



SENIOR SPECIALIST MANUAL

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This manual was originally compiled by a committee of PSIA/AASI NW members with the endorsement of the Board of Directors and the approval of the NW Education, Technical and Certification Vice Presidents and the Education & Programs Director. Manual revisions and evolutions would not have been possible without the support of the NW Senior Specialist committee, Senior Specialist clinicians and the PSIA/AASI NW Executive Director. This manual is

considered a fluid entity, enhanced and updated as our understanding and management of best practices evolves through learning.

A message from your Divisional Staff clinicians –

This manual contains our Core Beliefs regarding best practice. Multiple, lengthy and ongoing conversations have seeped into our product development work regarding how this credential is any different than a really good lesson from a really good instructor. This manual is our response to this question. This manual has been crafted in such a way to deliver content regarding our fundamental beliefs as to why and how the development of a lesson with this particular clientele is special, unique, and requires a specific skill and knowledge set. Concepts around pacing, developing low impact and continuous movement patterns, maximizing skeletal alignment applications and the importance of socialization all play vital roles in this specialty. While an awareness of cognitive, affective and physical domains is important at any age or ability regarding our snowsports clients, these central principles come to life in a way unique to this demographic which set the tone for a successful learning partnership.

As you begin to turn the pages, remember, age ain't nothing but a number.....

Chapter 1. Introduction

How old would you be if you didn't know how old you are? - Satchel Paige

Now in its fourth revision this manual is designed as a starting point for snow sport instructors interested in the elements that make up a pathway for successful teaching of the senior client. The creation and subsequent evolution of this instructional guide has been made possible with research and development by PSIA-NW clinicians, the perpetual vetting of current data and statistics as well as the on-going support of originating program development PSIA-NW board members and specialist participants.

Successful instructional integration, knowledge and growth cannot come from this manual alone. Reviewing the resources referenced throughout this guide, researching information and collaborating with fellow instructors and senior clients are all valuable and necessary responsibilities. To enhance growth learned from personal experience, a summary record of lessons taught is an excellent way to maintain a senior client specific diary and a lesson planning worksheet for this purpose is included in the appendix of this manual.

The purpose of the Senior Specialist program is to provide educational training for instructors of all ages and abilities to gain the tools and knowledge necessary to provide high quality teaching and performance enhancement outcomes for the older snow sport enthusiast.

Stakeholders including resorts, member snow sport schools and mountain management are sensitive to the recruitment and retention of visitors. As the senior visitor has been a consistent client, identification of skilled instructors to meet the senior client's specific needs is beneficial for all.

The PSIA-NW Senior Specialist program currently consists of, Senior Specialist 1 and Senior Specialist 2 educational credentials. This is a certificate program which is based on an educational framework with an assessment component. The Senior Specialist program is based upon and measured against the PSIA-NW Senior Specialist Standards, referenced in its entirety in the appendix of this manual. The Senior Specialist Standard is derived from existing National Standards including those from the Alpine, Children and Snowboard disciplines.

The premise of the Senior Specialist Standards is based upon the concepts of "levels of understanding", levels that define stages of learning within degrees of understanding. Just as certification is a measure of understanding, levels of certification represent stages of understanding. Although not a certification, Senior Specialist participants will be expected to meet levels of competency as defined by SS 1 and SS 2 standards. Participants will be held to the knowledge and performance standards of the level at which they are participating as well as the criteria for all preceding levels. Measurements of understanding are based on Bloom's Taxonomy, referenced further in the Senior Specialist Standard as well as the appendix.

It is important to note the Senior Specialist program is an educational training opportunity, it is not an exam. However, there is an assessment component and a certificate will be awarded upon successful completion of the Senior Specialist 1 and Senior Specialist 2. It is assumed each participant will pursue ownership of this material. Successful participants are expected to show an appropriate blending of skiing or riding skills and an appropriate level of understanding of senior specific teaching knowledge and theory. Courses include written feedback and suggested personal goals for continued growth documented on feedback forms specific to each course, as noted in the appendix of this manual.

Generally speaking, one might consider seniors to be identified only by their age. It has been suggested this “defining age” might be 50 years or older. However, there are some characteristics possessed by the senior age group that are often common with younger students in today’s environment as well. These characteristics may include alterations of sensory input, fear of terrain, inability to manage variable snow conditions, injuries, medical issues and physical limitations. Most likely, the pursuit of the mountain experience as a desired social experience is a goal held by many, not just the older client. This training is useful to maximize ideal learning situations, for any instructor looking to develop their skill and knowledge, regardless of student age or condition. A statement regarding age, as defined by a number, is a great conversation starter but unlikely to produce any defining or meaningful measure. Hence, while this program and this manual are titled and reference consistently the word ‘senior’, the information and philosophy is inherent to most of us.



Concepts covered in this manual include the following. The learning partnership as it applies to seniors: senior student profiles and subsequent instructor behaviors. The CAP Model for seniors: Cognitive (developmental milestones, behaviors, learned movement patterns, roadblocks),

Affective (desires, goals and personal history), and Physical (real and ideal movement patterns as well as anatomic and physiologic conditions). Theories and concepts include Maslow’s hierarchy of needs, Erik Erikson’s life stages, VAK processes (Visual, Auditory and Kinesthetic), and skill development utilizing the low impact /continuous movement curriculum as well as the senior teaching cycle.

We hope you enjoy this manual and experience a few learning ‘ah-ha’ moments. This manual is a work in progress and an evolving tool designed for growth and evolution. Statistics change, ski and board technology change, however what remains true is the ongoing desire for educational excellence. This manual is not intended for use in isolation, it is an adjunctive component to the on-snow senior specialist credential



Chapter 2. Creating the Learning Partnership

Well kids, don't let anyone tell you this show isn't realistic!

-Daffy Duck

Instructor Behavior and the Student Profile

The principles of good teaching are always relevant with any class. The American Teaching System (ATS), documented in the 1996 PSIA Alpine Manual is an excellent place to start. The principles of good instruction are facilitated by the instructor and are characterized by:

1. *Guest Services* Driven by developing positive interaction with the Snowsports area services and meeting the needs of the client base.
2. *Student Centered* learning facilitated by the instructor who identifies and meets the student needs throughout the lesson.
3. Establishment of a *Learning Partnership* with the student through the process of continuous communication and development of trust.
4. Development of a flexible lesson plan that is *Outcome Based*, one that caters on a real time basis to the needs of the student.
5. Allowance of sufficient time for the students to experiment and learn through *Experiential Learning* and/or trial and error.
6. Providing feedback and coaching that is *From the Heart*, that is accurate and honest yet diplomatic.

The principles of effective teaching were further expanded with the Core Concepts Manual (2001). These principles of good instruction have been further nuanced and broken down into specific skiing and riding models and teaching models. The senior specialist instructor shall be familiar and accountable to these common models as they are the foundation of all outcomes and methods utilized in the senior specialist program.

1. The Learning Partnership: student profiles and instructor behaviors.
2. The Teaching Model: including the teaching cycle for successful lessons.
3. CAP: Cognitive, Affective and Physical attributes of all learners.
4. Skiing and Riding: common efficient skills and movement patterns.

The instructor's assessment and understanding of each client, i.e., the Student Profile (based on the senior CAP Model) and the instructor's subsequent development of their lesson plan, i.e. the teaching cycle (based on the senior Teaching Model) creates the Learning Partnership. The student profile and instructor behaviors will be further discussed in subsequent chapters. The Learning Partnership can only be developed with proper assessment and understanding of the student profile and a proper development of an instructor plan of action.

Identifying the Client

Identifying the components of the student profile guide the development of the learning partnership by giving the instructor tools to utilize while assessing, interviewing and determining guest needs and hence creating a relationship. There are multiple components that make up the student profile – time, study and experience will assist in ultimate mastery as a senior specialist instructor. The first question to address, however, is exactly what is the senior client?

There are many different definitions of a senior depending upon what the reference source is and, as well, the perspective. For instance, a student in the last year of high school is referred to as a *senior*. This senior ready to graduate can suffer from *senioritis*. One who has tested extensively with the National Ski Patrol is considered a *senior* patrol member. A high level employee in the government's state department is considered a *senior* official. Restaurants cater to certain demographics depending upon their business model and may advertise *senior* specials on their menus. The PGA hosts a *senior* championship; one must be over 50 to be invited. Membership to AARP requires one to be 50 years old, what the organization considers a *senior*. Only a few decades ago, parents in their 40's were sending their children off to college. Now, many parents in their 40's are just starting their families. As we age we may be irritated to be offered a senior discount when we didn't ask for it or flattered when carded by the barkeep.

Additionally, the techniques studied and taught in this program apply to other demographics other than the older client. Anyone who has suffered a physical injury requiring surgical repair and/or extensive rehabilitation will find useful the low impact movement focus. Someone who has experienced a traumatic or frightening situation may find impactful the focus on the affective components of this model.

Membership in the great sport of skiing still includes active skiers who are considered to be in the Greatest Generation (1914-1930) and the Silent Generation (1930-1945). Now, as the Baby Boom Generation ages (1946-1964), Generation X (1968-1979) is nipping at their heels teaching us that the only thing we really know for sure is that the definition of *senior* and consequently the definition of aging will continue to change and evolve.

Demographic Realities and the Senior Market

The Federal Interagency Forum on Aging-Related Statistics (Forum) was founded in 1986 to foster collaboration among Federal agencies that produce or use statistical data on the older population. This source as well as the US Census bureau provide many of statistics provided in this manual. What we know for sure is that the senior demographic is growing. What we don't know for sure but have anecdotal evidence of is how this market is or is not impacting the ski and ride industry. See (Appendix 1. Additional Demographic Data) for further statistical analysis and data. This section offers a brief overview of numbers and impact. The following statistics vetted over the past ten years show interesting but not necessarily concrete information regarding the senior demographic. However, used in totality, the statistics show a compilation of age, income, activity levels and trends in participation that can help the instructor, school or mountain resort identify their client base and provide opportunity to add to the learning partnership.

The older population--persons 65 years or older--numbered 39.6 million in 2009. They represented 12.9% of the U.S. population, about one in every eight Americans. By 2030, there will be about 72.1 million older persons, more than twice their number in 2000. People 65+ represented 12.4% of the population in the year 2000 but are expected to grow to be 19% of the population by 2030.

The 2011 SIA's Snow Sports Market Intelligence Report looked at the snow sports industry analyzing statistics on participation, retail sales and resort information from the 2009/10 season. Gender was split 60% male and 40% female. The highest participation of skiers by age was around 20% both in the 25-34 brackets and 35-44 brackets. However, the 45-54 age brackets held strong at 16% but plummets to 5% in the 55-64 age group and 2% for those 65 and older. Overall, age trends are moving downwards compared to the previous 2008/09 report.

Definitive research thus far stems from Jasper E. Shealy, Ph.D., C.P.E, "Aging Trends in Alpine Skiing" (Shealy, J. E., Ettlinger, C. F., Johnson, R. J, 2010). This study notes the US Census Bureau data showing the mean age of the US population in 1970 was 26.8 years and in 2007 it was 36.4 years, an increase of 9.6 years. The study spanned 34 years from the 1972/73 to 2006/07 seasons and concluded that both the US population and the US skiing population are aging, with the skiing control population increasing more so than the general population.

How individual snow sport schools and resort areas use this data to reflect upon design impacts, resource allocation and marketing is yet to be seen in all but small pockets of our industry at this time. As noted by psychoanalyst Serge Prengel, "being proactive means being reactive – ahead of time". Will we continue to see the baby boomers come back to the sport of skiing, or take up the sport for the first time? Anecdotally, we hear of boomers coming to ski resorts with their children and grandchildren. Generational ski lessons are being marketed. The statistics alone are just one barometer to use when identifying the senior client.

While there is a tendency to use the age of 50 as a benchmark in identifying the senior client, it is only useful in providing a general frame of reference. Because age associated changes vary in onset and development and do not reflect any particular age in years, the characteristics of the individual skier are much more significant. It is important to identify who your client is, why they are participating in lessons and what their goals are. Understanding typical characteristics help in identifying the student profile.

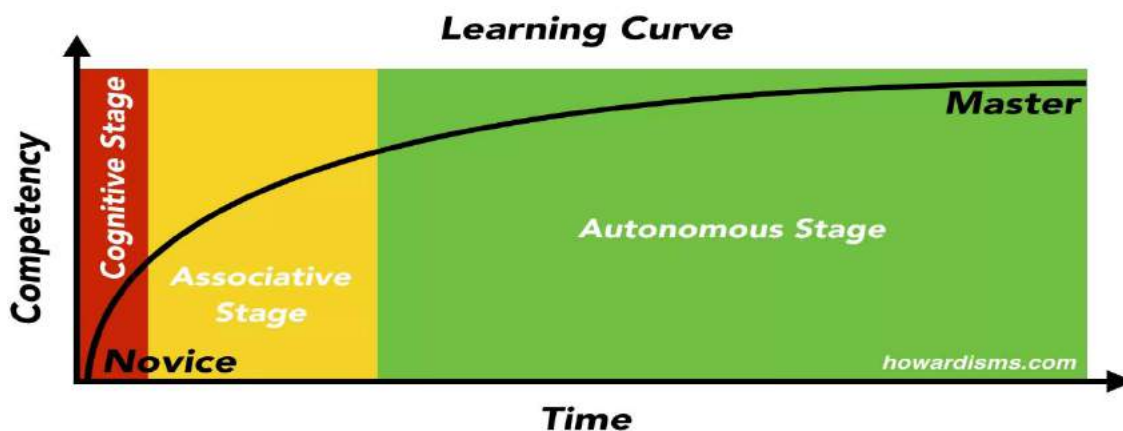
The senior population of skiers presents broad characteristics that influence their goals, needs and expectations. A good understanding of these traits enables instructors to be more successful in meeting client expectations and should significantly influence the format of the lesson, the pacing of the activities and the specifics of the learning partnership established between student and instructor. Each class will present specific challenges; the instructor's ability to appropriately identify the student profile and adjust accordingly creates successful outcomes.



With these generalized statistical and demographic profiles and characteristics identified, specific content will now be broken into component parts within the Cognitive, Affective and Physical (CAP) attributes of the senior population. How one thinks (cognitive), identifies, feels and operates in the word (affective) and is physically developed (physical) can help create a framework to identify and place information learned about a student. While originally developed by Benjamin Bloom (1956) in identifying three core domains of learning, and used extensively in the children's snow sport curriculum, the CAP model is equally useful in

understanding how any person functions in life, unrelated to age or discipline. Understanding the specific elements of the senior CAP model assists in delineating instructor behaviors that can create an effective learning partnership.

An important concept to consider while reviewing the following CAP attributes, is how these domains impact acquiring new skills or refining existing skills. The achievement of goals or certain skill levels does not diminish because of age. Time is now one of the core and essential elements that impacts acquisition and must be considered moving forward.



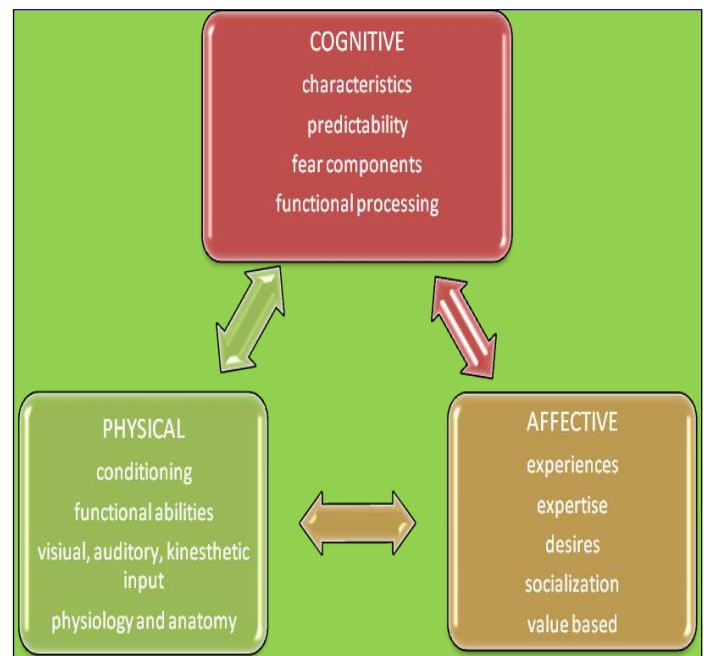
Chapter 3. The Senior CAP Model

Cognitive Attributes of the Senior Skier

If everyone is thinking alike, then somebody isn't thinking. – George S. Patton

We now know that we hit our cognitive peak between the ages of 40 and 68. Through the years, our brains build up connections and recognize patterns; meaning we're better problem-solvers and can more quickly get to the gist of an argument. It's the reason why judges and presidents tend to be middle-aged or older, and why Captain Chesley "Sully" Sullenberger was able to land that airplane on the Hudson River. Older brains can swiftly make the right calls. (*The Secret Life of the Grown-Up Brain*, Barbara Strauch, 2010)

Scientists used to think that we lose a significant number of our brain cells as we age, but more sophisticated computerized scans and scientific research have debunked that theory. We now know that we hit our cognitive peak between the ages of 40 and 68. Through the years, our brains build up connections and recognize patterns; meaning we're better problem-solvers and can more quickly get to the gist of an argument. It's the reason why judges and presidents tend to be middle-aged or older, and why Captain Chesley "Sully" Sullenberger was able to land that airplane on the Hudson River. Older brains can swiftly make the right calls. (*The Secret Life of the Grown-Up Brain*, Barbara Strauch, 2010)



Intelligence generally can be thought of as

Including a range of abilities that allow us to make sense of our experiences; the ability to comprehend new information, the ability to think abstractly, the ability to make rational decisions, spatial ability, numerical ability, verbal fluency, etc. Some abilities (e.g. the ability to think abstractly) are heavily biologically determined and are relatively independent of particular applications, reflecting what has been called “fluid intelligence.” Other intellectual abilities (e.g., verbal fluency) are more apt to reflect the knowledge and skills a person has gained through life experience, or “crystallized intelligence”. Intelligence tests have demonstrated a pattern of age-related changes in intellectual functioning typically beginning after the age of 60. This ‘classic aging pattern’ involves somewhat poorer performance on tests of fluid intelligence, but little or no difference on tests of crystallized intelligence. Not all cognitive changes in later life are negative, however. Older persons typically exhibit greater experience-based knowledge, increased accuracy, better judgment, and generally improved ability to handle familiar tasks than younger persons. Such applied knowledge, or wisdom, may in fact be considerably more important to one’s ability to accomplish most tasks of day-to-day life than are the abstract abilities tapped by intelligence tests. Most persons experience a

modest increase in memory problems as they get older, particularly with regard to the ability to remember relatively recent experiences. Decrements are found both in the ability to accumulate new information and in the ability to retrieve existing information from memory storage, although there is little decline in the ability to store new information once it is learned. (*Aging Successfully; the Importance of Physical Activity in Maintaining Health and Function*, Marc T. Galloway, MD and Peter Jokl, MD)

The most common cognitive change is a decline in speed of mental processing. As we age it appears there is a decrease in the speed of evaluating the information and reacting to it. Older persons also become less capable of making a decision regarding a stimulus, thereby appearing less decisive. However, these affects may not appear until the individual is much older. (*Ratcliffe & Saxton*, 1998)

Autobiographical memory (life stories and events) tends to remain sharply intact as one ages. Habitual processes (driving a car, riding a bike) remain constant as well. However, episodic memory (remembering names, tasks) starts to recede with aging. Short term memory such as recalling someone's name, the reason one went out to the garage in the first place, is a retrieval mechanism and sorting through the retrieval brain processes can become slower and weaker over time.

