

# **ADAPTIVE**

## **Educational Workbook & Exam Guide**

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## Introduction

This document is meant to provide an overview of information and resources covering information on commonly found disabilities, their effects on skill performance, definitions of adaptive equipment, and information on commonly found medications. It is only through commitment and experience that you can gather enough knowledge of disabilities to learn what is necessary to competently teach adaptive skiing. Specific resources concerning adaptive ski teaching are segmented and scattered through multiple resources. Learning is a never-ending process. Knowledge is ever changing.

The following are the current (2010) PSIA Education/Certification Standards. Reference to PSIA-AASI's Core Concepts, Adaptive Technical Manual and Alpine Technical Manual and terminology consistent with these manuals is used throughout this document. These standards provide a training focus, and represent a minimum competency for each level of certification. References to the American Teaching System (ATS), skill development, necessary modifications, and Adaptive Certification Exam information are included in this guide. Instructors will also need to attain alpine, adaptive, and children's manuals.

Certification standards are based upon the concepts of "levels of understanding" which define stages of learning and degrees of understanding. The evaluated clinic process is a measure of your understanding. Candidates will be held to the knowledge and performance standards of the level at which they are testing as well as the criteria for all preceding levels. The Level I certification is designed to be an evaluated clinic with six specific disciplines: Cognitive/Developmentally Delayed (DD), Visual Impairment, Mono & Bi Ski, and Three & Four Track.

PSIA-NRM currently offers their members the ability to pursue Level I of the adaptive certification within the division. At this time Adaptive Level II and III will need to be taken outside the division unless the division has enough demand to host an event. PSIA-NRM will host a Level II or III exam if two or more people are registered to take the exam.

## Organizing an Evaluated Clinic

Please contact the PSIA-NRM division to schedule an evaluated clinic. The fee for an evaluated clinic will be \$100/day and require a minimum of five people. Lift ticket prices are not included unless otherwise specified. Contact the NRM office or adaptive chair for more details. *PSIA-AASI membership is required prior to participation in a Level I evaluated clinic.*

PSIA-NRM email: [info@psia-nrm.org](mailto:info@psia-nrm.org)

Adaptive Chair: [Diana.proemm@gmail.com](mailto:Diana.proemm@gmail.com)

Resources needed prior to the clinic:

PSIA National Alpine Certification Standards

PSIA-NRM Level I task descriptions (2009 version)

Core Concepts Manual

Alpine Technical Manual

Children's Instruction Manual

Adaptive Snowsports Instruction Manual

Bold Tracks

Resources can be found at: [http://psia-nrm.org/educational\\_resources.html](http://psia-nrm.org/educational_resources.html)

## **CERTIFIED LEVEL I ADAPTIVE**

Certified Level I members must demonstrate a solid foundation of information and experience necessary to be an effective ski teacher. The Certified Level I instructor possesses an understanding of basic alpine skiing skills, teaching skills & progressions, disability & specific discipline equipment knowledge, medications, red flags of specific disabilities and professional knowledge; it is not expected that Level I candidates will have in-depth knowledge and experience in each of the areas of competence listed in these standards. In addition, it is expected that candidates will be able to demonstrate a significant level of competency with the skiing and teaching tasks listed specifically for assessment at a Level I event.

### ***Candidate Prerequisites***

A candidate for Adaptive Level I Certification must:

- Become a PSIA-NRM member or be a current PSIA-NRM member in good standing
- Volunteer or be employed by a recognized ski school, agency or adaptive program
- Optional: Attend a Level I Adaptive Prep Clinic

\*Once you obtain Level I adaptive certification, you are required to obtain 6 educational credit hours every 2 years in order to maintain your Level I status and continue to pay dues annually.

### **Information Criteria**

- All references refer to PSIA/AASI Core Concepts; and PSIA Alpine Technical Manual
- References to disability background and specialized equipment in PSIA/AASI Adaptive Manual and Bold Tracks: Third Edition.
- References to progressions for specific disciplines are in this guide.
- References to skill blending refer to balancing movements, rotary movements, edge control movements and pressure control movements.
- All references to class levels refer to ATS Levels 1-9.
- All references to "Your Responsibility Code" refer to the National Ski Areas Association (NSAA) Responsibility Code.

**IMPORTANT NOTE:** In all of the following categories; if an exam candidate has a disability; his/her capability to demonstrate skills and perform tasks will be evaluated relative to the extent of their disability. Candidates are expected to demonstrate the appropriate skill elements that equate to an able-body skier's demonstration of that specific task or demonstration. Candidates are required to communicate, analyze, direct and lead the group of candidates during some portion of the evaluation.

### **Evaluated Clinic Format:**

The evaluated clinic is a two-day clinic in which participants will be taught and coached on the material outlined by the national standard for Level I certification. They will be evaluated on their teaching, skiing, professional knowledge and personal mastery of the material on which they are being coached on throughout the two-day clinic. This is an interactive clinic that requires participation in discussions on and off the hill. Candidates should be prepared to lead a group through some basic ski instruction scenarios provided by the clinician.

- It is suggested that at least five people per exam group be needed to hold the event.
- Request a Level I Evaluated Clinic from the Adaptive Committee Chair.
  - *Please allow at least three months notice.*
- The group must choose one specific discipline in which to be tested to a level 6 skier.
 

Disciplines:

  - Cognitive/DD
  - Visually Impaired
  - Three-Track
  - Four-Track
  - Mono Ski
  - Bi Ski

## Outline of the Evaluated Clinic

Based on the location of the clinic, snow conditions and weather, as well as the experience and technical knowledge of the group, the order of clinic topics will vary. The following information provides an outline of all materials & skills that will be covered in the two-day clinic, and gives you an idea of what you will see over the course of two days.

## What to Expect During the Evaluated Clinic

The Adaptive Level I is a two-day evaluated clinic. The first day is a functional skiing assessment and the second day is an adaptive teaching assessment.

*\*\*Should a potential candidate already have their Level I Alpine Certification, they will not need to partake in the functional skiing assessment.*

## Day 1 – Functional Skiing Assessment

### *Administrative*

- Registration, provide contact info, sign liability release, meet clinician & other attendee's,
- Turn in take home exam (passing with a score of 85% or higher)

### *Skiing*

- During the day, the examiner will coach and test a candidate's functional skiing skills, encompassing alpine technical and mechanical knowledge, safety and risk management.
- Clinician will work with instructors to blend balancing, rotary, edging and pressure movements to demonstrate appropriate skill blending through the demos and tasks.
- Skiing will be evaluated on green and blue groomed terrain.

*For complete list of skiing demonstrations and tasks, please see the Alpine Certification Guideline Task List.*

## Day 2 - Teaching

*Knowledge - The instructor will be able to:*

- Identify the components of the Teaching Model and Skiing Model.
- Discuss how to use the models when teaching Levels 1-6.

- Understand the concept of learning styles. Discuss the different styles and be able to give examples of how to recognize a student's learning style.
- Understand the command and task style of teaching and explain or show how to use them during a lesson.
- Compare student profiles of adults and children and describe similarities and differences in teaching both groups through Level 6.
- Demonstrate knowledge that children think differently from adults and other children of different ages.
- Demonstrate knowledge that children of different ages are motivated and behave differently in learning situations.
- Demonstrate knowledge that children grow and develop physically in ways that can affect skiing performance.
- Describe the different disabilities commonly encountered in ski teaching.
- Be able to teach lift usage.
- Teach proper lifting techniques if utilizing sit down equipment (as some people do not have the physical capability to lift a 200+ pound person/ski)

***Application - The instructor will be able to:***

- Teach a disabled student through Level 6 in the specific discipline selected.
- Show effective use of each key component of the Teaching Model as adapted to student needs.
- Describe the skier services and activities at the home area.
- Create and maintain an environment that not only fosters a comfortable learning pace but matches special needs of the student.

**PROFESSIONAL KNOWLEDGE**

***Terminology - The instructor will be able to:***

- Define and explain basic terminology as described in ATS manuals.
- Define and explain basic terminology commonly associated with adaptive ski teaching (including medical terms) in the chosen specialty.

***Disability Understanding - The instructor will be able to:***

- Evaluate a wide variety of students in the chosen specialty. Define possible physical abilities, mental disorders and cognitive abilities
- Assess disability of student to gain information such as:
  - Specifics regarding the disability & abilities
  - Red Flags (seizures, spinal column issues, bed sores, etc.)
  - Medication and what it's taken for
  - Skiing history
  - Goals
    - More in depth questions can be asked of this particular candidate if needed to gain an understanding of their knowledge
- Create and maintain an environment that allows the student to make the most of their abilities
- Describe the medical background of common disabilities
- Relate how the most common medications will affect students in the chosen specialty

### ***Equipment - The instructor will be able to:***

- Describe different adaptive equipment and how each piece functions within the chosen specialty.
- Be familiar with basic options, solutions and benefits of modern shaped skis and new adaptive equipment.

### ***Skiing Movements/Skill Development & Movement Analysis - The instructor will be able to:***

- Describe basic movement patterns (Level 1-6) and how they relate to the chosen discipline
- Describe cause and effect relationships of movements and equipment usage commonly found in Level 1-6 and in the chosen discipline
- Identify situational variations or stepping-stones of skill application and how they relate to the chosen discipline
- Relate how a skier in the specialty uses the available muscles to effect changes in skill development
- Determine a cause and effect relationship as it relates to the fundamental skills
- Discuss appropriate "stepping stone" progressions that are efficient and effectively use the student's abilities, equipment, terrain and snow conditions
- Describe developmental skill needs by priority
- Prescribe exercises or tasks to increase skier's efficiency for variety of situations.

