CADS SNOWBOARD INSTRUCTOR MANUAL

CANADIAN ADAPTIVE SNOWSPORTS
SPORTS DE GLISSE ADAPTÉS CANADA

VISION

CADS is recognised nationally and internationally for its leadership in alpine adaptive snowsports

MISSION

CADS provides opportunities for people with disabilities to experience the joy of participating and competing in alpine adaptive snowsports through partnerships, training and instructor certification programs.

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INTRODUCTION

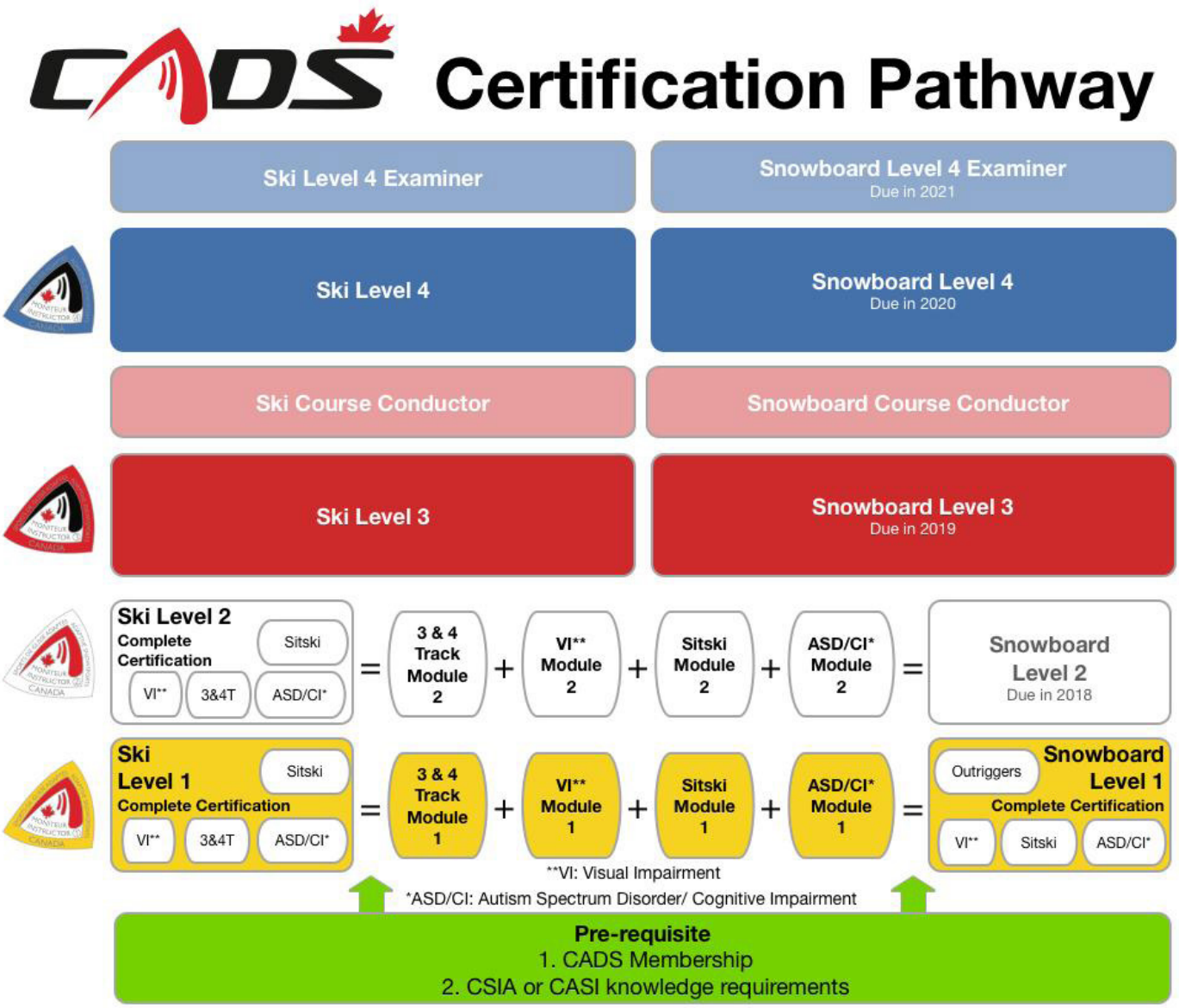
This manual represents the time, effort and passion of many individuals over decades, all dedicated to inclusion in snowsports. Adaptive Snowboarding is an emerging and growing sport, which offers opportunities for people of diverse abilities to enjoy sliding on snow.

Canadian Adaptive Snowsports (CADS) presents this manual as a valuable tool to enable instructors to provide quality lessons for students living with disabilities. It was made possible through important partnerships with the Canadian Association of Snowboard Instructors (CASI) and Canada Snowboard (CS).

Using the CASI QuickRide Progression as a foundation, CADS has built adapted progressions to provide a solid pathway for teaching to the strengths of individuals attempting a new sport, improving their skills, or adapting to life changing circumstances. Whether racing to the podium, or shredding on a sunny afternoon, the CADS Snowboard manual will help instructors provide safe, fun and inclusive lessons for all.

CADS CERTIFICATION SYSTEM

The CADS certification standards are developed by the CADS technical Committee (TC) and reviewed by key stakeholders, including the CADS National Board of Directors. The certification standards for all levels represent knowledge and competency standards relative to the CADS Snowboard instructor manual. The standards provide the basis for a program of training for potential and existing volunteers and instructors. The standards for certification are based on knowledge, teaching ability and riding competencies as outlined in the training and examination materials. The proposed certification pathway for snowboarding is based on the CADS ski certification pathway and is under development as the graphic shows.



WORDS WITH DIGNITY

CADS instructors work with students of all abilities. It is important to treat people with dignity and respect at all times. Here are some respectful words to use as recommended by the Active Living Alliance for Canadians with a disability (www.ala.ca), The following terms are suggested to describe persons with a disability. Remember, appropriate terminology is different in different communities and changes over time. How people identify is often a personal preference. If in doubt, ask.

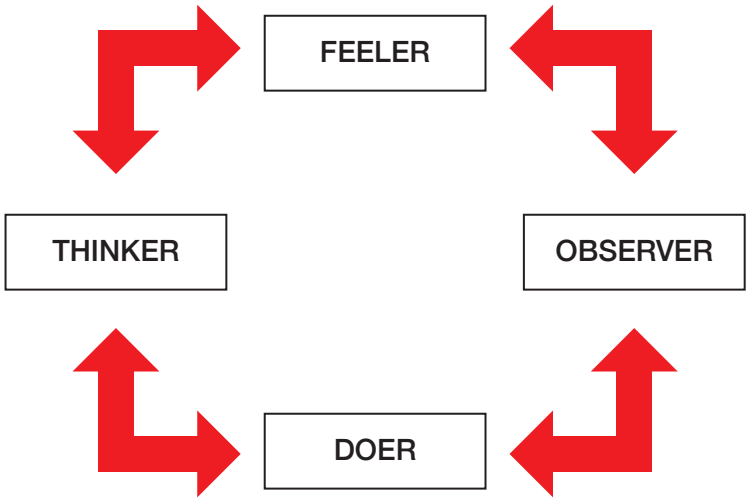
Follow this link for more information: https://ala.ca/words-with-dignity/

INSTEAD OF...	USE...
Disabled, handicapped, crippled	Person/people with a disability/ies
Crippled by/afflicted/suffering from/deformed	Person who has...or, Person with...
Lame	Person who has a mobility impairment
Confined, bound, restricted to a wheelchair	Person who uses a wheelchair Wheelchair user
Deaf and dumb, deaf mute, hearing impaired	Person who is...deaf...hard of hearing
Retarded, mentally retarded	Person with a cognitive impairment Person with a developmental disability Person with an intellectual disability
Spastic (as a noun)	Person with cerebral palsy
Physically challenged	Person with a physical disability
Mental patient, mentally ill, mental, insane	Person who has a mental illness Person who has schizophrenia Person with/person who has,,,
Learning disabled, learning difficulty	Person with a learning disability
Visually impaired, blind	Person with a visual impairment Person who is blind

FOUR LEARNING STYLES

A learning style is the way a person's sensory, memory, perceptual, decision-making, and feedback mechanisms operate as they acquire new information or skills.

Each individual is unique with their own abilities, knowledge, attitudes, past experiences, personality, etc. The same applies to dominant and non-dominant learning styles. Some individuals have a dominant style; others are comfortable with more than one style. There are four main types of learning styles: Doers, Watchers, Thinkers and Feelers. Most people learn best through a combination of the four types of learning styles.



DOERS

- This individual is practical and wants to experience a new task on the spot rather than hear about it.
- Action oriented: This individual prefers to do, rather than think and would also prefer risky activities rather than routine activities.
- This individual learns by trial and error… regardless of what the instructor may say. This type of individual will not respond very well to a teaching method using elaborate and wordy descriptions.
- Use pictures and action words or use another person to demo… while the student observes; focus on the main objectives keeping verbal commands minimal and simple.
- At the end of the exercise, refer back to the objective even if the task was not met. Many of these individuals may lose their concentration if there are too many details.
- Experiential learning is an efficient method for the Doer. To be efficient, this method should include the following components:
    - Active involvement in the experience;
    - Reflection on the experience;
    - Analysis of the experience
    - Use of decision-making and problem solving skills in the experience
    - Safe environment to practice skills learned from experience

OBSERVER

- This type refers to "visual learners".
- This individual learns best from visual demonstrations.
- They will watch and then try to imitate your actions, but likely will let others in the group go first so as to observe more.
- If there is a need to explain without demonstration, use verbal images or video demonstration.
- Videotaping the student's effort on the slope can make them aware of what they are doing. If using video, make sure to have a good demonstration to refer to. Be positive – point out good results and introduce changes by suggesting they try something different.
- This individual will definitely benefit from taking action immediately after a demo from the instructor….

THINKERS

- This type refers to “auditory learners”.
- This individual learns by auditory instruction and thrives on clear and concise descriptions. They typically like to know the “why” of the new information or task they are given.
- Use a specific body segment to explain what the individual is to achieve. Focus on specific muscles (contraction / relaxation) or joints (pressure).
- Thinkers need to analyze the situation before trying it. Ask questions to help the thinker further process and verbalize their understanding.
- Individuals in this category like to be involved in the problem-solving process, using their cognitive abilities.
- Individuals in this category may display anxiety; by better understanding what they have to do, it decreases their stress and helps them succeed.
- Have the student prepare as racers do before a race: concentrate on the drill they are about to perform by visualizing what their body is about to do.

FEELERS

- This type refers to “kinesthetic learners”.
- This individual learns through intuitive yet concrete experiences and processes information by how they physically feel.
- They learn best through active learning sensations combined with a good description and a demo.
- The instructor should work with the student's physical sensations as they perform the instructed task.
- The instructor will lose the individual’s interest if instructions become too analytical.
- The instructor needs to plan concrete drill exercises to develop specific abilities / movement patterns.
- This type of learner can easily transfer earlier acquired skills into snowboarding.

SAFETY AND RISK MANAGEMENT

When you, as a snowsports instructor, agree to undertake the instruction of a person, whether that persons is an adult or a child, you enter into a special relationship with that individual, out of which the court will impose upon you a duty of care for the safety of that student. This duty of care commences when you first meet your student at the start of the lesson and does not end until the lesson is completed. The Duty of Care guideline is presented in below.

DUTY OF CARE

It is very important to bear in mind that, in the eyes of the law, your role as an instructor is not simply to educate your student on the finer points of snowsports, but rather act as a knowledgeable, responsible, and vigilant guide to the student while on the mountain. An instructor must teach in strict accordance with the Alpine Responsibility Code, and ensure that the student under supervision is skiing or riding in full compliance with the code, as well as understands the reasons for doing so. The instructor must exercise great judgment in selecting the terrain upon which the lesson will take place, to ensure that it is commensurate with the student’s ability and minimizes the risks arising from natural hazards. The Alpine Responsibility Code is presented in below.

SAFETY AND LIABILITY CONCERNS

Safety and liability concerns are part of every operation at a ski resort. Snows ports instruction carries its own set of risks and responsibilities. Recognition and avoidance of risk is the first step. Instructors should be aware of ski area layout and equipment as well as traffic patterns. Monitor and consider conditions constantly. Use your best judgment to avoid situations that could put your students at risk. If you find yourself in situations that are inappropriate for your students, use your knowledge to reduce the risks and guide your students to safety.

In case of an accident, know and respect snow school and resort policies. The general guideline presented here is superseded by your resort's policy.

1. Stay with the injured person. Reassure and make them comfortable, but do not move them unless there is a high risk of further injury or death, in which case you must assure your own safety and then remove the injured person from further danger.
2. Notify ski patrol immediately by sending a blocker, volunteer/helper, or passing skiers, to the bottom of the closest lift. Be sure they know how to get to the lift and that they can describe the location and nature of the accident.
3. If you are with more than one student, keep the group together. If your students are adults, you can arrange a meeting place for later. However, it is generally preferred to keep everyone together.
4. Take note of the following:
    - The details relevant to the accident
    - Time and location
    - Conditions and visibility
    - How the accident occurred
    - Instructors' and students' relative location at the time of the accident. Note measurements if appropriate. If another party is involved, keep them at the scene and note their name and contact information. If there are witnesses, keep them on the scene and ask them to make a statement to ski patrol. Note any relevant information in regard to your instructions to the class and the injured party's response to your instructions.
5. Fill out required accident reports for the snow school, ski patrol and CADS insurance company. Follow up with patrol to see what the injury was and what steps were taken.
6. Do not make any statements or speculations on the accident. Refrain from judgments and comments.

INSTRUCTOR ETHICS & RESPONSIBILITIES

DUTIES

- Support personnel and partner organizations
- Provide up-to-date CADS instruction
- Attend CADS professional development and training sessions when available
- Demonstrate exemplary professional behavior at all times on or off the hill
- Be empathetic with participants and other CADS instructors
- Be respectful when dealing with problems
- Be responsible

PROFESSIONALISM

- Provide a consistent professional image
- Adopt appropriate personal grooming and appearance
- Dress appropriately in clothing that is clean and in good condition
- Maintain a positive, can-do attitude
- Be punctual at all times
- Show respect for participants and peers
- Maintain a knowledge of resort policies
- Be fully aware of the power in relationships between course conductor and participant. Avoid sexual intimacy or sexual harassment by yourself and others

SAFETY AND RESPONSIBILITY

- Be fully versed in the Duty of Care
- Know and utilize the Alpine Responsibility Code
- Practice safety at all times and know the procedure for handling accidents
- Be fully aware of liability issues

TEACHING EFFECTIVENESS

- Fully understand your role
- Utilize effective communication--verbal and non verbal
- Understand the four learning styles--watcher, thinker, feeler, doer
- Understand Motor Learning and the teaching implications
- Set attainable goals and objectives
- Fully utilize AOT and then on hill assessment for development in each discipline
- Utilize terrain and tactics to ensure development
- Utilize mileage, not talking, for improvement
- Provide constant positive feedback
- Utilize techniques such as Whole/Part/Whole and Guided Discovery for success

CODE OF CONDUCT

RESPECT FOR PEERS AND PARTICIPANTS

- Act in a manner respectful to all participants
- Provide feedback to participants in a caring sensitive manner
- Respect individuality and refrain from intruding in personal affairs
- Treat all participants in an equal manner regardless of race, athletic potential, colour, religion, political belief, social status, sexual orientation, place of origin, gender expression, or gender identity.
- Empower participants to be responsible for their own behaviour, performance, and decisions
- Keep information for each participant confidential both verbally and in written form

TEACHING RESPONSIBILITY

- Teach safely, with the best interest of all participants in mind
- Keep up-to-date with relevant information
- Be aware of your personal attitudes, beliefs, and values and how they may affect your actions as a CADS Instructor
- Do not assume responsibilities outside of your training
- Do not compromise safety.
- Apply every reasonable effort to help the participant achieve success
- Be fully aware of power in teaching relationships between the instructor and the participants
- Avoid sexual intimacy with participants. Zero tolerance.
- Abstain and hold intolerable all forms of harassment, including coercion to engage in sexual activity, sexually suggestive comments, gestures, or touching that are unwelcome, offensive, intimidating and harmful

INTEGRITY

- Be honest, sincere, and honorable in relationships with others
- Accurately represent your teaching qualifications, competencies and affiliations
- Declare conflicts of interest
- Avoid discrediting specific ski or snowboard equipment manufacturers, CADS equipment manufacturers, sponsors, suppliers or industry partners

HONORING SPORT

- Promote the value of sport for all individuals and partners.
- Be a positive role model by maintaining the highest standard of personal conduct and image in personal skiing/snowboarding and teaching skiing/snowboarding in the CADS setting
- Promote co-operation with ski schools, resorts, public and other participating groups that promote skiing/snowboarding
- Respect the efforts of others
- Respect the resort and, in particular, do not take any privileges given as a right and do not abuse them or cause embarrassment to any instructor or resort personnel

THE ALPINE RESPONSIBILITY CODE

CADS instructors are responsible for following the Code and teaching it to their students.

ALPINE RESPONSIBILITY CODE

THERE ARE ELEMENTS OF RISK THAT COMMON SENSE AND PERSONAL AWARENESS CAN HELP REDUCE. REGARDLESS OF HOW YOU DECIDE TO USE THE SLOPES, ALWAYS SHOW COURTESY TO OTHERS. PLEASE ADHERE TO THE CODE LISTED BELOW AND SHARE WITH OTHERS THE RESPONSIBILITY FOR A SAFE OUTDOOR EXPERIENCE.

1. *Always stay in control. You must be able to stop, or avoid other people or objects.*
2. *People ahead of you have the right-of-way. It is your responsibility to avoid them.*
3. *Do not stop where you obstruct a trail or are not visible from above.*
4. *Before starting downhill or merging onto a trail, look uphill and yield to others.*
5. *If you are involved in or witness a collision or accident, you must remain at the scene and identify yourself to the Ski Patrol.*
6. *Always use proper devices to help prevent runaway equipment.*
7. *Observe and obey all posted signs and warnings.*
8. *Keep off closed trails and closed areas.*
9. *You must not use lifts or terrain if your ability is impaired through use of alcohol or drugs.*
10. *You must have sufficient physical dexterity, ability and knowledge to safely load, ride and unload lifts. If in doubt, ask the lift attendant.*

Know the Code - Be Safety Conscious
It is Your Responsibility

CWSAA
Canada West Ski Areas Association

10/2010

CANADA SNOWBOARD

Para LTAD PAthway

The desired future for para-snowboarding in Canada is for athletes with all forms of disabilities to be able to participate and develop a passion for snowboarding while progressing through a clear pathway with a high degree of support in every stage of development.

To achieve this desired state, Canada Snowboard has identified four areas of development to fully integrate para-snowboarding within Canada Snowboard operations supporting our strategic pillars and delivering developmentally appropriate programming to participants in all stages of development.

AWARENESS & FIRST INTERACTION

QUALITY PROGRAMS

INCREASED OPPORTUNITY

MEANINGFUL COMPETITION

These actions require collaboration between Canada Snowboard, Provincial/Territorial Snowboard Associations, Clubs, the Canadian Adaptive Snowsports Association, Facilities and other partners, but will only be achieved by all partners working together.

Park to Podium, Canada Snowboard's (CS) Long Term Athlete Development (LTAD) Plan set the stage for Canada Snowboard's development of a LTAD for para-snowboard. The LTAD model should be a starting point for ALL athletes and an 11th key factor to effective LTAD implementation was added by adapting the 10 Key Factors for Athletes with a Disability.

Long Term Athlete Development - Para Snowboard

Long term athlete development provides a framework to guide the development of para-snowboarding programs. It informs athletes, parents, coaches, officials, administrators, event organisers and facility operators with regards to the specific characteristics and development considerations when developing programs and provides a framework for making decisions with regards to training, competition and recovery.

Based on the Canadian Sport for Life, 7 stage LTAD model and supplementary resources for athletes with a disability, Canada Snowboard's 8 stage model and this supplementary document outlines the specific considerations for para-snowboarding.

8 Stages of the LTAD Framework

01
ACTIVE START
AGES 0-6

02
FUNdamentals
AGES 6-9

03
LEARN TO RIDE
AGES 8-12

04
TRAIN TO TRAIN
AGES 12+

05
TRAIN TO COMPETE
AGES 14-16+

06
LEARN TO WIN
AGES 17-18+

07
TRAIN TO WIN
AGES 20-24+

08
ACTIVE FOR LIFE
ANY AGE

Snowboarding is a relative newcomer to the adaptive and para sport field. Adaptive activities, led by participants with disabilities and with increasing support and expectations from society, are a growing part of Canadian sport. People who have become disabled and others who were born with a disability may want to be a part of the snowboarding community.

Approximately 3.8 million (13.7%) of Canadians reported having a disability in 2012, 4.4% of whom are between the ages of 15 and 24 and 6.5% between the ages of 25 and 44[1].

Snowboarding can be an appropriate and meaningful way for them to be active for life and competitive at an international level. It is crucial then that all Canadians be provided with opportunities to fully engage in physical activity.

Canada Snowboard has been instrumental in adding para-snowboarding to the Paralympic program and the development of the para-snowboarding world championships. Canada Snowboard is leading the charge to develop opportunities in Canada and around the world.

To continue this leadership, Canada Snowboard has developed a Para LTAD that builds upon the Park to Podium Long Term Athlete Development Pathway, the Canadian Sport for Life Long Term Athlete Development 2.0 and No Accidental Champions (2nd edition) resource papers to identify specific athlete development considerations for the development of para-snowboarding.

Building the system will require collaboration and investment by stakeholders at all levels of the sport to increase capacity and create a culture focused on inclusiveness and providing opportunities for all.

The PARA LTAD can be accessed online by visiting: https://www.canadasnowboard.ca/en/about/snowboarding/paraltad/

CASI ACMS

CH.1: CASI REVIEW

CASI REVIEW

Teaching Beginner Snowboarders

CHOICE OF TERRAIN

The choice of appropriate terrain for teaching beginners is crucial. For safety, choose a gentle slope, wide enough to accommodate both your student and the other people on the hill. It should be free from distractions, dangerous intersections and blind spots, and should be well groomed without ice or bumps.

Choose terrain that has the right degree of slope for the student's ability level--terrain that is steep enough to allow for sideslipping, but not so steep that there is any risk of the student gaining excessive speed. If the slope is right, the student will experience success and will gain confidence. Look for a slope with a single fall line.

The QuickRide System

Teaching beginners is a continuous decision-making process. Your actions will be determined by what you see in your students' progress. Don't be afraid to change your approach if things aren't working! The number one goal for CADS instructors is to keep students safe. It is also really important to introduce your students to snowboarding in a positive and fun way, and have your students return to snowboard with you again.

The goal of the QuickRide System is to create mobility, control, and enjoyment on the snowboard as quickly as possible. Your student and situation will ultimately determine your approach; however, the progression is laid out in a series of five phases. The five phases of the QuickRide System, and their corresponding goals are:

THE QUICKRIDE SYSTEM

STEPS	STUDENT'S GOAL
1. BASICS	To learn to use the equipment, and gain comfort moving around on the snowboard with one foot attached.
2. SLIDING	To become comfortable standing on the snowboard while it is sliding.
3. CONTROL	To learn to control both speed and direction with both feet attached to the snowboard.
4.TURNING	To learn to turn (changing edges in the fall line).
5. FLOW	To learn to explore the mountain safely.

Using Hands-On Assistance

We must remember that we want our students to be self-sufficient on their snowboards. However, being ready to offer your help is an important part of avoiding crashes and potential injuries. Not all students welcome, or need, hands-on assistance. Remember the following:

- ASK before providing hands-on help.
- Be mindful of HOW you are providing assistance.

Flatter terrain, balance aids, and benches to assist in strapping in are all potential tools to help the student become self-sufficient.

***NOTE:** *Available tactics are meant to support the development of the goal of each stage of the QuickRide System. Keep in mind, the tactics as presented create a clear building block progression to learning. However, some students will not require all of the tactics, and some will require steps to be broken down even further. A good instructor will know how and when to speed up or slow down the progression to match the student's abilities.*

The S.A.F.E. Concept

When presenting new manoeuvres or movements, the S.A.F.E. approach will provide a progression for effective presentation. The S.A.F.E. acronym stands for:

STATIC (SKILL DEVELOPMENT MODEL: INITIATION)

When introducing a new movement, have students visualize/feel the sequence of movements on flat ground.

ACTIVE (SKILL DEVELOPMENT MODEL: ACQUISITION & CONSOLIDATION)

Students learn by doing – give a tactic or manoeuvre to try. During the initial trials, pay close attention to the terrain and situation to help ensure success.

FREE (SKILL DEVELOPMENT MODEL: REFINEMENT)

Focused mileage and practise. During this stage, mileage is the key. Allow students to practise, and allow them to make mistakes--just ensure that positive feedback/correction is given when mistakes are made.

EXPERIMENTATION (SKILL DEVELOPMENT MODEL: CREATIVE VARIATION)

Change the situation to encourage adaptation--vary the terrain, speed or movements. Remember, beginner snowboarders are acquiring the necessary movement patterns and working up to linking turns. Don't expect perfection, but rather focus on mileage and practice. People learn by doing!

The QuickRide System Overview

GOALS	KEY CONCEPTS	AVAILABLE TACTICS
BASICS: To learn to use the equipment, and gain comfort moving around on the snowboard with one foot attached.	EQUIPMENT MOBILITY	• Introductions • Equipment: Parts of the Board • Attaching the Front Foot • Equipment Familiarity and Mobility • 'The Neutral Position' • Skating • Climbing and Descending
SLIDING: To become comfortable standing on the snowboard while it is sliding.	STRAIGHT RUNNING	• 'Push-Push-Glide' • Straight Running • Experiment With Varied Body Positions • Toe/Heel Drag • J-Turns
CONTROL: To learn to control both speed and direction with both feet attached to the snowboard.	SIDESLIPPING PENDULUM	• Intro to Edging (Gas Pedal Exercise) • One-Foot-Attached Sideslipping • One-Foot-Attached Pendulum • Attaching the Board on a Slope • Sideslipping (two feet attached) • Pendulum (two feet attached) • Power Pendulum
TURNING: To learn to turn (changing edges in the fall line).	BEGINNER TURNS	• Static Rotation Exercise (board on or off) • Garland Exercise/'Chicken Turns' • J-Turns (revisit from step 2) • Walking Through Turns • Beginner Turns
FLOW: To learn to explore the mountain safely.	NOVICE TURNS	• Add Traverse Between Turns • Traverse With Flexion/Extension • Sliding 360s • Novice Turns (flex after fall line) • Speed Control: 4 S's (Speed = Shape + Size + Slope)

BASICS

The first step in the progression is to develop familiarity with equipment and mobility with one foot strapped to the snowboard.

INSTRUCTOR INTRODUCTION

Your introduction should be brief. It should not take more than a minute. Its purpose is to inform, reassure, and to set the mood for your student.

EQUIPMENT / SAFETY CHECK

The equipment your students use will be a significant factor in their ability to learn. Equipment factors to consider are:

- Boots should provide good ankle support and offer some forward flexibility. They should be comfortable, and should be tightened enough to avoid excessive foot movement. Check that your student's boots fit properly and are done up.
- The snowboard should be suited to the size, weight and boot size of the student and should be appropriately tuned for slow, sliding turns. Boards with top sheet traction, as well as a bevelled base profile are ideal. Also, bindings set to +9/-9 degrees work well for beginners. Check that your student's board is set up correctly, with bindings centred between the toe and heel edges, and all hardware is tight.
- The student should be dressed appropriately for the day's conditions. A helmet is definitely recommended.

EQUIPMENT

To enhance efficient communication, the following terms should be introduced and used throughout the lesson:

- The Toeside: The side of the board where the toes are positioned.
- The Heelside: The side of the board where the heels are positioned.
- Nose of the board (or Tip): This is the end of the board that is closest to the front foot.
- Tail of the board (or simply Tail): The end of the board that is closest to the back foot.
- Base: The bottom of the board--the part that slides on the snow.
- Bindings: High-backs, base plates, heel cup, ankle strap and toe strap.
- Goofy-Foot: When you prefer to have your right foot as the leading foot, you're a goofy-footed snowboarder.
- Regular Foot: When you prefer your left foot as the leading foot, you're a regular-footed snowboarder.

GOOFY OR REGULAR?

When determining whether a student should stand goofy- or regular-footed, there are a few options to try to test this:

- Have them envision sliding on a patch of ice. Many students will lead with their natural lead foot.
- Ask them which foot they would likely kick a soccer ball with. Most students will place their stronger foot (their kicking foot) at the back of the snowboard.
- With students standing facing away from you and feet together, give them a light push, forcing them to take a step. Many times, the foot that steps out first to stop the fall will be the front foot.

Keep in mind that often these tests will not yield a clear front and back foot, and experimentation might be needed during the first lesson. When in doubt, you'll need to make an educated guess and adjust from there as the student becomes more comfortable.

ATTACHING THE FRONT FOOT

The first step is to try to determine the forward foot. Any previous experience surfing, skateboarding, water- skiing or other similar activity will help the student to decide which foot should go forward. Let the student determine which stance feels more comfortable.

Be creative, but be efficient also. Many students won't know whether they are goofy- or regular-footed until they have tried both. Have the student strap in their chosen front foot, and offer assistance when necessary. They may decide later that they have the wrong foot forward.

When attaching the board, the following sequence should be respected:

- Remove the snow from the bottom of the front boot and from the front binding, and place the front foot in the front binding.
- Attach the ankle strap of the forward binding snugly so that the heel of the boot rests firmly against the back of the binding, in the heel cup.
- Attach the toe buckle snugly.

EQUIPMENT FAMILIARITY & MOBILITY

With the front foot attached to the board, have the student experiment with various challenges:

- Sliding the board back and forth
- Balancing on one foot (both the attached and free foot)
- Turning in circles – pushing and pulling the board in clockwise and counter-clockwise directions
- Stepping the rear/free foot from the toeside to the heelside--try with eyes closed and open
- Lifting the board up with the front leg in front of the body; lifting the board behind the body.
- Taking small hops with the back foot placed against the back binding.

Each of these tasks will help the student become familiar with the snowboard and get to know their equipment.

The Neutral Position

The neutral position is an athletic stance common to most sports. This position is stable and allows for quick reaction.

EXPLANATION

On a snowboard, this is a neutral position:

- Feet approximately shoulder width apart
- Ankles, knees and hip joints slightly flexed
- Arms to the side and slightly forward
- Feet, knees, hips and shoulders aligned at the same angle as the feet on the board
- Head up and facing the direction of travel
- Muscles alert, yet relaxed

Note: It's important to note the role of equipment set-up and its influence on the neutral position. Binding width and stance angles will affect the student's ability to maintain a natural position on the snowboard. For beginners, CASI recommends starting with a stance width slightly wider than shoulder-width and bindings set at angles of approximately +9 degrees on the front foot, and -9 degrees on the back foot. Once the student is linking turns, this stance may be altered to be more 'directional'--oriented towards the nose of the board (e.g. +18/-6).

DEMONSTRATION

On flat terrain, with the front foot attached, assume the neutral position. Place emphasis on this position as a 'ready' position. The rear foot should not be strapped in, but placed on the board against the back binding.

KEY WORDS: Neutral Position

- Joints slightly flexed
- Equal weight
- Head up
- 'Ready' position

Skating

Movement of the snowboard on flat terrain requires skating strides.

EXPLANATION

What: Moving around on flat ground with one foot attached to the snowboard.
Why: To get from point A to point B, and to be mobile with the board attached.
How: Starting from a neutral position, orient the head and eyes in the direction of travel, toward the nose of the board. Place the back foot on the snow either on the toeside or the heelside of the snowboard, with the front leg slightly bent. Take a small pushing step with the rear foot, and allow the snowboard to slide on the base. Repeat these small steps.

DEMONSTRATION

On flat terrain, do a series of small steps. Do a simple turn by lifting the board and pivoting around on your free foot. Repeat the steps back toward the student.

STUDENT TRIAL

Have the student skate back and forth. Ensure the student tries skating with the rear foot on both the toeside and heelside of the snowboard.

FEEDBACK

Key points to look for:

- Neutral position--eyes up, arms relaxed, joints flexed
- Weight distribution--changes from front foot to pushing foot and back
- Edging--used as needed, according to terrain/slope/snow

KEY WORDS: SKATING

- Upper body aligned with board tip and tail
- Looking forward
- Balanced on front foot
- Small steps between bindings

Climbing/Descending

In addition to moving on flat terrain, students will sometimes have to climb up or down small inclinations.

EXPLANATION

What: Moving up and down a slope with the snowboard across the fall line.
Why: To assist in negotiating varying sloped terrain with one foot attached to the board.
How: Climbing

- Start in a basic standing position with the front foot attached, facing up the slope, and the free foot uphill above the toeside of the board.
- Extend the front ankle and knee to engage the toe edge of the board.
- Take a medium-sized step up the hill with the free foot.
- Follow by taking a small step with the attached foot, lifting the snowboard. Engage the edge into the snow to prevent slipping backwards.

How: Descending

- Start in a standing position, facing down the slope, with the free foot uphill on the snow.
- Flex the front knee and ankle to engage the heel edge into the snow.
- Take a step downhill with the snowboard and follow with the free foot, lifting the board.

DEMONSTRATION

On a gentle slope, do a series of uphill steps. Turn around and descend the hill by stepping downwards.

STUDENT TRIAL

Direct the student(s) to practise stepping up (and down) the hill. Choose a formation that will not interfere with skier/rider traffic.

FEEDBACK

Points to look for:

- Board perpendicular to the fall line
- Neutral position, looking in the direction of travel
- Adequate edging to prevent slipping

KEY WORDS: CLIMBING/DESCENDING

- Face uphill/downhill
- Board across fall line
- Edge snowboard to grip snow
- Big step with the board, small step with trailing foot

SLIDING

The second step in the progression is to help the student gain comfort on the snowboard while it is sliding on a flat base.

Straight Running

This exercise introduces the student to using the neutral position while sliding, as well as the sensation of moving down a slope. It helps to build confidence through repetition on a slight grade or incline.

Remember to use the S.A.F.E. approach, to ensure the student accomplishes their goal safely and successfully.

EXPLANATION

What: Sliding down a slope with one foot attached to the snowboard.
Why: To gain comfort and balance on the snowboard.
How:

- After climbing a slight incline, turn so that the nose of the board is pointing down the slope, with thebase flat on the snow, in the fall line.
- Place the free foot in the snow to stop you from sliding.
- Look down the slope and when ready place the back foot on the snowboard (against the back binding) to begin sliding.
- Maintain the neutral position while sliding with knees slightly flexed, eyes looking forward, and arms comfortably to the sides.
- As the terrain flattens and the speed reduces to a stop, step off of the board and skate to a safe area.

DEMONSTRATION

Perform each of the above steps as explained on terrain that allows you to come to a stop naturally. Remember, you are trying to build your student's confidence and they do not know how to stop yet!

Note: Terrain choice is key--if your first demonstration goes any further than four to five metres, or if you are forced to use your foot to stop yourself, the incline is too steep. Look for terrain that has a slight slope with a single fall line, followed by a flat area or even a slight up-slope incline to help stop. Be aware of snow conditions; speed may vary.

STUDENT TRIAL

Have the student follow after each demonstration.

FEEDBACK

Points to look for:

- Board sliding flat on the base (have student feel their foot flat in the boot).
- Neutral position, looking in the direction of travel, with the shoulders in line with the snowboard--not rotated toward the nose.
- Weight distribution even over both feet--a common occurrence is leaning back on the rear foot.

KEY WORDS: STRAIGHT RUNNING

- Place board in fall line
- Back foot against back binding
- Look ahead
- Neutral position

OTHER SUGGESTED TACTICS:

Push-Push-Glide: *Start with a small skate, or push, to increase the sliding speed as the student becomes more comfortable. Add a second push to build some speed, and then place the free foot against the back binding and enjoy the glide!*

Experiment With Various Body Positions:

- *Fore and aft balance (front foot/back foot movement)*
- *Lateral balance (towards the toe and heel edges)*
- *Rotational balance (upper body rotation)*
- *Vertical (tall and small positions)*

Toe/Heel Drag: *While sliding, have the student move the free foot slightly off of the snowboard, on either toe or heelside, and gradually drag it in the snow. This will help with stopping, and cause a slight change in direction.*

J-Turn: *As the student is sliding, have them slightly turn their head as well as hips towards the heel edge as they drag their heel in the snow. Their path of travel should follow a broad heelside arc as they do this, introducing them to the concept of rotation, and eventually turning. Ask them to try to turn until they stop on the heel edge. Try the same on the toe edge.*

CONTROL

The third goal of the QuickRide System is to give students control over their snowboard with it positioned across the fall line. By the end of this phase, they should be able to control their speed and their direction and use momentum to assist in this.

It may be helpful to separate this stage into two:

1. Introduction of speed and direction control with one foot attached, using the Gas Pedal, Sideslipping and Pendulum exercises.
2. Refinement of speed and direction control with both feet attached, using the Sideslipping, Pendulum and Power Pendulum exercises.

Introduction to Edging (The Gas Pedal Exercise)

With the Gas Pedal exercise, students are introduced to edge angle's effect on speed. Increased edge angle decreases speed, and decreased edge angle increases speed. This is done in a controlled environment on a relatively flat slope, where the apprehension of falling is minimized.

The Gas Pedal Exercise can be introduced on flat terrain, and simply illustrates how an edged board will slow and stop, while a flat board slides.

EXPLANATION

What: Introduction to edging and speed control.
Why: To gain control over the snowboard and our speed.
How: On flat terrain, lean slightly toward the heel edge. While leaning, flex the ankle and knee of the attached (front) leg, while flexing the muscle that runs up the shin. This will increase the edge angle on the heel edge. Relax the joints to flatten the edge angle. With the board flat, use the rear (unattached) foot to push the board and body forward. Edge the board to resist the push. Try this on both the heel and toeside edges.

STUDENT TRIAL

Have the student(s) experiment with this exercise on flat terrain.

KEY WORDS: GAS PEDAL/INTRO TO EDGING

- Front foot attached
- Lean body inside board slightly
- Flex the hip, knee, and ankle to increase/decrease edge angle

PROGRESSING FROM THE GAS PEDAL EXERCISE TO ONE-FOOTED SIDESLIPPING

When the student is comfortable with straight running, the toe/heel drag, and now the Gas Pedal exercise, we can use these skills to gradually introduce sideslipping. On mellow terrain (similar to straight running terrain) students may start by orienting the board across the fall line on the heel edge. Facing down hill with their rear (unattached) foot in the snow on the heel edge of the board for control, the student can begin to push the board downhill to slide on the heel edge. As they become more comfortable, they will allow the snowboard to slide, rather than pushing it. Ask them to feel equal weight on both the front and rear foot as they slide.

To control speed or stop, flex the ankle, knee and hip of the front leg (as in the Gas Pedal exercise). Allow the student the time and repetition to practise this on both the heel and toe edges. When sliding on the toe edge, the student will be facing uphill, and the rear foot will be positioned over the toe edge with the toes dragging in the snow. Once successful, the student should be able to achieve a smooth slide with the back foot resting against the back binding.

ONE-FOOT-ATTACHED SIDESLIPPING AND PENDULUM

As the student become familiar with the Gas Pedal exercise, they will naturally become more comfortable allowing the board to slide. Encourage them to experiment with sideslipping, placing the free foot against the back binding, and the heel (or toe) slightly off the board to assist with speed control.

Once they are sliding smoothly, have them start to move laterally across the slope by shifting weight over the foot in the direction they would like to travel, as well as allow that end of the board to move downhill slightly.

Having the back foot unattached gives students the option to step out away from the board, catching themselves if they happen to fall or catch an edge.

ATTACHING THE BOARD ON A SLOPE

Before continuing with sideslipping and learning to control direction, the student will need to have both feet attached to the snowboard. To accomplish this safely, keep in mind the following points:

- Place the student in an area free of excessive traffic; standing with the front foot attached, facing down the hill.
- Using the heel edge of the snowboard, students can dig a platform in the snow which will allow them to stand without sliding.
- Clear any snow from the rear binding and place the foot in the binding.
- Attach the ankle strap and then the toe strap.
- Be ready to help students--they may require assistance strapping in for the first couple of times!

ALTERNATIVE METHODS:

- Facing uphill, use the attached foot to dig in the heel (downhill) edge. Use this platform to strap in the rear foot. This method may be easier for the student in harder snow.
- Sitting on the snow. If the situation (terrain, snow conditions, physical ability) doesn't allow students to strap in while standing, ask them to sit on the snow facing downhill to strap in the rear foot.

HOW TO STAND UP

Standing up on the heel edge (facing downhill) can be difficult for some students. There are a couple of options that may help:

Option 1:

- Facing downhill, slide the hips close to the snowboard.
- Place the back hand on the snow next to the hips and reach forward and up with the other arm.
- In one quick motion, rock forward and stand quickly.
- It may be helpful to reach forward and grab onto the toe edge using this method.

Option 2:

- From the seated position, the student can roll onto their knees. Turning the snowboard at a 45 degree angle to the slope may help them roll.
- Once they are on their knees and facing uphill, it will be easier for them to stand and begin sliding on the toe edge.
- If students can perform a small turn, they can stand up on the toeside and immediately pivot the snowboard to the heel edge.

Sideslipping (two feet attached)

With their experience sideslipping with the rear foot out of the binding, the student should now be able to easily transition into sideslipping with both feet attached.

EXPLANATION: HEELSIDE SIDESLIPPING

What: Sliding on the heelside edge with both feet strapped to the board. The board is kept across the fall line as it slides down the hill.
Why: To begin to use our edges to control speed, and gain comfort sliding with both feet attached to the snowboard.
How: Begin facing down the slope, with both feet strapped to the snowboard. With weight evenly distributed over both heels, relax the ankles to begin sliding down the hill. Maintain a neutral position, arms out and within eyesight. To slow and stop, flex the hips and knees slightly (as if sitting down on a tall stool), and flex the ankles to engage the edge and slow the snowboard.

EXPLANATION: TOESIDE SIDESLIPPING

What: Sliding down the hill on the toeside edge with both feet strapped to the board. The board is kept across the fall line.
Why: To begin to use our edges to control speed, and gain comfort sliding with both feet attached to the snowboard.
How: Begin facing up the slope with both feet strapped to the snowboard. With weight evenly distributed over both feet and the eyes looking uphill, relax the ankles to begin sliding down the hill. Maintain a neutral position, arms out and within eyesight. To slow and stop, push the knees forward slightly into the slope to engage the edge and slow the snowboard. Feedback and positive reinforcement is always beneficial--especially here, since it is the first time that the student has both feet attached to the board!

DEMONSTRATION
Ensure the student is able to see your demonstration. Sideslip down the hill in front of them. Incorporate gentle stops every one to two metres.

STUDENT TRIAL
Have the student try this exercise. Remind them to check for oncoming traffic before heading out. Repeat the exercise until the student is relatively comfortable with it before moving on.

FEEDBACK
Look for and correct:

- Neutral position--eyes looking downhill, back tall, position relaxed, and arms controlled
- Weight distributed evenly to keep the board perpendicular to the fall line
- Sufficient edge angle to control speed
- Sufficient speed and momentum to aid balance

Other suggested tactics:

- Stop & Go, and Red Light/Green Light exercises encourage comfort stopping and starting.
- Ballerina/Cowboy analogy: On the toeside edge, have the student experiment with standing like a ballerina (with the ankles extended and on the toes). This position is unstable, and makes it hard to moderate the amount of edge used. Encourage them to stand like a cowboy, with the ankle relaxed and the weight centred over the balls of the feet. This 'cowboy' position is helpful on the heelside edge, encouraging a wide base of support with the knees, and weight distributed evenly over the snowboard.

KEY WORDS: SIDESLIPPING
- Board across fall line
- Neutral position with head up, eyes looking forward
- Arms relaxed in front of body
- Relax ankles to slide
- Flex hips, knees, and ankles to slow down

THE PENDULUM
The purpose of this exercise is to experiment with pressure distribution and its influence on direction and speed control.

EXPLANATION
What: Moving side-to-side in a diagonal direction on the snowboard.
Why: To learn to control and use our pressure distribution, and to control the side-to-side direction of travel.
How:

- Begin on either the heel or toeside edge, in a sideslip.
- Initiate the diagonal movement by shifting slight pressure to the foot in the direction you want to move, and directing the eyes across and down the hill.
- Focus on a target to ride to and slightly relax the ankle on the lead foot, causing the board's edge angle to reduce slightly. On the heelside edge, it may be helpful to relate to the Gas Pedal exercise--push on the left foot gas pedal to go to the left, push on the right foot gas pedal to go to the right.
- Allow the snowboard to slide in a diagonal sideslip, maintaining pressure on the lead foot (approximately 60/40 split between lead and rear foot).
- To stop, shift pressure back to even distribution over both feet, and resume sideslipping. Repeat in the opposite direction.

DEMONSTRATION
Demonstrations should be performed as close as possible to the student without jeopardizing their safety. The demonstration should consist of the following:

- Sideslip for approximately one to two metres.
- Increase pressure on one foot and relax the edge angle of that foot, causing the board to slide gently across the hill.
- Gently shift pressure to the other foot, causing the board to slow and sideslip.
- Repeat the movement going the other way, performing three to four pendulum movements.

STUDENT TRIAL

Toeside and Heelside Pendulum: Since this particular exercise allows the student to be more mobile, they must know exactly where to start and finish the exercise.

Have the student choose either their toe or heel edge to begin. Once comfortable with one edge, have them try the other, as they ultimately will need to learn both.

Feedback

Look for and encourage:

- Gradual transfer of pressure to help control direction
- Use of the ankle and/or knee to release the board towards the fall line
- Adjustment of pressure and edge angle to avoid stopping during direction changes
- Proper use of edge angle to assist with speed control
- Controlled body position (eyes looking forward, arms quiet, knees flexed)
- Neutral position with eyes looking forward and arms controlled and within eyesight--a tall, relaxed position
- Weight distributed evenly to keep the board perpendicular to the fall line

KEY WORDS: HEELSIDE PENDULUM

- Start in a sideslip
- Shift weight to left or right foot
- Relax ankle and push same knee downhill slightly to initiate traverse
- Look ahead!
- Equalize weight and increase edge to slow and stop

KEY WORDS: TOESIDE PENDULUM

- Start in a sideslip
- Shift weight to left or right foot
- Slightly lower same heel to initiate traverse
- Look ahead!
- Equalize weight and increase edge to slow and stop

The Power Pendulum

The Power Pendulum is simply an extension of the Pendulum exercise. The Power Pendulum will appear slightly different from the Pendulum, in that students should now be comfortable guiding the snowboard through an arced path, as opposed to the diagonal sideslip of the Pendulum.

EXPLANATION

What: The Power Pendulum is a means of moving side to side at higher speeds and with more board control. It is also a key manoeuvre in learning to turn, as we are allowing the board to pivot now.
Why: To learn to use rotation to assist with directional control.
How:

- Begin on either the heel or toeside edge, in a sideslip.
- Allow the nose of the snowboard to move down the hill by shifting pressure to the lead foot, and relaxing the ankle (as in the Pendulum). Also, incorporate a slight rotation of the hips and knees down the hill, which will allow the snowboard to travel more down the hill than across.
- As speed increases, flex the lead ankle and knee and rotate hips back up the slope. Feel the feet turning slightly in the boots to aid in steering. This will cause the snowboard to move more across the hill.
- Continue these movements to guide the snowboard uphill, and slow down.
- Repeat in the opposite direction.

DEMONSTRATION

As this exercise is simply a variation of the Pendulum, the demonstration should highlight the new aspect: The rotation of the core (incorporating the hips, knees, and feet), as well as the altered path of travel of the snowboard. The path of travel will resemble a falling leaf instead of a diagonal path across the hill.

Sideslip for approximately one metre. Increase pressure on one foot and slightly turn the core to guide the leading end of the snowboard down the hill (e.g.: regular-footed rider travelling to the left would move the left shoulder downhill to initiate rotation of the core). Allow the edge angle to flatten slightly by relaxing the lead ankle. This will facilitate downhill movement of the board. As speed increases, maintain front foot pressure, and rotate the body (and feet slightly) back up the hill, through the fall line. Repeat the movements going the other direction.

STUDENT TRIAL

Have the student experiment with the Power Pendulum, using varying amounts of pressure and momentum.

FEEDBACK

Have the student focus on using their eyes to guide them in the direction they wish to travel. Encourage them to connect the eyes, hips, and knees when rotating through the fall line. When rotating the body, ensure the student is rotating with the core, and feels their feet turning slightly in their boots to aid in steering--guiding the snowboard back up the hill.

Pressure shifting in this exercise is a more dynamic and continuous process, and therefore requires the student to be more comfortable balancing on the edge. Encourage students to use increased momentum (speed) to carry them across the fall line and back uphill.

POWER PENDULUM: PATH OF TRAVEL

As the student becomes more comfortable with the ability to move side to side, they may begin to experiment with momentum; specifically, allowing the snowboard to approach the fall line (increasing speed) and turning back uphill to control speed.

KEY WORDS: POWER PENDULUM

- Start in a sideslip
- Shift weight to left or right foot and rotate hips downhill
- Increase speed
- Rotate hips uphill to slow
- Equalize weight and increase edge to stop

The Power Pendulum is a great milestone in learning to snowboard – students can now control speed and direction, and will be mobile on most beginner/novice terrain. The Power Pendulum is the snowboarding equivalent of the skiing snowplow turn!

Turning

Turning represents the next major milestone in learning to snowboard, and everything that the student has learned up until this point will be used in turning. With the skills to complete a Power Pendulum, and some simple guidance, the transition to turning is a simple process.

Turning should be introduced with safety and clarity in mind. Use simple explanations, with visual cues, to explain the heel and toeside turns:

- **Heelside Turn:** Begins on the toeside edge, crosses through the fall line on a flat base, and finishes on the heelside edge.
- **Toeside Turn:** Begins on the heelside edge, crosses through the fall line on a flat base, and finishes on the toeside edge.

The S.A.F.E. concept is a recommended approach to introducing turning, and the student may require some assistance to start, as well as lots of time to practise and experiment. Choose the supporting tactics and exercises carefully, with your student's success in mind. Some students will pick up turning immediately, while others will take more time and assistance.

THE BEGINNER TURN

The Beginner Turn introduces the concept of changing edges to the student. Using all the skills previously learned, the student will now attempt their first edge changes in the fall line with the board pointing downhill.

EXPLANATION

What: Turning the snowboard
Why: To move down the mountain using both edges, giving us complete control over our direction.
How: Heelside Turn

- On the toeside edge (facing uphill), start to traverse across the slope, with slight pressure centred over the lead foot and the eyes looking forward in the direction of travel.
- Initiate the turn by rotating the head over the lead shoulder, and rotating the core toward the nose of the board.
- Begin the edge change by moving the lead knee in the direction of the turn (across the board), and allowing the board to flatten with slight flexion of the ankle. Feel the calf muscle press into the high back of the binding.
- Allow the snowboard to approach the fall line and slide on a flat base briefly.
- Continue to direct the board through the turn by rotating the knees and using the lead knee and ankle flexion to change from the flat base to the heel edge.
- The hips must continue to rotate through the turn in order to maintain an aligned and balanced position over the snowboard.
- Once on the heel edge, flex the lower joints (knee, ankle) to engage the edge in the snow. Complete the turn by looking ahead and equalizing the weight distributed over the feet. Sideslip as necessary to slow down.

How: Toeside Turn

- On the heelside edge (facing downhill), start to traverse across the slope, with slight pressure centred over the lead foot and the eyes looking forward in the direction of travel.
- Initiate the turn by moving the lead hip and knee down the hill. Slightly extend the lead ankle to relax the edge angle, allowing the snowboard to move toward the fall line.
- Rotate the hips to maintain upper body alignment (shoulders in line with the length of the snowboard) as the board moves through the turn.
- Allow the snowboard to approach the fall line, and slide on a flat base briefly.
- Continue to direct the board through the turn by rotating the hips and flexing the lead knee and ankle to engage the toe edge.
- Once on the toe edge, push the lead knee forward toward the snow to complete the turn.
- Control the finish by equalizing the weight distributed over the feet.
- Sideslip as necessary to slow down.

STUDENT TRIAL

Encourage the student to start with the heelside turn. Once one turn is completed, ensure the student has control of their speed prior to starting the next turn. Encourage repetition and mileage once the student is completing both the heel and toeside turns. For the student's first turns, a hands-on approach may be necessary (see the 'Dance' exercise below).

FEEDBACK

Look for and correct:

- Insufficient rotation of the core, or rotation of head/arms only. Focus on rotation of the core.
- Correct edge change sequence. Sequence should be starting edge--flat base--finishing edge.
- Weight centred over lead foot (approximately 60%). Shifting of pressure to the back foot in the fall line. Encourage continued front-foot pressure to turn completion.

KEY WORDS: BEGINNER TURNS (HEELSIDE)

- Sideslip on toe edge
- Shift hips to front foot and slightly inside turn (downhill)
- Rotate lead hip and knee toward nose of snowboard
- Allow board to flatten
- Flex ankle (toes up) to change edge
- Equalize weight and increase edge to slow and stop.

KEY WORDS: BEGINNER TURNS (TOESIDE)

- Begin with sideslip on heel edge
- Shift hips towards front foot and slightly inside turn (downhill)
- Move front knee over toes of front foot
- Allow board to flatten
- Push hips and knees inside the turn slightly to change edge
- Equal weight and increase edge to slow/stop.

BEGINNER TURN SHAPE

It is important to remember that the slope of the hill will have a direct impact on the shape of the beginner's initial turns, and on your demonstrations. For example, if the slope is very flat, the turn may become very long and utilize less sideslipping. On a steeper, narrower slope more sideslipping will be required between turns.

Introducing Turning: Other Suggested Tactics

Students may need some extra help grasping their first turns. The following drills or exercises may help.

1. THE STATIC ROTATION EXERCISE

To introduce the student to the movements required for turning in an environment free of consequence, have them remove their snowboard, and stand on flat terrain. As you explain the sequence of movements required for turning, have them try to feel the movements at the same time. Focus on the movements of rotation with the core to initiate, as well as the edging movements with the knees and ankles that will be key in performing their first turns. This exercise can be completed prior to walking through the turns, or as a form of correction.

2. GARLAND EXERCISE ('CHICKEN TURNS')

To introduce students to the initiation and completion of turns, have them begin in a traverse on either the toe or heel edge. Initiate rotation by moving the hips downhill slightly, and rotate the body as if starting a turn. As the snowboard approaches the fall line, reverse these movements and focus on rotation away from the fall line, and an increased edge angle to slow the snowboard.

3. J-TURNS

Revisit the J-Turn from the sliding phase of the QuickRide progression. Sometimes having the student move back in their progression is a great way to kick-start forward progress!

4. WALKING THROUGH THE TURNS

In order to relate the sequence of movements required for turning, students may find it beneficial to walk through a series of toe and heelside turns with the board off. This will allow them to visualize and prepare for the next step.

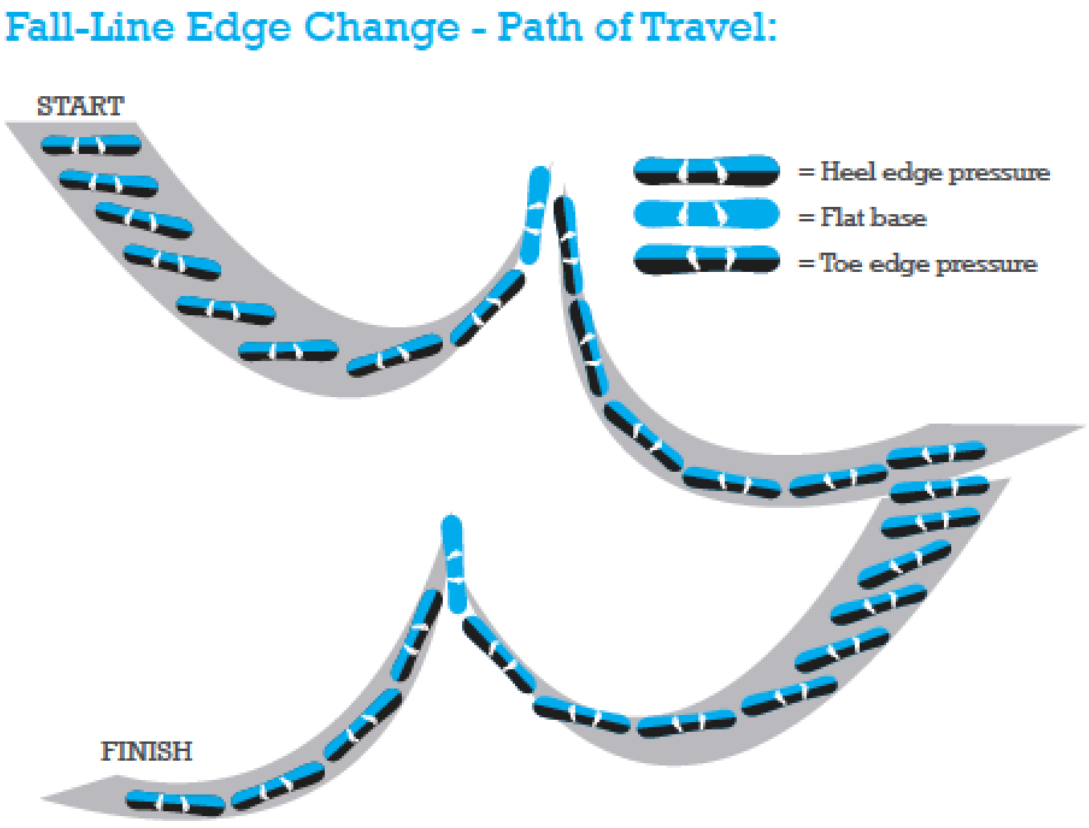
5. THE DANCE EXERCISE

The Dance exercise can be completed on nearly flat terrain. To assist with the student's first heelside turn, with your snowboard removed, stand behind the student (facing uphill and the student's back). Provide assistance by holding the rider's lead arm and trailing shoulder. Direct the student to begin the traverse and walk alongside them, verbally directing them through the movement of the turn. For the toeside turn, stand below the student, facing them, and walk them through the turn holding their hands or arms for balance.

6. THE MOUSTACHE (FALL LINE EDGE CHANGE)

The 'Moustache' is an exercise used to help the student learn to change edges, without the fear of accelerating in the fall line. It is also useful in getting the student to experiment with riding forward and 'switch' (with the opposite foot leading).

- Initiate movement in the same fashion as the Power Pendulum, allowing the snowboard to move into the fall line (downhill) slightly.
- Once sufficient speed and momentum has been achieved, have students rotate their core (as well as hips, knees, and feet) toward the uphill direction. Direct the eyes upwards, over the lead shoulder. As the snowboard turns uphill, speed will decrease.
- Have the student feel the base flat on the snow momentarily. As the snowboard begins to slide back downhill, have the student apply pressure to the opposite edge, and continue rotation to guide the snowboard across the slope.
- Hands-on assistance may be required to allow the student to successfully accomplish their first attempts. Position yourself uphill from the student at the point of their first intended edge change. As they approach you, hold their uphill (lead) hand to stabilize them as they feel the board flat on the snow. As they slide back downhill away from you, direct them to shift pressure to the new edge, and continue to look in the new direction.



With the snowboard off, you can have students walk through the intended path of travel during the FLEC, feeling the necessary movements of rotation, pressure shift, and edge change.

Hands-on assistance may be required to allow students to successfully accomplish their first attempts. Position yourself uphill from students at the point of their first intended edge change. As they approach you, hold their uphill (lead) hand to stabilize them as they feel the board flat on the snow. As they slide back downhill away from you, direct them to shift pressure to the new edge, and continue to look in the new direction.

FLOW

Once your student is able to complete both toeside and heelside turns, it's time to add some fluidity to their riding. Also, the addition of vertical movement will enhance stability at higher speeds. Finally, speed control through varying the shape and size of turns will allow the student to explore more of the mountain!

ADDING A TRAVERSE BETWEEN TURNS

Before beginning the Novice Turns, have the student practise exiting the turns by traversing across the slope, instead of a sideslip down the hill. As the student finishes the turn, have them focus on choosing a target at the side of the run and maintaining sufficient edge angle to keep the board moving across the slope.

Novice Turns

During the Novice Turn, the student will be introduced to flexion of the knees and ankles to assist in maintaining balance and enhancing stability while turning.

EXPLANATION

A Novice Turn is similar to a Beginner Turn, except it is done with flexion of the lower joints after the fall line, to help with stability at higher speeds, and to assist riders to link turns together fluidly.

What: A simple turn with flexion (bending) of the lower joints added.
Why: To help maintain balance and enhance stability in the later parts of the turn.
How:

- Perform a heel or toeside Beginner Turn, focusing on rotation of the core, and the initiation of edging movements with the knees and ankles.
- As the new edge is engaged (at or below the fall line), begin to flex the hips, knees and ankles to lower the Centre of Mass (COM) closer to the snow. Control the speed and direction of travel through flexion.
- Continue to traverse across the slope by maintaining 'edge grip', instead of sideslipping down the fall line, as in the Beginner Turn.
- Once under control, stand up to a normal body position and initiate the next turn.

DEMONSTRATION

By now, it will probably be difficult to restrain the students since they will be excited about applying their new skills and getting mileage and practice! Link three medium-sized turns followed by a stop. Exaggerate the movements of flexion after the fall line.

STUDENT TRIAL

Have the student follow your path and stop where you do. Make sure that they check for uphill traffic prior to starting. A follow-the-leader approach may be appropriate to continue this exercise afterwards and encourage mileage.

FEEDBACK

Provide plenty of positive reinforcement.

Look for and correct if necessary:

- Proper sequence of edging--all three phases.
- Neutral position. Smooth flexion as the board exits the fall line.
- Excessive speed caused by not edging across the fall line at the end of each turn, and not enough flexion.
- Encourage students to flex as a result of feeling increased speed and pressures after the fall line, as opposed to simply going through the movements of flexion.

KEY WORDS: NOVICE TURNS

- Begin in a traverse
- Shift weight to front foot and initiate beginner turn
- At fall line, flex hips, knees, and ankles to lower body position
- Traverse out of turn, return to neutral vertical position

OTHER SUGGESTED TACTICS

1. Traverse With Flexion: *Prior to asking the student to add flexion to their turns, have them practise a simple traverse across the slope, experimenting with up-and-down motion. Once this is developed, they will be able to add the movement of flexion after the fall line to their toe and heelside turns.*

2. Sliding 360s: *To further refine edge control and balance skills, you may have students attempt their first 360s (sliding on snow!). Ask student to initiate a heel or toeside turn as they would normally. At the completion of the turn, rather than traversing across the run, they will continue to rotate and allow the board to complete the second half of the rotation. Lowering the centre of mass will ensure stability in this exercise. Also, choose terrain carefully – flat enough to keep speed under control.*

2. Follow The Leader: *Encourage the student to attempt to follow your path, giving them opportunity to experiment with their turning.*

Speed Control

Increasing the amount of edge angle we use can reduce speed, but speed can also be controlled through turn shape and size.

SPEED = SHAPE + SIZE + SLOPE

This refers to the idea that a rounder, smaller turn will help to reduce speed on steep slopes. To increase speed, for example on flat terrain, a large, open turn is desirable.

Have the student experiment by trying to maintain the same speed over varying slopes. Ask them to identify what they had to change in order to make rounder or more open-shaped turns. What about small or large turns? A follow-the-leader approach can work well here.

KEY WORDS: SPEED CONTROL

- To reduce speed on steeper slopes, make rounder 'closed' turns.
- To increase or maintain speed on flatter terrain, create larger, more 'open' turns.

