
Teaching Bi-Skiers

What is a Bi-Ski?

A bi-ski allows people who cannot use their legs or who have balance problems to ski sitting down. Through the combination of a molded seat, or bucket, attached to two articulating side-cut skis by a suspension system, and outriggers, even a person with a high-level or very severe disability can ski. While some bi-skiers can ski independently, others require instructor assistance through the use of tethers.

Anyone who can sit in the bucket can ski in a bi-ski. Therefore, the bi-ski is an excellent equipment choice for any person with a disability who cannot stand to ski, lacks the muscle control, or has minimal balance or trunk support abilities.

❖ The bi-ski is not intended to be a stepping stone to the mono-ski. The two skis require very different skills that are not transferable. If the person is a candidate for the mono-ski, start there.

The bi-ski can be turned by either the skier or the tetherer. The participation of the instructor depends on the ability-level of the skier. The bi-ski can be controlled completely by the tetherer. In many cases, a turn can be initiated in the bi-ski using a simple leaning motion, such as a head lean to one side. The change in the center of mass puts the skis on edge and makes it turn. This leaning can be initiated by the skier or by the tetherer. More advanced bi-skiers use angulation to turn the ski similar to the mono-ski.

❖ NOTE: Bi-skis with fixed outriggers *must* be tethered at all times. Only the Bi-Unique can be skied independently without fixed outriggers.

Common Disabilities associated with Bi-Skiers	Common Medications to Consider
<p><i>Almost any type of disability can ski in a bi-ski as long the person can sit in the bucket</i></p> <ul style="list-style-type: none">• Cerebral Palsy• Spinal Cord Injury (quadriplegics)• Spina Bifida• Traumatic Brain Injury• Multiple sclerosis	<ul style="list-style-type: none">• Analgesics (pain)• Antibacterials and Antibiotics (infection)• Anticholinergics (bladder spasms)• Antispasmodic Medications (spasticity)• Anticonvulsants (seizures)

Student Assessment and Equipment Fitting

Some things to consider when assessing a bi-skier:

- Can the skier hold a pair of outriggers? If not, fixed outriggers should be used on the bi-ski. A T-bar is also an option if the skier is able to hold on to the bar.
- Check for other physical limitations: balance, ability to rotate the torso, arm strength. Any deficiencies may need to be compensated for. For example, a person who normally walks may tire easily from the upper-body workout involved in bi-skiing.
- Remember most bi-skiers have limited or no feeling in their legs. Be sure to keep the legs and body warm and protected. Make sure straps do not cause chaffing or injury.
- Is the student prone to pressure sores? Additional padding may be required to avoid sores.

- Can the student sit up straight or correct leaning on his own? If not, additional padding and strapping may be required to keep the student's body from moving around while skiing.
- Determine the level of participation the student is capable of. Encourage the student to do as much as possible, but be aware that not all bi-ski students will be able to control the ski. For students who are not participating at all in controlling the ski, skip the flatland lessons and tether the skier down Little Thunder.

The Skis

The bi-ski has two short, side-cut skis that are meant to turn. As a result, it is difficult to make a bi-ski go straight. The articulating mechanism that holds the skis to the bucket allows both skis to edge when the skier leans. If the ski leans too far laterally, the dampening device can be adjusted to limit the side-to-side movement.

The Bucket

The bucket should be snug and comfortable. The bi-ski's C-shaped bucket is designed to provide additional support to the skier and help maintain balance. Because the bi-ski turns by leaning, the higher the center of mass is off the snow, the less movement is required to turn the ski. Choose a ski that has a bucket best suited for the student. We have three basic styles of bi-ski:

- **Milty** — higher off the ground, so it takes less leaning to turn the skis. Great for a student who can't move a lot, but not great for a skier who is prone to uncontrolled movement. This ski also has a T-bar attachment that can be used for help with balance.
- **Mountain Man** — good for almost all bi-skiers. This ski has a handlebar attachment.
- **Bi-Unique** — lowest to the ground, so it takes more movement to turn the ski. This ski can be skied independently by some (without fixed outriggers). The fixed outriggers are at the back instead of the front.

