



ROCKY MOUNTAIN DIVISION
Professional Ski Instructors of America
American Association of Snowboard Instructors

ADAPTIVE EXAM GUIDE for BI- SKI

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Local regulations and safety guidelines take precedence over this information. It is in your best interest to exercise due diligence in determining the appropriateness of the information for your particular circumstances. In addition, please take into account any and all factors that may affect your lesson. This includes but is not limited to: the health, well-being and fitness of the student; weather conditions; terrain; other people on the slope; your own abilities, as well as those of your student and anyone who may accompany you.

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The bi-ski is a type of adaptive equipment that is designed for any skier who has significant problems standing and balancing while in motion. These problems are more frequently, but not always the result of physical trauma or neuromuscular disorders.

Types of Disabilities Common to Bi-Skiers

These are some of the most common disabilities for which a bi-ski may be used:

- Amputation
- Balance impairment
- Brain injury
- Cerebral palsy (CP)
- Cerebrovascular accident (CVA or stroke)
- Epilepsy
- Cognitive or developmental disability
- Multiple sclerosis (MS)
- Muscular dystrophy (MD)
- Neuromuscular disorder
- Paralysis & Paresis
- Poliomyelitis
- Post-polio syndrome
- Spina bifida
- Spinal cord injury (SCI)

In addition, there are some skiers who have progressive or degenerative types of disability. They may have started skiing as a two-, three-, or four-tracker but eventually become a sit down skier due to the progressive nature of their disease.

Evaluation of Student

Treat every student as an individual; the effects of an injury or disability can vary from student to student. A complete and detailed student analysis is needed to determine which piece of equipment is best suited for the student. Determining factors are physical strength, mobility, ability to maintain balance and level of injury. A thorough student evaluation is necessary to determine proper equipment selection.

For spinal cord injuries, a general rule of thumb is that a student with a T-6 and lower level of injury uses a mono-ski. Students with higher levels of injuries usually use a bi-ski. Each injury is somewhat different; the effects of a T-6 injury in one individual may vary from the same level of injury in another individual. In addition, a person may have an *incomplete spinal cord injury*. This means that there is some level of motor and/or sensory function below the level of injury.

Some medical concerns associated with bi-skiers include bowel/bladder management program (e.g., leg bag, catheter, etc.), pressure sores, spinal fusion, spasticity, sensitivity to hot or cold, and poor circulation.

Another 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, severe cold and heat, or severe blows to the body or head. If an instructor suspects autonomic dysreflexia, immediate action must be taken to eliminate the cause. The student is kept upright, straps are loosened and s/he 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, so it is important to determine any side effects the student may be experiencing. Additionally, it is valuable to know other activities in which the student participates. Much of this information can be obtained from the student, parent or guardian, as well as from the student's application or evaluation.

Equipment and Set Up

Take time to initially set up and evaluate a student to determine which type of equipment is best. Do not rush the set up for the first time skier! Proper time spent during the initial set up will equal success and enjoyment for the student in the long term.