The QuickRide System is meant to provide you with a flexible progression--not all students need the same steps or tactics to learn to turn!

BASIC TEACHING METHODOLOGY

The priority for the instructor is to provide a safe and fun experience for the student. The instructor will attempt to engage the student and use situations, activities and exercises to provide a platform for the student to learn new skills. To achieve this, the instructor must possess the following skills and attitudes:

- An understanding of the information you want to transfer
- A positive attitude
- Effective communication
- Ability to analyze the student's abilities and performance
- Leadership in coaching and guiding your students

CASI PRINCIPLES OF LEARNING

An understanding of the Principles of Learning will also help the instructor to create valuable lesson experiences:

- Telling doesn't ensure learning
- People learn by doing
- What people do first, they learn best
- Small steps are the best way to learn
- Immediate feedback improves learning

CADS Teaching Strategies

1. The starting point for all decisions is the **learning contract** shared by the instructor and learner. By considering the learner's experience, objectives, and physical and psychological factors, the instructor builds student-centred activities tailored to each learner.
2. The **situation** is always a factor in decision-making. Terrain, conditions and a safe learning environment are constant considerations for the instructor. Naturally-occurring and man-made terrain features provide opportunities for **terrain-assisted development**.
3. **Motor skill development** guides the choice and use of activities. Through observation, the instructor determines tasks for the learner, decides how much repetition and practice time is needed, and uses their situational and technical knowledge to vary tasks for fun and learning.
4. **Learning activities** are built around snowboard objectives, prioritised according to the student's needs and changing situations.
    - **Basics** - to become familiar with the use of equipment and comfortable moving around on the snowboard with one foot attached.
    - **Sliding** - to become comfortable standing on the snowboard while it is sliding
    - **Control** - to gain control of both speed and direction (across the fall line), with both feet attached to the snowboard
    - **Turning** - To learn to turn (changing edges in the fall line).
    - **Flow** - To learn to explore the mountain safely

THE SKILLS CONCEPT

Analysis of snowboard technique has led to the isolation of the Skills Concept in snowboarding. The Skills Concept attempts to create a snowboarding technical framework that is:

- **Outcome Based:** Riders should display the ability to use the various skills and movements appropriately to achieve the desired results in their riding (e.g.: increased fluidity, refined absorption skills, etc.).
- **Performance Driven:** The driving force behind many of the concepts is the development of board performance; the element that lends a dynamic and often powerful element to snowboarding.
- **Efficient:** "Maximum performance with minimum effort". Riders should have the ability to select and match their movements to the effort that the situation requires.
- **Adaptable to Varied Terrain and Conditions:** Riders employing this technical model should be able to adapt techniques to the ever-changing canvas that snowboarding takes place on, whether it be powder, ice, steeps,trees, freestyle or groomed terrain.

The Skills Concept is made up of five elements – each can be considered to be movement-based skills:

POSITION AND BALANCE

The ability to maintain balance in a variety of situations while sliding down a hill.
This is a relaxed position with the ankles, knees, and hip joints slightly flexed, while aligning the shoulders, hips and feet, and distributing the weight evenly on both feet. The head and eyes face in the direction of travel and the arms are relaxed in a natural position alongside the body.

PIVOT

Rotational movements allow a rider to develop an effective steering angle. By using rotating movements towards the toeside or heelside edges, the rider places the board across the line of momentum (direction of travel). This rotation will cause the rider's course to be deflected in a new direction.

EDGING

Edging is involved any time there is a change of direction. For effective edging, use of the ankle and/or hip joints is required to increase the edge angle. Edge control is a direct response to the rider's ability to manipulate the board's edge angle.

PRESSURE

Pressure is a sensory skill in which the rider moderates the forces acting on the board. Movements in the lower joints manage the changes under the snowboard due to terrain, speed and deformation of the snowboard.

TIMING AND COORDINATION

Timing and coordination refers to harmonizing skills and movements so that they are performed at the appropriate time and for the appropriate duration (timing) and that multiple movements are combined into a common effort (coordination).

RIDER DEVELOPMENT TACTICS

The following tactics are designed as ways to assist the candidate instructor with the development of the core competencies for their own riding ability, or to assist more advanced riders.

POSITION AND BALANCE

- Hop between turns
- Switch riding
- Sliding 360s
- Sideslipping 180 degree jumps
- Toe-to-toe/heel-to-heel

PIVOT

- Headlights on knees
- Garlands/chicken turns
- Motorboat turns
- Twist the discs
- Mason jar/pickle jar

EDGING

- Side cut turns
- Drinks on shoulders
- Clock face analogy
- Sponsor turns
- Static edging turns

PRESSURE

- Cowboy knees
- Ollies/Nollies
- Small straight airs
- Absorb varied terrain

TIMING AND CO-ORDINATION

- Follow-the-leader/'top gun' turns
- Count (1,2,3 turn)
- Tornado turns

CASI CORE COMPETENCIES

The CASI Core Competencies is a set of guiding principles that describe the relationship between body and snowboard for efficient and effective snowboarding.

The CASI Core Competencies pertain to all abilities, ages, terrain and equipment and is relevant to all turn shapes, speeds and levels of performance.

- CENTRED AND MOBILE POSITION
  Maintain a relaxed, adaptable position with weight generally centred over feet

- TURNING THE BOARD WITH THE LOWER BODY
  For efficiency when turning, use hips, knees and feet (or a combination thereof)

- BALANCE OVER THE WORKING EDGE
  Using a combination of inclination and angulation movements will help the rider to achieve edge grip and round turn shape.

CH.2: SNOWBOARD EQUIPMENT

SNOWBOARD EQUIPMENT

The Snowboard

The snowboard consists of many pieces laminated together to provide a sliding surface and a means of control. The base is a smooth (sometimes dimpled) surface on which wax is applied to minimize friction and allow the rider to slide. On each edge of the board, a metal edge is used to provide grip on the snow. The top sheet is where bindings are mounted to the insert packs to allow the board to be attached to the rider.

Snowboard sidecuts vary in size and shape, but provide the turning power of the board. The smaller the sidecut, the smaller the natural turning radius will be. The sidecut also plays a role in the edge grip on the snow. Some boards have multiple circles cut into the edges, (such as Mervin Manufacturing's "Magne-Traction") to provide more contact points.

Boards also come with a variety of flex patterns. The stiffness and shape of the board will allow the rider to perform various manoeuvres or achieve greater speeds, depending on design. Traditional **camber** boards are good all around and come with various degrees of stiffness based on function. Laid flat, a camber board will touch the floor at the tips, with a gap below the centre point. **Rocker** (also known as reverse camber) is the opposite. When laid flat, it will touch at the centre point, but not under the tips. Rocker boards can be a good choice for beginners, as they do not grip the snow as much and can help reduce edge catch when someone is learning to turn. Generally, rocker boards do not perform as well at high speeds. **Flat** boards are the usual design for beginners. They offer many of the benefits of rocker, but do not share the weakness at higher speeds. **Hybrid** board shapes are a mix between camber and rocker, with most manufacturers attempting to get the best of both into one board. Hybrids tend to be cambered between the feet (or underfoot only) and rockered at the tips to enhance float and reduce edge catches. **Spooned** boards are another type (which can incorporate the shapes discussed above) where the board is bent along the width, in essence turning the edges up towards the top sheet to reduce further the chance of catching the wrong edge on a surface (snow or jib feature).

A board intended for park- or street-style riding will usually be softer along the length and can be more agile (responding to rider input). Freeride and powder boards are generally stiffer lengthwise to provide stability. Some boards may have additional members inserted diagonally to increase torsion (width) stiffness while maintaining lengthwise flexibility. Board choice is therefore highly dependent on rider preference and purpose.

Rider weight and purpose are factors in choosing the appropriate snowboard. Generally, the heavier the rider, the longer the board should be. Boards intended for powder riding should be longer than normal, to provide increased float. Boards for park riding, on the other hand, are generally shorter to reduce weight and improve spin characteristics. Always consult the manufacturer's suggested weight ranges for your chosen board.

Boards may also come designed to travel in one direction (many powder and freeride/all mountain boards) or be true twin. The choice usually depends on the rider's preferred style. Twin boards allow better switch (riding with the non-dominant foot forward), while directional boards offer some advantages in deep powder or while riding at high speeds. Some directional boards may have a cut-off tail end (swallow tail) or set-back insert packs to better align the rider with the designed flex pattern.

Bindings

Bindings attach the rider to the board and allow the transfer of input from the rider's body to the board. Bindings are made up from the base plates, which are the attachment points, and have a toe ramp (making toeside turns more efficient). Attached to the base plate is a heel cup and highback, allowing the rider to lean into the heelside turn. Also attached to the base plate are the straps, which secure the rider's feet into the bindings. Variations on the basic ratchet strap are endless, but most common now is the toe-cap strap and traditional heel strap.

Step-in bindings come in two basic varieties: heel-toe or 'clips' and the falling highback style. A clip binding system uses spring loaded clips to attach either the heel and toe, or the sides of specially mated boots into a baseplate. This type does not have straps. Falling highback is where the highback drops towards the snow to allow the rider to slide their feet into the back. The highback is then kept in place with a tensioned cable. This type of binding is more widely available now than the clip type, but can be more difficult to put on if the student is sitting or standing on the snow. A binding with a falling highback is most easily attached when the student is kneeling, by simply snapping one large clip into place. This is advantageous for students who are unable to reach their bindings by bending over, or for students who may have difficulty with the type of fine motor skills necessary for using bindings with a ratchet system.

Boots

Boots, like other equipment for snowboarding, come in many styles. The most common in recreational riding is the soft boot. Within this category, boot manufacturers offer many ranges of flex. Most entry level boots will be fairly soft, to allow a gradual learning curve. The stiffer the boot, the more efficiently the rider's movements translate to the snowboard. Hard boots are typically used for slalom and backcountry riding. They are not typically encountered on resort slopes. For riders with lower joint orthotics (ankle braces), a hard boot may provide enough stability to omit the ankle brace, allowing a better fit and more comfort. Boots should fit snugly to the rider's feet; watch for heel lift (space in the rear of the boot allowing the foot to move within) and loose laces.

Equipment Considerations for Beginners

Students who start out on equipment that promotes learning will meet with more success. In general, beginner students will benefit from equipment that features the following:

- A snowboard with softer flex patterns
- A snowboard that is approximately as tall as the student's chin, or slightly below, when standing
- Top-sheet traction, either in the form a stomp pad between the bindings or traction that is embedded into the top of the snowboard to reduce slipping
- Equally-set stance angles (e.g.: +9/-9 degrees) will facilitate movement in both directions. Once students are confident in their chosen direction (regular- or goofy-footed), they may experiment with different angles.
- Bevelled base profile, to help reduce edges catching in the snow, and promote the snowboard pivoting during turns.

The right equipment can make or break the first-time experience of your students. At the beginning of the lesson, be sure to inspect your student's equipment. Check for loose connections, working straps and buckles, and proper fit.

CH.3: ADAPTIVE SNOWBOARD TOOLS & EQUIPMENT

ADAPTIVE SNOWBOARD TOOLS AND EQUIPMENT

Adaptive snowboarding uses tools and equipment both similar and different to adaptive skiing. How the tools and equipment are used is often slightly different. At the earliest stages and beginning steps of the snowboarding progression, instructors will generally be supporting their students from their boots, not their snowboards. As a student gains in confidence and ability, an instructor may start supporting the student from their snowboard.

The Snowboard Tango

One way that an instructor supports their student from their board is using the basic principles of the 'Snowboard Tango'. This is a method used to provide maximum physical and emotional support to the student by turning in unison with the student, holding their hands or hips.

The Snowboard Tango can be completed from behind, with the instructor's hands on the student's hips and the same foot in front--or in front, by holding one or both of the student's hands, with the opposite foot in front.
To complete the Snowboard Tango, the instructor will be required to have strong snowboarding skills and be particularly skilled in manipulating their timing and co-ordination throughout the turns. The basic principles of the Snowboard Tango require an understanding that the inside and outside riders will move at different velocities, and constant adjustments are required to account for this. During the Snowboard Tango, the outside turn is wider and moves slower. When the instructor is in this position, they will need to start out the turn a little ahead of the student in order to get around them without dragging them back. The inside turn is narrower and moves a little faster. When in this position, the instructor will need to start the turn slightly behind the student, by placing them slightly in front. Completing the Snowboard Tango with only the instructor's body requires the most amount of skill and technique and has the biggest potential risk for error. By adding pieces of equipment, this technique generally becomes easier for instructors. As a general rule, the more distance between students and instructors, the easier it is for an instructor to successfully support the student using principles of the Snowboard Tango. More distance also provides more independence for the student. Adding equipment may be a way to gradually move away from fully-supported turns. The Snowboard Tango can be supported by using a Hula Hoop, Ski-Pal, Sno-Wing, Rider Bar, or the 'bamboo pole sandwich'. Each of these will give varying levels of support and distance, so instructors are encouraged to experiment with what works best for the rider. Variables that can affect the choice of equipment include grip strength, size of the rider, and the need for emotional support.

Hula Hoop

A Hula Hoop can be used to provide a safe, confidence-building, hands-on connection between the student and instructor. Like tethers and the Sno-Wing, a Hula Hoop can provide input from the instructor to initiate, or provide support during, manoeuvres.

The Hula Hoop can be used two ways. First, held in the hands of the student and instructor; or held by the instructor with the student in the middle (small student or big hoop). The second method provides little control other than for runaway students. The first method can be used successfully during sideslipping and the beginning stages of turning.

The instructor should have a firm grip on the hoop; one hand above and one hand below the hoop to prevent it from slipping if the student falls.

The instructor may push or pull the hoop to provide some lateral or fore-aft input. To provide rotational input, the instructor would spin in place (creating an arc with the hoop and student, with the instructor as the centre).
The light weight and easy availability of this piece of equipment makes it ubiquitous at most ski schools.

Ski-Pal Hoop--Ski and Snowboard Trainer

The Ski-Pal is a useful tool for teaching new skiers or snowboarders. It is a sophisticated type of Hula Hoop. It is sturdy; made from rigid aluminium, which provides more control for an instructor to support and manipulate a student's movements than a flimsier, bendable Hula Hoop. It is shaped a little more rectangular than circular, and is designed to be ergonomically comfortable, with various areas to grip. It is lightweight, which makes it more practical for use with small children. The Ski-Pal is also adjustable for length and can come apart to allow it to be carried in pieces in a bag.

When using the Ski-Pal, the student may be on the inside or the outside. An instructor can use the Ski-Pal from their boots or board. If the instructor has their board on, they will be holding one edge of the Ski-Pal. If linking turns with the student, the instructor will be utilising principles of 'the dance', either riding faster or slower than the student depending on their position in the turn.

More information on how to use the ski-pal can be found at: http://www.ski-pal.com/.

Sno-Wing

The Sno-Wing is a device manufactured specifically for ski and snowboard instruction, aimed at riders with visual and developmental disabilities. It functions like the boom on a windsurf board, and when secured to the rider's hips, allows the instructor to control all the planes of movement (vertical, lateral, fore-aft, and rotational). The frame is attached to a harness worn by the student, which is then manipulated by the instructor to assist the rider into the correct position. It is a hands-on device and should be used when acquiring new skills or movements, with the goal of developing muscle memory and confidence.

The student can put on the belt (harness) without the frame attached. This will allow a better fit, as the weight of the frame is not pulling on the belt when the student puts it on. Once the belt is secure, slide the frame over the student (so that they are in the middle) and attach the four tensioning straps. Tension all straps evenly so that the frame is supported about hip level. On the flats, provide inputs for the four planes of motion by pushing and pulling on the frame to acquaint the student with how it feels.

If applicable for the student, when using the Sno-Wing it is advised to provide verbal instructions in addition to input from the Sno-Wing. Ensure that the rider is keeping their head up, looking in the direction of travel and not at the Sno-Wing. The student may put their hands on the frame (nose and tail) if they can reach. Otherwise, they should maintain a relaxed, athletic position.

Begin without the board on. Instructors should be highly proficient snowboarders prior to attempting to slide with their student, due to the possibility of falling on each other. When linking turns, the instructor will either have to ride faster or slower than the student due to the physics of sliding on a curve. One rider will be moving at a different velocity relative to the other.

The orientation of the frame (either perpendicular or parallel to the board) can provide additional distance between the rider and instructor. The Sno-Wing also has an attachment point for a bar to extend the reach of the instructor. The bar attaches to the ends of the wing, and may require some experimentation to use effectively due to the difference in turning radius between the rider and instructor. The bar can be used by either a snowboard or skier piloting.

More information, including videos, on how to use the Sno-Wing, can be found at: http://www.sno-wing.com/

Rider Bar

The Rider Bar is an instructor-controlled piece of equipment; it is not designed for independent-use by a student. It is an adjustable metal bar which attaches to a snowboard by metal plates under the bindings, and provides something for a student to use for support in a standing position. The bar sits in front of the student closest to their toeside edge, so the student is facing the bar. The bar is adjustable in height, and should be adjusted so the bar sits at a height comfortably supporting the student. An adaptive snowboard instructor provides additional support to the student by facing the student and manipulating the bar. From this position the instructor is easily able to communicate with the student and provide verbal and emotional support, as well as physical support. The instructor can physically assist the student by helping to control the rotation of the Rider Bar and snowboard. This will assist the student to complete desired movements. (The instructor may be required to ride 'switch', as their front foot will be the opposite of the student's front foot.)

When using the Rider Bar, it is important to note that the snowboard is laterally unbalanced. The toeside edge of the board is heavily weighted by the Rider Bar, so when the toe edge is engaged, the lightest part of the board is lifting off the snow. This makes a toeside turn easier to get on edge. A heelside turn requires more effort and force to enable the student to lift the heavy part of the board off the snow. When assisting a student learning to turn, it is important to ensure the turns remain skidded so the student can control their speed and feel balanced.

The Rider Bar is generally most effective when used by children or smaller adults, although it has applications for people of all sizes and has also been used for folks who have three or four prosthetics for limbs. It can be ridden by wheelchair users, and is an effective piece of equipment for helping to build leg strength and bone density. It may be possible to use the Rider Bar as a therapeutic tool for this purpose. It is important to keep in mind, though, that a student will only be able to progress to a certain point on the Rider Bar and will not be able to snowboard independently.

Adjustments to the angle of the bar can be made by rotating the metal rods which connect the bar to the metal base plates on the board. Often, a Rider Bar is used in conjunction with a harness to provide additional support. The harness may be attached from each hip to the bar. A strap beneath the student's buttocks can assist in keeping the hips forward, and offer even more support.

The Rider Bar also comes with a rear push-bar attachment to allow skiers to assist and support a student. Skiers are best able to assist snowboarding students when they have an understanding of the mechanics of snowboarding and particularly the turn shape of a snowboard.

Be aware, the push-bar attachment is not flexible and can cause injury during a fall. Wrapping it with pipe insulation will provide some padding. The attachment may cause difficulty using the chairlifts (due to the safety bar) so consult with the local 'lifties'.

Bamboo Pole

A bamboo pole can be used in a variety of ways to assist a snowboarding student.

Gondolier Style: A bamboo pole may be used to provide a point of contact with the snow, confidence, and assistance with balance. When used in this way, it is somewhat similar to how a gondolier uses their oar to steer a boat. However, the pole does not change sides and always remains in front of the student's body and toeside edge. The pole drags behind the student in the snow.

Pole Sandwich: If assisting a student with turning and trying to maintain even a minimal distance from them, a pole can be used between the student and the instructor as they link turns in unison. The pole will be placed horizontally and remain parallel with the snow. Both student and instructor can grip the pole with a one-hand-up/one-hand-down grip.

Pole lever: Alternatively if the student is at an earlier stage in the snowboarding progression (like the beginning stages of learning to turn), an instructor may hold one end of a pole while the student holds the other. Without a board on, the instructor can walk around on the snow, using leverage and pushing and pulling motions to keep a student safe while assisting them to rotate.

A pole can also be used to help a snowboarder remain balanced and supported when they are stopped and standing still on the side of a run.

Student in the Middle: This technique requires two instructors, one on either end of the pole. A student would be in the middle, parallel with the bar and their body facing it, head looking in the direction of travel, while an instructor would be oriented the same way on either side of the student at each end of the pole.

Alternatively, the student could be perpendicular to the pole, holding it with their front hand only while the instructors are on either side, also perpendicular to the pole, holding with one hand over and one under. The instructors alternate initiating the turn, swinging a wide arc around the student, which gives the student the rotation through their turns.

Snow Stick

The Snow Stick was developed by Kahuna Creations, a company that makes paddles for paddle boards and long boards. This stick utilizes the same shaft as Kahuna's standard paddles, but includes an attachment for use on snow.

It is used in a similar way as a bamboo pole when used in the 'gondolier style' (described above), but is heavier and most likely requires the use of two hands to hold it. The Snow Stick remains in front of the student's body and toeside edge, and drags behind the student in the snow. The design of the blade attachment allows it to glide over snow when placed at the correct angle.

When twisted 45 degrees, the Snow Stick is useful for pushing over flat sections of snow, or as a support when the snowboarder is stopped and standing.

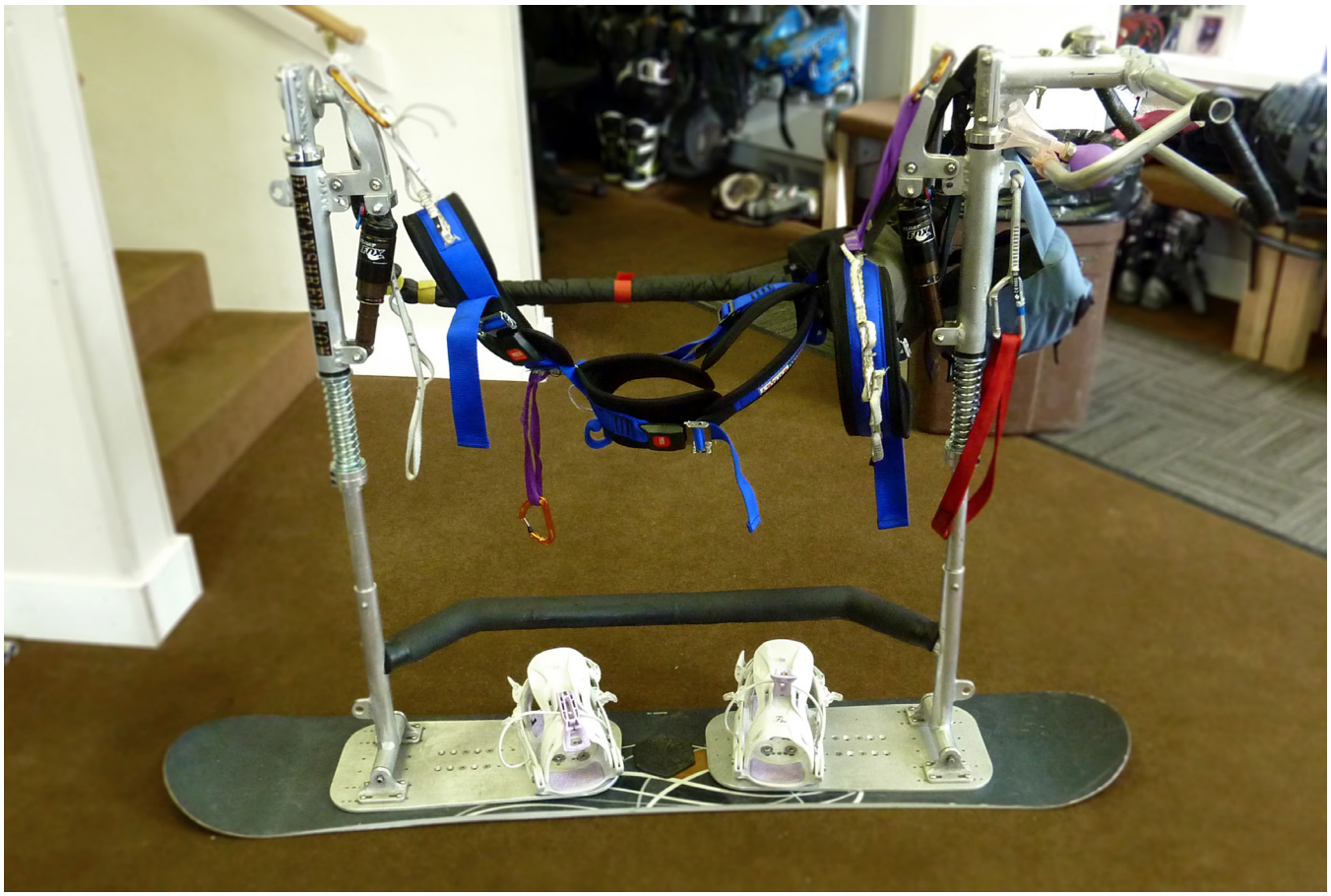
More information and videos on how to use the Snow Stick, can be found at: http://kahunacreations.com/collections/snow-sticks

Sit-Down Snowboards

Currently there is no widely available model of seated snowboard. The market has attempted to fill this gap and unique equipment has been used at many resorts. This section will attempt to guide instructors who may find themselves using such equipment.

RIGID FRAME

This type of adaption uses a large rigid frame, usually containing a seat and straps to harness the rider in an upright position. Typically there are handle bars to allow the rider to use the upper body to push the board onto each edge. These models do not typically have a bushing system (rubber block) to dampen the lateral motion. Risks include falling on the rigid frame and the inability to get up from a fall. This type of equipment uses the rider's mass moving laterally to transition edges.



PRODAPTIVE TWINRIDER

This emerging piece of equipment is being developed in the Netherlands. Similar to the rigid frame, the Prodaptive TwinRider is seated in a supporting frame, although the current model does not harness the rider in. Using separate handlebars, the rider is able to independently twist the snowboard (front and back) to engage the edge. The handlebars and frame are mounted on bushings to dampen the lateral motion.

GENERAL TIPS

- With all sit-down snowboards, the lesson progression is modified based on the abilities of the rider and equipment. Climbing and descending are not possible when seated, so if the rider cannot walk while supported by the rig, these steps should be skipped.
- Always ensure that the equipment you are using is safely maintained (no loose attachments or broken pieces) and the rider is wearing a helmet.
- Speed should be kept to a minimum while learning, and tethers can be attached to most models (either to the frame or to the snowboard) for speed control or assistance.

Grip Glove

Adapted gloves are available for increasing the grip, hand stabilization, and individual's control over the outriggers. Many are adapted like an orthosis and therefore are individualized. They are also sometimes called a 'tetra glove'. These can be used for students using stand-up outriggers or for students who are sitskiing.

Exit Strategies

When using tools and equipment, it is important for instructors to always be thinking ahead and planning strategies to fade their use. These items are used to support students to build skills and confidence; but ultimately, if possible, we want students to be independent and riding without the use of them. From the onset, it is important to build in removal strategies to avoid dependency on tools and equipment, which may lead to an inability to progress independently.

Suggestions for Exit Strategies:

- Always be thinking ahead about how you can minimise equipment
- Reduce the amount or size of tools and equipment
- Fade gradually; don't remove all at once
- Experiment with equipment removal/reduction on a familiar part of a forgiving slope
- Pick your day to start equipment removal/reduction – Is the student in a good place emotionally? Are the conditions forgiving? Is the terrain suitable?

CH.4: SNOWBOARD TETHERING

- Tethering Snowboarders and Snowboarders Tethering -

Tethers

Tethers are nylon straps (two of equal size or one long tether). Tethers should be long enough to allow free movement of both the student's and instructor's boards. The tether should hang on each side of the rider (toe and heel) and be of the same length on each side. The instructor should securely attach at least one tether to their body (generally at the wrist) as per the requirements of their adaptive snowsports program.

Tethers are found to be one of the most useful and easy-to-set-up teaching aids for adaptive snowboard lessons. They can be used to develop skills and confidence. Tethers will help control the student's speed, initiate steering, and maintain uphill edge. Tethers may also be useful to pull students across flat terrain without the student unbinding. Tethering allows the instructor to assist the student in a hands-off manner.

Control is gained when the tethers are tensioned against the forces generated by the rider. To achieve speed control, both tethers should be tensioned equally and the instructor must exert tension slowing by applying their heel edge. Rotational control is achieved when the downhill tether is tensioned as the uphill tether is slackened. For example, when a student riding regular performs a heelside turn (from toeside to heelside), the tether closest to the heelside edge would be 'downhill'). This allows the instructor to pull the student around to the new edge. By keeping tension on the tether through the turn, the instructor can ensure that the new downhill edge does not catch the snow. This tension also allows the instructor to guide the student through a traverse.

The actual act of tethering is an art form. Developing a high level of competence before going out with a student is critical for safety. In some situations it may be easier and safer for instructors to tether from a pair of skis. It is a good idea to practise with fellow instructors or volunteers before going out with a student.

Most Common Attachment locations:

NOSE ATTACHMENT

Tethers may be connected to the nose (leading tip) of the snowboard by means of small C-clamps or a ski bra. With a tether around each side of the student's legs at the shin and calf, the instructor will have the ability to input rotational movement (by tightening the uphill tether), exert some edge control (while tightened tether is pressed against shin or calf), and control speed. Use of verbal commands to integrate the student's movements with the tether inputs is strongly recommended. This type of attachment is useful for students who do not want tethers on their body and students with stronger balance skills.

Front Hip Attachment

Alternatively, tethers can be attached to a student's waist, generally crossing at their front hip. The tethers can be attached to a waist belt, inner tube or harness with carabiners resting on the front hip of the student, and running along both sides of the student's body. In this configuration, the instructor has both speed control and rotational control of the rider. This method can be useful where the student needs physical or bodily cues to initiate turns and maintain speed, or when the student is fairly mobile. The instructor should take care not to pull the student backwards and off balance

Alternative Attachment Locations:

BINDING ATTACHMENT

A tether can be attached to the rider's front binding, by either using a carabiner or looping through an opening in the base plate. This method may provide additional lateral input to the student, as the tethers tend to stay close to the student's legs, and can cue the student to change position laterally through pressure on the calves. Depending on the height of the student and their boots, this lateral input may or may not be useful.

ANKLE ATTACHMENT

The tether is attached similarly as above but to the student's boot instead of their binding. This may provide less leverage factor and therefore less turning ability than a tether on the nose of the board.

REAR HIP ATTACHMENT

Attaching to the rear hip by means of a harness or carabiner can be useful for controlling speed, particularly when the student has good balance and rotational control and does not need input from the instructor to initiate turns. As with other attachment methods, care should be taken to not pull the student off balance. In this configuration, pulling on the student's COM could cause them to fall backwards, stressing the front leg joints.

DUAL HIP ATTACHMENT

Tethers can be attached at each side of the student's hips and used for safety or as a teaching tool for a student who is sideslipping or completing pendulums (step 4: Control).

SINGLE WAIST ATTACHMENT

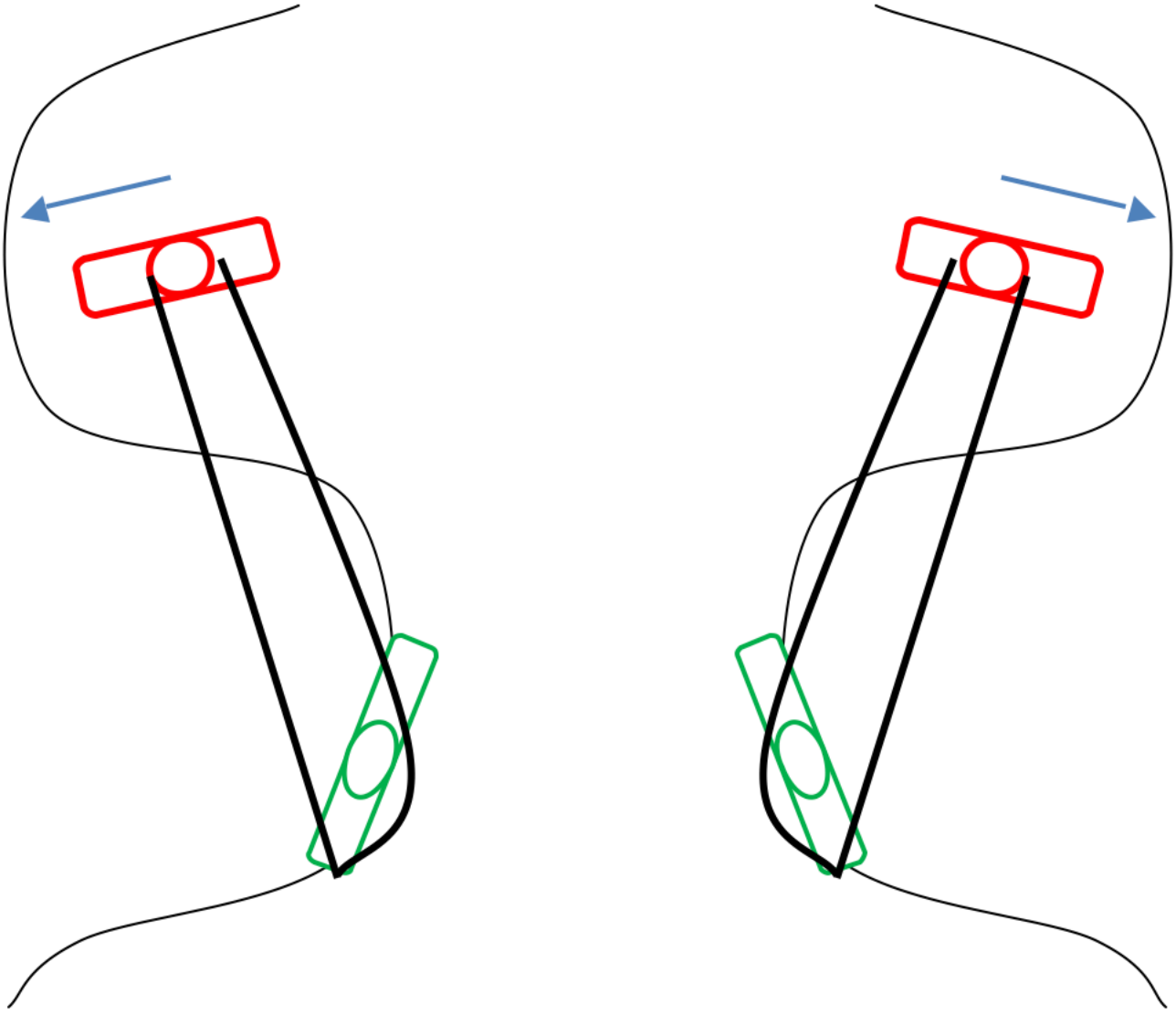
If a student is wearing a belt or bicycle inner tube around their waist, a single tether can be attached with a carabiner in the centre of a student's back or front (depending on which edge they are using). This allows the carabiner to move along the length of the belt, which can provide the instructor with the ability to 'slingshot' their student from right to left. This can be used for safety or as a teaching tool if a student is sideslipping or completing pendulums (step 4: Control).

TAIL ATTACHMENT

Attaching at the tail of the board with a ski bra or c-clamp can be useful for applying speed control at the early stages of learning to snowboard, for example when straight running in step-three sliding.

MANAGING TETHERS

Tethering a stand-up snowboarder is very similar to tethering a quadski . The tetherer (instructor) must stay above the student and be inside their arc to allow the instructor's input to the tethers to have maximum effect. Management of the slack (in the tethers), speed, and line (intended path downhill) are critical skills that will be acquired through experience. The illustrations below show the tension on the tethers, and the instructor's (red figure) position relative to the student (green figure) for both a heelside and toeside turn. The blue arrow indicates the instructor's direction of travel.



GUIDELINES FOR USING TETHERS

1. A sign of good tethering is when the student cannot tell if they are being tethered. This is an important goal to strive for as an instructor.

2. Tactical sensitivity is needed when the instructor is perfecting the coil-spring technique (arm flexion and extension movement) with their lower arms, wrists, hands, and fingertips. Having this sensitivity will help achieve the goal in #1.

3. Handling: When assisting a student with speed control and steering, there should not be slack in more than one tether at a time and ideally both tethers will have a slight tension. The only time there might be slack in both lines would be if a student is straight running in slow snow or extremely flat terrain. If you do find slack in the tethers, practise developing a good coil-spring or wrap system to tighten up the tether without the rider feeling jerky or sudden pulls.

4. Use the tether as a safety line by connecting the ends around your wrists. By connecting to the student, you will prevent the possibility of a 'runaway' who cannot control their own speed and turns.

5. Positioning--synchronized uphill technique: The instructor is positioned directly uphill, in the fall line or gravity zone from the student. As the rider changes direction, the instructor must change directions as well and maintain position directly uphill at a distance that allows smooth tension in the tethers.

   An uphill and slightly-ahead position can be used to increase momentum of the student. This position will also slightly pull the student onto the uphill edge while traversing between turns. By being slightly ahead of the student, tension in the downhill tether (wrapped around the downhill side) can be used to pull them into the next turn and onto the uphill edge. This technique is efficient for tethers connected to the nose or front binding. It is ideal for beginner terrain and lower speeds, and works best with smaller students.

   Tracking technique: The instructor is following in the student's tracks. This is appropriate for students who have advanced skills and are capable of higher speeds and longer radius turns. Tracking is used when the student's primary need is assistance with speed control.

6. A blocker provides extra support to the instructor-student team. The blocker can run interference as needed. The blocker watches traffic, guiding other skiers and riders around the team. This is particularly important when a team rides close to intersections or the edge of a trail. Blockers may need to move around the rear or sides of the tethering instructor-student pair and anticipate other skiers' movements. For added visibility, a vest may be worn identifying the blocker as an instructor's aide.

7. Riding Skills: The instructor must be able to change directions instantaneously while accelerating and decelerating, and while maintaining their position relative to the student.

Please Note:
Riding skills required to tether a student are balance, precise speed control, riding switch, changing direction, performing heelside sideslipping and falling leaf equally well in both directions and riding synchronized to the student's turns. Tethering a student from skis is much less technical and requires only a braking wedge held behind the snowboarder.

Safety

- Because you are attached to the student, it is VERY important that your riding is technically flawless. Any fall or glitch in your riding will pull on your student.
- In order to prevent a runaway student remember you must securely attach the tethers per your snowsports program requirements.
- Instructors are encouraged to stay on their heelside edge as this is the safest and strongest position if the student requires an adjustment or is in danger of falling. We do not encourage instructors to link turns and turn onto their toeside edge when tethering. The counter rotation required could cause injury in the case of an incident.

THE SKILLS OF SNOWBOARD TETHERING

The following progression can be used to demonstrate, practise, and refine the skills required to safely tether a stand-up skier, snowboarder or sitski. The instructor will develop the necessary movements and positioning, while learning to anticipate the path and motion of their tethered student.

Ideally, the skills of snowboard tethering are practiced on a steep, groomed, green or mellow blue run, however this will vary depending on the particular tactic, the skill level of the group, traffic, available runs and conditions. These skills are best practised with two or more instructors taking turns to be the person tethering and the person being tethered, under the guidance and direction of a course conductor. Some skills are practiced solo, (no-one is tethered), and some are practiced partnered – with someone tethered.

Have the instructors warm up with **top-gun turns** or **follow-the-leader turns**, where one rider follows directly in the path of the rider in front, so they are creating one line through the snow.

Next try **synchro turns**. Have the rider above carefully watch the rider in front and anticipate their direction changes based on their physical movements (e.g. rotation in the knee). Then ask them to try to synchronise their turns so they are turning in unison.

1. SIDESLIP AND POWER SIDESLIP (SIDESLIP TO A STOP)

Goal/Skill: Use pressure on the heel edge to stop quickly.

- **Solo:** Sideslip (on heel edge) over a variety of terrain while maintaining, gaining and reducing speed.
- **Partnered:** Someone in front is sideslipping on their heel edge, they are attached to tethers on either side of their hips. The tetherer will try to bring the tethered person to a complete stop.
- **Variation:** Have the tetherer use “3, 2, 1 STOP!” to alert the person being tethered they will be stopping. Practise both a gradual stop and (if safe and comfortable) a sudden stop.
- **Variation:** The tethered person can further reduce their assistance by pushing their hips forward, and being as loose and floppy as possible.

2. PENDULUM

Goal/Skill: On heel edge, demonstrate the ability to change direction effectively. While tethering remain in the proper position--high and inside the turn of the tethered person.

- **Solo:** Traverse from one side of the hill to the other on the heel edge.
- **Partnered:** Someone is tethered on their heel edge, tethers are attached on either side of the hips. The tetherer remains above.
- **Variation:** The person being tethered changes direction independently, the tetherer stays above and in line with them, ready to provide speed control if necessary. (Synchro-pendulum)
- **Variation:** The person being tethered requires assistance with direction change. The instructor allows the tethered person to swing ahead of them to one side, and by starting to traverse in the opposite direction can use momentum and the tension of the tethers to slingshot the tethered person back the other way
- **Safety:** Be aware of other traffic and the hazard of a tether line across the hill. It may be beneficial to use blockers.

3. POWER PENDULUM

Goal/Skill: Use of rotation in the pendulum to move from regular stance to switch and back again (U shape in the snow).

- **Solo:** Traverse from one side of the hill to the other on the heel edge, while using rotation to increase speed and alter turn shape.
- **Partnered:** Try tethering someone in front on their heel edge as above. Timing and coordination play a large role in effective tethering e.g. the ability to use the fall line to gain speed (to keep up to someone being tethered or as they go over a convex roll).

4. STRAIGHT RUN TO PENDULUM

Goal/Skill: Ability to move quickly and smoothly between straight running and traversing in both directions with either nose or tail in front (forward or switch).

- **Solo:** The instructor practices moving quickly and smoothly between straight running and traversing, with variation of size, shape and speed of traverses.
- **Partnered:** Not recommended

5. STRAIGHT RUN TO HOCKEY STOP

Goal/Skill: From a straight run come to a complete stop, under control and without lateral movement. Show effective use of upper and lower body separation.

- **Solo:** Have the instructor complete a hockey stop to come to a complete stop. Try to remain in a strong position with deeply-bent knees, and a straight back.
- **Partnered:** The tethers will ideally be attached to a belt in the centre of the tethered person's back and front. The tetherer will use a hockey stop to bring the person straight running in front to a stop.
- **Variation:** On steeper terrain, have the tethered person sideslipping and bring them to a stop. (tethers on sides of hips.)
- **Safety:** Developing the ability to quickly come to a stop or shed speed is required for safety. This is distinct from an emergency stop (i.e. falling/sitting down).

6. SWITCH STRAIGHT RUN TO A HOCKEY STOP

Goal/Skill: Develop the above skill while riding switch

7. SPEED CHECK--SLOW AND FAST

Goal/Skill: Speed control while maintaining forward momentum

- **Solo:** The tetherer stays centred and makes a speed check.
  - Try slow--Slowly stall on the flats to avoid overtaking the person being tethered
  - Try fast-- Quickly wash off speed while maintaining forward momentum
- **Partnered:** Try on mellow terrain with someone tethered in front (straight running or sideslipping).

8. 180 PIVOTS

Goal/Skill: Ability to pivot the board 180 degrees

- **Solo:** Start by sideslipping and doing a 180 degree turn flat on the snow.
- **Variation:** Once comfortable with flat 180 degree turns, try adding air.
- **Safety:** This is an important skill to allow the rider to quickly make a direction change or recover from a compromised position.

9. SIDE SLIP PIVOTS

Goal/Skill: Increase ability to use counter rotation to pivot the board.

- **Solo:** Starting in a straight run and using separation of upper and lower body, pivot the board so that you go back and forth between your switch or regular foot in front, always remaining on your heel edge. The rider continues down the fall line throughout this exercise, and utilises ankle flexion to control edge angle.

10. TETHERING A TURNER

Goal/Skill: To practice tethering someone who is turning in front of you.

- **Partnered:** The tethered person links turns, riding slow and switch. The person tethering stays on their heel edge, blending all the above skills. Synergising.

11. TETHER A SITSKI

Goal/Skill: Demonstrate the ability to utilize the previous skills to safely pilot a weighted quadski down the slope.

- Ability to demonstrate safe tethering utilizing the above skills with a weighted quadski.

THE SKILLS OF SNOWBOARD TETHERING ABBREVIATED

1. Sideslip and Power Sideslip (sideslip to a stop)
2. Pendulum
3. Power Pendulum
4. Straight Run to Pendulum
5. Straight Run to Hockey Stop
6. Switch Straight Run to a Hockey Stop
7. Speed Check--Slow and Fast
8. 180 Pivots
9. Sideslip Pivot
10. Tethering a turner
11. Tether a Sitski

CH.5: SNOWBOARDING WITH OUTRIGGERS

SNOWBOARDING WITH OUTRIGGERS

Overview

Outriggers can be a valuable tool for many adaptive snowboard students. They can improve balance and increase stability while walking, skating, sideslipping, straight running or turning. Outriggers can also facilitate skill development, particularly edging and pivoting, and lend support to minimize falls. They are particularly useful for students with balance, strength or mobility challenges.

Outriggers are used in two modes. When the ski attachment is flipped down, it provides an additional sliding platform on the snow. When turning, the outrigger becomes the contact point for the board to pivot around. When the ski attachment is flipped up, the outrigger provides support for walking, skating or using a lift.

Outriggers may be used in a variety of different configurations. Using **double outriggers** is snowboarding with two outriggers. A **single outrigger** is snowboarding with one outrigger. A **fixed outrigger** is snowboarding with one outrigger in the front hand and one in the back binding or boot. These are all different and potentially valuable methods of using outriggers.

DOUBLE OUTRIGGERS

SINGLE OUTRIGGERS

FIXED OUTRIGGERS

Single or double outriggers are used by students who snowboard with two legs and/or prosthetics strapped into their snowboard bindings. Depending on their abilities, the student may use one or two outriggers for support. One outrigger is generally less intrusive, but may not always provide adequate support, depending on the student's needs. Attempt to provide the most amount of support with the least amount of interference.

A **fixed outrigger** may be used by a student who is snowboarding with only one leg. A student who wants to or is required to snowboard with only one leg/prosthetic leg attached to a binding will need to be supported in their other binding. A fixed outrigger is an outrigger or a combined boot/outrigger which is strapped into the back binding of the snowboard. This provides a base of support for the student that cannot be achieved otherwise. A single outrigger in the front hand is used in conjunction with the fixed outrigger.

Always consider the risks versus rewards of using outriggers. Students may find coordinating their arms, legs and multiple pieces of equipment a cognitive or physical overload. Using outriggers may provide extra complications or even safety hazards in some cases. For other students, outriggers may be the perfect tool to add the confidence and support needed to commit to edge changes and make turns.

In many cases, outriggers are not intended to be a permanent solution. They can be an effective tool in the right circumstances. Use outriggers when they will provide necessary assistance, and fade as quickly and safely as possible. It may not be necessary or beneficial to use the outriggers for every step of the progression.

It is very important for the instructor to be able to use outriggers competently and fully understand how they operate before they teach students. A positive outcome is most likely to happen when both instructor and student understand the function and purpose of using outriggers.

WHO MIGHT USE OUTRIGGERS?

Anyone who has difficulties with balance, strength or mobility may find outriggers to be beneficial--specifically, students with conditions such as cerebral palsy, spina bifida, muscular dystrophy, hemiplegia, MS, incomplete paraplegia (spinal cord injury) and those who have had strokes or traumatic brain injuries.

Other students who might use outriggers are those who have any type of leg weakness, leg injury, knee injury or an above-knee, below-knee or double amputation. They may or may not use prosthetics.

Note: Please see the “Snowboarding With Prosthetics” section of the manual for more information on teaching students with prosthetic legs.

ASSESSMENT OF ABILITIES: ASK, OBSERVE, TEST (AOT)

The AOT process is designed to be used with a student to assess their balance, strength, and mobility, and to determine if they may be a good candidate for using outriggers The AOT can help determine what type of outrigger set-up the student may require.

Ask:

Ask questions of the student to determine their strengths and abilities, and find out the history of their injury, illness or condition, and any relevant experience they may have. Discover any specialized equipment they have used, and any supports or therapies they engage in. Try to discover any potential challenges or concerns.

ASK	LOOK FOR
What is the student's snowboarding history?	Time student has spent on a snowboard, and how recently. History of riding Goofy or Regular.
What other sports does the student participate in?	Experience in board sports and those that require similar types of balance, strength and mobility, e.g. surfing, wake-boarding, skateboarding, mountain biking, etc. If there is a history with board sports, which leg was the lead leg?
Does the person think of themselves as fit and active?	Pacing of lessons may be adjusted to accommodate the fitness level of student. Student's response may also assist in determining whether they have the ability to correctly self-evaluate.
Have they used any other specialized adaptive sports equipment?	Participation in other adaptive sports. Helpful or useful pieces of equipment which may also be relevant to adaptive snowboarding.
What is the student's disability or injury and how does it affect them?	Any difficulties with strength, balance, stamina, etc. Differences in physical function since the last time they snowboarded (if applicable). Whether the lead leg should remain leading (if applicable).

ASK	LOOK FOR
Is the disability congenital (from birth), or acquired (from an illness, injury, or accident)?	History of their disability.
Does the student have any additional injuries/impairments or disabilities?	Vision, hearing, cognitive ability, etc. of the student
Does the student have any type of paralysis? If so, where?	The parts of body that are affected, and to what extent. Affects on student's ability to snowboard. i.e problems holding an outrigger, skating, rotating, etc.
Does the student have one leg or one side of their body which is stronger?	Stronger side or leg Whether the current strong leg is the same one or different to the previous leading leg (if the student snowboarded before)
Does the student require balance support to move or walk? If so, what kind of support is the student using?	Use of crutches, cane, walker etc., and level of reliance
Does the student have any weakness in their hands that may prevent them from moving between the slide and support modes on an outrigger?	Whether an adaptive tool like a grip glove is needed to assist the student's ability to hold and move the outrigger from the slide to the support mode
What does the student think their strengths are?	Strategies to capitalise on the student's strengths
Do they participate in any therapy treatment programs?	The type of therapy treatment program and the intended purpose Any associated impacts on the student's strength, mobility and balance

Observe:

Observe the student and the way they move. Look at the speed of movement, the quality of movement and assess their ability to balance, bend, and flex. As they walk and move around, relate the ease of their movements to snowboarding.

OBSERVE	LOOK FOR	RELATE TO SNOWBOARDING
Is the student well-balanced while moving around?	Unsteadiness in movements, imbalances between right and left sides, any falls or stumbles.	The more unsteady, the more reliant the student may be on outriggers for support, balance and turning. Look for the stronger leg, arm and/or side.
Are additional supports used to assist students' movements?	Supportive aids, e.g. crutches, cane, walker, etc. Use of wall, chairs or other people for support	The more a student relies on aids for support, the more likely outriggers will be required. Double outriggers may be best for students who are heavily reliant on supportive aids.
Can the student separate movements between the upper and lower body?	The level of reliance on aids The upper body assisting the movement of the lower body when walking and turning Differences when rotating between turning to the right or to the left.	The ability to show separation between upper and lower body movements indicates greater mobility and an ability to steer with the lower body while snowboarding. If the student has difficulty rotating their body, an outrigger or two may assist them with turn initiation.
Can the student flex their joints equally on both sides of their body?	Unequal flexion in the knee, ankle and hip between left and right sides	When one knee flexes more than the other, this can cause kick-back in the less flexible knee and it may lock straight when changing edges.
Does the student wear any type of leg or knee brace? What is the function of the brace? Is it supportive, corrective or preventative?	Type and size of brace and how much of the leg it covers	Knowing the function of the brace will impact decisions related to the snowboarding lesson. Whether for a past or present injury, the instructor must take measures to try to prevent re-injury. Be aware of fatigue.

OBSERVE	LOOK FOR	RELATE TO SNOWBOARDING
Strength and the ability in the student's hands to hold and use an outrigger	Weakness, paralysis, stiffness or inflexibility in the hands.	May not be able to control the slide/ walk function of an outrigger.
How does the student move? What does their gait tell us?	Imbalances or differences between the left and right sides of the body while walking or moving. The quality, consistency and co-ordination of the student's gait. Movements that are smooth, stiff or stilted Up-and-down motion while walking (flexion & extension) Feet that point either in or out. Knees that knock together or splay outward	May provide insight into the most suitable stance for the student (width and angle of bindings). May indicate ability to use flexion and extension, and indicate potential imbalances in turns. If student heavily favours one side, a single outrigger may be best. If feet and knees point in, snowboarding may be challenging. An unusual stance with knees locked together may be possible, or student may consider skiing.
How are the student's stamina levels?	Signs of fatigue while standing/ walking or completing physical tests. The time required before a student needs a break or to sit down The cause of the fatigue	Helps determine the length of teaching sessions and how frequently breaks are required. It may also give an indication of the optimum length of breaks.
Are the student's movement patterns quick or slow?	The regular pace of the student's movements and any changes or differences when the student uses different movement patterns	The quicker the movements, the greater the confidence. This can have an effect on lesson pacing, as someone more steady and mobile may find balancing on a snowboard easier and may learn more quickly.

Test:

Do some simple body movement, position and strength tests to help determine the most ideal stance, position and equipment for your student's success when snowboarding. The tests below are applicable to both participants who may require support for balance or strength and participants with prosthetics.

TEST	LOOK FOR	RELATE TO SNOWBOARDING
Hand strength	*The student's strength if you try shaking their hands or ask them to squeeze your forearm for 5-10 seconds* Whether the student has the ability to use the slide/walk mechanism on an outrigger	The student must have the ability to control the mechanism of the outrigger to change it from support to slide mode. There are some pieces of adaptive equipment available to assist with this, e.g. the grip glove More instability due to balance, body position and/or stamina, means more reliance on adaptive devices to maintain a neutral position.
Balance and Stamina	*Ability to stand in a neutral position (on a flat surface) for a 30-second duration. Ankles, knees and hips should be flexed with weight balanced on both feet.* If there are signs of unsteadiness or fatigue, try the test above, using a single outrigger. Note any improvements. Try double outriggers for maximum support.	Outriggers provide support when the student fatigues easily, and assist with balance if unsteady. A single outrigger is less intrusive than double outriggers but may not provide adequate support. Attempt to provide the most amount of support with the least amount of interference.
Balance and Pressure	*Ability to stand in a neutral position, rocking from side to side.* *Shifting weight from one foot to the other, while lifting the opposite foot off the ground one to two inches* Any imbalances or differences between fore and aft movements Differences in the amount of flexion or ease of movement between the two legs.	Fore and aft movements are controlled through core strength in the upper body and shifting and flexing of hips, knees and ankles. This movement will provide an indication of the ability to maintain a centred position, as well as to modify nose and tail pressure on each foot, (needed to initiate and complete turns).

TEST	LOOK FOR	RELATE TO SNOWBOARDING
Flexion and Extension	*The ability to stand in a neutral position flexing knees, hips and ankles. The ability to extend the lower joints, moving up and down in a vertical plane, with weight balanced on both feet* The range and ability for vertical movement, focusing on the ability to flex and extend ankles, knees and hips. Imbalances between left and right joints in range and flexion Any improvement if the student uses two outriggers vs. one outrigger.	The ability to alter up and down pressure to initiate flexion and extension movements helps manage pressures while turning the snowboard. The greater their ability to flex the lower joints, the closer the student may get to a neutral position. If there are difficulties flexing the legs, adjustments to equipment or prosthetics may be necessary. (Ensure changes to prosthetics are done by a prosthetist or the student.) E.g. Adjust highback forward, or use a wedge under the student's heel to create greater flexion. Attempt to provide the most amount of support with the least amount of interference.
Pivot	*Ability to stand in a neutral position, then turn hips, legs and feet to the right and to the left.* Limitations in the student's ability to rotate their lower body. Differences in ease and ability between rotational directions.	The ability to rotate the hips, legs and feet in the direction of a turn enables the snowboard to pivot and complete a turn in a more efficient manner. Outriggers can be useful tools for assisting with rotation and turn initiation, provided the student is able to rotate their wrist and elbow. If rotation is easier in one direction, this may indicate an ability to turn more easily to one side (heelside or toeside). Student may be more reliant on outriggers to turn to the weaker side.

TEST	LOOK FOR	RELATE TO SNOWBOARDING
Balance and Edging	*Ability to stand in a neutral position with feet shoulder width apart, and rise up on toes for two seconds followed by balancing on heels for two seconds.* Differences in ease and ability between toes and heels Whether all joints--hips, knees and ankles--are flexing in these movements Imbalances between the left and right sides Loss of balance in one or both movements Improvements in stability whether the student uses one or two outriggers.	Lateral balance across the snowboard and movement in the toe-heel plane is important for getting the board on edge, for turning, stopping, traversing, and sideslipping. If it is easier to balance on one edge, this may indicate which edge to start the control phase with (heelside or toeside). If there is limited flexion in the knees, but good range of motion in the hips, the student may need to rely more heavily on the lateral movement of their hips in order to get their board on edge. Imbalances in joint flexion may make it difficult to get the board on edge smoothly and efficiently. Outriggers can provide balance and support for edging using inclination (leaning) and angulation (flexing). Adjustments to the student's equipment may assist them to reach a flexed position, allowing edge changes.
Rotational Balance	Ability to stand in a Neutral Position, with feet shoulder-width apart, and rotate arms and shoulders 65 degrees or more across the lower body to the right and hold for 10 seconds. Ability to repeat rotating the arms and shoulders to the left for 10 seconds Loss of balance Greater stability if the student uses two outriggers while rotating as opposed to one.	Rotational balance indicates an ability to move in and out of alignment and maintain balance and stability while turning. Difficulties in upper body rotation may make turning challenging, and the use of adaptive equipment may be required. A single outrigger can be a useful tool for assisting with balance and stability, rotation, and turn initiation. A second outrigger will provide an extra base of stability if the student remains imbalanced. If rotation is easier in one direction, this may indicate an ability to turn more easily to one side (heelside or toeside). Student may be more reliant on outriggers to turn to the weaker side.

TEST	LOOK FOR	RELATE TO SNOWBOARDING
Rotational balance with an outrigger	*The student's ability to stand on their snowboard in a neutral position with one outrigger in the lead hand* *Ability to cross the outrigger in front of their toe edge and behind their heel edge* Ability to maintain balance Differences in stability whether the outrigger is in front of or behind the student Improvements in stability if student holds a second outrigger in their back hand.	The outrigger should assist the participant to rotate the body towards the turn. Use of the outrigger should help to provide a balance point to pivot around and help keep the weight forward towards the front leg. A second outrigger in the student's back hand will provide a more stable base of support.

BASIC BODY MOVEMENT ASSESSMENT (BBMA)

Below, you will read a sequence of tests performed as part of the AOT process. The tests are sequenced so that each test builds on the last, starting with a static test and moving to more dynamic movements. Have the student:

1. Stand up in a neutral position on a flat surface for a 30-second duration, ankles, knees and hips flexed with weight equally balanced on both feet.
2. Rock laterally from side to side, shifting weight from one foot to the other while lifting the opposite foot off the ground one to two inches. Repeat 10 times.
3. Stand in a neutral position with feet shoulder-width apart, raise up on toes for two seconds, then balance on heels for two seconds. Repeat 10 times.
4. Stand in a neutral position with feet shoulder-width apart, rotate your arms and shoulders 65 degrees or more across the lower body to the right and hold for 10 seconds. Repeat, rotating the arms and shoulders to the left for 10 seconds.

The sequence above tests many of the components in the table above. It is not an exhaustive sequence.

FURTHER DRY-LAND TESTING:

For dry-land testing, instead of immediately strapping a snowboard to a participant, it may be beneficial to complete similar tests using a skateboard or longboard deck without trucks (wheels), or using a Spooner board. These pieces of equipment may be helpful to get a feel for what it is like to get on edge. They are also useful tools for evaluating, practising and strengthening the skills required (particularly balance) to snowboard,

FURTHER DRY-LAND TESTING

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Try further dry-land tests: With snowboard boots and bindings on, try the prosthetic in the forward or rear binding. Try outriggers in various positions (beside, in front, or a fixed outrigger via the back binding).

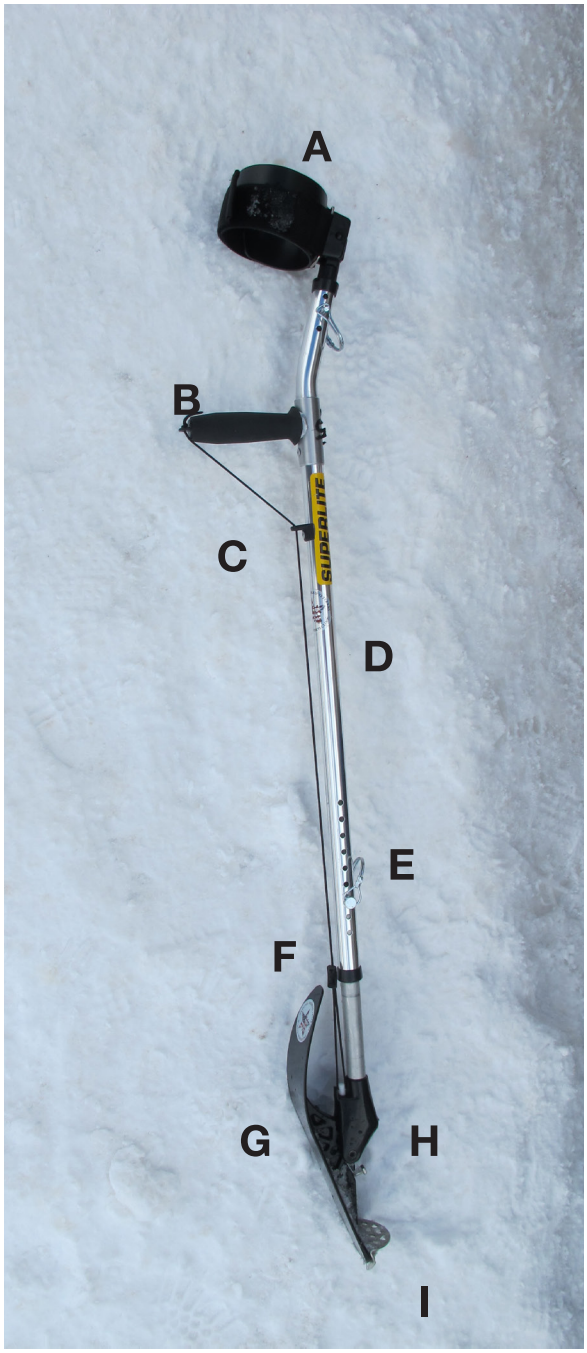
For some students, these options could enhance the possibility of success and fun on snow by maximizing balance and stability.

LEADING LEG

Use the AOT to help determine which leg is most appropriate to be leading. Consider the student's snowboarding/board sports history, strength, flexibility, co-ordination, physical impairments and personal preference.

Usually it is recommended that the strong side lead to allow better initiation, but some students may prefer the strong side to follow, particularly if the student has a history of using this leg in front for other board sports. Continue the AOT throughout the lesson, and remain open to which leg is most appropriate to be leading. Remember that during parts of step 4: Control, the student is using both legs as the lead leg, for example in Pendulum.

EQUIPMENT



A: Cuff and cuff strap
B: Handle/grip
C: Adjustment string
D: Pole/leg
E: Removable pin/quick clip
F: Line
G: Ski
H: Heel screw adjustment
I: Claw

OUTRIGGER SET-UP

Outrigger set-up and adjustment for a snowboard student is similar to that of a ski student, but outriggers are generally longer, and if the student is using double outriggers, the outriggers may be different lengths (e.g. Longer in front and shorter in back). Utilizing outriggers should allow the student to maintain a natural range of motion and as close as possible to a neutral position. The length and position of the outriggers can cause a student to be in a more upright or a flexed position. Ideally, outriggers will be made of lightweight but strong materials in order to minimize fatigue. Decide on which is the most appropriate outrigger configuration and style. Styles and brands may vary, however there usually remains three important adjustments, (see manufacturer for more detailed instruction):

- Distance from handle to cuff;
- Distance from handle to ski;
- Heel screw adjustment on the ski;

DISTANCE FROM HANDLE TO CUFF:

The cuff sits with the opening on the outside of the arm, and the solid part of the cuff resting on the fleshy part of the forearm, above the elbow. Ensure that the cuff is not too close to the elbow, and that the movement of the elbow is not restricted. Improper placement of the cuff could increase the chance of injury. To achieve the correct placement of the cuff, adjustments may be needed to the distance between the handle and the cuff.