### ***Biomechanics - The instructor will be able to:***

- Understand basic biomechanics as it relates to the four basic skills and the disabilities involved with the specific discipline

## **CERTIFIED LEVEL II ADAPTIVE**

PSIA-NRM standards require that the candidate who aspires to obtain an Adaptive Level II certification must first achieve an Alpine Level II certification and be a member in good standing before attempting any further levels of adaptive certification.

Certified Adaptive Level II members must demonstrate a solid foundation of information and experience necessary to be an effective ski teacher. The Certified Adaptive Level II instructor possesses an understanding of basic alpine skiing skills, teaching skills & progressions, disability & specific discipline equipment knowledge, medications, red flags of specific disabilities and professional knowledge and will have in-depth knowledge and experience in each of the areas of competence listed in these standards. In addition, it is expected that candidates will be able to demonstrate a significant level of competency with the skiing and teaching tasks listed specifically for assessment at an Adaptive Level II event.

### ***Candidate Prerequisites***

A candidate for Adaptive Level II Certification must:

- Achieve an Alpine Level II Certification
- Volunteer or be employed by a recognized ski school, agency or adaptive program
- Attend a Level II Adaptive Prep Clinic

## Information Criteria

- All references to ATS refer to PSIA American Teaching System: Second or Third Edition
- PSIA/AASI Core Concepts for Snowsports Instructor-Teachings; PSIA Alpine Technical Manual, Skiing and Teaching Skill.
- All references to disability background and special equipment needs may be found in Bold Tracks: Third Edition; and PSIA Adaptive Manual.
- All references to progressions for different disciplines may be found in this guide.
- All references to skill blending refer to balancing movements, rotary movements, edge control movements and pressure control movements.
- All references to class levels refer to ATS Levels 1-9.
- Variety of turn shapes refer to short, medium and long.
- All references to "Your Responsibility Code" refer to the National Ski Areas Association (NSAA) Responsibility Code.

**IMPORTANT NOTE:** In all of the following categories; if an exam candidate has a disability; his/her capability to demonstrate skills and perform tasks will be evaluated relative to the extent of their disability. Candidates are expected to demonstrate the appropriate skill elements that equate to an able-body skier's demonstration of that specific task or demonstration. Candidates are required to communicate, analyze, direct and lead.

## Evaluated Clinic Format:

The evaluated clinic is a two or three day clinic (1-2 people = 2 days, 3-4 people = 3 days) in which participants will be taught and coached on the material outlined by the national standard for Level II certification. They will be evaluated on their teaching, skiing, professional knowledge and personal mastery of the material on which they are being coached on throughout the two-day clinic. This is an interactive clinic that requires participation in discussions on and off the hill. Candidates should be prepared to lead a group through some basic ski instruction scenarios provided by the clinician.

- It is suggested that at least two people per exam group be needed to hold the event.
- Request a Level II Evaluated Clinic from the Adaptive Committee Chair.
  - Please allow at least three months notice.
- You will be examined on all six disciplines to a level 6 skier:
  - Cognitive/DD
  - Visually Impaired
  - Three-Track
  - Four-Track
  - Mono Ski
  - Bi Ski

## Outline of the Evaluated Clinic

Based on the location of the clinic, snow conditions and weather, as well as the experience and technical knowledge of the group, the order of clinic topics will vary. The following information provides an outline of all materials & skills that will be covered in the two-day clinic, and gives you an idea of what you will see over the course of two or three days.

## **What to Expect During the Evaluated Clinic**

The Adaptive Level II is a two or three day evaluated clinic. Both days each candidate will be evaluated in all six disciplines to the Immediate Zone.

### ***Knowledge - The instructor will be able to:***

- Identify the components of the Teaching Model and Skiing Model.
- Discuss how to use the models when teaching Levels 1-6.
- Understand the concept of learning styles. Discuss the different styles and be able to give examples of how to recognize a student's learning style.
- Understand the command and task style of teaching and explain or show how to use them during a lesson.
- Compare student profiles of adults and children and describe similarities and differences in teaching both groups through Level 6.
- Demonstrate knowledge that children think differently from adults and other children of different ages.
- Demonstrate knowledge that children of different ages are motivated and behave differently in learning situations.
- Demonstrate knowledge that children grow and develop physically in ways that can affect skiing performance.
- Describe the different disabilities commonly encountered in ski teaching.
- Be able to teach lift usage.
- Teach proper lifting techniques if utilizing sit down equipment (as some people do not have the physical capability to lift a 200+ pound person/ski)

### ***Application - The instructor will be able to:***

- Teach a disabled student through Level 6 in all disciplines.
- Show effective use of each key component of the Teaching Model as adapted to student needs.
- Describe the skier services and activities at the home area.
- Create and maintain an environment that not only fosters a comfortable learning pace but matches special needs of the student.
- Candidate needs to ride the adaptive equipment specific to the discipline examining in the beginner zone.

## **PROFESSIONAL KNOWLEDGE**

### ***Terminology - The instructor will be able to:***

- Define and interpret terminology as described in ATS manuals, Adaptive manuals and “Bold Tracks”, applying it to analyzing, understanding, and teaching skiers through Intermediate zone.
- Define and interpret terminology in a simple manner that is commonly associated with adaptive needs including medical terms in all disciplines.

### ***Equipment - The instructor will be able to:***

- Describe different adaptive equipment and how each piece functions through Intermediate Zone.
- Describe what equipment is appropriate and how each piece will be set up for students in all disabilities.
- Describe the benefits and drawbacks of short skis, shaped skis compared to traditional shaped and longer skis. Be prepared to apply this knowledge to your discipline and benefits to special needs students.

- Member will be able to ride all adaptive equipment in the Beginner zone.
- Describe changing equipment needs as students progress in ability.

***Skiing Movement, Skill Development And Movement Analysis - The instructor will be able to:***

- Describe the Stepping Stones concept and how they relate to each discipline.
- Describe the movement patterns of the ATS Skiing Model and how application of the skills relates to all disabilities.
- Describe the forces acting on a skier in a turn, relating them to the phases of a turn.
- Describe the cause and effect relationships of movements and equipment usage commonly found in Level 1-6 and in each discipline.
- Discuss appropriate “Stepping Stones” progressions that are efficient and effective use of a student’s abilities, equipment, terrain and snow conditions (Level 1-6).
- Relate how a skier in each discipline uses muscular ability to effect changes in skill development.
- Describe developmental skill needs by priority for all disciplines through Intermediate Zone.
- Prescribe exercises and tasks that target the student’s needs and should improve their skills in each specialty through Intermediate zone.
- Describe the basic movement patterns in own skiing and any specialty through Intermediate zone.
- Describe developmental skill needs by priority for all disciplines through Intermediate zone.

***Disability Understanding - The instructor will be able to***

- Evaluate any student with any disability.
- Define physical abilities, mental disorders, and cognitive abilities.
- Create and maintain an environment that allows the student to use the most of their abilities.
- Describe the medical background of common disabilities within each specialty.
- Relate how the most common medications will affect students within each specialty.

***Biomechanics - The instructor will be able to:***

- Understand basic biomechanics as it relates to the four basic skills and the disabilities involved within all disciplines.

## **CERTIFIED LEVEL III ADAPTIVE**

Candidates must have achieved at least a Level III Alpine certification before attempting the Adaptive Level III Certification exam. At the Level III standard, candidates are required to pass the Level III standards in all disciplines: Cognitive and Visual Impairments, Three and Four Track, Mono and Bi Ski.

Performs and demonstrates a comprehensive understanding of American Teaching System concepts and shows efficient movement and use of skis as outlined in the Alpine Level III standards. Additionally, the member will demonstrate a comprehensive understanding and thorough application of the disabilities, medical, and equipment knowledge pertaining to all disability classifications. Member will be able to ride all adaptive equipment in the Intermediate zone.

At this time a potential candidate must leave the division to pursue an Adaptive Level III exam. Suggested divisions to take the Level III exam would be Rocky Mountain, Northern Intermountain (offered every other year), East and West divisions.

## **AASI ADAPTIVE CERTIFICATION STANDARDS**

The Adaptive sector of AASI certification standards are based upon the knowledge and application of information gained from the AASI Manuals and the PSIA Adaptive Manual. Additional diagnosis knowledge and information from medical, organizational and disability resources is also required.

Certification standards encompass the snowboard sector standards and include the diagnosis, medical and special equipment knowledge and understanding enabling an instructor to work with the special population at each certification level. Adaptive classifications include: Blindness and low vision, cognitive related diagnoses, physical related diagnoses, and diagnoses related to the inability to stand on a snowboard.

### **Level I Certification**

Performs and demonstrates a basic understanding of AASI concepts; and shows efficient movement and use of a snowboard as outlined in the AASI Snowboard Level I section. Additionally, the member will demonstrate a general conceptual understanding of the diagnoses, medical and equipment issues pertaining to at least one classification.

### **Level II Certification**

Performs and demonstrates a working understanding of AASI concepts, and shows efficient movement and use of a snowboard as outlined in the AASI snowboard Level II section. Additionally, the member will demonstrate a more detailed understanding of the diagnoses, medical and equipment knowledge in all classifications.

### **Level III Certification**

Performs and demonstrates a comprehensive understanding of AASI concepts, and shows efficient movement and use of the snowboard as outlined in the AASI Snowboard Level III section. Additionally, the member will demonstrate a comprehensive understanding of and thorough application to all diagnoses, medical and equipment knowledge pertaining to all classifications

At this time a potential candidate must leave the division to pursue an AASI Adaptive Certification.