Seniors are just as likely as younger adults to understand material being presented to them, but they would benefit from more time to absorb the information. . . . seniors may be less able to 'store' new material that is presented rapidly. . . . reaction time is slowed. . . . however, it is important to note that these changes are minimal in normal aging, and do not generally impair the daily functioning of seniors. Further, there is considerable variation among seniors, and all of these changes are relative to the individual's level of functioning." (*Working with Seniors, Health, Financial, and Social Issues* Society of Certified Senior Advisors, 2005)

Of course, symptoms of dementia, such as Alzheimer's disease can rob a person of capacity and memory. Individuals with memory loss (even in the earlier stages) present a unique challenge both in learning (retention) and in class handling. One possible attribute of someone with dementia is a lack of empathy, or tolerance of others, with behavioral outcomes of anger or irritation not commensurate with the trigger. In other words, demonstrations of needless frustration and anger out of proportion to the reality of the situation. Also, short term memory can be impaired requiring directions and coaching to be measured and possibly repeated. Consideration of "partnering" so the individual is always with someone else may be helpful. Most seniors are sympathetic to persons with such conditions and don't mind participating in helping to ensure their safety and well-being when asked. A terrific story was shared during a previous Senior Specialist event wherein the participant informed the group of his experience skiing with his friends including a member with progressive dementia. The group had skied together for years and knew each other well. As their friend progressively became forgetful, eventually requiring reminders when to load and exit chairs and which run to take – she NEVER forgot how to actual ski. The smile on her face while flowing down the mountain gave

everyone else tremendous satisfaction in knowing that they were contributing to their friend's quality of life.

According to some experts, seniors tend to be more cautious in their decision making. Once they make a decision however, they are more reluctant to revise their decisions and judgments. This tends to make them less flexible in their learning which means it may be more of a challenge to convince senior students to try new movements. This challenge may be particularly difficult if they have some history which has given them the belief their current movements are appropriate, such as an earlier "good lesson", using outdated equipment or technique. Gradual changes with incremental improvement may be the best approach, rather than trying to convince the senior student to try something radically different. Habitual patterns are ingrained cognitive functions that take time to develop and, therefore, also take time to change or alter.

Cognitive development continues through an adult's early 20's with the brain undergoing continuous changes and remodeling. Thinking and learning occur in the amygdala, hippocampus and temporal lobe regions of the brain. A child's final brain development occurs in the pre-frontal lobe and is not considered finally mature until their early 20's. Neurological research is focusing now on the mature brain with theories that the brain remains neuroplastic, meaning that functioning can change and adapt. Seniors involved in self-improvement in the community setting with like-minded goals help maintain healthy brains on holistic levels. (*Vibrant Minds*, Lisa Schoonerman, 2008) As an adult matures into middle age and then senior years the brain uses the greatest developed functioning areas the most. The adage "use it or lose it" is generally true.

The brain sorts and organizes information. The physical response is the motor response or outcome which starts in the brain and is involved in a feedback loop of the senses. Our senses tell us how we receive information regarding position and movement through space. Our senses are how we hear, see, feel and taste. Three sensory receptors that relate to balance are the eyes, inner ear and kinesthesia, the perception of body movements (for skiers and riders, starting at the soles of the feet.) Visual, Auditory and Kinesthetic: VAK. This is an important concept to understand when working with senior skiers as their senses may be diminished or impaired, impacting balance as well as other potential outcomes. The senses can be considered free standing entities as well as inter-related as the mitigation of one sense may alter applications of the others.

Sensory input and cognitive functioning work towards creating physical outcomes. All the senses receive information. The brain processes this information which leads to the body having a motor response with the body then sending this information back to the brain via the sensory feedback loop. This is to be contrasted with a reflex, when the response feedback loop goes only to the spinal cord and not the brain, creating an involuntary response.

Visual

Vision declines with aging with decreased acuity

Localization: orientation of people or objects in space

Details: fog, density, brightness, contrast

Overload: crowds, volume, terrain, fear

Auditory

Hearing determines direction and distance

Sounds: ice, crud, crowds, inner-voice

Acuity: helmet usage, lack of eye contact

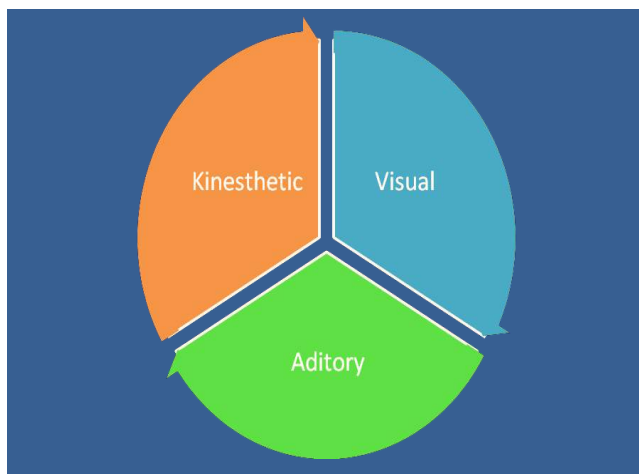
Kinesthetic

Sensation is primary source of sensory input

Tactile: how it feels

Pressure: sensations on body parts

Proprioception: the body's balance receptor



The brain is the sorter and the organizer. Again, the physical response is the motor response which creates actions and reactions which allow order and predictability. Labels attributed to senior skiers of “stubbornness” or “refusal to change ways” may really be ingrained cognitive and neurological processes that take time and coaching to alter or adapt.

For a more complete and detailed discussion of the relationship between skill acquisition and the interrelated cognitive functioning processes, see further information held in the Appendix.

As a general rule, seniors are smart and have a work life history of being good at something. Creating “buy in” and a desire to change learned movement patterns or trialing new ski technology can be more successful when considering multiple aspects of the cognitive component.

Published in 2015, an excellent article from Cognitive Skills and the Aging Brain: What to Expect outlines many of the aging cognitive nuances well. An extract: Mental abilities change throughout life, first as a result of brain maturation and later with aging of brain cells and their billions of complex interconnections. As people age, their movements and reflexes slow and their hearing and vision weaken. Until the 1990s, most aging research examined cognitive abilities of adults younger than 80. More recent research includes the fast-growing 80s-and-older population and has advanced our understanding of cognitive changes in the elderly.

http://www.dana.org/Cerebrum/2015/Cognitive_Skills_and_the_Aging_Brain_What_to_Expect/

Affective Attributes of the Senior Skier

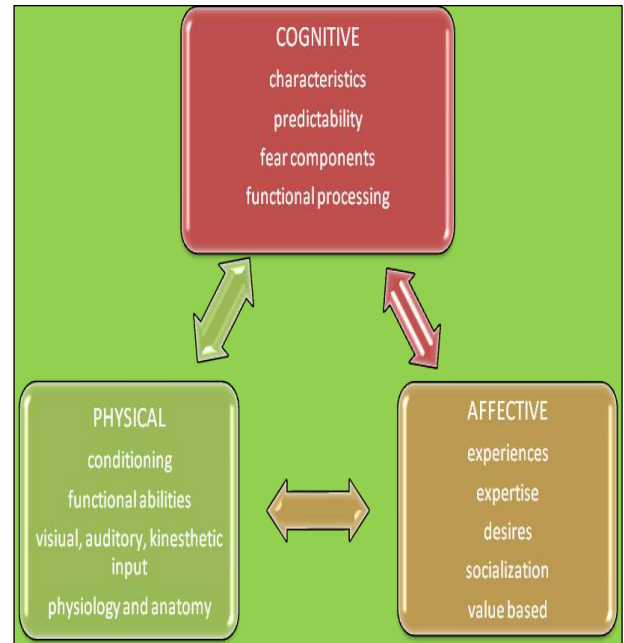
Success is the ability to go from one failure to another with no loss of enthusiasm.

- Sir Winston Churchill

A key in the affective development of most senior skiers is the importance of the “whole skiing experience” and the social aspects it can involve. Competition is less important and the overall desire for a good social experience greatens.

Most senior skiers have learned to want to savor each run and are willing to take the time to stop, chat and observe the world around them while taking the time to “smell the roses.” Often seniors favor the social aspects of skiing with a group of like-minded individuals.

Generally, seniors have a number of attributes in common. First they are middle-aged or older. They are very *goal oriented*, have *many years of life experiences* to draw from, *are experts at something* which will influence how they observe and learn and are generally *attracted to skiing more for the social environment* rather than the challenges of competition or difficult conditions.



Seniors have learned with life experience that setting specific goals in their activities creates greater outcomes. Often, this is reflected in the client’s approach to a lesson as they have specific goals identified that they want to achieve. The client may have a specific “issue” they want to address and a particular level of accomplishment they hope will be the result. The successful instructor will try to understand these goals. A more successful lesson is likely if the goal is appropriate and is one that can be reasonably achieved. This may require some moderation of the client’s initial expectation but seniors have the life experience to understand the process of achieving intermediate goals as long as they lead toward the ultimate stated goal.

As students, seniors come to you with many years of life experiences. This can be a rich source for “teaching for transfer.” Many of these experiences will allow the instructor to relate skiing movement patterns to some other life activity: tennis, sailing, hiking, musicianship. Socially, the client’s wealth of experiences can provide a great opportunity for group and individual interactions.

Throughout a senior’s many years they have become experts at something. They have experienced success and want to succeed in the lesson. An older client can understand success does not generally happen “overnight” and is generally willing to be more patient, particularly with demonstrable progress.

Few senior skiers approach the sport with the desire to conquer it. By this stage in life, the social interaction that can occur during a lesson, both with the instructor and the other students, has a greater importance. Participation in the lesson for the fun and the joy of sharing the experience with others, rather than to become “the best skier on the mountain” is of more paramount importance. Frequently, attributes of the experience include such things as the bus ride, lunch at the top of the mountain, a beer or glass of wine at the end of the day and a chance to recount the “best run of the day”. These times provide an opportunity to relive and share the day’s skiing experience with others in a comfortable social setting.

Today’s modern resorts offer a mixture of old and new amenities. High speed chair lifts get the skier onto the snow faster, a perceived benefit. For the senior client a high speed chair also minimizes the amount of rest time between runs and limits the opportunity for social discussions and visiting. Skiing is a solitary sport mixed with social opportunities, a prime mixture for most personalities.

“As we age, we are no longer willing to give up the pleasures of physical activity, nor should we be. However, it is difficult for us to maintain a clear perspective on just how much we can do. We do not have much in the way of role models. Our bodies and capabilities are constantly changing. We no longer have the same confidence in our physical ability. To feel apprehensive under such circumstances is not only understandable, it is to be expected. As an individual experiences more apprehension the less confidence he has in his ability to perform successfully. When we find ourselves physically unable to do something we had no problem with before, when we are slower to react, when we cannot rectify a mistake with the same alacrity, when we take longer to recover from an injury, we lose a clear sense of our capabilities and limitations. We lose confidences and thus we become apprehensive. So how do we deal with this - with this loss of confidence and the resultant anxiety and fear? We can succumb and either give up altogether (possibly making excuses that help us save face), or perform at a level far below our actual capabilities; we can deny that any of this is happening and put up a brave but reckless front, truly endangering ourselves; or we can be realistic, see the situation for what it is and deal with it. We can learn our capabilities and limitations, set realistic goals, and build confidence. We can learn new and different ways to do things and refine skills rather than relying on an ever declining strength. As we get older, our confidence in our physical abilities will decrease and, quite likely, our anxiety and fear will increase. An instinct for self-preservation, after all, is natural and healthy. How we deal with this then is up to us. The most constructive way is to rebuild confidence by setting attainable goals and finding ways to perform that require less brute strength, relying more on skill and finesse. With the right skiing attitude, you can enjoy a long skiing life and many happy turns.” (*Senior Skiers and the Fear Factor*, Elissa Slanger, Ph.D., 2007 PSIA-W)

“Old age is typically a time when the work role becomes less important and leisure takes on more significance in life. Leisure may be an end in itself, but moments of leisure also have a developmental pattern that is rich with purpose. Leisure, in short, can be serious business. For example, if we play sports or perform music or read a book, each moment leads to the next in some purposeful developmental pattern. It’s a mistake to resort to stereotypes about ‘old

people's' activities, such as bingo, or singing old-time songs.” (*Working with Seniors, Health, Financial, and Social Issues*, 2005 by the Society of Senior Advisors.) In short, many seniors interest in and passion for skiing may actually increase with age.

Researcher Victor Barnes has concluded that “next to dying our recognition that we are aging may be one of the most profound shocks we receive.” (*The Psychology of Old Age*, Victor Barnes, Ph.D., 2005) Barnes concludes that in this later stage of life a sign of maturity is attaining “ego integrity.” He describes this as “coming to accept one’s whole life and reflecting on it in a positive manner.” Persons who attain this maturity have generally progressed successfully through the earlier stages of life development. Barnes identifies a number of stresses that generally come into play in old age: retirement and reduced income; isolation (loss of loved ones); reduced physical attractiveness; and a tendency to self-devaluation (loss of importance or status). Citing Maslow’s Hierarchy of Needs theory, Barnes reminds us that we are not free to pursue self-actualization unless basic needs are secured. Accordingly, seniors whose financial well-being is more secure, for example, tend to be motivated to pursue activities concerned with aesthetics, creativity and altruistic matters. Those who are not secure will only be frustrated by attempts to focus them on such activities.

Another dominant attribute of the emotional domain for senior skiers tends to be fear of injury. In this respect the affective and physical domains intersect. Much more so than their younger counterparts seniors worry about physical injury. Risk taking is reduced with age, and with some good reason. Physical injuries may be greater or more likely with advanced age accompanied by reduced bone density, muscle loss, etc. Injury recovery time is generally much longer. Fear for physical safety is an inhibitor for learning and thus providing a safe lesson environment can be critical for the senior lesson. So too are learning skiing movements that reduce the physical impacts of skiing and reduce the chance of wear and tear injuries. This is an appropriate goal for the senior skier and will provide emotional as well as physical benefits.

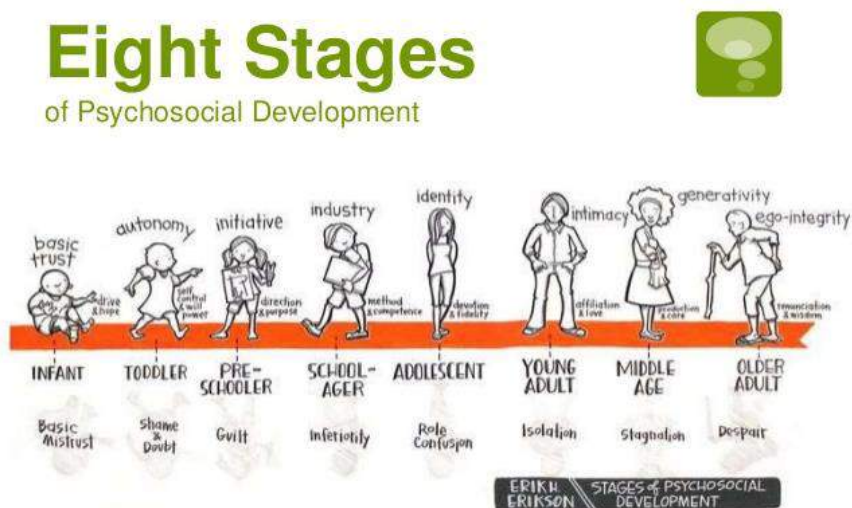
Abraham Maslow created a measurement tool to assist in evaluating when one’s emotional and physical needs are met to the point that potential can be fulfilled or “self-actualized”. Adapting Maslow's Hierarchy of Needs pyramid to identify the known social, emotional and physical needs of the senior skier is noted in the graphic below. In the manual’s next section on the physical attributes and needs of a senior, the physiological processes of the senior body will be explored more fully.

It’s important to note, however, that the lowest most foundational level of Maslow’s pyramid is about meeting physiologic needs. When children suddenly have to use the restroom, they have to go “right now”. Children’s cognitive functioning is at a point where the sudden urgency is more about their own egocentric developmental stage. For older adults, having immediate and known access to restrooms becomes about the physical changes in the bladder creating urgency. No one is ready to be self-actualized if their immediate worry is an embarrassing incident.

Safety and security take on unique perspectives as the senior client is fully aware of the skier’s responsibility code and the implied contract between them and the resort having in place safety measurements. A ski patrol that is working and has a presence is important. Crowded hill without appropriate safety signage and controls can be the instigator for a very unhappy senior

client. Old and outdated gear can manifest into physical safety issues and framing discussions about purchasing or renting newer equipment can be successful if approached from the Maslow's framework. A sense of belonging and having positive self-esteem are attributes that all people desire, from childhood to old age. According to psychologist Laura Carstensen, "aging doesn't turn a cheerful person into a grouch. To the contrary, research has shown that, as we age, we become more emotionally stable and content. In early adulthood, there are a lot of what-ifs: Am I going to find a soul mate? Have a child? Build a rewarding career? Then you spend the next few decades striving to achieve those goals. But when you're older, the what-ifs have been resolved." The senior student that is ready to learn, one that is ready to participate fully in the lesson and enjoy the mountain experience is one who has met the basic levels of Maslow's Hierarchy of needs.

Another model of human development often compared to Maslow's Hierarchy of Needs is Erik Erikson's (1902-1994) Psychosocial Development Theory, first published in *Childhood and Society*, 1950. Erikson's model starts at infancy and looks at eight stages of human development deemed important in successfully managing life stages or life cycles. His application is useful in looking at how personality and behaviors develop in people. Erikson's psychosocial theory (psycho: mind and social: relationships) shows how people experience eight 'psychosocial crisis stages' which drive outcomes of each person's development and personality. The term crisis is used by Erikson to describe an internal struggle that must be positively navigated by an individual in order to grow and develop. Successfully navigating each crisis involves having a healthy ratio or balance which Erikson defined as "basic virtues or strengths". The stages are subsequently built on each other, although there can be overlap as one moves into each stage over their lifetime. Successful negotiation through each stage involves striking the right balance between the extremes rather than entirely focusing on one ideal.