Some outriggers have a strap. This should be done up tightly for stability but not so tight that it restricts circulation. When tightening, pull the cuff strap towards the student's body.

DISTANCE FROM HANDLE TO SKI:

The length of the outriggers can be adjusted by shortening or lengthening the pole of the outrigger from the handle to the ski. Determine the appropriate length by having the student stand on a flat surface inside or on the snow (ideally on their snowboard), in a flexed and neutral position. Adjust the position of the student's arms and the outriggers to what they will be using to snowboard. If there is an outrigger in the front hand, the ski should sit on the snow/ground and be able to glide smoothly around the nose of the snowboard from toeside to heelside.

Usually outriggers are adjusted by removing a pin or screw, adjusting the length, then replacing it. When the length of the Pole is adjusted, the line attached to the ski must be loosened and then tightened once the length has been determined. The line must be tight enough to ensure the student is able to pull on it to change the outrigger from slide mode to support mode and back again.

As the student increases their skill and ability level, some may wish to shorten their outriggers as their reliance on outrigger support diminishes.

HEEL SCREW ADJUSTMENT ON THE SKI:

The outrigger has a heel screw attached to the ski, which can be adjusted to change the angle of the ski on the snow. A longer heel screw will provide more friction on the snow. This may be beneficial for beginners, allowing them to gain additional speed control methods when they are starting to use outriggers. As a student gains more confidence, generally the heel screw adjustment is shortened. The heel screw should be adjusted at the beginning of the lesson, and continuously reassessed as the student progresses. Always carry an appropriate tool to adjust the heel screw, as it may happen frequently.

When adjusting the outrigger's heel screw length, the ski should engage sufficiently to create resistance against the snow, yet not dig in. If the student's elbow gets pushed back or jerked because the outrigger does not glide smoothly, the heel screw is set too long. As skill and speed develops, the outrigger heel screw will need to be shortened to glide smoothly and easily across the snow, or to hover above it. Heel screws can also be removed entirely.

SUPPORT MODE

Support mode is when the ski on the outrigger is up. This is useful for when the student needs to use the outrigger as a stationary support. It can be beneficial for maintaining balance when stopped, for moving through a lift line, for skating etc.

SLIDE MODE

Slide mode is when the ski on the outrigger is down. This is useful for when the student is sliding on snow. This mode is used when the student is straight running, sideslipping, turning, off-loading a lift etc.

SWIVLER

A swivler is a rotational device that is mounted under the bindings. It provides a quick-release change of position that allows the lead foot to rotate toward the nose of the board. This decreases the inward or outward twist of the lead foot and leg needed for manoeuvering with one foot out of the binding.

This achieves a more comfortable position for skating, standing in lift lines, and loading and unloading lifts. This is particularly useful for those students who choose to ride with their prosthesis as their leading leg. Also, it allows for a quick stance change when riding.

TRAINING OUTRIGGER TIP

The training outrigger tip attaches to 'Superlite' outriggers, from Enabling Technologies. The training outrigger tip is designed as an intermediary step towards independent use of regular outriggers. The training outrigger tip is a grapefruit-sized, light, plastic ball that attaches to the end of an outrigger shaft in place of a ski. It provides the balance support of a regular outrigger but lacks edges. This means it is less likely to get caught on the snow at low speeds, and can be simpler for a new student who is learning to co-ordinate their various limbs. Placement of the training outrigger tip ball does not need to be as precise as placement of the outrigger ski on the snow. The training outrigger tip can be effective in the early stages of learning to snowboard, but does not provide turn-initiation assistance like an outrigger with a ski. At high speeds, the training outrigger tip will also catch on the snow and may become jerky and hinder the student. This is an indication that the student is ready to move to the next step, perhaps utilising regular outrigger/s.

DOUBLE OUTRIGGERS

Snowboarding With Two Outriggers

OVERVIEW

This type of outrigger set-up is for students with balance, mobility and strength challenges. Using two outriggers is for the students who require the most amount of physical support.

When someone uses double outriggers, they will use one in each hand. Where the outriggers are placed on the snow can affect the level of support they provide, and the alignment of the body in relation to the snowboard.

SPLIT-RIGGER POSITION

The front and rear outriggers are in different positions on the snow, relative to the nose of the snowboard. The split-rigger position will allow the rider to keep their ankle, knee, hip and shoulder joints more in line with their board, and closer to the neutral position. The student should stand in the neutral position, tall yet relaxed and flexed.

Place the lead outrigger on the snow 6-12 inches (15-30 cm) from the board and approximately halfway between the nose of the board and the front foot on the heelside. Place the rear outrigger on the snow 4-12 inches (10-30 cm) from the board and approximately 12 inches (30 cm) behind the lead foot on the toeside or in between the two feet.

The split rigger position puts the student in a more aligned position, but may not provide as much strength and support for students with high levels of weakness or an inability to flex. A binding set-up closer to a freestyle set-up (duck stance +9/-9) may be preferable. In this position, it is usually recommended to adjust the rear outrigger slightly shorter, and have enough length in the lead outrigger to ensure it can move in front of the nose of the board and switch to the heel or toeside edges when the rider is ready to make edge changes.

PARALLEL-RIGGER POSITION

The outriggers are placed parallel to each other, close to the nose of the board. The use of outriggers in this position will result in the ankles, knees, hips and shoulders all pointing towards the nose of the board, out of alignment with the neutral position, and may cause twisting or counter-rotation.

Place both outriggers parallel on the snow 6-12 inches (15-30 cm) from the board on either side, approximately halfway between the nose of the board and the front foot.

This position may be necessary for students who require high levels of physical support to maintain balance and strength. (For example, students who have difficulty supporting their weight or flexing their joints). If this is the best position for the student, bindings may also be adjusted closer to a racing stance, where they are both on a positive setting, pointing towards the nose of the board. This will take unnecessary pressure off the hips, knees and ankles. With this type of stance, outriggers should be adjusted to the same length, and with the same amount of brake bolt length.

NOTE: A rider may switch between the stances above in the turn sequence or may be more comfortable with a stance in between the two extremes listed. Riders may use either outrigger stance with a duck foot or racer binding set-up.

WHO COULD USE DOUBLE OUTRIGGERS?:

This type of outrigger set up may be used for students with significant balance, mobility and strength challenges. Using two outriggers can be beneficial for students who require the most amount of physical support. For example students with conditions such as cerebral palsy, spina bifida, muscular dystrophy, hemiplegia, MS, incomplete paraplegia (spinal cord injury) and those who have had strokes or traumatic brain injuries. Also students who have leg weakness, leg injury, knee injury or anyone who has had an above-knee, below-knee or double amputation.

SIX STEPS FOR DOUBLE OUTRIGGERS

Step 1: Equipment – Outrigger Set-up and Introduction

GOALS:

- Introduction to equipment
- Set up equipment for student

Using information gained via the AOT process, determine the appropriate length for the outriggers. Decide if the student will be using a 'parallel-rigger position' or 'split-rigger position'.

Ensure the outriggers are adjusted to the appropriate length from handle to cuff; handle to ski and that the heel screw is at the appropriate height. Longer outriggers will allow a more centred stance, but will decrease the amount of movement along the vertical axis. Introduce the student to the support mode and slide mode and teach the student how to adjust between these two modes. Allow the student to experiment with the outriggers, and then make adjustments as required throughout the lessons.

The ideal set-up of the snowboard bindings is -9/+9 (duck stance) but with the rider's physiology this may not be the most comfortable position. Experimentation with binding angles should be based on the rider's natural stance (AOT). Binding angles greater than 30 degrees between left and right may result in strain on the knee joints and hip sockets, and is not recommended.

Introduce the snowboard and the parts (toeside edge, heelside edge, nose, tail, base, bindings) and how they work. Allow the rider to play with the bindings (ratchets and straps), cinching and releasing until understanding of their function is achieved. Most bindings have a toe ramp to allow pressure on the toe edge to transfer to the board effectively; and a high-back to allow pressure to transfer to the heel edge effectively. The equipment explanation is so the student can start to understand what they are relying on when snowboarding.
NOTE: Some students using outriggers may find regular ratchet bindings more difficult to use; remember, there are other binding types available.

Step 2: Basic Mobility

GOALS:

- Familiarity with equipment
- Moving around on flats
- Develop the neutral position

THE NEUTRAL POSITION

During the initial steps, it is important to emphasis the neutral position and develop good habits. The neutral position (also known as the ready position, athletic position or the balanced body position) is common to many sports, and may have been encountered by the student in other activities.

In essence, the neutral position is:

- Feet shoulder-width apart
- Joints (ankles, knees, hips) flexed
- Arms to the side (where the arms are will depend on the outrigger setup)
- Head up, facing the direction of travel
- Relaxed, but ready to react

Demonstrate with the board strapped on and the rear foot pressed against the back binding. Have the student stand in the neutral position. Practice returning to the neutral position during the next series of tactics to reinforce it.

Changes to the student's stance (board set-up) will affect how the neutral position looks to an observer (shoulders may point more to the nose of the board). Outrigger set-up may also influence the neutral position, as parallel outriggers (both beside the nose) will result in a more open stance.

EQUIPMENT FAMILIARITY AND MOBILITY

After strapping the first foot in, have the rider plant the outriggers in the walking position, and by stepping over the snowboard, transfer weight to each edge to introduce them. Have the student move the snowboard, free foot and outriggers to explore the edges and neutral position and become familiar with the snowboard and outriggers.

TURNING IN A CIRCLE

To teach the rider to pivot the board (in order to get around a lift corral corner, or to change directions after practising pushing or pulling in a straight line), have the rider plant the two outriggers in the walking position on each side of the tip of the snowboard. The distance between the outriggers doesn't change. Next, lift the free foot, then the snowboard towards the outrigger in the intended direction. Reposition the outriggers and repeat until the pivot is completed.

This pivot is performed in very small steps; think of it like a minute hand. In order to successfully pivot on a slope, always stay uphill of your snowboard. If both feet are strapped in, the rider may be able to flatten the snowboard and twist against the outriggers to pivot.

SKATING

With the outriggers in the walking/upright position, have the rider try to pull (rider facing nose of board) and push (rider facing tail of board) themselves around on a flat surface. Remember to ensure the rider always has their head turned in the direction of travel to avoid collisions. The rider may choose to have both feet strapped in if balance/leg strength is an issue; otherwise, have the rider push the free foot against the rear (unused) binding to provide a more stable base of support on the board.

For pulling the rider, outriggers should be placed in the support position just ahead of the lead foot. The rider pulls their body weight until the board's rear binding is past the outrigger. Reposition the outrigger and repeat.
For pushing the rider, outriggers should be placed in between the bindings and the rider pushes their body weight away from the centre of mass towards the tail. Once the rear binding is past the outriggers, lift, reposition and repeat.
Riders with good balance and lower limb strength may try to skate naturally, using the outriggers in the sliding position. Have the rider point the hip to the direction of travel (looking ahead in that direction as well) and, with the free foot either on the heelside (for better alignment) or toeside (for more strength) near the front binding, push towards the tail of the board (keeping the stride ideally between the bindings).

NOTE: Riders may not be allowed to get on most chairlifts with two feet strapped in. Consult your local hill or program operator for specific instructions on loading, and explain the necessity.

CLIMBING

Have the student face uphill and place the outriggers in the support position. Set the outriggers firmly one step ahead (uphill, one at a time or together as balance allows). Have the student engage their toe edge to provide a base of support, allowing the free foot to step uphill to the outriggers. Then lift the board up to the free foot and engage the toe edge to provide stability. Repeat the sequence.

DESCENDING

Riders should be familiar with the process of safely descending the slope in case of fatigue, equipment failure or terrain that is unsuitable.

Have the rider place the outriggers in the support position close to their feet. Instruct them to step down with the board, the free foot and then the outriggers (either together or one at a time as balance allows). Complete this sequence of movements until the rider is at the base of the slope, or at an appropriate height for a basic slide.

Step 3: Sliding

GOALS:

- Sliding on flats
- Maintain the neutral position on a moving board
- Preparation for unloading magic carpets/lifts

STRAIGHT RUNNING

From a suitable height (slight slope to flat, or ideally slight slope to flat with a terrain assisted stop), have the rider place the outriggers in the sliding position one at a time. Once in the sliding position, move across the fall line to hold the rider in position until ready to slide. Place the free foot against the rear binding and, when ready, turn the outriggers down the fall line and slide. If the terrain is suitable, allow it to stop the student, or introduce 'heeling' the outrigger to slow and stop the rider.

HEELING

To heel the outriggers, the rider should flex the knees, ankles and hips together to engage the claw of the outrigger, while keeping the elbows near the body to achieve greater control and support on the outriggers.

NOTE: During this phase, it is important to reinforce proper body position. Head should be up and looking in the direction of travel. Knees and ankles should be slightly flexed. Shoulders, as much as possible with two outriggers, should be parallel to the board.

Having two outriggers may mean the rider has a slightly open stance (chest facing towards the nose) and may make them turn to the heelside, as the rotation in the upper body causes the board to turn. This can be compensated by having the rider shift their centre of mass slightly to the toe edge by keeping the front knee and ankle flexed (counter rotating).

OUTRIGGER POSITION

Depending on the rider's abilities, slight variations in outrigger position may be beneficial. The outriggers may be placed between the nose (tip) and the front binding, which creates a very flat board and is highly supportive. Outriggers may be placed further back between the bindings on both the heel and toeside edges which gives minimal support but extra balance and turning assistance; or somewhere in between.

Each rider will utilize the outriggers for support or balance differently, depending on their needs. Emphasis should be on using the outriggers to guide rotation of the centre of mass and induce rotation of the board, leading to a turn. Typically, the front-hand outrigger (left for regular rider, right for goofy rider) will be on the heelside slightly behind the nose of the board. The rear-hand outrigger (right for regular, left for goofy) will be on the toeside, slightly to the rear of the centre.

PUSH-PUSH-GLIDE

On flat terrain, practise sliding without the consequences of gravity, using the skills learned in basic mobility. Have the student start with a small push with the free foot (if possible) supported by outriggers in the sliding position and glide out the speed by assuming the neutral position. Increase the strength or number of pushes to gain confidence with some speed.

If the student cannot push with the free foot, practise pushing with both outriggers in the support position, quickly putting the outriggers into the slide position after the first two or three pushes.

TOE/HEEL DRAG

This tactic is useful to beginners as a way to slow themselves or introduce some direction control. This can be done when comfortable with Push-Push-Glide. Have the student push as before and, while gliding, slide their toe or heel off the board so they can drag it in the snow. The dragging toe or heel will slow the rider and create a point around which the board can pivot. This tactic can be performed on flat or slightly-sloped terrain.
This is only suitable if the rider has the use of their free foot (i.e. the rear foot is not strapped in).

HEELING

If the student cannot control or use the rear foot, similar results can be achieved by initiating friction on one side or the other by heeling the outrigger until the heel/claw catches the snow. This will slow and influence the direction of the rider, similar to dragging the toe or heel of the boot.

J-TURNS

This is a means of changing direction. Set the student up as you would for the previous tactic, but rather than sliding the rear foot or utilizing heeling to alter direction, have the student point both outriggers in the new direction while rotating the head, shoulders, hips and lower joints. Hold the rotation until the board pivots and the student is able to traverse to control speed. Repeat on the opposite edge.

For double outriggers, this tactic is pretty straightforward using the parallel position (both outriggers resting near the nose of the board). The turn to the heel may be easier to achieve due to the body already being turned in that direction because of outrigger placement.

For the split rigger position, the lead outrigger may provide more direction control, while the trailing outrigger provides more stability. It is possible in this scenario that the trailing outrigger does not initiate the direction change at all (especially to the heelside) due to the potential to steer the outrigger into the board edge.

J-Turns are usually completed with the rear foot placed on the board beside the binding, or with the rear foot dragging. However, for many students using double outriggers, it may be safest and most beneficial to complete J-Turns with both feet strapped in.

During this exercise, the student may also be physically supported; for example, holding the student's hips with their permission. Repeat with the other side (if on heelside first, try toeside).

Step 4: Control

GOALS:

- Edge control
- Speed control
- Basic direction control of the snowboard

INTRODUCTION TO EDGING (THE GAS PEDAL EXERCISE)

The Gas Pedal exercise is ideal for introducing the concept of edge control; supporting the student, with the lead foot in the binding and the other foot behind the heel edge on snow. While describing the action of a gas pedal, have the student press the toes of the snowboard foot towards the ground, as they would on a car gas pedal, until the board flattens and begins to slide. Note that too much pressure on the board may cause it to slip away too quickly. Have the student release the pedal; by lifting their toes to stop the snowboard and engage the edge. This exercise may be difficult for riders with prosthetics or weakness in the rear leg. If they have difficulties with it, try two feet in the bindings (heelside sideslip).

An alternative introduction to edging, particularly for children, may be to try a 'crab walk' for heelside or 'bear crawl' for toe-side. A game like red light/green light may also be a fun way to learn edging.

ONE-FOOT-ATTACHED TACTICS

One-Foot Sideslipping (Generally not recommended)

For some students, depending on balance, strength or conditioning abilities, it may not be safe or sensible to attempt one-footed tactics. Use your judgment as an instructor and gauge the comfort level of your student.

Similar to the gas pedal tactic, the student will start on the edge and gradually release the pressure until the board begins to slide. The outriggers will be positioned in front of the toe edge, pointing downhill. The student can use the outriggers to control speed by heeling, or can use the edge of the board combined with a slight heel drag (if able). Repeat the exercise with the toe edge (the student will be dragging their toe now instead of their heel).

One-Foot Pendulum (Generally not recommended)

Note: Remember that one-footed tactics may present unnecessary challenges to students requiring outriggers. Use your judgment as an instructor, and gauge the comfort level of your student.

Pendulum is a tactic to demonstrate the use of rotation for direction change. Rotation can be initiated by pointing the outriggers in the intended direction of travel, rotating the head, shoulders, core, hips and lower joints (if able). Maintain rotation until the top of the arc is achieved (no forward motion). Quickly lifting the outriggers, turn to the opposite side and repeat the tactic on the opposite edge.

SIDESLIPPING (TWO FEET ATTACHED)

Heelside Sideslip

On a suitable slope, have the rider place the board across the fall line on their heel edge (back facing uphill). Using outriggers in the sliding position facing down the fall line below the rider (in front of the toe edge), gradually reduce edge angle (drop toes) until the board starts moving downhill. The rider may heel the outriggers (bending knees outward to avoid 'breaking' at the waist), or increase edge angle (lift toes) to control speed. For most effective speed control, students will be heeling with their outriggers and increasing their edge angle simultaneously. However, If the student finds this difficult, determine the method to control speed (i.e. with outriggers or with edge control) prior to starting the exercise on a slope, so that proper body alignment can be maintained.

Toeside Sideslip

On a suitable slope, have the rider place the board across the fall line on their toe edge (back facing downhill). Using outriggers in the sliding position placed across the fall line, pointed at each other and above the rider (in front) for support, gradually reduce the edge angle (drop heels) until the board starts moving downhill. Outriggers may also be dragged in the support position for extra stability (they will not slide out to the sides), but this tactic is not effective at high speed because of minimal edge contact with the snow. With added pressure on the edges of the outrigger skis, the student can increase pressure on the toe edge to come to a stop or regain control.

SAFETY: The rider will not be able to see downhill without turning their head over their shoulder. A good technique is to have the student take a mental picture of the downhill terrain before setting out. Depending on student ability, the instructor must closely monitor what is approaching the rider to ensure safety. Introduce the idea of looking over the shoulder (quick head-checks) to see downhill once balance is achieved.
It is important to reinforce the neutral position throughout these tactics, as the student naturally wants to look down at the board to see what is happening.

PENDULUM/FALLING LEAF

Once the rider is effectively using edge angle to control speed, basic direction control (using one edge) can be introduced by using pressure. Have the rider apply pressure (stand heavy) on one foot to flatten the corresponding half of the board. This creates greater motion to the side of the applied pressure. To change direction, the rider must first return to neutral (even pressure on both feet, and sideslipping forwards), then lift the outriggers and place them on the snow facing the new direction before applying pressure to the opposite foot.

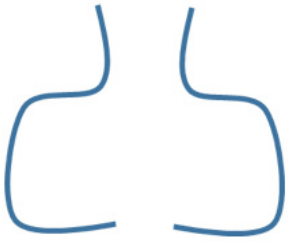
POWER PENDULUM

Once the rider is effectively using both edge angle and pressure control to manage speed and direction, introduce rotation to the sideslip. This drill is very similar to the Pendulum/Falling Leaf, but the introduction of rotation will allow the rider to point the board in the desired direction, increasing control. Starting from a sideslip, have the rider point the outriggers in the new direction while rotating the core (shoulders, hips, and knees depending on ability) in the new direction. Finish each direction change with the board approaching the fall line. As opposed to the zig-zag shape of the falling leaf, the shape will be more rounded near the vertex (lowest point) of the arc; approaching a "U" shape.

Step 5: Turning

GOAL:

- Single turn toeside
- Single turn heelside



BEGINNER TURNS

Heelside Turn: Have the student traverse across the slope on the toeside edge (facing uphill), as in a pendulum, with the lead outrigger behind the heel edge and the rear outrigger between the bindings in front of the toe edge, keeping eyes forward and slight pressure on the lead foot. Initiate the turn by rotating the head over the lead shoulder, rotating the core towards the nose of the board and the lead outrigger away from the nose of the board towards the fall line.

Begin the edge change by moving the lead knee (or lowest functional body part) in the direction of travel, and allowing the board to flatten, slightly flexing the ankle. The lead and rear outriggers point down the fall line momentarily and continue rotating across it.

Continue to direct the board through the turn with knee rotation and by pointing the outriggers in the new direction of travel. Use lead knee and ankle flexion to change from a flat base to the heel edge.

The hips follow the rotation and the student completes the turn by flexing the lower joints to engage the heel edge. The outriggers finish in the same position as starting, with the lead outrigger behind the heel edge and the rear outrigger in front of the toe edge between the bindings. Have the student look ahead, equalize weight, and if the student is using a sideslip to slow down, then bring the outriggers ahead pointing down the hill.

TOESIDE TURN:

The student begins in a traverse on the heelside edge. The lead outrigger is behind the heel edge, in line with the nose, and the rear outrigger is between the bindings in front of the toe edge.

Begin the turn by crossing the lead outrigger slightly in front of the nose of the board, and moving the lead hip, knee and ankle down the fall line (focusing on the lowest functional body part). The rear outrigger rotates minimally down the fall line.

As the student approaches the fall line, rotate the hips and allow the snowboard to flatten briefly. The outriggers point down the hill momentarily and continue rotating across the fall line.

Ensure the student keeps rotating their hips and flexing the lead knee and ankle as the outriggers continue rotating across the fall line.

As the board reaches the toe edge, the lead outrigger will pull back slightly and finish close to the nose and slightly behind the heel edge, with the rear outrigger in front of the toe edge between the bindings.

The rider will end facing uphill, and may finish in a sideslip, bringing both outriggers in front of the toeside edge (across the fall line pointed at each other), or in a toeside traverse.

OTHER SUGGESTED TACTICS FOR INTRODUCING TURNING

Static Exercises

For some students, static exercises are the safest place to start when learning to turn, as the consequences are generally low. Assess whether it is easier for your student to be walking or sliding on snow, and decide accordingly if static exercises are appropriate. If walking, assess whether the student requires outriggers for support. If outriggers are deemed necessary, use outriggers in the walk position.

Walking Through the Turn

To allow students to visualise and feel the motions and timing of a turn before being strapped onto a board, the instructor can walk the student through a turn. Starting on one edge (toes or heels), walk across the fall line in an arc. Flatten the feet when pointing down the fall line and rise up on the new edge when finishing the turn across the fall line on the opposite edge. Assess whether the student requires outriggers for support. If they do, use outriggers in the support position. If possible, walk through the turns again with the outriggers in the slide position, always pointing in the direction of travel.

Twist the Disks

Have the rider stand on the snow (no board) and rotate as though they are turning the snowboard. Watch for the rotation continuing down the body from the head and shoulders to the hips, knees, and ankles. Depending on the student's abilities, the rotation may not continue down through both feet. Examine what the outrigger is doing during the rotation, as there may be a tendency to lift the outriggers during this exercise.

GARLANDS/CHICKEN TURNS

This drill is to prepare the rider for the increase in speed due to the effect of gravity along the fall line. The rider will start in a sideslip, using both edge angle and rotation. Have the rider point the board and outriggers downhill along the fall line and then return to the starting sideslip. This eliminates the need to change edges to maintain control. Understanding the increase in speed due to the effects of the fall line will prepare the rider for linking turns as well as improve the coordination of rotation and edge angle during the turn. For toeside, the rider will need to drive the outriggers around the nose of the board, and then allow them to drag back to the sideslip position (uphill of the rider).

THE DANCE EXERCISE

The Dance exercise is a hands-on method to introduce the edge change during the turn. Essentially, the instructor (centre of the turn) will guide the rider's body through the turn from one edge to a new edge. Speed control is provided by the captive, short-radius turn around the instructor. It is recommended for the instructor to hold the student's hips and/or jacket, as the student will be holding outriggers in their hands. Verbal commands (such as flat board, heel/toe) will help the rider develop the timing for the turn.

SAFETY: When completing the dance exercise, the instructor should not have a snowboard strapped on and should not hold the rider's hands as it will interfere with the rider's turn. Be mindful of the consequences when there is a large difference in size between the instructor and the rider.

J-TURNS

Try a J-Turn as above in Step 3: Sliding. Try strapping in two feet.

Step 6: Flow

GOAL:

- Add fluidity to the student's riding
- Add vertical movement
- Vary the shape and size of turns to control their speed

ADDING A TRAVERSE BETWEEN TURNS

This tactic allows the students to begin linking turns together without coming to a complete stop or continuing downslope in a sideslip. Rather than using the sideslip at the end of the turn to control speed, the student will continue in the direction across the fall line until ready to initiate the next turn. The outriggers should always point in the intended direction of travel. Students can heel the outriggers to help slow down if there is not sufficient width or space available.

NOVICE TURNS

This tactic is useful for increasing the flow of the rider, using the flexion and extension to control pressure. While linking turns, have the student flex after the fall line when the board has changed edges. Flexion after the fall line increases the efficiency of the edge pressure and increases stability by bringing the rider's COM lower to the ground.

Again, outrigger set-up may need to be modified for this tactic, as long outriggers may catch the heel when flexing. Alternatively, the heel screw can be shortened to increase the range of motion in the outrigger.

OTHER SUGGESTED TACTICS FOR INCREASING FLOW:

Twist the Disks, With Flexion and Extension

Have the rider stand on the snow (no board) and rotate as though they are turning the snowboard. Watch for the rotation continuing down the body from the head and shoulders to the hips, knees and ankles. Once a few rotations have been made, have the rider extend or flex through the rotation; being tallest in the centered portion (shoulders parallel to the board) and going low (most flexed) at the extreme of the toe or heel rotation. This 'up un-weighting' will allow the board to have a flat base during the fall line portion of the turn.

Traverse, With Flexion and Extension

This tactic is to introduce the concept of flexion to help manage pressure generated in a turn. Have the student start a traverse (either as a stand-alone exercise or in conjunction with turning in the traverse) meanwhile moving their COM up and down by flexing the ankles, knees, and hips (if able). Outrigger length may impede the range of motion available to the student. During the flexion, the outriggers may heel (the tips of the outriggers will be lifted off the snow by the angle of the student's joint flexion). This should not be a problem as long as there is no pressure on the heel of the ski. Shorten the outriggers, or shorten or remove the heel screws to allow the outriggers to slide freely during this tactic.

Pay attention to the alignment. Depending on the level of mobility in their joints, the student may over-utilize the larger joints (hips) and underutilize the smaller joints (knees, ankles) resulting in the weight being too far over the heel edge during the exercise.

Sliding 360s

Sliding 360s are a fun tactic that can be used for many different focuses. Rotation, edge control, and pressure control are all components of this tactic. They can be done down the fall line or across the fall line.

Utilizing the fall line: Begin a sideslip. When ready, initiate rotation (in either direction) and reduce edge pressure until the student begins to spin. Hold the rotation until one revolution is complete (or more, but watch out for dizziness). Flexing to lower the COM may help with the student's stability.

Across the fall line: Begin by initiating a turn to the heelside or toeside. Rather than completing the turn with a traverse or initiating the opposite turn, maintain the rotation so that the student takes the board across the fall line in the direction of travel while reducing edge angle and pressure. This method eliminates the acceleration caused by traveling down the fall line.

Remember that the effective edge will change part way through the rotation (from heel to toe or vice versa) and instruct the student during your demonstration to avoid an unexpected edge catch!

Outriggers may not provide support during all phases of the rotation, depending on the direction of travel (i.e. when the heel of the ski is leading).

DOUBLE OUTRIGGER TROUBLE-SHOOTING TIPS

ASSESSMENT/OBSERVATION	POSSIBLE ORIGIN/REGION	DEVELOPMENT/SOLUTION
Outrigger is catching	Heel adjustment screw is too long	Shorten heel adjustment screw
Elbow gets pushed back or jerked	Heel adjustment screw is too long	Shorten heel adjustment screw
Knee pain	Bindings are not aligned well with student's physiology.	Adjust stance and bindings to more of a 'racer stance', in line with the hips.
Rider is getting pushed back onto back leg	Lead outrigger is too long.	Shorten lead outrigger
Rider's front shoulder is tipping towards their nose	Lead Outrigger is too short	Lengthen lead outrigger
Rider is using the parallel rigger stance and getting knee pain	Bindings and stance are not lined up with the stance of the rider	Adjust stance and bindings to make the upper and lower body more closely aligned (Turn towards nose, make both positive).
Student cannot control the support and slide modes on outrigger	Hand does not have enough strength or agility.	A grip glove may work. This is a specially-designed glove which wraps around the hand and straps it to the outrigger, providing more support to pull the support/slide mechanism.
Rider is over-rotating when turning.	Outrigger may be too short, causing a pivot point under the lead foot. Check stance and body position Student may have a racer stance, with upper body facing towards nose.	Adjust outrigger to achieve more even weight on each foot. Use pressure on toes to counter rotation to heel edge. Use pressure on toes to provide counter-rotation to heel edge.
Difficulties skating, standing in lift lines, loading and unloading lifts	The lead foot and leg cannot twist inward or outward as needed when manoeuvering with one foot.	Consider the use of a Swivler, allowing the lead foot to rotate toward the nose. Try switching which leg is the lead.
Pain in lead leg knee/ankle/foot when skating, standing in lift line, getting into or out of lifts.	The inward or outward twist of the lead foot and leg needed to manoeuver with one foot is causing pressure and pain to joints.	Consider the use of a Swivler to allow the lead foot to rotate toward the nose of the board.

SINGLE OUTRIGGER

Snowboarding with One Outrigger

Below is a summary of relevant adaptations to 'Six Steps for Double Outriggers'; refer back to those steps for full details.

OVERVIEW

For the single outrigger technique, the student usually holds it in their lead arm. For each turn, as the student changes from one edge to the opposite edge, the outrigger crosses over or in front of the nose of the board. This provides support to the inside of the turn, which assists with edging and pivoting. This technique helps the student begin to rotate the body towards the turn. It gives a balance point around which to pivot around and helps keep the rider's weight forward.

Alternatively, the student may use a single outrigger in their rear hand. This may work for a student who does not have the ability to hold an outrigger in their lead hand, or who finds using the rear hand more comfortable. This may particularly assist with toeside balance and for pushing on flat terrain.

WHO COULD USE?

Using a single outrigger is less intrusive than using double outriggers. One hand is free, and there are not as many pieces of equipment to control simultaneously. It is also simpler and easier to maintain a balanced body position. Using a single outrigger is particularly good for people with weakness or paralysis on one side of their body, or in one hand/arm. For students with hemiplegia or other asymmetrical weaknesses, the outrigger allows the student to compensate for their imbalance and weakness and support themselves. It may be difficult or impossible to hold an outrigger in both hands.

Other students who may benefit from using a single outrigger set-up include those with conditions such as cerebral palsy, spina bifida, muscular dystrophy, hemiplegia, MS, incomplete paraplegia (spinal cord injury) and those who have had strokes or traumatic brain injuries. Other potential candidates may have leg weakness, leg injury, knee injury or an above-knee, below-knee or double amputation.

SIX STEPS FOR SINGLE OUTRIGGER

Step 1: Equipment –Outrigger Set-up and Introduction

GOAL:

- Introduction to equipment
- Set-up equipment for student

Using the information from the AOT, decide which leg is leading and which hand will hold the outrigger. Usually it is recommended that the strong side lead (to allow better initiation), but some riders may prefer the strong side to follow depending on physical ability, previous experience, personal preference or physical comfort .

Usually the student holds the outrigger in the front hand, but grip strength may be the determining factor of which hand holds it. If the rider holds the outrigger in the rear hand, consider that it may be shorter than if it was in the lead hand

Ensure the outrigger is adjusted appropriately. Introduce the student to the support mode and slide mode and how to transfer between modes.

Step 2: Basic Mobility

GOALS:

- Familiarity with equipment
- Moving around on flats
- Develop the neutral position

THE NEUTRAL POSITION

Assist the student to adopt the neutral position, or as close an approximation as possible. With the outrigger in the front hand, the neutral position will look relatively the same as when adopted by an able bodied student. With the outrigger in the rear hand, the shoulders may point more toward the nose of the board to allow the outrigger to sit in a supportive position between the student's feet on the toe edge.

EQUIPMENT FAMILIARITY AND MOBILITY

Use the single outrigger in the support mode to complete mobility exercises. Please see "Six steps for Double Outriggers" or the "CASI Review" chapter for a full description.

TURNING IN A CIRCLE: PIVOT

Use the outrigger in the support mode to complete Turning in a Circle.
Please see "Six steps for Double Outriggers" or the "CASI Review" chapter for a full description.

SKATING

With the outrigger in support mode, have the rider try to skate using the outrigger as a balance aide. Once the student begins to gain some speed, they can try it in the sliding position.

With one outrigger, the push/pull method (described in "Six steps for Double Outriggers") for skating may be tiring for the student, and somewhat ineffective (50% of the power is lost when not using the second outrigger; there is also the effect of asymmetric force).

CLIMBING
Use the single outrigger in the support mode to complete ‘Climbing’. Keep the outrigger in front, one step ahead of the board and foot. Please see “Six steps for Double Outriggers” or the “CASI Review” chapter for a full description.

DESCENDING
Use the single outrigger in the support mode to complete ‘Descending’. Keep the outrigger in front, close to the board and foot. Please see “Six steps for Double Outriggers” or the “CASI Review” chapter for a full description.

Step 3: Sliding

GOALS:

- Sliding on flats
- Maintain the neutral position on a moving board
- Preparation for unloading magic carpets and lifts.

STRAIGHT RUNNING

Outrigger Position

Depending on the rider’s abilities, the outrigger may be in the front hand, placed close to the nose of the board behind the heelside edge. If in the rear hand, the outrigger will sit between the bindings in front of the toeside edge. Each rider may utilize the outrigger for support or balance slightly differently, depending on their needs.

Use the outrigger in slide mode. Teach the student to try to slide the outrigger smoothly across the snow. With one outrigger, there is a natural pivot point created by heeling, which may cause the rider to turn/rotate around the heeled outrigger. To counter the unwanted rotation, have the rider direct the outrigger (still heeling) in the opposite direction, or remove or adjust the heel screw. See the trouble-shooting section for more information.

PUSH-PUSH-GLIDE

Practise sliding on flat terrain without the consequences of gravity, using the skills learned in basic mobility. Have the student start with a small push with the free foot (if possible) supported by the outrigger in the sliding position, and glide out the speed by assuming the neutral position. Increase the strength or number of pushes to gain confidence with some speed.

If the student cannot push with the free foot, practise pushing with the outrigger in the support position, quickly putting the outrigger into the slide position after two or three pushes. Using only one outrigger to push will require the student to compensate with direction control of the board [pushing only on one side may make travel in a straight line difficult).

TOE/HEEL DRAG

The single outrigger will be used in slide mode and will ideally glide effortlessly across the snow. In the front hand, the outrigger will be close to the nose and held slightly behind the heel edge (heel drag) or in front of the toe edge (toe drag). Please see “Six steps for Double Outriggers” or the “CASI Review” chapter for a full description.

J-TURNS

The single outrigger will be used in slide mode. In the front hand, the outrigger will be held slightly behind the heel edge (heelside j-turns) or in front of the toe edge (toeside j-turns), close to the nose. Ask the student to point their outrigger in the new direction of travel, while rotating the head, shoulders, hips and lower joints. They need to hold the rotation until the board pivots and the student is able to traverse to control speed. Repeat on the opposite edge. Please see “Six steps for Double Outriggers” or the “CASI Review” chapter for a full description.

Step 4: Control

GOALS:

Edge control

- Speed Control
- Basic direction control of the snowboard

INTRODUCTION TO EDGING (THE GAS PEDAL EXERCISE)

The Gas Pedal analogy is ideal for introducing the concept of edge control. Support the student with the lead foot in the binding and the other foot behind the heel edge on snow. While describing the action of a gas pedal, have the student press the toes of the snowboard foot towards the ground, as they would on a car gas pedal, until the board flattens and begins to slide. Care should be taken not to apply too much pressure; the board may slip away too quickly. Have the student ‘release the pedal’ by lifting their toes to stop the snowboard and engage the edge. This exercise may be difficult for riders with prosthetics or weakness in the rear leg. If this is the case, try changing to two feet in bindings (heelside sideslip).

ONE-FOOT-ATTACHED TACTICS

One-Foot Sideslipping (May not be not recommended)

For some students, their balance, strength or conditioning may prevent them from attempting these tactics without the base of support offered with both feet strapped in. Use your judgment as an instructor, and gauge the comfort level of your student.

If beginning on the heel edge, the single outrigger will be positioned in front of the binding on the side holding the outrigger. Care should be taken to avoid running over the heel of the ski. The student can use the outrigger to control speed by heeling, being careful to keep the outrigger close to the bindings to prevent unintended rotation. They can also use the edge of the board combined with a slight heel drag (if one footed).

One-Foot Pendulum (May not be recommended)

Remember that one-footed tactics may present unnecessary challenges to students requiring outriggers. Use your judgment as an instructor, and gauge the comfort level of your student.

When using one outrigger in the lead hand doing a One-Foot Pendulum, the rider will have to lift and transfer the outrigger over the board and rotate the wrist 180 degrees to point the outrigger in the new direction of travel. If the rider is using the outrigger in the rear hand, only the wrist needs to be rotated 180 degrees to point the ski in the new direction of travel.

Repeat the tactic on the opposite edge. When introducing the release and use of edge on the toeside the student's free foot is in front (uphill) of the rider.

SIDESLIPPING (TWO FEET ATTACHED)

Heelside Sideslip

On a suitable slope, have the rider place the board across the fall line (back facing uphill), and place the outrigger in slide mode, in front of the toe edge, towards the centre of the board. Gradually reduce edge angle (drop toes) until the board starts moving downhill. Riders may heel the outrigger (bending knees outward to avoid 'breaking' at the waist), or increase edge angle (lift toes) to control speed. For most effective speed control, students will be heeling their outrigger and increasing their edge angle simultaneously. If the student finds this difficult, determine the method to control speed (i.e. with their outrigger or with edge control) prior to starting the exercise on a slope. Proper body alignment can then be maintained.

Toeside Sideslip

On a suitable slope, have the rider place the board across the fall line (back facing downhill). Use the outrigger in the sliding position and placed across the fall line, above the rider (in front) and centred. Gradually reduce the edge angle (drop heels) until the board starts moving downhill. The Outrigger may also be dragged in the walking position for extra stability (as they will not slide out to the sides), but this tactic is not effective at high speed because there is minimal contact of the edge with snow. With added pressure on the edges of the outrigger ski, the student can increase pressure on the toe edge to come to a stop or regain control.

Pendulum/Falling Leaf

When using one outrigger in the lead hand to do the Pendulum, the rider will have to lift and transfer the outrigger over the board and rotate the wrist 180 degrees to point the outrigger in the new direction of travel. If the rider is using it in the rear hand, only the wrist needs to be rotated 180 degrees to point the ski in the new direction of travel. In the learning phase, you may opt to not use the outrigger, and instead support the rider with hands or tethers or another piece of adaptive equipment like a Sno-Wing.

Mitigating Breaking at the Waist:

It is good to keep in mind that, when the outrigger is downhill of the snowboard, riders may have a tendency to break at the waist. This can be mitigated by keeping the knees and ankles flexed.

POWER PENDULUM

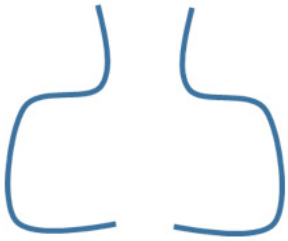
When using one outrigger in the lead hand doing power pendulum, the rider will have to lift and transfer the outrigger over the board as well as rotate the wrist 180 degrees to point the outrigger in the new direction of travel. If the rider is using it in the rear hand, only the wrist rotation is needed.

NOTE: The Falling Leaf and Power Pendulum may present difficulties to some students due to having to ride switch (with the prosthetic or weaker leg in the lead).

Step 5: Turning

GOALS:

- Single turn toeside
- Single turn heelside



BEGINNER TURNS

Heelside Turn

If using the outrigger in the lead hand, the student should start in a toeside traverse with the outrigger above them, in front of their toe edge. When ready, they can initiate the turn by rotating the head, shoulder, core and outriggers towards the nose of the board. As the board flattens have the student direct the lead knee and ankle (focusing on the lowest functional body part) down the fall line, then cross the outrigger in front of their nose towards the heel edge and pointing down the fall line. They will complete the turn with the outrigger behind them on the heel edge in a sideslip or traverse.

If using the outrigger in the rear hand, the student will start in a toeside traverse with the outrigger supporting them above and in front of the toeside edge. The outrigger should already be pointing in the direction of travel. The outrigger follows the student through the turn, and since it remains on the toeside, the student may be advised to complete the turn in a sideslip, using the outrigger in front for support. Please see “Six steps for Double Outriggers” or the “CASI Review” chapter for a full description.

Toeside Turn

The student begins in a traverse on the heelside edge. If using the outrigger in the lead hand, the outrigger will be behind their heel edge. Engage the joints to point down the fall line. (focusing on the lowest functional body part). As the student crosses through the fall line, the snowboard will flatten briefly and the outrigger will cross in front of the nose of the board. The outrigger will finish in front of the toe edge, and the student will finish in a sideslip or traverse on the toe edge.

If using the outrigger in the rear hand, the student will start in a heelside traverse with the outrigger supporting them below. The outrigger can help the student through the turn, pointing in the direction of travel and remaining in front of the toe edge of the board.

Please see “Six steps for Double Outriggers” or the “CASI Review” chapter for a full description.

OTHER SUGGESTED TACTICS FOR INTRODUCING TURNING

Static exercise: Walking Through the Turns

To allow students to visualise and feel the motions and timing of a turn before being strapped onto a board, the instructor can walk the student through a turn. Starting on one edge (toes or heels), walk across the fall line in an arc, flattening the feet when pointing down the fall line and rising up on the new edge when finishing the turn across the fall line on the opposite edge. Assess whether the student requires outriggers for support. If so, use the outriggers in the support position. If possible, walk through the turns again with the outrigger in the slide position, always pointing in the direction of travel. Depending on which hand is holding the outrigger, the student will be able to support themselves on either the toeside (rear hand) or heelside (front hand) more easily.

Static exercise: Twist the Disks

Have the rider stand on the snow (no board) and rotate as though they are turning the snowboard. Watch for the rotation continuing down the body from the head and shoulders to the hips, knees and ankles. Depending on the student’s abilities, the rotation may not continue down through both feet. Examine what the outrigger is doing during the rotation also, as there may be a tendency to lift the outrigger during this exercise.

OTHER SUGGESTED TACTICS FOR INTRODUCING TURNING

Garlands/Chicken Turns

This drill is to prepare the student for the increase in speed due to the effect of gravity along the fall line. The rider will start in a sideslip, using both edge angle and rotation. Have the rider point the board and outriggers downhill along the fall line and then return to the starting sideslip. This eliminates the need to change edges to maintain control. Understanding the increase in speed due to the effects of the fall line will prepare the rider for linking turns, as well as improve the coordination of rotation and edge angle during the turn.

Depending on which hand the student is using to hold the outrigger, it may not always provide efficient support. For the lead hand (heelside), the rider may not have support performing this tactic on the toe edge. The opposite is true for students using the outrigger in the rear hand (toeside)—this may not provide efficient support on the heel edge.

The Dance Exercise

The Dance exercise is a hands-on method to introduce the edge change during the turn. Essentially, the instructor (at the centre of the turn) will guide the rider's body through the turn from one edge to a new edge. Speed control is provided by the 'captive', short-radius turn around the instructor. The instructor should hold the student's hips and/or jacket, as the student will be holding the outrigger in their hand. Verbal commands (such as "flat board" or "heel/toe") will help the rider develop the timing for the turn.

NOTE: the instructor should not have a snowboard strapped on for this drill as it will interfere with the rider's turn. Be mindful of the consequences when there is a large difference in size between the instructor and the rider.

J-TURNS

Try a J-Turn as above in Step 3: Sliding. Try strapping in two feet.

Step 6: Flow

GOALS:

- Add fluidity to student's riding
- Add vertical movement
- Vary the shape and size of turns to control their speed

FLUIDITY WHEN USING AN OUTRIGGER

Timing and coordination with an outrigger is sometimes challenging; the outrigger should lead the rider. If the board begins to outrun the outrigger, it may trip up the rider. The outrigger should initiate the turn and begin the weight transfer to the active edge.

When the snowboard is traversing across or gliding down the hill, the outrigger ski should run along the snow smoothly, working together with the board in a parallel path without friction. When it is time to make a turn or edge change, the outrigger can be helpful. The outrigger guides the snowboard, by beginning to point in the new direction of travel slightly ahead of the it. When pointed in this new direction of travel, the outrigger ski generates friction, and creates a pivot point for the board to turn around. The snowboard follows the outrigger, and this helps to bring the rider around more quickly.

ADDING A TRAVERSE BETWEEN TURNS

This tactic allows the student to begin linking turns together without coming to a complete stop or continuing downslope in a sideslip. The outrigger should always point in the intended direction of travel. Students can use the outrigger to turn up the hill or heel the outrigger to help slow down if there is not sufficient width or space available. During the traverse, the outrigger should generally remain above the uphill edge of the rider.

If the student is using the outrigger in the rear hand, there may be a challenge in initiating the heelside turn due to interference from the board. Emphasis should be on the rotation of the body and not the outrigger for that turn initiation, with the outrigger providing support.

NOVICE TURNS

This tactic is useful for increasing the flow of the rider, using the flexion and extension to control pressure. Again, outrigger set-up may need to be modified for this tactic, as a long outrigger may catch the outrigger heel when flexing. The heel screw can be shortened or removed to increase the range of motion in the outrigger, or the outrigger length can be shortened.

Please see “Six steps for Double Outriggers” or the “CASI Review” chapter for a full description.

OTHER SUGGESTED TACTICS FOR INCREASING FLOW:

Twist the Disks With Flexion and Extension

Have the rider stand on the snow (no board) and rotate as though they are turning the snowboard. Watch for the rotation continuing down the body from the head and shoulders to the hips, knees, and ankles. Once a few rotations have been made, have the rider extend/flex through the rotation; being tallest in the centred portion (shoulders parallel to the board) and getting lower (the most flexed) at the extreme of the toe or heel rotation. This ‘up un-weighting’ will allow the board to have a flat base during the fall line portion of the turn. Use the outriggers in support mode for support.

Traverse with Flexion/Extension

During a traverse, have the student move their COM up and down by flexing the ankles, knees and hips (if able). Outrigger length may impede the range of motion available to the student. During the flexion, the outrigger may heel (the tip of the outrigger may be lifted off the snow by the angle of the student’s joint flexion). This should not be a problem if there is no pressure on the heel of the ski. Shorten the outrigger or shorten/remove the heel screw to allow the outrigger to slide freely during this tactic.

Pay attention to the alignment. Depending on the level of mobility in their joints, students tend to over-utilize the hips and underutilize the knees and ankles, resulting in their weight being too far over the heel edge during the exercise.

Sliding 360s

This is a fun tactic that can be used for many different focuses. Rotation, edge control, and pressure control are all components of this tactic. They can be performed down or across the fall line.

The outrigger may not be able to provide support during all phases of the rotation depending on the direction of travel. Please see “Six steps for Double Outriggers” or the “CASI Review” chapter for a full description.

SINGLE OUTRIGGER TROUBLE-SHOOTING TIPS

ASSESSMENT/OBSERVATION	POSSIBLE ORIGIN/REGION	DEVELOPMENT/SOLUTION
Outrigger is catching	Heel adjustment screw is too long	Shorten heel adjustment screw
Elbow gets pushed back or jerked	Heel adjustment screw is too long	Shorten heel adjustment screw
Student is over-rotating when they are using the outrigger to heel to a stop	Single pivot point created by heeled outrigger	Counter the rotation by driving the outrigger in the opposite direction. If heeling causes rotation to the heel edge, drive the outrigger around the nose of board to the toe edge, leading to a more neutral body position.
Outrigger is catching on the nose of the snowboard when changing edges.	Outrigger is too short	Lengthen outrigger
Outrigger is slipping on the snow, causing the student to lose balance	Brake bolt is too short	Lengthen brake bolt
Outrigger is getting caught up	Timing and co-ordination is out. Outrigger is not leading the way of the snowboard.	Work on smoothing out the timing and co-ordination so that the outrigger leads the snowboard and its turning arc.
Outrigger is getting caught up	Outrigger is too close to the snowboard	Lengthen outrigger or work on correct placement.
Over-rotation during single or linked turns	Weight not centred (too much on front foot); not returning to neutral (timing)	Outrigger may be too short if the body's COM is leaning forward of centre. If timing appears to be an issue, use static exercise or more verbal commands to queue sequence. Consider using a wiffle ball in the early steps of the progression.
Outrigger is not facing in the direction of travel.	Student is misplacing the outrigger ski on the snow	Consider using a wiffle ball or temporarily removing the outriggers.
Student is frustrated with the outrigger.	Too many limbs and pieces of equipment to co-ordinate	The instructor or adaptive equipment may help because the student does not have to control them independently.

FIXED OUTRIGGER

Back outrigger in a binding or boot

OVERVIEW:

Snowboarding with one sliding and one fixed outrigger in place of a rear (or front) leg can be done. For this method, the outrigger is either strapped into the binding (with or without foam to secure it in place) or inserted and secured in a boot (various methods have been used).

This method will allow the outrigger and arm, shoulder, etc to exert pressure on the snowboard, much as a leg would. By fixing the outrigger in either the binding or boot, the pivot of the outrigger (where the ski meets the post) functions like an ankle and allows specific pressure to be put on the toeside or heelside of the board.

WHO COULD USE IT?

This outrigger set-up is for students who have only one leg or prosthetic that is currently useable. It is also for people who have a residual limb with nothing attached to it. The outrigger that is in the back binding or boot acts in place of the second leg. It allows weight to be more evenly distributed over the board, and for the COM to be closer to the center of the board.

This method may also be used for persons with weakness in the lower limb only (as they will require strength in the upper body to support the body weight), such as those with polio, or other causes of specific weakness.

Fixed Outrigger: Set-Up

OUTRIGGER IN BINDING

This set-up does not require damage to equipment. To secure the outrigger in the binding, simply place the outrigger in the slide position into the binding plate, and ratchet the straps as tightly as they will go. There will be movement of the ski, but it cannot leave the binding. To provide more responsiveness and less movement, foam scraps can be placed between the ski and the binding straps.

NOTE: The claw may protrude past the edge of the board. This may cause irregular heel drag. Inserting foam between the post and the highback can shift the ski towards the toe and eliminate this drag. Caution should be used so as not to induce the same problem on the toeside.

OUTRIGGER IN BOOT - DETACHABLE

This set-up requires some preparation, but can also be used in rented equipment. An outrigger without a ski is required. You will also need a traffic cone or pylon (or any other semi rigid, cone shaped object) and a ball or ball-type object of similar material.

The ball is affixed to the post of the outrigger, which is then placed under the cone (or pylon) so that the ball prevents the post from leaving the cone. This assembly is then laced into a boot, the lacing preventing the cone assembly from coming out the top of the boot.

The ball provides more movement through the fore/aft and lateral planes, thus giving the rider greater pressure control.

OUTRIGGER IN BOOT - PERMANENT

This set-up requires the use of a boot. An outrigger with a small plate, or a broken ski) is placed into the boot and an expanding foam is sprayed into the boot to capture the outrigger.

Choosing foam that is semi-rigid or compressible will allow pressure to be exerted much like the ‘ball and cone’ method.

SIX STEPS FOR A FIXED OUTRIGGER

Step 1: Equipment

GOALS:

- Introduction to equipment
- Set up equipment for student

OUTRIGGER AND EQUIPMENT SET-UP AND INTRODUCTION

If, when completing the AOT, a fixed outrigger set-up is decided on, choose the appropriate set-up, either outrigger in binding or outrigger in boot (detachable or permanent). The rear (or fixed) outrigger should be adjusted for a comfortable height and support with the knee bent in the neutral position. The rider should be able to transfer weight fore/aft, laterally, as well as rotate freely, without restriction from the height of the outrigger. They should not have to pull the outrigger to be mobile.

The front outrigger will be set-up as described in the section above, “Six Steps for a Single Outrigger”.

If the rider has a rear leg and for whatever reason does not want to put weight on it, the rear limb may be ‘slung’ to the strong leg to help keep it within the stability triangle (near the COM). A snowboard leash--one-inch wide nylon, approximately two feet long with a loop on one end (to create the foot rest) and a pair of clips on the other (to attach to the thigh)--can be used. The loop acts as a foot rest and clips to the thigh to keep the limb off the snowboard. NOTE: A shorter board may ease acquisition of skills for this method. Height of the post may differ depending on the construction method.

Step 2: Basic Mobility

GOALS:

- Familiarity with equipment
- Moving around on flats
- Develop the neutral position

THE NEUTRAL POSITION

During the initial steps, it is important to emphasize the neutral position and develop good habits. Essentially, the neutral position is: 1) base of support (leg and outrigger) shoulder-width apart 2) joints flexed 3) head up and body relaxed. When using the fixed outrigger set-up, the front arm will be holding a regular outrigger in a relaxed and alert position, and the back arm will be using a fixed outrigger (in binding or boot) and will support fifty per cent of the student’s weight (acting as a back leg).

Changes to the student’s stance (board set-up) will affect how the neutral position looks to an observer (shoulders may point more to the nose of the board depending on the binding stance angle).

EQUIPMENT FAMILIARITY AND MOBILITY

After strapping the first foot in, have the student plant the front outrigger in the support position. Remove the rear (fixed) outrigger from the binding, and place it on the snow on the same edge as the front outrigger. The boot outrigger will be on snow, and the rear outrigger will be in support mode, also on snow). Encourage the student to try to flex the lower joints (ankles, hips and knees) to bring one edge off the snow. Flatten the board, then slowly transfer the outriggers one at a time to the opposite edges, bringing them off the snow. Alternatively, have the student keep the fixed outrigger in the binding, and the front outrigger in support mode and work on placing weight on the front outrigger (switching edges) and flexing the joints to explore the edges.

TURNING IN A CIRCLE - PIVOT
Practise pivoting the snowboard with both the fixed and front outriggers in the snow on opposite sides of the snowboard in a stable position. Using the outriggers to bear the weight of the student, have them lift and move the snowboard in the direction intended, until it approaches the outriggers. Reposition the outriggers and repeat the motions until the student has completed a revolution. Repeat in the opposite direction.

The student may also try sliding the snowboard between the outriggers, without lifting. This exercise improves edge control and can illustrate the differences between on edge and flat base.

SKATING
Using a regular outrigger and the fixed outrigger (in binding or in boot) removed from the binding, skate around a flat as you would using the push and pull methods introduced in the Double Outriggers chapter. Using the push or pull methods, it is important to look in the direction of travel and, as much as possible, keep the hips in line with the snowboard.

When using a fixed outrigger in boot set-up, the push method will apply less stress on it.

CLIMBING *(not recommended)*
Please see “Six Steps for Double Outriggers” or the “CASI Review” chapter for a full description.

DESCENDING *(not recommended)*
Please see “Six Steps for Double Outriggers” or the “CASI Review” chapter for a full description.

Step 3: Sliding
GOALS:
- Sliding on flats
- Maintain neutral position on a moving board
- Preparation for unloading magic carpets/lifts

STRAIGHT RUNNING
Outrigger Position: Use the sliding (front) outrigger as per “Snowboarding with Single Outrigger”.

Use the fixed outrigger (or boot outrigger) strapped in the binding to introduce sliding to provide maximum stability.

Once basic skills have been acquired, in anticipation of riding the chairlift, come back to suitable terrain and practice sliding with only the front foot in.

Please see “Six steps for Double Outriggers” or the “CASI Review” chapter for a full description.

PUSH-PUSH-GLIDE
Using flat terrain, practise sliding without the consequences of gravity, using the skills learned in basic mobility. Have the student start with a small push with the two outriggers. Depending on the fixed outrigger construction, this tactic may be difficult to achieve, as the fixed outrigger may not slide or may not be suitable for pushing.

A fixed outrigger constructed with a boot may be used similar to a rear foot for the glide. The sole will provide traction on the board topsheet.

TOE/HEEL DRAG
This tactic is useful to beginners as a way to slow themselves or introduce some direction control. Have the student push as in push-push-glide, and while gliding, slide the toe or heel of the fixed outrigger (depending on construction) off the board so that they can drag it in the snow. The dragging toe or heel will slow the rider, and create a point around which the board can pivot. This tactic can be performed on flat or slightly-sloped terrain.

If the student is using a fixed outrigger in a boot, use a modified boot drag in place of a heel or toe drag. The rider can drag the boot outrigger as you would your back foot. Practice dragging the boot on both edges of the board.

J-TURNS

A J-Turn adds rotation as a means of changing direction. Set the student up as you would for the previous tactic (toe/heel drag), but rather than sliding the fixed outrigger or utilising heeling to alter direction, have the student point their sliding outrigger in the new direction. They should also rotate the head, shoulders, hips and lower joints plus the fixed outrigger in the binding. Have them hold the rotation until the board pivots and the student is able to traverse to control speed. Repeat in the opposite direction.

Heeling: If the student cannot control the rear foot, similar results can be achieved by heeling the outrigger, creating friction. Heeling the outrigger so that the heel/claw catches the snow will slow, and influence the direction of, the rider. This is similar to dragging the toe or heel of the boot.

Step 4: Control

GOALS:

- Edge control
- Speed control
- Basic direction control of the snowboard

INTRODUCTION TO EDGING (THE GAS PEDAL EXERCISE)

The Gas Pedal exercise is ideal for introducing the concept of edge control on a very gentle slope. Begin on the heel edge, with the lead foot in the binding and the lead outrigger in front of the board. The fixed outrigger should be placed in front of the toe edge, supporting the student's weight. Have the student press the toes of the lead foot towards the ground as they would on a car gas pedal, until the board flattens and begins to slide. Remind them to take care not to press too hard as the board may slip away too quickly. Have the student "release the pedal" by lifting their toes to stop the snowboard and engage the edge. This exercise may be difficult based on the fixed outrigger construction; if the student has difficulty, try changing to two feet in bindings (heelside sideslip).

The reverse analogy works on the toe edge; apply and "release the brake pedal"' to introduce toeside edge control.

ONE-FOOT-ATTACHED TACTICS

One Foot Sideslipping (Generally not recommended)

Depending on how the outrigger is constructed, this tactic may be omitted.
If using a boot set-up, the tactic is similar to teaching a student with a single outrigger. The fixed outrigger provides support on the board, and to some extent by sliding the toe or heel of the boot partway off the board to drag in the snow.

One-Foot Pendulum (Generally not recommended)

Depending on fixed outrigger construction, this tactic may not be beneficial to the student.

Traveling in the switch direction may not be possible with a boot construction because the outrigger will not slide.

SIDESLIPPING (TWO FEET ATTACHED)

Heelside Sideslip

With the outrigger fixed in the binding, use the upper body to pressure the outrigger evenly with the strong leg. The sliding outrigger may or may not be required for balance placed downhill, in the sliding position. Please see “Six steps for Double Outriggers” or the “CASI Review” chapter for a full description.

Toeside Sideslip

The toeside may present more challenge as the outrigger lacks a ‘toe’ joint. The sliding outrigger may be used for balance, uphill of the rider. Please see “Six steps for Double Outriggers” or the “CASI Review” chapter for a full description.

Pendulum/Falling Leaf

Due to the difficulty of riding switch (fixed outrigger forward), stopping to change directions (and edges, consequently) may be required. Alternate the starting location/edge at the top of the slope to encourage even mileage on both edges. Please see “Six steps for Double Outriggers” or the “CASI Review” chapter for a full description.

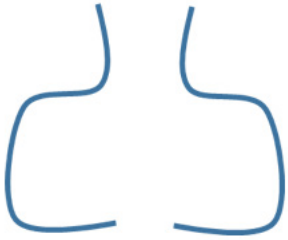
Power Pendulum

As above. You could modify this drill by linking the same edge twice in sequence (a ‘W’ shape). Stop, change edges, and repeat in the other direction across the fall line to improve mileage. Similar to a garland…
Please see “Six steps for Double Outriggers” or the “CASI Review” chapter for a full description.

Step 5: Turning

GOALS:

- Single turn toeside
- Single turn heelside



BEGINNER TURNS

Heelside Turn:

Performing the initial heelside turn, it may be difficult to find the correct amount of pressure on the fixed outrigger. Support should be offered to minimise falls. Begin with a fairly flat base and initiate the turn with the rotation of the upper body, then rotate the lower body (focusing on the lowest possible body parts) to begin the turn. Later, introduce minimal pressure on the heel edge with the leg and fixed outrigger. Please see “Six Steps for Double Outriggers” or the “CASI Review” chapter for a full description.

Toeside Turn:

Performing the initial toeside turn, it may be difficult to find the correct amount of pressure on the fixed outrigger. Support should be offered to minimise falls. Begin with a fairly flat base, and initiate the turn with the rotation of the upper body, then rotate the lower body (focusing on the lowest possible body parts) to begin the turn.

Please see “Six steps for Double Outriggers” or the “CASI Review” chapter for a full description.

OTHER SUGGESTED TACTICS FOR INTRODUCING TURNING

Static exercise: Walking Through the Turns

Walking through turns may not be possible. Consider using the ‘twist the disks’ tactic with an emphasis on pressuring the toes/heels as appropriate.

Static exercise: Twist the Disks

This tactic can be used as a static exercise to show how the rotation of the upper body transfers down into the boots (and snowboard). Standing on snow, with the fixed outrigger positioned as it would be on a snowboard, have the student rotate the foot and fixed outrigger together by using a twist in the upper body. Examine how the foot and fixed outrigger leave marks in the snow. Depending on the method used to build the fixed outrigger, the student may feel the rotation of the outrigger in the snow, or feel the rotation acting on the ski.

Garlands/Chicken Turns

Remind the student to keep equal weight on the leg and the fixed outrigger (or transfer slightly forward to initiate the turn) and lead with the sliding outrigger.