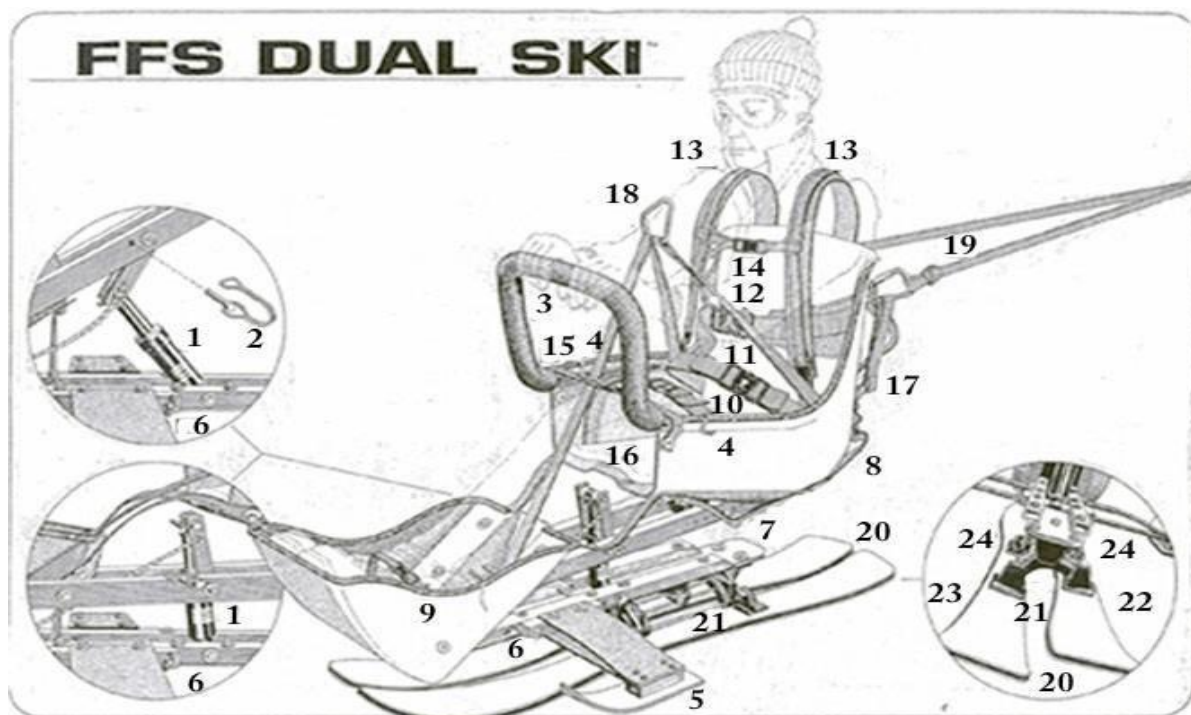
The bi-ski has a “boot”, seat and frame system that is mounted to a suspension system, which is usually mounted on two short skis with a radical side cut. Most bi-skis have fixed outriggers