When loading the student into the bi-ski, make sure that the skier is balanced in the ski.

Adjust straps so that there is no movement inside the bucket. Think of it as the equivalent to a ski boot—it needs to be snug, but not painful. When tightening straps, watch out for bladder bags and sensitive areas. Note, some skiers may require additional strapping to help restrict movements or to compensate for natural leaning.

❖ After a fall, always recheck the straps and remove any snow that is stuck in the bucket.

Adaptations — When necessary, use additional strapping, padding, or other creative means to provide support. Be careful not to limit flexibility and mobility however. The point is to use what the skier has available, and compensate for anything that is not available. Some skiers require creative padding to balance the weight equally on the ski. If the ski is "leaning" to one side, you will have trouble tethering the ski.

The Foot Tray

The foot tray provides a platform to secure and protect the lower legs and feet. It should be adjusted to allow for bent knees and a stable position. For an active skier, the knees should be bent enough to help the student maintain an athletic position. A less-active student may require the knees to be bent more to keep the student's body from moving too far forward. Also, you may need to adjust the legs of a student prone to spasticity until the spasms stop.

Hand-Held Outriggers

If the skier has the ability to hold and use hand-held outriggers, the outriggers will allow the skier to have more control. Bi-ski outriggers are shorter than mono-ski outriggers, but they work in much the same way.

- Hand-held outriggers provide balance. In the crutch position, outriggers are used for maneuvering the ski, such as pushing on the flats and loading a chairlift. Never ski with the outriggers in the crutch position.
- In general, fixed outriggers are not used when the skier is using hand-held outriggers. If both are to be used, make sure the fixed outriggers are positioned so they do not interfere with the hand-held outriggers.

Fitting Outriggers — When in the neutral athletic position, with elbows relaxed and bent comfortably, the outriggers should sit on the snow between the knees and feet.

For beginners, outriggers can be a little longer to provide a more stable platform. As skiers become more advanced, the outriggers are used less and less on the snow, although be sure they are long enough for the skier to push up onto a chairlift in the loading position.

Adjusting the brake — For beginners, allow for more braking, but not so much that the skier can't glide without braking. As the skier advances to more difficult terrain, less brake is needed.

Fixed Outriggers

For skiers who require additional stability, you can attach fixed outriggers to the bi-ski. Fixed outriggers provide stability to the ski by limiting the side-to-side movement of the ski. When adding fixed outriggers to a ski, you must also use a tether.

For beginning students, you can start with the fixed outriggers farther out and move them in as the student progresses. Remember, however, that fixed outriggers can interfere in turning even on green terrain. The farther out the outriggers are, the harder it is to turn the ski. Never take a bi-ski with fixed outriggers on terrain that does not allow the bi-ski to function properly.

Handlebars and T-Bars

These devices provide a stable platform for the skier to hold on to. These are commonly used with fixed outriggers. The skier can use the bars to help lean into the turns and return to a neutral position.

Tethers

Each bi-ski has two tether lines attached to the back of the ski. The tether is used by the instructor to help steer the ski, to control the speed, and to stop the bi-ski. For more information, see the Tethering section.

Helmets

Bi-skiers must wear helmets.

❖ NOTE: All emergency straps should have locking carabiners. Safety straps should have non-locking carabiners.

Special Considerations for Bi-Ski Students

- Pay attention to your student's physical needs—are they warm enough? Are they comfortable? Beware of snow accumulating in the bucket and around the student's feet.
- After a fall, check the straps and padding to make sure the student is still balanced in the ski.

Bi-Ski-Specific Teaching Techniques

Because a bi-ski is designed to accommodate a wide variety of skier abilities and participation, the instructor must adapt the lesson plan according to the abilities of the student. Never assume, however, that a student is not capable of participating in the skiing, even if it is just a head nod. Promote as much independence and participation as possible.

For skiers with the ability to hold outriggers and steer the ski, follow the lesson plan progressions to develop skills needed.

