PSIA-W Adaptive
Exam Prep Level III
Study Guide November 2017

This adaptive education study guide has been created for the purpose of exam preparation as well as to assist PSIA-W members in broadening their knowledge of adaptive skiing and how to work effectively with individuals with disabilities who wish to be active in the sport. This study guide is to be used as an aid in preparing for your Adaptive Level III Exam in conjunction with PSIA clinics and training at your home ski area. You will be responsible for the material in this packet as well as additional material obtained from other sources.

The study guide often cites the ***adaptive disciplines***, which refers to the following six categories of adaptive skiing currently recognized by PSIA:

- Mono-ski
- Bi-ski
- Three-track
- Four-track
- Blindness and Low Vision
- Developmental and Cognitive Disabilities

PSIA-W Adaptive Level III instructors are required to be versed in all six adaptive disciplines through the advanced zone. Each adaptive discipline has adaptive skiing equivalents based on the American Teaching System (ATS) as well as having a variety of associated disabilities and equipment options.

The exam will cover material including; the ATS Teaching Model, Stepping Stones Concept, movement analysis, personal skiing and skiing tasks and skills demonstrations. To be better prepared for an exam, candidates should answer all questions in this study guide, meet the criteria outlined in the study guide, and have taught multiple lessons in each adaptive discipline as a level II instructor before attending an Adaptive Level III Exam.

It is strongly suggested that instructors using this study guide also purchase and use the PSIA Adaptive Alpine Technical Manual, the PSIA Core Concepts for Snowsports Instructors, the PSIA Alpine Technical Manual, the PSIA Level III Study Guide, and the PSIA Children's Instruction Manual. These references are essential if the candidate wishes to be successful in their Adaptive Level III Exam.

PSIA-W Adaptive Exam Performance Parameters, Level III

Skiing

Free Skiing

Candidates will be scored on their own personal skiing, on the demonstrations required for skiers through the advanced zone, and the five predetermined tasks.

- Candidate's personal skiing will be scored by an adaptive examiner.
- Variations in free skiing may exist depending on the snow conditions during the exam, grooming available that day, or special requests from the examiner**.** Examiners choosing any turn variations will explain their rationale for wanting to see the variation and will demonstrate the turn/task prior to the candidate's performance.
- Skiing tasks will be performed on appropriate terrain as indicated below. The examiner will make the determination as to the proper terrain for the task to be completed.

Level III certified teachers should have the skills to make short, medium, and long radius turns with little or no skidding. The skis describe two well defined arcs from before the fall line to turn completion. Terrain and snow conditions should have a minimal effect on skill application, movement accuracy, and turn outcome. Turn dynamics should represent the terrain, speed, and snow conditions common to Advanced zone skiing. A Level III certified teacher has the ability to maintain dynamics and movement accuracy through most conditions, on any terrain on most mountains.

The candidate is able to…

1. **General Characteristics**
    a. Ski dynamic-parallel turns on any terrain on most mountains
    b. Reduce, generate, or maintain speed without interrupting overall flow or rhythm
    c. Ski a variety of turn sizes and shapes and apply them to different mountain situations
    d. Demonstrate different types of skill blends and movement patterns in exercises, tasks, and turns upon request, and as applied in different mountain situations
    e. Maintain control over turn shape and speed while skiing most conditions on any terrain on most mountains
2. **Balance** (Level III Advanced zone terrain, speed, and dynamics)
    a. Maintain lateral and fore-aft balance through turn transitions, as balance shifts from foot to foot through terrain and conditional variations
    b. Demonstrate an ability to consistently maintain the balanced relationship of the hips and the feet through all phases of the turn
    c. Utilize proactive movements which anticipate ski reaction and create balance adjustments, minimizing the interruption of rhythm and flow in most situations common to all mountain skiing
    d. Demonstrate the *visual cues to effective skiing* relative to balance in skiing and tasks common to Advanced zone skiers

Free Skiing (Continued)

3. **Rotary Movements** (Level III Advanced zone terrain, speed, and dynamics)
    a. Use an appropriate amount of rotational guiding to assist edge engagement and direction change when dictated by conditions, terrain, or task
    b. Demonstrate consistent guiding of both feet into and out of the fall line, creating two well defined arcs in the snow (minimal tail displacement)
    c. Utilize strong, accurate rotational movements in conditions, terrain, and tasks which require quick direction change with minimal side cut engagement
    d. Demonstrate the *visual cues to effective skiing* relative to rotary movements on demonstrations and tasks common to Advanced zone skiers
4. **Edge Control Movements** (Level III Advanced zone terrain, speed, and dynamics)
    a. Begin tipping of the skis from uphill edges to the downhill edges before turning the skis toward the fall line (minimal pivoting to an edge) in most conditions on any terrain on most mountains
    b. Demonstrate progressive, dynamic increase and decrease of edge angle throughout the phases of the turn
    c. Utilize side cut/ski design as the primary component controlling turn shape in most conditions in most situations
    d. Demonstrate the *visual cues to effective skiing* relative to edge control movements on demonstrations and tasks common to Advanced zone skiers
5. **Pressure Control Movements** (Level III Advanced zone terrain, speed, and dynamics)
    a. Maintain ski-snow contact when appropriate to condition, task, or demonstration
    b. Adjust movements to maintain, increase, or decrease pressure and turn forces as conditions, tasks, or demonstrations require, while maintaining turn shape and accuracy
    c. Demonstrate a gradual increase in pressure to the outside ski throughout round turns in most conditions on any terrain on most mountains.
    d. Adapt to terrain variables with minimal interference with ski performance
    e. Demonstrate the *visual cues to effective skiing* relative to pressure control on demonstrations and tasks common to Advanced zone skiers

DYNAMIC PARALLEL TURNS/BUMPS (Any terrain on the mountain)

General Characteristics:

- Ski dynamic-parallel turns on all mountain terrain.
- Show appropriate skill blending on all mountain terrain, except the most extreme.
- Reduce, generate, or maintain speed without interrupting overall flow or rhythm.
- Ski a variety of turn sizes and shapes and apply them to different mountain situations.
- Demonstrate different types of skill blends and movement patterns in exercises, tasks, and turns upon request, and as applied in different mountain situations.
- Maintain turning and speed control while skiing in any snow condition (i.e., powder, crud, bumps, ice, or hard pack).