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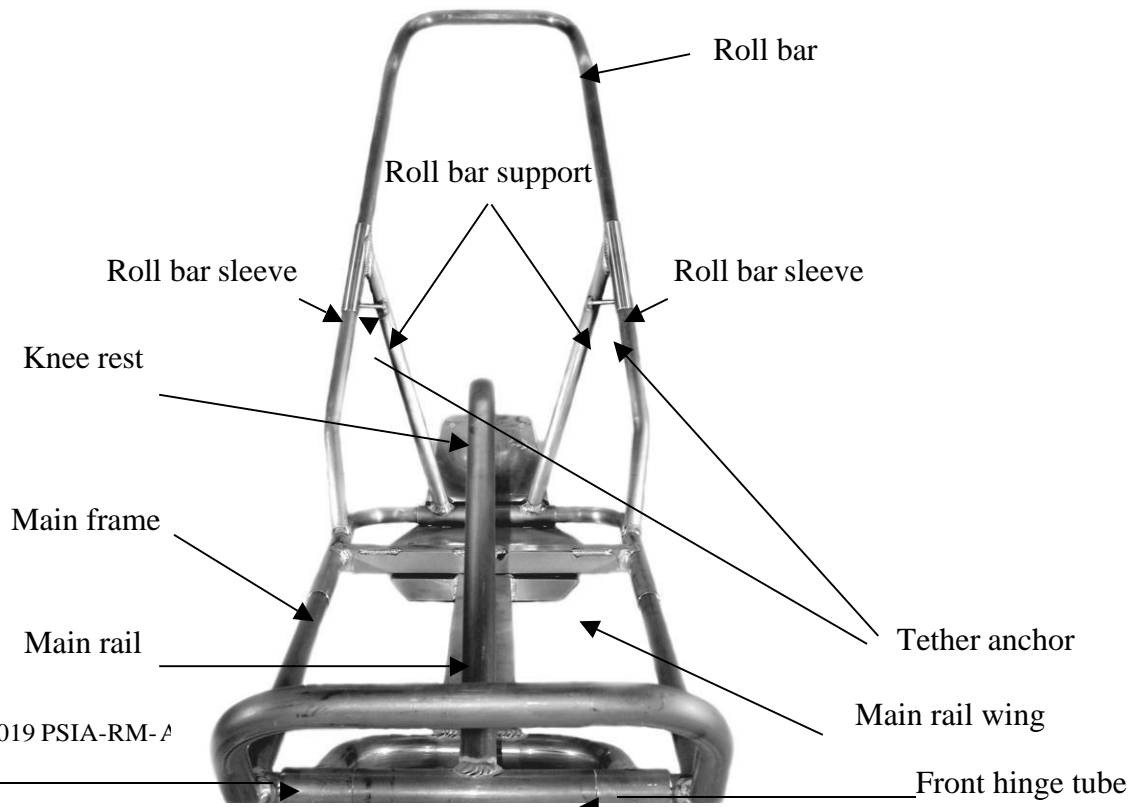
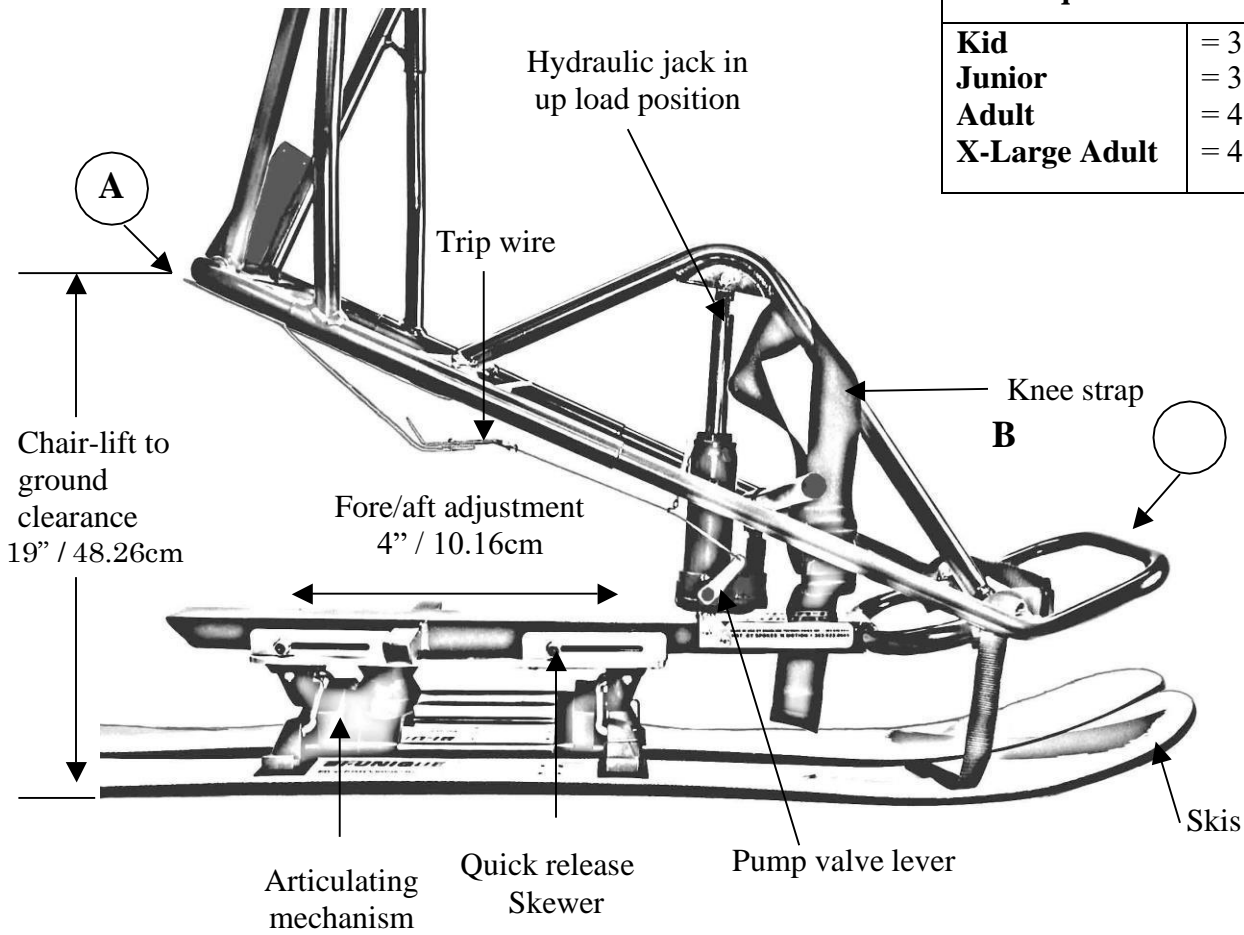
that can be mounted on the frame of the bi-ski. These outriggers can be adjusted as needed or removed. Bi-skis have a tethering system that allows you to assist the bi-skier in turning, speed control and in emergency situations. If fixed outriggers are used, using a secured tether strap is **mandatory** to assist the student and safely control the bi-ski. Some programs also require a safety loop.