Chairlift Loading and Unloading

Safety is the key!! If needed, ask the lift operator to slow down or stop the chair. For more information about additional chairlift procedures, including emergency procedures, see Chapter 2, "Safety Procedures and Policies" in the SKIFORALL Volunteer Manual.

Keys to success:

- Do a practice lift with your assistant before entering the loading ramp. Decide who counts.
- Explain to the student what will happen and what you need the student to do. Hand-held outriggers should be in the student's lap. When loading, once the ski is on the chair, the student should lean back and the bucket should be at the back of the chair. When offloading, the student should lean forward.
- When using fixed outriggers, beware of being hit or trapped by them when loading and unloading.
- Secure the tether before loading. It should never be dangling from the chair. For best results, remove the tether or secure it in the bucket of the bi-ski.
- Communicate with the lift operators at both the top and the bottom of the lifts. Never assume they know or remember what you need. Report any problems with lift ops to your Lead Volunteer.
- Make sure the safety strap is accessible. Do not leave the loading area until the strap is connected to the chair. Signal the lift operator when it is attached (usually done by the lifter).
- For unloading, do not remove the safety strap from the chair until your skis touch the snow on the ramp. Stop the chair if necessary.
- **The first time** the student rides the chairlift, stop the lift when loading and ask the lift operator to warn the operator at the top of the lift. Stop the lift for unload.

Transferring a Student to a Bi-Ski

When moving a student from a wheelchair to the bi-ski, be sure to communicate with the student about what is happening. Do not touch a student without permission.

- ❖ Never lift a student by yourself. Work with your partner or find someone to help you. Follow proper lifting techniques (for example, use your knees not your back).
- ❖ Always make sure the evacuation straps are accessible.

Tethering a Bi-Ski

With tethers, the instructor has complete control over the bi-ski. You can safely ski a student down the hill with little or no participation from the student. For students capable of initiating turns on their own, the tether provides speed control and corrections during a turn.

The bi-ski uses two tether lines, one attached to each side of the back of the bucket. This double line allows you to force the ski to lean in the direction of a turn and to return the ski to neutral position. For more independent skiers, use a longer tether.

- ❖ **NOTE:** Wrap the tether line securely around one wrist. In many cases, you are the last thing that will stop a ski.

Before moving (especially after a fall), always check with the student to make sure all is well. Establish a signal, something like "Tether on!" or "OK, Ready when you are!" before taking off.

Skiing Behind a Bi-Ski

When tethering, ski uphill and slightly inside the turn. Your exact location depends on the pitch of the slope, your speed, and how the skier is balanced in the ski. Most of the time, you should be in the *power wedge*—

but avoid leaning back, this isn't water-skiing! Short skis are recommended so your skis don't interfere with the bi-ski.

Steering the Bi-ski with Tethers

Initiate a turn with a combination of pulling up with the "outside" rein (like a biceps curl) and down/back on the "inside" rein (straighten out your arm and push down). Keep the movements close to your body and use your biceps rather than your shoulders. Do not have your hands over your head or straight out to your side.

SKIFORALL policy recommends using straight tethering techniques rather than crossed tether lines. A non-crossed tether line provides greater leverage over the ski.

Remember, the bi-ski is a fall-line seeking ski, meaning that when balanced it will try to head straight down the hill. To get the ski to head into the fall line, simply pull back on the tether while you are directly uphill from the ski. And be aware that it is difficult to traverse with a bi-ski, especially if it has fixed outriggers. Choose your terrain carefully.

When working with a student who is able to initiate turns, you need to work out the timing of the turns. If the student cannot communicate, the tetherer needs to be aware of the skier's body movements and anticipate turns. Be careful not to interfere in the student's skiing. Provide speed control and support, but allow the skier to have as much control over the skiing as possible.

The Emergency Stop

Choose a signal for an emergency stop and discuss it with your student. Typically, the student raises the outriggers or hands and yells "Stop!" Practice the stop with your student.