## Teaching Model (Credit PSIA-RM)

Every well-prepared teacher has a universal format in which to build a learning segment. Generally this is thought of in the context of a lesson with a beginning and end. Although in reality the teaching cycle is more of continuing learning spiral as an instructor builds upon previous learning to build on present learning with a future goal beyond the present. The major points to always include in your model are developing trust, assessing disability and skills, determine necessary equipment and best learning environment, using interesting activities, tasks to aid in learning, provide positive reinforce to students during practice, then end the segment with a debriefing or closure.

The PSIA Adaptive Manual, 1997 listed a more detailed description of a teaching cycle. Below is a condensed view but a more pragmatic outline of a teaching cycle which may be an easier approach for new instructors who are still honing their teaching skills.

### Introduction and Evaluation

- Create a supportive environment with the adaptive skier.
- Do a thorough evaluation of the adaptive skier's disability and potential problems.
- Explain to the skier what will happen in the lesson.

### Set Goals for the Lesson

- Understand the skier's expectations for the lesson.
- Set lesson goals based on the skier's potential, disabilities, and expectations.

### Planning the Lesson

- Select and fit appropriate adaptive equipment.
- Select appropriate terrain and snow conditions.

### Presenting Information

- Teach clearly and simply.
- Recognize the skier's learning style and teach in the appropriate teaching style for that skier and disability.

### Demonstrations

- Demonstrate the appropriate adaptive technique and skill level for the skier.
- Convey the appropriate skill development utilizing visual, kinesthetic, verbal or hands on teaching.

### Practice

- Allow sufficient time for practice.
- Facilitate practice with appropriate guiding, tethering, and hands-on assistance, feedback, as necessary for adaptive technique.
- Reinforce success and correct problems.

### Check for Understanding

- Check skier's understanding based on how the skier is skiing.
- Check skier's understanding based on verbal communication.

### Summarizing the Lesson

- Review goals and achievements in the lesson.
- Outline what the next lesson will cover.
- Outline what the skier should practice after the lesson.

## Adaptive Student Evaluation (Credit PSIA-RM)

Student evaluation is a vital component of the teaching cycle. Safety, fun and learning, and good learning requires that an instructor have a thorough knowledge of skills and limitations and any special concerns. Many adaptive snow sports programs require a student or their caregiver fill out a medical history with disability information, medications, communication needs, physical needs, etc. Often students will have history file and is another great tool to developing a lesson plan. Make note how a person is positioned in their wheelchair, or standing at rest; these will clues of how to set up a skier's equipment. Additionally, things change; medical needs, degenerative losses, aging, newly developed issues. Other changes like skill development and increased independence changes may require adjustment continued adjustments in the student evaluation. If you are an instructor who works or volunteers for a program that does not require this information then you need thoroughly interview during your evaluation process of the teaching cycle.

### Medical Information

- General physical condition
- Fitness level
- Medications
- Extent and effect(s) of disability
- Mental/Emotional/Learning preference

### Body Function

- Balance: fore, aft and laterally
- Mobility: arms, legs, trunk and hips.
- Upper body strength: laterally, fore, aft and arms.
- Lower body strength: laterally, fore, aft and legs.

### Equipment Needs

- Type of ski - Mono-Ski, Bi-Ski, two skis, one ski What about Dual Skis?
- Poles or Outriggers, fixed or hand
- Tip control, lateral control Ski-Bra/Trombone Edgie Wedgies, Klip Skis
- Ski Boot(s)
- Cants, wedges, etc.
- Adaptations for orthotics or prosthetic devices.
- Snow Wing
- Bamboo Poles

### Equipment Familiarization

- Description of parts and inspection
- Safety features
- Use of adaptive equipment and stationary (indoor as appropriate) balance practice.
- Proper clothing
- Special considerations for disability while in skiing environment.

## **Adaptive Two-Track Teaching Overview (Credit PSIA-RM)**

The Classifications of Cognitive Disability includes: Developmental Disability, Mentally Retarded, Down Syndrome, Traumatic Brain Injury (TBI), Cerebral Palsy (CP), Autism, Fragile "X" Syndrome, Epilepsy, Stroke, Friedreich's Ataxia, Deaf, Dyslexia, Neurologically Impaired, Spina Bifida, Attention Deficit Disorder, and Asbergers Syndrome are just a small sample of possible cognitive disability.

Two-track skiing is for any skier that stands, skis on two skis and does not use outriggers. Additional adaptive equipment such as ski bras, and/or tethers may be utilized to enhance leg strength. However, the student has the ability to stand and maintain balance while in motion.

Many disabilities, various degrees of disability, and/or combinations of disabilities are included in this two-track classification. Some disabilities included in this classification are: developmental, cognitive, blind and visually impaired, mild Cerebral Palsy, Multiple Sclerosis, Muscular Dystrophy and other muscular involvements, deaf and hearing impaired, acquired brain injury/traumatic brain Injury, and possibly Spina Bifida.

Blind and visually impaired skiers are usually two track skiers. A kinesthetic and concise, focused verbal approach to the ATS skill progression is utilized. Do not confuse this with learning style preferences of students. Due to the visual difficulties, student must utilize his/her other sensors, auditory, kinesthetic, and tactile to process information.

The instructor has the responsibility of acting as a guide, compensating for the student's decreased visual acuity as well as the teacher. Multiple ranges of visual acuity are possible, from limited depth perception, peripheral or tunnel vision, to legally blind or total loss of vision. Light, artificial or natural, bright or shadows can affect a student's visual acuity

A complete and detailed student analysis is needed to determine if the student is a two-track skier. A review of physical strengths (range of motion, strength of limbs, ability to balance, move right/left etc.) as well as a determination of cognitive strengths/weaknesses (do they comprehend left/right, can they follow commands, is there a delay in processing information?) all assist in making this determination. This evaluation will determine the equipment needed to create a successful learning environment. Analysis should also determine their learning preferences and abilities, which will dictate your teaching style. Current medications and/or other disability involvements are discussed during this evaluation.

Student Evaluation Focus: A thorough review of primary and secondary abilities, their cause and effect upon skill performance and cognitive processing. Medications may cause side effects and need to be reviewed. Much information can be gained by asking your student about other sports and activities in which they participate. Knowing the sports, activities and interests, plus information about their daily schedule can help you to access both physical and cognitive abilities.

### Student with Visual Impairment Evaluation/Guiding Overview

Evaluate indoors and outdoors:

- Visual abilities,
- Cause of visual impairment,
- Medication and medical precautions,
- Hearing and other sensory abilities,

- Range of vision,
- Ability to hear,
- Skiing skill level,
- Terrain and conditions.

### Equipment and Physical Assists

Balance and fine muscle coordination difficulties are common.

- Ski-bras, Edgie-Wedgies, Klip-skis can help lateral and tip control,
- hula-hoops, SnowWings, tethers, and bamboo poles assists with speed control,
- two-point holds increase balance and directional control.

#### *Bamboo Assists:*

- Single pole held horizontally at waist or shoulder height by both instructor and student, with instructor skiing backwards.
- A long single pole held horizontally at waist to chest level by both student and instructor, skiing side by side.
- Two poles - one in each hand of student and instructor, held at hip height with one person skiing in front, the other immediately in back; called horse and buggy.
- Clam Shell - two heavy/strong poles (or two poles taped together) held by two instructors; one pole being placed under the buttocks, the other placed waist-chest height for student's hands.

#### *Guiding the Visually Impaired*

The focus in guiding is to provide clear, concise instructions that will enable the student to ski. Verbal, as well as kinesthetic descriptions are utilized to establish a solid communication base between student and instructor.

#### *Emergency Situations when Guiding the Visually Impaired*

Most important, is an agreed upon word between student and instructor meaning imminent danger. This word needs to be established before the first lesson. This word, when hollered, will immediately result in the student falling to the ground and covering himself/herself the best way possible.

#### Popular Guiding Styles

- Simple-directional commands: This method includes such commands as: Stop, go, right, left, slower, faster, hold, etc. and can be used with beginning skiers. These commands are universally understood, and are clear and concise. Simple, basic commands can serve as the basis for communicating on and off the slope with students, regardless of their skill level.
- Clock System: A commonly utilized system with the visually impaired/blind population, the student is always facing 12 o'clock. If you desire the student to complete a 90 degree turn to the right, your instructions would be to turn to 3 o'clock. Once completed, the student is again at the 12 o'clock position and is ready to receive new instructions. This command system is utilized inside, in corrals and on the slope. It is very useful in intermediate/advanced ski guiding and in racing.
- Grid/Graph System: The Grid system enables the intermediate/advanced blind skiers to be aware of their location within the confines of the present skiing terrain. One side of the trail is "0", the other side is "10", the center of the slope is "5", etc. Utilizing the Simple-Directional Command System (or a modification thereof) plus the Grid system, students can be kept well informed of their position on the slope. As the

student progresses, the need for an agreed upon abbreviated/concise command system greatly increases, because timing is of the essence in upper level, blind ski teaching/guiding.

### *Developmentally Disabled*

Students in this classification comprise a widely diverse group that may include physical weaknesses in addition to cognitive limitation. What relates this group is that they all stand on two skis. The complexity of this classification requires knowledge of the many disabilities, their causes and effects upon skiing performance, plus commonly used medications

The ATS skill progression needs some modified to match the physical and cognitive skills of the student. Think of this as “Stepping Stones.” Steps may be modified to match the need of the student, steps may be smaller and take longer of accomplish

The student evaluation should include a review of medications. Insulin, anticonvulsives, antibacterials, antispasmodics, antibiotics and analgesics are commonly encountered in this four track specialty. Some medications increase fatigue levels, interfere with the ability to balance, or increase sensitivity to sun. Exploration and research of currently used medications provide insight into their effects upon the student.