If the skier possesses the necessary strength, balance and agility, hand held outriggers may be used in place of fixed outriggers and the skier may be able to ski independently. However, it is suggested that someone using handheld outriggers remain on tethers until s/he has become an upper level intermediate/advanced skier and can safely control turns and speed. Certain bi-skis have a self-loading device that allows strong, well-balanced, and agile bi-skiers to load independently but most bi-skiers still need one or two lifting/loading assistants.

A complete physical evaluation can help you determine how the bi-ski should be adjusted. As with the mono-ski, the bi-ski should be properly balanced and the skier should be properly fitted to the seat system.



Bi-unique Sizes: Measure from A to B	
Kid	= 33.25" / 84.45cm
Junior	= 37.50" / 95.25cm
Adult	= 41.50" / 105.41cm
X-Large Adult	= 46.50" / 118.11cm



Safety Issues and Lift Evacuations

Be aware of these points to keep your bi-ski lessons safe:

- *Your Responsibility Code* applies to all bi-skiers.
- Instructors must understand the hand signals for communication with lift operators (i.e., slow, stop, and maintain speed). Some hand signals may differ by ski area.
- Evacuation straps on the bi-ski must be regularly checked for wear and be replaced or repaired as necessary.
- The National Ski Patrol recommended procedure for a bi-ski lift evacuation is termed a double carabiner with opposing gates. Evacuation carabiners must only be mounted to a manufacturer-suggested evacuation strap (i.e., single- or three-point strap system). The evacuation system must always be ready for evacuation and not intertwined with the seat straps of the skier.
- Evacuation is always directed by Ski Patrol and it is at their discretion to use an alternate system.

General Overview of Lift Loading Procedures

These are general procedures for instructor-assisted chair loading and unloading of bi-ski students.

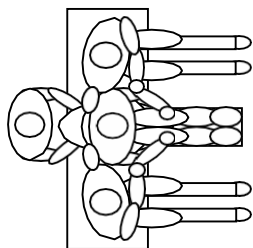
- Instructor calls a count or cadence (example: *Ready, 3, 2, 1, lift up and back*) when in the loading zone of the chairlift. For timing and safety concerns, it is a good idea to practice a lift with the instructor assistant and student out of lift lines and before the first load of the day.
- A lift operator must be ready to press the stop button in case of a misload. If a second lift operator is available, that person may assist with the lift loading.
- Once on the chairlift, attach safety strap and carabiner to the chair. Some programs and students put the bar down. When using the bar, keep it down during entire ride and take care not to lean on it, as this might put extra weight on the student's legs.
- After you have passed the final lift tower before the unloading platform, disconnect the safety carabiner and strap and lift the bar. Make sure all straps, clothing and outriggers are free of the chair so that you have a clean unload.
- At the unloading area, the instructor calls a count or cadence (example: *Ready, 3, 2, 1, lift up and down*) and s/he continues to guide/seat assist the student off the chairlift and to the side, out of the unloading area.

Lift Loading Assists

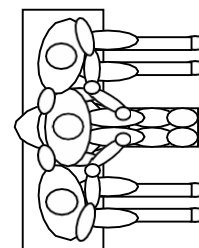
Chairlift loading procedures vary at resorts due to chair or loading area configuration, program parameters and resort parameters. Keep in mind these general guidelines for lift loading assists:

- Always lift with the back straight, in a wide stance and using the legs and biceps.
- Make sure proper communication has occurred between the student, instructor, instructor assistant and lift operator.
- There are three assists that may be used with bi-skis: a) lift and pull-back, b) lift with a front push-back and c) lift with a side push-back. **Remember that one lift operator must always attend the stop button in case of a misload!** If a second lift operator is available, that person may assist with the lift loading.

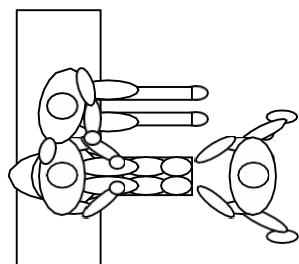
a) Lift and pull-back



The instructor and instructor assistant stand on either side of the bi-ski, with skis pointed in the lift direction, hips and shoulders turned slightly toward the bi-ski and chair. They grab the side handles. While they are lifting up and back from the sides, the lift operator reaches over the chair, grasps the handle on the back of the bi-ski, and pulls it back onto the chair. If a lift operator is not available for lift loading assistance, the instructor and instructor assistant may perform a lift and pull-back by themselves.