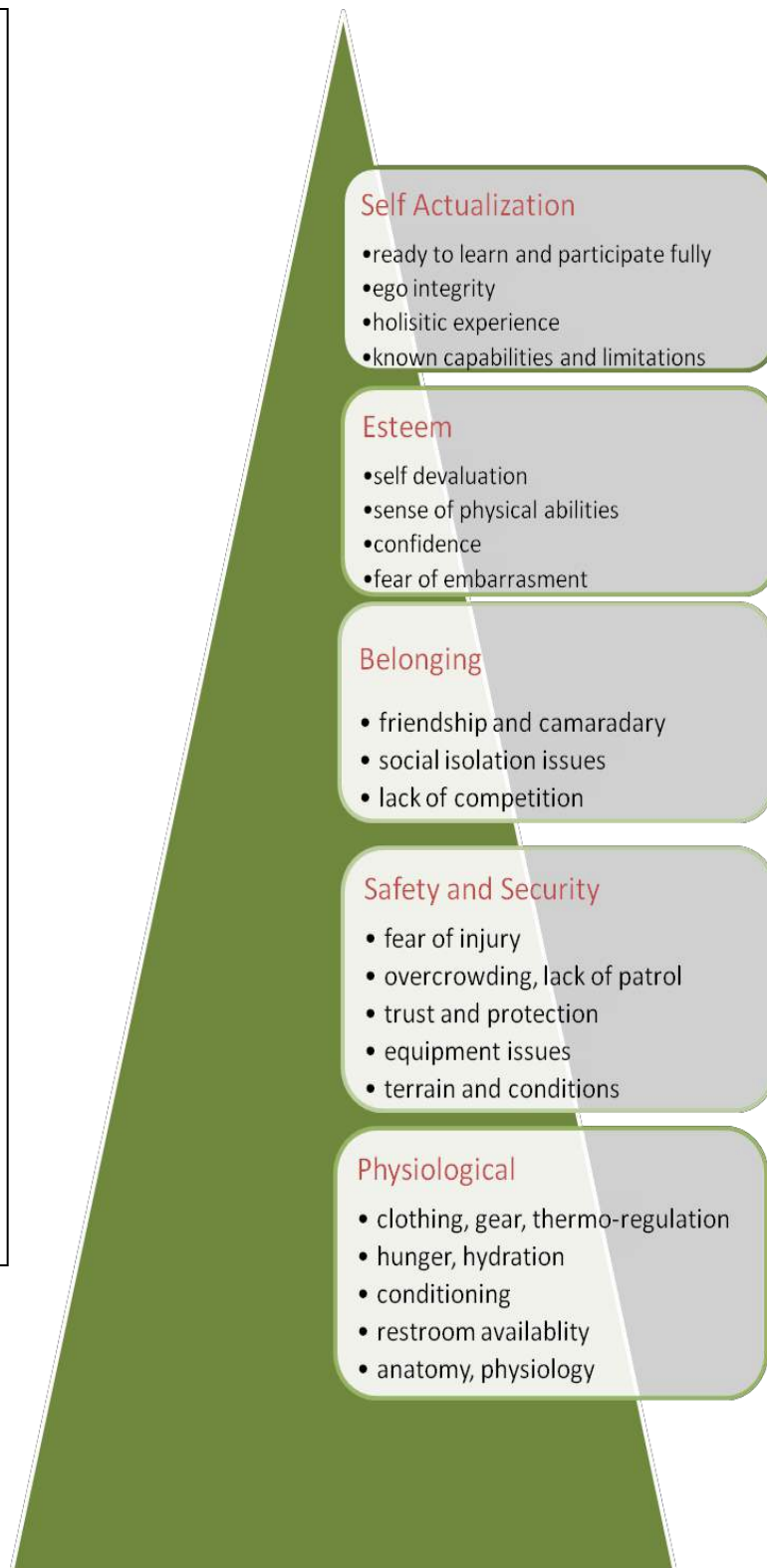
Looked at in depth, Erikson's theory involves explaining why too much of anything is not helpful for developing a well-balanced personality. This model is an excellent opportunity to explore the older person as they move into their last 2 stages. These final stages look at attributes including care, love, fidelity, competence, purpose, will and hope and how social and cultural factors can influence outcomes. If a crisis stage is not resolved, an identity crisis

occurs leaving a person not fully developed and unprepared to be successful. Or, in Maslow's language, self-actualized or not. For more information on this topic, Erikson's book *Vital Involvement in Old Age* (1986) is an excellent resource for the senior specialist.

Maslow's Hierarchy of Needs
Developed by Abraham Maslow
(1908- 1970) as a tool to use in
determining readiness to fully
participate in life based upon
humanistic psychology.

Maslow refers to the first four
needs as *deficit needs*, needs that
need to be filled to reach
homeostasis. To reach the final
stage, the previous needs must be
met as self-actualization or *being
needs* relate to the continuous
desire to fulfill potential. One has
moved beyond deficits and stasis to
completeness: the ability to be the
fullest you: self-actualized.

Common features of self-
actualization include reality
centered, problem centered, ability
to enjoy solitude, deep personal
relationships, autonomy, resistance
to social pressures and unhostile
sense of humor and acceptance of
self, spontaneity, simplicity,
humility and respect. As well,
Maslow identified qualities he
referred to as “human kinship” or
gemeinschaftsgefühl which is a
social interest, compassion and
humanity towards others. Maslow's
postulation on the percentage of the
world's population as being truly
self- actualized? About 2%.



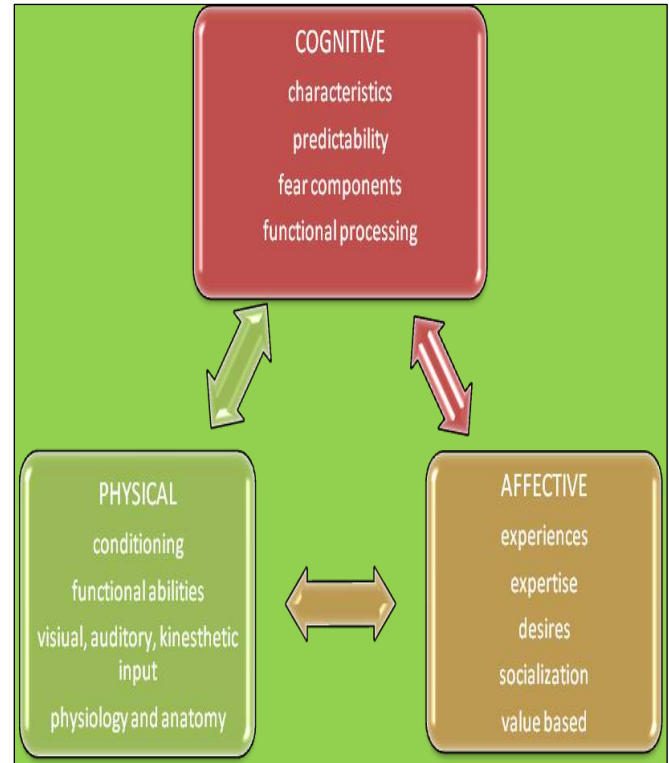
“I grow old ... I grow old ... I shall wear the bottoms of my trousers rolled.” — T.S. Eliot

Physical Attributes of Senior Skiers

You have to stay in shape. My grandmother, she started walking five miles a day when she was 60. She's 97 today and we don't know where the hell she is. - Ellen DeGeneres

"I suppose it's like the ticking crocodile, isn't it? Time is chasing after all of us." -J.M. Barrie, Peter Pan

What we know about the US population in general is that the older generations are aging in a more healthy and purposeful manner. The following section is about possible biologic outcomes of aging. This is general information, not meant to discourage or discount the fact that most of us reading this manual are healthy in heart and mind. This portion of the manual is for educational purposes only, an overview of common anatomical and physiological processes involved in aging. We all know stories of healthy 90 year olds and unhealthy 30 year olds. In fact, anecdotally, the older senior population is not different from a biological standpoint than their younger counterparts. Moving is doing and doing is moving; if you use it, you won't lose it.



Research has shown that disability and decline do not have to be inevitable consequences of aging. The health of the aging population can be preserved and chronic diseases can be reduced. Promoting healthy lifestyles and broadening the use of clinical preventive services are critical to preserving health, maintaining function and reducing health care costs and long-term care needs.

Life threatening illnesses have steadily decreased over this past century as modern medicine has expanded. Monitoring Medicare spending trends is one way of evaluating the general health trends of the older population. Health care costs of people 65 and older were 12.9% of their total expenditures based on the 2010 US census report. However, 25% of all Medicare spending is for the 5% of seniors in their final year of life. There is now evidence for the adage 'use it or lose it', i.e.: that exercise improves health and function in old age. Regular exercise also reduces mortality by up to 25% per annum and improves mood and well-being. (Parffnberger, R. S., Hyde, R.T., Wing, A.L. ET al.1993). As noted earlier, the principles of neuroplasticity hypothesize that the brain continues to rewire synapses with continuous activity, once again linking the cognitive, affective and physical domains.

Probably the most obvious attribute of advancing age is the decline in physical condition. The following breakdown of systems related to the effects of physiological aging has been accrued from the following sources: *Working with Seniors, Health, Financial, and Social Issues*, (2005) by the Society of Senior Advisors; *National Academy on an Aging Society*, (1999); *Physical Changes of Aging*, Suzanna Smith and Jennifer E. Grove; *Physical Changes in Aging*, Lopu Isbell and *The Epidemiology and Demography of Aging*, Moritz, S. J., Ostfeld, A.M. (1990).

The primary source is referenced with permission from Jasper E Shealy, Ph.D., C.P.E. (“*Aging Trends in Alpine Skiing Trauma and Safety: Eighteenth Edition*”, Shealy, J. E., Ettlinger, C. F., and Johnson, R. J., , 2010) a long term study assessing ski injury rates and trends identified that are age related as opposed to time related. The study found that overall the over 55 age group is at a lower risk of injury than the general skiing public. This study compared data collected between December 1972 and April 2006 with the authors evaluating prospectively 18,692 injuries sustained by 17,197 skiers and reported to the injury clinic operated in the base lodge of a moderate size northern Vermont ski area.

Muscular-Skeletal

In healthy young people, 30% of body weight is muscle, 20% is adipose tissue (mainly fat cells) and 10% is bone. Muscle accounts for 50% of lean body mass and about 50% of the total amount of body nitrogen. By age 75, about one half the muscle mass has disappeared; 15% of body weight is muscle, 40% is adipose tissue, and 8% is bone.

Maximum isometric strength is achieved in the third decade, plateaus till about 55 or 60, declines by 10 - 15% per decade till age 75, and then declines more rapidly at 1.8 - 4.1% per year 4. The isometric strength of a 70 year old has been estimated to be 50% that of a 20 year old.

As humans age there are inevitable age-related changes in the musculoskeletal system. In particular, as the human body ages, bone and soft tissue structure changes. Between ages 40 and 50, bone density begins to decrease in both sexes, most rapidly in women. Because bone mass is lost, fractures occur commonly at the proximal ends of long bones and the spine, often with minimal trauma. Articular cartilage shows a reduced response to growth factors, becomes more brittle, and tends to accumulate calcium pyrophosphate with aging (a painful arthritic process).

Connective tissue in ligaments and tendons loses tensile strength, elasticity, and regenerative capacity with aging. A decrease in muscle mass (sarcopenia) normally occurs with aging. Fibroblasts are responsible for growth and regeneration of the connective tissue that makes up most of ligaments and tendons. With aging, the in vitro proliferative capacity and synthetic activity of fibroblasts decrease. These changes may at least partially explain why, with aging, tensile strength, elasticity, and regenerative capacity of ligaments and tendons decrease. As a result, ligaments and tendons are predisposed to rupture and have a prolonged healing time. After about age 30, the number and size of muscle fibers progressively decrease, resulting in a decrease in skeletal muscle mass and thus lean body mass. This process is termed sarcopenia. Age-related factors contributing to sarcopenia may include reduced levels of exercise and physical activity, hormonal changes and reduced skeletal muscle protein synthesis. Resistance training has been shown to be a powerful intervention in the prevention and treatment of

sarcopenia. (Roth, Ferrel & Hurley, 2000)

Bone Health

With age come reduced muscle mass (loss of strength) and lower bone density (weaker bones). The average non-exercising person loses twenty-two to twenty-three percent of muscle mass between the ages of thirty and seventy. Exercise can slow the rate of loss. Beginning at about age thirty five, the average person begins to lose more bone mineral than is replaced, especially women. Between ages 40 and 50, bone density begins to progressively decrease. This decrease occurs because bone is lost from within. Bone cortices become thinner from the inside; also, whole structural elements of cancellous bone are removed, a process that differs in detail between the central and peripheral skeletons. Interestingly, decreased bone density does not tend to result from decreased bone production; bone remodeling can actually increase with aging. Bone loss that occurs as part of normal aging can be divided into 2 mechanisms: a rapid one that affects women after menopause (menopausal bone loss) and a slow one that affects both women and men after age 40 to 50 (senescent bone loss).

Exercise and a healthy diet can cut osteoporosis risk. Dairy products are rich in calcium, which is essential for building and maintaining strong bones as is Vitamin D which helps the body absorb calcium.

Joints are built to move and unlike machinery they actually increase in strength and tolerance with sensible use. The synovial joints are specific body joints that tend to move a lot, including the knees, hips and shoulders requiring special lubrication for functionality. Hip and knee replacements are growing with data showing that from 1997 to 2007 the population of people aged 45-64 grew by 36 percent but knee replacements in this group more than tripled, (orthoinfo.org). Half of the total hip replacement surgeries done in 2009 were in people under 65. Spinal surgeries including spinal rods for stability and/or reinforcement secondary to spinal degeneration are becoming more prevalent. Current research is looking at the possible future implications of age related joint replacements in the setting of artificial joint design generations increasing in length of functionality before requiring replacements, i.e. younger clients looking for joint replacements earlier in life knowing the replacements will last longer and better.

Cardiovascular and Respiratory

As the aging process evolves a reduced cardiovascular capacity (reduced oxygen in the blood) occurs. The heart muscle thickens reducing the heart's maximum pumping rate and negatively affecting the ability to extract oxygen from the blood. This implies a decrease in elasticity and an increase in stiffness of the arterial system.

A male's maximum oxygen capacity during exercise is reduced by about ten percent every decade. The corresponding reduction for females is about seven and a half percent. Arteries become stiffer and resistant to blood flow. Lung capacity too is decreased due generally to increased rigidity in the chest wall, decreased respiratory muscle strength, loss of elasticity in lung tissue and a reduced gas exchange surface area. This reduced respiratory reserve causes no apparent problems at rest, but compared to the young, the aging athlete may experience breathlessness at lighter workloads.

Resting heart rate is not generally affected by aging; however, decreased heart rate in response to exercise and stress is characteristic of healthy aging. The age-associated decline in maximal cardiac output and cardiovascular reserve capacity may not limit usual ability in otherwise healthy elderly adults because the vast majority of daily activities are performed at low and sub-maximal workloads.

Good cardiac health includes a low sodium and proper diet, moderate alcohol intake and exercise. The status of the physical condition of the client can radically affect the measurements of cardiovascular function in the older adult and changes in physical activity can profoundly change cardiovascular function.

Urinary System

The bladder capacity generally reduces with age and the kidneys become less proficient in removing waste from the blood. Bladder capacity and emptying efficiency falls in the older person.

Vision

Impaired sight and hearing are likely to accompany the aging process. Loss of close-up vision frequently occurs around the age of forty. Eyes tend to become more susceptible to glare around age fifty. At about the same time, it may become more difficult to see in low light conditions and to see moving objects. By age seventy, there is usually a decline in the ability to distinguish fine details. Most seniors notice a diminution in their peripheral vision.



Auditory

One in three persons over age 60 and half of those over 85 have significant hearing ability to hear high frequencies decreases with age. The existence of background noise can affect the ability to understand speech. Men experience a decline in hearing more than women. Untreated hearing loss can lead to depression, isolation, irritability and a decreased quality of life. Loss of hearing and vision can be easily mistaken for impaired intellect. Older persons may be frustrated or embarrassed about not being

able to understand what is being said. They may be uncomfortable asking speakers to repeat what they have said and they may hold back from participating for fear of making inappropriate comments.

Strategies to help a hearing impaired individual include: speaking clearly and in a normal tone; obtain the client's attention before speaking; maintain direct eye contact at eye level; keep hands away from the mouth while speaking; eliminate or wait for background noise to abate; attempt to express the same point different ways; build breaks into the conversation; use expressions and gestures; repeat frequently and ask questions as needed to clarify successful communication.

Stamina

Lactic acid forms in muscles when exercise intensity is fairly high. Muscles need fuel to supply energy to exercising muscles. The energy source that produces lactic acid is the glycolytic system as glycogen is broken down as the energy source; lactic acid is produced when exercise intensity requires more oxygen intake than can be supplied. The build-up of lactic acid is thought to contribute to muscular fatigue and can limit physical ability. Muscle cells can use lactic acid as an energy source and as fitness improves, muscle cells can adapt in this utilization.

A progressive reduction in VO₂ (maximum oxygen consumption) appears to be the primary mechanism associated with declines in endurance performance with age. Declines in endurance exercise performance and its physiological determinants with aging appear to be mediated in large part by a reduction in the intensity (velocity) and volume of the exercise that can be performed during training sessions. Exercise economy is measured as the steady-state oxygen consumption while exercising at specific sub-maximal exercise intensity (below the lactate threshold) and studies show that declines in exercise economy do not contribute significantly to the decreases in endurance exercise performance observed with advancing age.

Reaction Times and Proprioception

Seniors are just not as strong and don't have the same physical endurance, stamina or physical agility they once had in younger years. Appropriate pacing becomes of critical importance. The need to balance the need for rest and recovery time while not losing attention through inactivity by "standing around on the hill" is critical. Skiing in short "bursts" i.e., breaking up the run into shorter segments is a good class handling technique to keep things moving while still providing necessary pacing. These short rests are an excellent time for information sharing and positive coaching.

The somatosensory system provides information to the body regarding the orientation of body segments to one another and the support surface. Input to the system can be proprioceptive or tactile and comes from the peripheral sensory receptors located in skin, muscles and joints. Senior athletes have variations in proprioception and vestibular function perceptions that may occur with changes in the central nervous system. Decreased nerve conduction velocities can impair coordinated complex motor activities and maintenance of balance and can ultimately slow reaction time up to 20% compared to younger athletes. Of note, 40% of all women over the age of 70 have experienced at least one loss of balance fall during activities of daily living.

Meissner's and Pacinian corpuscles (the cutaneous end-organs, skin, which are part of the somatosensory system) are responsible for pressure, vibration, light touch and sensation. This function decreases to approximately one third of their initial density between the second and ninth decades of life. This implies that the elusive sense of touch that is so desired in good skiing can be diminished from a physical standpoint in the older client.

The foot as well is susceptible to basic human declines of aging. Loss of elasticity in body tissue is stressful to the intricate connections binding together the foot's 26 bones. When connecting ligaments lose their elasticity, the resultant outcomes will include foot pain and decreased functionality. This can be a particular problem for a sport such as skiing where the feet, and movements of the feet and ankles are of such significance.

Diabetes is a disease where the body cannot make enough insulin or cannot use it in the right way. In the broadest of terms, the body uses food eaten and changes it into glucose; insulin helps glucose get into the cells where it is crucial for energy. One of the major side effects of diabetes over time is the inability to heal well from skin or tissue injuries. It is important to make sure that boots are not too restrictive or too loose creating rubbing in a client who has diabetes. Encouraging this client to check their feet often and seek the advice of their physician for any circulation issues related to ski boot usage is important.

Altitude

Aging is associated with a reduced Pao₂ (arterial oxygen partial pressure) and the aging athlete is unable to deliver the same volume of O₂ to working muscles compared to the young. At high altitude the partial pressure of O₂ in the atmosphere is less so that less O₂ is available to capture and be carried to the tissues. This compounds older athlete's physiological disadvantage creating a greater challenge. However, fitness rather than age correlates with the older athlete's ability to tolerate exercise at altitude. *Advanced Age and Altitude Illness*, Balcomb, AC, Suttonn JR (1986).