**Two-Track Progression** for Blind and Developmentally Disabled: The following is based on the PSIA Alpine National Standards and has been adapted for blind and developmentally disabled skiing. This general progression may or may not follow each step in order, some are essential, some may be omitted or others need additional adaptations. The levels will give you a reference to compare a student’s zone level of progress.

### **Beginner / Novice Zone Objectives**

Level 1: Welcome to Skiing / Build the Foundation

Student assessment

Medical history

Equipment selection, introduction and set up

Static balance exercises, indoor

Student / instructor communication, safety, guiding, and emergency stop

Level 2: Introduction to Flats

Mobility on skis and snow

Understand the fall line and be aware of terrain changes

Falling and getting up

Straight runs

Develop skills for skating and climbing

Refine stepping and twisting skills to turn out of the fall line

Stopping and slowing

Level 3: Introduction to Turning

Turn left and right

Vary turn shape, size and speed control

Skating

Fan progression

Linking turns

Explore different equipment and uses for hands on guiding and teaching

Master beginner area

#### Level 4: Introduction to Chair Lift and Green Terrain

- Chair lift loading and unloading procedures
- Equipment and safety concerns for riding chair lift
- Develop greater skill blending
- Vary turn shape for the terrain situation
- Explore a variety of snow conditions
- Ski the easiest beginner terrain on the mountain
- Refine turning

#### **Intermediate Zone Objectives**

##### Level 5: Develop and Enhance Intermediate Movement Options

- Refine proper body movements and positions
- Develop long to medium and medium to long radius turns
- Carry and use poles more efficiently
- Maintain an open parallel through the turn on smooth blue slopes
- Develop various ways to control speed and turn shape on all green and some blue terrain

##### Level 6: Anchor Intermediate Skills and Movements

- Medium to short radius turns
- Link open parallel on easy blue terrain
- Ski varying snow conditions
- Feel carving sensations
- Explore various hands off guiding and or teaching methods
- Develop greater confidence and skill blending

##### Level 7: Explore Movements and Skills for Upper Level Skiing

- Bump skiing on blue terrain
- Short radius turns
- Total independence (keep safety in mind)
- Increase and decrease speed in turns on blue and black terrain
- Explore disciplined skiing
- Linked parallel turns

#### **Advanced Zone Objectives**

##### Level 8: Refine Advanced Movement Patterns

- Carving medium and long radius turns
- Ski short turns on the steps
- Ski blue and easy black bumps
- Boot top powder
- Breaking, gliding control movements on steep terrain

##### Level 9: Develop Movement Options for Steep Terrain

- Refine movements in short radius turns
- Develop movement patterns for varying speed control and conditions
- Develop optional movements and tactics for advanced bump skiing
- Beyond Black Specialist
- Bumps, racing, off-piste, terrain parks and pipe

## Three-Track and Four-Track Teaching Overview (Credit PSIA-RM)

This classification includes skiers who use outriggers, one or two skis, and stand up when skiing. Outriggers are used to compensate for weakness or a disability in the lower extremities and/or balance difficulties. As in other adaptive skiing classifications, this category includes vast population with varying degree of involvement, sometimes their only commonality is the use of outriggers.

Some common examples of disabilities included in this 3/4-track classification are: Cerebral Palsy, Muscular Dystrophy, Multiple Sclerosis, Post Polio, Leg Amputations (Above Knee (AK), Below Knee- (BK), and bi-lateral, unilateral, Arthritis, Spina Bifida, Spinal Cord Injury (SCI) and Traumatic Brain Injury (TBI).

It is very important that this group of skiers develop sound fundamentals skills. A common problem is "paper-clipping". This occurs when the skier bends forward at the waist and relies excessively on the outriggers. Do not confuse this with the normal stance of a CP 4-Track skier because of muscle/tendon strength/ surgery.

Common traits of a "paper-clip" skier:

Underdeveloped balancing ability:

Little or no dynamic balance on leg(s).

Relies on outriggers to remain in balance.

Underdeveloped ability to control rotary movements:

Lack of controlled rotary movements to initiate and control a turn.

Underdeveloped ability to control pressure movements:

Uses little or no flexion/extension.

Pressures only front of the ski.

Underdeveloped ability to control edging movements:

Poor upper/lower body separation.

Little or no angulation.

The student's learning preference can be matched with a complementary teaching style and an acceptable pace established, which is based upon the physical analysis and personal interview. The lesson plan will follow the ATS skill development progression with obvious modifications to accommodate physical limitations. The focus is the development of the four skills, regardless of where the movements originate!

### **THREE-TRACK**

Any person who can stand and ski on one leg and utilize outriggers to assist balance while in motion is classified as a 3-tracker. Some advanced 3 track skiers develop such good balance that they can eliminate the outriggers and use ski poles. The student evaluation should explore the causes of the disability.

During the student evaluation, some key considerations are: when the amputation occurred; condition of their stump, proper padding needs. Amputations are commonly the result of cancer, diabetes, blood clots, or accidents. Commonly a person will walk with a prosthetic so skiing solely on one leg may tire too easily and consideration of wearing a prosthetic while skiing. A 3-track skier may not have lost the limb but have lost function, strength or partial use of a leg; frequent causes are stroke, traumatic brain injury, or polio. If they have an atrophied leg, questions relative to circulation, feeling and ability to control movements need consideration. It is crucial to keep the affected limb or prosthesis in control while skiing to avoid injury.

Outriggers provide a three point balance system. Outrigger height and brake adjustment are individual to the student. A general rule of thumb is that beginners will have their outrigger brakes adjusted for more brake. Outrigger height should be adjusted to allow for an upright comfortable stance. As their skills develop, dependency on this balance system decreases and outrigger height adjusted and the brake adjustment is reduced.

## **FOUR-TRACK**

Any person who can stand/ski on both legs and utilizes outriggers, Snow Slider or Ski Legs or a walker to assist balance while in motion. Some 4-track skiers develop such good balance that they eliminate the outriggers, ski with poles and become two-track skiers. The student evaluation explores the causes of the disability. Balance problems or a general weakness in the lower extremities are frequently caused by strokes, Traumatic Brain Injury, Polio and Spinal Cord Injuries. The student's gait and stance should be closely evaluated. Some key concerns include: student's ski stance (parallel or a wedge), balance without assistance, standing on a flat ski,

Outriggers provide a four point balance system. Height and brake adjustment are individual to the student. Ongoing student assessment is necessary in order to determine whether outrigger length and/or brakes need adjusting. As the student develops skiing skills, movement options over the skis may increase, necessitating a review of outrigger settings.

Equipment adjustments, physical assists and terrain selection all enhance flow of movements and maintenance of balance in motion. Walkers offer more support than outriggers but may limit the student's ability to become an independent skier. The Snow Slider or Ski Legs offer a very stable base of support for the skier. It is extremely adjustable for any skier and allows the skier to move with the unit, while being tethered by the instructor. Tip control devices are often used to enhance lateral strength and to keep the skis from spreading apart. Tethers can aid in the development of rotary movements and they assist with flat land crossings and are generally removed as the student progresses.

## **Adaptive Three and Four Track Progression**

The following is based on the PSIA Alpine National Standards and has been adapted for three and four track skiing. This general progression may or may not follow each step in order, some are essential, some may be omitted or others need additional adaptations. The levels will give you a reference to compare a student's zone level of progress.

### **Beginner / Novice Zone Objectives**

Level 1: Welcome to Skiing / Build the Foundation

Student assessment

Medical history

Equipment selection, introduction and set up

Static balance exercises indoors

Student / instructor communication, safety and emergency stop

Level 2: Introduction to Flats

Pushing, turning, pivoting on flats

Getting in and out of equipment

Falling and getting up

Straight runs

Outrigger and body position while moving

Stopping and slowing

### Level 3: Introduction to Turning

Turning left and right

Proper outrigger use and skill blending for turn shape, size and speed control

Introduction of skills and fundamental movement patterns

Turning to a stop

Fan progression

Linked turns

Master beginner area

### Level 4: Introduction to Chairlift and Green Terrain

Chair lift loading and unloading procedures

Equipment and safety concerns for riding lift

Student / Instructor assisted chair lift loading and unloading

Outrigger position and timing during loading and unloading

Develop greater skill blending and confidence

Vary turn shape and size for terrain and condition

Explore a variety of snow conditions

### **Intermediate Zone Objectives**

#### Level 5: Develop and Enhance Intermediate Movement Options

Develop proper independent outrigger movements (outrigger lead change)

Refine proper body movements and position

Develop long to medium and medium to long radius turns

Edge and rotary control exercises

#### Level 6: Anchor Intermediate Skills and Movements

Medium to short radius turns

Ski varying snow conditions

Proper body movements

Upper / lower body separation

Hip and/ or lower body angulations

Independent lift loading and unloading

Hockey stops

Develop single outrigger exercises (ex: only use uphill / downhill outrigger, flying outrigger.)