The Dance Exercise

The Dance exercise can be done using fixed outriggers. They may provide additional support during this tactic, allowing the student to gauge and correct, if necessary, the amount of pressure being applied during the turn. It is important to minimize input into the outrigger, and allow the student to feel and learn to manage edge pressure. Be mindful of the outrigger handle and other protrusions when using a hands-on approach.

Step 6: Flow

GOAL:

- Add fluidity to the student's riding
- Add vertical movement
- Vary the shape and size of turns to control their speed

ADDING A TRAVERSE BETWEEN TURNS

This tactic allows the students to begin linking turns together without coming to a complete stop or continuing downslope in a sideslip. The sliding outrigger should always point in the intended direction of travel. Students can heel the outrigger to help slow down if there is not sufficient width or space available. Remember to apply even pressure to the rear fixed outrigger.

Please see "Six Steps for Double Outriggers" or the "CASI Review" chapter for a full description.

NOVICE TURNS

This tactic is useful for increasing the flow of the rider, using the flexion and extension to control pressure. Again, encourage the student to utilize even pressure distribution. As the fixed outrigger is not height-adjustable, the student will have to bend the upper limb to accommodate the flexion of the opposite lower limb. Remember to apply even pressure to the rear fixed outrigger.

When linking turns, be sure to use adequate pressure on the fixed outrigger (when on edge) and un-weight during the edge transition, or the transition will be slow or late and may cause a fall.

Please see "Six Steps for Double Outriggers" or the "CASI Review" chapter for a full description

OTHER SUGGESTED TACTICS FOR INCREASING FLOW:

Twist the Disks With Flexion and Extension

Have the rider stand on the snow (no board) and rotate as though they are turning the snowboard. Use the outrigger in the front hand in support mode. The rear hand will have an outrigger in a boot or on the snow (try the tactic in walk and slide mode). Watch for the rotation continuing down the body from the head and shoulders to the hips, knees, and ankles. Once a few rotations have been made, have the rider extend/flex through the rotation; maintaining height in the centred portion (shoulders parallel to the board) and going low/being the most flexed at the extreme of the toe or heel rotation. This "up un-weighting" will allow the board to have a flat base during the fall line portion of the turn. Use the outriggers in support mode for support.

Traverse With Flexion and Extension

This tactic is to introduce the concept of flexion to help manage pressure generated in a turn. Outrigger length may impede the range of motion available to the student (either the sliding rigger or the fixed rigger may require adjustment). During the flexion, the outriggers may heel (the tips of the outriggers will be lifted off the snow by the angle of the student's joint flexion). This should not be a problem if there is no pressure on the heel of the ski. Shorten the outrigger, or shorten or remove the heel screw to allow the outrigger to slide freely during this tactic.

The fixed outrigger will remain constant in length. Be sure that while the student is flexed, they are using equal pressure between the bindings.

Please see "Six Steps for Double Outriggers" or the "CASI Review" chapter for a full description.

Sliding 360s

Sliding 360s are a fun tactic that can be used for many different focuses. Rotation, edge control, and pressure control are all components of this tactic. They can be done down the fall line or across the fall line.

Remember that the effective edge will change part way through the rotation (from heel to toe or vice versa) and instruct the student during your demonstration to avoid an unexpected edge catch!

The fixed outrigger should allow the student to pressure each edge as they rotate through the 360 (lateral movement).

Please see “Six Steps for Double Outriggers” or the “CASI Review” chapter for a full description.

FIXED OUTRIGGER TROUBLE-SHOOTING TIPS

ASSESSMENT/OBSERVATION	POSSIBLE ORIGIN/REGION	DEVELOPMENT/SOLUTION
Fixed rigger is moving in the binding	Not enough downward pressure on the fixed rigger	Put more downward pressure on the fixed rigger or try a boot in the binding so there is less movement.
Difficult to turn	Base of support is not strong enough, stance is too wide.	Move bindings closer together for a narrower stance.
Beginning of turn happens quickly and the end of the turn is slow to come around.	Weight is too far forward	Try to centre weight more evenly.
Uncontrolled rotation (over-rotation)	Too much pressure on front foot (or rear, depending on where pivot is); not enough or too much pressure on fixed outrigger	As above, try to balance pressure between front and rear binding.
Hard to initiate turns/under- rotation	Possibly too much weight on the rear half of the snowboard.	Centre position or lengthen outrigger to put more weight on front leg.

LIFT PROCEDURES - FOR STUDENTS WITH OUTRIGGERS

Magic Carpet

The magic carpet is usually the first lift that a rider will encounter. Carpets consist of a moving rubber surface on which the rider will stand while being conveyed up the slope. Beside the loading area, have the student watch other students load the lift; be sure to note the distance between riders (for safety) and the sequence of movements. Be sure to discuss what to do in the event of an emergency stop (balance may be an issue) or a fall (getting up on a moving surface may be difficult). Most carpets feature a walkway beside the conveying surface, and it may be advisable for the instructor to walk beside the student when practical.

QUEUEING UP

The rider queues up to the loading ramp using the front sliding outriggers in the support position. For fixed outrigger users, depending on construction, the rear post (fixed outrigger) may be removable to assist with mobility on flats. If the rear outrigger is removable from the binding, assist the student to remove it and use as you would with a student with two outriggers

PREPARING TO LOAD

Once the rider ahead is past the mark (load spacing), have the student push gently with the outriggers or free foot until the nose of the board is gripped by the rubber belt. The instructor can be in front, beside or behind the student (board off--have the second instructor or aide carry it) to provide assistance or balance to the rider. Try to avoid standing on the carpet because you may trip the weight sensors.

LOADING

Guide the student to allow their board to be shuttled until the lead foot is past the ramp; then instruct the rider to quickly place the outriggers or free foot in a stable position to either side of the snowboard. Placing the outriggers slightly behind the rider in the support position may prevent slippage. If using a fixed outrigger and the post is not removed, twisting the front and rear of the snowboard to create torsion may improve edge grip on the rubber belt.

RIDING THE CARPET

Have the rider place their outriggers down on the carpet to reduce slipping if the belt is icy. If the boot is removable, slide the heel or toe off the board to provide traction on the belt.

PREPARING TO UNLOAD

At the top of the carpet, the slope will level off. Instruct the rider to prepare to unload by placing the outriggers in the slide position, to avoid catching the ski brakes in the carpet. If using the outrigger in boot set-up, instruct the student to slide it back onto the board to prevent catching the snow. (If using a removable post, the rider may be able to put the post back in the boot and slide it off the carpet; be sure you can clear the offload area quickly).

UNLOADING

Allow the rider's board to slide off the carpet and quickly clear the unloading area by returning their outrigger to the support position; there is most likely another rider behind them! The instructor may be at the top of the carpet (ahead of the rider) to assist with unloading.

PREPARING TO SNOWBOARD

Have the student skate to the side to a point where you can prepare for the run.

NOTE: It may be possible to use a chair to sit on while riding the carpet, if fatigue is an issue for the rider. Consult the ski area operator prior to doing so. If using a fixed outrigger set-up, the above process may be modified depending on construction. It is important to try to maintain three points of contact on the carpet.

T-Bar/J-Bar/Poma/Tow Rope

As before, always show the rider the use of the lift prior to getting in line. Allow the rider to ask questions. Some hills may have a 'practice' bar available to demonstrate to students how the lift operates.

NOTE: Riding this type of lift may be extremely challenging, and may require a significant amount of time for trial and error in order for the student to become successful. If allowed by the resort, the student may keep both feet strapped in (single or double outriggers).

PREPARING TO LOAD

Once the rider ahead has cleared the take-off area, assist the student to skate/slide to the line indicated for loading. (If the student has a fixed outrigger set-up, they will be unable to skate without a rear foot.) Have the student remove their front-sliding outrigger or have it hanging free from the cuff. Their free front hand will need to be available for holding the bar. The back hand may remain attached to the rear outrigger (or fixed outrigger) to balance the rider.

LOADING

The operator will place the bar between the rider's legs, against the lead thigh. The student should use the remaining outrigger (rear hand, if available) in the sliding position to balance as the bar pulls them upslope. The instructor (with the student's front outrigger, if removed) should follow them and disengage where they do.

RIDING THE SURFACE LIFT

Instruct the student to centre their balance holding the handle of the lift bar as the lift pulls them up the slope. Make sure the student does not sit on the bar. It is not designed to support the full weight of a rider.

UNLOADING

At the top, there will be a sign or mark indicating where to unload. Instruct the student to pull the bar from between their legs and gently let it go ahead of them. Be aware, the bars are spring loaded and will very quickly rise up out of the way. Make sure the student does not throw the bar. Ideally, the instructor will be available to give the student their front outrigger or physically assist them.

PREPARING TO SNOWBOARD

Assist the student to slide out of the unloading area to a safe spot to begin the lesson and proceed down-slope. Remember, the student will be unable to skate without a free rear foot.

Chairlift

Chairlifts are ubiquitous in the sport of snowboarding. The majority of ski areas operate lifts in similar configurations. Standing beside the loading area in a safe spot, discuss the process of queueing (the maze), approaching the loading zone and loading the chairlift (using other skiers and snowboarders as examples). Be sure to discuss the unloading at the top so there are no surprises! If possible, use a practice chair to practise sitting and standing (loading and unloading) onto the board--off loading can be tricky. Practise straight running with the rear foot out of the bindings to build confidence and improve the chances of successful unloading.

NOTE: The student may need to remove their fixed outrigger from its binding or the pole from the boot. Please check with the lift operator before loading.

APPROACHING THE LOAD

When safe, assist the rider to approach the loading line from the maze. Some lifts may be equipped with an indicator light (traffic or other). Guide the rider to slide ahead, perhaps using the outrigger to push/pull the rider.

PREPARING TO LOAD
Assist the student to stop at the loading line (either a coloured mark on snow, or indicated by a pylon or sign) and prepare for the chair approach. Have the student place their outriggers in the slide position to prevent the brake from catching.

LOADING
When the chair arrives, assist the student to sit and allow their snowboard to remain flat beneath the chair. Instruct the rider to lift their front sliding outrigger and place it in front of their body.

SAFETY BAR DOWN
Once the chair has proceeded, the student's board will lift off the snow. If the chair is equipped with a rest bar, instruct the rider to place their snowboard on the bar. Otherwise, the instructor may be able to support the weight of the student's snowboard with their free foot if necessary. The outrigger should stay on the student's arm, and can be rested on the lap, or on the bar (if equipped).

SAFETY BAR UP
Near the top, there may be signs indicating the approaching unloading area. Instruct or assist the student to lift the bar when prompted, and prepare to unload.

PREPARING TO UNLOAD
On the unloading ramp, guide the student to align their snowboard with the intended direction (usually straight ahead).

UNLOADING
When they are ready, assist the rider to stand up on their board and put the outrigger on the snow in the sliding position. (This will be very challenging if the student has been advised to remove their rear fixed outrigger.) Assist the student to 'straight run' down the off-loading ramp and proceed to a safe area to strap on their board.

SCOUT THE LIFTS
It may be advisable to scout the lifts you plan on using to, check the slope of the off-loading ramps. Steep sloped ramps are not ideal for beginners.

COMMUNICATE WITH THE LIFTIES
if required, chairlifts can be slowed for loading and unloading. Be sure to communicate clearly if you require the chair to be slowed or stopped for unloading.

Safety Recommendations
- It is strongly recommended that all students wear a helmet to ensure safety in the event of a fall or striking, or being struck by, the skiing public.
- It is strongly recommended that students also wear eye protection.
- As the student will be riding with rigid outriggers, ensure they know to try to move the outriggers away from themselves in the case of a fall. Also, be sure that the outriggers are not used in a way where they can strike other hill users or you.

SNOWBOARDING WITH OUTRIGGERS: SUMMARY

STUDENT PROFILE

Outriggers can be a useful tool for students with balance, strength or mobility challenges, such as students with cerebral palsy, spina bifida, hemiplegia, leg weakness/injury or lower-limb prosthetic users. Outriggers can assist students to improve their balance, increase stability, facilitate skill development and to minimize falling. When completing the AOT, particularly notice any imbalances between arms, legs and sides of the body. If tests are difficult without outriggers, try adding outriggers and note any improvements.

OUTRIGGER SET-UPS

A Double Outriggers Set-up is when a student uses two outriggers, and may be used for students who require considerable support for balance and strength. There are two positions that students may utilize while they are riding, the 'split rigger position' which assists students to be in a reasonably neutral position and the 'parallel position' which is for students who require significant support.

A Single Outriggers Set-up is when a student uses only one outrigger to provide some balance and support. Ideally, the outrigger is used in the lead hand, but if this is not possible, a student may try using an outrigger in their rear hand.

A Fixed Outrigger Set-up is for students who have a lower-limb amputation but do not wear a prosthetic. The lead hand holds an outrigger, and the rear hand holds an outrigger which is placed in a boot or binding.

SIX STEPS

Some tactics may be difficult or unsafe when combined with outriggers, particularly one-footed tactics. Use your judgment as an instructor and gauge the comfort level of your student. Adapt each tactic with a focus on where to put the outriggers and how to use them beneficially.

EQUIPMENT SET-UP

Spend time with the student to fit the outrigger correctly. Adjust the length and heel screw. Ensure the student knows how to adjust from slide to support modes.
Like all adaptive tools--aim to fade the outriggers if possible.

LIFT PROCEDURES

Ensure the student knows how, when and where to put their outriggers when loading lifts and what to do in the event of an emergency stop or a fall. Some types of lifts may be more challenging.

SAFETY

As the student will be riding with rigid outriggers, ensure they know how to move the outriggers away from themselves in the case of a fall. Also, be sure that the outriggers are not used in a way where they can strike other hill users or you.

It is strongly recommended the student wear a helmet and eye protection.

CH.6: SNOWBOARDING WITH PROSTHETICS

PROSTHETICS

UPPER LIMB PROSTHETICS

Students may also have upper limb impairments and may or may not use a prosthetic. An upper limb prosthetic may interfere with the student's ability to manage equipment, (eg. doing up bindings etc), and may prevent the use of an adaptive device like an outrigger.

LOWER LIMB PROSTHETICS

Lower limb prosthetics come in many different styles, shapes and sizes. Technology is continually improving. A prosthesis is fitted to an individual by a prosthetist. Students may have one or more 'legs' which they use for a variety of different purposes. The leg the student uses for walking may be different than the one which is used for snowboarding. A snowboarding leg will need to be built for increased speed, stress and dynamic movement. Using a walking leg may end up damaging or destroying the leg.

The prosthesis may include mechanical joints. Depending on where the amputation occurred, and where the residual limb ends, the prosthesis may have a mechanical knee. The prosthesis may also have a separate detachable foot, or may have an ankle and foot built into it. The ankle joint may or may not have flexion depending on the individual prosthesis.

The prosthesis is obviously custom-built and individualized to the person's particular needs.

SAFETY: Do not make modifications to anyone's equipment without involving the participant! You can suggest modifications based on your assessments, but modifications to a person's equipment should be done in consultation with a professional.

BK RIDERS: BELOW-THE-KNEE AMPUTATION

A BK rider is a student whose amputation occurred below their knee and maintains their knee and its natural flexion.

AK RIDERS: ABOVE-THE-KNEE AMPUTATION

An AK rider is a student whose amputation occurred above their knee, and whose prosthetic includes an artificial knee. There are different types of 'knees' on the market. Some include a shock absorber. The pressure in the shock may need to be tested, and adjusted throughout the day.

Prosthetic technology is constantly improving and evolving. Some popular high-performance prosthetics currently available include the PROCARVE 1 ® and PROCARVE II ® by Chabloz Orthopaedics, the XT9 ESPK (energy-storing prosthetic knee) by Symbiotechs USA, the Moto Knee by Biodapt, Inc, and the Pro type snowboard foot for step-in bindings.

Adaptations to prosthetics can be considered if a high-performance leg specifically designed for snowboarding is not available, but direction from a prosthetist or medical professional is highly desirable.

TEACHING STUDENTS WITH PROSTHETIC LEGS

If a student uses a prosthetic on one or both legs, it is important to find the set-up and stance that works best for that student. This may be an individual choice. Safety, comfort levels and short- and long-term goals are all important considerations when setting up a student's stance. It is also important to assess the student's history of snowboarding and board sports, and consider if their body already has a preference for which leg is in front. Valuable information can be drawn from these examples. Experimentation may be important to find the best set-up and stance for the student. The most appropriate one may change depending on where the student is in their riding career. Ultimately, it should be the student's choice.

PROSTHESIS ON THE REAR LEG

This stance allows a student to develop a technique for turning by weighting the front foot confidently. This set-up gives a student more flexion and extension abilities in the lead leg while allowing the student to steer the tip of the board actively through turns. Sometimes this stance hinders the student's ability to perform more advanced and complex moves if the ability of the prosthetic leg to flex is limited. Some students are able to use their prosthetic leg for skating. Alternatively, students may choose to snowboard and make turns with their prosthesis in the rear, but switch their stance while skating or riding a lift. For short amounts of time they may have their prosthesis on the lead leg, as it is easier to push off with their strong leg. Using a Swivler is another alternative to assist when skating. See the "Snowboard Equipment" section for more information.

Many students with a single leg amputation prefer this stance.

PROSTHESIS ON THE LEAD LEG

In this stance, the stronger leg is in the back. This increases the student's ability to hop, push, or steer the rear of the board through turns. However, this stance may also increase pressure on the forward residual limb. Once the student is starting to turn on their snowboard, the participant can try to push the toes on the lead foot first, and once in the turn push the toes of the rear foot. This gives a torsional twist to the board, and may assist the student to complete their turns. This set-up may also allow a student to skate more easily on flats, as the pushing leg is the stronger leg.

ABOVE-THE-KNEE AMPUTATION

A student with an above-the-knee (AK) amputation may have more support when the prosthetic knee is braced in a slightly flexed position. This may be achieved with the settings on the prosthetic leg, or in some cases, the use of heavy cardboard and duct tape, an Ace wrap, or Velcro to help hold the prosthesis in a flexed position. This will eliminate a full range of flexion, which can cause loss of control. Avoid locking a prosthetic knee into a straight position, which can be awkward, uncomfortable and limit function. With Ace wrap, Velcro, or duct tape, secure the brace set-up over the student's prosthesis to create a flexed position. Other methods for increasing flexion include adding one or two levels of forward lean on the highback of the binding with the prosthesis, or adding a wedge under the heel of the boot. If the student's prosthetic knee cannot be locked into a flexed position, try one of the following: A leg brace, which has a built-in angle at the knee, can also be used to acquire a flexed position. Or, use a piece of steel rod (1/2 or 5/8 inch rebar, depending on the student's size and weight) bent to the desired angle, approximately 10-15 degrees. Encase the steel rod in PVC tubing, heavily padded and secured

BILATERAL BELOW-THE-KNEE AMPUTATION

A student with bilateral (both legs) below-the-knee (BK) amputations may find that riding without prostheses is easier than with them. This is accomplished by putting the residual limbs into the snowboard boots (in place of feet). Ensure adequate padding is provided to fit and protect the limb. This set-up gives the student a better feel for the movement of the snowboard and improved balance. Hands can be used as a means of resistance to pivot the board. Also, 'stubbies'--prosthetics which are not full length—may be used. The shorter length gives the student a lower centre of gravity.

ABOVE-KNEE AND BELOW-KNEE AMPUTATION

If a student has one leg which is AK and one leg which is BK, experiment to find the best stance. Usually the student will have more range of motion and more control over their BK leg, and so it may make sense to put this leg in front. Finding the correct set-up may involve lots of trial and error.

Tips for Snowboarding With a Prosthetic Leg:

- Consider how much weight-bearing the leg with the prosthesis can withstand. This may help determine which foot will be the lead foot.
- Each student will move differently with his or her prosthesis. Complete the AOT both indoors and outside on the snow. Care must be taken to ensure the limb will not rotate or move inside the prosthesis; this can cause loss of control and movement of the board.
- Be aware that loss of feeling or slipping between the limb and the prosthesis, is possible. Ask how the prosthesis is fitting and remind the student that swelling may occur with increased activity and altitude. Friction may occur between the limb and the prosthesis.
- Remind the student to make frequent skin checks of his or her residual limb. If a silicone liner is used, slipping and sweating may occur. The liner may need to be changed regularly, so the sweat can be emptied.
- By placing the prosthetic foot into a plastic bag, the foot will slip into and out of the snowboard boot easier.
- It is usually easier for students to strap their prosthetic foot/leg into their boot first, then attach the prosthesis to the residual limb.
- With a lower-leg prosthesis, the space created between the cuff of the snowboard boot and prosthesis may need to be filled. Use foam, a towel or other material to fill this space; use duct tape to help hold the filler material in place. Filling the space helps transmit the movement from the leg to the boot, then to the snowboard. Check periodically to see if the filler is still filling the space and has not moved or shifted due to pressure.
- Consider the use of a golf shoe or similar instead of a snowboard boot on the prosthesis. It will need to be paired with a smaller style of binding, but is much easier to attach to the prosthesis, and has spikes to provide traction in the snow.
- It may be necessary to use a type of waist belt or strap to hold the leg in place, particularly for an AK rider. This becomes most important when riding lifts when the weight of the snowboard is hanging from the body.

ASSESSMENT OF ABILITIES: ASK, OBSERVE, TEST (AOT)

The AOT process is designed to be used with a student to assess their balance, strength, and mobility, and to determine if they may be a good candidate for using outriggers The AOT can help determine what type of outrigger set-up the student requires.

Ask:

These questions relate specifically to a student who has one or two prosthetic legs.

ASK	LOOK FOR
How long ago was their amputation?	Length of time using a prosthetic leg. Where they are in their recovery process.
Has the student had a single leg amputation or a double leg amputation?	Number of prosthetic limbs
Was their amputation below the knee or above the knee?	Residual knee or mechanical knee or one of each?
Are they working with a prosthetist?	History with a prosthetist or other health professional. Discussions with professionals about snowboarding on prosthesis.
Has their prosthesis been approved for snowboarding?	Understanding of the effects of snowboarding on a prosthetic leg at speed and with the potential for high impact. Any adjustments made to the leg specifically for snowboarding. PLEASE NOTE: Using a 'leg' not designed for high impact sports like snowboarding, may damage or break it, or make snowboarding difficult. Recommend the student have an alternative walking leg. If student does not have an alternative leg or theirs is not suitable for snowboarding, and they are determined to snowboard, they may be a candidate for using the fixed outrigger technique.
Does the student have a history prior to their accident, illness or injury of snowboarding or other board sports?	Helps to determine which leg to put forward. If a student already has vast experience and comfort with one leg forward, it may be best to maintain that.

ASK	LOOK FOR
How long ago was their amputation?	Length of time using a prosthetic leg. Where they are in their recovery process.
Has the student had a single leg amputation or a double leg amputation?	Number of prosthetic limbs
Was their amputation below the knee or above the knee?	Residual knee or mechanical knee or one of each?
Are they working with a prosthetist?	History with a prosthetist or other health professional. Discussions with professionals about snowboarding on prosthesis.
Has their prosthesis been approved for snowboarding?	Understanding of the effects of snowboarding on a prosthetic leg at speed and with the potential for high impact. Any adjustments made to the leg specifically for snowboarding. PLEASE NOTE: Using a 'leg' not designed for high impact sports like snowboarding, may damage or break it, or make snowboarding difficult. Recommend the student have an alternative walking leg. If student does not have an alternative leg or theirs is not suitable for snowboarding, and they are determined to snowboard, they may be a candidate for using the fixed outrigger technique.
Does the student have a history prior to their accident, illness or injury of snowboarding or other board sports?	Helps to determine which leg to put forward. If a student already has vast experience and comfort with one leg forward, it may be best to maintain that.

Observe:

These observations relate specifically to a student who has one or two prosthetic legs.

OBSERVE	LOOK FOR	RELATE TO SNOWBOARDING
What is the style, type and length of the student's prosthetic leg?	Location of prosthesis - above the knee (AK) or below the knee (BK). Mechanical or residual knee joint. Type of ankle joint--rigid or flexible.Type of 'foot'--separated or not. Any shocks.	The amount of flexion in the joints of the student or their prosthetic leg may determine how easily it is for them to be in a balanced body position, get on edge and apply pressure to the board.
Does student have one prosthetic leg for walking and one for snowboarding?	Ideally, student will have a snowboarding leg that is designed for impact and speed and, if it is damaged, this will not cause the student to be unable to walk.	A prosthetic leg approved for snowboarding will be stronger, and have more flexion for impact and speed.
Does student move more easily with the prosthesis on or off?	This is important, as some students will very rarely take off their prosthesis and will display unease with movements when doing so. Others may be very adept, and be nimble and manoeuvre easily with it removed.	If the student appears to be more comfortable with their prosthesis off, they may be a candidate for a fixed outrigger, or 3-track skiing. The more ease the student has with their movements, the better ability they will have to balance.

Test:

See the Test table: "Basic Body Movement Assessment Guide" and "Further Dryland Testing" in the Outriggers AOT section for some simple body movement, position and strength tests to help determine the most ideal stance, position and equipment for your student's success when snowboarding.

CH.7: SNOWBOARDING WITH A VISUAL IMPAIRMENT

VISUALLY IMPAIRED

Teaching and Guiding Students with Visual Impairments

OVERVIEW

When a student has a visual impairment, it may be a total or partial impairment, and in some conditions vision may be progressively lost. For the student, their vision may be different in each eye depending on the cause or condition. Visual impairment may be congenital (present from birth) or acquired (through a traumatic injury, illness or condition).

Some people with a visual impairment see nothing at all, but many people with a visual impairment can see something. Perhaps everything is blocked out but a tiny speck of light. Perhaps they are only able to distinguish between light and dark. Perhaps they are able to see large objects and shapes. Some folks can see everything but it is blurry, (there is no definition or detail). Perhaps they see a patchwork mixed with some blank areas and some defined areas. For some people, they see only a mist; for others they are seeing only the edges of objects and what is in the centre is dark (central vision is affected). For others, they are seeing darkness on the edges and sides of their vision, but the centre is visible (peripheral vision is affected).

There are a number of conditions that result in sight loss. Some common visual impairments include, but are not limited to: cataracts, diabetes, retinopathy, glaucoma and macular degeneration.

Vision loss is usually measured by a number of factors; most commonly visual acuity and visual field.

VISUAL FIELD
The boundaries of what a person can see in one instant (what someone can see without moving their eyes or head).

VISUAL ACUITY
The clarity, sharpness or acuteness of vision. Related to a person's ability to perceive fine detail.

Categories of Vision Loss

Currently there are no International Paralympic Committee (IPC) classifications for visually-impaired snowboarders. The following categories are designed to be helpful for the instructor to understand differences in visual impairments and how students are affected. These categories are influenced by the IPC Alpine skiing classification classes for visually-impaired skiers. It is very important that instructors always remember:
Each individual will have different levels of vision and varying support needs.

PROFOUND VISION LOSS

- Similar to BI sport class--IPC classification for visually impaired skiers
- These students have little to no vision and very low visual acuity
- Cannot recognize the letter 'E' (15x15cm in size) from a distance of 25cm
- Secondary hearing impairment is more common for B1 students
- Consider this student as having 0% vision (blind) or virtually no useable vision.

SEVERE VISION LOSS

- Similar to B2 sport class - IPC classification for visually impaired skiers
- Higher visual acuity than students with a B1 classification
- Student is unable to recognise the letter 'E' from a distance of 4m.
- If visual field is less than 10 degrees diameter, student is also eligible for this classification
- Consider this student to have 1 to 5% vision or very low vision

MODERATE VISION LOSS

- Similar to B3 sport class--IPC classification for visually impaired skiers (least severe classification)
- Student, either has a restricted visual field of less than 40 degrees diameter or low visual acuity.
- Consider this student to have 6 to10% vision or low vision

MILD VISION LOSS

- No IPC classification equivalent
- Student has some vision
- Student may not be able to see a demonstration, the skiing/riding public or obstacles
- Student may not be able to recognize you from a distance
- Student cannot safely navigate a ski hill independently without a guide or instructor

These students may have challenges with visual acuity or their visual field or both.

Visually impaired students may or may not need more time working on their balance, depending on their previous athletic experiences. Students with a congenital visual impairment may have learned fundamental motor skills differently than someone who has an acquired visual impairment. To improve balance skills, introduce static and dynamic movements both on and off the snow.

The movement of sliding laterally, specifically on flatter terrain may upset or distort the rider's feeling of equilibrium. Teaching aids or adaptive equipment that creates a point of contact with the instructor (e.g. tethers, the Snow-Wing) or the snow (e.g. ski poles/Outriggers) may help off-set any distortion a student may experience.

Four of the most common visual impairments and how they affect someone's vision:

MACULAR DEGENERATION

Usually people with this condition have peripheral vision but have loss of vision in the centre of their visual field when they are looking directly at something. Affects a small part of the retina at the back of the eye - the macular.

GLAUCOMA

Causes a loss of peripheral vision due to damage to the optic nerve or increased eye pressure. Treatment exists but cannot repair existing sight loss.

CATARACTS

Cause blurred or cloudy vision because of a yellowy pigment on the lens of the eyes. Surgery can be performed to remove the cloudy lens.

DIABETIC RETINOPATHY

Can affect anyone with diabetes. It causes floaters and blurred vision, resulting from damage to the retina because of high blood sugar levels.

ASSESSMENT OF ABILITIES: ASK, OBSERVE, TEST (AOT)

The AOT is designed to determine a student's strengths and weaknesses. This information will assist an instructor to determine the type of guiding and communication which will be used, and whether any adaptive equipment is necessary. It is also the place to determine what strategies need to be in place to protect the safety of the student, and other skiers and riders on the hill.

Ask:

Ask questions of the student to determine their strengths and abilities; find out the history of their injury, illness or condition, and any relevant experience they may have. Discover any specialized equipment they use, and any supports or therapies they engage in. Try to discover any potential challenges or concerns.

ASK	LOOK FOR	RELATE TO SNOWBOARDING
What is the cause of the visual impairment? Was it congenital or acquired? How does it affect the participant's vision?	Information about visual acuity (sharpness of vision); visual field (peripheral, central or fractured vision loss); information about what they can or cannot see (light and shadow or large objects etc.) Any differences between the two eyes. Whether the student has a history of seeing previously. (acquired VI).	May help determine teaching aids and guiding equipment. If one eye is stronger, students should usually lead with the side that has the strongest field of vision. E.g. If left eye has the strongest vision, ride as a regular. If right side is strongest, ride as a goofy. Previous history may change what is communicated and how.
Does the student use an aid in their day-to-day life? Which aids? What is the student's history with the aids?	The degree of confidence when the student moves around. The student's level of independence. The type of aid being used (cane, service dog, etc). The accuracy of the student's movements in space.	May help determine teaching aids and guiding techniques.

ASK	LOOK FOR	RELATE TO SNOWBOARDING
Any additional disabilities?	Any other physical, cognitive, or hearing impairments	Additional adaptive equipment or communication methods may be required, e.g. radios for hearing difficulties, changing communication style if the student has a cognitive impairment, outriggers if there is a relevant physical weakness.
What other sports does the student participate in?	Sports that require balance, strength, co-ordination etc.	More athletic students may acquire skills faster
How does the person self-assess?	A realistic self-assessment of fitness or ability.	Snowboarding is a physically demanding sport. Unrealistic self-assessments could lead to unsafe conditions. Advise student that falling can be part of acquiring snowboard skills. (Aim to teach slam-free snowboarding and safe falling methods.)
Has student used specialized sports equipment before?	Equipment that could be related to snowboarding	Consider using or adapting equipment which has been previously used.
Has the student skied (alpine or cross country) or snowboarded before?	Nature of snowsports experience (positive, or negative, challenges and successes)	Some students may be accomplished skiers and are looking for new challenges. Discuss differences in movements as they relate to the technical references, core competencies and basic skills.
If the student has previous sports or snowsports experience, does the student have established verbal commands that work for them?	Verbal commands that have worked previously. Try to find ways to use these commands successfully in the lesson.	Effective verbal commands will help ensure the student remains confident and safe.
Where do they think their strengths are?	Positive attitudes: perserverance, determination, etc.	Techniques to manage potential frustration due to the challenges involved in snowboarding

Observe:

Observe the student and the way they move. Look at the speed of movement, the quality of movement and assess their ability to balance, bend and flex. Notice the aids they use and how they navigate through space. As they walk and move around, relate the ease of their movements to snowboarding.

OBSERVE	LOOK FOR	RELATE TO SNOWBOARDING
Is the student well balanced while moving around? Are they able to identify and detect obstacles, and move around them?	The ease and quality of movement. Notice smoothness or jerkiness. Take notice of any tripping or falling.	The more ease a person has with movement, the better chance they have of remaining in balance while snowboarding.
Are they using additional support or aids to assist with movements?	The student's ability to use their aids and their degree of reliance.	The more ease a person has with movement, the better chance they have of remaining in balance while snowboarding.
Are movement patterns quick or slow?	Notice if movements become unbalanced or stay stable when they change speed.	Moving quickly shows the person has more confidence. This can have an effect on lesson pacing. Students with more confidence may find balancing on a snowboard easier and may learn faster.
When moving around, does the person display an ability to separate movements between the upper and lower body?	Look at whether the student is using their upper body to assist the movement of their lower body.	The ability to separate movements between the upper and lower body indicates greater mobility and consequently an ability to steer with the lower body while snowboarding.

Test:

Do some tests to identify the student's visual field, visual acuity and the affects of colour, light and noise. Also, do some simple body movement, position and strength tests to help determine the ideal stance, position and equipment for your student.

TEST	LOOK FOR	RELATE TO SNOWBOARDING
Identify the degree of visual impairment (both indoors and out) and the range of vision.	Student's visual field The point at which the student's vision is strong and when it becomes limited or non-existent. How far can the student see in all directions: forward, out to each side, and up and down. Test the student's vision by starting close and slowly moving away from the them; testing distance, field of vision and depth (Note changes between when the instructor is standing high, crouching or lying.) Consider testing the student's vision when they are in a neutral position and facing side-on (As they would be if snowboarding down a hill).	It is generally recommended to use the stronger eye/greater field of vision as leading side (goofy or regular) This may decide how you will guide and what aides may be used.
Is their vision better during the day, in the sun, in the shade, at night? Do weather and light conditions have an impact?	The impact of shade and light; night-time lights (if applicable) and weather - on the student's visual field and their ability to see their guide.	Safety may be impacted by sudden shade caused by clouds or trees. Lights at night may cause zones of poor vision for student. Flat light, fog, or heavy snow may impact their ability to perceive terrain and contrast of features.
Determine the level of usable colour vision	Student's ability to see specific colours (green, yellow, red, etc.) See appendix 2 at the back of this manual to apply a colour test.	Guide should wear clothing and use equipment that matches the student's best colour vision.
Impact of noise	Student's ability to hear you in a loud environment	Consider use of radios, and the appropriate volume and distance from the student while giving instructions.

TEST	LOOK FOR	RELATE TO SNOWBOARDING
Asses the student's movement ability	Student's ability to balance on toes, heels, towards the nose and tail of the snowboard. Student's ability to rotate and separate movements in the upper and lower body.	This will affect the student's ability to use the planes of balance (fore and aft, laterally, vertically, and rotational) Consider using a 'Spooner Board' or skateboard deck (without trucks) to test
Balance and Stamina	Student's ability to stand up in a neutral position on a flat surface for 30 seconds, ankles, knees and hips flexed, with weight balanced on both feet.	The more instability they experience due to balance, body position and/or stamina, the more reliant the participant may be on adaptive devices to maintain a neutral position.
Balance and Pressure	The student can rock from side to side (nose to tail plane), shifting weight from one foot to the other while lifting the opposite foot off the ground 1 to 2 inches. They should be able to repeat this action. Equal and balanced fore and aft movements or differences between sides.	Fore and aft movements are controlled through core strength in the upper body and shifting and flexing of the hips, knees and ankles. This fore and aft movement will provide an indication of the ability to maintain a centred stance, as well as the ability to modify nose and tail pressure on each foot. This is needed to initiate and complete turns.
Flexion and Extension	Symmetry or differences in the flexion and ease of movement between legs.	The ability to alternate up, then down pressure to initiate flexion and extension movements. This assists in managing pressures while turning the snowboard. The more ability to flex lower joints a participant has, the closer to a neutral position the participant can be.
Balance and Edging	The student's ability to stand in a neutral position with feet shoulder width apart, rising up on toes for 2 seconds followed by balancing on heels for 2 seconds. They should be able to repeat this action. Ability of all the joints--hips, knees and ankles--to flex in these movements. Imbalances between the left and right sides of the body.	Lateral balance across the snowboard and movement in the toe/heel plane are important abilities in order to get the board on edge for turning, stopping, traversing and sideslipping.

TEST	LOOK FOR	RELATE TO SNOWBOARDING
Pivot	Student's ability to stand in a neutral position and turn their hips, legs and feet to the right and to the left. Any differences between left and right sides. Any limitations in student's ability to rotate their lower body.	The ability to rotate the hips, legs and feet in the direction of a turn causes the snowboard to pivot and complete a turn in a more efficient manner.
Rotational Balance	Student's ability to stand in a neutral position, with feet shoulder width apart, rotating arms and shoulders 65 degrees or more across the lower body to the right and holding for 10 seconds. The ability to repeat, rotating the arms and shoulders to the left for 10 seconds Any imbalances.	Rotational balance indicates an ability to move in and out of alignment and maintain balance with stability while turning. Difficulties in being able to rotate the upper body may make beginner turns challenging, and the use of adaptive equipment may be required.

BASIC BODY MOVEMENT ASSESSMENT (BBMA)

Below, you will read a sequence of tests performed as part of the AOT process. The tests are sequenced so that each test builds on the last, starting with a static test and moving to more dynamic movements. Have the student:

1. Stand up in a neutral position on a flat surface for 30 seconds. Ankles, knees and hips should be flexed with weight equally balanced on both feet.
2. Rock laterally from side to side, shifting weight from one foot to the other while lifting the opposite foot off the ground one to two inches. Repeat 10 times.
3. Stand in a neutral position with feet shoulder width apart, raise up on toes for two seconds, followed by balancing on heels for two seconds. Repeat 10 times.
4. Stand in a neutral position with feet shoulder width apart, rotate their arms and shoulders 65 degrees or more across the lower body to the right and hold for 10 seconds. Repeat, rotating the arms and shoulders to the left for 10 seconds.

The sequence above tests many of the components in the table of tests above. It is not an exhaustive sequence.

FURTHER DRY-LAND TESTING:

For dry-land testing, instead of immediately strapping a snowboard to a participant, it may be beneficial to complete similar tests using a skateboard or longboard deck without trucks (wheels), or using a Spooner board. These pieces of equipment may be helpful to get a feel for what it is like to get on edge. They are also useful tools for evaluating, practising and strengthening the skills required (particularly balance) to snowboard,

Equipment

At minimum, the student and guide must wear “blind skier” (or rider) or “visually impaired skier” (or rider) and “guide” bibs to identify themselves to other hill users and staff. Goggles should be used to protect thestudent’s eyes from sun, wind, rain, snow or protruding objects. Reflective tape or flashing lights can be attached to helmets and used in low light or at night to identify visually impaired students.

PERSONAL TWO-WAY RADIOS

- Should provide voice activation and hands-off microphones for the guide to communicate with the VI student
- Motorcycle–type radio headsets that affix to the helmet work best
- Recommended for students with low vision and partial vision, but may also be used with students with little-to-no useable vision
- Radio batteries (preferably lithium) should be checked regularly and an alternate signal system should be established in case of failure
- For students with little-to-no useable vision, another option is a radio with a voice-activated microphone that transmits the guide’s voice. A speaker which is strapped onto the lower back or outside a backpack allows the student to hear the voice commands.

AUDITORY CUES

- For example: Tapping ski poles or ringing a bell
- Best for students with low-to-no usable vision
- Best when guiding from the front
- Student can determine where the sound is coming from and what direction to go
- Allow constant auditory connection between the visually impaired (VI) student and guide, saving the guide’s voice
- Be aware of other people tapping ski poles in high traffic areas, and the potential for confusion resulting in a safety risk for the student

ADAPTIVE EQUIPMENT

Consider the use of additional adaptive equipment to support the rider.

Tethers are a useful aid for assisting with speed control, rotation, turn initiation, confidence, and edging. They may be attached at the hip, on the nose of the board, or at the ankle/binding of the front foot.

NOTE:

- See the “Snowboard Tethering” section for information on tethering.
- A Sno-Wing, Hula Hoop or Ski-Pal may be another useful aid to assist with rotation, turn initiation, confidence and edging.
- Outriggers or modified ski poles may also help with challenges with balance or orientation.

Communication

The AOT will allow instructors to gain an understanding of what a student's communication needs are and, with input from the student, determine an appropriate communication system for explanations/teaching and for guiding. The student's communication needs will be based upon their level of sight, their level of comprehension of auditory cues, and their previous experience receiving verbal or auditory instruction.
In most cases, teaching and explanations will occur when the team is stopped and guiding occurs when the team is riding or moving forward.

COMMUNICATION TIPS

Identify yourself:
When speaking to students with lower vision, always announce who is speaking and let them know you are speaking to them.

Make it work:
Use a communication system that will work for both guide/instructor and student. Keep checking in.

How you say it:
The cadence, tone and inflection of commands is important – use an appropriate speed and predictable pauses between words to allow rhythm and flow.

A firm, confident voice assists the VI rider to develop trust and focus on movement.

Safety First:
Explanations should occur when stopped in a safe spot on the side of the hill.

Less is More:
Avoid a constant stream of nonessential chatter. Keep commands simple.

Clock system:
Consider using other verbal techniques such as the clock system. e.g. 12 o'clock is straight ahead, 3 o'clock and 9 o'clock are at 90 degrees on the right and left respectively.

Describe:
Pre-describe the environment: the trails (steepness, quality of snow, etc), any obstacles, identify sounds and describe how busy the lodge or slope is. Use simple yet descriptive language to create pictures in the mind of the student with low vision.

HANDS-ON INSTRUCTION

VI students may benefit from hands-on instruction. The instructor may position the student's body when introducing skills or concepts, such as straight running, sideslipping (toe and heel) and basic isolated turns. Instructors may also manipulate the student's hands to describe things such as the slope, body position, direction and the shape and size of turns. Another way of demonstrating or describing concepts/skills is to have the student use their hands to feel what your hands, board, binding, boots or body is doing. Always ask for permission before putting your hands on another person's body, within earshot of another person, if possible. Consider the comfort level and the gender and age of the student and instructor. (If the student is under-age, consider seeking parent or guardian consent or have them act as the demonstrator).

Guiding

Guiding a rider with a visual impairment, especially someone who has virtually no vision, can be one of the most challenging aspects of being an adaptive instructor/guide. It is an ongoing process, throughout which a rider with a visual impairment and the instructor/guide learn from each other.

In circumstances where there is only one guide for a rider with a visual impairment, it is important that the adaptive snowsports program attempt to provide the student with the best possible match, based on their experience and personality.

It is worth mentioning that students with a VI will generally always try to 'see' the guide's image in the area of usable vision. Adjustments to guide and VI rider positioning can be made with this in mind.

When you are guiding, it is always important to keep in mind the following advice: Don't assume. Remember you are the student's eyes, and you have the ability to directly influence what this student with a visual impairment can accomplish.

GUIDING INSIDE THE LODGE

Depending on the needs of the VI rider, determine whether the participant needs verbal directions and/or physical cues to circulate within the lodge. If the participant indicates that physical assistance is required, then either guide by the elbow or by the shoulder.

GUIDING BY THE ELBOW:

- Let the participant stand next to you and hold onto your elbow while staying about a half step behind
- When moving your elbow forward, the participant will walk forward; when moving your elbow to the right, they will move to the right, and so forth
- You may also wish to incorporate verbal communication when going around people or obstacles

GUIDING BY THE SHOULDER:

- For a totally blind participant, another option is to have them place a hand on your shoulder as you walk inside the lodge. This way they can remain directly behind you, which may facilitate manoeuvring in tight corridors.

It is very important to make sure to ask the participant their preferred method for receiving physical assistance, and to use it whenever possible.

NOTE: Don't push or pull the VI rider around and, if at all possible, don't leave the VI rider standing alone, without anything to hold on to.

CORRALS, LIFT LINES, CATWALKS AND TRANSITIONAL TERRAIN

As a guide, depending on the environment and the participant's visual ability, you may use: voice commands, guiding by the elbow or guiding by the shoulder (independently or in combination). You may also physically assist by pushing their hip or pulling their hand so they can slide on their board. Always negotiate with your student their preferred method of assistance. As the instructor, you may be skating or walking with your board off, depending on the circumstance. The student may have one or two feet strapped into their board to move forward. (One foot out is required when it is time to load the lift for you both.)

The use of a pole as a lead (if available) can help you guide the VI rider. Using the pole to steer the rider (coupled with some verbal directions) will assist them to move in the desired direction.

GUIDING: HANDS-ON AND SNOWBOARD OFF

This is guiding and teaching with boots on the snow and snowboard off.

- This is the method instructors will likely guide/teach from with new riders for many parts of the steps 1 to 5. Depending on the student's visual ability, the instructor may alternate between demonstrating with the board on, then assisting with the board off. This position is generally the safest position for instructor and student.
- The instructor may provide physical assistance from in front of or behind the student.
- Depending on the skill or step, the instructor may provide guidance by holding the student's waist either in front or behind, or by holding the student's hands. (With permission)
- Depending on the skill or step, the instructor may be uphill or downhill from the student. E.g. When introducing heel-edge sideslipping the instructor will be downhill from the student. When introducing toe-edge sideslipping, the instructor will be uphill from the student).
- Physical guidance can provide support, security and assistance with speed control.
- This method may be used for teaching **Basics**: skating, descending, and climbing; **Sliding**: straight running; J-turns, toe-heel drag turns; **Control**: sideslipping; **Turning**: CADS dance, twisting the disks, basic turn
- Always be aware of your surroundings when walking backwards.
- Be well-positioned. As an instructor/guide, you should be able to provide hands-on support and walk forwards or backwards without transferring unwanted movement or pressure to the rider, (causing the student to fall off-balance).
- Utilize verbal communication and non-verbal communication if relevant.

GUIDING: FACING THE STUDENT, ABOVE OR BELOW

This is guiding with your snowboard on, above or below the student and facing them.

- The instructor may teach or guide with their snowboard on and provide physical assistance with hands or equipment, particularly for steps 4 to 6: control, turning and flow.
- If the student is quite mobile, the instructor may be on their board but not in physical contact with the student. The guide/instructor must project their voice and establish an appropriate visual distance from their student. Use of hand signals may be beneficial, depending on the participant's vision.
- If the student is quite mobile, and for example is learning to turn or link turns, the guide/instructor may be in front of the student using verbal commands, and may be sideslipping facing up the hill to keep their voice projected toward the student.
- Ensure you as the instructor maintain awareness of what is around you and downhill from you. Do not become an obstacle to your student or to anyone else on the slope.

GUIDING: BELOW AND FACING AWAY

This is guiding with your snowboard on, below the student facing downhill, away from the student.

- The instructor may teach/guide with their snowboard on, particularly for steps 4 to 6: control, turning and linking.
- The instructor cannot provide physical assistance in this position
- This guiding position is usually for students with some vision
- This guiding position is for students who are quite mobile, and are completing pendulums, power pendulums or linking turns at a reasonable pace. Probably not used when a student is just learning to complete a basic turn.
- The guide/instructor must really project their voice (it is more difficult for a student to hear when the instructor is facing away from the student), and establish an appropriate visual distance from their student.
- The instructor and student will each require a solid understanding of the voice commands to be used, and using a guiding sequence may be necessary (see below).
- Use of hand signals may be beneficial depending on participant's vision.
- Frequent head checks are necessary to ensure the student remains following an appropriate distance from the instructor.
- Be sure to have a plan if the rider becomes separated/loses connection with the guide.

GUIDING: BEHIND THE STUDENT

This is guiding from behind the student with your snowboard on and trailing the student.

- The instructor may teach/guide with their snowboard on, particularly for steps 4 to 6: control, turning and linking
- The instructor cannot provide physical assistance in this position
- This guiding position is for students who are quite mobile, and are completing pendulums, power pendulums or linking turns at a reasonable pace. Probably not used when a student is just learning to complete a basic turn
- This position allows the instructor's voice to be heard well, allows a good visual vantage point to observe the rider and the crowd on the slope above and below you
- The instructor and student will each require a solid understanding of the voice commands to be used, and using a guiding sequence may be necessary (see below)
- Be sure to have a plan if the rider becomes separated/loses connection with the guide
- The second instructor may be a blocker behind the guiding instructor; block from the sides or stay in front of the student so there is one instructor behind and one in front. Decide on the most appropriate configuration as conditions dictate.

USE OF SECOND 'BLOCKER' GUIDE

For guiding VI riders, it is recommended that adaptive snowsports programs devote two guides to each participant whenever possible.

- This is the best risk-management strategy to provide a safer learning environment. A less experienced guide can be used as a 'blocker' to gain familiarity with the guiding techniques.
- Allows for a lead guide/instructor to be in total control of the guiding experience (including all verbal and non-verbal commands) while the silent blocker guide is positioned uphill (behind the lead guide and rider) to provide a safety buffer.
- The blocker, positioned uphill of the lead guide and VI rider, anticipates the turns of the rider and turns across the hill in order to block uphill traffic. They also block the skiing public should the VI rider fall.
- The blocker also is a messenger to seek assistance should the VI rider fall and require medical attention.
- Always be aware of where the student and primary instructor are.

TIPS FOR GUIDING MOBILE STUDENTS

Establish a system of commands that works for both the guide and the student. If the student has skied or snowboarded before, utilize the AOT to discover any commands or cues they have used previously, and may prefer. Feel free to give suggestions of other useful cues and commands. Negotiate a system that works for everyone; stay open to adjustments and refinements.

- When guiding VI students it is very important to use clear and concise words. Stay in close proximity while using a loud voice, or use a radio system to ensure effective communication. In most cases, teaching will occur when the team is stopped and guiding occurs when the team is riding or moving forward.
- Deliver guiding commands with simple, continuous and alternating sequences.
- In snowboarding, instead of using the commands of "right turn" or "left turn", instructors can be more specific and clear by saying "heelside" or "toeside". It is important for the student to understand the difference between these terms.

EXAMPLES OF GUIDING COMMANDS

COMMAND	IMPLIED
Heelside turn	Make a heelside turn
Toeside turn	Make a toeside turn
Neutral or flat board	Release the edge and move towards a flat board
And	Prepare for upcoming turn or next command
Hold, holding, keep holding	Maintain position or direction, usually a traverse
(Command) ... and stop	Come to a gentle stop
STOP, SIT, CRASH, or DUMP	Immediate/emergency stop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VERBAL GUIDING SEQUENCE FOR STUDENTS BEGINNING TO TURN

There is always a “neutral” or “flat board” command between each edge-to-edge command. Toe, neutral, and heel commands imply weight transfer and edge engagement.

Here is an example of a sequence of guiding commands for a beginner or intermediate rider:

Spoken:	Implied:
Neutral...AND	Flat board, centered position, prepare for turn.
Heelside turn...AND	Heelside turn, prepare for new turn.
Neutral...AND	Return to flat board, prepare for new turn.
Toeside turn...AND	Toeside turn, prepare for new turn
Neutral...AND	Return to flat board, prepare for new turn.
Heelside turn...AND	Heelside turn, prepare for new turn.
Neutral...AND	Return to flat board, prepare for new turn.
Stop Turn to a stop	Turn to a stop

(AND = Preparation for a new turn and release of the old turn)

When the instructor or guide wants a student to maintain their position or direction, the terms “hold,”, “holding” or “keep holding” can be used. To come to a simple stop, instructors and guides need to anticipate the stop and state, “toeside turn and stop.”

VERBAL GUIDING SEQUENCE FOR ADVANCED RIDERS:

When riders are more advanced and do not need the neutral/flat board command between turns, holding a turn and coming to a stop may sound like this:

- “Flat” can be spoken in place of “neutral”
- “heel-turn” or “toe-turn” can be spoken instead of “heelside turn” or “toeside turn.”
- To keep it simple, the calls can be “toe” and “heel”.

Below is a sequence for an advanced rider: note that fewer words are used to speed up movements:

Spoken:	Implied:
Toe turn...AND	Toeside turn, prepare for new turn.
Heel turn	Heelside turn,
Hold, Hold... AND	Stay on heelside edge (traverse).
Toe turn...AND	Toeside turn, prepare for new turn.
Stop	Heelside turn and stop.

Once VI students can link turns, the instructor can state that the student will begin with either a heelside or toeside turn. Then, the instructor calls out, “turn, and turn, and turn.”

Guiding is an ongoing process and the student and instructor (and aid) will learn from each other as the relationship progresses. Being aware of the commands and preferences of the student as well as the safety and lift procedures is paramount to an enjoyable and safe lesson.

NON-VERBAL COMMUNICATION

Primarily used for students with partial useable vision and stronger riding ability, the use of hand and arm signals (big motions!) may be helpful when guiding from the front. Caution should be used by the guide to ensure proper distance (stay in the student’s visual field). Signals should be mutually agreed upon and refreshed at every lesson. Be creative and do what works for both student and guide. This system may also be used as a backup for radio failure.

Examples include:

INTENDED MEETING	GESTURE
Dips and drops in terrain	Both hands palms-down and lowered
Terrain raising--slight uphill ahead	Both hands palms-up in a lifting motion
Flat section ahead (i.e. get more speed!)	Lassoing motion with rear hand, rear arm waving above head.
Direction change	Point arms to desired direction (left or right)
Stop	Crossed arms above head (across fall line)
Rolling terrain	Make big snake-like motion with one or both arms.

SIX STEPS FOR STUDENTS WITH VI

During the six steps, if possible, ensure there is one instructor in charge of blocking and keeping the student safe from other skiers and riders, and one instructor providing the guiding.

Step 1: Equipment and Communication

Goals:

- Ensure student has appropriate safety equipment
- Establish guiding and communication methods and the emergency stop command.
- Introduction to equipment

SAFETY EQUIPMENT

Ensure student has appropriate eye protection and instructor and student are wearing appropriately-marked clothing that is visible to the student and the public.

COMMUNICATION AND GUIDING METHODS

Work with the student to find a communication system that works for both instructor and student. Keep checking in. Be clear and consistent. Establish a word that will work as an emergency stop command in the case of imminent danger to the student.

The guiding method may change depending on which step or tactic is being taught.

EQUIPMENT INTRODUCTION

Allow the student to get acquainted with the equipment up close and personally, with opportunities to feel the equipment.

Step 2: Basic Mobility

Goals:

- Familiarity with equipment
- Moving around on flats
- Develop neutral position

GUIDING SUGGESTION

It is generally recommended to use ‘hands-on/board off’ guiding for tactics in step 2.

THE NEUTRAL POSITION

During the initial steps, it is important to emphasize the neutral position and assist the student to develop good habits. The neutral position (also known as the ready position, balanced body position or athletic position) is common to many sports, and may have been encountered by the student in other activities (e.g. Goal Ball).

In essence, the neutral position is:

- Base of support (leg and outrigger) roughly shoulder width apart
- Joints flexed (ankles, knees, hips)
- Arms to the side (relaxed, aligned with tips)
- Head up, facing the direction of travel
- Relaxed (ready to react)

As visual demonstration is not always feasible, conveying the neutral position may require hands-on realignment of the student's body. Always ask for consent when using a hands-on approach. Once the position is achieved, have the student relax, jump, stand or otherwise disrupt the position and return to it. Adjust as required until muscle memory allows the student to reliably return to the position.

EQUIPMENT FAMILIARITY AND MOBILITY

After strapping the first foot in, have the student plant the free foot on the snow near the back binding. Encourage the student to try to flex the lower joints (ankles, hips and knees) to bring one edge off the snow. Flatten the board, and then slowly transfer the free foot to the opposite edge and bring the opposite edge off the snow. Be ready to offer physical support or catch a student in case of balance issues.

TURNING IN A CIRCLE-PIVOT

Practice pivoting the snowboard. Using the free foot to bear the weight of the student, have them lift and move the snowboard in the direction intended, being careful not to step too far and fail off-balance. Reposition the free foot and repeat the motions until the student has completed a revolution. Repeat in the opposite direction. Verbal cues of arc of rotation are good to practice later. Try a rotation again, by sliding the board rather than lifting it. This exercise improves edge control and can illustrate the differences between 'on edge' and 'flat base'. Be ready to offer physical support or catch a student in case of balance issues.

SKATING

Have the rider point the hip in the direction of travel (pointing their eyes in that direction as well) and with the free foot either on the heelside (for better alignment) or toeside (for more strength) near the front binding; push towards the tail of the board (ideally keeping the stride between the bindings). If the rider has some vision, the guide could act as the point of reference (stand in front). If there is no vision, use verbal or physical cues to maintain direction. A VI rider may even choose to utilize an adaptive device for balance such as an outrigger, pole, white cane or short ski pole with a ping pong ball on the end for skating around the bottom of the hill. Do not use a person's only cane; there is always a risk of damaging equipment.

CLIMBING

Have the student place their board across the hill, perpendicular to the fall line, with their body facing uphill and the free foot above the toeside of the board. Take a medium-sized step with the free foot up the hill followed by a small step with the attached foot, lifting the board. Engage the board to prevent slipping backwards. Repeat this sequence. Ensure the rider keeps their head and chin up, and that steps are small. Repeat until sufficient height has been gained for a basic slide; or have the rider pivot 180 degrees and introduce descending.

DESCENDING

Riders should be familiar with the process of safely descending the slope in case of fatigue, equipment failure or terrain that is unsuitable.

Have the student place their board across the hill, perpendicular to the fall line with their body facing downhill and their free foot uphill of their board. Have the rider lift, then step down with the board, (digging the heel edge into the snow). Step down with the free foot, and continue stepping, board then free foot in sequence, until the rider is at the base of the slope or at an appropriate height for a basic slide.

Step 3: Sliding

Goals:

- Sliding on flats
- Maintain neutral position on a moving board
- Preparation for unloading magic carpets/lifts

GUIDING SUGGESTION

It is generally recommended to use 'hands-on/board off' guiding for tactics in step 3.

STRAIGHT RUNNING

From a suitable height (slight slope to flat, or ideally slight slope to flat with a terrain-assisted stop), have the rider stand in the neutral position. Place the free foot against the rear binding and, when ready, slide. If terrain is suitable, allow the terrain to stop the student, or physically assist the student to stop with your body.

NOTE: During this phase, it is important to reinforce the neutral position. Head should be up and facing in the direction of travel. The student will need specific instruction and perhaps physical guidance in which direction to face their body. Knees and ankles should be slightly flexed. Shoulders should be parallel to the board.

PUSH-PUSH-GLIDE

Using flat terrain, practice sliding without the consequences of gravity, using the skills learned in basic mobility. VI students may require verbal cues (i.e. “glide”) during the initiation of this tactic as they may not be able to reference their speed, depending on their visual impairment. Call out, or have them count the number of pushes prior to the glide.

TOE/HEEL DRAG

This tactic is useful for beginners as a way to control speed or introduce some direction control. This can be done when the student is comfortable with Push-Push-Glide is achieved. Have the student push as before and, while gliding, slide the toe or heel of the free foot off the board, so that they can drag it in the snow. The dragging toe or heel will slow the rider, and create a point around which the board can pivot. Again, verbal and physical cues may be required when introducing this tactic.

J-TURNS

A J-Turn adds rotation as a means of changing direction. Set the student up as you would for the previous tactic (heel/toe drag), but rather than sliding the rear foot off the board to alter direction, have the student rotate their head, shoulders, hips and lower joints in the chosen direction. They should hold the rotation until the board pivots and the student is able to traverse to control speed. Repeat in the opposite direction. Use verbal and physical cues as necessary.

Step 4: Control

Goals:

- Edge control
- Speed control
- Basic direction control

GUIDING SUGGESTION

It is generally recommended to use ‘hands-on/board off’ guiding for the step 4 tactics below

INTRODUCTION TO EDGING (THE GAS PEDAL EXERCISE)

The Gas Pedal is an exercise for introducing edging on the heelside. Support the student, with their lead foot in the binding and their other foot behind the heel edge on the snow. While describing the action of a gas pedal, have the student press the toes of the snowboard foot towards the ground, as they would in a car gas pedal, until the board flattens and begins to slide; care should be taken not to apply too much pressure, as the board may slip away too quickly. Have the student ‘release the pedal’ by lifting their toes to stop the snowboard and engage the edge.

An alternative introduction to edging, particularly for children, is to try a ‘crab walk’ for heelside or ‘bear crawl’ for toeside as initial steps to gain comfort with edge angle. A game like red light/green light may also be a fun way to learn about edging.

Use verbal cues and hands-on guiding as relevant. Be aware when using analogies that the student with a visual impairment may or may not have ever seen the things being described; adjust your language and explanations accordingly.

ONE-FOOT-ATTACHED TACTICS

One-Foot Sideslipping

As another introduction to sideslipping, you might try the tactic with the rear foot unstrapped. This may allow the student to feel more secure, by helping them to adjust their base of support quickly by moving the free foot to regain balance.

Begin across the fall line, slowly relaxing the edge and allowing the board to begin sliding. Be sure to have established verbal cues or commands such as “toes up” or “heels down” so that you can help maintain a comfortable speed.

One-Foot Pendulum

Similar to one-footed sideslip, the use of this tactic with a free foot is intended to provide a greater feeling of safety during the acquisition phase of learning the skill.

It may be beneficial to have two instructors form a corridor (standing 6 to 8 board lengths apart) to provide verbal cues on both sides of the student while moving down the slope.

Using rotation of the head, shoulders, hips and lower joints, the student should slide in an arcing path down the fall line. A tactile cue, such as a high five or fist bump at the top of the arc may signal the student to begin the tactic in the opposite direction (switch).

GUIDING SUGGESTION

For sideslipping, the instructor will generally begin by guiding ‘hands-on and snowboard off’, and, as the student progresses with this skill, they can move to ‘facing the student--above or below’ (snowboard on) guiding.

SIDESLIPPING (TWO FEET ATTACHED)

Heelside Sideslip

Complete this tactic with two feet strapped in. On a suitable slope, have the rider place the board across the fall line (back facing uphill). Gradually reduce edge angle (drop toes) until the board starts moving downhill. Riders will increase their edge angle (lift toes) to control their speed and slow down.

Toeside Sideslip

Complete this tactic with two feet strapped in. On a suitable slope, have the rider place the board across the fall line (back facing downhill). Gradually reduce the edge angle (drop heels) until the board starts moving downhill. Riders may increase their edge angle (lift heels/press toes) to control speed.
Note: The instructor must monitor who or what is approaching the rider to ensure safety.

GUIDING SUGGESTION

For pendulum and power pendulum, the instructor may guide ‘facing the student – above or below’ And, as the student progresses, move to guiding from behind.

PENDULUM/FALLING LEAF

Once the rider is effectively using edge angle to control speed, basic direction control (using one edge) can be introduced by using pressure. Have the rider apply pressure (stand heavy) on one foot to flatten the corresponding half of the board. This creates greater motion to the side of the applied pressure. To change direction, the rider first returns to neutral (applying even pressure on both feet) then applies pressure to the opposite foot.

POWER PENDULUM

nce the rider is effectively using both edge angle and pressure control to manage speed and direction, introduce rotation to the sideslip. This drill is very similar to the Pendulum/Falling Leaf, but the introduction of rotation will allow the rider to point the board in the desired direction, increasing control. Starting from a sideslip, have the student rotate their core (shoulders, hips, and knees, depending on ability) in the new direction. Finish each direction change with the board approaching the fall line. As opposed to the zig-zag shape of the falling leaf, the shape will be more rounded near the vertex (lowest point) of the arc; approaching a “U” shape.