- ❖ It is important that the bi-ski is heading straight down the hill and that you are in the appropriate position when you do the hockey stop. If the ski is turning when you stop it, you must be uphill on the inside of the turn or the skier will tip over. For best results, always have the ski pointing down the fall line when stopping.



Lesson Plan: Introduction to Equipment

Goals

- Introduce the equipment before loading the student into the ski. Explain functional aspects and safety features.
- Transfer the student to the ski and adjust the ski as needed to ensure a balanced fit.
- If using fixed outriggers, attach them. Do not put them too far out or they will interfere with turning.
- Teach appropriate body position—neutral athletic stance: Outriggers next to heel of boot, hands relaxed, elbows bent and by hips, shoulders relaxed, head up, eyes forward.
- Show how hand-held outriggers work: walking position, skiing position.
- Explain the safety code.

Teaching Tips

- Explain the concept of the seat as the boot and the importance of a snug fit.
- Note any adjustments to the equipment on the skier's progress report.
- Allow the skier to do as much as possible, but do not allow the student to become exhausted.

Exercises

- Transfer the student to the ski and demonstrate how straps work.
- Take time to set up equipment properly to ensure that student is balanced in the ski.
- Demonstrate the appropriate body position and balance.
- Experiment with balance: slowly rock forward and back, with outriggers on the ground and with outriggers in the air.
- Explain and demonstrate the loading mechanism. Have student practice.

❖ **NOTE:** Adapt the exercises to the ability of the student. Not all exercises are appropriate for all bi-skiers. Use common sense.

Skills Concept (BERP) Review

- ◆ **Balancing movements** — Ability to maintain balance while moving torso fore/aft and outriggers up/down/out.
- ◆ **Edge-control movements** — Ability lean to engage edging and then return to a flat ski.
- ◆ **Rotary movements** — Ability to turn head and upper body.
- ◆ **Pressure-control movements** — Ability to move torso fore/aft



Lesson Plan: Flatland Drills

Goals

- Become familiar with the equipment on flat terrain.
- Focus on developing good balance, good body position.
- Teach how to move around on flats using outriggers.

❖ NOTE: Not all exercises are appropriate for all bi-skiers. Use common sense. Allow the student to participate as much as possible, but feel free to adapt the lesson to the needs and abilities of the student.

Teaching Tips

- **Don't be afraid to spend extra time on the flats!** Run through all of the movement patterns in the safe environment before moving to the chair lift. Explain the importance of the flatland drills to the student.
- Have the skier do as much of the work as possible, but be careful not to wear them out too soon.
- Always reinforce an athletic stance and give students the opportunity to work on balance. If you hold them up all of the time, they will never learn for themselves!
- If skier continues to have balance problems, check that the ski is balanced and set up correctly. The hips must be square. Make sure the straps are positioned correctly to provide support where necessary but still allowing the skier to move as much as possible.

Exercises

- Balancing with outriggers off the ground. Add moving the body forward and back while maintaining balance as well as lifting both outriggers off the ground.
- Push around using the outriggers in crutch position and in skiing position.
- Lift the ski off the ground using the outriggers in crutch position.
- Star turns: turning the ski in a circle while lifting the ski off the ground using outriggers in crutch position.
- Teach how to use outrigger brakes to stop in lift lines. Warn the student never to stop the ski using outriggers when skiing (similar to using poles to stop you).

Skills Concept (BERP) Review

- ◆ **Balancing movements** — Developing static balance through proper body and outrigger position.
- ◆ **Edge-control movements** — Ability lean to engage edging and then return to a flat ski.
- ◆ **Rotary movements** — Turning the ski using the outriggers.
- ◆ **Pressure-control movements** — Moving body forward and back and from side to side.



Lesson Plan: Straight Run

Goals

- Add movement to flatland drills by having skier do a straight run.
- Challenge the skier's balance while focusing on maintaining correct body positioning.
- Control speed using the outrigger brakes.

❖ **NOTE:** Some skiers who will be tethered do not require flatland drills. Allow the student to participate as much as possible, but feel free to adapt the lesson to the needs and abilities of the student.