Thermo-regulation

The body continually works to keep a balance between how much heat it makes and how much it loses. Too much heat induces sweating, too little warmth induces shivering. There are four ways the body transfers heat: *radiation*, *evaporation*, *conduction*, and *convection*. The senior often has difficulty regulating heat transfer because of other medical conditions, certain medications, thinning of the skin, reduced circulatory capacity and, simply, age. According to the National Institute on Aging, most people who die from hyperthermia (being too hot for too long) each year are over 50 years old. As an older person's body temperature rises, heat exhaustion can rapidly progress to heat stroke. Signs of heat stroke include fainting, a change in behavior such as confusion or agitation, nausea, weakness and dry flushed skin. Seeking attention immediately is advised.

Because so many factors can predispose the elderly to dehydration during exercise, including an impaired hypothalamic thermo-regulatory control system (reduced thirst sensations and a reduction in total body water ratios) drinking fluids routinely before, during and after exercise is recommended.

Overall the skin is thinner and more fragile. Blisters are more common. Renewal of the epidermis is slower, leading to delayed healing. The dermis is less cellular and less vascular and there is less subcutaneous tissue, thus less insulation especially in elderly women. Sweat gland numbers and function are reduced. As one ages, there is diminished important cellular functioning that manages skin, tissue and thermoregulation. This includes T cell function, Langerhans cells

stop reproducing and after about age 50 melanocytes decline at 2% per year all making the aged more susceptible to hyper and hypothermia, infection, neoplasm and U.V. damage.

Aging athletes can minimize risks by drinking fluids routinely and dressing in appropriate layers. Allow breaks for the removal or addition of layers of clothing, application of sun screen and intake of fluids. Encourage newer more high tech clothing options including pants with venting zips, under layers designed to exchange heat, high tech gloves and venting helmets. Keep in mind that an older client may be very comfortable and regulating their temperature perfectly well while appearing to be over or under dressed. Teasing someone still bundled in a heavy coat and hat on a sunny day is not only inappropriate but may well disrupt the client's ability to manage their own needs.

Exercise and Stretching



Good fitness prevents injuries and the older one gets, it seems the longer it takes to recover from injuries. A strong core, flexibility and balance training all play a role in injury prevention. Regular exercise can forestall the physical effects of age, eventually though, no one is in as good physical condition as when they were younger. These physical declines can also have an effect on the cognitive and

particularly the affective domain. The rate of decline of muscle mass in virtually all physiologic changes can be reduced by means of regular weight-bearing exercise.

Skiing is a sport most do irregularly, that is, not on a daily basis. Encouraging daily activity and exercise will assist the senior skier in ability to maintain endurance and energy for a full day of slope side activity. Senior clients should be encouraged to engage in regular conditioning activities. Stress exercises and activities that will help improve strength, augment balance and enhance endurance. Low impact activities that will create minimum stress on the joints can be beneficial. Endurance exercise programs should include components related to intensity, mode, duration, frequency and progression. Functional fitness, programs that build strength and balance leading to increased abilities to function in everyday life are ideal. Sarcopenia, the loss of muscle and strength as well as decreased quality of muscle tissue, is often seen in the older adult. Delaying or minimizing the effects of sarcopenia can be managed with regular exercise. For older adults who want to stay healthy, the National Institutes of Health (NIH) recommend four types of exercises to be built into weekly routines: strength, balance, stretching and endurance.

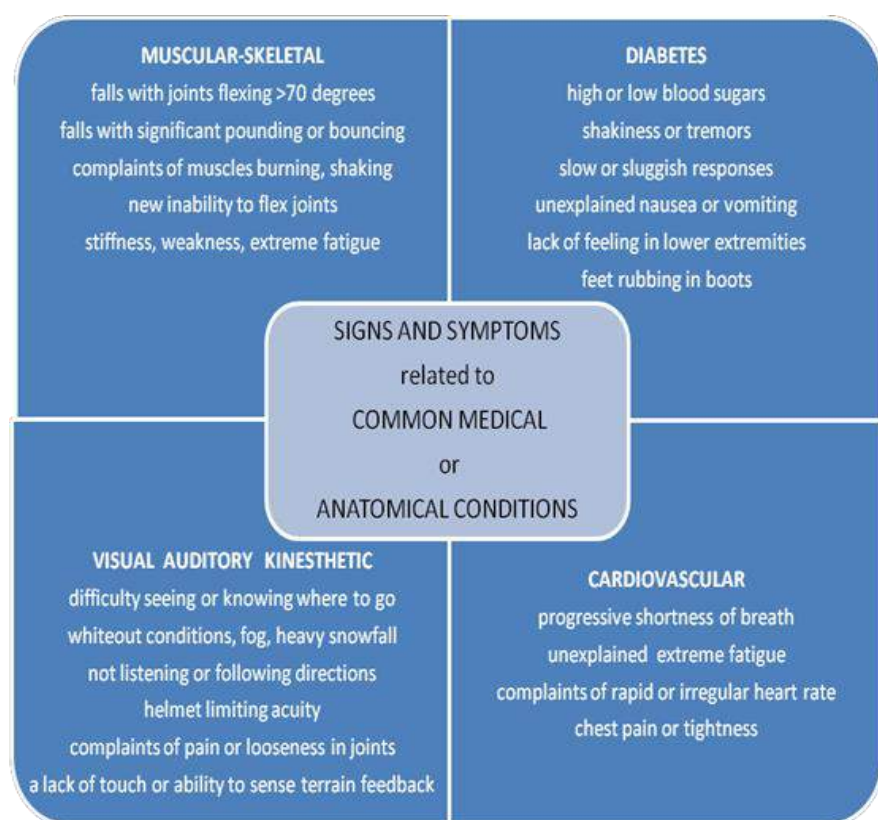
For sports that stress the skeleton more (running, football, rugby, soccer) or any activity that involves a lot of jumping and/or changes in direction (basketball, tennis, volleyball) studies show that stretching does seem to help prevent injuries. (Witvrouw E, et al. 2004). There is little study regarding the benefits of stretching related specifically to the senior student. However, there is quite a bit of research done on stretching for endurance sports in general. In running,

each time the foot strikes the ground, the joints, muscles and bones absorb approximately 12 times the person's body weight. Joint warm ups help the synovial fluid "warm up", easing the compressive forces started with activity.

Stretching exercises the senior clinician may want to incorporate into lessons after a slow warm up run and again at the completion of the lesson may include: forward, lateral and backward leg swings from a stationary position, knee tucks, leg cradles, easy forward walking lunges and side step walking lunges as well as gentle toe touching and shoulder stretches.

Injury Statistics

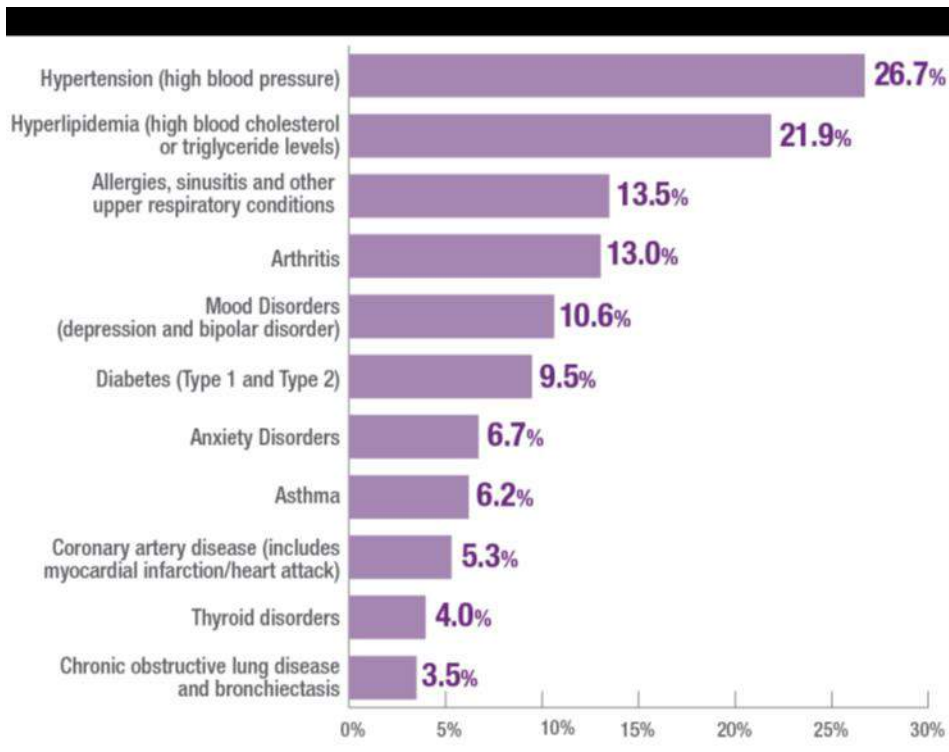
Recognition of needed rest periods is crucial. Most ski injuries, regardless of age, occur after lunchtime. In addition, injury rates increase when the injured person reports they were skiing beyond their ability trying to keep up with friends.



According to Shealy, et al, skiing does not represent an increased level of risk to skiers over 55 years of age, with the exception of the tibial plateau fracture (0.5% of all injuries). In other words for more than 99% of all likely injuries in skiing the over 55 skier either faces no incremental risk or a reduced level of risk of injury. The skiing population is getting older, but the increase in age essentially mirrors the increase in age in the US population as a whole.

Evaluating your students for a history of common medical conditions is part of the instructor assessment in getting to know your guest and developing trust. Listed below are common

symptoms relative to ailments the older student may present. Instructors are not expected to diagnose or treat potential medical issues but they are expected to be aware that students may have medical conditions. If a student complains of symptoms during a class, the instructor should at least consider whether to immediately seek advice from the ski patrol.



Chronic diseases and conditions, such as heart disease, stroke, cancer, type 2 diabetes, obesity, and arthritis are among the most common, costly, and preventable of all health problems.

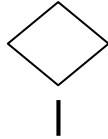
As of 2012, about half of all adults, 117 million people, had one or more chronic health conditions. One in four adults had two or more chronic health conditions.

Seven of the top 10 causes of death in 2014 were chronic diseases. Two of these chronic diseases, heart disease and cancer, together accounted for nearly 46% of all deaths.

- Obesity is a serious health concern. During 2011–2014, more than one-third of adults (36%), or about 84 million people, were obese (defined as body mass index [BMI] ≥ 30 kg/m²). About one in six youths (17%) aged 2 to 19 years was obese (BMI ≥ 95 th percentile).
- Arthritis is the most common cause of disability. Of the 54 million adults with doctor-diagnosed arthritis, more than 23 million say they have trouble with their usual activities because of arthritis.
- Diabetes is the leading cause of kidney failure, lower-limb amputations other than those caused by injury, and new cases of blindness among adults.



Summary



Senior CAP Model

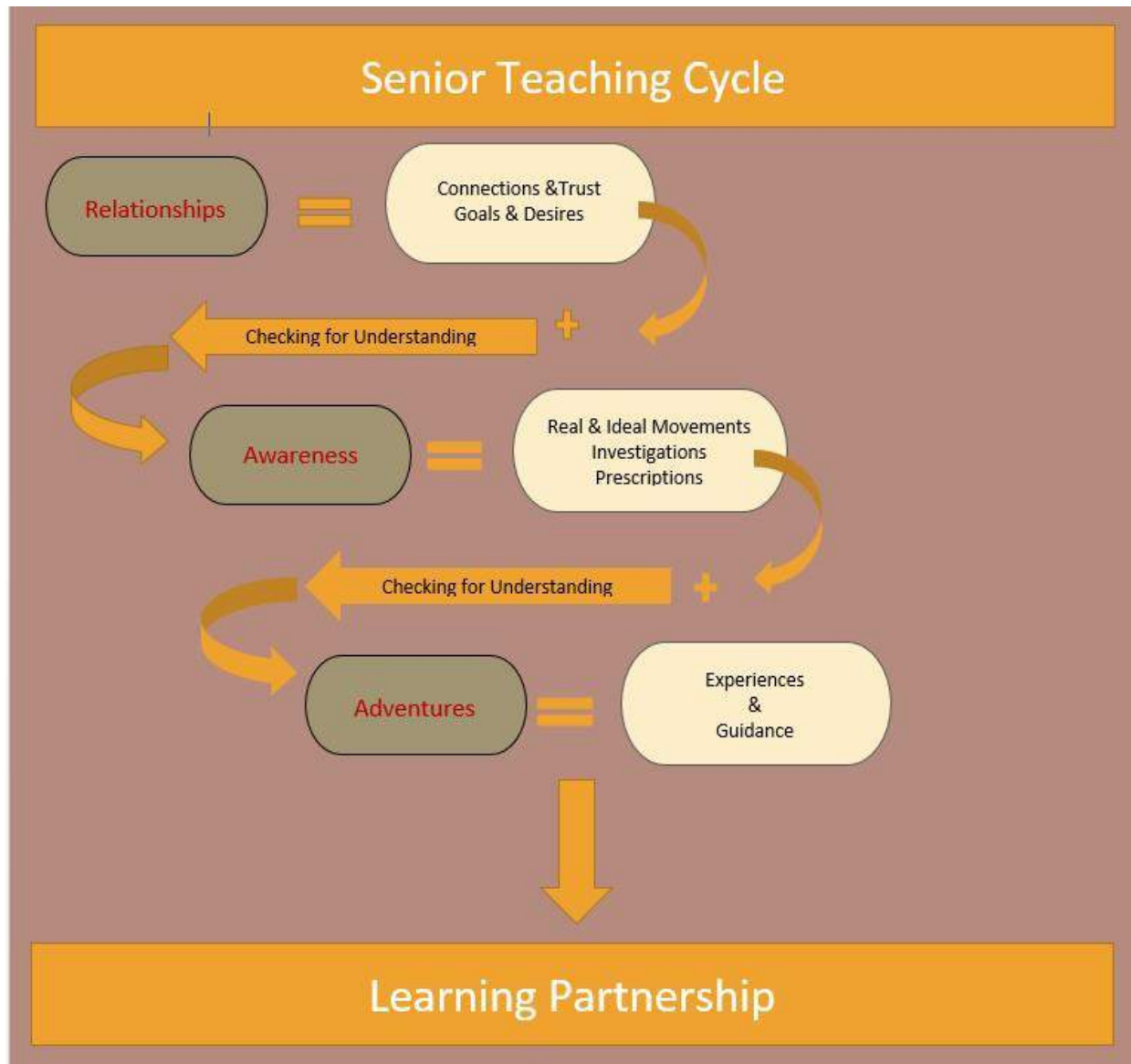
Age Range, 20 to 50		Age Range, 50+	
Cognitive			
Analytical (want details & reasoning why) Innovative Varied risk tolerance Aware of cause & effect Very goal oriented Like to be challenged within comfort zone Want to excel Skeptical Understands own learning style Goal oriented & self assured Intimidated by fear of failure Various levels of self-assurance	Selective about challenges Less risk tolerance More cautious Slowed decision making More reluctant to revise decisions/judgments Want measured progress Realistic or conservative goals More limited comfort zone Clear understanding of goals Expects positively directed feedback Retains feedback that is understood Decreased speed of mental processing Reduced ability to retrieve recent memories Taking lessons to achieve desired outcomes Expects to be treated as a peer (with respect) High expectations for success Open to learning Require clear feedback		
Affective			
Very socially conscious Outgoing Want to be leader of group Independent & competitive Enjoys off-color humor Husband/wife compatibility could be issue Expect obvious value from lesson Sensitive to performance in front of peers Uncomfortable with what they don't know Focused on outcomes	Skiing is a social experience Value whole experience Look for purpose even in leisure activities Relies on peers for support Are supportive and "team" oriented Lack confidence in physical abilities Apprehensive of new movement patterns Fearful of injury and complications Expect value from lesson Accomplishment of outcomes are obvious Prefers process to accomplish outcomes Desires instructor who is a peer Appreciates subdued humor Comfortable with what they don't know		
Physical			
Conditioning & strength highly variable Flexibility highly variable Endurance highly variable Reaction capability reasonably good Frequently uses strength over finesse Center of mass moving down Male & female differences in conditioning Potential visual and/or aural impairment	Conditioning & strength somewhat degraded Flexibility & endurance somewhat limited Reduced cardio capacity Reduced bladder capacity Needs to renew muscle memory Potential reaction/balance impairment Needs to use finesse rather than strength Center of mass moving down Past injuries may cause limits in movement Potential visual and/or aural impairment Increased sensitivity to sun and to cold		

Chapter 5. The Teaching Model

On the shady side of middle aged.....

The teaching model consists of the student profile and the subsequent instructor behaviors that make up the learning partnership. Utilizing the Senior Specialist teaching cycle can assist the instructor in identifying pathways to successful partnerships by outlining key steps required by the instructor.

The Senior Specialist Teaching Cycle



The Senior Specialist teaching cycle identifies three components that, although specific to the senior client, still follow the PSIA teaching cycle. This model is designed to be broken into sections for application yet remains circular in fashion recognizing that, dependent on circumstances, the instructor may pass back and forth through each component multiple times. As always, the learning partnership is at the root of all successful outcomes.

As noted in the 2001 PSIA Core Concepts manual, everything the instructor does to initiate and explore movement belongs in the realm of teaching activities. Teaching activities are the tools for bridging the gap between where the student is now and where the student wants to be by the end of their lesson experience. Some movements, or combinations of movements and sensations, lend themselves to a step by step progression. Others require holistic activities such as varying speed, intensity, duration, rate or timing. Terrain, student's past experiences, conditions of the day and ability levels all play into chosen teaching activities.

Referencing movements back to the efficient skills is important to learners of all ages, from beginner to expert. The Senior Specialist program focuses on critical skills and skill blends have been identified to help the instructor when working with the senior client. These skills are crucial for the instructor working with, demonstrating to and teaching the senior client. Assisting the client in developing their movements and movement patterns to be more efficient is a goal of instructor behavior. Outcomes will be movements and techniques enabling the student to: minimize muscle fatigue, minimize impact on joints, conserve energy, improve confidence, improve current skills, allow for exploration of more terrain and increase their enjoyment of the mountain experience.

Relationships

Introduction of the lesson and developing trust, creating goals: this first component of the Senior Specialist teaching cycle is likely the most important. Creating the student profile involves identifying the factors discussed in the affective portion of the senior CAP model: why is the student taking the lesson, what are their motivations and desires? What are the cognitive and physical attributes the student brings to the lesson? Understanding the theories of Maslow and Erikson and incorporating that understanding into building the student profile is crucial. Creating a successful learning partnership involves establishing trust between the instructor and guest.

Create connections by demonstrating a genuine interest in the client. Interviewing clients to ascertain their goals, potential limitations and what they bring to the table allows the instructor to start building the student profile. The instructor may then start to then develop their instructional plan, based upon the student's goals and desires.

Awareness

Assessing movements and planning experiences: evaluate what the student is capable of currently and how to work within that framework to achieve client goals. Goals should be outcomes students can achieve. Objectives are steps the instructor can take to reach the final goal. Goals should be an agreement between the student and the instructor of movement pattern outcomes that are both desired by the client and found to be attainable by the instructor. Goals and outcomes can be short term or long term, broad based or very specific. Being able to ski bumps better is a long term, broad goal or outcome. For example, learning to turn the foot without pivoting the hip could be a short term, specific objective.