Dynamic-Parallel Turns

- Demonstrate dynamic parallel turns in a variety of terrain and snow conditions.
- Blend skills appropriately, in response to speed, turn radius, tactics, terrain, snow condition, or intention, at any place on the mountain.
- Use ski design and skill blending to carve and shape turns.
- Maintain pressure on the outside ski with dynamic balancing movements.
- Link turns with continuous and accurate movements.

Bumps

- Ski any bumps on the mountain.
- Link turns in the fall line for the entire length of the selected run.
- Reduce, maintain, or generate speed without interrupting the overall flow of the run.
- Maintain turning within a line and intentionally change lines during the run.
- Demonstrate appropriate tactical choices, as dictated by terrain

DEMONSTRATIONS

Wedge-Christie Turns

- Demonstrate on any green or easy blue terrain (not necessarily groomed).
- Demonstrate steering of the inside ski to facilitate matching
- Demonstrate shaping of the control (shaping) phase of the turn by blending skills and steering both skis
- Demonstrate matching of the skis in a variety of places in the turn (beginning, middle, end), depending on speed, terrain, or intention

Open-Parallel Turns

- Demonstrate on any blue or easy black terrain (not necessarily groomed).
- Demonstrate a simultaneous edge change at the turn initiation
- Demonstrate a pole swing that facilitates extension and edge change at turn initiation
- Demonstrate active steering of both legs throughout the turn to facilitate turn shape and speed control
- Maintain an accurate blending of skills to perform a series of consistent turns.

Dynamic Parallel Turns

- Demonstrate dynamic parallel turns in a variety of terrain and snow conditions.
- Blend skills appropriately, in response to speed, turn radius, tactics, terrain, snow condition, or intention, at any place on the mountain.
- Use ski design and skill blending to carve and shape turns.
- Maintain pressure on the outside ski with dynamic balancing movements.
- Link turns with continuous and accurate movements

TASKS

- Hop turns: Skier connects short, angular-shaped turns with a hop. From an edge set and pole plant in one direction, the skier hops up, turns the skis in the air, and lands on the new edges in the new direction.
- Pivot sideslips: slipping down the hill within a corridor with multiple direction changes accomplished by pivoting within the same corridor.
- Retraction / Extension turns: The skier initiates the turns by actively pulling the legs up under the body by contracting the muscles of the abdomen and hips.
- Single-ski skiing: Skiing down the hill on only one ski at a time. The examiner can specify for the task to be completed on either ski.
- Pure carved turns: The skier makes turns created purely by ski design with no skidding.

Teaching

Candidates will be tested in all adaptive disciplines as follows:

- Knowledge will be assessed in both written and on-hill practical exam formats including teaching and movement analysis sessions. Candidates will be asked about skiers and situations associated with adaptive skiers through the advanced zone in each adaptive discipline.
- Teaching scenarios with adaptive equipment will occur. The candidate will be scored on his/her ability to teach a safe and fun lesson in which learning takes place. The examiner is looking for safety considerations, presentation skills, creativity, application of the teaching model, lesson content, and practical application of the appropriate teaching style for the student's learning style.
- Candidate will be expected to demonstrate appropriate communication techniques for the student.
- Candidate will be expected to demonstrate knowledge of lesson handling skills for children, adolescents, and adults as well as to identify and address the specific needs of students based on their cognitive development, biomechanical factors and learning styles.
- The candidate will be required to demonstrate assists, loads, and guiding techniques, as well as the proper use of equipment appropriate for each adaptive discipline.

Understanding

Candidates will be tested on technical knowledge and understanding in each of the adaptive disciplines as follows:

- Knowledge based questions will be asked on the hill as well as on a written test.
- Define ski terminology as described in the PSIA Alpine and Adaptive Manuals.
- Define disabilities, secondary disabilities, and medications associated with each adaptive discipline and relate them to the cause and effect of skiing and the environment. The candidate is expected to identify and address any "red flags" for the disabilities associated with each adaptive discipline.
- Conduct appropriate physical and/or cognitive evaluation of student(s)
- Develop progressions to meet student goals in all adaptive disciplines.
- Define and explain the purpose of the skeletal, muscular, and nervous systems as they apply to teaching and skiing within each adaptive discipline. Define and explain the type of joints and how they work as applied to teaching and skiing within each adaptive discipline.
- The technical and functional aspects of adaptive equipment associated with each adaptive discipline will be explained and/or demonstrated by the candidate.
- The candidate is expected to know the physics that affect a skier during a turn. Identify the phases of a turn and the forces that act upon the skier during the turn.
- Application of movement analysis will occur in a group, or in a one-on-one situation with the examiner, during on-snow sessions. Candidates will be asked to comment on a skier within each adaptive discipline, through skiers up to the advanced zone, and make comments regarding their observation of the skier:
    - Skier profile
    - Turn type/Turn shape
    - Synopsis of the four basic skills
    - Ski type and effect on movements
    - Prescription for change based upon the skier analysis (what one skill would the candidate prioritize and work on?). Describe the progression that would be used to enhance or correct the student's skills in order to meet the student's goals.