#### Level 7: Explore Movements and Skills for Upper Level Skiing

Bump skiing on easy blue terrain

Short radius turns

Explore carving sensation

Explore extension and retraction at turn initiation

Increase and decrease speed thru turns

Total Independence

### **The Advanced Zone Objectives**

#### Level 8: Refine Advanced Movement Patterns

Carving medium and long radius turns

Ski short turns on the steeps

Boot top powder

Breaking, gliding control movements on steep terrain

## Level 9: Develop Movement Options for Steep Terrain

Refine movements in short radius turns

Develop option movement patterns for varying speed control and conditions

Develop option movements and skiing tactics for advanced bump skiing

Beyond Black / Specialist

Bumps, racing, off-piste, terrain parks and pipe

## **Mono-ski & Bi-ski Teaching Overview (Credit PSIA-RM)**

The mono and bi-skis are two types of adaptive equipment that are designed for any skier who has difficulties standing and/or balancing. Disabilities common to mono/bi-skiing is diverse, some examples are: spinal cord injuries (SCI), brain trauma (BI), cerebral palsy, amputee, neuromuscular diseases, post polio, multiple sclerosis, muscular dystrophy, Spina Bifida, dwarfism, severe balance impairments, stroke, cancer, and Friedreich's Ataxia. Additionally there are progressive or degenerative types of disabilities. They may have started skiing as a two or four tracker but eventually become a sit down skier due to the progressive nature of their disease.

### **Evaluation**

Treat every student as an individual; the effects of an injury or disability can vary from person to person. A complete and detailed student analysis is needed to determine which piece of equipment is best suited for the student. Determining factors are their physical strength, mobility, ability to maintain balance, level of injury and degree of completeness of spinal cord break. A thorough evaluation aids in determining best equipment selection. A general quick rule of thumb is a T-6 and lower level of injury will use a mono-ski. Higher levels of injuries usually use a bi-ski. But each year a student will not fit the T-6 profile. The selection of equipment needs a multitude of considerations. Each student is unique. Good strength, balance and agility are helpful in becoming a successful mono-skier.

Knowing the kind of medications the student is taking. Check for any side effects a student might experience. Additionally, you can obtain valuable information by knowing what other activities your student may be involved in. Some medical concerns associated with mono and bi-skiers include; bladder management devices (i.e.: leg bag, catheter, etc.), pressure sores, temperature sensitivity and poor circulation problems. Another point of concern is autonomic dysreflexia (AD). This is a potentially life threatening hypertensive occurrence produced by the body's inability to sense and react to specific stimuli; (see the Medical appendix for more information.)

### **Equipment and Set Up**

There are differences and similarities between mono and bi skis. They are two distinct different pieces of equipment that operate differently. The most noticeable difference is in their visual appearance. Take time to initially set up and evaluate a student to determine which type of equipment is best for them. Do not rush the set up for the first time skier. Proper set up will provide a greater opportunity for success for a student

### **MONO-SKI**

The mono-ski is a single ski unit, which includes a seating system (the boot), mounted on a suspension/shock absorption system. Most mono-skis have a device that assists the skier to lift and be loaded onto chairlifts. Often mono-skiers develop significant independence and have the ability to push him/her self up onto the chair (self loading). Mono-skiers use handheld outriggers to assist with balance and loading the chairlift. The fit of the boot needs to be snug fit with no gaps or spaces and centered equally on the ski. Foam padding fills gaps and protects sensitive areas.

## **BI-SKI**

The bi-ski also has a boot mounted to a suspension system. There two short skis mounted to the suspension. Often there is a radical side cut on the skies. Some bi-skis have a self-loading device. A skier may use handheld or fixed outriggers depending on individual needs. Bi-skis have a tethering system that allows the instructor to assist the skier in turning, speed control or in emergency situations. If fixed outriggers are used, it is mandatory to also use a tether strap to assist the student and control the bi-ski. Often snowsports programs require a student remain on tether until they are immediate/advanced skiers.

### **Lift Loading Procedures – General Overview -**

The following are general procedures for an instructor assisted chair loading and unloading of mono and bi-skis. Lead instructor calls a count or cadence (example: Ready, 3, 2, 1 lift up and back) when in the loading zone of the chair lift. It is a good idea to practice a lift with the assistant instructor and/or student out of lift lines and before the first load of the day for timing and safety concerns. Once on the chair lift, first put safety bar down and then attach safety strap and carabineer to the chair. Keep safety bar down during entire ride. It is a good idea for the instructors not to lean on the safety bar. Disconnect the safety carabineer and strap once you have passed the final lift tower before the unloading platform. Do not lift the safety bar until the chair is over the netting of the unloading ramp. When at unloading area, lead instructor calls a count or cadence (example: Ready, 3, 2, 1, lift up and down) and the lead instructor continues to guide/bucket assist the student off to the side out of the unloading area.

### **Safety Issues and Lift Evacuations**

The NSAA Your Responsibility Code applies to all mono-skiers and bi-skiers. All instructors should understand the hand signals for communication with lift operators (i.e.: slow, stop, and maintain speed). Some hand signals may differ from ski area to ski area. The National Ski Patrol recommended procedure for a mono or bi-ski lift evacuation is termed a double carabineer with opposing gates. Evacuation carabineers should only be mounted to a manufacturer suggested evacuation strap (i.e.: single or three point strap system). The evacuation system should be ready for evacuation and NOT intertwined with the bucket straps of the skier.

## **Adaptive Mono and Bi-Ski Progression**

### **Beginner / Novice Zone Objectives**

Level 1: Welcome to skiing / Build the foundation

Student assessment

Medical history

Equipment selection, introduction and set up

Static balance exercises, indoors

Student/instructor communication, safety and emergency stop

Level 2: Introduction to Flats

Pushing, turning, pivoting on flats

Static balance exercises, outdoors on flats

Falling and getting up

Straight runs

Outrigger and body position while moving

Stopping and slowing

Level 3: Introduction to Turning

Turning left and right

Mono-ski – through balance and rotary control movements  
Bi-ski – through balance and edge control movements  
Vary turn shape and size  
Speed control  
Turning to a stop  
Fan progression  
Linked turns  
Master beginner area

Level 4: Introduction to Chair Lift and Green Terrain  
Chair lift loading and unloading procedures  
Review lift evacuation procedures  
Student assisted/instructor assisted chair lift loading and unloading  
Outrigger position and timing during loading and unloading  
Develop greater skill blending  
Vary turn shape and size for terrain and condition  
Explore a variety of snow conditions

### **Intermediate Zone Objectives**

Level 5: Develop and Enhance Intermediate Movement Options  
Proper outrigger movements (outrigger lead change)  
Refine proper body movement and position  
Develop long to medium and medium to long radius turns  
Edge control exercises for mono-ski  
Rotary control exercises for bi-ski

Level 6: Anchor Intermediate Skills and Movements  
Medium to short radius turns  
Ski varying snow conditions  
Proper body movements  
Upper/lower body separation  
Hip and lower body angulation  
Independent lift loading and unloading  
Hockey stops for mono-skis  
Hip drops for bi-skis

Level 7: Exploring Movements and Skills for Upper Level Skiing  
Bump skiing on easy blue terrain  
Short radius turns  
Explore carving sensations  
Spinal cord extension at turn initiation  
Total independence  
Rebound turns for mono-skis  
Hip check turns for bi-skis

### **The Advanced Zone Objectives**

Level 8: Refining Advanced Movement Patterns  
Carving medium and long radius turns  
Ski short turns on the steeps

Ski blue and easy black bumps  
Boot top powder  
Braking, gliding control movements on steep terrain

#### Level 9: Develop Movement Options for Steep Terrain

Refine movements in short radius turns  
Develop optional movement patterns for varying speed control and conditions  
Develop optional movements and skiing tactics for advanced bump skiing  
Beyond Black/ Specialist  
Bumps, racing, off-piste, terrain parks and pipes

## Disabilities and Medical Information (Credit PSIA-RM)

### Disability Terms

The information in this section is a general overview of common disabilities. Each person is unique and each disability has many variations in its complications. Always ask questions to learn as much as you can about the individual.

**Amputations:** Removal of body part, usually a leg or arm.

**AK** -Above knee - often skis without prosthesis. Most people usually walks with a prosthetic most of the time

**BK** - Below knee – A guideline for a stump length is four inches or longer and the skin is in good condition, the individual may ski with prosthesis.

**AE** - Above elbow

**BE** - Below elbow

**Hip Disarticulation** - Amputation at the hip joint, this preserves the pelvis and the soft tissue to the buttocks . Often student skis without prosthesis

**Syme's Amputation** - at the ankle.

**HP Hemipelvectomy** - The most severe level of amputation. This amputation includes half of the pelvis and the limb leaving, only the soft tissue of the buttocks.

**Shoulder Disarticulation Amputation** - at the shoulder joint.

**Unilateral Amputations** - on the same side. Although obtaining and maintaining dynamic balance when skiing is difficult, unilateral amputees do ski. (i.e. a unilateral BK/BE could ski on both skis with one outrigger).

**Bilateral Amputations** - on both sides. This can include: 1) amputation of both legs, 2) amputation of both arms, 3) amputation of an arm on one side and leg on the other (arm and leg amputees usually ski on one ski with one outrigger).

What for the cause of the loss and are there hidden issues: Cancer, recent or current, chemotherapy may cause fatigue or impaired temperature control. If amputation is due to diabetes, the individual may lack sensation in other areas (often hands or feet), plus may need to eat or take medication on a certain schedule. Injuries resulting in amputation may encompass other hidden disabilities for example, minimal brain damage, need for a bladder control device, or hearing impairment. The residual limb (stump) needs to be protected while skiing. An ace wrap should be applied to prevent swelling and/or the limb should be padded and covered to avoid damage from falls or cold. Skiing with a prosthesis is determined by the length of the residual limb plus advice from a prosthetist to be sure it is strong enough to withstand the stresses of skiing. Skiers choosing to use their prosthesis may need to secure with a waist belt to avoid losing the leg when riding a chairlift

**Angelman Syndrome:** - A genetic disorder that causes developmental delay and neurological problems. Children are described as having "flat heads, jerky movements, protruding tongues, and bouts of laughter." Infants with Angelman syndrome appear normal at birth, but often have feeding problems in the first months of life and exhibit

noticeable developmental delays by 6 to 12 months. Many begin having seizures between 2 and 3 years of age. Individuals with this syndrome often display hyperactivity, small head size, little speech or no language and movement and balance disorders. Angelman syndrome is inherited from the mother.