An initial warm up and the first few runs will allow the instructor to start understanding what the student reports they can do and shows what they can do. The successful instructor compares what they are seeing and what the identified goals were and then builds a lesson around how to reach reconciliation of these two components. A successful instructor will take time to evaluate existing movement patterns, look for efficiencies that can be built upon and help the client understand how the lesson objectives will lead to goal reaching outcomes. Real movements will be identified that may be based upon the physical make-up of the client; ideal movement patterns based upon this assessment can then be crafted.

This part of the teaching cycle includes identifying skills, tasks, progressions and verbal instruction on how to practice attaining specific desired movements. Once the student is successful at demonstrating the desired outcome, the instructor can move on to the next component of the teaching cycle. This is where the instructor works with the client on specific ways to turn the foot without pivoting the hip by using a drill, demonstration or short progression and giving feedback.

Adventures

Create experiences and guide practice: the ability to take a movement pattern and coach tactical means to achieve the goal.

Once the student has accomplished the immediate task or drill, expanding the movement pattern into new terrain, allowing mileage and practice and adding or taking away additional tasks can be done in the third component of the cycle. This is where the instructor would take the objective of turning the foot without pivoting the hip onto more challenging terrain, moving into mini bumps and finally applying the objective in terrain with bumps. Accounting for pacing, monitoring for fatigue and ensuring the social experience all play a large role in this component of the teaching cycle.



The ability to provide an accurate performance visual is an important teaching tool for the instructor. Senior specific skill blending should be focused on as well as the skill emphasis and skill blend being developed. Having fun, taking breaks, enjoying the scenery, and choosing alternate routes all come into play as the adventurous lesson unfolds.

Constantly checking for understanding and debriefing often demonstrates the instructor has continually assessed student understanding and that the stated goals are either being met or have adjusted to meet the client's needs.

A successful lesson isn't measured by whether the student can now ski bumps perfectly but by

the student identifying skills they now have to reach attainable outcomes. Leaving the lesson with new skills, new tactics, refreshed and having enjoyed the mountain experience is a good sign that the learning partnership was successful.

Chapter 6. Tailoring the Learning Process

The moment you doubt whether you can fly, you cease for ever to be able to do it.

— J.M. Barrie, Peter Pan

This final chapter begins to address core beliefs regarding the how's of coaching an older clientele. The Senior Specialist Matrix identifies competencies and expectations of a SS 1 and SS 2 credentialed instructor. This scope will be further evaluated and investigated during the on-hill portion of this specialty.

From the perspective of good teaching practices there is nothing new or significantly different when working with senior groups. While not new, or seemingly significant, these fundamental beliefs drive the essential element of what a Senior Specialist credentialed instructor is. The major consideration, however, is in how these practices are applied. There are three basic principles one must keep in mind to be successful when working with this demographic. These are:

- Use of low impact drills and exercises that encourage stacking of the body over the feet to reduce the amount of muscular stress required to maintain balance and still accomplish the desired goals
- Encouragement of continuous fluid movements of body parts throughout each turn
- Pacing of the class to maintain the lesson as an enjoyable social experience while providing real value added changes without taxing the stamina and endurance of the client

The credentialed senior specialist instructor employs the ability to create an inspiring experience for the senior guest. The instructor utilizes skills that raise the level of trust/rapport that allows the guest to share the specifics of their skiing experience. History, motivations and related physical conditions that are likely to shape lesson planning and risk management. The senior specialist tailors the learning environment to fit the needs and goals of the guest. The Senior Credentialed instructor observes and analyzes the guests movements/ /ski performance through the lens of the students stated goals. Then guides practice and feedback that is paced appropriately for the senior student.

Additional competencies include:

- Minimize the risk in the learning environment.
- Instructor models Behaviors and Communication skills that build rapport/trust with guests.
- Partner with students in defining goals and clearly communicate the determined lesson plans.
- Uses a logical sequence of activities to engage the group and meet stated goals.
- Tailors the learning environment to a variety of audiences and situations.
- Observe, analyze, and describe student's body movements and/or ski performance as

related to the desired outcome.

- Demonstrations accurately support the teaching outcome.
- Utilizes guided practice and feedback appropriately paced for individual needs.

There are a number of guidelines to keep in mind for entry level senior students. A maximum amount of the lesson should be spent gliding with a very small percentage of the time devoted to walking, skating or climbing up the hill. This will require their first experience to be conducted in specially prepared areas on the hill, on magic carpets or indoors. Quite a bit of productive progress can be made indoors especially in terms of equipment familiarization, stance balancing, walking and learning to maneuver on the flat. Some resorts have carpeted areas where they can experience gliding for the first time.



Experienced seniors have either reached a plateau in their development or wish to improve their skills for more enjoyment, to be able to ski or ride with their friends and relatives or tackle more challenging conditions with less effort. Students at this level are likely working on blending of the skills for more efficient movement patterns. Loss of balance may require muscular effort to recover leading to fatigue and frustration. The instructor must be very aware of this during the lesson and consciously look for these signs before fatigue starts affecting client performance.

Many experienced senior skiers and riders wish to improve their skills to be able to ski or ride with their friends and relatives or to tackle more demanding conditions. These students will need to spend some time perfecting the blending of skills necessary for these more diverse and challenging conditions. Students at this level will need to effectively and efficiently blend all of the basic skills through highly efficient movement patterns that will help them avoid getting out of

balance in this more challenging environment. This desired outcome can be best experienced and perfected on groomed terrain. Managing speed and direction control in varied terrain is important. Many senior snow sport enthusiasts' long to be able to ski conditions they once found exciting and challenging. More than likely their lack of good tactics and skills were offset by younger bodies and fewer inhibitions. A return to these conditions requires a more complete blending of skills so they can enjoy this environment with less strength, more finesse and more confidence. The key for success in these conditions is a good understanding of the appropriate tactics to be used

It is important to understand the framework for a teaching progression emphasizing low impact, continuous movement exercises which promote accelerated learning while recognizing the unique affective and physical attributes of the senior student population.

Goals for all senior specific movement patterns include the utilization of a stacked skeletal alignment to reduce muscle fatigue; continuous flexing and extending movements to reduce harsh impact, balancing movements which include maintaining a strong inside half (the inside half of the body is raised and ahead of the outside half) and a tripod stance, and rotary movements where the turning of the leg is initiated with the femur rotating within the hip socket, which necessarily includes the feet, shin and leg.

Appendix 5 contains a list of tasks identified to assist in evaluating and leveraging specific movement patterns. These tasks should also be regarded by the participants as an opportunity to incorporate some of these efficient movements into their own personal skill pool which will enhance their enjoyment of skiing in all terrain and snow conditions. Finally, these tasks constitute a clearly defined basis for performance evaluation. It should be emphasized the evaluation is based on the demonstrated blending of skills shown during the performance of all the tasks not on the performance of any one task. Hence, training should concentrate on using the tasks to improve the overall skill blending in all terrain and snow conditions.

Appendix and Adjunct Information

Workbooks

Workbook materials required for successful completion of the Senior Specialist 1 and 2 programs are located on the PSIA-NW website under the Senior Specialist menu. To be successful, participants must satisfactorily complete the essay questions and write a lesson plan for one of the provided scenarios. The workbooks must be completed and turned into the PSIA- NW office two weeks prior to the event. Completed course work will be reviewed and discussed during the indoor sessions.

ADDITIONAL DEMOGRAPHIC DATA

The 2010 US Census provided informative statistics on the aging American population. Nationally, the number of older adults will increase by 15 million over the next 10 years. In Washington State alone, the number of residents 65 and older grew 25% over the past decade with residents 85 and older increasing by 40% and most interestingly the number of residents aged 60-64 grew in population over the past decade by 81%. Statewide the percent of the population 65 and older is 12.3. PSIA-NW associated states are similar: in Oregon this percentage is 13.5, Idaho is 12.1 and Montana is 14.6. In the US, people aged 55 years and over make up 24.3% of the total US population. Of note, this number drops to 12.7% of those 65 and older and 5.8% of those 75 and older. Since 1900 the percentage of Americans older than 65 has more than tripled. The marital status of all men older than 65 is at 72% and women at 42%; widowhood accounts for 41% of all older women as of 2009. Households containing families headed by persons 65 or older reported a median income in 2009 of \$43.7K with 87% reporting social security as their major source of income, 54% reporting income sources from assets, 25% reporting income sources from earnings and 28% from pensions.

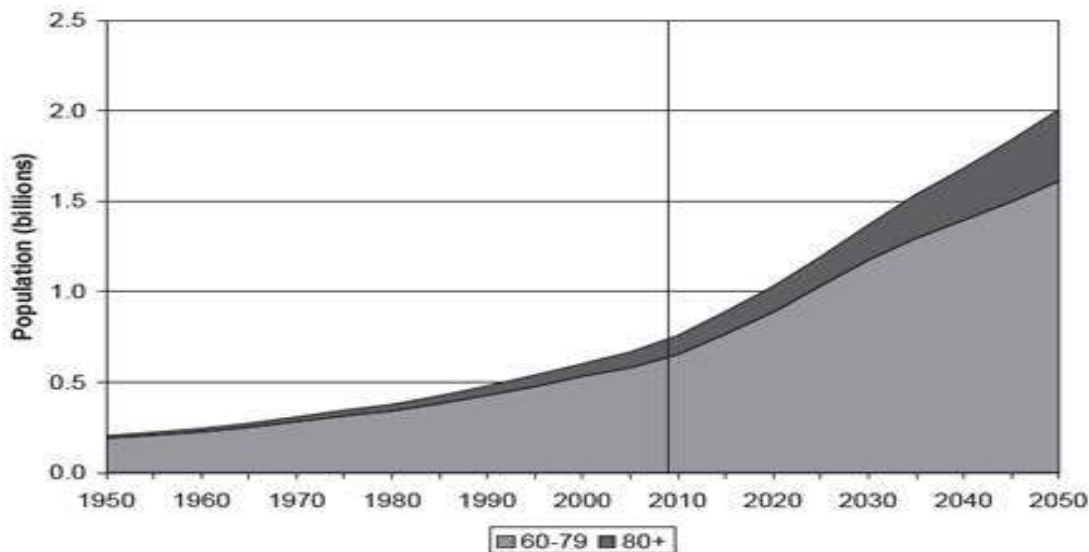


Figure 3 Population Trends

The Snow Sports Industries of America (SIA) 2011 report showed that alpine skiing grew 5.4% from the 2008/09 to 2009/10 season. They also reported that the annual income of 47% of those alpine skiers was \$100,000 or more.

However, in 2008/2009 research done by (SIA) measured snow sport participation by age group. The numbers are telling:

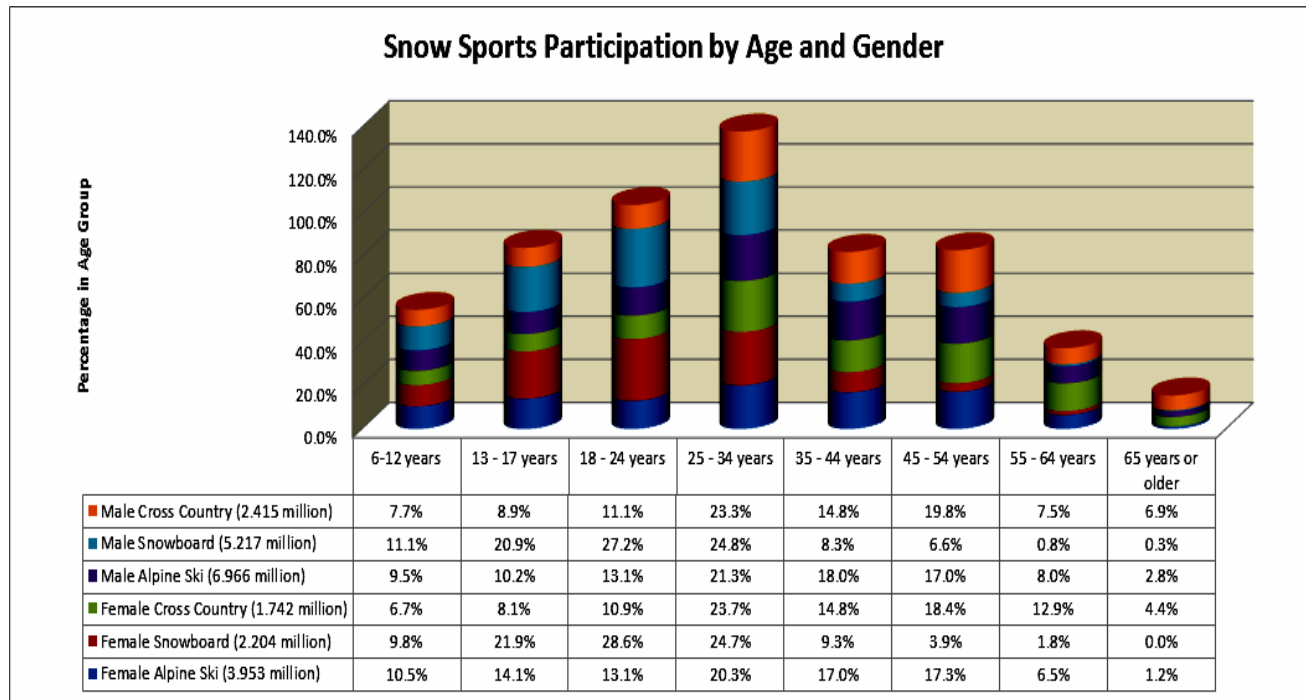


Figure 4 Snow Sports participation

The 2011 SIA's Snow Sports Market Intelligence Report looked at the snow sports industry analyzing statistics on participation, retail sales and resort information from the 2009/10 season. Gender was split 60% male and 40% female. The highest participation of skiers by age was around 20% both in the 25-34 brackets and 35-44 brackets. However, the 45-54 age brackets held strong at 16% but plummets to 5% in the 55-64 age group and 2% for those 65 and older. Overall, age trends are moving downwards compared to the 2008/09 report noted above.

The National Ski and Snowboard Retailers Association studied downhill ski participation trends from 2000 to 2009 showing the average number of days skied peaked at 12.9 in 2006, dropping back to 7.6 in 2009. Overall industry figures dipped to 57.1 million skier visits in 2009, down from 60.5 in 2007. Income trends show that 46% of skiers in 2009 had income greater than \$100,000 an increase from 23.8% in 2004. The mean age for men consistently fell between 30 and 33 years and women 28 to 35 years of age. However, in 2009 66.3% of all participants were older than 25.

In 2009, the National Ski Areas Association (NSAA) addressed the need regarding perpetuation of continued growth in alpine participation as the concern is growing that baby boomers will be dropping out of the sport as the generation ages. NSAA research during the past decade reflects that the percentage of visitors (defined as one skier or snowboarder riding a chairlift per day) age 45 to 54 grew from 14.0 percent to 19.9 percent, with age groupings above 54 also showing

increases. Today, in 2011, the tail end of the baby boom generation is turning 50 years old. The NSAA Model for Growth research project is addressing how resorts can attract new generations of skiers to replace the boomers without alienating the core group that has driven resort growth to date.

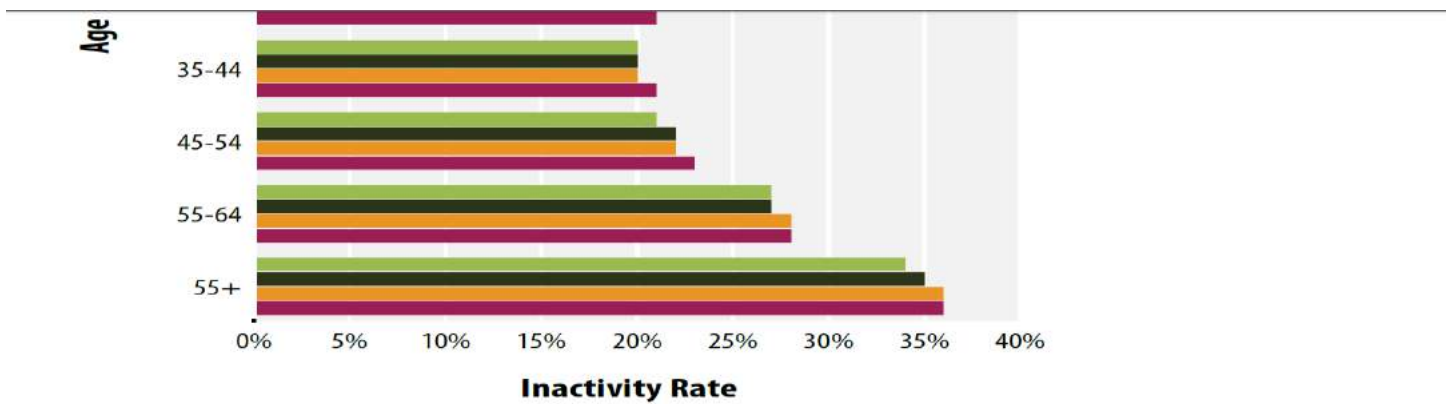
The National Ski Areas Association (NSAA) reports in the 2004-2005 ski season 31% of downhill skiers in the United States were over the age of 45 up from 21% in 1997-98. In 2006-2007, a little over seven percent of skiers were over 55. The National Sporting Goods Association (NSGA) reports that alpine skiers between age 45 and 74 increased from about 1.1 million in 2002 to 1.3 million in 2003.

Although not measured by age ranges the NSGA reported in 2010 that only 12 sports showed positive growth trends measured by participation since 2006 which included cross country skiing up 19.5% and alpine skiing up 15.6%. The Physical Activity Council (PAC) researched 117 different sports during 2009, citing trends in levels of activity. Not age specific, the data showed that 50% of Americans participated in no activity at all during the research year and that winter sport activity showed single digit growth with the exception of snowshoeing which showed a participation increase of 17.4%.

Americans are living longer than ever before, yet their life expectancies lag behind those of other developed nations. Death rates for certain diseases have declined over time, while others have increased. Older age is often accompanied by increased risk of certain diseases and disorders. Large proportions of older Americans report a variety of chronic health conditions such as hypertension and arthritis. Nevertheless, most people age 65 and over report their health as good, very good, or excellent.