PSIA-W
Level III Adaptive Education Checklist

Skiing

- Practice skiing technically correct, dynamic parallel turns, or the adaptive equivalent, on various types of terrain throughout the mountain.

- Practice skiing bumps on various runs throughout the mountain.

- Practice the demonstrations required for skiers through the advanced zone in each adaptive discipline. (Non-disabled candidates are not required to perform demonstrations in the mono ski, dual/twin ski, or the bi-ski). Have your trainer or a fellow instructor watch to make sure you demonstrate the tasks in a technically correct manner.

- Practice the exam skiing tasks. Have your trainer or a fellow instructor watch to make sure you demonstrate the tasks in a technically correct manner.
    - ❖ Hop turns
    - ❖ Pivot sideslips
    - ❖ Retraction / Extension and Extension / Retraction turns
    - ❖ Single ski skiing
    - ❖ Pure carved turns

- Practice the exam skiing demonstrations. Have your trainer or a fellow instructor watch to make sure you practice the demonstrations in a technically correct manner.
    - ❖ Wedge turns
    - ❖ Wedge Christie turns (both beginning and advanced)
    - ❖ Open-stance parallel turns
    - ❖ Dynamic parallel turns

Understanding

- Understand the facets of the disabilities common to each adaptive discipline. Refer to the specific disabilities that are listed (at the end of the chapter) in the PSIA Adaptive Alpine Technical Manual for the chosen discipline of focus. Disability definitions/descriptions can be found in the PSIA Adaptive Alpine Technical Manual Glossary of Common Diagnoses

- Be familiar with the classifications of medications and specific medications in each class that are commonly used by skiers within each adaptive discipline. Candidates are responsible for knowing the reason for use, potential side effects, and any safety related concerns.

- Be familiar with basic anatomy and medical terminology as it is used in conjunction with skiers in each adaptive discipline. Identify the purpose of the skeletal, muscular, and nervous systems as they apply to each adaptive discipline. Refer to PSIA Core Concepts, and the PSIA Adaptive Alpine Technical Manual.

- Gain practical experience in physical and cognitive assessment procedures of skiers within each adaptive discipline. Refer to the disability sections in the chapter of the PSIA Adaptive Alpine Technical Manual and PSIA Core Concepts.

- Be able to explain the technical aspects and uses of various brands of adaptive equipment pertinent to each adaptive discipline. View and experiment with the actual equipment whenever possible. Refer to the Equipment and Setup section in the chapter of the PSIA Adaptive Alpine Technical Manual for each adaptive discipline.

- Gain practical experience in fitting various types of equipment relative to all disabilities within each adaptive discipline. Refer to specific chapter for each adaptive discipline in the PSIA Adaptive Alpine Technical Manual.

- Be able to explain and demonstrate the proper procedure and equipment involved in a chairlift evacuation as it applies to each adaptive discipline. Refer to the PSIA Adaptive Alpine Technical Manual. See your staff trainer for additional area specific procedures for stand-up and sit-down skiers.

- Understand the technical aspects of the Skills Concept and the Skier Zones so that you can compare and contrast the concepts with the adaptive equivalents for skiers through the advanced zone in each adaptive discipline. Refer to the PSIA Alpine Technical Manual and the chapter in the PSIA Adaptive Alpine Technical Manual for each adaptive discipline.

- Understand and be able to utilize the concepts of *Coaching Your Students* (PSIA Core Concepts pages 23-48) and *Movement Analysis* (PSIA Alpine Technical Manual) in an adaptive ski lesson for skiers through the advanced zone in each adaptive discipline. Refer to the PSIA Adaptive Alpine Technical Manual sections specific to each discipline.

- Develop progressions for teaching students within each adaptive discipline. A progression should follow a logical sequence and be directed to address the specific skill that needs to be corrected and/or developed. Refer to the specific chapter in the PSIA Adaptive Alpine Technical Manual for each adaptive discipline and the PSIA Alpine Technical Manual.

- Be able to identify and discuss the basic principles of physics that affect skiers, both statically and dynamically (in motion). Be able to discuss Center of Mass (CM), gravity, the different types of friction that relate to skiing, centripetal force, and centrifugal force. Refer to PSIA Alpine Technical Manual, and PSIA Core Concepts pages 19-20.

Teaching

- Observe several lessons in each adaptive discipline. Record notes on the communication and teaching styles employed by fellow instructors.

- Understand the use and value of student information forms and lesson progress notes. Refer to PSIA Adaptive Alpine Technical Manual.

- Identify learning styles and give several examples of how to recognize a student's learning preference. Refer to PSIA Core Concepts pages 13-15 and 39-41.

- Identify and discuss teaching styles and give examples of how each one might be used in a teaching situation. Refer to PSIA Core concepts pages 39-43

- Discuss the environmental elements that can create general safety and comfort issues for the student during a lesson. Be familiar with Maslow's Hierarchy of Needs and the implications that result for students within each level. Refer to PSIA Core Concepts pages 35-39, and 63-74

- Discuss the environmental elements that create safety concerns particular to students and their disabilities within each adaptive discipline. Refer to the specific chapter within the PSIA Adaptive Alpine Technical Manual for each adaptive discipline and Chapter 6 of the PSIA Core Concepts Manual.

- Be able to identify and apply the theories regarding teaching children. Be able to identify the stages of development and the characteristics of children in each stage. Be able to address the specific needs of students based on their cognitive development and biomechanical factors. Refer to PSIA Core Concepts pages 12-17 and the PSIA Adaptive Alpine Technical Manual pages 23-4.

- Describe all of the points of Your Responsibility Code and how you would introduce it to skiers with disabilities when teaching skiers through the advanced zone in each adaptive discipline. Refer to PSIA Alpine Technical Manual and PSIA Core Concepts Manual page 65.