**Aphasia:** Has difficulty understanding or producing language. Expression language is one and two word sentences. Receptive language may also be limited, ask simple questions, which do not require a choice. When communicating to these individuals use gestures as well as words. People who have had head injuries or stroke often become aphasic.

**Arthritis:** An inflammatory disease of the joints as well as other parts of the body. Chronic pain and loss of movement are common.

- Ankylosing Spondylitis Chronic inflammation of the spine. Bones will often fuse together.
- Juvenile A general term which is used to define any arthritis which affects children.
- Osteoarthritis - Degenerative joint disease common in seniors, the most common form of arthritis.
- Rheumatoid -Total body inflammation of moving and weight bearing joints. Most disabling form of arthritis.

**Attention Deficit Disorders:** There are two types of ADD. Both types feature a persistent pattern of inattention, impulsivity and hyperactivity may be present. Try to limit distracting stimuli; give one direction at a time; try to maintain eye contact; avoid complex instructions; and be clear and concise. Since these children are easily frustrated, maintain a calm attitude. Children who have ADD often have normal to above normal intelligence.

- UADD Undifferentiated Attention Deficit Disorder, does not include hyperactivity and is characterized as someone who is absent minded, unorganized, easily distracted and very inattentive.
- ADHD Attention Deficit Hyperactivity Disorder. Three common features are inattention, impulsivity and hyperactivity. Typified by children who seem to always be in trouble, aggressive, have difficulty following directions, difficulty concentrating, are easily confused or do not finish tasks. ADHD children may exhibit inappropriate fear in new situations.

**Autism** – The presence of abnormal or impaired development in social interaction and communication. Frequently people with autism do not like physical contact with other people and avoid eye contact. They have difficulty with new environments, new sensations. Individuals very self absorbed, prefer their world to be regimented and are detached from normal family and social interactions. Some people have a good grasp of conversation, others do not speak. There is a wide variety of function and intelligence. There is wide degree of impairment from individual to individual.

**Pervasive Developmental Disorder (PDD)** - is often characterized by impaired communication, extreme self absorption, being detached from reality and sometimes destructive behavior due to lack of awareness of their behavioral consequences.

- *Asbergers* – often has impaired social interaction and repetitive behaviors and nonfunctional rituals. They have focused interest in tasks or academic subjects (i.e. a Civil War buff, geography whiz.)

**Blind/Visually Impaired:** Partial or total loss of vision which may include, but not be limited to: tunnel vision, peripheral vision, myopia, or loss of depth or distance perception. Some causes include: Diabetes, Glaucoma, Detached Retina, Eye Injury, Multiple Sclerosis, Brain Tumor or Head Injury. Ask specific questions and define the student's range of vision.

- Myopia: Visual defects in which distant objects appear blurred. Images are focused in front on the retina rather than on it.
- Glaucoma: Disease of eye characterized by high pressure within the eye. Damage to optic disk, hardening of the eyeball, causes partial or total blindness.

- **Cataracts:** Clouding of the lens causing partial or total blindness, often easily removed which restores some vision.
- **Diabetic Retinopathy:** A non-inflammatory retinal disorder that result from interference with the blood supply to the eyes. A leading cause of acquired adult blindness.
- **Retinitis Pigmentosa:** Genetically induced progressive destruction of the retinal rods. Resulting in washing away (atrophy) of the pigment membranous tissue and eventual blindness.
- **Macular Degeneration:** A common cause of central vision impairment. Commonly affects the elderly which can be treated with laser therapy.
- **Retinal Detachment:** Retinal layers split and space fills with fluid caused by degenerative changes in the retina. Usually caused by trauma.
- **Tunnel Vision:** Severe constriction of the visual field.
- **Nystagmus:** Constant involuntary, cyclical movement of the eyeball. There are many causes for this disease.
- **Ophthalmoplegia:** Paralysis of ocular muscles.
- **Diplopia:** Double vision occurring in one or both eyes. Seen in diseases of the eyeballs, cranial nerve affections, and disease of the cerebellum, cerebrum, and meninges.

**Brain Injury – Traumatic or Acquired-** caused by some type of insult to the brain.

**Closed head injury –** This is caused by trauma to the head which does not cause a fracture to the skull. Damage can be deep within the brain.

- **Open Head Injury –** The skull is penetrated and the exposed brain is damaged. This could be surgical or injury. Injury may involve a part of the skull was forced into the brain or a foreign object enters the brain.
- **Diffuse injury –** The brain is injured in several locations (i.e. impact from car crash, shaken baby syndrome.)
  - **Focal injury –** The brain injury happens to one specific location of the brain.
- **Hypoxia -** Injury caused by the lack of oxygen. Drowning is one example.

**Cerebral Palsy:** A non-progressive disorder caused by brain damage before, during or after birth. It is characterized by abnormalities of muscle tone and difficulties with voluntary motor control. It usually results in delayed motor development. The individual may have one type or a mixture of types. Individuals with cerebral palsy may or may not have cognitive impairment or other impairment. Medical associations and text varies as to types and numbers of classifications.

- **Spastic (hypertonic) -** Increased muscle tension and difficulty with relaxation, may have lack of full mobility at some joints. Tense contracted muscles.
- **Low Tone (hypotonic) (flaccid) -** Decreased muscle tension, may appear floppy, often have joint hypermobility (double jointed). Diminished muscle tone.
- **Athetoid -** Muscle tone fluctuates from high to low therefore motor control is inconsistent. Extraneous uncontrolled movements.
- **Ataxic -** Muscle tension often appears okay but control of movement and balance is impaired so that the
- **Individual may appear drunk. Jerky uncontrolled movements**
- **Rigid -** Muscle tension often is very tense. Stiff uncontrolled movements.

**Cornelia de Lange Syndrome (CdLS):** A congenital syndrome, meaning it is present from birth. Most of the signs and symptoms may be recognized at birth or shortly thereafter. Mental retardation ranging from mild to profound, with the majority fall in the mild to moderate range. Each child will progress slower than average rate of physical and cognitive development. The area of speech and communication is often delayed, even in the more mildly affected.

**Deaf/Hearing Impaired:** Hearing Impairments refer to a reduction in sensitivity to sound. This may also be accompanied by some loss in the ability to correctly interpret auditory stimuli even after amplification. The deaf/hearing impaired population is often noted as being the largest of all chronic physical disabilities. Hearing loss

occurring after 19 years generally does not affect speech. Hearing losses occurring from birth to three years are referred to as “prelingual deafness”. Deafness occurring from three years to 19 years is termed as “prevocational deafness”.

Hearing Impairments fall into three categories:

- **Conductive Impairments:** - Defects in the auditory system which interferes with sound waves reaching the cochlea. Damage may lie in the middle or outer ear (i.e. ruptured ear drum). Generally, conductive losses are often lesser in degree not exceeding moderate impairment.
- **Sensorineural Impairments:** - Defects to the auditory pathway beginning with the cochlea and auditory nerve, brain stem and cerebral cortex. Damage here prevents or disrupts interpretation of the signal (i.e. maternal rubella and noise).
- **Mixed Impairments:**- Defects involve both Conductive and Sensorineural impairments (middle ear infections).

**Diabetes:** A disease in which the body cannot properly process sugar (carbohydrates). This is caused by the inability of the pancreas to produce enough insulin to meet the body's needs. Two possible concerns with diabetes are:

- **Hyperglycemia:** High blood sugar level.
- **Hypoglycemia:** Low blood sugar level. Hypoglycemia is a major concern, as it can be triggered by exercise (skiing), and delays in meals. Sugar is needed immediately if it occurs.

**Down Syndrome:** is also referred to as Trisomy 21- is caused by an extra chromosome in the twenty-first pair of chromosomes. Individuals with Down Syndrome often have low muscle tone and very flexible joints. Additionally, there may be a predisposition for cervical subluxation, cervical vertebrae (C-1, 2, 3) slip or shift causing a spinal cord compression even from a normally minor jar or fall. This can easily be detected by x-ray. Surgical repair may be necessary to prevent injury. People with Down Syndrome can have additional health like heart defects, respiratory and visual limitations. Most people with Down Syndrome are a watcher type learner, but occasionally the student may also be ADD with impulsive and hyperactive behaviors.

**Epilepsy/Seizure Disorder:** A seizure is an abnormal electrical impulse in the brain. Although this disability does not predispose someone to need adaptive ski lessons, it is common and always must be taken into consideration if a student has epilepsy.

Seizures may consist of a brief suspension of activity where an individual stares into space, or may be generalized tonic clonic (grand mal) with full body involvement. Most seizure disorders are controlled by medication. Some events, anxiety, anticipation of an event and in some cases seizures can be self-induced. If a seizure occurs, try to protect student from injury. A restraint system on chairlift rides is usually advised. Normally discontinue skiing, as the individual may be disoriented.

- **Tonic Clonic- Grand Mal -** Seizures are generalized affecting the entire brain. An aura (strange feeling, taste, vision or smell) may indicate the start of a seizure. The seizure proceeds with loss of consciousness and movements alternating between contraction and relaxation of the muscles. Incontinence may occur. Seizures may last from seconds to minutes.
- **Focal - Petit Mal – Absence -** Seizures tend to be in a specific part of the brain with loss of consciousness, eye or muscle fluttering or loss of muscle tone. The period of unconsciousness so brief and may not be detected by observers unaware of the subtle indicators. Person recovers quickly to normal activity.
- **Complex Partial–** the brain has multiple areas affected during the seizure.
- **Psychomotor -** Characterized by a loss of contact with consciousness. The individual is mentally confused, may stagger, perform purposeless movements, and make unintelligible sounds. Possibly individuals do not understand what is said and may refuse help.