Step 5: Turning

Goal:

- Single turn toeside
- Single turn heelside

GUIDING SUGGESTION

In the beginning stages of learning to turn, instructors will usually guide the student in the ‘hands on and snowboard off style, and may progress to ‘guiding facing the student–above or below’.

BEGINNER TURNS

Heelside Turn:

Have the student traverse across the slope on the toeside edge (facing uphill), with their head facing the direction of travel and slight pressure on the leading foot.

- The student then initiates the turn by rotating their head over the lead shoulder towards their back, and rotating their core towards the nose of the board. The nose of the board will pivot towards the fall line.
- The edge change begins with moving the lead knee in the direction of travel, and allowing the board to flatten, slightly flexing the ankle.
- Have the student continue to direct the board through the turn with knee rotation, using lead knee and ankle flexion to change from a flat base to the heel edge.
- The hips follow the rotation and the student completes the turn by flexing the lower joints to engage the heel edge.
- Have the student look downhill, equalize weight on both feet, and use a sideslip to slow down to a stop. Equalizing weight is an important step, and will help the student progress to linking turns smoothly.

For students with visual impairments, verbal coaching through each phase of the turn is critical. If using verbal cues for direction, the instructor should take care to be standing in an appropriate area to provide direction and avoid being struck. As these movements happen in quick succession, it may be good practice to review the commands with the student to make them concise and efficient.

Toeside Turn:

The student begins in a traverse on the heelside edge. They should be facing in the direction of travel, looking over their lead shoulder.

- The student begins the turn by looking down the fall line, and moving the lead hip, knee and ankle down it (rotating towards the tail of the snowboard). As the student approaches the fall line, they should rotate their hips and allow the snowboard to flatten briefly as they continue to rotate to the new direction. Make sure the student keeps rotating their hips and flexing the lead knee and ankle to engage the toe edge as they cross the fall line.
- As the board reaches the toe edge, the rider will end facing uphill, shoulders parallel to the snowboard tips, and may finish in a sideslip, which involves equalizing their weight on both feet.They continue to sideslip to a stop.

Again, the speed at which the student must complete the sequence may make long commands inefficient. Practice with static drills to refine the command sequence.

OTHER SUGGESTED TACTICS FOR INTRODUCING TURNING

Static exercise: Walking Through the Turns

You can walk the rider through a turn without a snowboard strapped on. Starting from the heels or the toes, have them walk sideways through an arc, flattening their feet when parallel to the fall line and rising up on the opposite part of the foot from the start, ending on toes or heels. This will allow the rider to get a feel for the timing.

Static exercise: Twist the Disks

Have the rider stand on the snow (no board) and rotate as though they are turning the snowboard. Watch for the rotation continuing down the body from the head and shoulders to the hips, knees and ankles. Garlands/

Chicken Turns

This drill is to prepare the rider for the increase in speed due to the effect of gravity along the fall line. The rider will start in a sideslip, using both edge angle and rotation. Have the rider point the board downhill along the fall line and then return to the starting sideslip. This eliminates the need to change edges to maintain control. Understanding the increase in speed due to the effects of the fall line will prepare the rider for linking turns, as well as improve the coordination of rotation and edge angle during the turn.

The Dance Exercise

The dance exercise is a hands-on method to introduce the edge change during the turn. Essentially, the instructor (at the centre of the turn) will guide the rider's body around the turn. Speed control is provided by the 'captive', short-radius turn around the instructor. Verbal commands (such as flat board, heel/toe) will help the rider develop the timing for the turn.

NOTE: The instructor should not have a snowboard strapped on for this drill, as it will interfere with the rider's turn.

J-Turns

Try a J-turn as described above in Step 3: Sliding. Try the tactic with two feet strapped in.

Step 6: Flow

Goal:

- Add fluidity to student's riding
- Add vertical movement
- Vary the shape and size of turns to control their speed

GUIDING SUGGESTION

Depending on the student's abilities, the instructor may guide in the 'Facing student above or below' style (speed limitations), 'Below and Facing away' style (generally for students with some vision) or 'Behind the Student' style (Close contact, ease of verbal communication, instructor is facing forward).

ADDING A TRAVERSE BETWEEN TURNS

This tactic allows the students to begin linking turns together without coming to a complete stop or continuing down-slope in a sideslip. Rather than using the sideslip to control speed, the student will continue in the direction across the fall line at the end of the turn until ready to initiate the next turn.

If the student is having difficulty feeling the fall line, verbal cues may be used to signify when to begin the traverse phase of the tactic and when to start a new turn.

NOVICE TURNS

This tactic is useful for increasing the flow of the rider, using flexion and extension to control pressure. While linking turns, have the student flex after the board has changed edges (after the fall line). Flexion after the fall line increases the efficiency of the edge pressure and increases stability by bringing the rider's COM lower to the ground.

Be sure to encourage the student to utilize even pressure distribution. Depending on balance, there may be a tendency to tilt towards the nose or tail of the board.

Across the fall line

With a sideslip

OTHER SUGGESTED TACTICS FOR INCREASING FLOW

Twist the Disks with Flexion and Extension

Have the rider stand on the snow (no board) and rotate as though they are turning the snowboard. Watch for the rotation continuing down the body from the head and shoulders to the hips, knees, and ankles. Once a few rotations have been made, have the rider extend/flex through the rotation; being tallest in the centred portion (shoulders parallel to the board) and going low/being the most flexed at the extreme of the toe or heel rotation. This 'up un-weighting' will allow the board to have a flat base during the fall line portion of the turn. Use verbal cues and hands-on guiding as relevant.

Traverse With Flexion and Extension

This tactic is to introduce the concept of flexion to help manage pressure generated in a turn. Have the student start a traverse (either as a stand-alone exercise or in conjunction with turning with a traverse) and during the traverse move their COM up and down by flexing the ankles, knees, and hips.

Pay attention to the alignment, as depending on the level of mobility in the joints, students may tend to over-utilize the larger joint (hips) and underutilize the smaller joints (knees and ankles), resulting in the weight being too far over the heel edge during the exercise.

Again, if the student is having trouble feeling the fall line, verbal cues may be used to start each phase of the manoeuvre.

Sliding 360s

Sliding 360s are a fun tactic that can be used for many different focuses. Rotation, edge control, and pressure control are all components of this tactic. They can be done down or across the fall line.

Utilizing the fall line: Have the student begin a sideslip, and when ready, initiate rotation (in either direction) and reduce edge pressure until they begin to spin. Hold the rotation until one revolution is complete (or more, but watch out for dizziness). Lowering the COM, by flexing, may help with the student's stability.

Across the fall line: The student begins by initiating a turn to the heelside or toeside. Rather than completing the turn with a traverse or initiating the opposite turn, the student maintains the rotation so they turn the board across the fall line in the direction of travel as they reduce edge angle and pressure. This method eliminates the acceleration caused by traveling down the fall line.

Remember that the effective edge will change part way through the rotation (from heel to toe or vice versa) and instruct the student during your demonstration to avoid an unexpected edge catch!

Verbal cues may be difficult depending on the speed of rotation. Depending on the innate balance of the student, vertigo during rotation may be a serious issue, due to the disruption of the inner ear fluids and the lack of balance based on the visual horizon.

VI TROUBLE-SHOOTING TIPS

ASSESSMENT/OBSERVATION	POSSIBLE ORIGIN/REASON	RELATE TO SNOWBOARDING
Falling onto the active edge early in the turn	Too much/too sudden pressure	Work on the timing of the turn. Count out 1-2-3-4 and have student gradually increase pressure on their toes/heels
VI rider is experiencing dizziness on slopes/unable to perceive fall lines	Loss of natural 'stereo' balance due to being strapped to a board	Use an outrigger to provide another point of reference, or a short ski pole with a ping pong ball on the end
VI rider is not responding to your voice commands	Too much distance between the guide and the VI rider Too much noise on the hill, too much wind, or a combination of both If using a radio headset, it is not functioning	Close the gap between the VI rider and the guide. Guide raises voice to be heard Train the VI rider to slow or stop when this occurs. Check radio headsets of both VI rider and guide to determine cause
VI rider turns in the opposite direction of your voice command	Rider does not understand the difference between toeside and heelside turns.	Ensure the rider understands all the verbal communication being used
A mobile VI rider who is linking turns is getting stuck on the flats.	Instructor is not communicating early enough for rider to increase/keep speed because a flat terrain is approaching.	Ensure the communication signals are being given prior to reaching the flats, not when the student is on the flats.
When the instructor is using a guiding sequence with the VI rider, the rider's reaction time starts to slow down, and they are not completing turns as quickly.	Fatigue is setting in Fear factor Cannot hear the commands due to other noises	Stop and rest. Go have a break or quit for the day. Stop and discuss with the VI rider. Determine cause of fear: on-hill traffic, terrain, conditions, internal fear etc. It may be necessary to change terrain. Focus on maintaining a calm and reassuring voice, or change to a more supportive guiding technique.
Student is having difficulty maintaining their balance	Guide's voice is too low. Student's equilibrium is affected, and they are challenged by the changes in the terrain.	Consider the use of adaptive equipment such as an outrigger, tethers or a hoop device.

LIFT PROCEDURES - FOR STUDENTS WITH A VISUAL IMPAIRMENT

Magic Carpet

The magic carpet is probably the first lift that a rider will encounter. Carpets consist of a moving rubber surface on which the rider will stand while being conveyed up the slope.

Beside the loading area, have the student listen to patrons load the lift. For safety, be sure to note the time that elapses between the sounds patrons make and the sequence of movements.

QUEUEING UP

On command, the rider queues up to the loading ramp (after using hands-on or verbal guiding techniques to navigate the queue).

PREPARING TO LOAD

Once the rider ahead is past the mark, give the command for the rider to push gently with their free foot until the nose of the board is gripped by the rubber belt.

LOADING

As they are either standing on the board or with their free foot in the air (if balance is adequate), the student will be shuttled by the rubber belt until their free foot is past the ramp.

RIDING THE CARPET

Quickly guide the student to place their free foot down on the carpet to reduce slipping (if the belt is icy); or if the foot was on the board, have them slide the heel or toe off to provide traction on the belt.

PREPARING TO UNLOAD

An instructor should ride in front of the student to provide adequate verbal warnings, and to be ready to physically assist the student to unload the carpet, if necessary. At the top of the carpet, the slope will level off; prepare the student to unload

UNLOADING

Allow the student's board to slide off the carpet and guide them to quickly use their free foot to clear the unloading area; there is most likely another rider behind them!

PREPARING TO SNOWBOARD

Guide the student to skate to the side, to a point where they will strap in their free foot.

NOTE: It is possible to use a chair on the carpet if fatigue is an issue for the rider. Consult the ski area operator prior to doing so.

T-Bar/J-Bar/Poma/Tow Rope

As before, always discuss the use of the lift with the rider prior to getting in line. Allow the rider to ask questions. Some hills may have a practice bar available to demonstrate to students how the lift operates. If possible, it is best to have one instructor in front and one behind. The instructor in front can assist the student to unload, and the instructor behind can assist in the case of a fall.

PREPARING TO LOAD

Once the rider ahead has cleared the take-off area, guide the student to skate to the line indicated for loading.

LOADING

The operator will place the bar between the rider's legs, against the lead/strapped in foot. If possible, consult with the lift operator prior to loading a student.

RIDING THE SURFACE LIFT

Guide the student to hold the handle of the lift bar, balancing as the lift pulls the rider up the slope. Firmly remind them not to sit on the bar. It is not designed to support the full weight of a rider.

UNLOADING

At the top, there will be a sign/mark indicating where to unload. The instructor will need to provide verbal warnings indicating where the student should unload. Have the student pull the bar from between their legs and gently let it go ahead of you. Be Aware, the bars are spring-loaded and will very quickly rise up out of the way. Remind the student not to throw the bars.

PREPARING TO SNOWBOARD

The instructor should guide the student to skate out of the unloading area to a safe spot to begin the lesson/proceed down-slope.

Chairlift

Chairlifts are ubiquitous in the sport of snowboarding. The majority of ski areas operate lifts in similar configurations. Standing beside the loading area in a safe spot, discuss the process of queueing (the maze), approaching the loading zone and loading the chairlift (using other skiers and snowboarders as examples). Allow the rider to listen to the sounds, and describe the sequence in time to the sounds if possible. Be sure to discuss the unloading at the top so there are no surprises! If possible, use a chair to practice sitting and standing (loading and unloading) onto the board. Unloading can be tricky. Practice of straight running with the rear foot out of the bindings may be required to build confidence and improve the chances of successful unloading.

APPROACHING THE LOAD

When it is safe, guide the student to approach the loading line from the maze. Some lifts may be equipped with an indicator light (traffic or other).

PREPARING TO LOAD

Guide the student to stop at the loading line (either a line on the snow, or indicated by a pylon) and prepare for the chair approach.

LOADING

When the chair arrives, guide the student to sit and allow the snowboard to remain flat beneath the chair.

SAFETY BAR DOWN

Once the chair starts moving, the board will lift off the snow. If the chair is equipped with a rest bar, have the student place the snowboard on the bar. Otherwise, the instructor can support the weight of the snowboard with their free foot.

SAFETY BAR UP
Near the top, there may be signs indicating the approaching unloading area. Provide verbal warnings to the student. Have the student lift the bar when prompted, and prepare to unload.

PREPARING TO UNLOAD
On the unloading ramp, guide the student to align their snowboard in the intended direction (usually straight ahead)

UNLOADING
When the rider is ready, help them stand up on their board. Guide the student to do a 'straight run' down the unloading ramp and proceed to a safe area to strap on the board.

NOTE: It may be advisable to scout the lifts you plan on using in advance to check the slope of the unloading ramps. Steeply sloped ramps are not ideal for beginners. If required, you can ask that the chairlift is slowed for loading and unloading. Be sure to communicate clearly with the student and the lift operator if you want to do this.

SAFETY

Note for instructors; always have a lead guide. Only one person should be in charge of giving instruction. The blocker or aid should be in charge of managing on-coming traffic and safety and must be able to call out the emergency stop command.

VISIBILITY
- Ensure student and instructor have highly visible identifying safety vests (or similar). E.g. 'Blind' or 'Visually Impaired' and 'Guide'. Reflective tape is recommended to enhance visibility in low light.
- Red flashing bicycle lights attached to the back of helmets are useful in low-light conditions.

EYE PROTECTION
- Ensure the student has eye protection (goggles or sunglasses) to protect their eyes from sun, glare, snow, wind, protruding objects, etc. A student who has a visual impairment is still at risk of eye damage.

CHOOSE AN EMERGENCY STOP WORD
- Before heading out to the snow, the instructor/guide and the student should choose a command for an emergency stop. An emergency stop command is spoken when the instructor wants their student to stop right then and there, without starting, continuing, or finishing a turn. Students may have to do a sharp, quick edge set if possible, or sit or fall down to stop suddenly. For safety, students must be able to demonstrate they understand this command early in the lesson. Emergency stop words can be "stop," "sit," "crash," "dump" or any word that works for the team.

PRACTICE EMERGENCY STOP
- Practice the emergency stop at the beginning of the lesson. This will reveal the student's reaction time and confirm their understanding of the command. The instructor should avoid situations that require a faster reaction then the student has demonstrated.

COMMUNICATE ON-HILL SAFETY
- It is imperative for instructors and guides to look up the hill to check for traffic before moving out. Instructors could teach students to ask, "Is it safe uphill?" before they start riding. Before starting down a slope, the instructor should inform their student about the snow conditions, terrain, and the other people or activities on the hill.
- Explanations should be given when stopped in a safe spot on the side of the hill.

LOUD CONDITIONS
- On days when conditions are fast, firm or icy, the snow can be very loud when we are sliding across it on our snowboards. This can make it difficult for our VI students to hear verbal commands or calls. This can pose a safety risk and may also cause anxiety for the student. Consider adjusting your guiding style or using a radio headset on loud days. It may also be helpful to reduce your edge angle (to reduce board noise), if it is possible and practical to do this safely.

WARM-UP RUN:

- More advanced riders can take a warm-up run on easy terrain to allow time for the guide and student to become comfortable with each other before progressing to steeper, more challenging terrain. Starting out on easy terrain will allow time to develop or refresh commands, and to determine whether you have accurately assessed the rider's visual field. Always take a warm-up run, even if there is a previous relationship and history between the student and guide.

SNOWBOARDING WITH A VISUAL IMPAIRMENT: SUMMARY

STUDENT PROFILE/DEFINING VISUAL IMPAIRMENT

Vision loss is primarily measured by the student's visual field and visual acuity. This represents the boundaries and sharpness of their vision respectively. Some of the most common visual impairments are macular degeneration, glaucoma, diabetic retinopathy and cataracts. Four categories of vision loss have been identified to provide a framework for the instructor to understand some of the differences: profound, severe, moderate and mild. Use the AOT to determine the strengths and limitations of the student's vision.

COMMUNICATION

Communication is vitally important when working with a student who has a visual impairment. Figure out a communication system that works for both student and instructor. Use clear, concise language with an appropriate speed and predictable rhythm. Always identify the speaker and describe the environment.

TYPES OF GUIDING ON SNOW

The most appropriate guiding method for any student depends on their challenges and abilities, and which tactic or step of the progression is being taught. 'Hands-on/Snowboard off' is a technique used in the early stages of learning. It allows the instructor to use their hands and voice to describe the equipment, tactics and environment. 'Facing Student--above or below' is a useful guiding technique for the early stages of sideslipping or learning to turn. 'Below and Facing Away' is a useful technique to be used with students who have more vision, and are able to follow an instructor. 'Behind student' is a technique for a more mobile and independent student who requires consistent verbal cues.

VERBAL GUIDING SEQUENCES

Some examples of verbal guiding sequences are included in the chapter, to communicate to a rider when and how to turn down the slope at either a beginner or a more advanced level.

SIX STEPS

When teaching the six steps, keep in mind the student's level of vision and adapt accordingly. Demonstrations may not be possible. More hands-on instruction is often required, paired with clear and descriptive communication.

LIFT PROCEDURES

Ensure the student has a good understanding of loading, riding, unloading and emergency procedures prior to getting on a lift. Use consistent verbal cues.

SAFETY

It is very important to ensure that the instructor and student wear identifiable garments which make them highly visible to others on the hill. Eye protection is very important for a student with a visual impairment, and it is important that student and instructor come up with an emergency stop word and know when and how to use it. The instructor is responsible for educating their student about on-hill safety and ensuring the conditions and equipment don't interfere with the student hearing verbal commands.

CH.8: SNOWBOARDING FOR PEOPLE WITH AUTISM SPECTRUM DISORDER (ASD)

AUTISM SPECTRUM DISORDER

Teaching Snowboarding to People with ASD

OVERVIEW:

Autism Spectrum Disorder, also referred to as autism or ASD, is a neurological disorder which causes developmental disability. Autism affects the way the brain functions, resulting in difficulties with communication and social interaction that may also include unusual patterns of behaviour, activities and interests.

The term 'spectrum' refers to a continuum of severity or developmental impairment. If you've met one person with autism, you've met one person with autism. There is a huge range in language skills, attention span, interests, sensory sensitivities, etc. Individuals with ASD usually have particular communication, social and behavioural characteristics in common, but the conditions cover a wide range:

- Number and kinds of symptoms
- Severity: mild to severe
- Age of onset
- Levels of functioning
- Challenges with social interactions

GENERAL SYMPTOMS RESULTING IN AN ASD DIAGNOSIS

- Persistent deficits in social communication and social interaction across contexts
- Restricted, repetitive patterns of behavior, interests, or activities
- Symptoms must be present in early childhood (but may not become fully manifest until social demands exceed limited capacities)
- Symptoms together limit and impair everyday functioning.

Please note, in the past what is now known as autism spectrum disorder was broken down into several different diagnoses, including aspergers syndrome. There may be some students who continue to identify with this label. A person who self-identifies as having aspergers has ASD.

STRENGTHS EXHIBITED BY INDIVIDUALS WITH AUTISM

People with ASD may have strengths that overshadow the developmental problems experienced by the individual.

These strengths may include one or more of the following:

- Non-verbal reasoning skills
- Reading skills
- Perceptual motor skills
- Drawing skills
- Computer interest and skills
- Exceptional memory
- Visual spatial abilities
- Music skill

WEAKNESSES EXHIBITED BY INDIVIDUALS WITH AUTISM

The above exceptional skills may be combined with subtle or significant delays in other areas of development. All individuals with the diagnosis demonstrate some of the following:

IMPAIRED COMMUNICATION

Communication may range from limited or no speech to typical speech. Difficulties using and understanding verbal and non-verbal language are exceedingly common in individuals with autism. Deficits can be found in these areas:

- The development of spoken language--no speech
- Responses to the communications of others (e.g. won't look)
- Failure to initiate or sustain conversations (e.g. turn-taking)
- Pronoun confusion (e.g. I vs. you)
- 'Choppy' language
- Repetitive language
- Difficulty staying on topic
- Poor conversation skills
- Abnormalities in pitch, stress, rate, rhythm, and intonation of speech
- Stereotypical and repetitive use of language (using lines from a favourite movie to communicate)
- Idiosyncratic use of words and phrases (e.g. always salutes and says "Yes sir" when given a direction)

ALTERNATIVE COMMUNICATION METHODS

Individuals with autism may also use alternative, non-verbal communication methods, e.g. sign language, picture communication systems, technology (an iPad with a communication app).

IMPAIRED SOCIAL SKILLS

Autism is characterized by an impaired ability to engage in social relationships and can result in serious deficits in the ability to make friendships. This is demonstrated in various ways, including:

- Failure to respond to their name when called
- Appearing not to listen when spoken to
- Inability to display appropriate facial expressions
- Avoiding eye contact
- Failure to respond to affection
- Sometimes treating people as if they were inanimate objects
- Will acknowledge an adult only for the purpose of getting a need gratified and will return to ignoring the adult thereafter
- May engage in one-sided conversations
- Difficulty with perspective-taking including sharing and taking turns
- Withdrawn behaviour
- Engages in one-sided play

PERSEVERATION ON INTERESTS AND ACTIVITIES

Perseveration is when an individual becomes 'stuck' on a topic, word, thought, activity, item, problem-solving strategy or emotion and has trouble moving on. Individuals with autism may have a narrow range of interests (e.g. a child will only go to play in the block area of the classroom). They may also engage in repetitive, stereotypical body movements such as hand flicking, spinning or rocking. They may insist on carrying certain objects around with them in the classroom to keep themselves from losing control or to help them feel secure. Perseverations might extend to food. A person with autism may have a preference for or dislike certain colours, textures or temperatures of foods. Some individuals perseverate on certain topics. The person might remain intrigued with one or two topics, such as music or modes of transportation, and exhaust everyone who comes into contact with them about their knowledge in that area of interest.

DEPENDENCE ON ROUTINE

Sometimes individuals with autism will develop excessive adherence to routines, ritualized patterns of verbal or nonverbal behavior. They may exhibit excessive resistance to change, such as insisting on a specific route or food, or repetitive questioning. They may experience extreme distress at small changes.

ABNORMAL RESPONSES TO SENSORY STIMULATION

Individuals with autism may experience hyper- or hypo-reactivity to sensory input or unusual interest in sensory aspects of their environment; such as apparent indifference to pain, heat or cold, adverse response to specific sounds or textures, excessive smelling or touching of objects, fascination with lights or spinning objects.

Individuals with autism may exhibit unconventional reactions to sensory stimulation. Some individuals show a hypersensitivity to stimuli (e.g. can hear lights buzzing, cannot tolerate touch, etc.) while others display a hyposensitivity to stimuli (e.g. demonstrates high pain tolerance, acts as if deaf, etc). A person with autism may be fascinated with a piece of lint, or may spend hours rocking or watching objects twirl. In general, these types of reactions are providing some sort of sensory stimulation for the person.

It is believed that these sensory difficulties stem from neurological dysfunction in the brain. We are bombarded with thousands of sensations daily. Our ability to integrate these sensations by attending to the important ones and filtering out the non-essential input helps us to function efficiently. Without smooth functioning of this system, the individual is unable to accurately interpret their environment and respond and adapt.

SENSORY DIFFICULTY	EXAMPLES OF WHAT IT MIGHT LOOK OR SOUND LIKE
Hyper-reactivity *Greater than expected reaction*	• Students with their hands on their ears • Students who are fascinated by sand and water • Students concerned about clothes being itchy • Students who hate to get dirty
Hypo-reactivity *Less than expected reaction*	• Students who don't react to pain • Students who don't react to and appear not to hear loud noises.

BEHAVIOUR PROBLEMS

Behaviour problems can also be associated with individuals with autism. These can include incidents of tantrums, self-injury, property destruction, and acts of aggression. Some behaviours are the result of developmental deficits (e.g. a person cannot speak and engages in challenging behaviours as a form of communication).

Episodes of self-injury are an abnormal response to sensory input seen in people with autism. Regardless of the cause, when a person is performing self-stimulating behaviours (e.g. hand flapping, twirling, finger posturing, etc.), it is often difficult for them to be able to focus on learning.

Common Health and Wellness Challenges

HEALTH/WELLNESS CHALLENGE	WHAT?	HOW IT AFFECTS SNOWBOARD INSTRUCTION
Sleeping difficulties	Difficulties falling asleep, disturbed sleep, regular awakenings	Inquire how the child slept the previous night. Know that the parent may also be sleep-deprived.
Gastrointestinal problems	Constipation, diarrhea, abdominal pain or bloating	May cause physical discomfort and make learning and focusing challenging.
Motor Challenges	Difficulties with balance, coordination, limb speed, agility, simple and complex reaction time, motor planning and fine motor skills. Low muscle tone, hyper-flexion of joints, toe-walking, clumsiness and irregular gait.	Perform your AOT, looking for the presentation of any motor challenges and determine any adaptive equipment or strategies needed to accommodate the student.
Limited diet and picky eating	Food allergies or intolerances Diet may be limited to only a few preferred foods.	Never offer food or drink without parent or care-giver approval

INTERACTING WITH AN INDIVIDUAL WITH AUTISM

The complexity of autism makes it difficult to establish a general set of strategies that will enhance interaction. The following guidelines provide a starting point. Establishing a rapport with the student with ASD is an important first goal.

TALK LESS, LISTEN AND OBSERVE MORE.

- Too much talk can be overwhelming for a student with autism.

USE 'SHOW AND SAY' AS MUCH AS POSSIBLE.

- Many students with ASD are strong visual learners.
- A side-by-side approach when demonstrating is often easier for the student to comprehend.

USE AN OPEN-ENDED APPROACH WITH CHOICE/FORCED CHOICE. REDUCE THE DIRECTIVE APPROACH

- "We are putting on your snowboard, then you get to choose if we slide over here by the door or over there by the sign."

AVOID ASKING A YES/NO QUESTION IF YOU ARE NOT PREPARED TO HONOUR A NO ANSWER

- Try using language like, "it's time to go snowboarding" or "let's go snowboarding", instead of "do you want to go snowboarding?"

BREAK THE TASK INTO ACHIEVABLE PIECES.

- Beginning points may include putting on snowboard boots and walking around inside before going outside, for example. Build success on what the student CAN do.

GIVE TIME TO PROCESS

- The instructor might have to pause and count 1, 2, 3, 4, 5 in their head to allow the student time to respond before repeating the instruction/question, or utilising additional teaching strategies or communication methods.

UTILIZE REPETITION

- Students may need to practice a task many times before they have mastered it. Allow time for a student to hone their skills before moving on.
- Review, Re-teach, Repeat, and Practice.

ENSURE YOUR COMMUNICATION MATCHES THE ABILITY OF THE STUDENT

- Use a communication style, pace and type that fit within the student's ability.

POSITIVE REINFORCEMENT

- Praise the child for what they do well
- Consider the use of rewards

COMMUNICATION TIPS

USE SHORT, CLEAR PHRASES

- "eyes up", "Bend knees", "Look at me"

SHOW AND SAY

- Pair words with pictures, models, gestures, visual cues, text (lists, schedules, etc.)

BE SPECIFIC AND DIRECT

- Instead of "wait nicely", say what you want to see! "I need you to stand here with your snowboard off" Or "you can sit here and play with the snow."

SUPPORT STRATEGIES

Remember: If you've met one person with autism, you've met ONE person with autism.

- Always be thinking about the individuals on the spectrum you support as individuals.
- Personal preferences, strengths, learning styles, dislikes, etc.
- Not every strategy will be a good fit for every person in every situation.
- Work as a team to understand the situation and match the appropriate strategies.
- If working with a child, collaborate with parents/caregivers to understand individual strategies

BEHAVIOUR SUPPORT TOOLS

BEHAVIOUR SUPPORT TOOL	WHY?/WHEN?	HOW IT AFFECTS SNOWBOARD INSTRUCTION
First/Then	Helps motivate students through more challenging/less preferred activities	First sideslip. Then play in the snow.
Countdown Strip	Shows the student how many more they need to do	Five more straight runs, then you get a break
Token Board	Helps motivate students to complete activities	"You did a great J-turn, you get a token"
Timer	To transition away from a preferred activity. To show the amount of time left for a less preferred activity	Two minutes of building a snowman, then time to snowboard Five minutes of snowboarding, then go inside for a hot chocolate
Choices	Offering more choices reduces problem behaviour, even 'small choices'	"Which boot do you want to put on first?" "Do you want to sit on the left or right?"
Visual Schedule	Lets the student know what is happening in their day. Picture, written or electronic schedules	Depending on the student's ability, we may show them their day with photos, line drawings, written lists or an electronic version.

BEHAVIOUR SUPPORT TOOLS CONTINUED

BEHAVIOUR SUPPORT TOOL	WHY?/WHEN?	HOW IT AFFECTS SNOWBOARD INSTRUCTION
Wait Card	A concrete way of representing waiting.	Student holds a card with the word 'wait' on it while lining up for the chairlift.
Front-loading	Remind the student in advance of the expected behaviour, and the great outcome if they do.	"When we line up, we need to wait nicely. If we wait nicely, you can hold the toy on the chairlift. If we don't wait nicely, there will be no toy."
Social Scripts	Short stories to explain what to expect from a new routine or activity.	"It's ok if I fall down, my instructor will help me get back up."

ASSESSMENT OF ABILITIES: ASK, OBSERVE, TEST (AOT)

The AOT process is designed to determine a student's strengths and weaknesses. This information will assist an instructor to determine the type of teaching and communication strategies to use, and whether any adaptive equipment is necessary. It is also the place to determine what strategies need to be in place to protect the safety of the student, and other skiers and riders on the hill.

Ask:

Being aware of a student's specific disability, an adaptive snowboard instructor needs to focus on a student's potential while recognizing any challenges, and where they originate.

Three very important questions to ask caregivers and parents when working with children:

ASK	LOOK FOR
What does your child like?	Activities, interests, characters, creatures, objects, ideas, words, sounds, foods etc. This information can be used to build rapport and motivate a student to participate in snowsports.
Is there anything I should avoid?	Triggers or situations that may cause the student to become anxious, worried or engage in challenging behavior. E.g loud noises, certain phrases or words, the chairlift ride, etc.

ASK	LOOK FOR
Is there one support strategy you would recommend I definitely use?	The parent/caregiver's extensive knowledge of their child. Strategies that support the child to have a fun, safe and easy learning experience.
Does the student require the support of an educational assistant at school for academics? Lunch time and recess? Extracurricular activities? Phys-ed class? Toileting?	Independence in daily activities and how that relates to snowboarding A student who requires only support for academic learning is more independent than someone who requires an educational assistant during learning, recess, eating, toileting etc.
Does the student use any particular learning tools, aids or behaviour-support strategies?	Picture communication, visual schedules, wait cards, token board, first/then, countdown strips, timers, token boards, iPads, sensory therapy tools like weighted garments, headphones etc.
Does the student use any tools for communication?	Picture communication, augmentative communication systems, e.g. iPad with apps, sign language--ASL or LSQ.
Are there any learning strategies that have or haven't worked in the past?	Why were these techniques effective (or not)? Look for techniques that can be applied to snowboarding
Are there any specific learning strategies that are being implemented at home or school?	Techniques that can be applied to snowboarding. Helps maintain consistency in learning through the different activities the student participates in.
Are there any other tips or strategies that can be used to help manage behaviour or lower stress and anxiety?	Calming strategies, e.g. deep breathing, squeezing hands, calming words, token systems, breaks, first/then strategies, positive reinforcement.
Does the student have any sensory triggers or sensitivities the instructor should be aware of?	Light, sound, touch, clothing texture or temperature that causes overwhelming stimulation.
Does the student have any specific likes/dislikes, interests, favourites?	Topics/passions that can help maintain focus and interest in snowboarding.
What other sports does the student practice?	Sports that require balance, strength and mobility Previous participation in skiing or snowboarding.
What is their snowsports history?	Information about sleeping challenges, gastrointestinal difficulties, etc.
Does the student have any additional health challenges?	Additional diagnoses, particularly muscle weakness, low muscle tone, loose joints, toe-walking, clumsiness, etc.
Does the student have any additional disabilities or challenges?	Seizures, flight risk (wandering off)
Are there any safety concerns? Where do they think their strengths are?	Perseverance, participation in other sports, positive attitudes, determination, etc.
What are common challenges the student faces?	Fatigue, balance, co-ordination, lack of belief in self or ability, frustrations.

Observe:

Examine the student as they walk and move around. As you do this, relate the ease of their movements to snowboarding.

Pay attention also to how the individual student communicates, both expressively (how they communicate to you), and receptively (the information they receive)

OBSERVE	LOOK FOR	RELATE TO SNOWBOARDING
How the family/ caregiver verbally communicates with the student	The word or sentence lengths used by the family members/ caregivers, e.g. 1 to 2 words or full sentences	While instructing snowsports, use words and instructions that match the language the student can understand.
The method of communication the student uses	The method of communication used, e.g. Verbal communication, Picture communication; Sign language-ASL or LSQ; Augmentative communication device, e.g. Ipad with a communication app.	Important to use the appropriate method of communication for the student to increase chances of learning and understanding. Decide with parents/care-givers, the most appropriate method for communication while out on the slopes.
The type of language the student understands easily	The student's ability to respond to your questions The student's ability to repeat back instructions you have given them.	If the student finds it challenging to answer the instructor's questions or repeat back instructions, this may mean they will find it challenging to follow directions. Try slowing down speech, using fewer words or focusing on one task at a time. It may also be beneficial to use additional teaching strategies in conjunction with your instruction. e.g. modeling, physical guidance, visual cues.
The method the family/caregiver uses to get the student's attention	If the family /caregiver gets down on the same eye-level as the student or uses physical contact, eg. Gently squeezing the student's shoulder or another method for attention-getting.	How well a student can pay attention, can be related to that student's ability to watch demonstrations or follow directions and learn how to snowboard. The instructor may imitate and use similar types of attention-getting methods to ensure the student has the opportunity to learn and participate in snowsports.

OBSERVE	LOOK FOR	RELATE TO SNOWBOARDING
Things that excite the student	Anything the student has talked about, or an item they have with them that makes them really excited.	Sometimes utilizing the student's interests can help the student to be more engaged in snowsports. Examples: "First we go snowboarding, and then we can talk about dinosaurs for 5 minutes." "First we snowboard for 10 minutes, and then we can look at your Pokémon cards."
Particular topics, activities, ideas or interests the student perseverates on.	Talking non-stop about a particular topic, activity or interest.	These might be topics, interests or subjects that are best avoided, or they may be useful as a way of relating to the student or teaching them new skills, e.g. "Let's pretend we are Spiderman and use our web to pull us across the hill".
Signs of sensory sensitivities	**Hyper-reactivity:** Avoids engagement with sensory input *Examples:* • Student has their hands over their ears in a loud room • Student is averse to wearing goggles on their face. **Hypo-reactivity:** Seeks out engagement with sensory input. *Examples:* • Student makes constant verbalizations. • Student wants to repeatedly crash into the snow bank. Unusual interest in the sensory aspect of the environment *Examples:* • Student wants to watch the chairlifts spinning on the bull wheel repetitively. • Student is fascinated by the texture of snow	**Hyper-reactivity:** It is important to realize that a student's behaviour may be a reaction to the sensory input in their environment. Students with sensory sensitivities may be averse to some types of snowsports equipment or find it extremely uncomfortable. It is important to introduce equipment ahead of time, and slowly build up tolerance of it. **Hypo-reactivity:** Modifying or replacing gear can also be helpful, e.g. using a large translucent visor in the place of goggles or cutting the tag off a pair of ski pants. Unusual interest in the sensory aspect of the environment. It may be helpful to offer the student short breaks to engage with the sensory aspects of the environment, e.g. watching the chairlift or playing with snow.

OBSERVE	LOOK FOR	RELATE TO SNOWBOARDING
Signs of anxiety	An anxious or worried look on the student's face. Self-stimulating behaviours such as rocking, flapping, spinning	Build a rapport with the student. Spend time explaining with words, pictures, diagrams, equipment, etc., what the day will look like. Ask parents if the student has any coping strategies and utilize them.
The student's gait	Smoothness, co-ordination and consistency of the student's gait. Feet pointing out or in Skipping or bouncing Stiff or stilted appearance Length of steps Walking on toes instead of the balls of their feet.	May affect student's ability to maintain a neutral position. They may fatigue easily. Provide regular breaks. Students who toe-walk often have tight heel cords and calves, making it difficult or painful to wear snowboard boots without modification. Students whose feet point in may be better suited to skiing.
The motor-planning skills of the student	The student's ability to watch a demonstrated skill, then execute the correct movements in the correct sequence.	Skills for snowboarding may need to be broken down into very small steps and repeated often.
Low muscle tone	Muscles may appear soft and floppy.	Students may need more time to learn and practice new movements. Strength and stamina may be affected. The instructor may need to build in more breaks.
Ability to balance	Unsteadiness, lack of balance, lack of confidence.	Determine whether it is necessary to use adaptive equipment to support balance.
Flexion of the joints	Any balance or walking aids The movement of the joints and whether any hyperflexion is present, particularly in fingers, elbows or knees.	Hyperflexion of the joints is commonly linked with low muscle tone. Increased knee flexion can affect posture. The student may require assistance to maintain a good stance. Increased flexibility in fingers may make the hands less stable and make gripping, lifting and manipulating objects more challenging. Students may require assistance with zippers, boots, bindings, etc.

Test:

Do some simple body movement, position and strength tests to help determine the ideal stance, position and equipment for your student's success when snowboarding.

TEST	LOOK FOR	RELATE TO SNOWBOARDING
A student's learning style	The method of teaching which they respond best to	Use the most effective teaching methods possible for the individual student. E.g. visual, kinesthetic, auditory, cognitive
A student's ability to follow the instructor's verbal instructions	The student attempts to follow your verbal instructions without further assistance.	Determine what kind of language to use with the student, e.g. sentences or 1 to 2 words at a time only. Determine whether the student will require additional teaching strategies in conjunction with verbal instruction, e.g. modeling, gestures, physical guidance, visual cues such as text/ pictures/snow-drawings, video-modeling.
A student's ability to maintain attention to an instructor's words.	Whether the student is imitating your demonstrations or following your directions.	Determine the best strategy for maintaining the student's attention. E.g. • Getting down at the student's level. • Talking with fewer words • Using gentle physical contact to get the student's attention, e.g. light shoulder squeeze.
A student's ability to follow multi-step directions	Whether the student is able to follow more than one instruction at once.	Determine how many steps the task needs to be broken down into to ensure effective learning.
A student's ability to summarize or repeat back the information you have given them	Inconsistencies or the inability to tell the instructor what they were told.	Determine the rate of speech to use; how many words at a time and whether additional teaching strategies will be needed.
A student's processing time	Whether there is a consistent delay in the student's response to a question or instruction.	The instructor may need to pause and wait after issuing an instruction or asking a question, to allow the student time to process the information.

TEST	LOOK FOR	RELATE TO SNOWBOARDING
Balance and Stamina	Ability to stand in an athletic stance (on flat surface) for 30 seconds; ankles, knees and hips flexed with weight balanced on both feet.	Instability due to balance, body position and/or stamina means reliance on adaptive devices to maintain a neutral position.
Balance and Pressure	Ability to stand in an athletic stance rocking from side to side, shifting weight from one foot to the other, while lifting the opposite foot off the ground 1 to 2 inches. Any imbalances or differences between fore and aft movements Differences in amount of flexion or ease of movement between legs.	Fore and aft movements are controlled through core strength in the upper body and shifting and flexing of hips, knees and ankles. This movement will provide an indication of the ability to maintain a centred stance, as well as to modify nose and tail pressure on each foot. These skills are needed to initiate and complete turns.
Flexion and Extension	Ability to stand in an athletic stance flexing knees, hips, and ankles, then extend the lower joints, moving up and down in a vertical plane, with weight balanced on both feet. Range and ability for vertical movement, focusing on ability to flex and extend ankles, knees, and hips. Imbalances between left and right joints in range and flexion.	Ability to alter up and down pressure to initiate flexion and extension movements assists in managing pressures while turning the snowboard. Ability to flex the lower joints brings the student closer to acheiving a neutral position. If the student has difficulty flexing their legs, adjustments to the equipment may be necessary.
Pivot	Ability to stand in an athletic position, then turn hips, legs, and feet to the right and to the left. Limitations on the student's ability to rotate their lower body. Differences in ease and ability between directions of rotation.	The ability to rotate the hips, legs, and feet in the direction of a turn helps with pivoting the snowboard and completing a turn in a more efficient manner.

TEST	LOOK FOR	RELATE TO SNOWBOARDING
Balance and Edging	Ability to stand in an athletic position with feet shoulder width apart, and rise up on toes for 2 seconds followed by balancing on heels for 2 seconds. Differences in ease and ability between toes or heels. Whether all joints--hips, knees, and ankles--are flexing in these movements. Imbalances between the left and right sides. Loss of balance during one or both movements.	Lateral balance across the snowboard and movement in the toe-heel plane is important for getting the board on edge, for turning, stopping, traversing and sideslipping. If it is easier to balance on one edge, this may indicate which edge to start the control phase with, (heelside or toeside). If there is limited flexion in the knees, but good range of motion in the hips, student may need to rely more heavily on the lateral movement of their hips in order to get their board on edge. Imbalances in joint flexion may make it difficult to get the board on edge smoothly and efficiently.
Rotational Balance	Ability to stand in an athletic position with feet shoulder width apart, and rotate arms and shoulders 65 degrees or more across the lower body to the right, holding for 10 seconds. Ability to repeat rotating the arms and shoulders to the left for 10 seconds Loss of balance.	Rotational balance indicates an ability to move in and out of alignment, maintaining balance and stability while turning. Difficulties in upper-body rotation may make turning challenging. The use of adaptive equipment may be required. If rotation is easier in one direction, this may indicate an ability to turn more easily to one side (heelside or toeside).

BASIC BODY MOVEMENT ASSESSMENT (BBMA)

Below you will read a sequence of tests performed as part of the AOT process. The tests are sequenced so that each test builds on the last, starting with a static test and moving to more dynamic movements. Have the student:

1. Stand in a neutral position on a flat surface for 30 seconds; ankles, knees, and hips flexed with weight equally balanced on both feet.
2. Rock laterally from side to side, shifting weight from one foot to the other while lifting the opposite foot off the ground 1 to 2 inches. Repeat 10 times.
3. Stand in an athletic position with feet shoulder width apart; raise up on toes for 2 seconds, then balance on heels for 2 seconds. Repeat 10 times.
4. Stand in a neutral position with feet shoulder width apart. Rotate your arms and shoulders 65 degrees or more across the lower body to the right and hold for 10 seconds. Repeat, rotating the arms and shoulders to the left for 10 seconds.

The sequence above tests many of the components in the table of tests above. It is not an exhaustive sequence.

FURTHER DRY-LAND TESTING:

For dry-land testing, instead of immediately strapping a snowboard to a participant, it may be beneficial to complete similar tests using a skateboard or longboard deck without trucks (wheels), or using a Spooner Board. These pieces of equipment may be helpful to get a feel for what it is like to get on edge. They are also useful tools for evaluating, practicing and strengthening the skills required to snowboard, particularly balance.

ADDITIONAL TEACHING STRATEGIES

Sometimes you give a great, clear instruction, but the participant does not do the skill. Here are some options to add after the initial instruction, if needed. Do not just repeat yourself!

Technique: Modeling (demonstrating)

WORKS WELL IF	TIPS	DOES NOT WORK IF	TIPS
The participant will watch your demonstration	Get the participant's attention before modeling.	The participant does not look, or runs away as you are demonstrating the skill.	Progress by doing simple drills that will benefit basic motor ability: agility, coordination, balance, limb speed, hand-eye and foot-eye coordination.
The participant is able to copy the skill after you demonstrate it	Have a volunteer or peer model while you point out the key components of the skill.	The participant does not yet have the motor ability to copy the skill	

Technique: Physical guidance

WORKS WELL IF	TIPS	DOES NOT WORK IF	TIPS
You are physically able to guide the participant into the correct movement. The participant is ok with guiding touch.	Move slowly and with respect. Use a low voice Let the participant know what you are doing/ask "I am going to help you put your hand in the right place, ok?"	You cannot physically guide the movement. The participant is very resistant to physical guidance.	Use modeling, or video modeling. Ask someone who has a good connection with the student to physically guide the movement.

Technique: Video modeling

WORKS WELL IF	TIPS	DOES NOT WORK IF	TIPS
You have access to an iPad/iPhone You can quickly film a short video of someone performing the skill The participant is interested in watching the video.	Keep it simple, short and clear.	The video does not hold the student's attention.	Watch for what is holding the student's attention.

Technique: Visual cues

WORKS WELL IF	TIPS	DOES NOT WORK IF	TIPS
You can think of a good cue to add. (e.g. using dye to draw the course on the snow, adding more targets to aim at.)	Be creative!	Visual cue presented does not get the attention of the student.	Try something the student can focus on in a small visual field, e.g. video modelling.

SIX STEPS FOR PEOPLE WITH ASD

Due to social-communication difficulties your student may present, the following steps should be considered as a best practices guide only. You may have to skip, combine, or change the order of these steps to maintain the attention of your student. However, safety is still paramount for every lesson.

Make goals realistic and aim for success. Talk to the student or their parent/caregiver about what they are looking to achieve in each lesson. Be prepared to take considerable time for students to move through the progression and their goals. It may also be necessary to do a lot of repetition in order for a student to master a skill.

Teaching and Support Strategies

When giving instructions, try to 'show and tell'. Use minimal language and pair your words with visual cues: modeling, demonstrations, drawings, images, videos, etc. Consider the most appropriate teaching or support strategies for your student. Remember to provide opportunities for processing and repetition. Consider breaking the tasks into steps. It may be helpful to provide physical guidance to complete a task. Give plenty of opportunities for practice. Provide positive feedback and consider the use of rewards for motivation. Take frequent breaks and offer choices. Don't forget to pre-load your student when appropriate and consider using support tools such as a first/then board, countdown strip, visual schedule, token board, wait card, time, or social script.

Step 1: Equipment and Communication

Goals:

- Establish communication methods
- Determine necessary adaptive equipment
- Introduce equipment to the student
- Utilize the student's strengths and interests to build rapport

BUILDING RAPPORT
It is really important to try to establish a connection with the student. Utilize their strengths and interests to assist in building a relationship between you.

COMMUNICATION METHOD
Ensure you know and use the most appropriate communication methods with the student.

EQUIPMENT INTRODUCTION
Introducing the student to the equipment may take time. Keep in mind any sensory sensitivities the student may experience, and remember that what is new and different can sometimes be challenging for a student with ASD. Helmets, goggles, boots, snow pants etc may all be new equipment for the student. Introduce equipment in stages if necessary, and provide time to allow the student to get used to wearing the equipment. Try to keep it fun and light. Use visual supports and modeling (demonstrations) if relevant and helpful for the student. Keep language appropriate for the student. If your student is a child, consider playing a game like tag to gain comfort with the boots.

Step 2: Basic Mobility

Goals:

- Familiarity with equipment
- Moving around on flats
- Develop the neutral position

THE NEUTRAL POSITION
During the initial steps, it is important to emphasize the neutral position and assist the student to develop good habits. The neutral position (also known as the ready position, balanced body position or athletic position) is common to many sports, and may have been encountered by the student in other activities.

In essence, the neutral position is:

- Base of support (leg and outrigger) roughly shoulder width apart
- Joints flexed (ankles, knees, hips)
- Arms to the side (relaxed, aligned with hips)
- Head up, facing the direction of travel
- Relaxed (but ready to react)

The instructor may use demonstration, images, video modeling or physical prompting (always ask for consent when using a hands-on approach) to assist the student to find the neutral position. Spend some time getting the student comfortable with this foundational piece before moving on.

EQUIPMENT FAMILIARITY AND MOBILITY
After strapping the first foot in, have the student plant the free foot on the snow near the back binding. Encourage the student to try to flex the lower joints (ankles, hips, and knees) to bring one edge off the snow. Flatten the board, and then slowly transfer the free foot to the opposite edge and bring it off the snow. Try using demonstration or physical guidance, and be ready to support the student to prevent falls.

TURNING IN A CIRCLE-PIVOT
Practice pivoting the snowboard. Have the student use their free foot to bear their weight then lift and move the snowboard in the direction intended, being careful to not step too far and fall off-balance. Reposition the free foot and repeat the motions until the student has completed a revolution. Repeat in the opposite direction. Try another rotation by sliding the board rather than lifting it. Try using demonstration or physical guidance and be ready to support the student to prevent falls.

This exercise improves edge control and can illustrate the differences between ‘on edge’ and ‘flat base’.

SKATING
Have the rider point their hip in the direction of travel, looking that way as well. With the free foot either on the heelside (for better alignment) or toeside (for more strength) near the front binding push towards the tail of the board (ideally, keeping the stride between the bindings). Try using modeling, visual cues or physical prompting.

CLIMBING
Have the student place their board across the hill perpendicular to the fall line, with their body facing uphill and the free foot above the toeside of the board, then take a medium-sized step with the free foot up the hill. They should follow with a small step with the attached foot, lifting the board, then engage the board edge to prevent slipping backwards. Repeat this sequence. Ensure the rider keeps their head and chin up, and that steps are small. Repeat until sufficient height has been gained for a basic slide, or have the rider pivot 180 degrees and introduce descending. Try using modeling, visual cues or physical prompting.

DESCENDING
Riders should be familiar with the process of safely descending the slope in case of fatigue, equipment failure or terrain that is unsuitable.

Have the student place their board across the hill, perpendicular to the fall line, with their body facing downhill, and their free foot uphill of their board. Have the rider lift, then step down with the board, (digging the heel edge into the snow), step down with the free foot and continue stepping with the board, then the free foot, in sequence until the rider is at the base of the slope or at an appropriate height for a basic slide. Try using modeling, visual cues or physical prompting.

Step 3: Sliding
Goals:

- Sliding on flats
- Maintain neutral position on a moving board
- Preparation for unloading magic carpets/chairlifts

STRAIGHT RUNNING
From a suitable height (slight slope to flat, or ideally slight slope to flat with a terrain assisted stop), have the rider stand in a balanced body position. Place the free foot against the rear binding and, when ready, slide. If the terrain is suitable, allow it to stop the student. You may also physically assist them to stop with your body.

NOTE: During this phase, it is important to reinforce proper body position (the neutral position). Head should be up and facing in the direction of travel. The student will need specific instruction and perhaps physical guidance on where to face their body. Knees and ankles should be slightly flexed. Shoulders should be parallel to the board.

PUSH-PUSH-GLIDE
On flat terrain, practice sliding without the consequences of gravity, using the skills learned in basic mobility. Ensure the student knows what each of the steps are, e.g. push and glide. It may be necessary to break this tactic into small steps. It might be helpful to say the steps together as the student completes them, or to count.

TOE/HEEL DRAG
This tactic is useful to beginners as a way to control speed or introduce some direction control. This can be done when the student is comfortable with Push-Push-Glide. Have the student push as before, and while gliding, slide the toe or heel of the free foot off the board so that they can drag it in the snow. The dragging toe or heel will slow the rider and create a point around which the board can pivot. Use verbal, visual or physical prompts as necessary.


FIREFLY

J-TURNS

A J-Turn adds rotation as a means of changing direction. Set the student up as you would for the previous tactic (toe/heel drag) but rather than sliding the rear foot off the board to alter direction, have the student rotate their head, shoulders, hips, and lower joints in the chosen direction. Tell the student to hold the rotation until the board pivots and they are able to traverse to control speed. If the student is comfortable being touched, it may be beneficial (at least for the first one or two turns), to physically guide the student, allowing them to feel the associated body and board movements. Use other verbal or visual prompts as necessary, and consider the benefit of breaking down this tactic into small steps, or starting this tactic with two feet strapped in. Repeat in the opposite direction. Use verbal, visual or physical cues as necessary

Step 4: Control

Goals:

- Edge control
- Stopping with the snowboard
- Basic direction control

INTRODUCTION TO EDGING (THE GAS PEDAL EXERCISE)

The Gas Pedal is an exercise for introducing edging on the heelside. Support the student, with their lead foot in the binding and their other foot behind the heel edge on the snow. While describing the action of a gas pedal, have the student press the toes of the snowboard foot towards the ground, as they would on a car gas pedal, until the board flattens and begins to slide; care should be taken not to apply too much pressure, as the board may slip away too quickly. Have the student 'release the pedal' by lifting their toes to stop the snowboard and engage the edge.

An alternative introduction to edging, particularly for children, could be to try a 'crab walk' for heelside or 'bear crawl' for toeside as initial steps to gain comfort with edge angle. A game like red light/green light may also be a fun way to learn about edging.

ONE-FOOT-ATTACHED TACTICS

One-foot Sideslipping

As another introduction to sideslipping, you might try the tactic with one foot unstrapped (the rear). This allows the student to possibly feel more secure, by allowing them to adjust their base of support quickly (moving the free foot to regain balance).

Begin across the fall line, slowly relax the edge and allow the board to begin sliding. Be sure to have established verbal cues or commands such as "toes up" or "heels down" so that you can help maintain a comfortable speed. It is important to ensure the student understands the meaning of verbal cues before using them. It may be beneficial to practice the words and actions together.

One-foot pendulum

Similar to 'one-footed sideslip', the use of this tactic with a free foot is intended to provide a greater feeling of safety during the acquisition phase of learning the skill.

Using rotation of the head, shoulders, hips and lower joints, the student should slide in an arcing path down the fall line. A fun tactile cue, such as a high five or fist bump at the top of the arc may signal the student to begin the tactic in the opposite direction (switch).

NOTE: For some students with ASD, it can be difficult to learn a new way of doing something once a particular way has been learnt. If a student becomes very comfortable with one-footed tactics, e.g. one-foot sideslip or one-foot pendulum sometimes there may be reluctance to try a new version of the tactic, e.g. two-foot sideslip or two-foot pendulum. Consider this before deciding to use one-footed tactics, or try not to spend too much time on them.

SIDESLIPPING (TWO FEET ATTACHED)

Heelside Sideslip

On a suitable slope, have the rider place the board across the fall line (back facing uphill). Gradually reduce edge angle (drop toes) until the board starts moving downhill. Riders will increase their edge angle (lift toes) to control their speed and slow down. Try using modeling, visual cues or physical prompting.

Toeside Sideslip

On a suitable slope, have the rider place the board across the fall line (back facing downhill). Gradually reduce the edge angle (drop heels) until the board starts moving downhill. Riders may increase their edge angle (lift heels/press toes) to control speed. Try using modeling, visual cues or physical prompting.

NOTE: The instructor must monitor who or what is approaching the rider to ensure safety.

PENDULUM/FALLING LEAF

Once the rider is effectively using edge angle to control speed, basic direction control (using one edge) can be introduced. Have the rider apply pressure (stand heavy) on one foot to flatten the corresponding half of the board. This creates greater motion to the side of the applied pressure. To change direction, the rider first returns to neutral (using even pressure on both feet), then applies pressure to the opposite foot. Try using modeling, visual cues or physical prompting.

POWER PENDULUM

Once the rider is effectively using both edge angle and pressure control to manage speed and direction, introduce rotation to the sideslip. This drill is very similar to the Pendulum/Falling Leaf, but the introduction of rotation will allow the rider to point the board in the desired direction, increasing control. Starting from a sideslip, have the student rotate their core (shoulders, hips, and knees depending on ability) in the new direction. Finish each direction change with the board approaching the fall line. As opposed to the zigzag shape of the falling leaf, this shape will be more rounded near the vertex (lowest point) of the arc; approaching a 'U' shape. Try using modeling, visual cues or physical prompting.

Step 5: Turning

Goal:

- Single turn Toeside
- Single turn Heelside

BEGINNER TURNS

Heelside Turn:

Have the student traverse across the slope on the toeside edge (facing uphill), with their head facing the direction of travel and slight pressure applied on the leading foot. They can initiate the turn by rotating their head looking back over the lead shoulder, and rotating the core towards the nose of the board, which will pivot towards the fall line. Begin the edge change by moving the lead knee in the direction of travel, and allowing the board to flatten, slightly flexing the ankle. The student should continue to direct the board through the turn with knee rotation, and use the lead knee and ankle flexion to change from a flat base to the heel edge.

The hips follow the rotation and the student completes the turn by flexing the lower joints to engage the heel edge. Have the student look downhill, equalize weight on both feet, and use a sideslip to slow down to a stop. Equalizing weight is an important step, and will help the student progress to linking turns smoothly.

There are many steps in learning to turn. For students with ASD, it may be helpful to break the turn into small incremental steps. The instructor may try other teaching strategies such as video modeling, providing visual cues or offering physical support to help the student complete the turn.

TOESIDE TURN

The student begins in a traverse on the heelside edge. They should be facing in the direction of travel, looking over their lead shoulder. Have them begin the turn by looking down the fall line and moving the lead hip, knee and ankle down it (rotating towards the tail of the snowboard).

As the student approaches the fall line, they need to rotate the hips and allow the snowboard to flatten briefly as they continue to rotate to the new direction. The student should keep rotating their hips and flexing the lead knee and ankle to engage the toe edge as they cross the fall line.

As the board reaches the toe edge, the rider will end facing uphill, shoulders parallel to the snowboard tips. and may finish in a sideslip. This involves equalizing the student's weight on their feet. They then continue to sideslip to a stop. Again, consider the most appropriate teaching and support strategies to help the student to be successful when completing a turn.

OTHER SUGGESTED TACTICS FOR INTRODUCING TURNING

Static exercise: Walking Through the Turns

You can walk the rider through a turn without a snowboard strapped on. Starting from the heels or the toes, walk sideways through an arc, flattening the feet when parallel to the fall line and rising up on the opposite part of the foot from the start, ending on toes or heels. This will allow the rider to get a feel for the timing. For some students this may be very abstract and it may be hard to relate walking through the turns to making a turn on a snowboard.

Static exercise: Twist the Disks

Have the rider stand on the snow (no board) and rotate as though they are turning the snowboard. Watch for the rotation continuing down the body from the head and shoulders to the hips, knees and ankles. Try using modeling, visual cues or physical prompting.

Chicken Turns

This drill is to prepare the rider for the increase in speed due to the effect of gravity along the fall line. The rider will start in a sideslip, using both edge angle and rotation. Have the rider point the board downhill along the fall line and then return to the starting sideslip. This eliminates the need to change edges to maintain control. Understanding the increase in speed due to the effects of the fall line will prepare the rider for linking turns, as well as improve the coordination of rotation and edge angle during the turn. Try using modeling, visual cues or physical prompting.

The Dance Exercise

The Dance exercise is a hands-on method to introduce the edge change during the turn. Essentially, the instructor (at the centre of the turn) will guide the rider's body around the turn. Speed control is provided by the captive, short-radius turn around the instructor. Verbal commands (such as "flat board" or "heel/toe") may help the rider develop the timing for the turn, and pair the verbal cues with the physical movements. This method will not work well for students who are averse to touch.

NOTE: The instructor should not have a snowboard strapped on for this drill, as it will interfere with the rider's turn.

J-Turns

Try a J-turn as described above in Step 3: Sliding. Try the tactic with two feet strapped in.

Step 6: Flow

Goal:

- Add fluidity to student's riding
- Add vertical movement
- Vary the shape and size of turns to control their speed

ADDING A TRAVERSE BETWEEN TURNS

This tactic allows the students to begin linking turns together without coming to a complete stop or continuing down-slope in a sideslip. Rather than using the sideslip to control speed, the student will continue in the direction across the fall line at the end of the turn until ready to initiate the next turn. Consider using visual cues to help the student understand that they need to continue traversing, and then when to start the next turn.

NOVICE TURNS

This tactic is useful for increasing the flow of the rider, using the flexion and extension to control pressure. While linking turns, have the student flex after the board has changed edges (after the fall line). Flexion after the fall line increases the efficiency of the edge pressure, as well as stability, by bringing the rider's COM lower to the ground. Be sure to encourage the student to utilize even pressure distribution. Depending on balance, there may be a tendency to tilt towards the nose or tail of the board. It may be necessary to provide modeling, visual cues or physical prompting to help the student know what, when and how to flex and extend.

Across the fall line **With a sideslip**

OTHER SUGGESTED TACTICS FOR INCREASING FLOW

Twist the Disks with Flexion and Extension

Have the rider stand on the snow (no board) and rotate as though they are turning the snowboard. Watch for the rotation continuing down the body from the head and shoulders to the hips, knees, and ankles. Once a few rotations have been made, have the rider extend/flex through the rotation; being tallest in the centred portion (shoulders parallel to the board) and going low/being the most flexed at the extreme of the toe or heel rotation. This 'up un-weighting' will allow the board to have a flat base during the fall line portion of the turn. Use modeling, visual cues and hands-on prompting as relevant.

Traverse With Flexion/Extension

This tactic is to introduce the concept of flexion to help manage the pressure generated in a turn. Have the student start a traverse (either as a stand-alone exercise or in conjunction with turning with a traverse) and during the traverse move their COM up and down by flexing the ankles, knees, and hips.
Pay attention to the alignment. Depending on the level of mobility in the joints, students may tend to over-utilize the larger joints (hips) and under-utilize the smaller joints (knees and ankles), resulting in the weight being too far over the heel edge during the exercise.

This tactic may need to be broken down into smaller steps. It is important that the student knows how, when and what to flex before starting out. Visual cues and hands-on prompting may be beneficial also.

Sliding 360s

Sliding 360s are a fun tactic that can be used for many different focuses. Rotation, edge control, and pressure control are all components of this tactic. They can be done down or across the fall line.

Utilizing the fall line: Begin a sideslip. When ready, the student can initiate rotation (in either direction) and reduce edge pressure until they begin to spin, then hold the rotation until one revolution is complete (or more, but watch out for dizziness). Lowering the COM (by flexing) may help with the student's stability.

Across the fall line: The student will begin by initiating a turn to the heelside or toeside. Rather than completing the turn with a traverse or initiating the opposite turn, the student should maintain the rotation across the fall line in the direction of travel as they reduce edge angle and pressure. This method eliminates the acceleration caused by travelling down the fall line.

Remember that the effective edge will change part way through the rotation (from heel to toe or vice versa) and instruct the student during your demonstration to avoid an unexpected edge catch!

LIFT PROCEDURES

For Students with ASD

Front Load: Before riding a lift with a student with autism, clearly explain the procedures and expectations. Front-load the student with information about the lift before getting on it. Give as much information as necessary, depending on the student's developmental and communication abilities.

FRONT-LOADING PROGRESSION FOR RIDING A LIFT:

Consider using some or all of these front-loading steps to prepare the student before they ride the chairlift.

- Talk about the lift and look at pictures, photos, diagrams, social scripts, videos, etc.
- Look at the lift from a distance
- Look at the lift up close.
- Watch people load the lift

Safety

Clearly explain the important rules that need to be observed while riding a lift (particularly the chairlift). If using a surface lift, ensure the student knows what to do in case of a fall. Have the student repeat the expectations in their own words. People with autism (children in particular) may not have a strong awareness of safety concerns. It may be necessary to use a harness, tether or physical support to ensure the student remains on the lift.