- Study the concepts of Coaching Your Students and be able to discuss each concept and understand how it is used during lessons. Refer to the PSIA Core Concepts Manual pages 23-48.

- Learn as much as you can about communication with your students. Refer to the PSIA Core Concepts Manual pages 10-17, 24-30 and 34-45.

- Be proficient with hands-on physical assists appropriate to each adaptive discipline (i.e. bamboo pole, two-point hold, tip hold, reins, tethers, and seat assist).

- Practice loading and unloading skiers on chairlifts using adaptive equipment appropriate to each adaptive discipline. Know and practice what to do in case of a mis-load/unload.

Extended Study Questions For Bi-skiing

To get the most out of this section answer these questions on a separate piece of paper, discuss the questions with your trainer and fellow instructors, and talk about these topics with your students.

Equipment

1) Compare and contrast the different types of bi-skis that are available at your school and the advantages and disadvantages of each. Discuss the differences in skis and articulation systems for the various types of bi-skis.
2) List all of the parts of a bi-ski and their respective functions.
3) Demonstrate and discuss the different loading characteristics of the various types of bi-skis.
4) How are the outriggers (fixed and hand-held) sized for a student and what is their purpose?
5) Discuss the purpose of tethers and how they are used.
6) What guidelines do we use to adjust the skis forward and back.
7) Describe how to fit a person into a bi-ski.

Teaching and Understanding

1) Discuss reasons why a straight run is taught. Discuss reasons why a straight run might not be taught to a beginning student?
2) What skill is primarily emphasized in beginning bi-ski turns? Cite the skills hierarchy.
3) Why does a bi-ski have super side-cut skis? Why are the side-cuts asymmetrical?
4) Describe the differences/similarities between teaching with fixed and hand-held outriggers.
5) Why do we teach the "drop and block" method to a bi-skier? When would this method not be appropriate?
6) What determines whether a turn will be skidded or carved?

Disability/Medications

1) Prior to the lesson, how do you evaluate the abilities of your student?
2) What kind of questions should you ask your student about his/her disability, medications, medical needs, and athletic abilities?
3) What factors determine whether a person bi-skis?
4) What factors determine whether a person will use hand-held outriggers or fixed outriggers?
5) Identify the vertebrae, the associated nerves, and the muscle and body function these nerves control.
6) Define autonomic dysreflexia, cite its symptoms, and when and why it occurs. At what injury level it is usually associated? What do you do when autonomic dysreflexia occurs?
7) What is a PDR and what is it used for? Is there a comparable substitute?
8) Cite the classes of medications that may be taken by some bi-skiers. Be able to identify examples of specific drugs for each class and any possible side effects.
9) Define the following disabilities and their associated "red flags":

Cerebral palsy - spastic, athetoid, flaccid, ataxic, and rigid

Muscular dystrophy	Multiple sclerosis	Post Polio
Spina bifida	Spinal cord injury (SCI)	Diabetes
Brain injury	Progressive diseases	Friedrich's Ataxia
Epilepsy		

Safety

1) Discuss the potential safety issues regarding outrigger use (both hand-held and fixed).
2) Discuss the possible safety challenges related to the student and instructor regarding tethering a bi ski.
3) Investigate the safest way to transfer your student to and from the bi-ski and how to assist the student after a fall. Consider both the student and the instructor.
4) Describe and demonstrate the evacuation systems for the bi-skis available at your program.

Extended Study Questions For Mono-skiing

To get the most out of this section answer these questions on a separate piece of paper, discuss the questions with your trainer and fellow instructors, and talk about these topics with your students.

Equipment

1) Compare and contrast the different types of mono-skis available to your program. Discuss the advantage and disadvantages of each.
2) List all of the parts of a mono-ski and their respective functions.
3) How are the outriggers sized for a student and what is their purpose?
4) What is a dowel test and how is it done? Is weight ever added to a mono-ski? Why?
5) Discuss the important points with regard to fitting a student in a mono-ski.

Teaching and Understanding

1) What role do the outriggers play in a straight run? Where are they positioned?
2) What skill(s) are emphasized in a wedge turn? Parallel turn? Cite the skills hierarchy.
3) Positioning a mono-skier's pelvis forward in the seat offers what type of advantages?
4) What is differential friction? How does a mono-skier create differential friction?
5) Why would we teach symmetrical and asymmetrical outrigger movements?
6) What assists are typically used with a mono-skier and why?

Disability/Medications

1) Prior to the lesson, how do you evaluate the abilities of your student?
2) What kind of questions should you ask your student about his/her disability, medications, medical needs, and athletic abilities?
3) What factors determine whether a person mono-skis?
4) Identify the vertebrae, the associated nerves and the muscle and body function they control.
5) How can you test the balance and strength of a potential mono-skier?
6) Cite the classes of medications that may be taken by some mono-skiers. Be able to identify examples of specific drugs for each class and any possible side effects.
7) Define the following disabilities and their associated "red flags":

Cerebral palsy - spastic, athetoid, flaccid, ataxic, and rigid

Muscular dystrophy	Multiple sclerosis	Post Polio
Spina bifida	Spinal cord injury (SCI)	Diabetes
Brain injury	Progressive diseases	Friedrich's Ataxia

Safety

1) Discuss the potential safety issues regarding outrigger use.
2) Discuss the possible safety challenges to the instructor and student regarding physically assisting a mono-skier.
3) Investigate the safest ways to help transfer your student to and from the mono-ski and how to assist the student after a fall. Consider both the student and the instructor.
4) Describe and demonstrate the evacuation systems for the mono-skis available at your program.