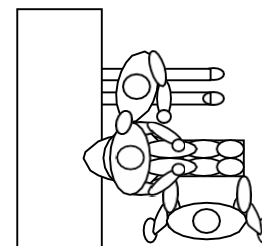
b) Lift with a front push-back



The instructor stands at the side of the bi-ski, with skis pointed in the lift direction, hips and shoulders turned slightly toward the bi-ski and chair. The lift operator stands in front of the student, looking directly at the student and the on-coming chair, and grasping the foot rest 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 assist can be used for a small student in a bi-ski with an instructor who just needs that extra push back.

c) Lift with a side push-back

The instructor stands at the side of the bi-ski, with skis pointed in the lift direction, hips and shoulders turned slightly toward the bi-ski and chair. The lift operator stands on the other side and at 90 degrees to the 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.



Tethering a Bi-Ski

When tethering a bi-ski, the instructor's goal is to provide safe, smooth assistance as needed for speed control, turn initiation and stops, and obstacle avoidance. Since tethering procedures can vary, it is important that you understand and adhere to the tethering safety protocols of your local program/resort.

Attaching the tethers to the bi-ski

The design and attachment of tethers varies greatly by ski program and by the structure of the specific bi-ski. Moreover, the ability of the student can affect the tethering techniques. These are some of the variables in design and attachment of the tethers:

- Two tethers versus one single looped tether
- Two points of attachment to the ski versus one point of attachment
- Attachment low on the ski versus high on the ski

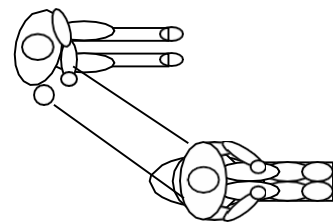
Attaching the tethers to the instructor

There are several key points to remember when attaching the tether to your self:

- **If you are the sole command of a bi-skier on the slope, you must maintain tether contact at all times.**
- Attach the tethers to your wrists using a girth hitch, maintaining skin contact *beneath* your gloves and jacket.
- Do not attach the tethers to your upper arms. Attaching to your upper arms is less effective and efficient. If you feel like you need to, check to see if the tethers are too long.
- Use a second back-up safety attachment when required by your local program/resort. One end is fastened to the tether and the other end is fastened to your wrist, arm or waist. A carabiner is often used for this attachment.

Body position

Body positioning is very important to the success of tethering. You should be uphill and behind the bi-ski. In most cases, you have a slightly narrower corridor than the bi-ski. If you get too far outside of the bi-ski corridor or below the bi-ski, your ability to guide, control and stop the student is diminished.



Stay in sync with the bi-ski student. Look for subtle cues, such as a head tilt, to time your assistance of the student's turn initiation.

Feet and skis

Ideally, you can make stem/step turns in sync with the bi-ski. See the Adaptive Functional Skiing Exam Criteria for details on how to perform this maneuver.

The wedge may also be used to effectively tether a bi-ski, especially when coming into crowded areas or on flat terrain. Beginning tetherers often learn to tether using the wedge in order to master body and hand position. Progressing to stem/step turns is ultimately safer for your hips

and knees and it is usually smoother for the student.

Parallel to parallel tethering should only be used by strong, experienced tetherers who have already mastered wedge and stem/step tethering. Use caution with parallel to parallel tethering, as it is easier to catch a downhill edge, potentially causing the tetherer to fall. Unless it is done smoothly and with finesse, it can prematurely pull the student into the fall line, preventing him/her from making complete turns and causing a rough ride.

Hand and arm position

For maximum control and stability, your hands and arms should be close to your center of mass. This is known as the “power box” and in this position, your hands are between your hips and chest; arms are flexed, with your elbows ahead of your spine (similar to carrying ski poles). When your hands and arms are outside of the “power box,” you may reduce your ability to guide, control and stop the student.

Tether handling

There are several different techniques that can be employed to initiate turns, including pulling the tether, wrapping the tether in or rotating the tether like a steering wheel. Regardless of what technique you use, practice is critical so that you can develop a feel for what is most effective.