REASSURING THE STUDENT:

Be aware that riding a lift may produce anxiety in some students with autism. Try to prepare the student thoroughly in a meaningful and understandable manner. Describe a slow and thoughtful step-by-step process before actually riding the lift.

EXPECTATIONS OF BEHAVIOUR:

Clearly define the types of behaviours which are expected when riding a lift. Remember, there are many steps involved. Use clear and simple language, and a communication method which is appropriate for the student. It may be necessary to repeat the rules for riding a lift regularly. Remember to give clear instructions.E.g. "When we wait in line, we keep our hands to ourselves"

- "Stay on the chairlift until the instructor tells you it is time to get off."
- "When you get to the top, let go of the tow-rope and move to the side"
- "Lean forward a little when you get on the carpet."

AN EXAMPLE FOR EXPLAINING HOW TO RIDE A CHAIRLIFT:

The Loading Procedure:
(Explanation may happen while watching people load the lift.)

- Walk through the maze
- Wait until the lift operator says we can walk again
- Walk up to those metal stalls
- Wait until I say it's okay and then skate to the red line
- Stop and look behind you
- Sit down when I tell you to

On the chairlift:

- Help me put the bar down when I say it's time
- Keep your arms out of the way of the bar
- Put your snowboard onto the footrest

The Unloading Procedure:

- Slide board and boots off the footrest
- Lift the safety bar
- Stand up when we get to the flat area with the orange cones
- Put your back foot next to the binding and lean forward
- Slide straight ahead

Consistency: Tell your student how many times you will be going up the hill using the chairlift before going inside the lodge for a break. Three might be a good number. This will likely become part of the routine.

MEET THE STUDENT'S NEEDS

Learning to ride a chairlift may require many steps over many days or weeks, or it may happen quickly and easily. Choose the appropriate steps which will assist with the student's learning and help ease anxiety for the student.

When providing verbal information, only give as much as the student is able to comprehend.

Magic Carpet

The magic carpet is probably the first lift that a rider will encounter. Carpets consist of a moving rubber surface on which the rider will stand while being conveyed up the slope.

Beside the loading area, it may be beneficial to have the student watch people load the lift, and talk through the steps.

QUEUEING UP

Explain the expectations for the student when queueing. There will be times of moving and times of stopping and waiting. The student will have to wait their turn, and listen to the instructor to tell them when to stop and when to go. The student will need to try to keep their body calm and hands to themselves.

Preparing to Load
Show the student where and how to stand on their board (more weight on the front foot). Prompt the student with words, visuals or physically to push gently with their free foot until the nose of the board is gripped by the rubber belt.

LOADING

Prompt the student with words, visuals or physically to keep their weight forward slightly and get ready to bring their rear (pushing) foot down onto their board or the carpet.

RIDING THE CARPET

Prompt the student to place their free foot down on the carpet to reduce slipping (if the belt is icy); or slide the heel or toe off the board to provide traction on the belt.

PREPARING TO UNLOAD
An instructor should ride in front of the student to provide adequate visual and verbal warnings, and be ready to physically assist the student to unload the carpet if necessary. At the top of the carpet, the slope will level off; prepare the student to unload

UNLOADING
Allow the student's board to slide off the carpet and guide them to quickly use their free foot to clear the unloading area; there is most likely another rider behind them! It can be helpful for the instructor to stand in front of the student and have them slide towards them.

Preparing to Snowboard: Prompt the student to skate to the side, to a point where they can strap in their free foot. Physically assist if necessary.

T-Bar/J-Bar/Poma/Tow Rope
Discuss and demonstrate the use of the lift prior to getting in line. Consider using photos, video and watching others load. Some hills may have a "practice" bar available to demonstrate to students how the lift operates. Alternatively, use two poles to show how one bar sits underneath the rider's bottom and the other pole is used to hold onto. Allow time for practice.

If possible, it is best to have one instructor in front and one behind. The instructor in front can assist the student to unload, and the instructor behind can assist in case of a fall. If riding a T-bar, it may be best to ride side-by-side with the student.

Ensure the student knows what to do in case they fall. Create a plan with the student and have them tell you the plan (if possible). Ensure the student knows what to do at the top of the lift (e.g. gently let go of the t-bar)

PREPARING TO LOAD
Remind the student of expected behaviours when lining up. Show the student where to load and, when ready, prompt the student to skate to the line indicated for loading.

LOADING
The lift operator will place the bar between the rider's legs, against the lead/strapped in foot.

RIDING THE SURFACE LIFT
Prompt the student to hold the handle of the lift bar, balancing as the lift pulls the rider up the slope. Remind them, "Stay standing, do not sit on the bar". It is not designed to support the full weight of a rider.

UNLOADING
At the top, there will be a sign or mark indicating where to unload. The instructor may need to provide visual and verbal warnings to indicate where the student should unload. Prompt the student to pull the bar from between their legs and gently let it go ahead of them. BE AWARE, the bars are spring-loaded and will very quickly rise up out of the way. Firmly remind the student not to throw the bars.

PREPARING TO SNOWBOARD
The instructor should prompt the student to skate out of the unloading area to a safe spot to begin the lesson/ proceed downslope.

Chairlift
Chairlifts are ubiquitous in the sport of snowboarding. The majority of ski areas operate lifts in similar configurations. Standing beside the loading area in a safe spot, discuss the process of queueing (the maze), approaching the loading zone and loading the chairlift (using other skiers and snowboarders as examples). Allow the rider to watch and listen for as long as necessary to feel comfortable. Consider also using photos, pictures, videos, or social scripts beforehand.

Be sure to discuss the unloading procedure (at the top) so there are no surprises!! If possible, using a practice chair, practice sitting and standing (loading and unloading) onto the board--unloading can be tricky. Also practice straight running with the rear foot out of the bindings, to build confidence and improve the chances of successful unloading.

QUEUEING UP
Explain the expectations for the student when queueing. There will be times of moving and times of stopping and waiting. The student will have to wait their turn, and listen to the instructor to tell them when to stop and when to go. The student will need to try to keep their body calm and hands to themselves.

APPROACHING THE LOAD
When safe, prompt the student to approach the loading line from the maze. Some lifts may be equipped with an indicator light (traffic or other).

PREPARING TO LOAD
Prompt the student to stop at the loading line (either on snow, or indicated by a pylon) and prepare for the chair approach.

LOADING
When the chair arrives, prompt the student to sit and allow the snowboard to remain flat beneath the chair.

SAFETY BAR DOWN
Once the chair has proceeded, the board will lift off the snow. If the chair is equipped with a rest bar, have the student place the snowboard on the bar. If necessary, the instructor can support the weight of the snowboard with their free foot. Remind the student that they need to remain seated, and keep their body as calm as possible. Look for any signs of anxiety and reassure or distract the student as appropriate. Consider telling the student how many towers the chair needs to go past before getting to the top

SAFETY BAR UP
Near the top there may be signs indicating the approaching offloading area. Provide visual and verbal warnings for the student. Assist the student to lift the bar and prepare to unload.

PREPARING TO UNLOAD:
On the unloading ramp prompt the student to align their snowboard with the intended direction (usually straight ahead).

UNLOADING
When ready, prompt the rider to stand up on their board. Guide the student to do a straight run down the unloading ramp and proceed to a safe area to strap in the board.

PREPARING TO SNOWBOARD
Explain what will happen next, e.g. “We will go down the Rambler run. We will do 5 turns before stopping. Follow me.” Note: it may be advisable to scout the lifts you plan on using to check the slope of the unloading ramps. Steeply sloped ramps are not ideal for beginners.

If required, chairlifts can be slowed for loading and unloading. Be sure to communicate clearly with the student and the lift operator if you require the chair to be slowed or stopped for loading/unloading.

SAFETY RECOMMENDATIONS

- It is strongly recommended that all students wear a helmet for safety, in the event of a fall or striking or being struck by the skiing public.
- It is strongly recommended that students should also wear eye protection.
- Be alert to any safety concerns for the student, including seizures and flight risk (wandering off). Use the AOT to ask parents or caregivers about safety concerns.

SNOWBOARDING FOR PEOPLE WITH ASD: SUMMARY

STUDENT PROFILE

Autism Spectrum Disorder is a neurological disorder causing developmental disability. A person with ASD has difficulties with communication, social interaction and often exhibits unusual patterns of behaviour, activities and interests. The spectrum is wide. Remember, 'If you've met one person with autism, you've met ONE person with autism'. During the AOT, take time to discover the student's interests as a means for creating rapport. It is also important to discover communication and behaviour support strategies that are most effective for working with that student.

People with ASD commonly have other health and wellness challenges which may affect their ability to learn, including: sleeping difficulties, gastrointestinal problems, motor challenges, limited diet, picky eating, anxiety and sensory sensitivities.

COMMUNICATION

When communicating with students with ASD, generally less talk is better. Use short, clear phrases and be specific and direct. Match your communication style and level to the student's.

TEACHING STRATEGIES

When giving instructions, try to 'show and tell'. Pair your words with visual cues – modeling/demonstrations, drawings, images, videos etc. Try breaking tasks into incremental steps and give the student time to process and repeat the task. It can also be helpful to provide physical guidance or prompting to complete a task. Empower the student by offering choices throughout your lesson, and provide frequent breaks.

SUPPORT STRATEGIES

Pre-loading is an important support strategy for working with students with ASD. This involves providing information about the upcoming situation, including information about what will happen and the expected ways to behave in that situation. Some tools that help with this concept include a First-Then board, which provides a visual incentive to complete a task. Countdown Strips measure the amount of time or tasks left. Token Boards offer an incentive to work towards. Visual Schedules illustrate the activities of the day. Wait Cards help the student to understand when it is time to wait. A Timer will signal when time is up, and a Social Script illustrates expected behaviours and a story of what will be occurring.

SIX STEPS

When teaching the six steps, utilize appropriate teaching and support strategies that work well for the student you are working with. This may be different for each student.

LIFT PROCEDURES

Pre-load the student with information about the lift. Explain the expected behaviour, how to stay safe and reassure the student about any fears or concerns. Take time to allow the student to become comfortable with the idea of riding a lift, this may involve explanation, demonstration, observation, visual supports, or a combination thereof.

SAFETY

It is strongly recommended for students to wear helmets and goggles. Be aware of other safety concerns including seizures and flight risk (wandering off).

CH.9:

SNOWBOARDING FOR PEOPLE WITH COGNITIVE IMPAIRMENT (CI) & INTELLECTUAL DISABILITY (ID)

COGNITIVE IMPAIRMENT AND INTELLECTUAL DISABILITY

Teaching Snowboarding to Students with CI or ID

OVERVIEW:

Defining cognitive disability is not easy, and the definitions are usually very broad. Persons with cognitive disabilities may have difficulty with various types of mental tasks. Intellectual disabilities, also known as developmental delay are a group of disorders defined by diminished cognitive and adaptive development.

Cognitive or Intellectual Disabilities (CIs or IDs) fall in a range of disabilities including but not limited to: Down sSyndrome, Fragile X Syndrome, autism, traumatic brain injuries and learning disabilities. Many cognitive disabilities have a base in physiological or biological processes within the student, and others are based in the structure of the person's brain. Persons with more profound cognitive disabilities often need assistance with aspects of daily living activities while a person with minor learning disabilities might be able to function adequately despite their disability.

Each disability has unique differences just as every student with a cognitive or intellectual disability presents with unique challenges and strengths. However there are also similarities in how to approach teaching a person with an ID to participate in adaptive snowsports.

While there can be components of physical disability that include some motor skills (coordination, agility and muscle tone), overcoming communication challenges between you and your student is the overriding focus.

People with limited mental abilities can struggle to develop the skills needed for independent living. Without these skills, it is hard to live in a safe and socially-responsible manner. Children with IDs usually develop more slowly than their peers. They usually begin to sit, walk, and talk much later than other children. This delayed development means they do not act their age. Limited mental capacity makes learning difficult. Therefore, learning new information and skills is challenging. As such, the learning curve proceeds more slowly. It is also difficult to apply information in a practical and functional manner. People with IDs may have trouble grasping complex and abstract concepts. This may affect their ability to develop important social skills (because social skills are complex and abstract).

Down Syndrome

Down syndrome refers to a type of cognitive delay in general intellectual functioning that may include deficits in adaptive behaviour, motor coordination, muscle tone as well as cardiac, digestive, vision and hearing impairments. Down syndrome is the most common genetic origin of IDs and is caused by an extra chromosome called Trisomy 21.

Students with down syndrome characteristically have loose joints with accompanying low muscle tone referred to as hypo-tonicity. They may also have cardiac and respiratory conditions that may impede their endurance and overall heath. Atlanto-axial (two first cervical spine bones) instability is a congenital defect at the top of the spine which can be present in children with down syndrome. This could prevent their participation in sports including skiing and snowboarding; therefore, potential students with Down Syndrome should have a cervical spinal x-ray and permission from a medical professional before participating.

Down Syndrome commonly has an effect on learning style, although the differences are highly variable, just as physical characteristics or health concerns are.

Fragile X Syndrome

Fragile X Syndrome is the second-leading genetic cause of intellectual disabilities (the most common genetic cause in males). People can be carriers of Fragile X without showing any symptoms. In other words, family members may have excessive repeats of the gene. However, the repeats are not enough to cause IDs. Fewer repeats mean fewer problems.

There are several physical features of Fragile X. The face is elongated and the ears are large. The forehead tends to be larger than normal. The jaw has a pronounced shape. People with Fragile X are generally large in stature, but with poor muscle tone.

Behavioural features include a reluctance to make eye contact. Students with Fragile X may engage in odd, stereotypical movements such as hyperactivity, tremors, and poor motor coordination. Moreover, their social and communication skills are not well developed. Similar behavioural symptoms are characteristic of Autism Spectrum Disorder (ASD). People can receive a diagnosis of both IDs and ASD.

There are three subtypes of Fragile X. Here we present the first two as they will have a significant impact on teaching these students to snowboard, and on their ability to perform the task. The first presents cognitive deficits which are more severe and share many symptoms of ASD:

- Social avoidance
- Repetitive movements
- Severe delays in developing speech and language

The second type of Fragile X affects motor skills (sense of balance) and presents tremors and memory deficits

Autism Spectrum Disorder

A leading cause of intellectual disabilities is ASD. A person may be diagnosed with both ASD and IDs. People with ASD may have trouble with communication and social interaction. They may also demonstrate repetitive patterns of behaviours, interests, or activities. Some examples are repetitive speech, ritualized patterns of behaviour, or fixation upon certain objects. Thus, while ASD and IDs share some similarities, they are not the same. For more information on ASD, refer to the ASD chapter.

Learning Disabilities

Learning Disabilities refers to a number of disorders that may affect the acquisition, organization, retention, understanding or use of verbal or nonverbal information. These disorders affect learning in students who otherwise demonstrate at least average abilities essential for thinking and/or reasoning.

Learning disabilities are due to genetic and/or neurobiological factors or injury that alters brain functioning in a manner which affects one or more processes related to learning and is lifelong. The way in which they are expressed may vary over a student's lifetime, depending on the interaction between the demands of the environment and the student's strengths and needs.

Brain Injury

There are a number of causes of brain injury, including stroke, illness, traumatic brain injury (TBI), brain tumors, and meningitis, among others. Each brain injury is unique - there is no reliable way to predict how a student's brain will be affected by a particular injury. The extent of the injury to the person's brain determines the outcome of the person's ability to process information.

An injury to the central nervous system produces numerous motor impairments, ranging from focal paralysis of one or a few muscles to generalised difficulties in planning and co-ordinating complex movements.

Lesions to the main line of the motor system may result in an enhancement of some features (positive features or exaggerated response) or a reduction (negative features).

Positive features or **exaggerated response** can include: Hyperreflexia and hyper-tonus (abnormal resistance to passive movement).

Negative features can include: loss of strength, loss of dexterity, fatigability.

Impairment of the Brain Stem System may lead to: dyscontrol of automatic behaviours, such as posture, balance, locomotion and breathing.

Impairment of the Motor Areas of the Cerebral Cortex may cause: weakness, hyperreflexia, or spasticity. The motor cortex plays an important role in organizing, shaping and refining movement.

Cerebellum lesions may lead to: poor planning of movement, poor regulation and timing of movement, and reduced smoothness and co-ordination of movement.

Other areas of the brain may also be altered and would lead to multiple characteristics: hypertonicity or hypotonicity, poor postural control or loss of voluntary control, slowing of movement, poor co-ordination, poor implementation of motor plans, focal weakness, loss of sensation, etc.

We strongly suggest assessing possible motor deficits and cognitive understanding in Students with brain injuries.

SEVERITY CODES

Both the American Psychiatric Association (APA) and The American Association on Intellectual and Developmental Disabilities (AAIDD) use severity codes to refine diagnoses and categorize IDs. Severity is assessed across three domains (1-conceptual, 2-social, 3-practical life skill) and falls into one of the four severity categories: mild, moderate, severe and profound.

CATEGORY	% EFFICACY IN THE 3 DOMAINS	DESCRIPTION
Mild	85	• Many students within this group can achieve some academic success; • Usually meet elementary academic levels or beyond with sufficient supports; • Are mostly self-sufficient; • Can live independently within their communities with a minimal level of additional supports (i.e. assistance with life decisions, finances, nutrition, shopping, and transportation).
Moderate	10	• People in this range have adequate communication skills but complexity is more limited; • Social cues, social judgment, and social decisions (particularly romantic decisions) regularly need support; • Most self-care activities can be performed but may require extended instruction and support; • Independent employment can be achieved in positions that require limited conceptual or social skills. However, additional supports may be required; • Independent living may be achieved with moderate supports such as those available in group homes.
Severe	3-4	• Communication skills are very basic; • Self-care activities require daily assistance; • Many students in this category will require safety supervision and supportive assistance; • Residence in supported housing is usually necessary.
Profound	1-2	• Dependent upon others for all aspects of daily care, Usually 24-hour care and support are needed; • Communication skills are quite limited; • Usually have co-occurring sensory or physical limitations.

COMMON DIFFICULTIES FOR PEOPLE WITH CI OR ID

FRUSTRATION TOLERANCE

A related difficulty is poor frustration tolerance. When an impulse is inhibited, it requires the ability to tolerate a bit of frustration. This ability is called frustration tolerance. Frustration tolerance is an important developmental skill. It allows people to comfortably endure the small frustrations of everyday life. This in turn serves to limit the unpleasant consequences associated with impulsive behaviour. Frustration tolerance also enables people to build confidence. People respond to frustration in different ways. Some people respond in an impulsive, stubborn, and aggressive manner. Others respond with passivity, withdrawal, and compliance. Poor frustration tolerance may cause aggression toward caregivers. It may also lead to self-injurious behaviours. These behaviours are observed in some people with cognitive impairments.

SELF-ESTEEM

Another common difficulty is low self-esteem. Self-esteem naturally develops as children learn to solve problems. The ability to solve problems builds self-confidence. However, limited intellectual functioning makes it difficult to solve problems and is associated with little perseveration and attention skills.

SOCIAL SKILLS

A related difficulty is the slower development of social skills. This becomes evident when children play together. Students with IDs struggle to understand and heed social rules and customs. Some common examples are taking turns and waiting in line. IDs are mostly undetected until a child starts school. Education challenges children to develop and expand their cognitive, social, and emotional skills. Children with IDs cannot easily meet these challenges. It is hard for them to learn new information as quickly as other children do.

GROSS MOTOR SKILLS

Gross Motor Skills (GMS) in people with IDs can range from a level of normal functioning to significant physical disability. When a person with IDs has GMS impairment, one result is increased difficulty accessing learning opportunities.

HYPERACTIVE AND HYPOACTIVE

Some students with intellectual disabilities have difficulty interpreting, integrating, and coordinating sensory input. Sensory integration activities help these students strengthen these abilities.

HYPERACTIVE (OVERACTIVE) SYSTEMS

These students have difficulty blocking out signals that should be ignored and in response to this overactive system, they avoid motion activities like climbing stairs, are prone to motion sickness and may seek support from others while walking.

HYPOACTIVE (UNDERACTIVE) SYSTEMS

These students have difficulty attending to signals that should be heeded, may actively seek out motion and may enjoy swinging and climbing activities without becoming dizzy after spinning.

Sensory integration activities (like snowsports) address student's sensory needs by either lessening or amplifying the intensity of the sensory stimulation they receive. Most sensory integration activities work with student's vestibular, proprioceptive, and tactile sensory systems.

The *vestibular sensory system* enables us to stand, coordinate movement and involves sensory input from vision and from sensory organs in the inner ear. Activities that stimulate the vestibular system involve movement like swinging, jumping, and spinning. The *proprioceptive sensory system* provides information about the body's positioning. Proprioceptive feedback helps coordinate gross and fine motor skills.

ASSESSMENT OF ABILITIES: ASK, OBSERVE, TEST (AOT)

The AOT process is designed to determine a student's strengths and weaknesses. This information will assist an instructor to determine the type of teaching and communication strategies which will be used, and whether any adaptive equipment is necessary. It is also the place to determine what strategies need to be in place to protect the safety of the student, and other skiers and riders on the hill.

Ask:

Being aware of a student's specific disability, an adaptive snowboard instructor needs to focus on the student's potential while recognizing challenges, and where they originate from.

Note: When asking questions, it is recommended to first ask the participant to help gauge understanding and self-awareness. If the student is unable to give the answers that are required, then engage a parent or guardian to assist. It is also important to remember that a student with an ID may be able to communicate well and answer questions but may have an over-exaggerated--or under-valued--sense of self, so questions will need to be supported with observations and testing.

ASK	LOOK FOR
Does the student have Down Syndrome? Does the student have Atlanto-Axial (cervical Instability)?	If the student has atlanto-axial (cervical instability), snowboarding is not recommended for safety reasons and medical advice should be sought. If unknown, ask for medical permission prior to any test on snow.
What other sports does the student participate in?	Sports that require balance, strength and mobility and some motor skills ability. These could be transferred into snowboarding.
Does the person think of themselves as fit and active? If so, why?	The ability to correctly self-evaluate.
Have they used any other specialized adaptive sports equipment?	Sports that could be related to snowboarding as well as adaptive equipment.
How long can they stand/walk without support?	Gauging their endurance level will guide how you will pace the lesson.
Where do they think their strengths lie?	Perseverance, participation in other sports, positive attitude, determination.
What are the common challenges the student face?	Limited movement, fatigue, balance, coordination, lack of belief in themselves and /or their abilities, frustration, social skills, etc. Fatigue Chart can be found in Appendix 4. Check their ability to understand concepts and simultaneously try to evaluate the severity of their condition (mild, moderate, severe or profound).
How did the student overcome these challenges?	Creativity with answers and perseverance.

ASK	LOOK FOR
Do they participate in a physiotherapy or kinesiology treatment program?	Reason they have treatment.
What happens if they are unable to overcome a challenge?	Look for frustration tolerance, impulsivity or aggressive behaviour response pattern. If there is a history of aggressive behaviour, be clear with the student that it will not be tolerated in this environment.
How is their self-esteem?	Low perception of their ability
How are their social skills?	Difficulties to understand social rules and customs.
Does the student have hypoactivity or hyperactivity?	Difficulty interpreting, integrating, and coordinating sensory input Hyper: difficulty blocking out signals Hypo: difficulty attending to signals
How has the student found they learn best: Verbal commands (complex or easy), visual demonstration, hands-on or imitation.	By finding out the student's strength in learning and following directions It will help you to structure your snowboard lesson accordingly and control how the information is provided.

Observe:

Examine the student as they walk and move around. As you do this, relate the ease of the movements to snowboarding. Also with an student with an ID, observe their ability to follow directions, whether that is with their family, peers or other directional cues such as observing and obeying signs. This will help gauge their ability to follow directions and safety rules on the hill that will be so important to a positive experience.

OBSERVE	LOOK FOR	RELATE TO SNOWBOARDING
Is the student well-balanced while moving around?	Unsteadiness, lack of balance, lack of confidence.	The more unsteady the student is, the more reliant they will be on adaptive equipment for support, balance and turning.
Is the student looking for additional support to assist movements?	Uses chair, walking aid, wall or a support person.	
Is one side of the body stronger and/or does one move more easily than the other?	Weakness that originates from the legs, trunk or upper body or a combination of the above.	Weakness on one side may make the student a good candidate for outriggers, see "Snowboarding With Outriggers" chapter. Weakness in the core muscles will affect lateral, fore and aft balance. Weakness on the upper segment of the body (core or arms) may affect the ability to stabilize the upper body.

OBSERVE	LOOK FOR	RELATE TO SNOWBOARDING
Does the student have mobility in their joints?	Flexion Rotation Pronation	Greater mobility in the joints will facilitate a more centred mobile stance.
The student's gait	Smoothness, co-ordination and consistency in the student's gait. Feet pointing out or in Skipping or bouncing Stiff or stilted appearance Short or long stride Walking on toes instead of the balls of the feet.	May affect student's ability to maintain a balance. Student may fatigue easily. Provide regular breaks, Students who toe-walk often have tight heel cords and calves, making it difficult or painful to wear snowboard boots without modification. Students whose feet point in may be better suited to skiing.
Eye contact	Ability to make eye contact	When you explain a task, the student may be reluctant to look at you. Make sure they understand, but do not insist on being looked at. It is important to find out their signs of understanding of directions and tasks, so you can be aware of this during the lesson.
Are movement patterns quick or slow?	Quick movement patterns Slow movement patterns	The quicker the movements, the greater the confidence. This can have an effect on lesson pacing as someone that is more steady and mobile will find balancing on a snowboard easier and therefore may learn more quickly.

Test:

Do some simple body movement, position and strength tests to help determine the ideal stance, position, and equipment for your student's success when snowboarding.

TEST	LOOK FOR	RELATE TO SNOWBOARDING
Student's learning style	The method of teaching which they respond best to.	Use the most effective teaching methods possible for the individual student, e.g. visual, kinesthetic, auditory, cognitive

TEST	LOOK FOR	RELATE TO SNOWBOARDING
Student's ability to follow the instructor's verbal instructions	Attempts to follow your verbal instructions without further assistance.	Determine what kind of language to use with the student, e.g. sentences or 1 to 2 words at a time only. Determine whether the student will require additional teaching strategies in conjunction with verbal instruction, e.g. modeling, gestures, physical guidance, visual cues such as text/ pictures/snow-drawings, video-modeling.
Student's ability to maintain attention to an instructor's words.	Whether the student is imitating your demonstrations or following your directions.	Determine the best strategy for maintaining the student's attention, e.g. getting down at the student's level, talking with fewer words, Using gentle physical contact to get the student's attention (light shoulder squeeze).
Student's ability to follow multi-step directions	Determine whether the student is able to follow more than one instruction at once.	Determine how many steps the task needs to be broken down into to ensure effective learning.
Student's ability to summarize or repeat back the information you have given them	Inconsistencies or the inability to tell the instructor what was told to the student.	Determine the rate of speech to use, how many words at a time to use, and whether additional teaching strategies will be needed.
Student's processing time	Whether there is a consistent delay in the student's response to a question or instruction.	The instructor may need to pause and wait after issuing an instruction or asking a question to allow the student time to process the information.
Balance and Stamina	Ability to stand in an athletic stance (on flat surface) for 30 seconds, ankles, knees, and hips flexed, with weight balanced on both feet.	Instability due to balance, body position and/or stamina means reliance on adaptive devices to maintain a neutral position (BBP).
Balance and Pressure	Ability to stand in an athletic stance, rocking from side to side, shifting weight from one foot to the other, while lifting the opposite foot off the ground 1 to 2 inches. Any imbalances or differences between fore and aft movements Differences in amount of flexion or ease of movement between legs.	Fore and aft movements are controlled through core strength and shifting and flexing of hips, knees, and ankles. This movement will provide an indication of the ability to maintain a centred stance as well as the ability to modify nose and tail pressure on each foot. (These skills are needed to initiate and complete turns.)

TEST	LOOK FOR	RELATE TO SNOWBOARDING
Flexion and Extension	The ability to stand in an athletic stance, flexing knees, hips, and ankles, then extend the lower joints, moving up and down in a vertical plane, with weight balanced on both feet. The range and ability for vertical movement, focusing on the ability to flex and extend ankles, knees, and hips. Imbalances between left and right joints in range and flexion.	Ability to alter up-and-down pressure to initiate flexion and extension movements assists in managing pressures while turning the snowboard. Greater ability to flex lower joints, brings the student closer to the neutral position. If the student has difficulties flexing legs, adjustments to equipment may be necessary.
Pivot	Ability to stand in an athletic position, then turn hips, legs and feet to the right and to the left. Limitations in the student's ability to rotate their lower body.	The ability to rotate the hips, legs, and feet in the direction of a turn helps the snowboarder to pivot and complete a turn in a more efficient manner.
Balance and Edging	Differences in ease and ability between directions of rotation. Ability to stand in an athletic position with feet shoulder width apart, and rise up on toes for two seconds followed by balancing on heels for two seconds. Differences in ease and ability between toes or heels. Flexion in all joints--hips, knees, and ankles--during these movements. Imbalances between the left and right sides. Loss of balance during one or both movements.	Lateral balance across the snowboard and movement in the toe-heel plane is important for getting the board on edge, for turning, stopping, traversing and sideslipping. If it is easier to balance on one edge, this may indicate which edge to start the control phase with (heelside or toeside). If there is limited flexion in their knees, but good range of motion in their hips, the student may need to rely more heavily on lateral movement of their hips in order to get their board on edge. Imbalances in joint flexion may make it difficult to get the board on edge smoothly and efficiently.

TEST	LOOK FOR	RELATE TO SNOWBOARDING
Rotational Balance	Ability to stand in an athletic position, with feet shoulder width apart, and rotate arms and shoulders 65 degrees or more across the lower body to the right and hold for 10 seconds. Ability to repeat rotating the arms and shoulders to the left for 10 seconds Loss of balance	Rotational balance indicates an ability to move in and out of alignment, maintaining balance and stability while turning. Difficulties in upper body rotation may make turning challenging. The use of adaptive equipment may be required. If rotation is easier in one direction, this may indicate an ability to turn more easily to heelside or toeside.

BASIC BODY MOVEMENT ASSESSMENT (BBMA)

Below is a sequence of tests performed as part of the AOT process. The tests are sequenced so that each test builds on the last, starting with a static test and moving to more dynamic movements. Have the student:

1. Stand in the neutral position on a flat surface for 30 seconds; ankles, knees, and hips flexed with weight equally balanced on both feet.
2. Rock laterally from side to side, shifting weight from one foot to the other while lifting the opposite foot off the ground 1 to 2 inches. Repeat 10 times.
3. Stand in the neutral position with feet shoulder width apart; raise up on toes for 2 seconds, then balance on heels for 2 seconds. Repeat 10 times.
4. Stand in an athletic position with feet shoulder width apart. Rotate your arms and shoulders 65 degrees or more across the lower body to the right and hold for 10 seconds. Repeat, rotating the arms and shoulders to the left for 10 seconds.

The sequence above tests many of the components in the table of tests above. It is not an exhaustive sequence.

FURTHER DRY-LAND TESTING:

For dry-land testing, instead of immediately strapping a snowboard to a participant, it may be beneficial to complete similar tests using a skateboard or longboard deck without trucks (wheels), or using a Spooner Board. These pieces of equipment may be helpful to get a feel for what it is like to get on edge. They are also useful tools for evaluating, practicing and strengthening the skills required to snowboard, particularly balance.

MOBILITY CHECKS:

Do frequent mobility checks even with students whom you have taught before. Due to a variety of factors, their mobility levels may differ from the last time you went snowboarding together. Understanding the student's mobility and strength levels are essential to being able to work and adapt to their strength, and experience the greatest success on snow.

Teaching Methods

BREAK TASKS INTO SMALL STEPS

Students with intellectual disabilities benefit from the same teaching strategies used to teach people with other learning challenges. One such strategy is to break down learning tasks into small steps. Each learning task is introduced, one step at a time. This avoids overwhelming the student. Once the student has mastered one step, the next step is introduced. This is a progressive, step-wise learning approach. It is characteristic of many learning models. The only difference is the number and size of the sequential steps.

AVOID WORDY ABSTRACT EXPLANATIONS

Another strategy is to modify the teaching approach. Lengthy verbal directions and abstract explanations are ineffective teaching methods for most audiences. Most people are kinesthetic learners. This means they learn best by performing a task hands-on. This approach is particularly helpful for students with ID. They learn best when information is concrete and observed.

UTILIZE VISUAL SUPPORTS

People with ID do best in learning environments where visual aids are used. These might include charts, pictures, and graphs. These visual tools are also useful for helping students to understand what behaviours are expected of them. For instance, using charts to map students' progress is very effective. Charts can also be used as a means of providing positive reinforcement for appropriate, on-task behaviour.

PROVIDE IMMEDIATE FEEDBACK

The best teaching strategy is to provide direct and immediate feedback. Students with ID require immediate feedback. This enables them to make a connection between their behaviour and the teacher's response. A delay in providing feedback makes it difficult to form the connection between cause and effect. As a result, the learning opportunity may be missed. This is linked to a learning method called Applied Behavioural Analysis (ABA). In its most basic form, the ABA teaching technique rewards a person for making a correct choice. Incorrect choices are ignored, or not rewarded. Therefore, students learn by making simple associations between cause and effect. With repetition, the student learns to associate a correct action with a reward. As such, this correct choice will be repeated. Immediate reward for correct behaviour is crucial to motivation. However, the reward must be valuable or desired. Each student will find different things rewarding. Only things that are intrinsically rewarding have a motivational effect. An example of a reward could be positive feedback, a high five, a treat, playtime with a toy, etc.

FACTORS THAT CAN INFLUENCE YOUR TEACHING DECISIONS

- Communication and learning style, overall fitness, confidence, fatigue level and equipment available, severity and section of the brain altered if dealing with a student with brain injury. A fatigue chart can be found in Appendix 4.
- Consideration of terrain (know your terrain and use it well),
- Assessment of basic Skills (Does your student have a centred and mobile position? Are they turning the snowboard with their lower body? Are they balanced over their working edge? Choice of development tactics (prioritize which basic skill(s) can best achieve the desired objective or competency). Perform each task using micro-steps and reward immediately any success.
- Evaluation of progress (tangible results achieved by the student's terrain and skiing skills). Reward immediately any new success or achievement.

TIPS FOR STUDENTS WITH COGNITIVE AND DEVELOPMENTAL DELAY

- Building a positive relationship with your student is a priority.
- The best teaching advice is to have short and clear instructions. Allow for possible delays in understanding and processing instructions.
- Use any kinesthesis approach to make it concrete and meaningful.
- Keep it simple and focus on one idea or concept at a time or for an entire lesson.
- Provide a positive attitude within your teaching at all times.
- Provide lots of positive feedback.
- Recognize and reward a positive step in learning no matter how small it may be.

Teaching Techniques

The foundation for teaching adaptive snowboarding to people with CI and ID, follows the CASI teaching progression and methodology. Adaptations will be made in how the information is presented, and how the instructor communicates to their student. This will need to be carefully considered during the assessment of the student's abilities. It is important for instructors to establish a teaching environment that best sets the student up for success.

FACTORS THAT CAN INFLUENCE YOUR TEACHING DECISIONS INCLUDE:

- Assessment of your student (communication factors, learning style, overall fitness and motor skill, confidence and self-esteem, fatigue and equipment). A fatigue chart can be found in Appendix 4 of the CADS manual.
- Consideration of the environment:
  - Terrain (know your terrain and use it well),
  - Light (brightness)
  - Noise (other skiers and riders, skidoo, snow guns, lift, etc.)
  - Outside temperature
  - Wind factor
- Choice of development tactics (prioritize which basic skill(s) can best achieve the desired objective or competency),
- Evaluation of progress (tangible results achieved by the student in terrain and snowboarding skills),
- Guided mileage for skill development (consolidates progress and builds student confidence).

ADDITIONAL TEACHING STRATEGIES

Sometimes you give a great, clear instruction, but the participant does not do the skill. Here are some options to add after the initial instruction, if needed. Do not just repeat yourself!

Technique: Modeling (demonstrating)

WORKS WELL IF	TIPS	DOES NOT WORK IF	TIPS
The participant will watch your demonstration The participant is able to copy the skill after you demonstrate it	Get the participant's attention before modeling. Have a volunteer or peer model while you point out the key components of the skill.	The participant does not look, or runs away as you are demonstrating the skill. The participant does not yet have the motor ability to copy the skill	Progress by doing simple drills that will benefit basic motor ability: agility, coordination, balance, limb speed, hand-eye and foot-eye coordination.

Technique: Physical Guidance

WORKS WELL IF	TIPS	DOES NOT WORK IF	TIPS
You are physically able to guide the participant into the correct movement. The participant is ok with guiding touch.	Move slowly and with respect. Use a low voice Let the participant know what you are doing/ask "I am going to help you put your hand in the right place, ok?"	You cannot physically guide the movement. The participant is very resistant to physical guidance.	Use modeling, or video modeling. Ask someone who has a good connection with the student to physically guide the movement.

Technique: Video Modeling

WORKS WELL IF	TIPS	DOES NOT WORK IF	TIPS
You have access to an iPad/iPhone You can quickly film a short video of someone performing the skill The participant is interested in watching the video	Keep it simple, short and clear.	The video does not hold the student's attention.	Watch for what is holding the student's attention.

Technique: Visual Cues

WORKS WELL IF	TIPS	DOES NOT WORK IF	TIPS
You can think of a good cue to add. (e.g. using dye to draw the course on the snow, adding more targets to aim at.)	Be creative!	Visual cue presented does not get the attention of the student.	Try something the student can focus on in a small visual field, e.g. video modelling.

SIX STEPS FOR STUDENTS WITH CI & ID

Due to social or communication difficulties your student may present, the following steps should be considered as a best practice guide only. You as an instructor may have to skip, combine, or change the order of these steps to maintain the attention of your student. However, safety is still paramount for every lesson.

Make goals realistic and aim for success. Talk to the student or their parent/caregiver about what they are looking to achieve in each lesson. Be prepared to take considerable time for students to move through the progression and their goals. It may also be necessary to do a lot of repetition in order for a student to master a skill.

TEACHING AND SUPPORT STRATEGIES

When giving instructions, try to show and tell. Use minimal language and pair your words with visual cues--modeling/demonstrations, drawings, images, videos, etc. Consider the most appropriate teaching or support strategies for your student. Remember to provide opportunities for processing and repetition. Consider breaking the tasks into steps. It may be helpful to provide physical guidance to complete a task. Give plenty of opportunities for practice. Provide positive feedback and consider the use of rewards for motivation. Take frequent breaks and offer choices. Don't forget to pre-load your student when appropriate.

Step 1: Equipment and Communication

Goals:

- Establish communication methods
- Determine necessary adaptive equipment
- Introduce equipment to the student
- Utilize the student's strengths and interests to build rapport

BUILDING RAPPORT

It is really important to try to establish a connection with the student. Utilize their strengths and interests to assist in building a relationship between you.

COMMUNICATION AND SUPPORT STRATEGIES

Ensure you know and use the most appropriate communication and support strategies for the student.

EQUIPMENT INTRODUCTION

Introducing the student to the equipment may take time. Keep in mind any sensory sensitivities the student may experience, and remember that what is new and different can sometimes be challenging for a student with ASD. Helmets, goggles, boots, snow pants etc may all be new equipment for the student. Introduce equipment in stages if necessary, and provide time to allow the student to get used to wearing the equipment. Try to keep it fun and light. Use visual supports and modeling (demonstrations) if relevant and helpful for the student. Keep language appropriate for the student. If your student is a child, consider playing a game like tag to gain comfort with the boots.

Step 2: Basic Mobility

Goals:

- Familiarity with equipment
- Moving around on flats
- Develop the neutral position

THE NEUTRAL POSITION

During the initial steps, it is important to emphasize the neutral position and assist the student to develop good habits. The neutral position (also known as the ready position, balanced body position or athletic position) is common to many sports, and may have been encountered by the student in other activities.

In essence, the neutral position is:

- Base of support (leg and outrigger) roughly shoulder width apart
- Joints flexed (ankles, knees, hips)
- Arms to the side (relaxed, aligned with hips)
- Head up, facing the direction of travel
- Relaxed (but ready to react)

The instructor may use demonstration, images, video modeling or physical prompting (always ask for consent when using a hands-on approach) to assist the student to find the neutral position. Spend some time getting the student comfortable with this foundational piece before moving on.

EQUIPMENT FAMILIARITY AND MOBILITY

After strapping the first foot in, have the student plant the free foot on the snow near the back binding. Encourage the student to try to flex the lower joints (ankles, hips, and knees) to bring one edge off the snow. Flatten the board, and then slowly transfer the free foot to the opposite edge and bring it off the snow. Try using demonstration or physical guidance, and be ready to support the student to prevent falls.

TURNING IN A CIRCLE--PIVOT

Practice pivoting the snowboard. Have the student use their free foot to bear their weight then lift and move the snowboard in the direction intended, being careful to not step too far and fall off-balance. Reposition the free foot and repeat the motions until the student has completed a revolution. Repeat in the opposite direction. Try another rotation by sliding the board rather than lifting it. Try using demonstration or physical guidance and be ready to support the student to prevent falls.

This exercise improves edge control and can illustrate the differences between ‘on edge’ and ‘flat base’.

SKATING

Have the rider point their hip in the direction of travel, looking that way as well. With the free foot either on the heelside (for better alignment) or toeside (for more strength) near the front binding push towards the tail of the board (ideally, keeping the stride between the bindings). Try using modeling, visual cues or physical prompting.

CLIMBING

Have the student place their board across the hill perpendicular to the fall line, with their body facing uphill and the free foot above the toeside of the board, then take a medium-sized step with the free foot up the hill. They should follow with a small step with the attached foot, lifting the board, then engage the board edge to prevent slipping backwards. Repeat this sequence. Ensure the rider keeps their head and chin up, and that steps are small. Repeat until sufficient height has been gained for a basic slide, or have the rider pivot 180 degrees and introduce descending. Try using modeling, visual cues or physical prompting.

DESCENDING

Riders should be familiar with the process of safely descending the slope in case of fatigue, equipment failure or terrain that is unsuitable.

Have the student place their board across the hill, perpendicular to the fall line, with their body facing downhill, and their free foot uphill of their board. Have the rider lift, then step down with the board, (digging the heel edge into the snow), step down with the free foot and continue stepping with the board, then the free foot, in sequence until the rider is at the base of the slope or at an appropriate height for a basic slide. Try using modeling, visual cues or physical prompting.

Step 3: Sliding

Goals:

- Sliding on flats
- Maintain neutral position on a moving board
- Preparation for unloading magic carpets/chairlifts

STRAIGHT RUNNING

From a suitable height (slight slope to flat, or ideally slight slope to flat with a terrain assisted stop), have the rider stand in a balanced body position. Place the free foot against the rear binding and, when ready, slide. If the terrain is suitable, allow it to stop the student. You may also physically assist them to stop with your body.

NOTE: During this phase, it is important to reinforce proper body position (the neutral position). Head should be up and facing in the direction of travel. The student will need specific instruction and perhaps physical guidance on where to face their body. Knees and ankles should be slightly flexed. Shoulders should be parallel to the board.

PUSH-PUSH-GLIDE

On flat terrain, practice sliding without the consequences of gravity, using the skills learned in basic mobility. Ensure the student knows what each of the steps are, e.g. push and glide. It may be necessary to break this tactic into small steps. It might be helpful to say the steps together as the student completes them, or to count.

TOE/HEEL DRAG

This tactic is useful to beginners as a way to control speed or introduce some direction control. This can be done when the student is comfortable with Push-Push-Glide. Have the student push as before, and while gliding, slide the toe or heel of the free foot off the board so that they can drag it in the snow. The dragging toe or heel will slow the rider and create a point around which the board can pivot. Use verbal, visual or physical prompts as necessary.

J-TURNS

A J-Turn adds rotation as a means of changing direction. Set the student up as you would for the previous tactic (toe/heel drag) but rather than sliding the rear foot off the board to alter direction, have the student rotate their head, shoulders, hips, and lower joints in the chosen direction. Tell the student to hold the rotation until the board pivots and they are able to traverse to control speed. If the student is comfortable being touched, it may be beneficial (at least for the first one or two turns), to physically guide the student, allowing them to feel the associated body and board movements. Use other verbal or visual prompts as necessary, and consider the benefit of breaking down this tactic into small steps, or starting this tactic with two feet strapped in. Repeat in the opposite direction. Use verbal, visual or physical cues as necessary

Step 4: Control

Goals:

- Edge control
- Stopping with the snowboard
- Basic direction control

INTRODUCTION TO EDGING (THE GAS PEDAL EXERCISE)

The Gas Pedal is an exercise for introducing edging on the heelside. Support the student, with their lead foot in the binding and their other foot behind the heel edge on the snow. While describing the action of a gas pedal, have the student press the toes of the snowboard foot towards the ground, as they would on a car gas pedal, until the board flattens and begins to slide; care should be taken not to apply too much pressure, as the board may slip away too quickly. Have the student ‘release the pedal’ by lifting their toes to stop the snowboard and engage the edge.

An alternative introduction to edging, particularly for children, could be to try a ‘crab walk’ for heelside or ‘bear crawl’ for toeside as initial steps to gain comfort with edge angle. A game like red light/green light may also be a fun way to learn about edging.

ONE-FOOT-ATTACHED TACTICS

One-foot Sideslipping

As another introduction to sideslipping, you might try the tactic with one foot unstrapped (the rear). This allows the student to possibly feel more secure, by allowing them to adjust their base of support quickly (moving the free foot to regain balance).

Begin across the fall line, slowly relax the edge and allow the board to begin sliding. Be sure to have established verbal cues or commands such as “toes up” or “heels down” so that you can help maintain a comfortable speed. It is important to ensure the student understands the meaning of verbal cues before using them. It may be beneficial to practice the words and actions together.

One-foot pendulum

Similar to ‘one-footed sideslip’, the use of this tactic with a free foot is intended to provide a greater feeling of safety during the acquisition phase of learning the skill.
Using rotation of the head, shoulders, hips and lower joints, the student should slide in an arcing path down the fall line. A fun tactile cue, such as a high five or fist bump at the top of the arc may signal the student to begin the tactic in the opposite direction (switch).

NOTE: For some students with ASD, it can be difficult to learn a new way of doing something once a particular way has been learnt. If a student becomes very comfortable with one-footed tactics, e.g. one-foot sideslip or one-foot pendulum sometimes there may be reluctance to try a new version of the tactic, e.g. two-foot sideslip or two-foot pendulum. Consider this before deciding to use one-footed tactics, or try not to spend too much time on them.

SIDESLIPPING (TWO FEET ATTACHED)

Heelside Sideslip

On a suitable slope, have the rider place the board across the fall line (back facing uphill). Gradually reduce edge angle (drop toes) until the board starts moving downhill. Riders will increase their edge angle (lift toes) to control their speed and slow down. Try using modeling, visual cues or physical prompting.

Toeside Sideslip

On a suitable slope, have the rider place the board across the fall line (back facing downhill). Gradually reduce the edge angle (drop heels) until the board starts moving downhill. Riders may increase their edge angle (lift heels/press toes) to control speed. Try using modeling, visual cues or physical prompting.

NOTE: The instructor must monitor who or what is approaching the rider to ensure safety.

PENDULUM/FALLING LEAF

Once the rider is effectively using edge angle to control speed, basic direction control (using one edge) can be introduced. Have the rider apply pressure (stand heavy) on one foot to flatten the corresponding half of the board. This creates greater motion to the side of the applied pressure. To change direction, the rider first returns to neutral (using even pressure on both feet), then applies pressure to the opposite foot. Try using modeling, visual cues or physical prompting.

POWER PENDULUM

Once the rider is effectively using both edge angle and pressure control to manage speed and direction, introduce rotation to the sideslip. This drill is very similar to the Pendulum/Falling Leaf, but the introduction of rotation will allow the rider to point the board in the desired direction, increasing control. Starting from a sideslip, have the student rotate their core (shoulders, hips, and knees depending on ability) in the new direction. Finish each direction change with the board approaching the fall line. As opposed to the zigzag shape of the falling leaf, this shape will be more rounded near the vertex (lowest point) of the arc; approaching a 'U' shape. Try using modeling, visual cues or physical prompting.

Step 5: Turning

Goal:

- Single turn Toeside
- Single turn Heelside

BEGINNER TURNS

Heelside Turn:

Have the student traverse across the slope on the toeside edge (facing uphill), with their head facing the direction of travel and slight pressure applied on the leading foot. They can initiate the turn by rotating their head looking back over the lead shoulder, and rotating the core towards the nose of the board, which will pivot towards the fall line. Begin the edge change by moving the lead knee in the direction of travel, and allowing the board to flatten, slightly flexing the ankle. The student should continue to direct the board through the turn with knee rotation, and use the lead knee and ankle flexion to change from a flat base to the heel edge.

The hips follow the rotation and the student completes the turn by flexing the lower joints to engage the heel edge. Have the student look downhill, equalize weight on both feet, and use a sideslip to slow down to a stop. Equalizing weight is an important step, and will help the student progress to linking turns smoothly.

There are many steps in learning to turn. For students with ASD, it may be helpful to break the turn into small incremental steps. The instructor may try other teaching strategies such as video modeling, providing visual cues or offering physical support to help the student complete the turn.

Toeside Turn:

The student begins in a traverse on the heelside edge. They should be facing in the direction of travel, looking over their lead shoulder. Have them begin the turn by looking down the fall line and moving the lead hip, knee and ankle down it (rotating towards the tail of the snowboard).

As the student approaches the fall line, they need to rotate the hips and allow the snowboard to flatten briefly as they continue to rotate to the new direction. The student should keep rotating their hips and flexing the lead knee and ankle to engage the toe edge as they cross the fall line.

As the board reaches the toe edge, the rider will end facing uphill, shoulders parallel to the snowboard tips. and may finish in a sideslip. This involves equalizing the student's weight on their feet. They then continue to sideslip to a stop. Again, consider the most appropriate teaching and support strategies to help the student to be successful when completing a turn.

OTHER SUGGESTED TACTICS FOR INTRODUCING TURNING

Static exercise: Walking Through the Turns

You can walk the rider through a turn without a snowboard strapped on. Starting from the heels or the toes, walk sideways through an arc, flattening the feet when parallel to the fall line and rising up on the opposite part of the foot from the start, ending on toes or heels. This will allow the rider to get a feel for the timing. For some students this may be very abstract and it may be hard to relate walking through the turns to making a turn on a snowboard.

Static exercise: Twist the Disks

Have the rider stand on the snow (no board) and rotate as though they are turning the snowboard. Watch for the rotation continuing down the body from the head and shoulders to the hips, knees and ankles. Try using modeling, visual cues or physical prompting.

Chicken Turns

This drill is to prepare the rider for the increase in speed due to the effect of gravity along the fall line. The rider will start in a sideslip, using both edge angle and rotation. Have the rider point the board downhill along the fall line and then return to the starting sideslip. This eliminates the need to change edges to maintain control. Understanding the increase in speed due to the effects of the fall line will prepare the rider for linking turns, as well as improve the coordination of rotation and edge angle during the turn. Try using modeling, visual cues or physical prompting.

The Dance Exercise

The Dance exercise is a hands-on method to introduce the edge change during the turn. Essentially, the instructor (at the centre of the turn) will guide the rider's body around the turn. Speed control is provided by the captive, short-radius turn around the instructor. Verbal commands (such as "flat board" or "heel/toe") may help the rider develop the timing for the turn, and pair the verbal cues with the physical movements. This method will not work well for students who are averse to touch.

NOTE: The instructor should not have a snowboard strapped on for this drill, as it will interfere with the rider's turn.

J-Turns

Try a J-turn as described above in Step 3: Sliding. Try the tactic with two feet strapped in.

Step 6: Flow

Goal:

- Add fluidity to student's riding
- Add vertical movement
- Vary the shape and size of turns to control their speed

ADDING A TRAVERSE BETWEEN TURNS

This tactic allows the students to begin linking turns together without coming to a complete stop or continuing down-slope in a sideslip. Rather than using the sideslip to control speed, the student will continue in the direction across the fall line at the end of the turn until ready to initiate the next turn. Consider using visual cues to help the student understand that they need to continue traversing, and then when to start the next turn.

NOVICE TURNS

This tactic is useful for increasing the flow of the rider, using the flexion and extension to control pressure. While linking turns, have the student flex after the board has changed edges (after the fall line). Flexion after the fall line increases the efficiency of the edge pressure, as well as stability, by bringing the rider's COM lower to the ground.

Be sure to encourage the student to utilize even pressure distribution. Depending on balance, there may be a tendency to tilt towards the nose or tail of the board. It may be necessary to provide modeling, visual cues or physical prompting to help the student know what, when and how to flex and extend.

Across the fall line

With a sideslip

OTHER SUGGESTED TACTICS FOR INCREASING FLOW:

Twist the Disks with Flexion and Extension

Have the rider stand on the snow (no board) and rotate as though they are turning the snowboard. Watch for the rotation continuing down the body from the head and shoulders to the hips, knees, and ankles. Once a few rotations have been made, have the rider extend/flex through the rotation; being tallest in the centred portion (shoulders parallel to the board) and going low/being the most flexed at the extreme of the toe or heel rotation. This 'up un-weighting' will allow the board to have a flat base during the fall line portion of the turn. Use modeling, visual cues and hands-on prompting as relevant.

Traverse With Flexion/Extension

This tactic is to introduce the concept of flexion to help manage the pressure generated in a turn. Have the student start a traverse (either as a stand-alone exercise or in conjunction with turning with a traverse) and during the traverse move their COM up and down by flexing the ankles, knees, and hips.

Pay attention to the alignment. Depending on the level of mobility in the joints, students may tend to over-utilize the larger joints (hips) and under-utilize the smaller joints (knees and ankles), resulting in the weight being too far over the heel edge during the exercise.

This tactic may need to be broken down into smaller steps. It is important that the student knows how, when and what to flex before starting out. Visual cues and hands-on prompting may be beneficial also.

SLIDING 360S

Sliding 360s are a fun tactic that can be used for many different focuses. Rotation, edge control, and pressure control are all components of this tactic. They can be done down or across the fall line.

Utilizing the fall line: Begin a sideslip. When ready, the student can initiate rotation (in either direction) and reduce edge pressure until they begin to spin, then hold the rotation until one revolution is complete (or more, but watch out for dizziness). Lowering the COM (by flexing) may help with the student's stability.

Across the fall line: The student will begin by initiating a turn to the heelside or toeside. Rather than completing the turn with a traverse or initiating the opposite turn, the student should maintain the rotation across the fall line in the direction of travel as they reduce edge angle and pressure. This method eliminates the acceleration caused by travelling down the fall line.

Remember that the effective edge will change part way through the rotation (from heel to toe or vice versa) and instruct the student during your demonstration to avoid an unexpected edge catch!

LIFT PROCEDURES

For students with a Cognitive Impairment

FRONT-LOAD:

Before riding a lift with a student with a cognitive impairment, clearly explain the procedures and expectations. Front-load the student with information about the lift before getting on it. Give as much information as necessary, depending on the student's developmental and communication abilities.

Front-loading Progression for riding a lift:

Consider using some or all of these front-loading steps to prepare the student before they ride the chairlift.

- Talk about the lift and look at pictures, photos, diagrams, social scripts, videos, etc.
- Look at the lift from a distance
- Look at the lift up close.
- Watch people load the lift

SAFETY:

Clearly explain the important rules that need to be observed while riding a lift (particularly the chairlift). If using a surface lift, ensure the student knows what to do in case of a fall. Have the student repeat the expectations in their own words. People with cognitive impairments (children in particular) may not have a strong awareness of safety concerns. It may be necessary to use a harness, tether or physical support to ensure the student remains on the lift.

REASSURING THE STUDENT:

Be aware that riding a lift may produce anxiety in some students. Try to prepare the student thoroughly in a meaningful and understandable manner. Describe a slow and thoughtful step-by-step process before actually riding the lift.

EXPECTATIONS OF BEHAVIOUR:

Clearly define the types of behaviours which are expected when riding a lift. Remember, there are many steps involved. Use clear and simple language, and a communication method which is appropriate for the student. It may be necessary to repeat the rules for riding a lift regularly. Remember to give clear instructions.E.g. “When we wait in line, we keep our hands to ourselves”

“Stay on the chairlift until the instructor tells you it is time to get off.”
“When you get to the top, let go of the tow-rope and move to the side”
“Lean forward a little when you get on the carpet.”

AN EXAMPLE FOR EXPLAINING HOW TO RIDE A CHAIRLIFT:

The Loading Procedure:

(Explanation may happen while watching people load the lift.)

- Walk through the maze
- Wait until the lift operator says we can walk again
- Walk up to those metal stalls
- Wait until I say it’s okay and then skate to the red line
- Stop and look behind you
- Sit down when I tell you to

On the chairlift:

- Help me put the bar down when I say it’s time
- Keep your arms out of the way of the bar
- Put your snowboard onto the footrest

The Unloading Procedure:

- Slide board and boots off the footrest
- Lift the safety bar
- Stand up when we get to the flat area with the orange cones
- Put your back foot next to the binding and lean forward
- Slide straight ahead

Consistency: Tell your student how many times you will be going up the hill using the chairlift before going inside the lodge for a break. Three might be a good number. This will likely become part of the routine.

MEET THE STUDENT’S NEEDS

Learning to ride a chairlift may require many steps over many days or weeks, or it may happen quickly and easily. Choose the appropriate steps which will assist with the student’s learning and help ease anxiety for the student. When providing verbal information, only give as much as the student is able to comprehend.

Magic Carpet

The magic carpet is probably the first lift that a rider will encounter. Carpets consist of a moving rubber surface on which the rider will stand while being conveyed up the slope.

Beside the loading area, it may be beneficial to have the student watch people load the lift and talk through the steps.

QUEUEING UP

Explain the expectations for the student when queueing. There will be times of moving and times of stopping and waiting. The student will have to wait their turn, and listen to the instructor to tell them when to stop and when to go.

The student will need to try to keep their body calm and hands to themselves.

PREPARING TO LOAD

Show the student where and how to stand on their board (more weight on the front foot). Prompt the student with words, visuals or physically to push gently with their free foot until the nose of the board is gripped by the rubber belt.

LOADING
Prompt the student with words, visuals or physically to keep their weight forward slightly and get ready to bring their rear (pushing) foot down onto their board or the carpet.

RIDING THE CARPET
Prompt the student to place their free foot down on the carpet to reduce slipping (if the belt is icy). If their foot was on the board, slide the heel or toe off the board to provide traction on the belt.

PREPARING TO UNLOAD
An instructor should ride in front of the student to provide adequate visual and verbal warnings, and to be ready to physically assist the student to unload the carpet (if necessary.) At the top of the carpet, the slope will level off, prepare the student to unload.

UNLOADING
Allow the student's board to slide off the carpet and guide them to quickly use their free foot to clear the unloading area; there is most likely another rider behind them! It can be helpful for the instructor to stand in front of the student and have them slide towards them.

PREPARING TO SNOWBOARD
Prompt the student to skate to the side, to a point where they can strap in their free foot. Physically assist if necessary

T-Bar/J-Bar/Poma/Tow Rope
Discuss and demonstrate the use of the lift prior to getting in line. Consider using photos, video and watching others load. Some hills may have a "practice" bar available to demonstrate to students how the lift operates. Alternatively, use two poles to show how one bar sits underneath the rider's bottom and the other pole is used to hold onto. Allow time for practice.

If possible, it is best to have one instructor in front and one behind. The instructor in front can assist the student to unload, and the instructor behind can assist in case of a fall. If riding a T-bar, it may be best to ride side-by-side with the student.

Ensure the student knows what to do in case they fall. Create a plan with the student and have them tell you the plan (if possible). Ensure the student knows what to do at the top of the lift (e.g. gently let go of the t-bar)

PREPARING TO LOAD
Remind the student of expected behaviours when lining up. Show the student where to load and, when ready, prompt the student to skate to the line indicated for loading.

LOADING
The lift operator will place the bar between the rider's legs, against the lead/strapped in foot.

RIDING THE SURFACE LIFT
Prompt the student to hold the handle of the lift bar, balancing as the lift pulls the rider up the slope. Remind them, "Stay standing, do not sit on the bar". It is not designed to support the full weight of a rider.

UNLOADING
At the top, there will be a sign or mark indicating where to unload. The instructor may need to provide visual and verbal warnings to indicate where the student should unload. Prompt the student to pull the bar from between their legs and gently let it go ahead of them. BE AWARE, the bars are spring-loaded and will very quickly rise up out of the way. Firmly remind the student not to throw the bars.

PREPARING TO SNOWBOARD
The instructor should prompt the student to skate out of the unloading area to a safe spot to begin the lesson/ proceed downslope.

Chairlift

Chairlifts are ubiquitous in the sport of snowboarding. The majority of ski areas operate lifts in similar configurations. Standing beside the loading area in a safe spot, discuss the process of queueing (the maze), approaching the loading zone and loading the chairlift (using other skiers and snowboarders as examples). Allow the rider to watch and listen for as long as necessary to feel comfortable. Consider also using photos, pictures, videos, or social scripts beforehand.

Be sure to discuss the unloading procedure (at the top) so there are no surprises!! If possible, using a practice chair, practice sitting and standing (loading and unloading) onto the board--unloading can be tricky. Also practice straight running with the rear foot out of the bindings, to build confidence and improve the chances of successful unloading.

QUEUEING UP
Explain the expectations for the student when queueing. There will be times of moving and times of stopping and waiting. The student will have to wait their turn, and listen to the instructor to tell them when to stop and when to go. The student will need to try to keep their body calm and hands to themselves.

APPROACHING THE LOAD
When safe, prompt the student to approach the loading line from the maze. Some lifts may be equipped with an indicator light (traffic or other).

PREPARING TO LOAD
Prompt the student to stop at the loading line (either on snow, or indicated by a pylon) and prepare for the chair approach.

LOADING
When the chair arrives, prompt the student to sit and allow the snowboard to remain flat beneath the chair.

SAFETY BAR DOWN
Once the chair has proceeded, the board will lift off the snow. If the chair is equipped with a rest bar, have the student place the snowboard on the bar. If necessary, the instructor can support the weight of the snowboard with their free foot. Remind the student that they need to remain seated, and keep their body as calm as possible. Look for any signs of anxiety and reassure or distract the student as appropriate. Consider telling the student how many towers the chair needs to go past before getting to the top

SAFETY BAR UP
Near the top there may be signs indicating the approaching offloading area. Provide visual and verbal warnings for the student. Assist the student to lift the bar and prepare to unload.

PREPARING TO UNLOAD
On the unloading ramp prompt the student to align their snowboard with the intended direction (usually straight ahead).

UNLOADING
When ready, prompt the rider to stand up on their board. Guide the student to do a ‘straight run’ down the unloading ramp and proceed to a safe area to strap in the board.

PREPARING TO SNOWBOARD
Explain what will happen next, e.g. “We will go down the Rambler run. We will do 5 turns before stopping. Follow me.”

NOTE: it may be advisable to scout the lifts you plan on using to check the slope of the unloading ramps. Steeply sloped ramps are not ideal for beginners.

If required, chairlifts can be slowed for loading and unloading. Be sure to communicate clearly with the student and the lift operator if you require the chair to be slowed or stopped for loading/unloading.

SAFETY RECOMMENDATIONS

- It is strongly recommended that all students wear a helmet for safety, in the event of a fall or striking or being struck by the skiing public.
- It is strongly recommended that students should also wear eye protection.
- Be alert to any safety concerns for the student including severe allergies, seizure disorders and flight risk (wandering off). Use the AOT to ask parents or caregivers about safety concerns.