Extended Study Questions For Three-track Skiing

To get the most out of this section answer these questions on a separate piece of paper, discuss the questions with your trainer and fellow instructors, and talk about these topics with your students.

Equipment

1) How are the outriggers sized for a student and what is their purpose?
2) How can a flat ski be achieved for a three-track skier?
3) Discuss canting.
4) Discuss some methods to restrain the residual or free limb of a three tracker if necessary.
5) What advantages do shaped skis offer a beginning three-tracker?

Teaching and Understanding

1) What role do the outriggers play in a straight run? Where are they positioned?
2) What is the primary skill emphasized in a beginning turn? What body mechanics are used to develop this skill?
3) Cite the skills hierarchy at the beginning turn level. How do all of the skills interact?
4) What is differential friction? How does a three-tracker create differential friction?
5) Describe the placement of the residual limb/non-skiing leg while skiing. Why is the placement important? What can happen to the action of the ski if the limb is in the improper position?

Disability/Medications

1) Prior to the lesson, how do you evaluate the abilities of your student?
2) What kind of questions should you ask your student about his/her disability, medications, medical needs, and athletic abilities?
3) Who is a candidate for three-track skiing? Why?
4) How does an amputation affect balance and strength?
5) What precautions must one take to protect the residual limb?
6) Can an amputee wear a prosthesis while three-tracking? If so, when?
7) Cite the classes of medications that may be taken by some three-trackers. Be able to identify examples of specific drugs for each class and any possible side effects.
8) Define the following disabilities and their associated "red flags":

Below the knee amputation (BKA)	Diabetes	Post Polio
Unilateral amputation	Cerebral Palsy	TBI/CVA
Above the knee amputation (AKA)	Hemipelvectomy	Hip Disarticulation
Bilateral Amputation	Congenital anomalies of the leg and/or foot	
Osteosarcoma and other cancers		

Safety

1) Discuss the potential safety issues regarding outigger use.
2) Describe ways to protect the residual limb from the elements.
3) Discuss the possible safety issues regarding skiing with a prosthesis.
4) Discuss the safest ways to assist your three-track skier to a standing position after a fall.

Extended Study Questions For Four-track Skiing

To get the most out of this section answer these questions on a separate piece of paper, discuss the questions with your trainer and fellow instructors, and talk about these topics with your students.

Equipment

1) How are the outriggers, walker, and other potential equipment sized for a beginning four-tracker? What is their primary function?
2) How can fore/aft balance, equal fore/aft pressure, and a flat ski be created for a four-tracker?
3) Discuss the equipment that can be used to maintain lateral control of a four-trackers legs and skis.
4) Describe different types of leg/hip/back braces worn by four-trackers. How do these braces work? How might these braces positively or negatively affect the skier/

Teaching and Understanding

1) What role do the outriggers play in a straight run? Where are they positioned?
2) What is the primary skill emphasized in a beginning turn? What body mechanics are used to develop this skill?
3) Cite the skills hierarchy at the beginning turn level. How do all of the skills interact?
4) Describe where rotary forces originate in four-trackers. Is it the same place in all 4-trackers?
5) What is differential friction? How does a four-tracker create differential friction?
6) When is it appropriate to tether a four-tracker? What type of equipment can be used in conjunction with the tethers?

Disability/Medications

1) Prior to the lesson, how do you evaluate the abilities of your student?
2) What kind of questions should you ask your student about his/her disability, medications, medical needs, and athletic abilities?
3) Who is a candidate for four-track skiing? Why?
4) Cite the classes of medications that may be taken by some four-trackers. Be able to identify examples of specific drugs for each class and any possible side effects.
5) Define the following disabilities and their associated "red flags":

Congenital anomalies of the leg and/or foot
Cerebral palsy - spastic, flaccid, athetoid, ataxic, rigid

Spinal cord injuries	Spina bifida	Post-Polio
Multiple sclerosis	Muscular dystrophy	TBI/CVA
Friedrich's Ataxia	Charcot Marie Tooth	Diplegia and Hemiplegia
Progressive Diseases	Guillain Barré Syndrome	Various forms of cancer

Safety

1) Discuss the potential safety issues regarding the use of outriggers, a walker, and other equipment when loading and unloading the chairlift.
2) Discuss the safety considerations for a student loading the chairlift with leg braces.
3) Discuss ways to ensure chairlift safety for a student who is prone to seizures.
4) Discuss the safest ways to assist your four-track skier to a standing position after a fall. Consider both the student and the instructor.

Extended Study Questions For Blindness And Low Vision

To get the most out of this section answer these questions on a separate piece of paper, discuss the questions with your trainer and fellow instructors, and talk about these topics with your students.

Equipment

1) What ski equipment could be used for a skier with blindness or low vision? Why?
2) What type of physical aids may be used by an instructor/guide?
3) List the clothing and accessories, head to toe, which may be used by a skier with blindness or low vision.
4) Discuss different types of communication equipment a guide and skier might use.

Teaching and Understanding

1) Describe different types of guiding systems. How do we determine the best guiding technique for a particular student?
2) What is the primary skill emphasized in a wedge turn? What body mechanics are used to develop this skill?
3) Cite the skills hierarchy of a beginning wedge christie turn. How do all of the skills interact?
4) What purpose does dragging a pole hold for a blind or low vision skier?
5) Describe the different positions from which a guide may work. What are the advantages and disadvantages of each?
6) List and describe the meanings of the verbal commands a guide may use.