Smooth tether handling is critical for your student’s safety and skiing ability. You should be able to release and gather the tether with ease; there should never be so much slack that you risk tripping over the tethers.

The tightness of the tether lines can vary based on the needs of the student. In general, more advanced students benefit from light guiding of the tether lines, used as ‘teaching tethers’, not a control device. Beginning students, on the other hand, may need the greater instructor control that is available with tighter tether lines.

Emergency stops

This is a required safety maneuver for all bi-ski instructors. It is used to quickly stop the bi-ski and avoid hazards such as trees, lift towers, and other people on the slopes. The movements are similar to the Linked Sideslip with a Hockey Stop to either side of the Adaptive Functional Skiing Exam Criteria. It should be performed precisely and quickly. Poor body alignment can hinder your ability to stop and may cause the bi-ski to flip.

Seat assists

Seat assists are used in a variety of circumstances: in lift lines, on cat roads, when an outrigger is broken and when a student is fearful or fatigued. It can also be used with beginning bi-ski students to help them feel their balance and to give them kinesthetic feedback as they learn how to ski. In general, seat assists should not be used to “take the student for a ride.” Instead, you are encouraged to promote the student’s independence to the highest possible degree.

Consider safety implications when seat assisting. When performing a seat assist, use a wide-stanced, skidded parallel technique. It is best to avoid using a wedge so that your ski tips don’t get caught under the bi-ski tips. In most cases, seat assists are used over very short distances. When it is necessary to seat assist on long runs, you should remove the fixed outriggers as a safety

consideration. Lastly, for the safety and enjoyment of your student as well as other skiers, do not take up the entire width of the slope while performing a seat assist.

Tethering exercises

The following exercises may be used to improve your tethering techniques:

- **Develop strong skiing skills.** In particular, mastery of the following maneuvers can improve your tethering skills:
 - Stem/step turns
 - Falling leaf
 - Side slip to hockey stop
 - Synchronized skiing (with visual and verbal cues)
- **Practice tether management:** At home attach tethers to a chair and practice wrapping and unwrapping the tethers. Next, practice smoothly releasing the tether and then gathering it back up. Make sure you don't have slack to trip over.
- **Practice tethering without the bi-ski.** Use a stand-up skiing partner who is skiing in front of you, just as a bi-ski student would be in front of you. This partner should not be attached to the tethers but instead, should hold them loosely (to protect his/her shoulders).
- **Use guided discovery to find the “power box” hand and arm position.** Hold your hands high, low and in-between until the height of the “power box” is established. Then determine the width of the “power box” by holding your hands close together, far apart and in-between. Finally, play with the flex of your arms, moving from straight arms to a tight-angled bend and in-between. As above, this exercise should be done with a stand-up skiing partner, not with a bi-skier.
- **Practice tethering, emergency stops, and seat assists with other instructors.** If possible, practice these maneuvers on people of varying weight and height. Have them role play different levels of ability. Practice until you consistently use effective body position and foot movements. Feel how different techniques affect the bi-skier. Notice the difference between full control and gentle guiding.
- **Be tethered by another instructor.** If you meet the weight restrictions of the bi-ski, have another instructor tether you to understand the experience of your bi-ski students. Notice which tethering techniques are helpful and which techniques hinder your progress.

Adaptive Bi-Ski Objectives

The following is based on the *Adaptive Alpine Technical Manual* (PSIA-AASI). Local regulations and safety guidelines take precedence over this information. It is in your best interest to exercise due diligence in determining the appropriateness of the information for your particular circumstances. In addition, please take into account any and all factors that may affect your lesson. This includes but is not limited to: the health, well-being and fitness of the student; weather conditions; terrain; other people on the slope; your own abilities, as well as those of your student and anyone who may accompany you.

Beginner / Novice Zone Objectives

Level 1: Welcome to skiing / Build the foundation

- Perform **student assessment**.
- Discuss **medical history**.
- Determine and share **goals**.
- Select, introduce and set up **equipment**.
- Agree on student / instructor **communication and safety**.
- Perform **static balance exercises** and develop **athletic stance**, indoors.
- Perform **pushing, turning, pivoting and balancing drills** on flats.
- **Begin** to understand the **fall line** and **terrain changes**.
- Learn how to safely **fall and get up**.
- Learn to **slide** at slow speed.
- **Glide and slide across the slope**.
- Perform a **straight run** to a terrain-assisted stop.
- Develop effective **outrigger and body position while moving**.