Teaching Tips

- Use terrain that allows for a natural stop.
- As student becomes more comfortable, increase speed and length of the straight run.
- *Avoid bucket-assisting as much as possible.* If the student is having trouble maintaining balance, go back to flatland balance drills until the student is comfortable. Some bucket assisting is necessary to keep a student from falling and becoming frustrated...but try to let the student correct himself before you correct him.
- It is easiest to perform the flatland and straight run lessons in your boots (assuming you have good terrain). Save your skis for when you are on the slopes.

Exercises

- Straight run to a natural stop.
- Straight run to a stop using outrigger brakes.
- Straight run change ups: lifting outriggers off snow, braking and releasing,
- Introduce outrigger braking — maintain stance and apply pressure to the outriggers by lowering the elbows and driving the hands down and forward.

Skills Concept (BERP) Review

- ◆ **Balancing movements** — Maintain balance while moving.
- ◆ **Edge-control movements** — Avoid leaning to maintain a flat ski.
- ◆ **Rotary movements** — Maintain straight run with no rotary.
- ◆ **Pressure-control movements** — Maintain equal pressure on outriggers.



Lesson Plan: Beginning Wedge Turn Equivalent (on the flats)

Goals

- Add slight changes of direction to the straight run to introduce turning. Gradually increase size of turn.
- Turning in each direction to a stop, using outrigger braking if needed.

❖ NOTE: This lesson takes places on the flats!

Teaching Tips

- Have student lean in the direction of the turn. Begin with slight changes of direction. Increase turn size while increasing speed.
- If having trouble getting the ski to turn, increase speed and have the student lean forward a bit while leaning in the direction of the turn. Check the equipment if problems persist (loose straps, unequal outrigger brakes).
- Watch the outriggers. Too much pressure on one or both can be indications of balance problems.
- If the ski is turning too much, have the student lean less to make large-radius turns that won't slow the ski down too much.
- While pushing the bi-ski on the flats, encourage the student to maintain balance of the ski.

Exercises

- In straight run, begin leaning slightly in direction of the turn.
- Increase size of direction changes while keeping outriggers on the snow. Ski in front of student and have him follow your tracks. Vary the size of the turns.
- Turning in one direction to a stop.
- Avoid the “open the door” technique unless the skier is having difficulty getting the ski to turn. This technique is normally introduced at a more advanced stage. For a beginner, keep it simple. Focus on looking in the direction you want to go.

❖ NOTE: Adapt the exercises to the ability of the student. Not all exercises are appropriate for all bi-skiers. Use common sense.

Skills Concept (BERP) Review

- ◆ **Balancing movements** — Maintain balance while moving.
- ◆ **Edge-control movements** — Leaning to engage edging.
- ◆ **Rotary movements** — Slight rotations of upper body in direction of the turn.
- ◆ **Pressure-control movements** — Maintain equal pressure on outriggers. Lean forward slightly to help initiate the turn and return to center to finish the turn.



Lesson Plan: Wedge Turn Equivalent

Goals

- Introduce the chairlift and explain safety.
- Increase size and variety of turns on beginner terrain. Turns should be on flat, skidded ski. Avoid too much leaning and edging at this level.
- Speed control through turn shape.
- Work on turn initiation with increased outrigger involvement.

Teaching Tips

- Follow safety precautions for chairlift loading/unloading.
- Remember, a bi-ski with fixed outriggers *must be tethered*.
- If the student is having trouble turning in one direction, check ski setup and ensure the student is balanced in the ski.
- If using fixed outriggers, make sure they do not interfere with turn shape. Do not move to steeper terrain without adjusting fixed outriggers as appropriate.
- Tethering: When skier initiates a turn lift up on the outside/uphill tether and pull down on the inside/downhill. Use the tethers to help control speed if needed.
- For a more active student at this level, tethering should be at a minimum. Longer tethers are helpful. Consider using the Bi-Unique and working on independent skiing as a goal.