Disability/Medications

1) Prior to the lesson, how do you evaluate the abilities of your student? When, where, and how is a vision assessment done?
2) What kind of questions should you ask your student about his/her disability, medications, medical needs, and athletic abilities?
3) What level of vision should a person have in order to require a guide while skiing?
4) Cite the classes of medications that may be taken by some blind or low vision students. Be able to identify examples of specific drugs for each class and any possible side effects.
5) Define the following disabilities and their associated "red flags":

Albinism	Blindness or partial sightedness
Cataracts	Congenital eye defects
Corneal Disease	Diabetic retinopathy
Glaucoma	Macular degeneration
Optic nerve disease	Peripheral vision
Retinitis pigmentosa	Strabismus
Tunnel vision	

Safety

1) Discuss the safety issues regarding loading/unloading chairlifts with blind or low vision skiers?
2) Discuss the possible safety challenges regarding guiding blind or low vision skiers on crowded slopes, on slopes with hard snow or icy conditions, and on slopes with active snow making guns.
3) What should you do if you and your blind or low vision student become separated on the slopes?
4) Discuss the need for emergency commands during a lesson with a blind or low vision student. Why do we need to establish emergency commands before the lesson begins?

Extended Study Questions For Developmental and Cognitive Disabilities
To get the most out of this section answer these questions on a separate piece of paper, discuss the questions with your trainer and fellow instructors, and talk about these topics with your students.

Equipment
1) What ski equipment could be used for a skier with a cognitive disability? Why?
2) What type of mechanical aids, or devices, may be used by an instructor to assist a developmentally disabled student during a lesson?
3) List the clothing and accessories, head to toe, which may be used by the student.
4) Why is it important to check the gear your student receives from the rental shop?

Teaching and Understanding
1) What adaptations of the Skills Concept and Skier Zones, if any, are used with skiers who have cognitive related disabilities?
2) What is the primary skill emphasized in a wedge turn? Describe the body mechanics used.
3) Cite the skills hierarchy of a wedge christie turn. How do all of the skills interact?
4) List some considerations of mental processes of developmentally disabled students.
5) Discuss the type of teaching style that may best suit the mental processes identified above.
6) Describe the different communication styles an instructor may employ with a developmentally disabled student. What are the advantages/disadvantages of each?
7) What different types of behavior challenges may be found in developmentally disabled students? What methods can the instructor use to deal with these challenges effectively?

Disability/Medications
1) Prior to the lesson, how do you evaluate the abilities of your student? How is a cognitive assessment done?
2) What kind of questions should you ask your student, or caregiver, about his/her disability, medications, medical needs, and athletic abilities?
3) Cite the classes of medications that may be taken by some skiers with developmental disabilities. Be able to identify examples of specific drugs for each class and any possible side effects.
4) Define the following disabilities and their associated "red flags":

Autism	Attention Deficit Disorder (ADD, ADHD)
Brain injury	Cerebral Palsy
Down Syndrome	Developmental Delays
Fetal Alcohol Syndrome	Fragile X Syndrome
Hemiplegia	Learning disabilities
Mental Retardation	Progressive Diseases

Safety
1) Discuss the potential safety issues in teaching a skier with "loose joints".
2) Discuss the possible safety challenges regarding teaching skiers who have cognitive disabilities on crowded slopes.
3) Discuss the implications and considerations involved with a student who is easily distracted.
4) What can an instructor do to prevent becoming separated from his/her student?
5) Discuss the safety issues associated with a student who is prone to seizures.

Evaluation/Assessment
Discuss the following profiles. Identify potential characteristics and or red flags associated with the disabilities, their potential impacts in a lesson, and how the impacts would be addressed:

1. A 52-year-old man who is blind, has diabetes, and has a BKA.

2. A man in his mid-thirties who sustained a frontal lobe brain injury due to a gunshot wound three years ago.

3. A woman who has severe arthritis in her right hip and Post Polio Syndrome.

4. A 17-year-old girl with Spina bifida who walks up right using a swing through gait. She wears polypropylene AFO's and has sores on her right calcaneus.

5. A retired NASCAR driver who became a C 5-6 as a result of a race day crash. Prior to the accident the individual suffered from asthma.

6. An electrical accident has left a 28 year old male with right BE and left BK amputations.

7. A young woman who was diagnosed with MS two years prior to a stroke which resulted in hemiplegia and problems with lability.

8. A primary school aged girl who has ADHD as well as severe seizure disorder.

Recommended Reading List

PSIA Adaptive Alpine Technical Manual
PSIA Education Foundation

PSIA Alpine Technical Manual
PSIA Education Foundation

PSIA Alpine Level I Study Guide

Available on-line at www.psia-w.org

PSIA Alpine Level II Study Guide

Available on-line at www.psia-w.org

PSIA Alpine Level III Study Guide

Available on-line at www.psia-w.org

PSIA Core Concepts for Snowsports Instructors
PSIA Education Foundation

Bold Tracks, Teaching Adaptive Skiing, 3rd edition
Hal O'Leary

Reference List

TITLE:	AVAILABLE THROUGH:
PSIA Adaptive Snowsports Instruction Manual © 2003 PSIA Education Foundation	PSIA-W 530 587-7462 www.mist@psia.org
PSIA Alpine Technical Manual © 2002 PSIA Education Foundation	PSIA-W 530 587-7462 www.mist@psia.org
PSIA Core Concepts for Snowsports Instructors © 2001 PSIA Education Foundation	PSIA-W 530 587-7462 www.mist@psia.org
PSIA Alpine Level I Study Guide PSIA Education Foundation	only available on-line at www.psia-w.org
PSIA Alpine Level II Study Guide PSIA Education Foundation	only available on-line at www.mist@psia.org
PSIA Alpine Level III Study Guide PSIA Education Foundation	only available on-line at www.mist@psia.org
Bold Tracks, Teaching Adaptive Skiing, Third edition Hal O'Leary	National Sports Center for the Disabled 970-726-1540 www.nscd.org