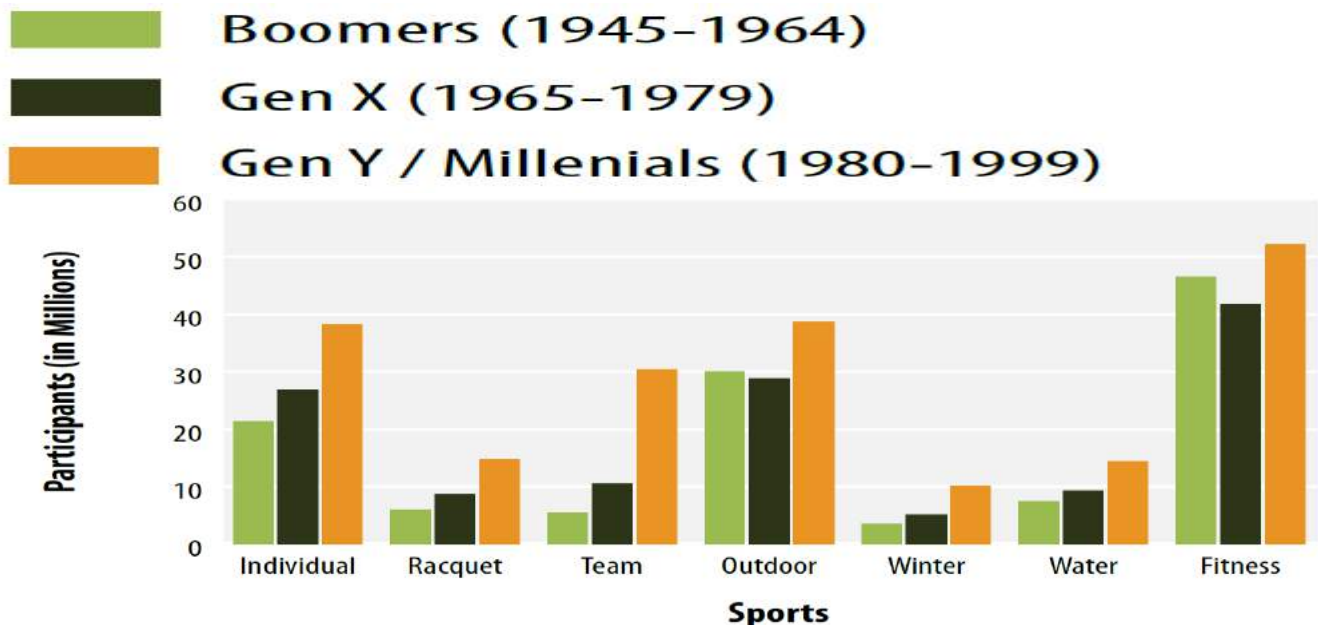
In 2010, about 11 percent of people age 65 and over reported participating in leisure-time aerobic and muscle-strengthening activities that met the 2008 Federal physical activity guidelines.

In 2011, the number of inactive Americans ages six and older increased to more than 68 million, and the inactivity rate rose to almost 24 percent. Inactivity rates among children ages six to 12 fell slightly from 4.6 million people in 2010 to 4.5 million people in 2011. Activity rates among adolescents ages 13 to 17 remained fairly flat. Unfortunately, inactivity among adults continued to rise. Among adults ages 18 and older, inactivity increased from 58.7 million in 2010 to 60 million in 2011. Over the past three years, the rate of inactivity has increased by just over eight percent, outpacing growth of the US population ages six and older. Although the growth in inactivity from 2010 to 2011 is modest when compared to past years, it is clear that we must keep working to inspire Americans to become more physically active.

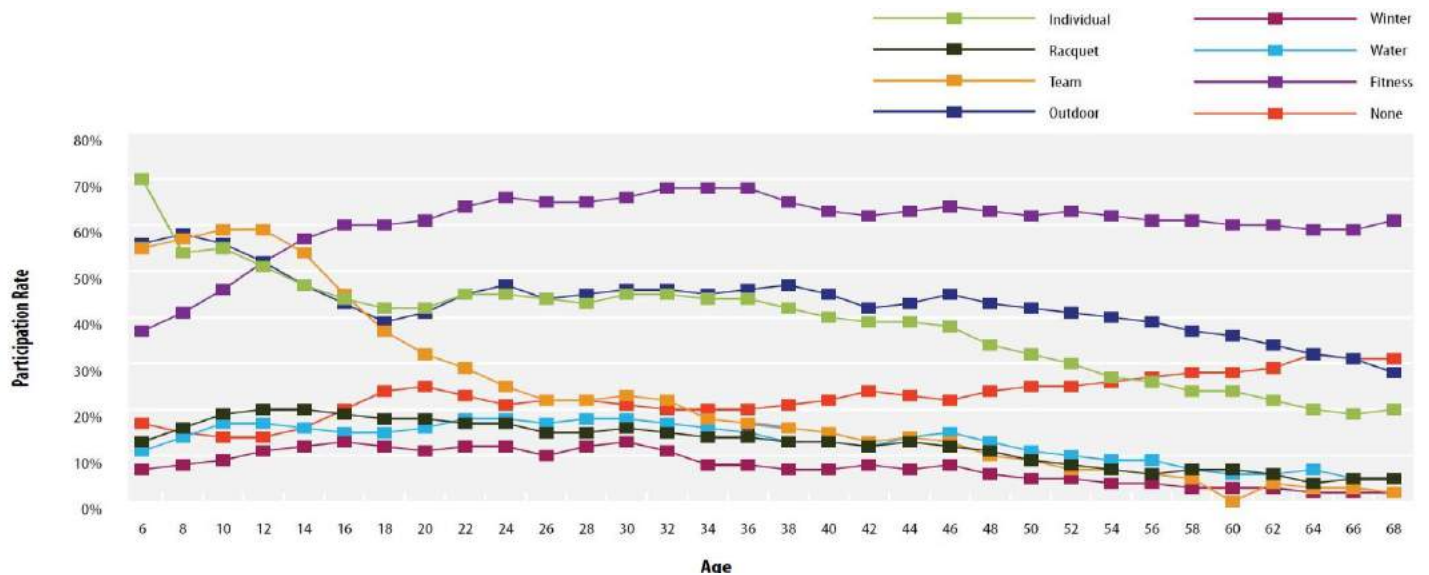


PHYSICAL ACTIVITY COUNCIL REPORT

The Millennial and Gen Y generations dominate all sports, but their participation is especially pronounced in team sports. More than 30 million Millennials and Gen Yers participate in team sports, while only 10.6 million Gen Xers and 5.4 million Boomers participate. Gen X comes in second in all sports, except outdoor sports, where Boomers outnumber them by almost three million, and fitness sports, where Boomers outnumber them by almost five million.



Looking at participation over a lifetime, from ages six to 68, it is clear age demographics play a significant role in which sports and activities people choose to participate in. Team sports peak during childhood and quickly drop after age 12. During this same period, fitness participation grows and does not peak until age 34. These fitness activities remain more constant throughout life compared to other physical activities. Participation in outdoor activities in general peak at age 38, while participation in snow sports peak much earlier — at age 16 — and then makes another upward run at age 30.



http://www.aoa.gov/Aging_Statistics/
<http://www.healthystates.csg.org/NR/rdonlyres/B810343C-5D88-4210-B9991A1A42711F62/0/agingLPB.pdf>
http://www.aoa.gov/Aging_Statistics/
<http://www.outdoorfoundation.org/pdf/ResearchParticipation2013.pdf>
<http://www.physicalactivitycouncil.com/PDFs/2012PACReport.pdf>
<https://www.cdc.gov/chronicdisease/overview/index.htm>

<https://www.ahrq.gov/sites/default/files/wysiwyg/professionals/prevention-chronic-care/decision/mcc/mccchartbook.pdf>

SKILL DEVELOPMENT AND COGNITIVE PROCESSES: AGE AND SKILL ACQUIREMENT

Skiing and Riding are, quite simply, acquired skills. Over the years, there has been a great deal of research in the field of 'skill' development (be it in athletics, music, surgery, piloting, etc.). Much of the focus has been on using 'experts' as benchmarks for study as to how people generically best acquire, develop and enhance skill. In recent years, there have been significant advancements in the understanding of neurobiology, that correlate well with observed, empirical research that has been going on for many decades.

To understand how skill development is affected with more senior populations, one first must have a rudimentary understanding of how skill is acquired in general. One belief held by many, is that skill expertise follows those that are naturally 'gifted' or talented. The 'ability' is innately there, and just needs some help bringing it to the surface. This belief, particularly for complex activities, has not been validated by the research. Instead, the best indicators for successful, high levels of skill development are those who employ a focused, conscious style of practice, and a lot of it. We truly do 'learn by doing'. However that is only a necessary, but not sufficient ingredient. The practice of greatest value is when we are in a state researchers call 'metacognition'. This is where one is maintaining an 'awareness' of one's actions and activities. Mindless practice usually nets low level results.

The phrase 'Deliberative Practice' (coined a leading researcher in the field, K. Anders Ericsson) is used most commonly, and it involves reflection and analysis of the activity (before, during and after). The general characteristics of Deliberate Practice is a state where skill is advanced in modest incremental steps, usually right at the edge of one's abilities (but not entirely out of reach), at that threshold where failure and errors usually occur. At this point, the individual maintains a mental focus on his/her performance, constantly adjusting (and hence, learning). It can be very exacting. This 'small steps' approach, is best when it is structured towards larger, more integrated and complex goals (yes, this is very consistent with the PSIA principles of mini progressions, that break a given skill or task into basic components, then piece them together into an integrated whole). Another key element is also the action of doing a 'debrief' after performing. One weighs the merits, successes and weaknesses of a practice and consciously thinks of how to best approach picking up on the activity 'next time' (again, entirely consistent with PSIA practice of summarizing at the end of the 'teaching cycle').

Naturally, quality coaching can be critical to more rapid, successful skill development. This assumes that the coach can provide proper guidance on the specifics of a task (the decisions or movements that are being strived for, in small tactical manners) and relate it in a concrete feedback as to what the athlete is doing (where the athlete is 'at' and where he needs to be moving towards). The famous UCLA basketball coach, John Wooden, the most successful in men's collegiate history, was known for his targeted, specific feedback (directed at guiding the specific action or skill, not the person). In essence, vagueness kills, specifics advance.

In the field of neurobiology, this all appears to fit quite nicely with how our brains and nervous systems are 'wired' to learn. In essence, when a new memory (or skill....) is learned, neurons

in our brains make many, many new connections, establishing a memory network. The more a given activity is performed, the more that memory (skill) is used. This much has been understood, for a long time.

More recently, there has been understanding of the role of glial cells in the brain (neurons being ‘grey matter’, glial cells well outnumber them, and are sometimes referred to as ‘white matter’) regarding how our brains function. Glial cells will work to nourish neural networks, but in addition, they help to develop the robustness and efficiency of often used, important neural networks (our memory circuits, if you will). They do this by creating what amounts to a form of insulation, called myelin, that significantly increases the electrical conductivity along the length of a neuron (ease at which the electrical current will travel, speeding it along), as well as dramatically reducing the electrical signals tendency to ‘hop’ over to other, surrounding neural pathways. Consider it nature’s version of wire insulation, but one that has the effect of allowing ever faster, more accurate use of the desired circuit. Well myelinated circuits may be hundreds of times faster and much more accurate, than those with little myelin.

However, for glial cells to expend the effort to create and wrap myelin around a given neural network, it appears two conditions must exist. First, is the neural pathway is one that gets used a lot (hence the importance of repetition/practice of a skill/activity). Secondly, and just as importantly, there must be some level of ‘imperative’ to that activity. If the activity is ‘good enough’, and can be placed on automatic pilot (so to speak), then there is no call to further reinforce that circuit. If the activity has some sense of urgency, concentration, exactitude, then the glial cells get the message that these circuits are that much more important, need more attention, and wrap more myelin. Mindless practice, where one’s head is not in the game, may use the skill circuits in question, but these will not be reinforced. It will be a low level of quality practice, and one is unlikely to ‘advance’ in skill.

An example skill would be driving a car. High levels of concentration were involved when first learning to drive. While this was happening, skill was developing at real and measurable ways. With time, a degree of proficiency is usually met, and folks will usually start to multi-task, drive while listening to the radio, talking with others, etc. At this point, the brain is in a state of ‘automaticity’. It is performing at a given level, but without a conscious concentration or imperative on doing better, the skill is being used but not advanced. However, if one were to take a week long racing course, driving at the edge of one’s abilities, stop watches for feedback as to lap times, competition on one’s tail, expert coaching on how best to brake to corner, accelerate, pass others, then ones overall driving abilities (and amount of myelin of those circuits), would undoubtedly be much advanced.

A characteristic of myelin is that glial cells wrap...but do not ‘unwrap’ myelin. If a new skill is acquired, the new circuit is just that, it is new and separate. It does not ‘tear down’ the old one. It is used in place of the old one. Hence, when one is not concentrating on ‘the new’ way, or is stressed into a quick action, the old (faster insulated) circuit is often defaulted to. Once a new and improved skill is further developed (better myelinated), the new skill will start to prevail. So yes, old dogs can learn new tricks...but just don’t expect them to ‘forget’ the old ones. This is true of at any age; however, younger clients simply may not have as many or as well-

developed neural networks in place that would ‘compete’ with the new skill.

According to brain scans, peak myelination seems to occur in our fifties. However, the brain is remarkably ‘plastic’. It evolves and rewires all our lives. All the recent evidence is that Myelin and new neurons and neural networks can be developed until we die (given normal, healthy aging, there are diseases that can interrupt or affect this process). Further, the older, more developed brain will leverage the extensive connectivity it has, and often will adjust ‘strategies’ as its means to development or performing.

There is an old belief that “For decades the conventional view in medicine was that once we reach adulthood, we can only lose neurons, not add them....recent research shows that none of this is true. Our brains are perfectly able to add new neurons well into old age when conditions demand it, and brain plasticity doesn’t stop with age.” (Page 183 Talent is Over-rated by Geoff Colvin)

For dealing with a senior snow sport client, there are two elements to consider. If at the acquisition stage of totally ‘new’ skills, comparison tests between younger, middle and older age groups do suggest that the ‘rate’ of skill advancement may be slower in many tasks (on average). However, there is research that indicates that in many cases, advanced skill levels can still be attained, it just may take longer (so it’s not a matter of ‘can’t do it’ due to age, but recognizing the need for patience that the ‘rate’ of attainment may be slower, the use of Deliberative practice techniques being key). This is generally good news.

Myelin can degrade with age, but only if those circuits are not reinforced or used. In essence, it is a ‘Use it or Lose it’ situation (researchers will use the term ‘cognitive reserve’ in this context). But again, not just ‘used’ but ‘used’ with a ‘deliberative practice’ type of imperative. Maintenance of skills for those who already perform at high levels, studies have indicated that they can maintain highly proficient levels (hence have highly myelinated circuits) do not generally decline in those skills even after they may be showing areas of decline in other aspects of their lives. To quote:

“Studies in a very broad range of domains-management, aircraft piloting, music, bridge, and others- show consistently that excellent performers suffer the same age-related declines in speed and general cognitive abilities as everyone else-except in their field of expertise.” (Talent is Over-rated)

Experiments have shown that situations in which people are forced to adapt and attune themselves to new challenges (i.e. make errors, pay attention, deep practice) tend to increase cognitive reserve.” (Pg. 216 The Talent Code, by Daniel Coyle). One study showed that elderly people who pursued more leisure activities had a 38% lower risk for developing dementia. This study did not mention skiing specifically, but the implication is clear. Other factors notwithstanding, the senior client can develop new skills (one must simply be prepared to deal with a slower ‘rate’ of acquisition), and as long as deliberative practice (staying mentally focused in a state of metacognition) principles are maintained, the brain can develop high level of skills thru-out ones Senior years.

CHECKING FOR UNDERSTANDING, TIPS

Do not confuse the teaching with the learning. Consider Bruner's three reasons for why a traditional coverage approach is uneconomical in the long run: Such teaching makes it exceedingly difficult for the student to generalize from what he has learned to what he will encounter later. In the second place, [such] learning has little reward in terms of intellectual excitement. Third, knowledge one has acquired without sufficient structure to tie it together is knowledge that is likely to be forgotten. An unconnected set of facts has a pitifully short half-life in memory.

Understanding by Design, Expanded 2nd Edition by Grant Wiggins and Jay McTighe

Checking for understanding allows the teacher to understand what and how the student is thinking. Below is an effective questioning template referenced to Bloom's Taxonomy. Bloom recognized that what was important in education was not that students should be compared, but that they should be helped to achieve the goals of the curriculum they were studying. Used as a tool, higher level thinking skills are allowed to develop in a systematic process. Checking for understanding can be accomplished a variety of ways including by the teacher asking questions directly to the student; asking students to share out to the group their thoughts; asking students to share with a peer their thoughts with the teacher listening in; having the teacher paraphrase the student's thoughts or observations for validation; or asking the student to repeat back information. The instructor can visually assess the physical movements the student is performing. However, the only way the instructor can assess what the student is learning as well as how they learn and process information is to ask questions.

Knowledge is to remember and **Comprehension** is to understand the basic facts.

Drill and direct instruction can develop discrete skills and facts into automaticity (knowing "by heart"), but they cannot make one truly able. They are known points of reference by which we get our bearings when we are plunged into the strange and unknown. No creativity required.

Student Can:	Teacher Questions:
Copy	Define....
List	Tell in your own words....
Name	Cite an example of...
Restate	What facts do you know about...
Paraphrase	Describe....

Application is the ability to use or to develop existing information and **Analysis** is the ability to break info into parts and to build new information.

Application is about transfer, in other words, to truly understand requires the ability to transfer what we have learned to new and sometimes confusing settings and involves the capacity to take what we know and use it creatively, flexibly, fluently, in different settings or problems or on our own.

Student Can:	Teacher Questions:
Show and Demonstrate	What causes this to....
Assemble known information, choose the best option	What other ways could you....
Compare, subdivide, differentiate	How would you prioritize....
Organize multiple pieces of information	What would you do if...
Choose relevant components	Compare and contrast by showing...

Synthesis is the ability to discover new applications of the same material and **Evaluation** is the ability to judge, place value on and critique outcomes.

To grasp the meaning of a thing, an event, or a situation is to see it in its relations to other things: to see how it operates or functions, what consequences follow from it, what causes it, what uses it can be put to. Understanding asks us to more closely examine prior knowledge and the assumptions by which we claim something to be knowledge.

Student Can:	Teacher Questions:
Combine, create or invent	What would happen if
Modify instruction to meet new needs	What would you do next and why
Think creatively to generate new understanding	How could you revise for a different outcome
Evaluate effectiveness of past experiences	How does this influence that
Use evaluation to determine next course of action	What would you expect to see if this

SKILL ACQUISITION

How did you learn to ski or ride? When did you first recognize that ‘ah ha’ moment that sliding down a slippery slope is fun and exhilarating? Perceptions result when a person gives meaning to sensations, to movements. This article is about how we learn physical movements, that learning is a cognitive process and that it starts in the brain. The brain, of course, is a complex organ. While I dabble in the medical profession, consider the science in this article coming from the 30 thousand foot level; that is, it is accurate but far more complex and nuanced than can be addressed here.

A little science review of the brain. The cerebrum, and processes therein, is responsible for functions that get us through everyday life; some processes that are done automatically and some that are done intentionally: executive functioning, consciousness, breathing, vision, decision making, hearing and emotional responses are just examples. I will address the part of the brain that plays an intricate part in our capacity to move down a hill – the cerebellum. Movement, free will, imagination, choice, planning: the cerebellum.

The cerebellum, or little brain, among many other things controls voluntary functions including balance, posture, coordination, equilibrium, muscle movements, motor control and very importantly, draws upon learned rote movements to make adaptations. Along with the basal ganglia, the cerebellum consists of large collections of cells whose purpose is to adjust movements on a real-time basis and regulate complex motor behaviors. The cerebellum has been referred to as a memory bank that allows for movement control as well as making tiny micro-adjustments of movements while in action. The cerebellum and its associated brain stem nuclei and the cerebellar system function to compare the intention of motor movement with actual performance, and, most awesomely, makes corrections when there is a mismatch in signals (the ‘almost’ fall). Meaning, this part of the brain is what controls the ability to learn from movement mistakes and can calculate anticipated positions as well, even with rapidly moving body parts. Amazingly, the cerebellum takes up a little over one-tenth of the entire brain by volume but contains over fifty percent of total brain neurons.

The vestibular system (think inner ear) and cerebellar system (motor activity) is the first sensory system to mature. This attentional system regulates incoming sensory data. The part of the brain that processes movement is the same part of the brain that's processing learning, this happens via activities in the vestibular nuclei (inner ear) which are closely modulated by the cerebellum. Again, it's these very specific cognitive functions and interactions that helps us keep our balance, turns thinking about an action into an action and coordinates most movements. Pretty handy for a skier or rider.