**Fragile X Syndrome:** is a chromosomal disability. Most children have a delayed growth and very flexible joints. Some people have autistic type behaviors and others have almost normal intelligence; this variation is dependent of the number of abnormal repetitions of the X chromosome in their DNA.

**Learning Disorders:** An abnormality in cognitive processing. Deficits in could involve vision, perception, linguistic processes, attention or memory, or combination that effects academic skills. Often their intelligence is normal or above normal. It is conservatively estimate that about 2 million children between the ages of 3 to 21 in the United States have learning disabilities severe enough to warrant special education services. The prevalence of learning disabilities is far greater among boys than girls 15:1 to 25:1.

**Mental Retardation:** Mentally retarded person is a person who develops at a below-average rate during their childhood. Their deficit often encompasses learning, social adjustment and economic productivity. The retardation can range from mildly retarded (largest group), to moderately retarded, profound or severely retarded. There are many causes for mental retardation development in an infant or child, birth trauma, childhood injury or illness.

*Degrees of Severity of Mental Retardation:*

Degree	IQ Level	Population %
Mild	50-85	Often will become semi independent, most adults hold jobs in the community.
Moderate	35-50	Are often independent in home and familiar settings. As adults they will often be able to hold a semi -job with extensive job coaching and monitoring.
Severe	20-35	Needs consistent supervision and training. Many adults can take care of the personal needs and perform work tasks. Need consistent structure to perform regular tasks.
Profound	Below 20	Very limited abilities. Often need prompting to get task started, but often will complete the simple task independently. Little to no expressive language skills.

**Multiple Sclerosis (MS):** A progressive disease that causes the myelin sheath around nerve cells to disappear so that they no longer transmit the necessary signals. The disease may go into remission, but generally worsens over time. Progression varies from individual to individual. It occurs more often in women than men; initial onset is usually in the late twenties or early thirties. Fatigue and heat make the symptoms worse. Muscle paralysis may be partial or full in any limb and loss of sensation may also be partial or full in any area. Visual problems are very common.

**Muscular Dystrophy (MD):** MD is a progressive degeneration of muscles. There is large grouping of MD diseases, some will shorten the life span children. Other forms present chronic issues but a person lives a reality normal life. Males are affected more than females

- Duchenne Type: - The most common and most severe form of MD. Onset is usually between ages 3 - 10. Caused by a defective gene that is passed from parent to child. Generally a delay in learning to walk with frequent falls. A waddling gait is usually apparent by 6 years of age.
- Facio-Scapular-Humeral Type: The most common form of MD in adults. Symptoms do not appear until adolescence and are not recognized until adulthood. Prognosis is good. The disease may arrest itself at any stage. Effects facial, shoulder, and arm muscles.
- Limb Girdle Type: This type may occur at anytime from age 10 or after. The onset usually occurs during the second decade. Both genders are equally affected. Effects movement in upper/lower extremities including ability to move. Mixed Type: Rapidly progressing and usually fatal within five years. Effects all voluntary muscles.
- Mixed Type - Rapidly progressing and usually fatal within five years. Effects all voluntary muscles.

**Neuromuscular Diseases:** A group of central nervous system diseases affecting the motor system, causing weakness or clumsiness with voluntary motion and involuntary movement. These diseases include: Huntington's Disease, - "An heirloom from generations away back in the dim past." has been traced back to the Middle Ages. Huntington's disease results from genetically programmed degeneration of nerve cells, in certain areas of the brain. It is passed from parent to child through a mutation or misspelling in the normal gene. This degeneration causes uncontrolled movements, loss of intellectual faculties, and emotional disturbance. Specifically affected are cells of the basal ganglia, structures deep within the brain that have many important functions, including coordinating movement.

**Parkinson's Disease:** Parkinson's disease belongs to a group of conditions called motor system disorders. Symptoms include tremor in hands, arms, legs, jaw, and face; rigidity or stiffness of the limbs and slowness of movement; and postural instability or impaired balance and coordination. As these symptoms are progressive, patients may have difficulty walking, talking, or completing other simple tasks. It is not contagious nor is it usually inherited.

**Friedreich's Ataxia:** inherited disease that causes progressive damage to the nervous system. Symptoms ranging from gait disturbance and speech problems to heart disease. Coordination problems such as clumsy or awkward movements and unsteadiness happens because of the degeneration of nerve tissue in the spinal cord, in particular sensory neurons that connect with the cerebellum. The spinal cord becomes thinner and nerve cells lose some of their myelin sheath.

**Amyotrophic Lateral Sclerosis (ALS) :** "Lou Gehrig's Disease" is a progressive, fatal, neurodegenerative disease caused by the degeneration of motor neurons, the nerve cells in the central nervous system that control voluntary muscle movement. The disorder causes muscle weakness and atrophy throughout the body. Degenerate ceasing to send messages to muscles. The patient may ultimately lose the ability to initiate and control all voluntary movement except for the eyes. Progresses rapidly. Sensory nerves and the autonomic nervous system, which controls functions like sweating, generally remain functional.

**Guillain-Barre Syndrome:** A disorder in the body's immune system attacks part of the peripheral nervous system. The first symptoms of this disorder include varying degrees of weakness or tingling sensations in the legs. These symptoms can increase in intensity until certain muscles cannot be used at all and, when severe, the patient is almost totally paralyzed. Other problems include breathing, an abnormal heart beat, infections, blood clots, and high or low blood pressure. It can affect any person, it can strike at any age and either gender. After the first clinical manifestations of the disease, the symptoms can progress over the course of hours, days, or weeks. Most people reach the stage of greatest weakness within the first 2 weeks after symptoms appear, and by the third week of the illness 90 percent of all patients are at their weakest. Most patients recover from even the most severe cases of Guillain-Barré syndrome, although some continue to have a certain degree of weakness.

**Myasthenia Gravis :** is a chronic autoimmune neuromuscular disease characterized by varying degrees of weakness of the skeletal muscles of the body. Myasthenia gravis is caused by a defect in the transmission of nerve impulses to muscles. The autoimmune disease normally protects the body from foreign organisms but instead mistakenly attacks itself. It occurs when normal communication between the nerve and muscle is interrupted at the neuromuscular junction, the place where nerve cells connect with the muscles control. Muscles such as those that control eye and eyelid movement, facial expression, chewing, talking, and swallowing often are involved, but not always. The muscles that control breathing and neck and limb movements may also be affected. Myasthenia gravis occurs in both genders. It most commonly affects young adult women (under 40) and older men (over 60), but it can occur at any age. The majority of individuals with myasthenia gravis have a normal life expectancy. Myasthenia

gravis is not directly inherited nor is it contagious. Occasionally, the disease may occur in more than one member of the same family.

**Polio:** Muscle weakness or paralysis in any specific muscle or muscle groups caused by the polio virus. The involvement is specific to each person.

**Post Polio Syndrome:** On set happens sometime after a person has Polio. This is a progressive, degenerative disease impacting nervous and skeletal systems. The disease can be disabling since resulting problems are added to preexisting damage that occurred at the initial polio infection. There is no cure. Symptoms include: fatigue, muscle atrophy, muscle spasms, disc disease, and nerve damage resulting in muscle weakness, scoliosis, and other symptoms.

**Stroke - Cerebrovascular Accident (CVA):** Sudden impairment of cerebral circulation in one or more of the blood vessels supplying the brain, which interrupts or restricts the oxygen supply and commonly causes brain damage. Many individuals will have a one-sided paralysis, hemiplegia, of extremities. Balance may also be impaired. Some stroke victims have difficulty speaking or processing auditory input.

**Spina Bifida:** A birth defect resulting in abnormal development of the spinal column during the early stages of pregnancy. The covering over the spinal column forms a sac-like pouch; the vertebrate fail to enclose the spinal cord which may affect the connection between the brain and the spinal cord. Damage may occur in one or multiple locations along the entire length of the spinal cord. Disability may range from weakness in the legs to full paraplegia with trunk weakness and other internal issues.

**Spinal Cord Injury (SCI):** Spinal cord damage due to some type of injury to the spinal cord, such as trauma, infection or tumor. If injury is partial, the individual is said to have an incomplete injury, para-paresis or partial. If the cord is completely transected, the injury is referred to as complete, paraplegia. If all four extremities are affected this is quadriplegia or tetraplegia.

When damage occurs in the cervical region it is normally considered as quadriplegia. Approximately 50% of all spinal injuries cause some degree of quadriplegia. Damage in either the thoracic, lumbar or sacral region is considered paraplegia. Most common areas of injury are C5-C6, T6-T7 and T12-L1.

The 5 regions of the Spinal Column:

**Cervical Region (Neck)** This region contains the first seven vertebrae and the first eight spinal nerves.

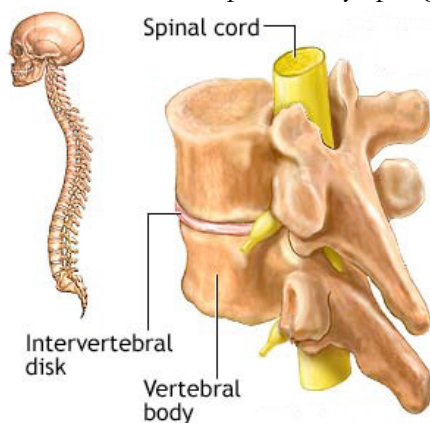
**Thoracic Region (Chest)** This region contains the next twelve vertebrae and the next twelve spinal nerves.