Level 2: Introduction to Turning

*Note: Turning at this level achieved through **balance and edging skills***

- Develop **stopping and slowing** skills.
- **Turn left and right to a stop**.
- Perform **linked turns**.
- Begin to **vary shape and size of turns**.
- Develop effective **outrigger and body position for turning**.
- Perform **outrigger-equivalent braking wedge**.
- Learn how to **ride chairlift**.
- Review **lift evacuation procedures**.
- Learn safe **outrigger position and timing** while **loading and unloading**.
- Introduce **sideslip** skills in the beginner area.

Level 3: Introduction to Green Terrain

- **Explore terrain** – go for lots of quality mileage!
- Actively **edge** the skis for turn shape and speed control.
- **Begin** to use **turning movements** to initiate a turn.

Intermediate Zone Objectives

Level 4: Mastering Green Terrain

- Refine the ability to control the skis by **tipping and turning** the appropriate body parts.
- Perform **skidding** exercises.
- Explore **all green terrain in a variety of snow conditions**.
- Experiment with **turn shape and size**.
- Develop an understanding of **how changes in stance affect the skis**.
- Solidify a **release move to initiate a turn**.
- Use **hockey stops**.

Level 5: Developing Skills to Enhance Parallel Skiing

- Use **independent outrigger action**.
- Improve **dynamic balance**, increase **range of motion**, and feel the **edges**.
- Gain an understanding of **upper and lower body independence**.
- Develop **simultaneous edge release for parallel turns** on blueterrain.
- **Control speed** on green and groomed blue terrain by **blending skills and using tactics and turn shape**.
- Develop **long- to medium- and medium- to long-radius turns**.
- Ski a **“green line” in the bumps**.

Level 6: Anchor Parallel Skiing & Learning Tactics for bumps and Variable Conditions on Blue Terrain

- **Link open parallel turns** with emphasis on **simultaneous rotation and edging**.
- Perform **medium- to short-radius turns**.
- Ski **varying snow conditions**.
- **Carve uphill arcs**.
- **Refine tipping movements** to become more dynamic.
- Perform **short-radius turns while developing upper and lower body independence**.
- Create body **angulation**.
- Explore using **skidded and carved short turns as tactics for speed control on steeper terrain**.
- Explore **powder, crud and cut-up snow** conditions.
- Ski a **“blue line” in the bumps**.
- **Load and unload** on lift **independently**.
- Develop **total independence**.

Advanced Zone Objectives

Level 7: Linking Parallel Turns on All Blue and Some Black Terrain, and Increasing Confidence in Variable Terrain and Conditions

- Perform carved **railroad track turns**.
- Perform **hip check turns**.
- Continue to **refine skill blending** for parallel turns on all blue and some black terrain.
- Explore a **variety of turn shapes** on groomed and variable terrain
- Explore **tactics** for skiing all terrains.

Level 8: Mastering the Mountain and Exploring the Latest Ski Designs

- Continue to enhance **upper and lower body separation**.
- **Carve medium- and long-radius turns**.
- **Refine edge engagement and release movements**, changing line, turn shape, and speed to adapt to challenging terrain and snow conditions.
- **Refine flexion and extension movements** to maintain balance, manage uneven terrain, and allow the efficient blending of all other movements.
- **Perform short-radius turns using upper and lower body independence** in variable conditions to develop more speed control and manage terrain more efficiently.
- Ski the **“black line” in the bumps**.
- Become comfortable skiing all of the mountain’s **most difficult terrain**.

Level 9: Skiing Any Turn, Anytime, Anywhere in Any Snow Condition

- Increase confidence in **ski design and speed** in a safe environment (especially useful for the skier interested in racing).
- **Refine flexion and extension movements** to enhance turn mechanics.
- **Use timing and tempo to enhance the release of the old edges**, tipping both skis simultaneously from turn to turn while reducing anxiety and fatigue to allow for more enjoyable skiing on challenging terrain.
- **Refine movements and options in short-radius turns**, adjusting tactics at will.
- Explore **alternative movement blends and tactics** for variable conditions, **skiing the entire mountain efficiently**.