Snowboarding for People With CI and ID: SUMMARY

STUDENT PROFILE

People with cognitive Impairment and intellectual disabilities fall under a range of disabilities including but not limited to: Down syndrome, Fragile X, ASD, brain injury and learning disabilities. These conditions can be difficult to define and group together. Some people with CI or ID may need assistance with most aspects of daily living all their lives, while others may be able to learn to live independently. Sometimes severity codes may be used to describe individuals: mild, moderate, severe, and profound. Some common challenges for people with CI and ID include learning new skills, (which may take time and patience), frustration tolerance (refers to someone's ability to tolerate frustration and is related to the ability to control impulses. Other common difficulties include low self-esteem; challenges with social skills/gross motor skills, and sensory sensitivities. When completing the AOT, take time to discover the student's interests as a means for creating rapport. Determining how the student best learns and communicates is also vitally important.

COMMUNICATION

When communicating with students with CI or ID, generally less verbal talk is better. Use short, clear phrases and be specific and direct. Avoid abstract concepts. Match your communication style and ability to the student.

TEACHING STRATEGIES

When giving instructions, try to use 'show and tell'. Pair your words with visual cues: modeling or demonstrations, drawings, images, videos etc. Try breaking tasks into incremental steps and give the student time to process and repeat the task. Focus on one idea or concept at a time. It can also be helpful to provide physical guidance or prompting to complete a task. Empower the student by offering choices throughout your lesson. Try to provide immediate feedback when the student completes an activity or task. Let them know they tried hard, or did a great turn.

SIX STEPS

When teaching the six steps, utilize appropriate teaching and support strategies that work well for the student you are working with. This may be different for each student.

LIFT PROCEDURES

Front-load the student with information about the lift. Explain the expected behaviour, how to stay safe, and reassure the student about any fears or concerns. Take time to allow the student to become comfortable with the idea of riding a lift. This may involve explanation, demonstration, observation, visual supports or a combination thereof.

SAFETY

It is strongly recommended for students to wear helmets and goggles. Be aware of other safety concerns including severe allergies, seizure disorders and flight risk (wandering off).

CH.10: SITSKI

- Teaching Sitskiing from a Snowboard -
(Monoski, Biski and Quadski)

TEACHING SITSKIING FROM A SNOWBOARD (MONOSKI, BISKI & QUADSKI)

Overview:

The sitski is a piece of adaptive snowsports equipment that has a moulded seat placed upon a frame, and this frame is attached to a ski or skis. The seat should fit snugly since it acts in a similar manner as the skier's foot in the ski boot. On most sitski equipment, the frame is mounted with a shock absorber and it can be lifted to be loaded on a chair lift. The skier is also equipped with short adjustable outriggers to assist with balance and other manoeuvres. There are many sitskis on the market and more are being developed.

Initially, it is very important for an instructor to thoroughly assess the balance, strength and mobility of the potential sitski student to ensure proper equipment selection. The piece of equipment chosen should allow the individual to reach their maximum level of independence, as well as utilising the highest potential of ski performance.

It is important for instructors to complete a thorough assessment of the student's physical abilities in order to develop an individualized lesson progression, to determine an individual's' capabilities, and to decide on appropriate teaching techniques and adaptive equipment. The assessment is also used to establish individual goals towards autonomy and to create a lesson progression plan accordingly. The assessment should be completed in environments that consider the movement that accompanies a motion sport like skiing, instead of only in a static environment.

Here are some of the most common types of disabilities a potential sitski student may have.

- Amputation
- Balance Impairments
- Cerebral Palsy
- Cerebrovascular Accident (CVA/stroke)
- Epilepsy
- Limb Deficiency (strength, endurance, spasm, proprioception, etc.)
- Multiple Sclerosis
- Muscular Dystrophy
- Neuromuscular Diseases
- Paralysis & Paresis (paraplegic and quadriplegic)
- Poliomyelitis
- Post Polio Syndrome
- Spina Bifida
- Spinal Cord Injury
- Traumatic Brain Injury

The above list is by no means complete and many more possibilities could be added. In addition, there are some individuals with progressive or degenerative types of disabilities, including knee injuries.

Assessment of Abilities

Consider every individual as unique, since the effects of an injury or disability will vary from one individual to another. A complete and detailed individual analysis is needed to determine which ski technique and which piece of equipment is best suited. To make this determination, we propose the AOT process which is outlined below.

Level of Injury, if a spinal cord injury (SCI), or nature of the disability
Balance
Mobility
Physical Strength

Spinal cord injuries are traumas to the spinal cord that temporarily or permanently disrupt the nervous system control below the lesion. Damage to the spinal cord usually results in motor and sensory impairment. Impairment can be complete or incomplete (partial) paralysis, also known as paresis (weakness). Thirty-one pairs of nerves exit the spinal column at various vertebral levels to innervate specific muscles and body organs. The severity of impairment is dependent upon the vertebral level at which the trauma occurs. The higher up the spinal column that the lesion occurs, the more severe the injury, with more paralysis and more dysfunction of the musculature. Spinal cord injuries are generally classified as either paraplegia or quadriplegia. Paraplegia is partial or complete paralysis of the legs and lower trunk of the upper body. Quadriplegia is partial or complete paralysis of both arms and both legs. Spinal cord injuries that originate from an accident are called Traumatic Spinal Cord Injuries (TSCI).

Spinal cord injuries could also originate from damage as a result of infection, loss of blood supply, compression by a cancer or slow degeneration of the spinal bones (vertebrae) as in osteoarthritis, that permanently decrease the flow of information through the neural canal in the spinal cord. Another disability affecting the spinal cord is spina bifida, which is a congenital orthopedic defect caused by the failure of one or more vertebral arches to close prior to birth. Spinal cord injuries that do not originate from an accident are called Non-Traumatic Spinal Cord Injuries (NTSCI).

Understanding spinal cord injuries can be based on:

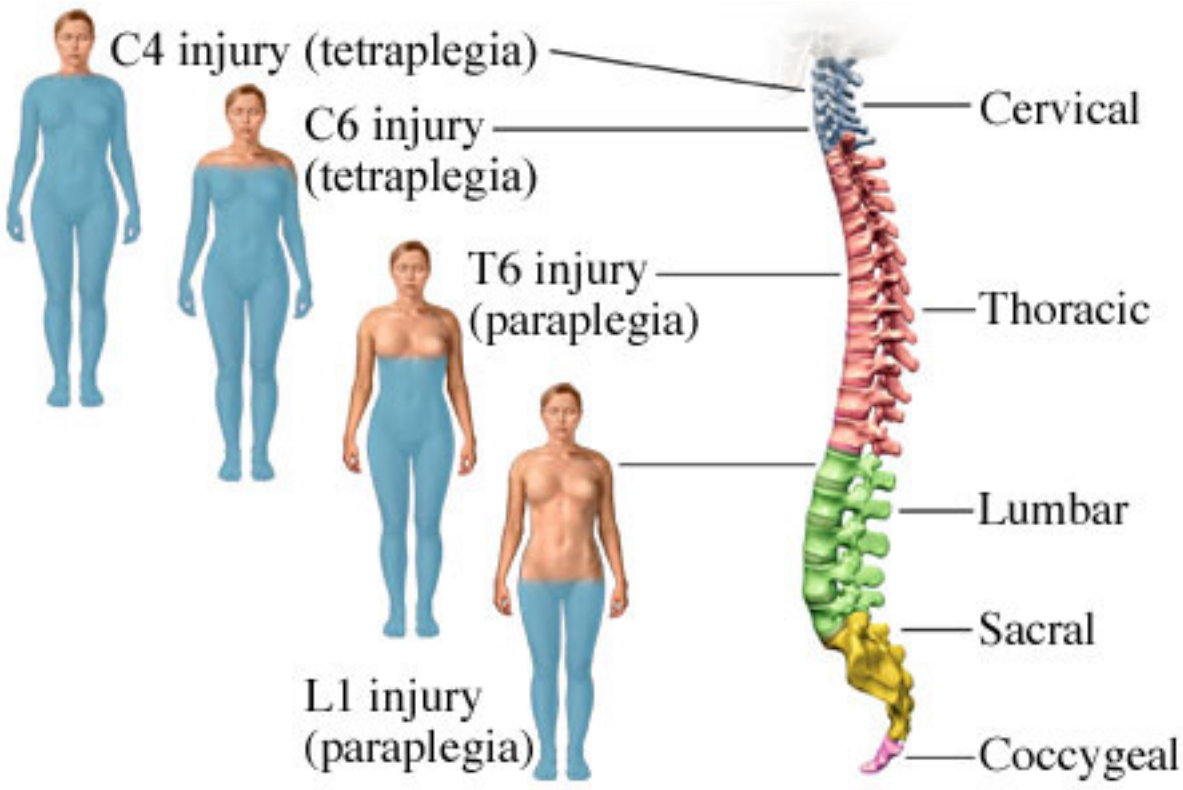
Level of injury
Complete or incomplete, as detailed below

LEVEL OF INJURY

The level of injury will tell you which muscles, muscle groups or section of the body has been affected by the TSCI or NTSCI. Most of all, it indicates which muscles or muscle groups are still functioning.

In the picture below, the blue-coloured portions of the body indicate motor and sensory functions that should not be functioning if the TSCI is complete at the indicated level. Normally, an individual will describe the injury by starting with the first letter of the spinal section name.

A SCI is named by the last vertebra from where motor and sensory functions are intact. So when a student says they are a T6, it would mean that above that level all motor and sensory functions are intact, thus functional. It also indicates that below that level all muscles, including abdominal and back muscles, are not functioning and will therefore be affecting the ability to maintain balance and perform fore/aft and lateral movements.



COMPLETE AND INCOMPLETE

When the TSCI of a person begins and ends at the same level on the spinal canal, it is called a '**complete** TSCI'. Inversely, when a TSCI starts and ends at different levels on the spinal canal, it is called an **incomplete** TSCI or **incomplete** NTSCI. That information is very important for the instructor assessment. Let's use the example of the third person (T6) in the above picture. The person now tells you that the SCI is incomplete and ends at L1 level. Now you understand that above T6 all motor and sensory functions are normal. But the incomplete information tells you that, between T6 and L1, there will be motor or sensory functions (or both) that remain functional. Therefore, this might increase the number of working muscles and the ability of the individual to use more muscles.

Each instructor must have gone through the **CADS Student Information and Medical Form** (Appendix 1), prior to performing the AOT.

ASSESSMENT OF ABILITIES: ASK, OBSERVE, TEST (AOT)

The AOT process process is designed to be used with a student to assess their balance, strength and mobility, and to determine the most appropriate type of sitski equipment to be used.

Ask:

Ask questions of the student to determine their strengths and abilities. Find out the history of their injury, illness or condition, and any relevant experience they may have. Discover any specialized equipment they use/have used, or any supports/therapies they engage in. Try to discover any potential challenges or concerns.

ASK	LOOK FOR
What level of injury does the student have?	Lowest functioning parts of the body
Is it complete or incomplete?	Sensory and motor activity functioning below the region of the SCI.
What is the level of functioning in the limbs? If you do not have specific tools to measure the range of motion, use the unaffected side as an example to compare.	For the upper limbs: hand grip, ability to flex and extend fingers; flex, extend, and rotate wrists; forearm flexion, extension and rotation (inside and outside) and biceps and triceps flexion and extension. You can do the same assessment for the torso and for the legs.
If NTSCI, what is the disability?	Level of functioning.
What other sports does the individual participate in?	Sports that require balance, strength, and mobility.
Do they think of themselves as fit and active? If so, why? Have they used any other specialized adaptive sports equipment?	The ability to correctly self-evaluate. Sports that could be related to snowsports as well as adaptive equipment.
Have they participated in snowsports before?	Previous level, type of skier/rider, etc.

ASK	LOOK FOR
Where do they think their strengths are?	Perseverance, participation in other sports, positive attitudes, self-determination, etc.
How did the student overcome challenges?	Creative answers, perseverance, self-determination, etc.
What are the student's goals for the short term and the long term? Is the student looking for a brief/fun experience or looking to become an independent skier?	A student's goals for sitskiing should influence the choice of equipment for the student.
Do they have the strength to move between slide and support modes for outriggers?	Physical ability to change modes on outriggers

Observe:

Observe the student and the way they move. Look at the speed of movement, the quality of movement and assess their ability to balance, bend and flex. As they move around, relate the ease of their movements to sitskiing.

OBSERVE	LOOK FOR	RELATE TO SITSKIING
If using a wheelchair, how does the student manage to get to you (opening doors, going around obstacles, etc.)?	Ability to open doors, go over little steps. Whether student is using full upper-body strength or requires support.	The ease with which the student uses the chair could indicate good control over body movements. This would result in the student's ability to find balance in a sitski faster than a student who struggles with basic movements.
Is the student able to reach down to the side with one hand.	Ability to perform the task without using the wheel for support	Having to hold onto the opposite side of the wheel chair while leaning the other way indicates a possible loss or weakness of back and abdominal muscle control, resulting in difficulties with lateral balance.
Whether the student has the ability to transfer from the wheelchair to a seat.	Ability of the student to perform the transfer. Fluidity of the transfer.	Quick, fluid transfers indicate that the student has good strength and coordination relative to mobility levels. We would expect a student who can perform quick and smooth transfers to quickly find balance.
Strength and the ability in the student's hands to hold and use an outrigger	Weakness, paralysis, stiffness or inflexibility in the hands.	May not be able to control the slide/ support function of an outrigger.

Test:

Do some simple body movement, position and strength tests to help determine the most ideal set-up and equipment for your student's success when sitskiing.

BALANCE:
Balance assessment of the student using a sitski is an important assessment. Balance can be tested in the wheelchair or directly in the sitski. For all tests, have the student start in a neutral position, sitting up straight with the body centred.

TEST	LOOK FOR	RELATE TO SITSKIING
From neutral position, reach down to your left and return. Repeat with right side.	Range of motion Smoothness of motion Confidence Co-ordination Any differences on left or right sides.	If a student cannot independently return to a neutral position, adjustments such as a chest strap may be necessary. Students that are more confident may progress faster.
From neutral position, reach down to your feet and return.		
From neutral position, rotate both torso and shoulder to the left and return, maintaining balance. Repeat with left side.		
From neutral position, reach forward at 45 degrees to your right and then return to centre. Repeat with left side.	Range of motion Smoothness of motion Confidence Co-ordination Any differences on left or right sides.	Indicates ability to move outrigger in front and to the side.

MOBILITY:
These mobility tests show how the student is able to support and move around with their own weight. If the student has difficulty with tests, this will likely mean that the student with SCI will require assistance when loading a chairlift and getting up after a fall.

TEST	LOOK FOR	RELATE TO SITSKIING
Perform a horizontal transfer from one chair to another side-by-side.	Smoothness of motion Confidence Co-ordination Strength.	Provides information about ability to control the pressures generated. Likelihood of being able to load a chairlift and/or get up after a fall independently.
Perform a vertical transfer from one chair to another placed at 90 degrees to the individual's left side.		
Perform a vertical transfer from one chair to another placed at 90 degrees to the individual's right side.		
Ask the student to lift up and support their body weight for a minimum of 15 seconds.	Smoothness of motion, confidence, co-ordination, signs of fatigue (shaking).	Likelihood of being able to load a chairlift and/or get up after a fall independently.

PHYSICAL STRENGTH:
Physical strength is a challenge. In fact, shoulders, arms, wrists, and hand grip will be used at all times. Moreover, torso muscles (back and abs), when functional, will be needed for lateral and fore and aft balance.

TEST	LOOK FOR	RELATE TO SITSKIING
Lift rear of the sitski using the two outriggers in the crutch position (support mode) for a maximum of 15 seconds.	How far the sitski lifts off the ground How long the student can hold the position	The ability to complete this manoeuver strongly is necessary to independently load a chairlift
Using the outriggers, perform a 360-degree turn. Every step of the turn is to be lifted (goal) but could be slid.	Whether the sitski remains lifted or is skidded. Fluidity of movement.	This indicates possible ability to independently load a chairlift, and to independently manoeuver in a tight situation
From a fall on the snow, get back up (teach and demo every manoeuver and step required to perform the task prior to testing).	Whether the student has the strength, balance and mobility to independently lift themselves back up.	Falls may be frequent when learning to sitski. A student cannot be fully independent if they cannot get up without assistance.
Push forward 50 feet/15 metres.	Signs of fatigue.	A useful skill for loading and unloading a chairlift or other type of lift.
Push backward 50 feet/15 metres.		A useful skill for a student if they get stuck on the flats and need to move a considerable distance.
On a beginner hill, push uphill in a forward position for 25 feet/7 metres.	Signs of fatigue Any signs of slipping or sliding	May be necessary to load/unload a chairlift or move up a slight incline independently.
On a beginner hill, push uphill in a backward position for 25 feet/7metres.		
Student will squeeze instructor's forearm as hard as possible for 5-10 seconds. Repeat with both hands.	Whether the student has the ability to use the slide/support modes on an outrigger	The student must have the ability to control the mechanism of the outrigger to change it from support to slide mode. If unable, consider the use of the grip glove

USING SCORING SYSTEM TESTS TO ASSESS STUDENTS AND THEIR EQUIPMENT NEEDS

The scoring system tests for balance, mobility and strength are designed to help an instructor to learn about their student's strengths, challenges and limitations and to assist the instructor to choose the most appropriate adaptive equipment for their student. This includes the type of sitski, whether fixed or hand-held outriggers are to be used, and whether any additional strapping/bars are required.

The document below, Scoring System Tests, provides a template which can be copied and printed. This template will help the instructor to make a choice about the most appropriate equipment for the instructor.

The four-point scale below each table will guide the instructor to score a manoeuvre.

The total score is for each manoeuvre added together from each table, and provides a suggestion of the type of equipment to use.

SCORING SYSTEM TESTS

Balance:

Balance assessment of an individual using a sitski is an important one. Balance can be tested using seven basic manoeuvres in the wheelchair or directly in the sitski.

BALANCE TEST	USING WHEELCHAIR SCORE 0-3	USING SITSKI SCORE 0-3
1. From a neutral position, reach down to your left and return.		
2. From a neutral position, reach down to your right and return.		
3. From a neutral position, reach down to your feet and return.		
4. From a neutral position, rotate both torso and shoulder to the left and return, maintaining balance.		
5. From a neutral position, rotate both torso and shoulder to the right and return, maintaining balance.		
6. From a neutral position, reach forward at 45 degrees to your right and then return to centre.		
7. From a neutral position, reach forward at 45 degrees to your left and then return to centre.		
TOTAL SCORE /21		

(As a general rule, if the sitski fits well the scores should be equal or higher in the sitski than in the wheelchair. If the sitski scores are lower, another equipment choice or set-up is advised.)

FOUR-POINT SCALE

0 = Unable to reach the position and or unable to get back up without assistance
1 = Able to but needs help and shows instability
2 = Able to but needs help to initiate the movement going back up, shows no instability
3 = Complete independence. Able to complete without any help

TOTAL SCORE

0-7 = A biski with rigid shoulder straps should be strongly considered; a quadski is also an option if arm strength is weak
8-14 = An abdominal elastic strap should be strongly considered. A biski or monoski can be used
15+ = Balance is not an issue for the student. A monoski or an advanced biski can be used.

Mobility:

This mobility test shows how the individual is able to support and move around with their own weight. A low score would mean that an individual with SCI will require assistance when getting onto the chair lift and getting up after a fall.

MOBILITY TEST	SCORE 0 TO 3
1. Perform a horizontal transfer from one chair to another side-by-side.	
2. Perform a vertical transfer from one chair to another placed at 90 degrees to the individual's left side.	
3. Perform a vertical transfer from one chair to another placed at 90 degrees to the individual's right side.	
4. Ask the individual to lift up and support their body weight for a minimum of 15 seconds.	
TOTAL SCORE: /12	

(For tests 2, 3 and 4, the individual may try up to 3 times; use only the best score.)

FOUR-POINT SCALE

0 = Absolutely needs assistance
1 = Needs some assistance, but with time is able to perform the action
2 = Needs little assistance
3 = Independent

TOTAL SCORE

0-5 = Biski might be good equipment to use for stability. (Some biskis also include a push-up device to help the individual get onto the chairlift.)
5-9 = Consider a biski or advanced biski
9+ = Consider a monoski or advanced biski

Physical Strength:

Physical strength is a challenge. In fact, shoulders, arms, wrists, and hand grip will be used at all times. Moreover, torso muscles (back and abs), when functional, will be needed for lateral and fore and aft balance. A higher score will lead you to select a monoski or a more advanced biski while a lower score will suggest the use of a biski.

PHYSICAL STRENGTH TEST (IN THE SITSKI)	SCORE 0 TO 3
1. Lift rear of the sitski using the two outriggers in a crutch position (support mode) for a maximum of 15 seconds.	
2. Using the outriggers, perform a 360-degree turn. Every step of the turn is to be lifted (goal) but could also be slid.	
3. From a fall on the snow, get back up (teach and demo every manoeuver and the steps required to perform the task prior to the test).	
4. Push forward 50 feet/15 metres.	
5. Push backward 50 feet/15 metres.	
6. On a beginner hill, push uphill in a forward position for 25 feet/7 metres.	
7. On a beginner hill, push uphill in a backward position for 25 feet/7 metres.	
TOTAL SCORE: /21	

FOUR-POINT SCALE

0 = Absolutely needs assistance
1 = Needs some assistance but with time is able to perform it
2 = Needs little assistance
3 = Independent)

TOTAL SCORE

0-7 = A bi-ski with rigid shoulder straps should be strongly considered; a Quadski is also an option if arm strength is weak
8-14 = Consider a bi-ski or advanced bi-ski
15+ = Consider a monoski or advanced bi-ski

Decision-Making Table

Use the table below to record the total scores and the equipment choice. Refer to the equipment categories, diagrams and images to assist with decision-making.

INJURY LEVEL/ DISABILITY	COMPLETE/ INCOMPLETE	BALANCE Total Score /21	MOBILITY Total Score /12	STRENGTH Total Score /21	SUITABLE SITSKI *(Eg. Quad, Bi or Mono?)*

FATIGUE LEVELS

After completing the tests, ask the student to evaluate the fatigue level they may feel using the Fatigue Chart (Appendix 4). Reports of rapid fatigue will directly impact the relationship between resting periods and reliance on adaptive aids for support.

DECISION-MAKING TABLE FOR PROGRAM USE

This table can be used by programs to document the students coming to their program and what types of equipment they have been using. It is also a helpful reference guide when a program has the ability to buy new equipment. The table can be used to assess the most appropriate equipment purchases based on the needs of past students.

INJURY LEVEL/ DISABILITY	COMPLETE/ INCOMPLETE	BALANCE Total Score /21	MOBILITY Total Score /12	STRENGTH Total Score /21	SUITABLE SITSKI *(Eg. Quad, Bi or Mono?)*

EQUIPMENT

Choosing the most appropriate equipment

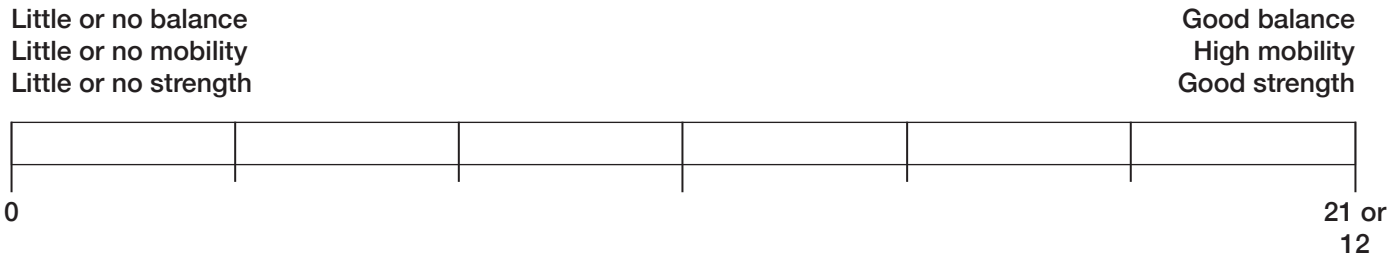
In many adaptive snowsports programs, choosing the most appropriate equipment is not a question, mainly because that particular snowsports program only has one sitski or one type of sitski. Therefore, without a choice of equipment, the only decision to make is which teaching techniques to use.

The scoring system for balance, mobility, and strength can also be used to carry out an equipment assessment for your future sitski purchases. For example, if you carry out balance, mobility and strength tests for your sitski program and most individuals score high on the tests, you may then look to buy equipment that matches the results.

The general guideline is that if the student has significant challenges with balance, mobility and strength, select equipment that is close to the ground with a wider base (biski or quadski). Below is a quick description of the actual continuum of existing adaptive equipment. Different types of equipment can be found on the market for each section of the continuum. The pictures shown below are for examples only and must not be taken as commercial publicity. Some equipment requires specific training/certification from the manufacturer. Therefore the training is not included in the CADS Instructor Manual.

Each category below has example pictures and a description of who is best suited to that type of equipment setup. The line in yellow on the equipment continuum shows the level of skills that correspond best to that category of equipment set-up.

EQUIPMENT CONTINUUM



Putting an individual with more functional muscle groups into equipment that usually fits the need of an individual with less functional muscle groups will result in a possible decrease of the autonomy level of the person and increase in the possibility of damaging the equipment. Inversely, putting an individual with less functional abilities into equipment that require more abilities from the individual will result in increasing balance problems, increasing risk of injuries and increasing stress. There are no real solutions; the guideline remains: choose the equipment that best fits the skills assessment. Should the adaptive snowsports program not have the equipment needed, tell your student about it, and make your teaching as adaptive as you possibly can.

GENERAL RULES FOR HIGH LEVEL INJURIES (TSCI AND/OR NTSCI)

Usually if a student has an injury above T6 and has significant challenges with:

- Balance (scores below 7/18 on balance tests)
- Mobility (scores below 6/12 on mobility tests)
- Strength (scores below 6/21 on strength tests

The instructor will choose adapted equipment that:

- Has a seat closer to the ground
- Has multiple strapping possibilities (shoulder belt and abdominal/thoracic elastic band)
- Could be operated directly from the back using thumbing or bucketing technique, or holding a back bar, or tethered
- Has the possibility to add fixed outriggers to increase stability

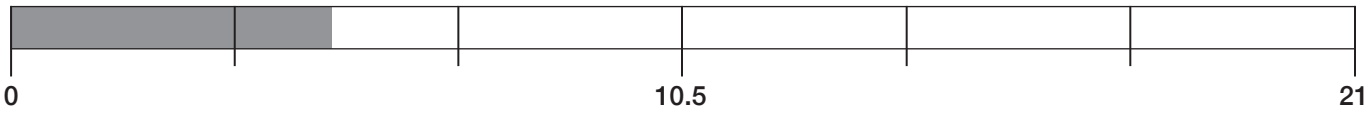
Category:

SKI SLED WITH DRIVER DIRECTLY BEHIND

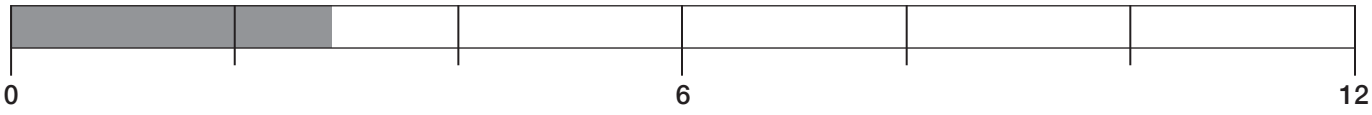
- Unable to maintain balance
- Possible hypertonia or spastic/rigid muscles create difficulty for students to fit properly into any sitski
- Little to no upper-body mobility or strength
- Unable to get onto chairlift or get up after fall
- Needs complete assistance
- Will not help individual reach autonomy but allows community integration

As of now, the equipment requires additional training and certification from the manufacturer. CADS is actually developing a training and certification module for the skisled/tandem

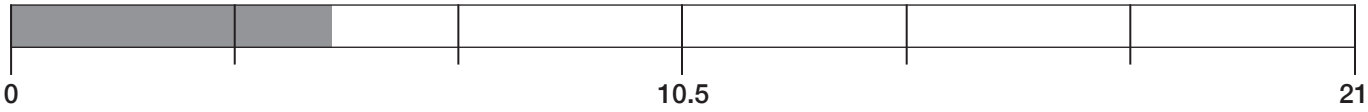
Little or no balance — **Good balance**



Little or no mobility — **High mobility**



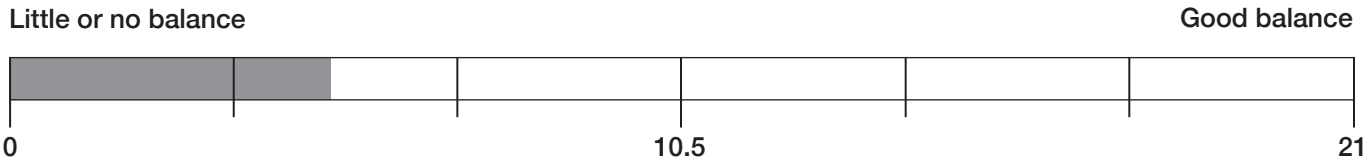
Little or no strength — **Good Strength**

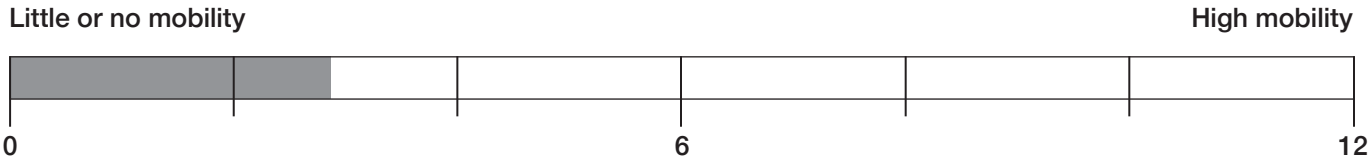


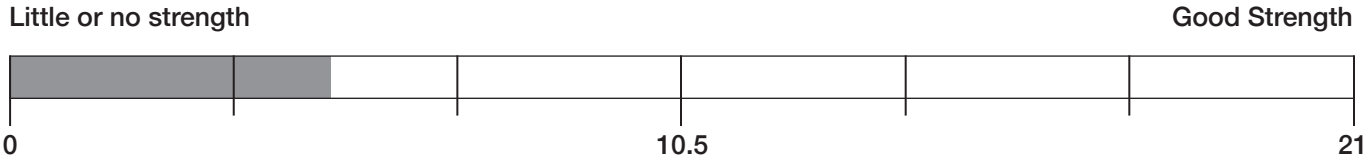
Category:

TETHERED QUADSKI OR BISKI WITH INSTRUCTOR HOLDING THE BACK BAR SEAT

- Balance is a serious issue
- Average or weak to little body mobility and strength
- Unable to generate proper hand grip to use outriggers
- Needs assistance and tethering at all times for balance and speed control
- Unable to get on chairlift or get up after a fall without assistance



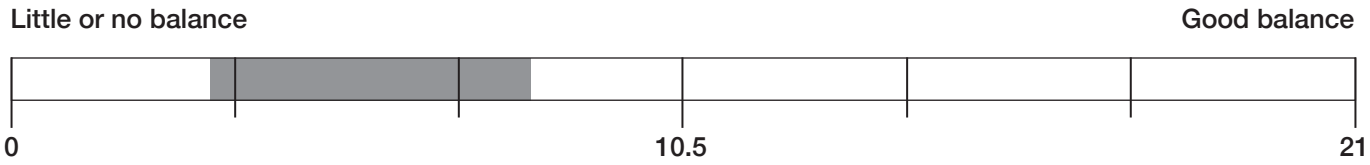


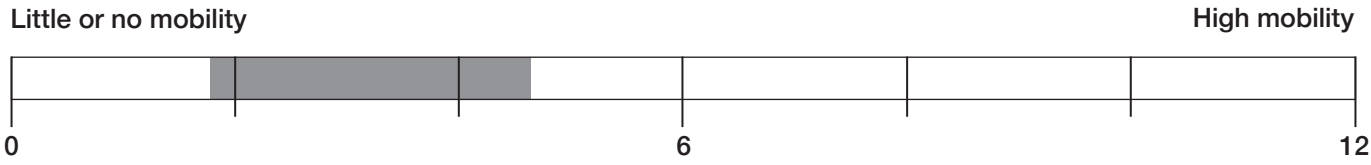


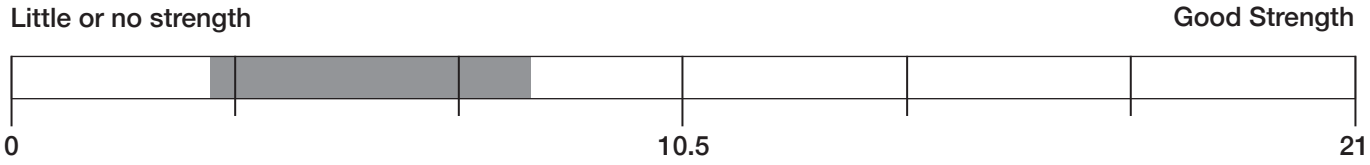
Category:

BISKI/QUADSKI WITH INSTRUCTOR DIRECTLY BEHIND; KARTSKI WITH INSTRUCTOR HOLDING SEAT/BACK BAR OR TETHERING AT ALL TIMES

- Balance is still an important issue
- Low mobility in general--strength capacity increases as muscle groups closer to the body are used (shoulders, biceps, triceps)
- Little grip capability
- Needs speed control assistance at all times
- Unable to get on chairlift or get up after a fall without assistance
- Moves around using an electric, motorized or manual wheelchair



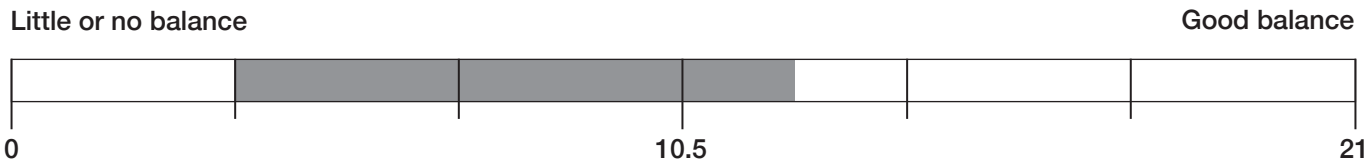


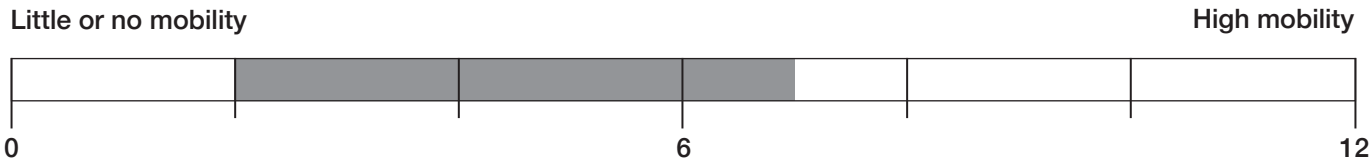


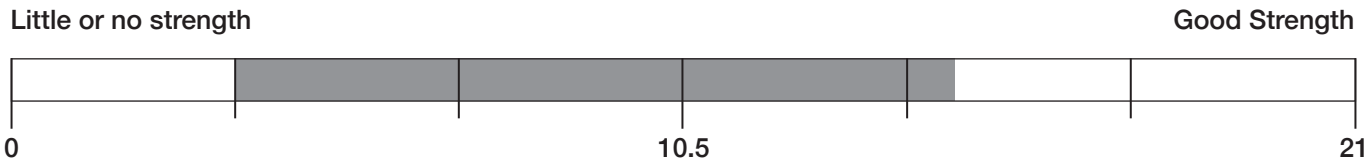
Category:

BISKI (WITH OR WITHOUT TETHER)

- Weak to average balance
- Little to no abdominal or back muscles
- Good to firm hand grip
- Strong enough to use outriggers but unable to lift sitski while sitting in it
- Needs assistance of tether at all times to prevent speeding and to get up after a fall
- No need for fixed outriggers
- Low to high difficulty to independently load a chairlift



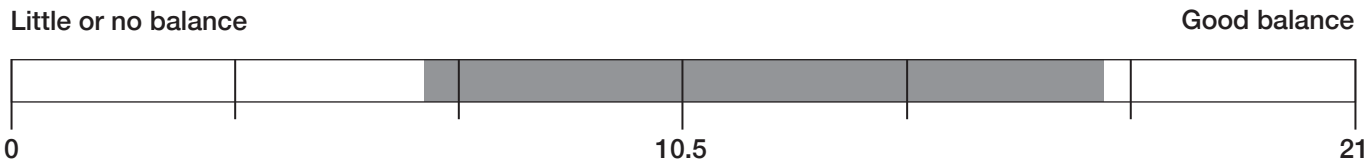


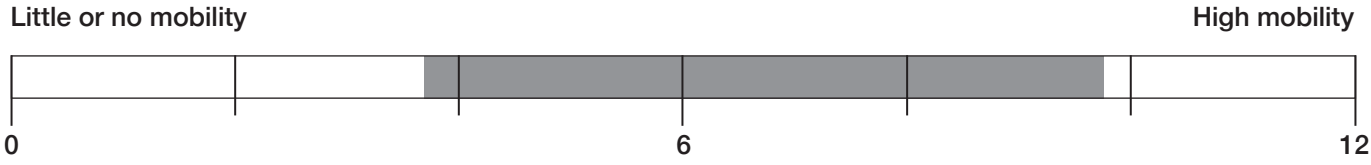


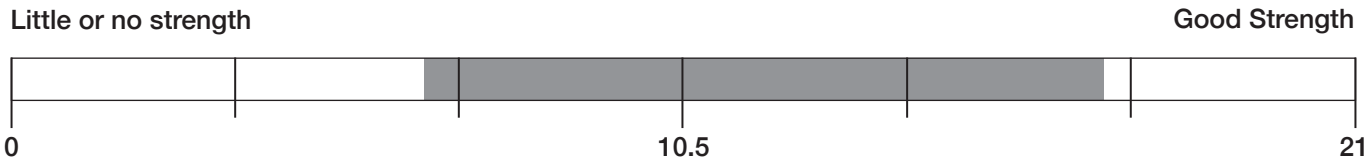
Category:

BISKI; ADVANCED BISK; MONOSKI

- Balance is still lacking but mobility and strength are not
- May use additional abdominal/thoracic elastic strap or belt depending on SCI level or disability or dynamic balance test results
- Ability to independently load a chairlift and get up after a fall



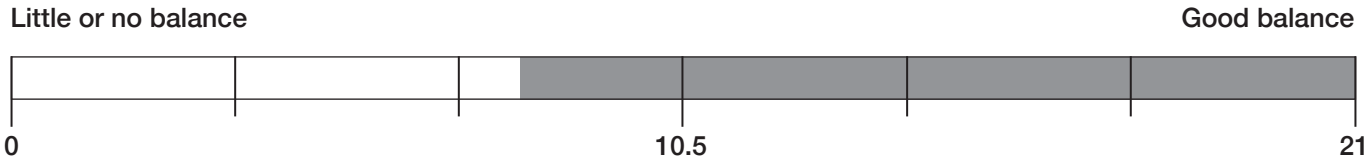


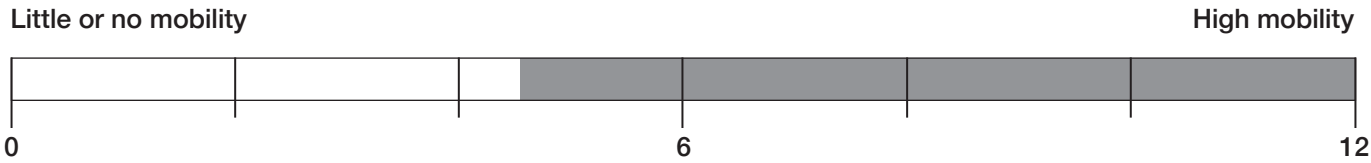


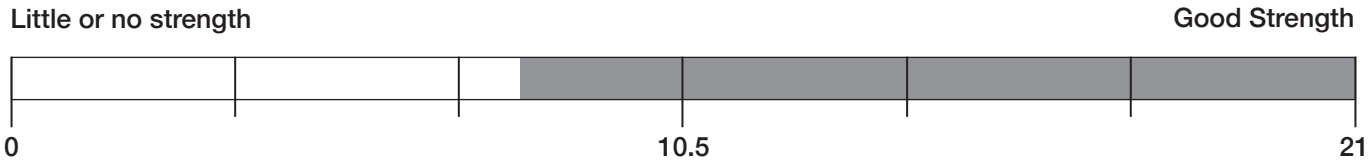
Category:

ADVANCED BISKI; MONOSKI

- Scores high on balance, mobility and strength tests
- May tether at first for speed control only
- Tethering becomes unnecessary when balance and speed control gained
- Quick learning curve, only limited by student's attitude
- Ability to become completely independent, with only a need for a ski buddy for company







SEAT

The seat of a sitski plays the role of a ski boot. Therefore, the individual should fit snugly into the seat. In fact, the more the seat is adapted for the skier, the more balance and control of the sitski the individual has.

Some seats are standard and some are thermoformed. The thermoformed seat is likely be used when the individual has scoliosis, needs additional back support, or has back pain problems.

Thermoformed inner seat in the making.

Front cut of a thermoformed inner seat showing different legs sizes.

Check if there are spaces between the student's body and the inner seat foam. If there are any gaps, fill the space or change the seat size, or inner foam thickness. When the student is properly fitted into the seat, re-test balance. Some manufacturers will propose various seat sizes with their sitski unit, others propose extendable seats (one size fits all) and finally, some do not offer any choices.

NOTE: To really feel if there is any excess space, your hand may come into contact with the student's hips or buttocks. Ensure you have the consent of the student to place your hand in sensitive areas.

SITSKI STRAPS

Most sitskis have rigid shoulder straps and/or an abdominal/thoracic elastic band that can increase upper body stability. These are used depending on the SCI and NTSCI level. For a skier with a low SCI level, the freedom to move back and forth in the sitski seat will enhance the ski experience. For a skier with a high SCI (T6 and above) level, the elastic chest band will give the individual greater control, balance and increase safety. Generally, the straps or elastic bands are flexible or stretchy, come in different sizes (4, 6, and 8 inches wide), and are attached by Velcro.

Manufacturers may suggest specific adaptations for positioning, but this manual is intended to guide you through the steps of strapping most belts, elastic bands and straps before skiing. Individuals may use their own personal inner seat to decrease the risk of pressure sores. When an individual is using their own inner seat, the instructor needs to ensure that the material used in the inner seat does NOT become harder in cold weather.

Sitski Strapping Steps

Before performing the strapping steps, ask the individual to empty their pockets and ensure you have the student's consent before placing your hands in proximity to sensitive areas.

STEP 1 WAIST/HIP STRAP:
After the individual has been transferred (with or without assistance) into the sitski seat, make sure that individual's buttocks are properly positioned (as far back as possible in the seat). Add any necessary padding to ensure there are no gaps between the student and the seat, then pull firmly on the waist belt/strap. The buckle should be centred with the student's body. If the individual has some sensory information originating from the waist, then ask if the belt is hurting or decreasing the torso flexibility.

STEP 2 THIGH STRAP:
Raise the knee level in order to decrease back leg pressure. The Instructor should be able to slide their fingers easily between the back leg muscles and the seat foam cover. Ensure that when strapping the thigh belt you do not squeeze the catheter, as this could decrease or stop the urine flow and increase the possibility of infection. Both knees should be equally level, and it may be comfortable to put some cushioning between the knees. If the knees are not level, this is an indication that the student may be twisted in the seat at the waist level. If knees are not level, undo both thigh and waist straps, reposition the body, and redo steps 1 and 2.

STEP 3 FOOT STRAP:
When the above two steps are completed, adjust the foot support for the longest leg (when that equipment option is available) and add padding underneath the other foot (as needed). Then, strap both feet. The foot strap should not be tightened too firmly since it might decrease blood flow and increase chances of frostbite.

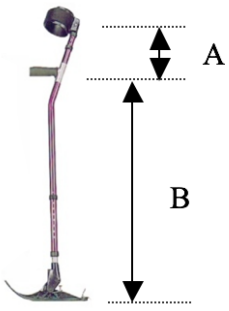
STEP 4 CHEST BAND AND SHOULDERS STRAPS:
To be used as required. Normally, the balance skill tests performed in the AOT will guide the instructor as to whether or not these should be used.

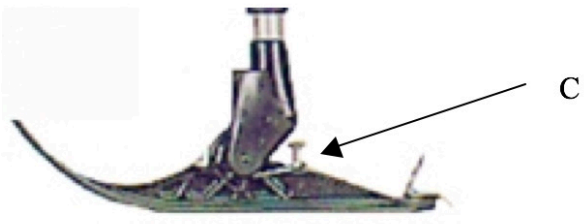
The elastic **Chest Band** gives the individual more stability, range of motion laterally, and fore and aft movements. If the individual is able to control balance using the elastic band, it is then suggested to use it.

Shoulder straps, however, are rigid and will not permit any movement as their role is to get the individual's torso as close as possible to the seat back for stability and safety. Do the balance test again and see if the individual gets better results from being strapped at the chest level.

DO NOT USE shoulder straps if not necessary, as this could impede the progress of the student.

Outrigger Set-Up for Sitskiing





Most outrigger manufacturers provide a full explanation on how to properly assemble their outrigger kit. However, three main adjustments remain essential:

Distance from handle to cuff (A);
Distance from handle to the ski (B);
Ski heel screw adjustment (C)

DISTANCE FROM HANDLE TO CUFF

In sitskiing, the A adjustment (distance from the handle to the cuff) remains the same as explained in the Outrigger adjustment section above.

DISTANCE FROM HANDLE TO SKI

For the length B, you need to make sure that the outriggers are set at a length that facilitates a centred mobile stance. To achieve this, the individual has to have an athletic upper-body position, with outriggers on the snow in the ski-setting position (slide mode), shoulder width, arms close to the torso and slightly flexed at the elbow joint. Outriggers should be placed between the thighs and feet. That way, the centre of mass (COM) is directly over the base of support (BOS).

Another way to set the length B of the outriggers is to use the outriggers in crutch position (support mode), aligned on each side of the torso at shoulder width, ready to push up. Shoulders and elbows should be horizontal; elbows must never be higher than the shoulders, but equal or lower.

HEEL SCREW ADJUSTMENT

Finally, the ski heel screw adjustment (C) would have to be screwed/unscrewed in order to increase heel pressure on the snow surface immediately when needed (i.e. if the individual pushes down using their forearm). This adjustment is to be revised, meaning that the instructor will add or decrease the adjustment as needed (depending on individual attitude, SCI and NTSCI level, proper sitski equipment used, etc.).

DOWEL TESTING

The dowel test is used to determine where the sitski base should be placed with reference to the student's center of mass (between skis and bindings). Proper placement allows the student to make full use of the sitski and be set up for optimum on-snow performance.

All adjustments for proper seating (padding, frame length, torso support and outriggers) need to be done prior to performing the dowel test. This test is done with the student sitting in the sitski, maintaining good balance and in a centred position.

A wooden rod of four centimeters (cm) in diameter or an equilateral triangle with a length of 60 cm should work well for the dowel test. Follow this six-step instruction to perform a dowel test: Determine the centre of the ski, which is the manufacturer's designated centre of the ski, from where the ski performs at its best. (Most skis have a centre mark).

The individual should be dressed in full ski clothes and helmet, then transfer to the sitski.

1. Have the individual use the outriggers for support.
2. Place the dowel under the sitski skis, perpendicular to the sitski and at the ski centre.
3. Have the student take an athletic position. Then, position the student balanced on the dowel. The student should be able to tip fore and aft with minimal movement of the head and shoulders, while maintaining a functional sitskiing position. If the student cannot balance, move the dowel slightly forward or back as necessary until the balance point is achieved.
4. The point at which the student reaches balance, directly above the dowel, is approximately the centre of the ski. Mark this point on the base frame of the sitski where it interfaces with the ski.
5. Move the ski to align the mark of the sitski base frame over the ski centre mark. This is a reasonably good place to start with a beginner student to take best advantage of the ski's technical design.
6. If not properly balanced, the sitski might skid out at the end of the turn if mounted too far forward, or the student may be unable to initiate turns if the sitski is mounted too far back.

SITSKI EQUIPMENT SAFETY CHECK

After choosing the equipment, a full check of the features must be done, including: straps, buckles, seat and ski attachment, carabineer, belts, tether, ski lift attachments (safety line, evacuation harness), and the loading and locking system. Moreover, every nut & bolt should be checked as well. Straps, elastic bands, and tethers should be free of knots, and the integrity of the straps MUST be free of tears or rips, as well as cracks in the buckles, seat and carabiner.

ANYTHING that seems damaged or missing must bring this question to the instructor's mind:
"If I use this equipment, am I jeopardizing the student's safety?"

Unless the answer is NO, do not use the equipment. Take necessary actions to get it fixed and ready, following the manufacturer's guidelines.

Sitski Equipment Safety Checklist		
DESCRIPTION	**OK**	**FIX/ REPAIR**
Rigid back straps and buckles,		
Elastic abdominal/thoracic band		
Rigid hips straps and buckles		
Rigid thigh straps and buckles		
Tether		
Rigid foot straps and buckles		
Rigid outside handle straps		
Attachment integrity between seat and frame		
Carabiner		
Lock and unlock mechanism for chairlift and pin		
Lock and unlock mechanism for slide position and pin		
Alignment integrity of the sitski: back, seat, thigh, foot and skis MUST be aligned.		
Integrity of all pivot mechanisms available on the equipment. Check if they all have their nuts, washers, and screws.		
Integrity of the binding system		
Skis are tuned		

Teaching Techniques

Students often progress more quickly when using appropriate ski techniques and a proper fitting sitski. Progression is dependent on each student's balance, mobility and strength within their own SCI level or disability.

The teaching techniques presented in this manual aim to help the instructor guide a beginner student's progress up to complete autonomy.

The following are six steps to follow as a recommended progression.

SIX STEPS FOR SITSKI

Step 1: Introduction to equipment

Goal:

- Develop familiarity with equipment
- Set up equipment for student

The first part of the introduction to the equipment will depend on the frame chosen from the AOT, and any other accessories that may be available, including outriggers.

If appropriate, introduce the student to the equipment and ensure that the student understands the basic functions. The explanation should include: straps (foot, knee, thigh, waist, chest and shoulder), the lift mechanism (if included), the evacuation harness and any tow straps that may be required.

Next, develop the plan for the transfer with the student, (based on the AOT process) from the wheelchair or mobility device to the sitski. Be sure to follow lifting procedures and use consent if you are physically assisting during the transfer.

Ensure the seat is the appropriate fit, check for any gaps and pad as necessary. Strap the student into the sitski, using the straps appropriate for the student, and perform the dowel test to find the student's balance point. Proper fit will give the student the best advantage for learning how to sitski.

If outriggers are to be used, ensure the student can easily change them from sliding to walking mode. Ensure the heel adjustment screws are at the proper height.

For biskis and quadskis, if tethers are to be used, double-check their integrity and attachments for signs of wear and damage, and ensure that the student understands the function of the tethers and tetherer (instructor). This may change as skills and comfort progress. Please refer to the "Snowboard Tethering" section above for detailed information on tethering.

The instructor may wish to perform basic mobility tactics (see below) inside before moving outside onto the snow.

Step 2: Basic Mobility (on snow)

Goals:

- Develop mobility
- Develop skills and balance
- Introduce pivoting

INSTRUCTOR

For basic mobility, it is important for the instructor to be close by to catch the student if they lose their balance. The instructor is advised to be in boots (without their snowboard), allowing them to be mobile, agile and eliminating any risk of striking the sitski with the snowboard. For all basic mobility tactics, try to promote smooth student movement. For demonstrations, the snowboard instructor might use a pair of outriggers intended for sitskiing and make their body low and small, imitating a sitting position, or use a sitski.

MOBILITY AND BALANCE
On flat terrain, have the student move their weight fore and aft and laterally to find the limits of their mobility and balance. Be either hands-on, or ready to catch the student if they are outside their stability zone. This is an experiential way to find the limits for the model of sitski chosen.

Have the student lift the outriggers one at a time and then together to find their balance with the ski flat on the snow. Then have them try lifting both outriggers and rotating the upper body to the left and right.

PIVOTING
Have the student practise pivoting the sitski with the use of outriggers in support mode (by lifting their own weight and twisting at the lowest possible body part, or by offsetting the outriggers and using the upper body strength to twist the sitski on a flat ski). You should also assess the student's mobility in the lower joints by trying to pivot the sitski in the opposite direction. Remind the student to focus on using their lowest possible body part. Take care to ensure there are no ruts or bumps that may knock the student off balance. Emphasis should be put on achieving a flat ski for the pivot, as it will be difficult if the ski is on edge.

PROPULSION
Have the student experiment with moving forwards or backwards using the outriggers in support mode. Then have the student propel themselves using the outriggers in slide mode, both forwards (outriggers behind, facing outwards) and also in reverse (outriggers in front, pointing inwards) and feel the sliding motion on a flat ski. The instructor should be behind and ready to assist with balance.

CLIMBING
If the student shows strong upper body strength, you might also demonstrate or explain how to climb up-slope or down-slope. This skill may be required to climb up to a lift. Not all students will have the ability to perform this manoeuvre. Encourage the student to experiment with using the outriggers in both slide mode (outriggers in front, pointing inwards), or in support mode.

HEELING
Have the student perform a series of forward pushes and use the claw on the rear of the outrigger's heel to control speed. This is not a method to stop a sitski on a slope, but can be useful in lift lines and around the base of the slope.The instructor might choose to skip this step if they are working with an athlete with limited or no mobility, as they are not likely to be getting around independently.

Step 3: Gliding and Stopping

Goals:

- Develop balance skills while straight running
- Ability to slow down and stop using outriggers
- Ability to control speed through use of outriggers

INSTRUCTOR
It is advisable for the instructor to remain in snowboard boots without their board on to remain agile and mobile for this step. The instructor can support the student with the use of a tether (see the "Snowboard Tethering" section above for detailed information on tethering). For demonstrations, the snowboard instructor might use a pair of outriggers intended for sitskiing and make their body low and small (imitating a sitting position) or use a sitski.

TERRAIN
Choice of terrain for the first glide would ideally be gentle and end in either a flat or reverse slope (for terrain assisted stopping). As speed and height on the slope are not the goal, the student may push themselves up the slope in reverse (if possible) to be ready to slide without pivoting, or be instructor assisted.

If the terrain is accessible with a surface lift, and appropriate terrain is available at the top, it may be beneficial to use the surface lift to avoid fatigue of both the student and instructor.

STRAIGHT RUNNING
Practise gliding on a flat ski in a relaxed and balanced position with outriggers pointed towards the direction of travel. Use the terrain to stop.

SLOWING AND STOPPING

Now have the student complete a straight run (glide), heeling the outriggers to slow down to a stop. Once the student is competent at maintaining balance while gliding, try lifting both outriggers off the snow to test their balance while moving. Finally, while in a straight run, try using the heel of the outrigger to slow the speed, but then continue moving forward.

Step 4: Individual Turns

Goals:

- Single left turn
- Single right turn
- Develop pivoting and edging skills
- Continue to develop balance skills

INSTRUCTOR

For this step, it is generally best for the instructor to remain in snowboard boots with no board on. However; when performing first turns on beginner terrain, they may have to run to keep up at some points. For demonstrations, the snowboard instructor might use a pair of outriggers intended for sitskiing and make their body low and small (imitating a sitting position) or use a sitski.

DEVELOP PIVOTING SKILLS

Referring to the pivoting action from step 2, and using similar terrain to the previous step (Gliding), start the student in the fall line and have them pivot the ski across it to a stop. Either have the student hold themselves in the fall line using their outriggers, or provide assistance by using the back strap or holding the foot plate. When the student is ready, have them start downhill and pivot the ski with the lowest joint. This will be a very shallow turn, as the goal is to feel the pivot of the flat ski. Practise on both sides.

Alternatively, you may try starting them perpendicular to the slope and have them pivot the sitski into the fall line. The instructor should be positioned to catch the foot plate and prevent acceleration down the slope. This allows the student to try the pivot with no forward speed or momentum. They should use their lowest mobile joint to initiate the pivot. Practise this on both sides.

Again, using suitably safe terrain (ideally with a terrain assisted stop, or low possibility of a runaway), try pivoting all the way through an individual turn (C shape) to a stop.

STEPS TO PERFORM A SINGLE TURN (FULL TURN)

Using beginner terrain, ideally with a flat run out, have the student perform a straight run keeping the ski(s) flat. Once balanced and with momentum, have them start to turn by pivoting the skis using steering effort of the upper body which is led from the lowest functioning body part in connection with the seat. If the student has feeling in their hips and buttocks, have them use these body parts to steer with. If the individual has a SCI then have them start to steer from the body part where their injury is located or the lowest body part where they can use their muscles.

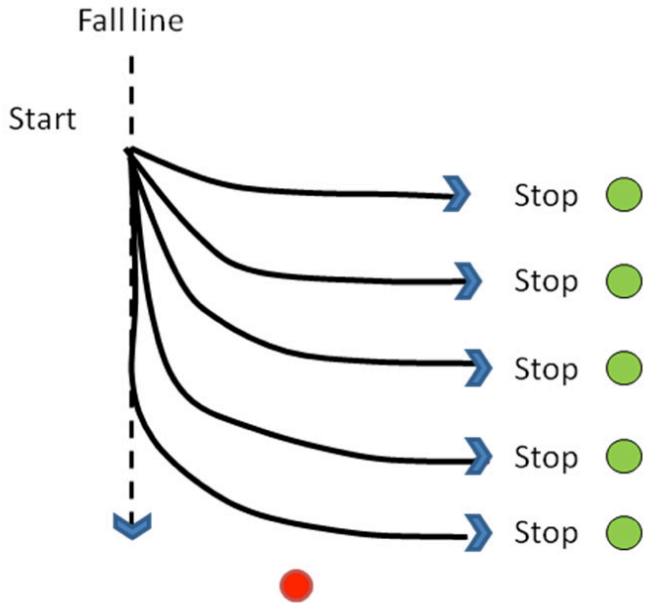
Encourage the student to keep steering the sitski across the fall line in the direction of the turn until they come to a stop. Have them repeat this action a few times until achieving success, making sure to try it on both sides-left and right.

Methodology to support success:

Have the student try to keep their head facing slightly downhill. This will support the lowest functional body part, which is performing the steering effort and creating separation relative to the student's mobility levels. It will also help maintain control over the steering of the sitski by helping to prevent them from over-rotating and finishing facing up hill. The goal for the student is to finish in a good position, ready to start their next turn.

FAN-PROGRESSION EXERCISE

If necessary, using the appropriate terrain, have the skier perform the fan-progression exercise. Repeat in both directions.



If the fan progression exercise is used and completed, have the student perform a complete turn and control speed by continuing to steer the sitski uphill. As momentum begins to decrease, have the student steer the sitski in the opposite direction, thereby linking two turns. Rhythm and confidence will increase as the student controls speed between turns.

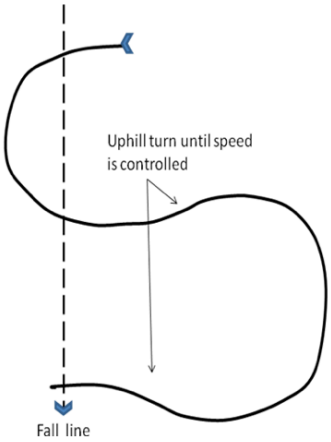
Step 5: Linking Turns

Goals:

- Introduction to linked turns
- Progress to multiple linked turns
- Control speed using turn shape

INSTRUCTOR

For this step, the snowboard instructor is advised to be wearing their snowboard at all times.



INTRODUCTION TO LINKED TURNS

Have the student perform a complete turn and control speed by continuing to steer the sitski uphill. As momentum begins to decrease, have the student turn the sitski in the opposite direction, thereby linking two turns. Rhythm and confidence will increase as the student controls speed between turns.

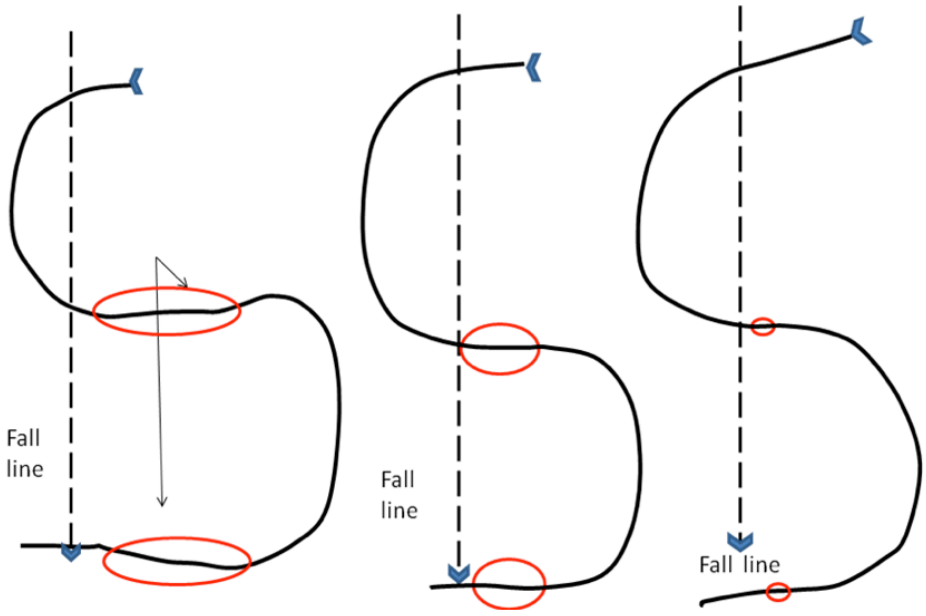
TERRAIN
The use of convex terrain may allow the sitskier to better feel the pivoting action of the ski (on the convexity) because the student will generally slow down as they near the apex of the convexity.

LINKED TURNS
Practice linking turns on a green groomed slope until the student has gained confidence in controlling speed. At this point, encourage maximum speed on a minimum slope; this will result in linking fewer turns but at increased speed and confidence.

SPEED = SLOPE, SIZE AND SHAPE
As confidence increases, move to blue groomed terrain to link turns. Use of a single turn may again be required to develop confidence, progressing to a Garland exercise. Continue with turn linking, turn shape and speed control. Use guided mileage for further improvement.

Eventually move to more challenging terrain. As with all terrain progressions, make sure the next challenge or terrain choice is safely achievable.

HOCKEY STOP
Introduce the Hockey stop: a way to quickly come to a stop in the case of emergency or obstacle in the path of travel. To perform a hockey stop, the sitskier must pivot the sitski 90 degrees and engage the uphill edge while maintaining balance. First, they need to pivot the ski so that it is across the fall line (or direction of travel if in a traverse). Then they use the lowest functional joint to angulate over the uphill edge, using grip and edge angle to slow to a stop. Once the momentum is gone, they must return to an upright balanced position to avoid falling uphill.



Diag. 1 Diag. 2 Diag. 3

The goal is to link turns and eliminate the traverse (Diag. 1) between turns (Diag. 2 & 3)

The transition between turns will decrease so that the sequence becomes turn-to-turn without any traverse. Speed will increase but be controlled by the turn shape and size relative to the slope.

Step 6: Turn Progression and Beyond

Goals:

- Continue to develop the CSIA technical reference
- Experiment with changing the turn radius and speed (short and long turns)
- Experiment and build confidence with different speeds, terrain and snow conditions

INSTRUCTOR

For this step, the snowboard instructor is advised to be wearing their snowboard at all times.