Medications: Physicians Desk Reference (PDR) or other medication reference materials that is current
Disabilities: Medical Dictionary that is current

Sample Exam Questions

Technique and Disability Questions

1. Is it safe to wear a ski tip connector on the chairlift?
2. Is it safe to wear a ski tip connector on the poma lift?
3. How are outriggers adjusted for a beginning three tracker?
4. How are outriggers adjusted for a beginning mono-skier?
5. Explain how outriggers are adjusted for a mono-skier as the skier progresses.
6. How are outriggers adjusted for a beginning bi-skier?
7. What are some common Blind and Low Vision ski guiding commands?
8. When would you use a spreader bar?
9. How do you determine what size spreader bar to use?
10. What learning style would you associate with an autistic person?
11. What learning style suits most blind people?
12. How do you check for a leg length difference?
13. How do you discover canting needs?
14. What are some red flags for spinal cord injuries?
15. What is Multiple Sclerosis? Name some red flags.
16. What is Muscular Dystrophy? Name some red flags.
17. What is Spina Bifida? Name some red flags.
18. What happens if a three-tracker is edge-locked?
19. What might cause a three-tracker to become edge-locked?
20. Name five causes of Mental Retardation.
21. Name five characteristics of autistism.
22. What is Atlantoaxial Subluxation?
23. What is Autonomic Dysreflexia?
24. Name five symptoms of Autonomic Dysreflexia.
25. Name three possible causes of Autonomic Dysreflexia during a ski lesson.
26. What is a shunt?
27. What is scoliosis and what effect does it have on a skier?
28. How do you dowel test a mono skier?
29. How do you cant a mono skier?
30. What are the red flags for a diabetic amputee?
31. What is insulin shock?
32. Name five symptoms of insulin shock.
33. What is epilepsy?
34. Name two types of seizure.
35. What do you do if your student has a grand mal seizure?
36. What precautions do you take if your student has a seizure disorder?
37. Name five anticonvulsants.
38. What is PDR?
39. What is the definition of legally blind?
40. What are cataracts?

41. What is glaucoma?
42. What is nystagmus?
43. What is astigmatism?
44. What does myopic mean?
45. What is a CVA?
46. What does hemiparesis mean?
47. What is bilateral AKA?
48. What is unilateral AKA, BEA?
49. What does paraplegia mean?
50. What is the spinal cut off point which determines paraplegia vs. quadriplegia?
51. What is the skill ordering for a Mono-ski progression?
52. What is the skill ordering for a Bi-ski progression?
53. Name five possible equipment problems for a mono-ski that won't turn.
54. Should a three-tracker ever pressure the tail of the ski? When?
55. What does the shock absorber on a mono-ski do?
56. How do you adjust the foot tray on a mono-ski?
57. How high of a seat back does a T-4 mono-skier need?
58. How do you set up a post polio three-tracker?
59. Name five types of CP and give examples of how each type might ski.
60. What causes CP?
61. What type of person might have echolalia?
62. What is fragile X syndrome?
63. What is Freidrich's Ataxia?
64. Explain diabetic retinopathy.
65. What does the left brain do?
66. What is left aversion?
67. What is lability?
68. What is aphasia?
69. What is dysarthria?
70. What muscle groups are controlled by the C-5 nerve pairs?
71. What is the approximate cut off for Autonomic Dysreflexia on the spinal cord?
72. Which nerve pairs control the triceps?
73. Name and explain the vertebra of the spine.
74. Is there such a thing as a C-8 injury? Explain.
75. What disabilities can inhibit proper thermoregulation?
76. When must a bi-skier be tethered?
77. Why is it easier for a three-tracker to turn opposite his good leg?
78. How would you set up a student with TBI and hemiparesis for skiing?
79. What is the difference between proliferative and non-proliferative diabetic retinopathy?
80. Name and explain two types of insulin.
81. Give ten characteristics of a TBI.
82. List the nerve pairs of the cervical region as well as the muscle groups they control.
83. Name and explain two ways a Bi-Skier can achieve crossover.
84. What determines the maximum steepness of terrain for a four-tracker?
85. What determines the maximum steepness of terrain for a bi-skier?

86. What type of angulation can a mono-skier use?
87. Where does the rotary come from in mono-skiing?
88. How do you get a four-tracker with full-length braces on the chairlift?
89. What types of angulation can a four-tracker use?
90. When in a mono-ski progression should you introduce opening the door?
91. How does a mono-ski progression differ from a bi-ski progression in terms of skill ordering?
92. What determines whether an amputee can ski with a prosthesis?
93. How does a Mono-ski progression differ from a three-track progression in terms of skills taught and skill sequencing?
94. How does a Bi-ski progression differ from a two-track progression in terms of skill ordering?
95. What is the advantage of the crossed tether technique?
96. Why tether from a wedge position?
97. When does the tetherer do a falling leaf while tethering?
98. What is the difference between hip check and hip projection in a mono-ski?
99. How do you tune the ski for a mono-ski? Why?
100. Explain why bi-skis have different side cut on the inside and outside edges.

Physics and Biomechanics Questions

1. What is friction?
2. Name three different types of pressuring movements.
3. Give examples of three types of rotary movements that will cause skis to turn.
4. Give two examples of edging movements.
5. Why don't we ski hunched over?
6. What does skeletally aligned or skeletally stacked mean?
7. Which is easier to balance: an object with a high or low center of gravity?
8. Approximately where is a skier's center of gravity?
9. Can a skier relocate his center of gravity by adjusting his stance and limbs?
10. Why do skis have sidecut?
11. Why do skis have camber?
12. Why do we mount bindings on the center of our skis and not the tip or tail?
13. Why do skis have edges?
14. Why do skis have a curved tip?
15. What is supination of the foot?
16. What is pronation of the foot?
17. What is hypertonicity?
18. What does a scissor gait look like?
19. What does a swing through gait look like?
20. What is canting and why is it necessary?
21. Explain how outriggers can be used to create rotary movements.
22. What does differential friction mean when applied to outriggers?
23. What is centrifugal force?
24. What is centripetal force?