**Lumbar Region (Lower Back)** This region contains the next five vertebrae and the next five spinal nerves.

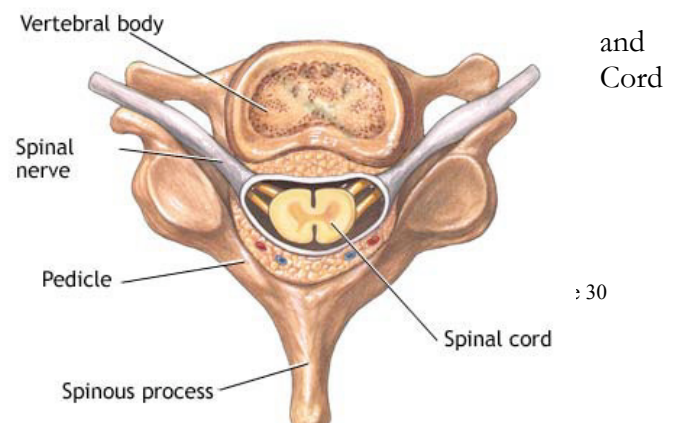
**Sacral Region (Tail Bone)** This region contains the next five vertebrae fused into one and the last six spinal nerves.

**Coccyx (tip of tail bone)** This region contains four vertebrae fused into one and no spinal nerves.

The spinal cord is surrounded by the bony vertebrae, which usually protect the soft spinal cord from injury. The cord runs through the oval shaped opening in the vertebra seen in the diagrams. The vertebrae are stacked on top of one other and separated by spongy "discs" that act as shock absorbers for the spine.



Two  
Vertebrae  
Spinal  
istructors of America



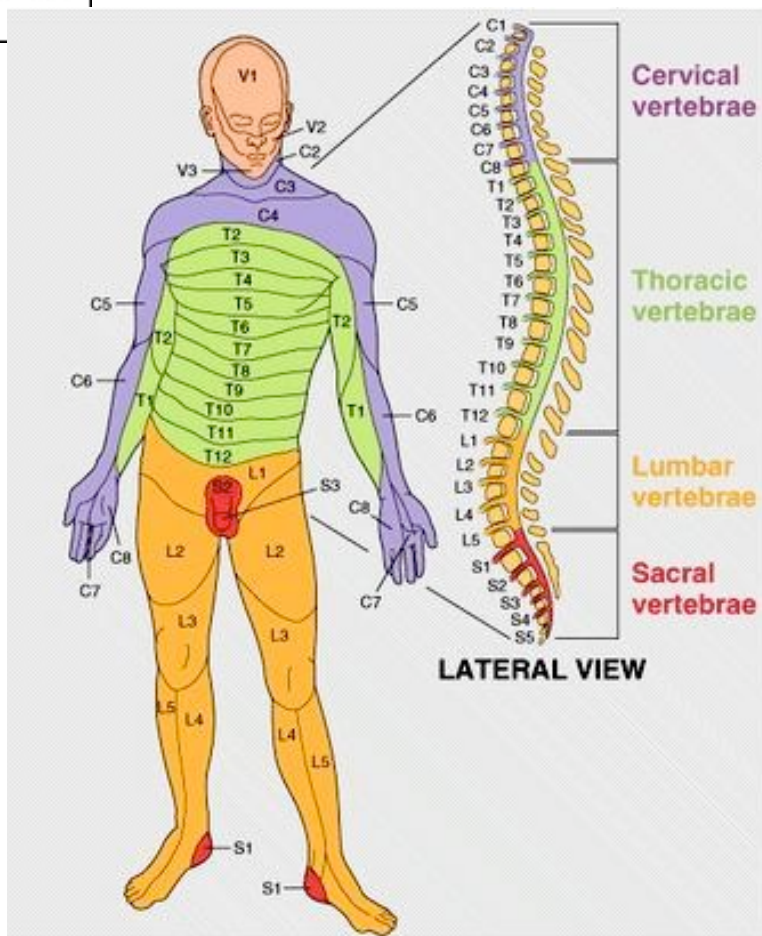
Cross Section of the  
However, if a  
presses into the soft  
the cord will be  
vertebrae, which are  
muscles, are pushed  
even if the vertebrae  
broken vertebra  
shows the broken  
Causes of spinal cord  
of violence (24%),  
diving accidents)



### Spinal Column

vertebra is broken and a piece of the broken bone  
spinal cord (it has the consistency of toothpaste),  
injured. The cord can also be injured if the  
normally held in place by strong ligaments and  
or pulled out of Alignment,(called subluxation),  
are not fractured. The diagram below shows a  
pressing on the spinal cord (the view in the diagram  
vertebra cut in half to reveal the spinal cord).  
injuries include motor vehicle accidents (44%), acts  
falls (22%), sports (two-thirds of these are from  
(8%), and other (2%).

A point of concern is  
autonomic dysreflexia  
(AD). This is a potentially life threatening  
hypertensive occurrence produced by the body's  
inability to sense and react to specific stimuli.  
Symptoms include a feeling of impending doom,  
flushing of the skin, sweating, blurred vision and/or  
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 AD take immediate action to  
eliminate the cause. Keep the skier upright,  
loosening the straps, and readjusting the skier or  
take the student to the rest room or inside a warm  
building to help resolve the problem.



The mono-skier must also be properly balanced.  
This is achieved through a “dowel test.” With the  
mono-skier sitting in the boot, move the boot  
forward or aft on the ski until it is balanced over the  
center balance point of the mono-ski. A good rule of  
thumb to see if a mono-skier is balanced is that  
mono-skier should be able to “teeter totter” on the  
dowel with minimal or no body moment.

NOTE: With the advent of step-in binding systems  
for monoskiers, the dowel test is negated as the  
binding is mounted at the ski's boot center. Some skiers may have less or no mass in front of the binding (such as bilateral amputees). For these skiers, mounted the binding slightly forward of boot center may be necessary. The majority of the skiers who use a mono-ski have spinal cord injuries, double leg amputation, muscular dystrophy, multiple sclerosis, or spina bifida.

Spinal cord diagrams from: [www.sci-recovery.org/sci.htm](http://www.sci-recovery.org/sci.htm)

## Medications (Credit PSIA-RM)

Disabled skiers take medications for a variety of reasons. Any medication has the potential to cause a side effect. Some of these side effects may negatively effect skier performance. The following is not a complete list. Several resources for information on medications are available, including the Physician's Desk Reference (PDR), nursing drug guides and the internet. Knowledge of a student's medications is an important factor to initial assessment. Sometimes a drug may be used for completely reasons, like tegretol, it most often taken for seizures but can also be taken for pain. A word about medication side effects: When you look up a drug, all side effects will be listed. Researchers are required to list ALL side effects that occur, whether one person or one hundred people had the side effect. Your student may have none of the side effects or several. Check with the student or their guardian about the response to medications. As you read through the medication section, recognize that ANY medication has the potential to cause nausea, vomiting or diarrhea. Therefore, these three side effects will not be listed.

Note: When you look up a drug, all side effects will be listed. Your student may have none of the side effects or several. Check with the student, parent or caregiver about their reactions to medications.

Analgesics: Pain Relief (two categories, narcotic and non-narcotic)

Non-narcotic – Tylenol, Aspirin – relives pain - side effects - nausea, vomiting

Narcotic – Codeine, Oxycontin, Demerol – side effects sedation, lethargy, dizziness, confusion, increased sweating

Antibiotics: Treatment of Infection

Common antibiotics - Amoxicillin, Tetracycline, Zithromax, Penicillin, Bactrim, Keflex and Cipro

Side effects are nausea, vomiting, diarrhea or sensitivity to sun;protect skin & eyes.

Anticholinergic: Treatment of Bladder Spasm

Two common medications Ditropan, Detrol

side effects: constipation, abdominal pain, dry mouth

Anticoagulants: Prevention of Blood Clot Formation -

Common medications – Coumadin, Heparin

side effects – potential excessive bleeding, bruises easily, nose bleeds

Antiemetic: Control of Nausea and Vomiting

Common medications – Phenergan, Compazine

side effects - drowsiness, dry mouth, blurred vision sun sensitivity

Anticonvulsive: Treatment of Seizure Disorders

Common medications - Dilantin, Depakote, Tegretol, Clonopin, Phenobarbital,

side effects – drowsiness, lethargy.

\*Some anticonvulsives are used for non-seizure problems, so be sure to check why your student is taking the medication

Anti-Inflammatory: Prevention or Reduction of Inflammation

Common medications - Ibuprofen, Morton, Advil, Anaprox –

side effects -headache, dizziness, stomach ulcers, internal bleeding.

Antispasmodic: Reduction of Muscle Spasm

Common medications – Dantrium, Flexeril, Lioresal, Valium

side effects - drowsiness, dizziness, fatigue, dry mouth

Anti-Hypertensive: Control of High Blood Pressure

Common medications – Norvasc, Toprol, Tenormin

side effects - Dizziness, headache, fatigue, lethargy

Antipsychotics: Management of Symptoms for Psychotic Disorders

Common medications – Haldol, Thorazine, Clozaril –

Side Effects - Drowsiness, dry mouth, tremors, vertigo, nausea, and urinary retention

Antidepressants: Treatment of Depression

Common medications – Zoloft, paxil, prozac –

side effects - Headache, drowsiness, dizziness and sweating

CNS Stimulants: Behavioral Control

Common medication – Dexidrine, Ritalin

side effects - Over-stimulation, restlessness, dizziness, dry mouth, high blood pressure