Learning is an active process, the result of experience. The main objective or purpose of most instruction typically is teaching a concept, a generalization, an attitude or a skill. To learn is to acquire knowledge or skill and involves a change in attitude or behavior. Learning is a process of changing behavior and must be an active process to be meaningful. Learning is multi-faceted and purposeful and the process of learning a psychomotor or physical skill is initiated and influenced by brain activity.

To provide a real illustration of physical skill learning, try the following exercise: on a piece of paper, write the word "learning" 10 times with your left hand or non-dominant hand. Go ahead, I'll wait. Oh, and try to improve the speed and quality of your writing as you go along. Hard? Easy? Easier as you went along? While a muscular sequence was being learned, other things were happening as well. Hopefully, you noticed that your perception of the level of challenge changed as the sequence became easier. *Perceptions result when a person gives meaning to sensations.* Concepts of how to perform the exercise were developed and attitudes were changed as your physical skill performance improved. Perceiving involves more than the reception of stimuli from the five senses. Notice that I haven't yet discussed learning from the perspective of watcher, doer, and thinker? I didn't ask you to consider what kind of learner you were...I don't really care if you believe yourself to be a visual learner or a doer; that sort of preference has very little to do with how we actually learn and then develop physical movements. Okay, I care about you, but I don't let your personal preference impact my teaching of skill acquisition.

In other words, when we teach our students a new skill related to skiing or riding, we are teaching them how to acquire a skill: skill acquisition. We do not acquire skill based on what type of learner we are. What type of learner we are references a preference, i.e., I prefer to take in information visually. However, the skill itself is learned by a cognitive function and is most closely associated with our snow sport language surrounding kinesthetic awareness. Sensory receptors in the muscles, tendons and joints and tactual sensitivity (usually referenced as the skin and soles of feet, but in the snow sport world, consider the sensitivity coming up through the boot from the snow to the soles of the feet) along with the vestibular organ of the inner ear provide the sensory information for the brain to engage and institute various neuromuscular bodily adjustments.

We know from the Fitts-Posner model of skill acquisition that psychomotor learning occurs in three stages. Psychomotor learning is the relationship between cognitive functions and physical movement: movement, coordination, manipulation, dexterity, grace, strength, speed and actions. Attention is given to the learning of coordinated activity between body parts. When learning psychomotor skills, individuals progress through the three possible stages of acquisition: the [cognitive](#) stage, the [associative](#) stage, and the [autonomic](#) stage. These stages are always in order, stage one cannot be skipped to automatically get to stage three. In fact, sometimes, we may never get to stage three of skill acquisition. When an individual learns physical movements, this leads to changes in the [motor cortex](#). The more practiced a movement is, the stronger the neural encoding becomes. Practice of inefficient movements OR precise and technically sound practice, either way, the neural encoding gets stronger.

Actions are controlled by the brain using a collection of learned movements. Practice (training) results in changes in information processing capabilities and in the underlying structure and function of the brain and neuro-muscular system. These changes collectively produce significant observable changes in motor performance. With practice, skills become less consciously controlled and more automatic. This provides highly-skilled performers with both the capacity to perform multiple tasks concurrently and improvements in efficiency that help delay the onset of fatigue. Think back to when you first learned to ski or ride. Likely, your initial attempts were not rhythmical, were disjointed and tiring and required a high degree of

‘thinking’ about the pattern. Over time, the movements required for the skill you were learning became more fluid, the timing improved, the considerable ‘think’ time reduced and you became consciously able to take in further information and practice various applications regarding the nuances of the skill.

Psychomotor learning is a complex process that is not always directly observable. While the performance is observable and can imply learning, the learning itself can only be determined after successive attempts that demonstrate consistency. The brain’s cerebellum plays an intricate role in this acquisition. Think back to your experience in writing the word ‘learner’ over and over. You likely struggled at first with rhythm and timing, the output on the paper did not look like your ‘normal’ writing. With practice, things improved. You can thank your cognitive processes for this, actual cerebellar activity that allowed you to improve with concentrated practice. Think of the student who is learning a gliding wedge and the arms veer out to a V-formation. Now think of how hard you likely gripped your pen or bit your tongue or made other unusual body moves as you struggled through the exercise. We learn movements via a cognitive process: a feedback looping system that takes sensations and movements and integrates them into tangible outcomes.

As you consider your lessons and teaching experiences and the type of student you interact with whether children or adults, the skills we are asking them to learn are going to be processed and outputted via cognitive faculties. The CAP model, what we normally associate with the education of children, is applicable to all of us, children and adults alike. We physically take in sensations via kinesthetic processes, cognitively sort the processes into meaning and subsequently demonstrate an outcome. Facilitating practice that ensures sound, skill based and efficient outcomes and not ingrained inefficient movements is your job as a professional instructor.

Fitts-Posner Model

The cognitive stage is characterized by thinking—trying to understand the skill. In this stage the learner forms a cognitive picture of the skill and what is required to do it

- The movements in this stage are jerky, halting and poorly timed
- Performance is variable with a large number of gross errors
- An increase in ‘self-talk’ is evident as this stage progresses
- The learner knows that something is wrong, but is unsure how to correct it

The associative stage is characterized by length, it is quite long. In fact, the person might never move beyond the associative stage. In this stage, the fundamentals and mechanics of the skill have been learned and performance is less variable and more consistent

- There are fewer errors and they are less gross because the athlete has developed the ability to detect and correct errors
- Movements become coordinated and refined to the task as the athlete learns to use environmental cues for timing
- Anticipation develops, and smoother, unrushed movements result as the individual needs to think less about the skill
- There is a shift to memorized movements
- There is rapid improvement with a marked decrease in energy expenditure.

The Autonomous Stage of Skill Acquisition is evidenced usually after much practice and experience, and the skill becomes habitual or automatic.

- In this stage, improvements come slowly, but there is good consistency of performance
- The athlete has good timing, and can detect and adjust errors and disguise actions
- This develops self-confidence and risk-taking in performance situations.
- Most of the skill is performed without thinking because the athlete requires less attention to basics
- Instead, athlete can give more selective attention to higher-order cognitive activities, such as game strategies and external cues

THE LEARNING ENVIRONMENT

The man who views the world at fifty the same as he did at twenty has wasted thirty years of his life.
- Muhammad Ali

Equipment Considerations for the senior skier

Recent equipment developments can help seniors ski more efficiently. Ski design now enables skiers to bend the ski at moderate speeds and with less pressure against the ski and with correspondently less stress on the body from the forces necessary to bend the equipment than previously. Wider and varied camber skis have made it possible for the intermediate skier to ski powder and crud snow with much less muscular effort by allowing greater ski to snow contact. New ski technology in varied early rise and rocker configurations allow for easier and greater maneuverability. Ski length should be appropriate for the desired outcome, size and skill of the skier. Today's shorter skis provide great performance and stability in shorter lengths and can be guided with less effort. Even shorter skis (110 to 130 cm) for beginners lessen the awkwardness of moving around with extensions on their feet and also make getting up from a fall much easier. Today's ski design and materials allow softer flexing skis to have sufficient torsional rigidity to provide a good solid platform at moderate speeds. Generally a softer flexing ski will be easier to carve, load and bend at slower speeds and with less effort, however a softer ski may not hold up to high edge angles in higher speed turns.

Proper equipment adds to successful pacing, years of skiing enjoyment, ability to ski longer and manage conditions more successfully. The importance of tuning and maintaining the ski edge and base may need to be reinforced.

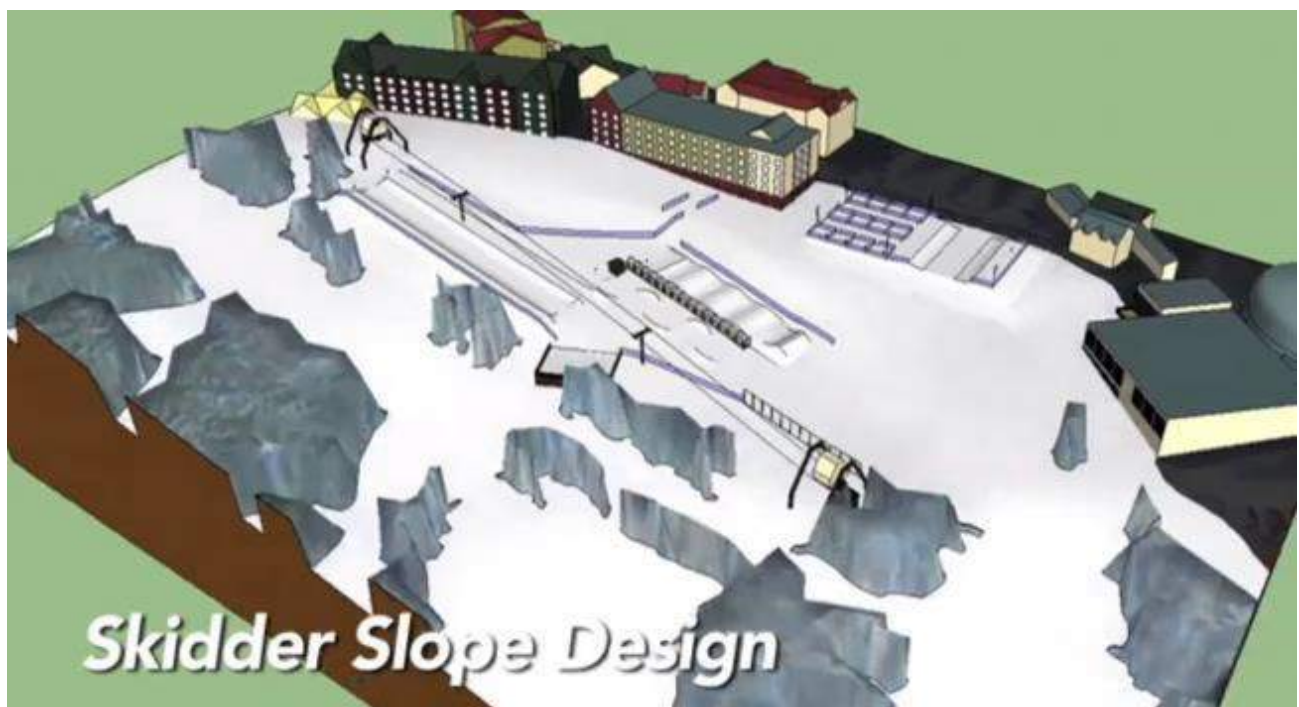
Because of the greater susceptibility to foot problems as seniors age boot fit becomes even more critical. The caveat that the boot should fit like a snug "handshake" (about 1 ½ finger width between the heel and the boot shell) is still true. Assessment of fit is important as an older client may have been fit in a boot too large because of the mistaken belief this would allow a greater degree of comfort. Not only are performance characteristics of a good snug fit lost, an ill-fitting boot may actually increase the risk of blisters from foot movement within the boot or from the compensation of wearing socks that are too thick in an effort to try to take up excess space. This can be compounded as boot fit loosens even more with wear. Appropriate boot flex is important as the reduction in muscular strength with age, and sometimes weight loss as well, the inability to flex a stiff boot becomes more prevalent. As with any skier, proper alignment and canting is critical for an efficient and effective stance. Recommendations to a good boot fitter may be appropriate to enhance function.

Good poles are important as tactical skiing requires proper pole position and carriage. A client that comes with an older set of poles will be surprised at how much lighter and easier a current generation pole is to use. Beginning senior skiers should always use ski poles. While an aid in balance/stance and alignment, poles can also be used to provide propulsion and as an aid in getting up from a fall. Pole length is very important and should be long enough to minimize changes in stance when they are used. A good starting point for proper sizing is the forearm should be parallel to the ground when the pole basket is ahead of the boot toe when standing on skis.

Starting and Maintaining Senior Programs

As noted above in the CAP Model, the senior client often views skiing primarily as a social experience; values the whole mountain experience, relies on peers for support and expects value from their lessons. Some of the allure of lessons can come from the perception of special consideration for the senior client by the resort, the school and the instructor. In setting up senior programs, there are a number of features that can be readily offered by different stakeholders to promote the senior clientele feeling comfortable, valued and supported. Collaboration by the resort, school and the instructor can be rewarded by growth, consistent attendance and increased ticket sales through desire of the seniors to include their immediate families in the experience.

Features a senior client may find alluring include specific designated space and terrain options. A designated indoor location or meeting place where the senior students can gather, socialize, leave their extra gear and get together after the lessons. Provision and maintenance of special terrain features that can facilitate learning without excessive physical exertion would be beneficial. One such example is the “mini-pipe” which can be used to learn gliding skills for the beginner without the fear of stopping, learn to turn as the edge of the lip is approached and can maximize mileage by using shallow traverses between each turn. Terrain based learning, designed to help the skier or rider “feel” the mountain without fear of acceleration or injury, with purposefully designed features assisting in direction change or speed. Snowshoe Mountain:



For the beginning student, the value of having a designated indoor and outdoor meeting area is ideal so that learning can take place without having to first slide on the snow. An article in *The Professional Skier* (Winter 2008), "Boot and Flat Work – Do They Really Matter?" by Bill Claire presents a pretty compelling line of reasoning and data regarding the value of boots-only indoor flatwork and flat terrain drills with skis prior to on snow gliding practice. The author showed an accelerated learning curve when an average of 20 minutes was taken from the on-snow class time to experiment with some of the fundamental movements in a very un-intimidating environment. It is conjectured that for senior students this sort of approach would be enhanced if it could be done in a familiar area free from traffic and other distractions.

From a 2012 Huffington Post article, "I don't think you're ever too old to ski. Maybe there is a point where you need to stop, but I've kept skiing throughout my 50s and have enjoyed it immensely," said John Hurlock, an accountant in New York City. "It can be a bit intimidating when young kids are flying by you, but I try to go when it's not so crowded and to resorts that aren't so crowded."

Senior specific programs are potentially facilitated due to the fact that this demographic tends to form support groups as they approach retirement. These groups are usually well organized and open to opportunities for activities that interest the members. In addition, most metropolitan areas have groups of skiers who band together and take a bus to one of the local areas on mid-week days when the crowds are reduced. Once started, these programs tend to become self-sustaining through word of mouth contacts and communication.

The first such senior only program was established by Floyd Lambert who founded the 70+ Ski Club in 1977 as he saw seniors giving up the sport because they could no longer afford it or had no one to ski with. Another such club founded in the NW was the Ancient Skiers club, originally only taking skiers who hit the slopes before the US entered World War II. Today there are programs and clubs throughout the US including Boomers on Groomers and The Over the Hill Gang.

According to studies done by the National Ski Areas Association, mountain management stakeholders are looking at the demographics of who their clients are. If the baby boom generation ceases to drive resort operational planning, advances need to be considered to maintain not only the senior client but their extended family. Conversely, the extended family will need enticements to view the mountain resort as a place for all generations of their family. Colorado destination resorts are attempting to attract a new generation of skiers and snowboarders to replace the boomers without turning their backs on a group that has been their core customers. Among the most visible attractions are sprawling terrain parks and massive half pipes designed to appeal to Generation Y skiers and snowboarders. As the nation's skiing populace ages, a massive face-lift appears inevitable. Baby boomers, long the driving force behind the infrastructure of skiing, may or may not have reached their demographic peak on the slope. The diminishing virility of a traditionally robust skiing market has Colorado resorts searching for their own version of an antidote by marketing to multi-generations of customer.

The NSAA report did address a continuation of a “three-generation phenomenon” as the Baby Boomers continue to participate in snow sports, at the same time that persons young enough to be their children and grandchildren also take up skiing and riding, thus causing an overall broadening of the participant age profile.



The 2010 Kottke report commissioned by the NSAA commented on the statistics demonstrating that the massive Generation Y or Millennials (persons born after 1980) are a huge demographic in snowsports and will likely be driving future growth numbers in skier visits. Generational skiing can likely be optimized looking at the growth trends of the Generation Y and the still being born Generation Z (after 1991) populations.

Regardless of the demographics, or the unknowns of what is to come, the senior specialist instructor plays a valuable role as the provider of quality instruction leading to fulfilled clients, retention of clients and successful programs.

SENIOR SPECIALIST SKIING TASKS, DRILLS AND MOVEMENT PATTERNS

*Note: This section is a work in progress. The SS Task Force is working towards updating this content to include the most current Skiing and Snowboard technical information based on the 2016 and 2017 Alpine and Snowboard Fundamentals.

Skill usage in performing each of the skiing tasks is detailed herein. While the desire is to achieve a uniform blending of the basic skills in every turn exercise or drill, learning is accelerated if one of these takes precedent and is emphasized during practice. These skills are shown in **red bolded** text. For each task some of the primary movement pattern focuses for seniors are also shown. While the following tasks are one possible progression for the beginning senior skier up to open parallel, these tasks are also useful drills for every level of senior skier working on developing efficient skiing movements. In utilizing these tasks either as a progression or as individual drills, the instructor should keep in mind both the elements for efficient skiing in general and some of the particular focuses for the senior student. Utilization of a stacked skeletal alignment to reduce muscle fatigue; continuous flexing and extending movements to reduce joint impact; balancing movements which include maintaining a strong inside half (the inside half of the body is raised and ahead of the outside half) and rotary movements where the turning of the leg is initiated with the femur rotating within the hip socket (which necessarily includes the feet, shin and leg) are all examples of some of the movements highlighted by these tasks.

While these tasks are common in our industry for developing good movement patterns, they are unique to the senior skier in that they can be used to easily highlight the senior specific movement patterns that are focused upon. A core component of the senior specific movement patterns includes a focus on low impact and continuous movements to allow for a smoother and less impacting experience, allowing flow and maneuverability. A focus on stance and alignment includes reinforcing a tri-pod alignment – a stance that highlights pressure to the balls and heel of the bottom of each foot to facilitate a more upright and neutral yet athletic position.

- **Straight Run**

Description of Task: Skis maintain a parallel relationship, gliding flat on the snow with equal weighting on each ski. The resultant tracks consist of two parallel lines of roughly equal depth. Ankles, knees and hips vary flex as required by terrain variations.

Purpose for Senior Students: This may be the first experience gliding while in motion or a drill useful for balance and stance. Focusing on incorporating a tripod stance will help retain balance while in motion.

Variations for Reinforcement Include: Weighting from foot to foot, stepping from foot to foot and shuffling the feet while moving.

Skill Blend Emphasis: **Balance.** Skier maintains a consistent open stance width, cuff pressure on both boots and a tall skeletally aligned stance. A focus on proper balancing while in motion will enhance the ability to utilize all muscle groups of the legs, in lieu of reliance on the quadriceps, to minimize fatigue as well as a strategic skeletal alignment or stacking will maximize strength in length.

- **Straight Run with Paddle Turn to Stop**

Description of Task: Demonstrate a balanced stance with the legs slightly flexed, hands and arms in front of the body while in a straight run. In a series of small steps across the fall line,

starting with the inside leg, transfer the weight from one ski to the other in a scissoring fashion to a stop.

Purpose for Senior Students: Introducing or focusing on speed control through turning across the fall line by active steering of the inside leg and proper flexion and extension to maintain balance. The task focuses on movements that change direction across the fall line leading to the ability to control speed with relatively little effort, using the terrain and using turn shape while staying in a neutral comfort zone.