Exercises

- Ride the chairlift. Have the student do as much as possible.
- MILEAGE!! Vary turn size.
- Develop ability to perform medium- to long-radius turns to control speed. Explain how turn shape controls speed.
- Uphill Christy Fan progressions — allow student to become comfortable with turning uphill to slow down and stop.
- Garlands — focus on either turn initiation or finishing the turn. Show how leaning forward and looking downhill starts a turn and how returning to neutral position helps end a turn. Let student become comfortable with shifting weight from one turn to the other.

❖ NOTE: Adapt the exercises to the ability of the student. Not all exercises are appropriate for all bi-skiers. Use common sense.

Skills Concept (BERP) Review

- ◆ **Balancing movements** — Maintain balance while moving over varied terrain.
- ◆ **Edge-control movements** — Leaning to engage edging and return to neutral position.
- ◆ **Rotary movements** — Slight rotations of upper body in direction of the turn, assisted by outrigger leads.
- ◆ **Pressure-control movements** — Lean forward to help initiate the turn and return to center to finish the turn.



Lesson Plan: Wedge Christie Turn Equivalent

Goals

- Increase size and variety of turns on beginner terrain.
- Introduce opening-the-door concepts for turning. Practice statically first.
- Begin introducing edging control by encouraging outrigger matching.
- Initiate turns faster, switching between medium- and short-radius turns.
- Increase fore/aft pressure movements and countering during turns for more active crossover.

Teaching Tips

- Work on more active outrigger use as well as more dynamic body movement. Encourage matching of outriggers throughout turn.
- Keep the open-the-door technique simple. Do not introduce countering or reaching downhill.
- Take known drills and experiment with different body and outrigger positions. Show how leaning the body forward and pointing outriggers down the hill initiates turns. Let the student experiment and find what works best. It may be different for different students.
- Tethering: Interfere as little as possible. Only help where needed, for example, some bi-skiers will always need help finishing a turn. Adjust your style to the needs of the student.

Exercises

- MILEAGE!! Practice variety of turn shapes.
- Uphill Christie Fan progressions — experiment with body positions.
- Falling leaf — try leaning too far forward, too far back, centered and notice differences.
- Side slipping — begin experiments with edging. The body stays down the hill.
- Open-the-door — work on one arm at a time and with outriggers in different positions. Have student feel the differences.
- Garlands — experiment with opening the door during garlands.

Skills Concept (BERP) Review

- ◆ **Balancing movements** — Maintain dynamic balance while moving at greater speeds.
- ◆ **Edge-control movements** — Leaning to engage edging to begin and end turns.
- ◆ **Rotary movements** — Slight rotations of upper body in direction of the turn. Enhanced outrigger use provides slight countering.
- ◆ **Pressure-control movements** — Lean forward to help initiate the turn and return to center to finish the turn.



Lesson Plan: Parallel Turns and Beyond

Goals

- Skiing blue/easy black runs in control with more active and controlled turning.
- Reaching down the fall line with outriggers.
- Greater upper and lower body separation.
- Independence.

Teaching Tips

- Encourage earlier turn initiation.
- Allow skier to do as much as possible. By this stage, a skier should be skiing independently. (Only the Bi-Unique can ski independently. NEVER USE FIXED OUTRIGGERS when skiing independently!)
- Check with Lead Volunteer before skiing without tethers.
- Tethering — If still tethering, interfere as little as possible. Only help where needed, for example, some bi-skiers will always need help finishing a turn. Adjust your style to the needs of the student. Long tethers will help.

Exercises

- Hockey stops
- Mixed turns: short-radius, swing turns, etc.
- Side slipping
- Falling leaf

Skills Concept (BERP) Review

- ◆ **Balancing movements** — Maintain dynamic balance while moving.
- ◆ **Edge-control movements** — Use leaning movements to engage and release edges.
- ◆ **Rotary movements** — Rotation of upper body in direction of the turn, creating angles with hips.
- ◆ **Pressure-control movements** — Lean forward to help initiate the turn and return to center to finish the turn.