25. Name two types of friction affecting a skier.
26. Give three reasons why we ski on the outside ski rather than the inside one.
27. Biomechanically, why does a binding release the way it does?
28. What type of joint is the knee?
29. What type of joint is the ankle?
30. What joint is primarily responsible for leg steering?
31. What muscle groups are primarily responsible for leg steering?
32. Can the knee rotate? Under what conditions?
33. Name four ligaments of the knee.
34. What does a ligament do? Can you strengthen a ligament non-surgically?
35. Do ligaments heal?
36. What types of falls tend to injure the ACL?
37. What do tendons do? Do they heal if torn?
38. How can we protect the ligaments of the knee?
39. Explain the gravity friction principle.
40. A non-edged ski is weighted at the tip. Which will seek the fall line, tip or tail?
41. An edged ski is weighted at the tip. Which will seek the fall line, tip or tail?
42. What is velocity?
43. What is angular velocity?
44. What is force?
45. What is torque?
46. What is momentum?
47. Explain counter rotation.
48. Explain leg steering.
49. Explain upper body rotation.
50. Name four types of un-weighting and explain each.
51. Explain how side cut aides in turning.
52. Explain the body's balancing mechanisms.
53. What are proprioceptors?
54. What is the difference between center of mass and center of gravity?
55. Can the center of gravity ever be outside the body? Show how.
56. Why do we go faster on a steeper hill?
57. What is the component of gravity that pulls us down the hill?
58. What is the component of gravity that pulls us into the hill?
59. Where does centripetal force act?
60. Where does centrifugal force act?
61. How is centrifugal force calculated?
62. What is the resultant vector?
63. Which increases centrifugal force more, adding speed or reducing turn radius?
64. Why must we inclinate when skiing?
65. Why angulate?
66. What are the four types of friction that act on the bases of our skis?
67. What is the best type of wax to overcome each type of friction?
68. Which is greater, static friction or dynamic friction?
69. Explain moment of inertia.

70. What type of rotation is used to execute a helicopter?
71. Explain conservation of angular momentum.
72. Name and explain three types of ACL injuries sustained by skiers.
73. How does friction change as the slope of the hill changes?
74. Give two examples of eccentric contractions and concentric contractions.
75. What is co-contraction? Give an example.
76. Explain the difference between adaptive canting and corrective canting.

ATS Knowledge Questions

1. What are the four skills?
2. In what order are the skills generally taught?
3. What types of stance problems have you seen in beginning skiers?
4. Why do we ski in an athletic stance?
5. Explain each of the four skills.
6. Name two ways of edging skis.
7. What is the difference between inclination and angulation?
8. Name three types of pressuring movements.
9. What are the phases of a turn?
10. Discuss an outline for coaching your students.
11. What is the Stepping Stones Concept?
12. What does ATS stand for?
13. What type of rotary movements are taught in a gliding wedge turn?
14. How does a wedge Christie differ from a gliding wedge turn?
15. Why do we teach a straight run?
16. What skill does sidestepping develop primarily? Explain your reasoning.
17. What skill does a star turn develop primarily?
18. Name four different learning styles.
19. Name five different teaching styles.
20. Name the three goals of a lesson in order.
21. Name the learning style most often used in: DD, Blind, etc.
22. What is the turning power?
23. Name four different turning powers.
24. How is a turning power different from a turning force?
25. What pressuring movements can a skier make?
26. Name three exercises that correct stance.
27. Name three exercises that work on rotary.
28. Name three exercises that develop edging movements.
29. Name three exercises that concentrate on pressuring movements.
30. Name four types of un-weighting.
31. Describe the mechanical priorities of a long radius parallel turn.
32. Explain lateral learning and give three examples.
33. What are ski poles used for?

34. Explain crossover.
35. In which phase of a turn does crossover occur?
36. What is skill sequencing?
37. Explain what happens when matching in a Wedge Christy in terms of skills
38. Explain counter rotation.
39. Explain upper body rotation.
40. Explain lower body rotation.
41. What is split rotation?
42. Name four elements essential to a good skier analysis.
43. Why do we wax skis?
44. Why do bindings release the way they do?
45. What are the advantages of lifter plates beneath bindings?
46. What is the difference between a sintered base and an extruded base?
47. Describe the mechanical priorities of a short radius turn.
48. What is the difference between a short radius turn and a short swing turn?
49. Describe the characteristics of a good beginner ski.
50. How does a slalom ski differ from a GS ski?
51. What types of wax are used for soft wet snow and why?
52. What types of wax are used for hard cold snow and why?
53. What is Bloom's Taxonomy?
54. Explain cross under.
55. Why put a base bevel on skis?
56. Why put and edge bevel on skis?
57. Why is the tip of a ski generally broader than the tail?
58. What is the advantage to a narrow waisted ski?
59. How does skill development differ on shaped skis?
60. Name and explain four types of friction acting on a ski's base.
61. How can we reduce electrostatic friction?
62. What is the advantage to fluorocarbon waxes?
63. How do you measure the taper of a ski?
64. What is the advantage of non-ninety degree sidewalls on a ski?
65. What is a cap ski?
66. What does graphite wax do?
67. What is Braquage?
68. What is Avalement?
69. What is Reploiment?
70. When and why have you used lateral learning in a lesson?
71. Who was the toughest student you ever had and why?