As the student becomes more confident with linking turns and speed is increased but controlled, the objective is to improve and refine skills. Choose tactics to enhance the technical reference and continue to experiment with turn shape and speed for improvement through guided mileage.

This list of tactics can be used to improve the student's skills and competencies. Explanations of the tactics are below the table.

INTERMEDIATE SITSKIER	STANCE & BALANCE	PIVOTING	EDGING	PRESSURE CONTROL	TIMING & COORDINATION
Lifting outriggers at the beginning of every turn.	X				
Sideslipping on both sides.	X		X	X	
Hockey stops	X	X	X	X	X
Full turns	X	X	X	X	X
Short radius turns (1 cat-track wide)	X	X	X	X	X
Long radius turns (2 cat-tracks wide)	X	X	X	X	X
Counting through turns (1,2,3) 1 = the start of their turn 2 = the fall line 3 = completion					X
Skiing faster on green runs (minimum slope/maximum speed)	X	X	X	X	X
Glade skiing	X	X	X	X	X
Skiing variable terrain (powder, moguls, etc.)	X	X	X	X	X

LIFTING OUTRIGGERS
This tactic is to encourage the use of the student's balance and proper position. At the beginning of each turn have the student lift the outriggers off the snow, relying on their position for balance rather than the outriggers.

SIDESLIPPING
Sideslipping in a sitski can be challenging when the smaller joints (knees, ankles and toes) usually used to complete the manoeuvre are impaired. Have the student start perpendicular to the fall line. With their chest facing downhill and the downhill outrigger pointing down the fall line, slowly release the edge so that they travel down the fall line. The ski should not pivot. Practise on both sides.

FULL TURNS
When moving to new terrain or to a steeper slope, it may be beneficial for the student to practise single full turns. This allows familiarisation with conditions and potentially more speed. Begin the tactic on edge and have the student pivot through the arc, achieving a flat ski along the fall line for the edge transition.Repeat as required. The goal is to achieve smooth transitions on the new terrain.

LONG- AND SHORT-RADIUS TURNS
This tactic will illustrate how the size and shape of a turn can help control speed. Set a corridor, or use defined boundaries, such as a few ski lengths. Have the sitskier complete a series of short-radius turns and another series of long-radius turns. Discuss what is different between them (use of pivot versus sidecut, pressure control, timing, etc…)

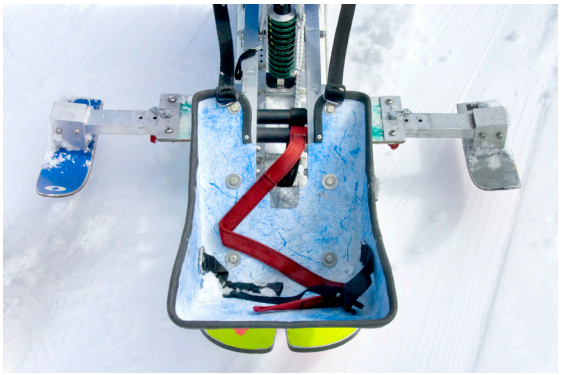
COUNTING THROUGH THE TURNS
To improve timing, challenge the student to count out a sequence of turns. Vary the timing allowed (count 1, 2, 3, 4 versus 1, 2) to achieve symmetrical turn shapes to the right and left.

VARIED TERRAIN
The use of varied terrain (bumps, rolls, chutes, glades) and snow conditions (groomed, powder, ungroomed, ice, slush) will improve the student's confidence and skills and allow them to progress towards independence. The use of varied terrain will be impacted by weather and location. Always scout out terrain in advance, and be ready to assist the student safely if required. If planning on using gladed terrain, ensure that it is safe to do so (student can turn quickly and with intent) or practise using racing gates (in place of trees) to prepare them for the challenge of obstacles.

OTHER ADAPTIVE SITSKI EQUIPMENT THAT MAY BE USED-QUADSKI

The quadski is a biski with fixed outriggers. It may also have a hand rest for the student to hold onto (sometimes referred to as a 'chicken bar'), and a back bar allowing the instructor to drive the quadski from the back (using the 'end around' technique for bucketing or thumbing). Generally, fixed outriggers will be used when the student does not have the strength or muscle coordination to hold the outriggers, for stability and control, or when they lack the cognitive ability to understand how to competently and safely use hand-held outriggers

The student will always be tethered or driven from the back of the seat using the back bar. It is not recommended to use regular outriggers and fixed outriggers at the same time.



Using a quadski will require the use of a thoracic band and shoulder straps. More foam might also be necessary on each side to fill any space between the student and the seat bucket.

Finally, because the amount of work done by the student is limited, the individual might get cold faster. Therefore, you should be aware of the signs of hypothermia. You should check for these signs frequently throughout the lesson, at the top of lifts and bottom of runs.

NOTE: If the end around technique (see below) for bucketing or thumbing is to be used, then the fixed outriggers should be removed from the sitski for safety and ease of movement and control. The person driving the sitski from the back MUST be tethered at least by the non-dominant wrist when performing this technique.

QUADSKI TEACHING TECHNIQUES

Quadski teaching requires the instructor to do most of the work. The “skills of tethering” must be mastered before tethering an individual in a quadski. Refer to the “Snowboard tethering” section of the CADS Snowboard manual. Once the tethering skills have been acquired, here are suggested steps that you can follow for teaching:

After fitting the individual properly into the seat, strap the belts tightly. Use as many straps and belts as necessary for body control, balance and safety.

Step 1:Turning on Flat Terrain Or a Beginner Hill

Get the fixed outriggers set as large as necessary to secure balance. This will increase the stability of the quad skier and reduce the chances of tipping over.

As in the picture, the quad skier who has control of the head position is using that ability to incline the sitski equipment inside the turn, thus edging and pivoting using the shape of skis. The instructor tells the quad skier when to use that ability using a countdown (e.g. 3, 2, 1 right turn), thus helping them to get ready at the right time for the action. While guiding the quad skier to do some of the work, the instructor also makes sure that the quadski is stable by pulling the equipment inside the turn, until the uphill fixed outrigger is on the snow. Moreover, this position also promotes turn shape--but, because of the fixed outrigger, the radius of the turn is likely to be a lot bigger.

Step 2: Building Turn Rhythm

Practice verbal commands utilizing the student's abilities. The instructor gives the command word for turning in the desired direction, and the quad skier helps incline or steer in the same direction, using whatever muscle group they can control. Practice both sides and also give a command for a neutral body position. Depending on the ability of the student, the instructor could also use a 3, 2, 1 countdown for each turn.

Step 3: Increasing Independence in Turns

Challenge the rhythm by modifying the turn radius. The instructor is still required to pull the seat inside the turn, but ask the student to do more of the edging movement. The instructor gives the command word for turning in the desired direction and the quad skier helps incline or steer in the same direction using whatever muscle group they can control.

Step 4: Increasing Difficulty In the Turn

When the individual has mastered the required coordination and rhythm for each turn, you may challenge their balance by slightly reducing the width of the fixed outriggers and increasing the speed, or progress onto steeper terrain.

NOTE: The fixed outrigger set-up can be changed to facilitate turn shape and accommodate various terrain. For example, the out-front-and-wide setting works for gentle terrain and a setting which is further back and in works for steeper terrain.

SEAT ASSIST: SITSKI HANDLING

Flats Management

Much like a snowboarder, when a sitskier hits flat terrain, it may bring them to a stop and be difficult for them to easily regain forward momentum. It can be helpful for an instructor to provide assistance in order to prevent the fatigue which can occur from pushing long distances with outriggers over flats. It is ideal for the snowboard instructor to anticipate how to manage flats before the student comes to a stop or becomes fatigued. To help the student maintain their speed over the flats the instructor will hold onto the back bar, seat, or strap of the sitski, and may use a variety of techniques. These include 'scooching' (using fore/aft movements to push your snowboard forward), pumping (vertical pressure), hops, or taking out a back foot and skating. Ensure the student's comfort when choosing your technique.

An instructor may also be pushing a sitski on flat terrain when exiting or entering a lift, and skating and straight running (one-footed) while holding the back bar is the best method to do this.

End Around Technique

The End Around Technique is the technique used to 'bucket' or 'thumb' a sitski from a snowboard. This series of end around manoeuvres allows the snowboard instructor to assist the sitskier to turn. Using fixed outriggers may reduce the ability of the instructor to safely perform this technique, therefore they should be removed. The instructor should always have a safety tether attaching themselves to the sitski to prevent a runaway.

To perform an End Around manoeuvre, a snowboard instructor will begin on one side of the sitski while it is traversing across the hill, facing the sitski (the instructor is on their toe edge) and with the lead hand holding either the seat or the side strap and the rear hand holding the back bar. While maintaining a hold on the back bar with the trailing hand, the instructor walks the lead hand towards the back of the sitski to the back bar, then moves the trailing hand over, allowing them to slide in behind the sitski on their heel edge. The sitski will be pointed down the fall line, accelerating. The instructor will be countering that force by braking on their heel edge, with their snowboard perpendicular to the direction of travel. Now the instructor will need to prepare to move to the opposite side of the sitski, (the opposite foot will lead). They will walk the 'new' lead hand towards the side handle or seat and line up the snowboard again, parallel to the sitski (toe edge). This will require a quick pivot onto the new edge.

This manoeuvre can be repeated and used to lead the sitski down a section of slope. Care should be taken to keep speeds to a safe level at all times.

An End Around is generally performed with the snowboard instructor remaining downhill of the sitski, though it is possible to perform an End Around remaining uphill of the sitski. The downhill position helps the instructor stay in a position which is closer to the neutral body position and is a little less vulnerable.

An End Around is most easily performed with a sitski that has a back bar, though it may be performed by holding the back of the seat or the back strap. Sitskis that have skis which stick out a long way behind them are difficult for snowboarders to handle, and if a student is using this type of sitski, it may not be safe or appropriate for a snowboarding instructor to be handling it.

NOTE: This tactic requires significant comfort riding switch.

Practice is required, as with all disciplines, to become proficient at the manoeuvres. Practise with an unpiloted sitski and proceed once comfortable with the manoeuvre around the tail of the ski to a loaded sitski.

Tethering

Please see the "Snowboard Tethering" section of the CADS Snowboard manual (above) for detailed information about tethering.

TROUBLE-SHOOTING FOR SITSKI

Equipment		
ASSESSMENT/OBSERVATION	**POSSIBLE ORIGIN/REASON**	**DEVELOPMENT/SOLUTIONS**
Knees are not level	One leg is longer Buttocks are twisted in the seat	Adjust foot plate for the longest leg and add foam under the shorter foot. Re-assess seat fitting and positioning
Twisted in the seat	Scoliosis, buttocks twisted in the seat, buttock muscles are bigger on one side, wallet in rear pocket	Re-assess seat fitting and positioning
Shoulder and upper body leaning on one side	Scoliosis	Redo the positioning, respecting body alignment
Arm flexions are not the same while outriggers are on the snow	Outriggers aren't the same length	Re-assess and adjust outriggers
Unable to maintain balance	Lack of stability in the core and torso, equipment alignment is compromised	Re-assess AOT and the choice of equipment, seat fitting and positioning.

Basic Mobility		
ASSESSMENT/OBSERVATION	**POSSIBLE ORIGIN/REASON**	**DEVELOPMENT/SOLUTIONS**
While the student performs the basic mobility exercises, you observe: Core instability Lack of balance Lack of mobility Lack of strength. Knees are not level	Not seated correctly Strength differs between left and right sides Individual is not strapped in properly	Reposition the body in the seat Fasten the strap a bit more firmly Re-assess AOT for balance and strength
	There might be space between the student's body and the seat	Reposition the student in the seat, re-check the fitting, add foam as required, change seat size if equipment permits.
	Student is unbalanced in their seat Scoliosis	Being balanced does not mean that the person has to be sitting straight up, because it might not be their usual body position and therefore the person may be forced to compensate. This may result in a decrease of balance. Position the individual with respect to the natural body alignment. Re-check strapping requirements to add support.
	One leg is longer Twisted in the seat	Adjust foot support to the longest leg and add padding under the shortest one. Reposition the student in the seat.
	You do not see anything wrong.	Check that the strapping is appropriate for the student. Check if the sitski choice corresponds to the student's ability. You may have to consider re-doing your balance, mobility and strength scoring tests.

Gliding and Stopping

ASSESSMENT/OBSERVATION	POSSIBLE ORIGIN/REASON	DEVELOPMENT/SOLUTIONS
Quickly off-balance or always turning on the same side	The student pushes equally on the outriggers but the setting of C (screw adjustment) is not the same on each side. Therefore, the braking is unequal.	Reset the screw adjustment as well as the outriggers length (B) equally on each side.
	The student has a dominant/ stronger side which they prefer to lean towards.	Have the student trust in their weaker side to remain centred over the ski.
Shoulders are being pushed back, arms are shaking or unstable.	The screw on the outriggers is too long, causing too much resistance between the outriggers and the snow.	Shorten the screws.
Cannot maintain balance. Exhibits difficulty when lifting one outrigger or both.	The student's chest and torso are unable to handle the lifting, thus making the seat and the sitski lean to that side.	You may have overestimated the student's core/torso strength. The use of a thoracic band may help.

Individual Turns

ASSESSMENT/OBSERVATION	POSSIBLE ORIGIN/REASON	DEVELOPMENT/SOLUTIONS
Balance over the edge is difficult to maintain.	Instability--the student often falls on the uphill side. The student is leaning uphill. The student may be placing the uphill outriggers too far away from the sitski.	Check all straps, body position, and re-check balance ability on the flat. May have to tighten or loosen the thoracic belt. Practise maintaining a centred, balanced position and be sure both outriggers stay on the snow at all times. Keep outriggers close to the body, elbows tucked in to support the chest, and keep the individual more centred.
Ability to perform sideslipping on one side, but having difficulty on the other side. The student falls on the uphill or downhill side.	Sitski frame is twisted. Knees are not level. Student is stronger on one side of their body and favours this side. Scoliosis Undetected/hidden back problems and back pain.	Check the sitski alignment: student's shoulders, seat, knees, and skis. Reposition the student to ensure they are straight in the seat. Have the student trust the weaker side and try to maintain a more centred position. Try more pressure on the outrigger on the weaker side. The student may have scoliosis; adjust the seating. Lift or lower the buttocks on one side, and do the opposite on the other side. Re-asses the AOT.

LIFT PROCEDURES

Magic Carpets

Magic carpets may be the student's first introduction to a lift mechanism. The nature of surface lifts allows for easy loading and unloading, though there are special considerations when using a sitski on a surface lift. Generally, using a magic carpet does not require the removal of the loading pin, but you may want to incorporate this now into the loading routine.

Always explain the loading procedures and, if possible, watch other hill users load the carpet and explain each step.

PREPARING TO LOAD

Using the outriggers in support mode, the sitskier will queue up on the flats. Approaching the loading gate may be difficult depending on its width.

LOADING

Once the rider ahead is past the mark for spacing on the carpet, have the sitskier push gently, with the outriggers in the support position, until the front of the ski is gripped by the carpet. As the carpet engages, this may cause instability for the sitskier.

RIDING THE LIFT

Once the sitski is on the carpet, the sitskier should maintain balance and put the outriggers in the slide mode in preparation for un-loading.

UNLOADING

To unload, the sitskier only needs to allow the carpet to push them off into the unloading zone. Then the sitskier shou ld return the outriggers to the support mode to push out of the unloading zone.

CARPET SAFETY

Until the sitskier has practice in maintaining balance on a moving surface, the instructor should support them, either by standing directly behind ready to assist, or by walking beside (if the carpet has weight restrictions). Depending on the width of the carpet, the student may not have adequate space to self-support with their outriggers.

T-Bars, J-Bars and Poma (platter) lifts

T-bars and the related tow lifts should be used only with approved quick-release safety devices. These safety devices enable the sitskier to release the bar lift at the top of the lift, in the case of a fall or to avoid a fallen rider ahead of them.

The ski lift operator may need instruction in the use of a quick-release safety device. Skipping a bar may be a good practice to allow sufficient time for the student to prepare for the tow. The instructor may need to perform some testing prior to using the lift with a student to determine possible adaptations to loading procedures, always ensuring safety for the student.

PREPARING TO LOAD

Ensure the quick-release device is set up to load and is safely attached to the sitski frame or mounting points.

Have the sitskier queue up and, once the rider ahead has cleared the take-off area, move up to the load line. Either the instructor or the lift attendant will attach the lift device to the bar. Depending on the lift, the attendant or a second instructor may need to 'push start' the sitski to avoid the sudden jerk when the bar engages the weight of the sitski.

RIDING THE LIFT
Have the sitskier maintain a centred, balanced position, with the outriggers in the sliding position on either side of the sitski. The sitskier should not try to manoeuvre or steer while being towed.

UNLOADING
When on the flats at the top of the lift, release the bar with the quick-release mechanism and clear the offload area. Stow the quick-release mechanism in preparation for the run.

Chairlift
These are general instructions for the loading and unloading sitskis on chair lifts. Local regulations may dictate slightly different procedures due to chair or loading area configurations. Check with the Program Coordinator and the Hill Operations Manager for any variance from these instructions. Keep in mind these are general guidelines for lift-loading assistance.

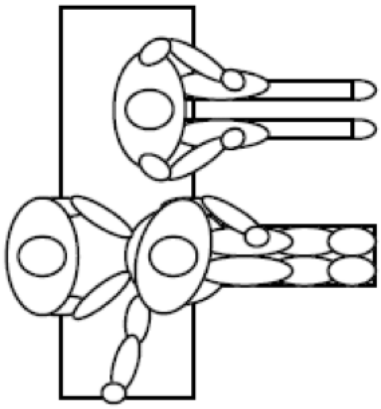
WHEN LOADING AND UNLOADING A CHAIR LIFT, YOU MUST
1. Always practice the lift loading procedure prior to getting in the lift line.
2. Remove the lifting mechanism pin or locking device on the sitski prior to loading sitski (usually in the lift line up)
3. Ask to slow or stop the ski lift for a first-time use.
4. Make sure that the uphill lift operator is aware that you are coming and that there is a slow or stop device on the ski lift.
5. Should you use a snowboarder as lift assistant, position the board on his toe-side facing the sitski, so they are facing the individual sitting in the sitski and adopting a natural position to assist with loading.
6. Attach the safety strap to the back of the chair lift with a non-locking carabiner or hold the back of the sitski once on the chair
7. Always bring the safety bar down once loaded and avoid using the chair foot rest. When the safety bar is in the down position use care as to how much pressure is being applied to the student‘s legs.

LOADING
Depending on the size of both the instructor and the skier, as well as on the skier ability level and the instructor’s experience, a 2:1 ratio should be required. The instructor always lifts with a straight back, in a wide stance and using both legs and arms.

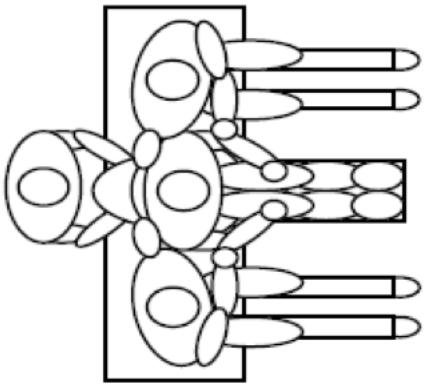
- Ensure proper communication between the skier, the lead instructor, the assistant instructor and ski lift operator.
- There are four different methods that may be use with sitskis: 1) Pull-back, 2) Lift and Pull-back, 3) Lift with a Front Push-back and 4) Lift with a Side Push-back. **Remember that one lift operator should always attend the stop button in case of a problem or a fall when loading!** If a second lift operator is available, that person may assist with the lift loading.

Don’t forget to take out (pin) or unlock any sitski system or device prior to loading.

PLEASE NOTE: These diagrams show a variety of loading positions, using skiers as examples. Snowboarders would stand in the same locations but facing the student, and with snowboards on their feet.

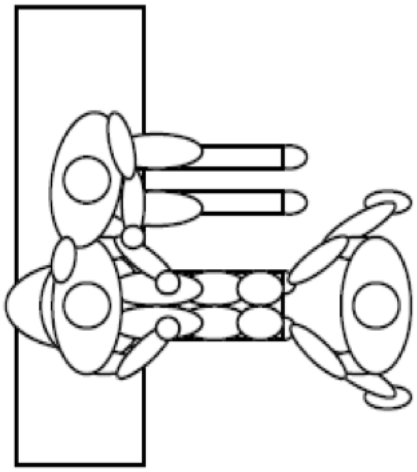


1. PULL-BACK
The lift operator reaches over the chair, grasps the back of the sitski and pulls it back onto the chair. This is usually used for fairly independent skiers or in the learning process of loading.



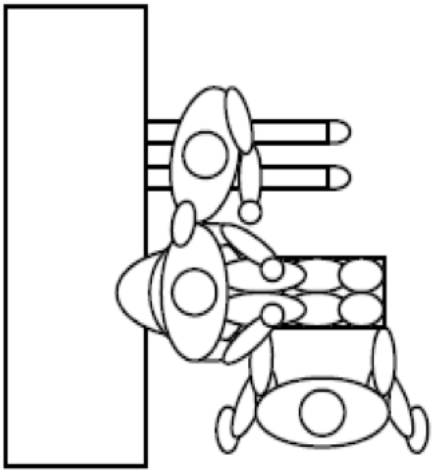
2. LIFT AND PULL-BACK

The lead instructor and assistant instructor stand on either side of the sitski, with skis pointed in the ski lift direction, hips and shoulders turned slightly toward the sitski and chair. They grab the side seat's handles. While they are lifting up and back from the sides, the lift operator reaches over the chair, grasps the back of the sitski and pulls it back onto the chair. If a lift operator is not available for lift-loading assistance, the lead instructor and assistant instructor may perform a lift up and pull-back on their own. Always use proper lifting techniques.



3. LIFT WITH A FRONT PUSH-BACK

The instructor stands at the side of the sitski, with skis pointed in the ski lift direction, hips and shoulders turned slightly toward the sitski and chair. The lift operator stands in front of the student, looking directly at the student and the on-coming chair, grasping the sitski footrest with both hands. While the instructor lifts up and pulls back from the side, the lift operator lifts from the front and pushes the seat up and back onto the chair. This method is used for a person in a monoski or advanced bi-ski who has one or two people assisting with the loading on to the chair. It can also be used for a fairly independent skier.



4. LIFT WITH A SIDE PUSH-BACK

The instructor stands at the side of the sitski, with skis pointed in the ski lift direction, hips and shoulders turned slightly toward the sitski and chair. The lift operator stands on the other side and at 90 degrees to the ski lift direction. The instructor and the lift operator grasp the side handles and lift up. The instructor pulls back while the lift operator pushes back.

ASSISTANCE IN SELF-LOADING

The instructor stands at the side of the sitski, with skis pointed in the lift direction, hips and shoulders turned slightly toward the sitski and chair. The skier self-balances, flips-up outriggers, and gets ready to push up and back onto the chair. The instructor could do a countdown as the chair lift approaches.

The instructor still stands on the side and gets ready to physically assist the skier. As the chair lift approaches, the skier pushes up and back onto the chair lift. The instructor could grasp the back handle to assist the loading and loading direction.

As soon as the sitting position in the chairlift seat is attained (as far back as possible), the skier reaches up and pulls down the safety bar. The instructor still assists the skier by slightly holding the back of the seat. In some occasions, side handles can be used but if used to pull hard, it will make the sitski pivot the seat.

UNLOADING

Unloading a sitski from a chair lift requires the instructor to refer to the following checklist:

- Have the skier place the outriggers in a ski position held forward on each side of sitski.
- Unclip the safety carabiner from the back of the chairlift.
- Raise safety bar.
- Instructor should always have a firm grip on the side seat and back seat handles to prevent premature unloading.
- Make sure the sitski points straight towards the unloading ramp.
- Once at the unloading ramp, a small push from the instructor may be needed to move the sitski.
- The first two or three times the skier uses the ski lift, you can ask the lift operator to slow down or stop the chair lift as needed so the skier can unload safely.
- Just as the skis are at the unload area, have the skier (where possible) try to shift weight forward to help the sitski slide off the chair lift. This will enable the skier to play an active role in the unloading process.
- Make sure that you replace the lifting mechanism pin or locking device on the sitski system prior to skiing away.

CHAIR LIFT EVACUATION:

Ski lift Evacuation Plan: There will be a policy and procedure in place at each hill/resort, therefore the adaptive ski instructor should be aware of the procedure before using any ski lift. Each sitski is required to have an evacuation strap system with locking carabineer as part of the sitski equipment. Most sitski manufacturers do offer the evacuation strap system as regular equipment; however, second-hand sitskis may not have it. It is the skier and each CADS program's responsibility to have it installed properly.

FALLING/GETTING UP WITH ASSISTANCE

Take advantage of a fall to demonstrate getting up with assistance:

- Make the necessary rotation until the skiers skis are downhill and perpendicular to the fall line. It is recommended to do this rotation of the sitski in a backward direction so as not to gather snow in the seat of the sitski, as this can cause the skier to get cold and also to not be off balance in the sitski.
- Place downhill outrigger across skiers' chest and uphill. Place uphill hand on the snow, combine push with outrigger and hand until upright;
- The assistant placed sideways to the sitski and exerts pressure with one of his skis on the downhill ski of the sitski while pulling the sitski; you may want to remove your skis and use your ski boot to put the pressure on the sitski to avoid damaging the base/edges of your skis.
- The skier assists by pushing up with the outriggers until attaining an upright position;

SAFETY

MEDICAL CONCERNS

Some medical concerns associated with sitski students include bladder management devices (e.g. leg bag, catheter, etc.), pressure sores, spinal fusion, sensitivity to heat or cold and poor circulation.

AUTONOMIC DYSREFLEXIA

Another critical point of concern is autonomic dysreflexia. This is a potentially life-threatening, hypertensive occurrence produced by the body's inability to sense and react to specific stimuli. Possible symptoms include a feeling of impending doom, flushing of the skin, sweating, blurred vision and a sudden change in the ability to comprehend or communicate. Common causes include bladder or bowel distension, pressure sores, chills, and heat stroke, or severe blows to the body or head.

If an instructor suspects autonomic dysreflexia, immediate action should be taken to eliminate the cause. The student is kept upright, straps are loosened and the individual is taken to a warm place. Ski Patrol should be called immediately—this is a medical emergency. Medications taken by the student can also be a source of concern.

SAFETY RECOMMENDATIONS:

- **Helmet:** It is mandatory for all students using a sitski to wear a helmet to promote safety in the event of a fall or collision (including being struck by the public).
- **Goggles:** It is strongly recommended that students using a sitski should wear eye protection.
- **Sitski Equipment:** Complete a thorough sitski equipment safety check as per the "Sitski Equipment Safety Checklist" to ensure the equipment is in good working order.

TEACHING SITSKIING FROM A SNOWBOARD: SUMMARY

STUDENT PROFILE

Students that may use a sitski include but are not limited to people with spinal cord injuries, paralysis and paresis, amputations, traumatic brain injuries, spina bifida, muscular dystrophy, multiple scelrosis, cerebral palsy etc. If the student has a spinal cord injury, information about the level of injury and whether it is complete or incomplete is important.

During the AOT, it is important to assess the balance, mobility and strength of the student. This will assist with appropriate selection of equipment and teaching techniques. A scoring system test is provided to make this simpler.

EQUIPMENT

After equipment selection has been made, do an equipment safety check, then fit the student to the sitski. Ensure the seat fits snugly, like a ski boot should on a foot. Tighten the waist/hip strap, thigh strap, foot strap and chest band/ shoulder straps. Select appropriately sized outriggers and teach their function. Complete a dowel test to ensure the sitski is centred for the student.

SIX STEPS

In the early stages of the six-step teaching progression, a snowboard instructor will be in their snowboard boots, with their board off. The role of the instructor is to explain and demonstrate to the student and to be prepared to mitigate potential falls. As the student becomes more mobile and starts to link turns, the instructor might put their board on.

LIFT PROCEDURES

Make a plan for loading and practise the plan on the snow, before it's time to ride the lift. Use clear communication with loading partners, the student, and lift attendants, so that everyone is working together co-operatively. Always ensure you remove the pin before loading, and replace it after unloading. When loading with two snowboard instructors, it is imperative for them to face the sitski (and each other). They may need to adjust which foot is leading on the board.

SEAT ASSIST--SITSKI HANDLING

A snowboard instructor may be required to help a sitskier to navigate flat terrain on a run, or when getting on or off a lift. This involves holding the back of the sitski and manouvering forward, using one of a variety of techniques.

A snowboard instructor might also be required to assist a sitskier while they are turning. This manoeuvre is known as an End Around. It involves a three-point turn from one toe edge beside the sitski, onto a heelside sideslip (braking position) behind the sitski, then onto the new toe-edge (with the opposite foot forward) on the opposite side of the sitski. It requires significant comfort while riding switch.

SAFETY

There are important medical concerns associated with sitski students to be aware of including autonomic dysreflexia. This is a potentially life-threatening condition which the instructor needs to be educated about in order to avoid it, or to know how to identify it and respond immediately. Ensure the sitski equipment is in good working order by completing the "Sitski Equipment Safety Checklist". Strongly encourage the student to wear goggles and ensure they are wearing a helmet.

APPENDIX 1

CADS Student Information and Medical Form

Confidential

Date: _____

NEW Student _____ RETURNING Student _____

Section 1- PERSONAL INFORMATION

Last Name: _____ First Name: _____ Age: _____
Date of Birth: _____ (yy/mo/day) Provincial Health Card Number: _____
Gender: Male _____ Female _____ Other Gender Identity:_____
Height: _____ Weight: _____

Section 2- EMERGENCY CONTACT INFORMATION

Primary Address:_____
City: _____ Postal Code: _____
Home Phone: _____
Cell Phone: _____
E-mail Address: _____
Parent/Guardian Names (if applicable): _____
Parental consent (if child) for retrieving from Resort if not Parent or Guardian _____
Name of Emergency Contact: _____
Relationship to Student: _____ Phone Number: _____

Section 3- SKI/ SNOWBOARD EXPERIENCE

Skied or Snowboarded before?_____(Y/N). If Yes, complete Section 3, if No, go the section 4.

Level of skiing/boarding ability:
Ski: Never skied ____ Beginner____ Intermediate____ Advanced____
Snowboard: Never boarded ____ Beginner____ Intermediate____ Advanced____
Number of days ____ or seasons ____ of snow sport activity. Ski____ SB_____
Tethered___ Single outrigger___ Double outrigger ___Fixed outrigger___
3-track___ 4-track___
Sitski : (Quadski:____ Biski:____ Monoski:____ other sitski equipment: _____)
Tandem:_____

Other adaptive snow sports equipment: _____
_____

Details of your experience: _____
_____

APPENDIX 1

CADS Student Information and Medical Form

Confidential

Section 4- GENERAL INFORMATION:

PHYSICAL information:

_____ Allergies (specify applicable environmental/food/medical)_____
_____ Uses an Epi-pen _____ Carries an Epi-pen
_____ Amputee - Specify type _____ location _____
_____ Arthritis
_____ Arthrogryposis
_____ Asthma
_____ Atlanto-axial dislocation (please list last X-ray date) _____
_____ Bladder/Bowel issues or adaptations
_____ Brain Injury (please specify) _____
_____ Cerebral Palsy
_____ Congenital Heart Disease
_____ Cystic Fibrosis
_____ Diabetes
_____ Epilepsy
_____ Feeding Tube
_____ Hearing Impairment (specify degree)_____
_____ Heart Problems
_____ Multiple Sclerosis
_____ Muscular Dystrophy
_____ Parkinson's disease
_____ Post-Polio
_____ Respiratory Disease
_____ Scoliosis
_____ Seizure disorder :
If Yes: Frequency_____ Duration_____ Typical time of day_____
Type_____ Date of last seizure _____
_____ Shunt
_____ Spina Bifida
_____ Spinal Cord Injury
If yes: level _____paraplegic_____ quadriplegic _____ Complete_____
Incomplete_____
_____ Stroke
If Yes : degree _____ side affected _____
_____ Visual Impairment
If Yes: degree_____ glasses_____ contacts _____
_____ Other (specify) _____

APPENDIX 1

CADS Student Information and Medical Form

Confidential

MOBILITY information:

_____ Independent
_____ Person-Assisted (specify) _____
_____ Braces
_____ Canes/Crutches
_____ Manual Wheelchair
_____ Electric Wheelchair
_____ Is transfer assistance required?
Describe any challenges with mobility and/or gait that may affect participation in snow sports: _____

Person living with Visual Impairment:
Describe impairment: _____
Degree of vision in: Left eye _____ Right eye _____
Mobility requires use of: Cane _____ Guide dog _____
Secondary hearing loss challenges: Left_____ Right_____
Corrective measures required:
louder guide voice _____ helmet radios _____ ski/walk closer to guide _____
Muscle tone: hypertonicity_____ hypotonicity_____

DEVELOPMENTAL information:

_____ Autism - Level 1_____ Level 2_____ Level 3 _____
_____ Down syndrome - Severity code (Mild __ Moderate __ Severe __ Profound __)
_____ Fragile X
_____ Other (specify):_____

LEARNING DISABILITY information:

_____ Perceptual difficulty
_____ Distractibility
_____ Hyperactivity
_____ Dyslexia
_____ Attention Deficit Disorder
_____ Other (specify) _____

APPENDIX 1

CADS Student Information and Medical Form

Confidential

BEHAVIOUR information:

Ability to tolerate frustration: _____
Social Skills: _____
Aggressive behaviours: _____
Self-injurious behaviours: _____
Impulsive behaviours: _____
Describe self-esteem: _____
Other (specify): _____

PSYCHOLOGICAL/EMOTIONAL information:

_____ Anti-Social
_____ Anxiety
_____ Depression
_____ Disorientation
_____ Eating Disorder
_____ Neurosis
_____ Psychosis
_____ Schizophrenia
_____ Substance abuse
_____ Other (specify)

COMMUNICATION information:

_____ Verbal

_____ Non-Verbal

_____ Signs

_____ Other

Section 5- ADDITIONAL INFORMATION

Current medications? Please list type and reason:

_____

Recent injuries, illnesses, surgeries or hospitalizations we should be aware of (describe):

_____

_____

APPENDIX 1

CADS Student Information and Medical Form

Confidential

Section 6- LEARNING ENVIRONMENT

What are the student's interests/motivations? _____

_____

_____

What are the best support strategies to use with the student? _____

_____

_____

Is there anything to be avoided? _____

_____

_____

How does the participant behave when elevated, upset or frustrated? _____

_____

_____

What are methods to make learning more successful (e.g. visual, tactile, verbal, etc.)?

_____

_____

Is the participant able to follow verbal directions? _____ To problem solve? _____

_____

For a student with a visual impairment, do they see better at night or during the day?

_____

For a student with a visual impairment, do you have any strategies for low light conditions?

_____

What is the most appropriate bib colour? _____

Any additional information that would be helpful for the instructor: _____

_____

_____

_____

APPENDIX 1

CADS Student Information and Medical Form

Confidential

Section 7- PARTICIPANT RECREATION AND LEISURE INFORMATION

List other sports/activities participated in: _____

_____

_____

Which of the following barriers restrict physical activity? Indicate all that apply.

Lack of endurance: ___ Lack of coordination: ___ Lack of mobility: ___ Lack of flexibility: ___

Spasticity: ___ Paralysis: ___ Lack of strength: ___ Muscle tone: ____ Susceptible to cold: ___

Susceptible to over-heating: ___ Susceptible to impact: _____

Other (specify): _____

Hyperactive and/or Hypoactive: _____

Section 8- OTHER

What expectations do you have of your CADS experience? _____

_____

_____

Please write a personal goal that the student will work towards through participation with CADS:

_____

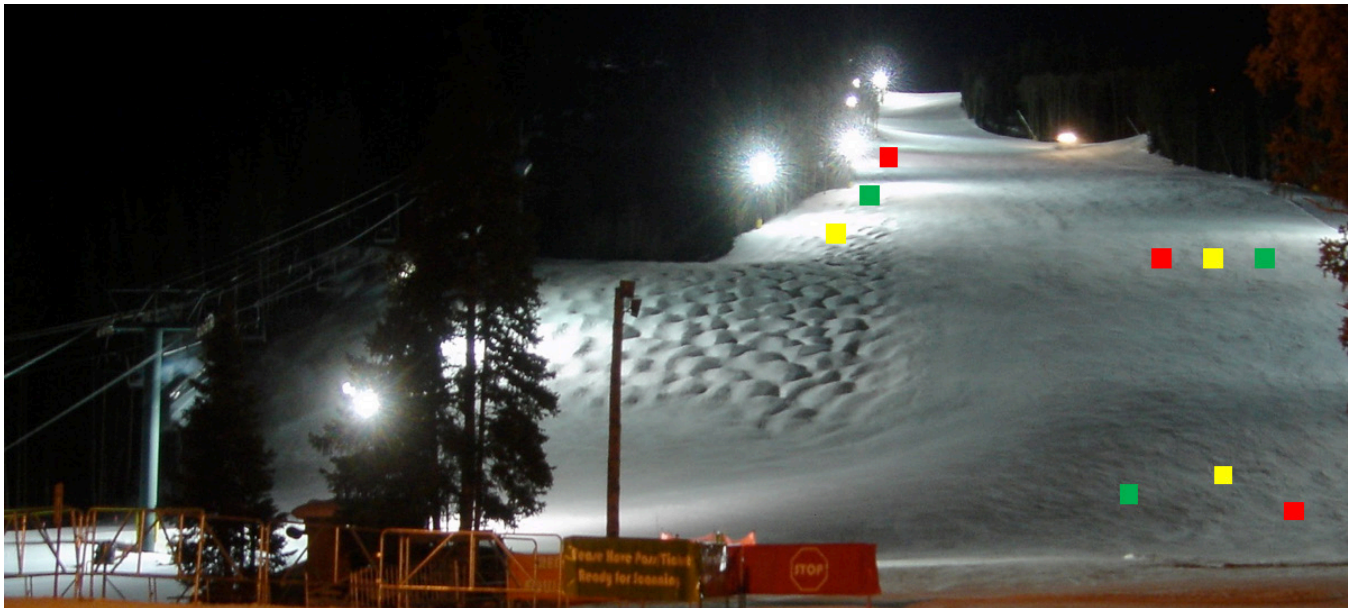
_____

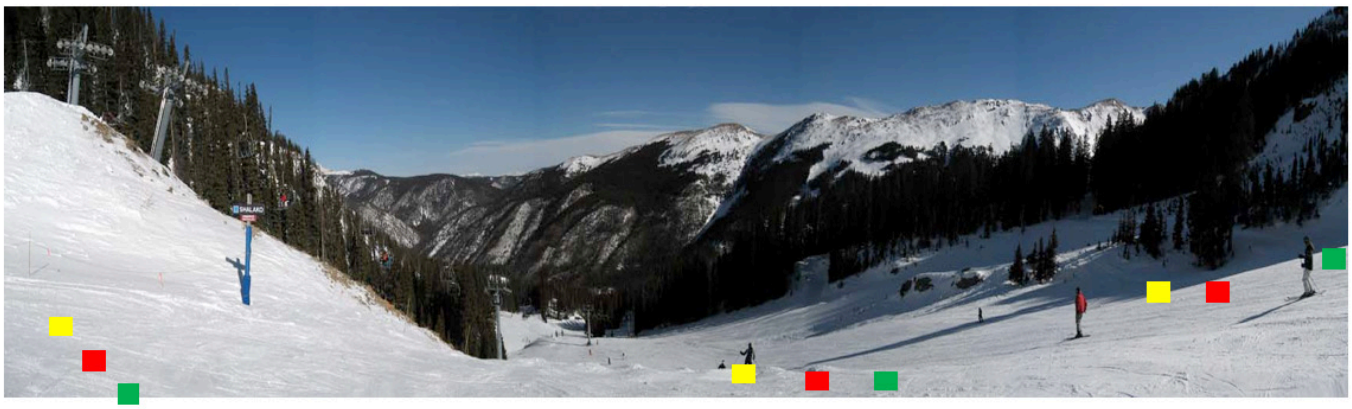
_____

APPENDIX 2

VI: Determination of Guide Bib Colours

Determination of the level of vision using colours. The ability to identify different colours in different and varying conditions.





APPENDIX 3

VI Safety Awareness Questionnaire for Instructors & Guides

NOTE: There may be more than one correct answer.

Q1. Which of the following are prudent considerations, particularly for new VI skiers or boarders?

A. Ask them what they can see.
B. Walk them around the lodge to help identify sounds inside. Tell them what is where: where they should meet to start the ski program, washroom location, location of ski rentals, etc.
C. Outside have them practice entering their bindings. Have them feel the equipment. Explain how the boots should feel. Have them walk around in their boots.
D. Walk or guide them as you either ski or snowboard toward the lift. For a new skier or boarder, be sure to discuss the sounds outside; walk them around to hear the lift, snow-making machines, snowmobiles, skis/snowboards on snow, etc.

Q2. Which of the following equipment considerations are appropriate to assess and discuss regarding safety?

A. Whether they have a helmet, safety vest, and light.
B. Confirm that the VI skier or boarder knows where to put their skis or board outside the lodge.
C. Do they have appropriate dress, goggles, boots, skis or board that fit and are in good working order?
D. Are ski aids necessary?

Q3. Prior to each session, which of the following capabilities are appropriate to assess/discuss with blind or visually-impaired skiers or boarders, or their parents?

A. Vision at night and during the day; how far can they see, experience on lift and skiing or snowboarding, what details can they see (i.e. bumps, ice, shadows, rocks etc.).
B. Other health issues or disabilities that may affect their skiing such as: hearing and/or any attention deficits. Can they hear guiding over other noises on the hill? Are they aware of their surroundings and can they maintain concentration?
C. Determine their athletic ability and physical strength in order to determine what ski hill to choose.
D. The score of the hockey game and whether the favoured team is winning.

Q4. Are any of the following recommended when taking a VI skier or boarder on the lift?

A. Explain the lift operation; how to get on and off and tell the operator if it is their first time or if they are inexperienced with that particular lift.
B. Ensure that the VI skier or boarder is comfortable turning around to chat with the folks on the chair behind.
C. Position a guide on each side of the VI skier or boarder; if necessary, hold their poles; count down the lift as it approaches.
D. Assist the VI skier or boarder as necessary when exiting the lift, by directing the VI skier's or boarder's arm, or by directing their ski with your ski. Explain what the VI skier should feel when exiting a lift.

Q5. Which of the following are appropriate considerations when on the hill with a blind or visually impaired skier or boarder?

A. If unsure about the VI skier's or boarder's ability, practice stops and turns on easy terrain in order to assess them before moving to more challenging terrain or up the lift.
B. Ask the VI skier if they want a description of the surroundings before each descent, and a description of the terrain as you ski.
C. Follow directly behind the VI skier in their ski tracks, calling directions.
D. Ski uphill of the VI skier, placing yourself between the hill traffic and your VI skier, mirroring their turns as best as possible and calling directions.

APPENDIX 3

VI Safety Awareness Questionnaire for Instructors & Guides

Q6. Which of the following would be considered prudent hill safety practices?

A. When guiding, maintain a safe distance at the side of the hill in case the VI skier or boarder doesn't hear you or misunderstands a call.
B. Be visible at all times, and if the VI skier or boarder falls, stand directly above them to protect them.
C. If you are not comfortable when you are approaching a busy spot on the hill, stop the VI skier or boarder and proceed when safe.
D. Allow your VI skier or boarder to choose whether or not to wear safety equipment prescribed by the CADS program.

Q7. Which of the following are good vocal practices to guide VI skiers/boarders on the hill?

A. Talk directly to the VI skier/boarder; speak clearly and loud enough to be heard above other noises.
B. Use a panic-free tone of voice, being firm with directions on turns and stops/starts.
C. Before starting to ski, advise VI skiers/boarders to stop immediately if they cannot hear the guide's voice.
D. Scream at the top of your lungs if your VI skier/boarder is not responding.

Q8. What are good practices for helping a VI skier or boarder progress?

A. Take it slow at the beginning. Gain your VI skier's/boarder's confidence.
B. Allow the VI skiers/boarders to feel your legs so they can understand correct positioning. With their permission, use their hands to demonstrate ski position (e.g. wedge, parallel).
C. Take the VI skier/boarder on more advanced hills before they are ready, in order to make other hills seem easier.
D Depending on the level of the VI skier/boarder, progress from walking with equipment, to learning how to stop, slide, make a turn, and then link turns, Do not progress to the lift until they perform these skills.

Q9. What is recommended in the event of an accident or incident involving the VI skier/boarder and or guide?

A. Report all accidents or incidents to the program supervisor as soon as possible.
B. If a blocker is not available, stop a public skier or guide and ask them to get a patroller. Ensure that the patrol is aware that the VI skier/boarder is blind or visually impaired and may need special care and/or more verbal explanations.
C. Ensure that the accident area is visible to other skiers and boarders to prevent further incidents.
D Ensure that the Alpine Responsibility Code is being followed by guides and VI skiers/boarders.

Q10. What are appropriate actions in cases of VI skier's/boarder's questionable behaviour during the program?

A. First, discuss it with the VI skier/boarder, request it be terminated, advising them clearly on next steps you will take.
B If inappropriate behaviour continues, bring VI skier/boarder back to the lodge and report to the supervisor. End the lesson.
C. Ask the supervisor to discuss with the VI skier/boarder or their parents about the inappropriate behaviour and about a more suitable behaviour to adopt to participate in the program.
D. Let it go, do nothing, the VI skier/boarder will get over it or the next guide will have the same 'fun' you did.

APPENDIX 3

VI Safety and Awareness Questionnaire Grid Sheet

Select the correct answer below for each question
NOTE: There may be more than one correct answer.

Name: _____

Date: _____

1 a) A , B
b) A , B, C
c) A, C
d) All of the above

2 a) A
b) B
c) A, C, D
d) B, D

3 a) A, B
b) A, D
c) A, B, D
d) A, B, C

4 a) B
b) A, B
c) A, C, D
d) All of the above

5 a) A, B, D
b) A, B, C
c) A, C
d) B, C, D

6 a) A, D
b) A, B, C
c) B, D
d) A, C

7 a) All of the above
b) A, B
c) B, C
d) A, C

8 a) B, C, D
b) A, B, D
c) A, B, C
d) All of the above

9 a) A, C, D
b) All of the above
c) A, C
d) A, B, C

10 a) A, B, C
b) D
c) B, C
d) A, B

NOTE: *Answers are found on the next page*

APPENDIX 3

VI Safety and Awareness Questionnaire Answers

Question/Answer

1. d)
2. c)
3. d)
4. c)
5. a)
6. b)
7. a)
8. b)
9. d)
10. a)

APPENDIX 4

CADS Fatigue Chart

Date: _____

Student: _____

	FEEL NO FATIGUE	FEEL JUST A LITTLE TIRED	NORMALLY TIRED	I AM OR FEEL TIRED	I AM EXHAUSTED
Beginning of lesson					
End of lesson					

***The timeline for the Fatigue Evaluation should be adapted to the situation for safety consideration.*

APPENDIX 5

ASD/CI Assessment Tool

CANADIAN ADAPTIVE SNOWSPORTS
SPORTS DE GLISSE ADAPTÉS CANADA

ASD/CI Assessment Tool	
For students with Down Syndrome. Do they have 'atlanto-axial instability?' (Requires medical clearance before participating in snowsports)	
What are the student's interests? (Use this information to build rapport)	
Is there anything to be avoided? (Triggers)	
What's an effective support strategy?	
What are some effective communication strategies?	
What are some effective teaching strategies for the student?	
What's the best way to get (and keep) the student's attention?	
What does the student dislike?	
What are signs the student is feeling anxious or distressed?	
Does the student have any additional disabilities or health problems? (eg. GI or sleep challenges, seizure disorder, allergies etc.)	
Does the student have any sensory sensitivities? (e.g. Hypo- or Hyper-reactivity)	
Does the student have any physical limitations or physical challenges? (e.g. toe-walking, low muscle tone, joint hyperflexion, motor-planning challenges etc.)	

APPENDIX

APPENDIX 5

ASD/CI Assessment Tool	
Does the student have the support of an Educational Assistant (EA) at school?	
Has the student skied or snowboarded before?	
What other sports does the student do?	
How long can the student stand or walk?	
Is the student well balanced while moving around?	
Does the student take any medication and are there any side effects?	
Does the student have any additional disabilities?	

APPENDIX 6

Glossary of Terms

TECHNICAL BASICS
UNDERSTANDING CADS AND DISABILITY TERMINOLOGY

- **Amplitude** – the range of movement. An individual with a brain injury may experience less flexibility when a movement is performed quickly.
- **Amputee** – A person who has a missing or partial limb(s). Either congenital (from birth) or acquired (surgically removed)
- **AK** – Above Knee: Amputation above the knee--includes hip disarticulation (removal of leg through the hip joint)
- **AOT** – the assessment process used by CADS instructors: Ask, Observe, Test
- **Applied Behavioural Analysis** - A teaching technique that rewards a person for making a correct choice. Incorrect choices are ignored, or not rewarded. Therefore, students learn by making simple associations between cause and effect.
- **Arthrogryposis** – Condition in a newborn child when joints don't move as much as normal and may even be stuck in one position. Often the muscles around these joints are thin, weak, stiff, or missing.
- **Atlanto-Axial Dislocation** – A condition characterized by excessive movement at the junction between the atlas (C1) and axis (C2) as a result of either a bony or ligamentous abnormality
- **Autism Spectrum Disorder (ASD)** – Also referred to as autism, it is a neurological disorder which causes developmental disability. Autism affects the way the brain functions, resulting in difficulties with communication and social interaction, and unusual patterns of behaviour, activities and interests. See "Snowboarding with people with ASD" section of the manual for further information.
- **Autonomic** – A division of the peripheral nervous system that influences the function of internal organs.
- **Autonomic Dysreflexia** – A sudden rise in blood pressure in people with spinal cord injuries, resulting from a noxious stimuli (e.g. distended bladder, blocked catheter, urinary retention, urinary tract infection, etc.) It can be LIFE THREATENING
- **BK** – Below Knee: Amputation that is below the knee
- **Bi-Lateral** – Means two limbs have been affected and could be on one side (an arm and a leg), both legs, or both arms.
- **Blind/Visually Impaired** – Legal blindness in Canada is defined as a range of vision from the perception of light of 10 per cent or less vision. Other visual impairments include colour blindness, tunnel vision, night blindness, and a lack of visual acuity. *See CADS Instructor Manual, Visual Impairment section for further information.
- **Blocker/Tailgunner** – A volunteer who rides behind the VI guide and VI rider to anticipate the turns of the VI rider; block uphill traffic; help in case of a fall, etc.
- **Cadence** – The steady rhythm of the instructor's voice when giving directions to a student
- **CADS** – Canadian Adaptive Snowsports -- adaptivesnowsports.ca
- **Cant** – A bevelled wedge put under the person's foot to level the ski on the snow
- **Cerebellar Lesions** – Brain lesions are any type of abnormal tissue in or on the brain. Major types of brain lesions include: traumatic, infectious, malignant, and benign. Symptoms: Unco-ordinated muscle movement that may affect gait, over- or under-reaching, focus and gaze.
- **Cerebral Palsy** – This is a term used to describe a group of disorders affecting body movement and muscle co-ordination. The medical definition of cerebral palsy is "a non-progressive but not unchanging disorder of movement and/or posture". See CADS instructor Manual for further information.
- **Clock System** – The system of directing a skier (usually a VI skier) using the numerals of a clock, e.g. 1 o'clock – slight turn to the right.

APPENDIX 6

Glossary of Terms

- **Cognitive Disability** – A condition that results in a person having greater difficulty with one or more types of mental tasks than the average person. Clinical diagnoses of cognitive disabilities include autism, down syndrome, traumatic brain injury (TBI), and even dementia. Less severe cognitive conditions include attention deficit disorder (ADD), dyslexia (difficulty with reading), dyscalculia (difficulty with math), and learning disabilities in general. See CADS manual for further information.
- **Congenital** – Inborn, inherited. Having a particular disease or physical abnormality from birth.
- **Cystic Fibrosis** – a hereditary disorder that causes the production of abnormally thick mucus, leading to blockage of the pancreatic ducts, intestines and bronchi, and often resulting in respiratory infection.
- **Deaf** – medically defined by the extent of loss of functional hearing and by dependence upon visual communication.
- **Diabetes** – Diabetes mellitus is a metabolic disorder characterised by the presence of hyperglycemia due to defective insulin secretion, defective insulin action or both. Diabetes mellitus is associated with damage, dysfunction and failure of various organs – especially the kidneys, eyes, nerves, heart and blood vessels. See CADS instructor manual for further information.
- **Down Syndrome** – A congenital disorder arising from a chromosomal defect, causing intellectual impairment and physical abnormalities, including short stature and broad facial profile. See CADS instructor manual for further information.
- **Double Outriggers** – A method of using two outriggers to provide support to the snowboard student. See parallel outriggers and split outriggers for more information.
- **Epilepsy** – A group of neurological diseases characterised by seizures. Epileptic seizures are episodes that can vary from being brief and nearly undetectable to long periods of vigorous shaking.
- **Feeding Tube** – A medical device used to provide nutrition to patients who cannot obtain nutrition by mouth, are unable to swallow safely, or need nutritional supplementation. The state of being fed by a feeding tube is called gavage, enteral feeding or tube feeding.
- **Fixed outrigger** – An outrigger used or constructed for placement inside the student's binding. It provides a means to pressure, edge and twist the snowboard for a student who cannot use both legs or a method of using a fixed outrigger and a free outrigger to support a student with a missing or inoperable limb.
- **Fixed outriggers** – A pontoon attached to the bottom of a biski to make it a quadski.
- **Four (4) Track** – A skier using two outriggers and two skis, giving them four points of contact with the snow.
- **Fragile X Syndrome (FXS)** – A genetic condition caused by a mutated gene located on the X chromosome resulting in intellectual disabilities, behavioural and learning challenges and various physical characteristics. Though FXS occurs in both genders, males are more frequently affected than females, and generally with greater severity. Life expectancy is not affected in people with FXS. See CADS Instructor Manual for further information.
- **Front-Load** – Provide information to a student ahead of time to create understanding of what is coming next, what is expected, and to ease anxiety.
- **Frustration Tolerance** – The ability to tolerate some frustration when an impulse is inhibited or prevented.
- **Gait** – The pattern of movement of the limbs while walking or running.
- **Gross Motor Skills** – The abilities required in order to control the large muscles of the body for walking, running, sitting, crawling and other activities.
- **Guide** – A competent skier/snowboarder who can guide a visually impaired or blind person around the resort and while riding. May use voice guiding, visual cues, beeper, pole or headsets.
- **Hard of Hearing** – Refers to an individual who has a mild to moderate hearing loss who may communicate through sign language, spoken language, or both.
- **Heeling (with outriggers)** – A method of using the outrigger heel with or without a claw to slow down while sliding.

APPENDIX 6

Glossary of Terms

- **Hyperactive** - overactive
- **Hypoactive** - underactive
- **Hyperreflexia** – Also hyper-reflexia *See autonomic dysreflexia
- **Hypertonicity** – Increased tension of the muscles, resulting in muscle tone that is abnormally rigid, hampering proper movement
- **Hypotonicity** – Having deficient tone or tension
- **Intellectual Disability** – A broad term used to describe any condition that includes a lifelong impairment to a person's ability to learn or adapt to their environment. Related terms: Cognitive Disability, Developmentally Delayed. Includes: Down Syndrome, Fragile X Syndrome, Autism Spectrum Disorder, Learning Disability, Brain Injury and others.
- **Multiple Sclerosis (MS)** – A condition in which the immune system attacks the protective sheath (myelin) that covers nerve fibers and causes communication problems between the brain and the rest of the body. Eventually, the disease can cause the nerves themselves to deteriorate or become permanently damaged.
- **Muscular Dystrophy** – A group of neuromuscular disorders characterised by the progressive weakness and wasting of the voluntary muscles that control body movement.
- **Neurosis** – A relatively mild mental illness that is not caused by organic disease, involving symptoms of stress (depression, anxiety, obsessive behaviour, hypochondria)
- **Outrigger** – An arm support with a ski tip attached to the lower end. Usually used in pairs. Flip-up outriggers have a hinge system to allow the ski attachment to be raised vertically to be used as a support. Types: stand-up and sitski.
- **Parallel-rigger Position** – A method of using two outriggers to provide support. In this method the outriggers are pressured equally and usually work together to provide direction control and stability.
- **Paraplegia** – Paralysis of both lower limbs dues to a spinal disease or injury.
- **Paresis** – A condition of muscular weakness caused by nerve damage or disease; partial paralysis
- **Parkinson's Disease** – A progressive disease of the nervous system marked by tremors/shaking, muscular rigidity, and slow, imprecise movement, chiefly affecting middle-aged and elderly people.
- **Polio** – A viral infection in the spinal cord affecting transmission of nerve impulses from the brain to the muscles in the limbs. Skin sensation is retained. No muscle can be built in the affected limb.
- **Post-Polio** – Post-polio syndrome (PPS) is a condition that affects polio survivors years after recovery from an initial acute attack of the poliomyelitis (polio) virus. Post-polio syndrome is mainly characterised by new weakening in muscles that were previously affected by the polio infection as well as in muscles that seemingly were unaffected.
- **Prosthesis** – An artificial (man-made) device that replaces a missing body part, which may be lost through trauma, disease, or congenital disease.
- **Psychosis** – A severe mental disorder in which thought and emotions are so impaired that contact with external reality is lost.
- **Quadriplegia** – Paralysis of both lower limbs as well as both upper limbs due to a spinal disease or injury.
- **Quadski** – A biski fitted with stabilizers (or 'arms') which have short ski tips that attach to either side of the biski frame.
- **Residual limb** – The part of the body that remains after an amputation has been performed.
- **Schizophrenia** – A mental disorder often characterized by abnormal social behaviour
- **Scoliosis** – A curvature of the spine

APPENDIX 6

Glossary of Terms

- **Secondary Disability** – One thing that is not identified, obvious, or most visible, but must be determined and considered if present.
- **Seizure Disorder** – A condition is termed 'seizure disorder' once two or more seizures have been recorded.
- **Self-Esteem** – Confidence in one's worth or abilities; self-respect
- **Sensory motor integration** – Sensory motor integration is the relationship between the sensory system and the motor system. Since the two communicate and coordinate with each other, if one is problematic, the other can suffer as a result. Effects include, but are not limited to:
    - Difficulty with hand-eye coordination activities. Perceived motor difficulty
    - Motor planning delay. Delayed visual processing.
    - Difficulty with directional awareness .
- **Shunt** – A hole or a small passage which moves or allows movement of fluid from one part of the body to another. The term may describe either congenital or acquired (medically implanted) shunts. Acquired shunts (sometimes referred to as iatrogenic shunts) may be either biological or mechanical.
- **Single outrigger** – A method of using a single outrigger to provide support. Can be due to a weakness on one side or the other, or any inability to manipulate two outriggers at once. Also used for students who don't require as much support as double outriggers.
- **Sitski/sitskiing** – Method used for skiing where skier sits in a molded seat over two skis (biski) or a single ski (monoski) using two outriggers or two skis (biski) using fixed outriggers.
- **Slide Mode** – The configuration of the outrigger when it is ready to slide.
- **Sno-Wing** – Adaptive equipment designed to help stabilize the student's upper body. Also provides a means to assist the student as needed for turns and speed control.
- **Social skills** – The ability to interact and communicate with others. Social rules and relations are created, communicated and changed in verbal and nonverbal ways. The process of learning these skills is called socialization.
- **Spina bifida** - Abnormality at birth in the bony vertebrae around the spinal cord. Can range from mild muscle weakness to total paralysis in limbs.
- **Spinal Cord Injury (SCI)** – Damage to any part of the spinal cord or nerves at the end of the spinal canal – often causes permanent changes in strength, sensation and other bodily functions below the site of the injury.
- **Split-rigger position** – A method of providing support using two outriggers. In this method, the outriggers are disproportionately spaced and this provides an improved body position for the student.
- **Stroke** – A stroke is a sudden loss of brain function caused by the interruption of flow of blood to the brain (ischematic stroke), or the rupture of blood vessels causing brain cells (neurons) in the affected area to die.
- **Support mode** – The configuration of the outrigger which allows the user to push against the snow to support or propel themselves. Opposite of slide mode.
- **Sympathetic nervous system** – Stimulates the body's fight or flight response. It is also constantly active at a basic level to maintain homeostasis, that is, to maintain balance amongst the systems of the body or return systems to functioning within a normal range.
- **Tether** – A length of nylon webbing (approx 2.5 x 4 cm) used by the instructor to control the speed and direction of a stand-up skier or sitski skier.
- **Tetraplegia** - see quadriplegia
- **Three (3) Track** – Skiing with two outriggers and one ski, using three points of contact with the snow.

APPENDIX 6

Glossary of Terms

TECHNICAL BASICS - UNDERSTANDING SNOWBOARDING TERMINOLOGY

- **Angulation** – the lateral angle formed between joints of the body to achieve edging
- **Base of Support (BOS)** – usually refers to the feet and/or what they are attached to ie; the snowboard.
- **Centre of Mass (COM)** – The three-dimensional balance point of an object. The point at which the upper body mass balances with the lower body mass.
- **Counter-rotation** – the upper and lower body rotating against each other. The upper body rotates in the opposite direction to the lower body.
- **Duck Stance** – a term used to describe positive angles on the front foot and negative angles on the back foot.
- **Edging** – Using angulation and inclination to engage the edge of the snowboard during a turn.
- **Edge angle** – the lateral angle formed between the base of the board and the slope.
- **Effective edge** – the length of the metal edge of the snowboard that touches the ground. The part of the edge that is used to make a turn, not including the tip and tail.
- **Extension** – lengthening the body or limbs. Opposite of flexion.
- **External forces** – natural physical influences exerted on the rider from an outside source, e.g. incline, terrain, snow conditions.
- **Fall Line** – an imaginary line following the general or greater slope. On any hill, there is at least one fall line.
- **Flexion** – bending of the joints. Opposite of extension.
- **Flow** - the ability to explore the mountain safely with fluidity and style.
- **Freeriding** - snowboarding on all types of terrain.
- **Front foot** – the foot mounted closest to the nose, a regular-footer's left foot and a goofy-footer's right foot.
- **Goofy Foot** – riding a snowboard with the right foot in the forward position.
- **Heel edge** – the edge on which the heels rest (one of two edges)Inclination – the natural movement of the vertical axis toward the inside of the turn to counteract external forces.
- **Nose** - the front tip of the snowboard
- **Pivot point** – the point along the length of the board around which the board can be altered by moving one's weight forward or backward.
- **Pivot** – turning the board around the vertical axis of the rider.
- **Position** – the placement of the body on the snowboard
- **Pressure** – controlling pressure on or against the board by use of flexion and extension of the legs. Upper body action may also modify pressure to the board.
- **Rear foot** – the foot mounted closes to the tail
- **Regular Foot** – riding a snowboard with the left foot in the forward position.
- **Rotation** – the force applied by rotating the body in the direction of travel
- **Sliding/skidding** – a sideways movement of the board on the snowSteering – the combination of pivoting the feet, pressuring and edging the snowboard
- **Steering angle** – The angle formed between the longitudinal axis of the board and the direction of travel of the rider. Present in sliding turns only – carved turns have no steering angle.
- **Tail** – the rear tip of the snowboard
- **Timing and Co-ordination** – blending the skills at the correct time and place through the turning arc.
- **Switch** – performing a trick while riding backwards, in the opposite direction of the natural stance.
- **Toe Edge** – the toeside of the board. The edge on which the toes of the boots rest. (one of two edges.)
- **Weighting** – increasing board pressure against the snow

APPENDIX

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