Variations for Reinforcement Include: Practicing from various angles to the fall line from a traverse to a straight run. Encourage flexion/extension of the ankles, knees and hips with each step as well as active inside edge engagement from a balanced platform to maintain the ability to balance along the length of the ski and move in the intended direction.

Skill Blend Emphasis: **Balance**, Rotary, Edging. Skier uses flexion and extension in the ankle, knee, hip and spine to maintain balance while moving forward and laterally and demonstrating active steering of the feet and legs to redirect the skis while stepping from the platform of a slightly edged ski. Low impact and continuous movements can assist in managing fatigue by enhancing reliance on the whole leg turning in the hip socket in lieu of reliance of the quadriceps muscle and with skeletal alignment to maximize strength in length to balance against the outside ski.

- Gliding Wedge

Description of Task: Demonstrate a balanced stance with the legs slightly flexed, hands and arms in front of the body to assist in stance and balancing while steering the skis into a slight wedge relationship. Balance is equally weighted to both skis with a variation of gliding on a flat ski to a progression of edge engagement with significant skidding.

Purpose for Senior Students: Introduction to or reinforcement of gliding on a flat ski in a narrow wedge to a wider wedge with subsequent progressive edge engagement. The focus is on balancing over gliding skis in a narrow wedge. Edge engagement is managed primarily through varying the size of the wedge.

Variations for Reinforcement Include: Varying the width of the wedge with progressive edging to blend speed variables and a focus on maintaining balance between the skis with the center of mass keeping pace with forward movement.

Skill Blend Emphasis: **Balance**, Rotary. Skier maintains a tall stance with pressure to the cuff of both boots, hips centered between the feet and demonstrates foot and leg steering variations between a straight run and wedge relationship. Lower edge angles may result in progressive skidding but can promote less muscle fatigue of the lower extremities.

- Wedge Turns

Description of Task: Demonstrate a balanced stance in a slow to moderate speed, changing direction with slight continuous rotation of both legs. The entire ski maintains contact with the snow and the wedge attitude is maintained. The legs turn more than the upper body, the inside ski will lead by the fall line resulting in a balanced, stable upper body facing slightly downhill at the end of the turn.

Purpose for Senior Students: This is the first attempt, or a reinforcement of, changing direction while gliding through gradual continuous rotary movements of the legs and feet. Such movements of the legs capitalize on the design of the ski and enable the student to execute round shaped turns with minimum effort. Turning the legs requires turning the leg within the hip socket, thus by default, the entire leg assists with turning: feet, shin, thigh.

Variations for Reinforcement Include: Balanced stable upper body faces slightly downhill by the finishing phase of each turn resulting in the legs and feet turning more than the upper body. The inside ski lead change takes place before the fall line with the inside leg actively steering in the direction of the intended turn to aid in shaping. The turn is initiated with a forward and lateral movement of the legs with subsequent continuous flexing of the ankles, knees, hips and

spine as the turn is developed. Speed is controlled by the shape of the turn not the size of the wedge.

Skill Blend Emphasis: Balance, **Rotary**, Edging. A slight forward and lateral extension at turn initiation accompanied by active steering to guide both skis through round turns with the feet turning slightly more than the upper body develops a slightly countered relationship. This low impact and continuous movement pattern conserves energy and maximizes the power of the turning legs to control the shape and speed of the turn. This is also a strategic use of ski design. The focus is on managing the arc of the turn to manage turn shape.

- **Traverse**

Description of Task: Traverse across the hill with both skis tipped onto their uphill edges. Given slope angles, slightly more weight will be on the downhill ski. Each ski should track across the hill and not slip or skid as the result of a loss of edge angle. The skier's position is upright with a tripod stance with shin contact to both boot cuffs. Ankle, knee, hip and spine joints are flexed evenly with the inside half of the body raised and slightly ahead.

Purpose for Senior Students: This is one of the key movement patterns for all advanced skill blending movements. The traverse can be used between linked turns as well to enable the skier to move to more desirable terrain or to slow the pacing to allow rest periods.

Variations for Reinforcement Include: Vary terrain and pitch to reinforce the forward and lateral movements to maintain balance and control the edge angle to slip, skid and carve.

Skill Blend Emphasis: **Balance**, Edging. A tall tripod stance with shin contact to both boots cuffs, slightly more weight on the downhill ski with sufficient counter appropriate to the pitch of the terrain. This aligned stance allows skeletal stacking to maintain a position of power and strength and minimizes the need for reliance on muscular strength.

- **Diagonal Sideslip**

Description of Task: Starting from a tall, balanced, strong inside half position with both skis pointed across the hill, tip the legs to release the edges and start a skid at an angle to the fall line. Weight should be roughly equal on both skis with slightly more on the downhill ski as appropriate for the given pitch and with the center of mass moving in the intended direction of travel.

Purpose for Senior Students: The ability to control the direction of the skis at an angle to the fall line by tipping the feet and legs while maintaining balance. Developing slipping and skidding skills in a safe environment under low speeds is an essential element to introduce or reinforce the subsequent controlling or shaping phase of the turns. A balanced, skeletally aligned position may allow for more inclination and less counter while managing a slipping or skidding movement.

Variations for Reinforcement Include: Explore starting from a standstill or while in a traverse. Experiment with varying the angle of the slip relative to the fall line. Explore the stance required to control the slip or skid in the desired direction. Explore the use of inclination and angulation to determine edge angle.

Skill Blend Emphasis: **Balance**, **Edging**. Maintain an open, skeletally aligned stance with slightly more weight on the downhill ski accompanied by the ability to tip both legs to vary the edge angle and control the diagonal slip of both skis. Skidding on a flatter ski at lower edge angles allows the senior skier to minimize fatigue buildup by relying more on skeletal alignment and less on muscular efforts.

- Falling Leaf

Description of Task: From a balanced, strong inside half parallel stance with slightly more weight to the downhill ski initiate linked controlled sideslips alternating in forward and backward directions by slightly moving weight fore and aft along the length of the skis. Direction is controlled by a combination of edge angle and weight distribution along the ski. The center of mass should align and maintain pace with the direction of travel moving forward and backward to maintain a balanced stance.

Purpose for Senior Students: This drill provides the ability for the student to learn how to control the ski direction and speed through the blending of balancing, pressuring and edging skills in non-threatening terrain. A progressive extension movement at the initiation allows the skis to easily move forward and laterally.

Variations for Reinforcement Include: Play with the wide range of fore/aft movements and how ski design affects outcomes. *Focus on movement that can blend into turn initiation skills.*

Skill Blend Emphasis: **Balance, Edging, Pressuring.** While maintaining an open skeletally aligned stance the skier moves forward and diagonally in the intended direction of travel to release the edges and causing the skis to slip diagonally. Continuous progressive flexing and extending movements facilitate skidding and cause lower impact and less muscle fatigue.

- Uphill Christy

Description of Task: From a traverse at an angle to the hill in an upright, balanced, strong inside half stance initiate a skidded parallel, turn up the hill to a stop by steering both feet, and legs in the direction of the intended turn. Progressively guide the arc of the turn by continuous steering of the legs with progressive flexion of the ankles, knees, hips and spine as the turn develops. Maintain body alignment slightly open to the turn as the legs turn more than the upper body and as the pressure on the outside ski increases.

Purpose for Senior Students: This drill reinforces the ability to turn both skis at the same time in the direction of the new turn. Utilizing this task, on moderate terrain, with a slight convex face will facilitate the skidding and rotary movements to more easily control the arc of the turn.

Variations for Reinforcement Include: Start with a shallow traverse and progress to steeper approaches from the fall line to explore rate, timing and intensity at which turns can be steered and pressure managed.

Skill Blend Emphasis: **Rotary,** Edging, Pressuring. Skier maintains a tall stacked stance and steers both feet and legs simultaneously to shape the turn while maintaining consistent open stance width and allowing a countered relationship between the legs and upper body to develop as the legs turn in the hip socket more than the upper body. This low impact, continuous movement explores strategies to minimizing fatigue build up and stress to joints.

- Linked Wedge Christies

Description of Task: As the previous turn is completed in a flexed, balanced and parallel stance, a new turn is initiated with an extension by steering both skis towards the fall line in a wedge relationship. The skis become parallel through more active steering of the inside leg resulting in a rounded turn shape with no traverse. The inside ski and the inside half of the body lead before the fall line with the feet and legs aiding in turn shape and managing the arc of the turn.

Purpose for Senior Students: This task can be utilized as a platform for continued progress or for reinforcement in blending of all skills. Linked wedge christie turns can allow further exploration of the mountain with reasonable control and comfort.

Variations for Reinforcement Include: Experiment with turn shape, turn size and speed. The matching of the skis may be demonstrated in a variety of places in the turn, including the beginning, middle or finish. Pole touch is optional, but if used must complement the movement of the body in the direction of the new turn. Actively steer both ski tips into the new turn. Flexion of the ankles, knees, hips and spine is progressive through the turn with subsequent progressive extension of the joints at turn initiation. Shaping of the turns is enhanced through gradual continuous rotary movements of the feet and legs.

Skill Blend Emphasis: **Rotary**, Edging, Pressuring, Balance. A slight forward and diagonal extension at the initiation of the turn allows for flattening of the skis and facilitates steering movements which originate in the feet and legs. As the turn develops, active steering of the inside leg results in a parallel open skidded finish. Shaping the turn with skidding movements allows for lower impact while continually moving in the direction of the intended turn. A strong, stacked and skeletally aligned body position will allow for greater strength from the skeleton and can assist in minimizing muscle fatigue. This can assist with managing endurance and subsequently allow greater exploration of the mountain environment.

- Traverse - Advanced

Description of Task: Traverse across the hill with both skis tipped onto their uphill edges. Stance should be upright and balanced over the whole foot with the ankle, knees, hip and spine slightly flexed. A strong inside half is exhibited with the inside half of the body raised and ahead of the outside half. Demonstrate the ability to: lift the uphill ski while continuing the original track of the downhill ski; lift the downhill ski while continuing the original track of the uphill ski; and alternate between the uphill and downhill ski while continuing the original track.

Purpose for Senior Students: This task explores the ability to move from ski to ski while maintaining balance and edge engagement. The skier demonstrates appropriate flexion of ankles, knees, hip and spine to maintain alignment and edge engagement.

Variations for Reinforcement Include: Addition of garlands through task exploration. Lifting of only the tail or tip of the ski while in the traverse to explore balancing while in motion. Exploration of outcomes by allowing the ski to skid while in the parallel traverse.

Skill Blend Emphasis: **Balance**, Edging, Pressuring. Skier maintains a tall, skeletally stacked alignment with appropriate ankle flex and shin pressure to the cuff of the boot while in motion. A strong inside half will promote strength and alignment to minimize an overly countered position and correspondingly reducing fatigue buildup.

- **Linked Pivot Turns**

Description of Task: From a sideslip down the hill in a flexed, balanced, strong inside half stance, extend forward and laterally in the direction of travel and simultaneously steer both skis under the torso to allow shaping of the turn with progressive skidding movements through the shaping phase of the turn until the skis are 180 degrees from the original direction of travel. The inside ski is ahead and the inside half of the body is raised and ahead by the fall line. Transfer weight to the new uphill ski and repeat.

Purpose for Senior Students: Exploration of changing direction relatively quickly while remaining in balance and controlling speed buildup from turn to turn. Managing flexion and extension movements of the ankles, knees, hip and spine while actively steering the feet and legs. Turning the legs requires turning the leg within the hip socket thus by default the entire leg assists with turning: feet, shin, thigh.

Variations for Reinforcement Include: Explore moderate to steeper blue terrain preferably where the slope is flat rather than concave or convex. Explore the range of flexion and extension of the ankles, knees, hips and spine while guiding both skis by turning (actively steering) both legs through rotation of the femur in the hip joint. Explore more pivoting (Pivot Slips) and more shaping (Pivot Turns). Explore movements shifting pressure from the downhill ski to the uphill ski at turn initiation.

Skill Blend Emphasis: **Rotary**, Balance, Edging, **Pressuring**. Skier simultaneously steers both legs under a quiet upper body while transferring weight and balance over the new outside (downhill) ski into a skidded finish. A tall, skeletally aligned stance with an awareness of a strong inside half at turn transition will allow for low impact and continuous movements with reduced muscle fatigue. A progressive drifting and skidding exploration to manage turn shape in lieu of a quick pivot action to turn feet promotes inherent strength, enhances balance and minimizes fatigue build up.

- **Linked Open Parallel**

Description of Task: Balanced, rhythmical turns with no traverse. The pole swing timing complements movements into the turn, edge change and weight transfer. The inside half of the body is raised and ahead of the outside half by the fall line with the skis remaining in a parallel relationship throughout each turn.

Purpose for Senior Students: Exploration of a blending of the skills especially on easier groomed terrain, maintaining a balanced stance throughout each turn with rounded turn shapes. Upper body alignment should be slightly open to the hill, moving in the direction of travel, with the legs turning more than the upper body as the turn progresses. Initiation is a forward and diagonal extension with shins maintaining contact with both boot cuffs as weight moves progressively to the new outside ski. As the turn develops the ankles, knees, hips and spine flex and the femur continues to rotate in the hip joint to guide the skis and shape the turn.

Variations for Reinforcement Include: Refinement of the blending of the skills by varying turn radius, seeking to increase speed on flatter terrain and controlling speed on steeper terrain through shaping of the turns. Prudent use of terrain features such as small bumps and rolls can aid in accomplishing the desired blending. Reinforcement of maintaining a balanced stance while in motion.

Skill Blend Emphasis: Balance, Edging, Rotary, and Pressuring: Skier maintains a stacked skeletal alignment when necessary and maintains an open consistent stance width. Turn initiation is with a forward and diagonal movement of the feet and legs while maintaining stacked skeletal alignment (hips over feet and perpendicular to the slope), accompanied by continuous progressive edging and rotary skill blends to manage the turn shape based on slope and pitch. The awareness of continuous progressive movements, maintaining an aligned stance, maintaining balancing while in motion and purposeful terrain choice will allow the senior skier to manage and maintain the arc of each turn and subsequently turn shape and consequently the senior skier will be able to enjoy and explore the mountain environment.

- Effective Pole Use

Description of Task: Pole swing is continuous and purposeful throughout all turns. Grip is firm with direction of swing and pole touch determined by intent of direction of travel and radius of turn. Functional engagement of the core is directed by hand/arm carriage and tension.

Purpose for Senior Students: upper body discipline will allow a stronger, engaged core upon which the lower legs can turn against. Hand/arm carriage assists with the ability to ski into and out of countered relationships. Timing and direction of the pole swing varies to complement the desired movements

Variations for Reinforcement Include: Trialing pole swing and touch in a variety of turn shapes and speed ranging from pivot slips to medium radius.

Skill Blend Emphasis: Proper upper body engagement facilitates efficient stance and alignment.

- Carved Parallel

Description of Task: Same as open parallel with a focus on progressive edging before the fall line with minimal twisting of the feet. Tails should follow tips from transition to finish with speed and radius consistent from turn to turn.

Purpose for Senior Students: Applications for advanced terrain and pitch and mastery on all blue terrain. Progressive edging and de-edging movements facilitate flow and smoothness. Continuous movements of the center of mass to maintain fore/aft, lateral and rotary balance over the base of support. Utilization of inclination to adjust edge angles. Maintenance of ski snow contact through rhythm and flow.

Variations for Reinforcement Include: Various terrain and pitch selections altering duration, timing and rate of progressive edge engagement.

Skill Blend Emphasis: Stance and alignment can have a positive and selective effect of the blending of the skills within each turn and series of turns allowing for stability, progressive edging and de-edging and with limited pivoting and steering as controls for turn shape.

For the Senior Specialist participant, the goal is to progressively apply senior specific movement patterns and embellish the low impact/continuous movement curriculum from beginning skill zones to advanced skill zones. Application of these fundamental core identified tasks as drills for enhancement, tools for reinforcement of a particular movement pattern or as progressions for skill blending are all equally valid and useful for enhancing the ultimate goal of good, fun and efficient skiing. As the skill set and technical understanding improves, the tasks and drills can be applied to varied terrain, conditions, pitch and speed.

LESSON DIARY TEMPLATE/WORK SHEET

RELATIONSHIPS: Connections & Trust || Goals & Desires

AWARENESS: Real & Ideal Movements || Investigations || Prescriptions

ADVENTURES: Experiences || Guidance

Senior Specialist

2011

PSIA-NW Standards: Foundations, SS 1 and SS 2

Senior Specialist Standards

Introduction

The following are the current (2010–11) PSIA Senior Specialist Standards. Referenced to the *Alpine Technical Manual (ATM, 2nd Edition, 2007)*, *Core Concepts (2001)* and the *PSIA-NW Senior Specialist Manual (SS Manual, 2nd Edition, 2010)*, terminology is consistent with these manuals and is to be used throughout this document. These standards provide a training and educational focus and represent a minimum competency for each level of specialist.

The premise of the standards is based upon the concepts of “levels of understanding” that define stages of learning in degrees of understanding. Just as certification is a measure of understanding, levels of certification represent stages of understanding. Although not a certification, Senior Specialist’s will be expected to meet levels of competency defined by SS 1 and SS 2 standards. This is a certificate based educational offering of PSIA-NW. Candidates will be held to the knowledge and performance standards of the level at which they are participating as well as the criteria for all preceding levels.

Levels of participant understanding are based on Bloom’s Taxonomy. The Taxonomy criteria are noted in italicized formatting throughout this document.

Original (Bloom et al., 1956) and Revision (Anderson, 2001)

Definitions from Bloom B. S. (1956). Taxonomy of Educational Objectives, Handbook I: The Cognitive Domain. New York: David McKay Co. Anderson, L. W., Krathwohl, D. R. (Eds.). (2001). A taxonomy for learning, teaching and assessing: A revision of Bloom's Taxonomy of educational objectives: Complete edition, New York: Longman.

Remember (Knowledge Level)

Ability to recall or recognize terms, definitions, facts, ideas, materials, patterns, sequences, methods, principles. Key verbs: name, list, state, describe, recall, label, recognize.

Understand (Comprehension Level)

Read and understand descriptions, communications, reports, tables, diagrams, directions, regulations, etc. The ability to grasp meaning. Key verbs: paraphrase, identify, explain, translate, interpret.

Apply (Application Level)

Know when and how to use ideas, procedures, methods, formulas, principles, theories, etc. The ability to use learned material in new situations or the unprompted use of abstractions. Key verbs: execute, compute, demonstrate, discover, predict, show, solve, implement.

Analyze (Analysis Level)

Break down information into its constituent parts and recognize their relationship to one another and how they are organized; identify sublevel factors or salient data from a complex scenario. The ability to distinguish between fact and inference. Key verbs: diagram, illustrate, outline, infer, conclude, differentiate, compare/contrast.

Create (Synthesis Level)

Put parts or elements together in such a way as to reveal a pattern or structure not clearly there before; identify which data or information from a complex set is appropriate to examine further or from which supported conclusions can be drawn. Key verbs: create, compose, design, reorganize, formulate, create a new ending.

Evaluate (Evaluation Level)

Make judgments about the value of proposed ideas, solutions, etc., by comparing the proposal to specific criteria or standards. The ability to judge the value or worth of material and ideas against stated criteria. Key verbs: judge, appraise, compare, contrast, criticize, justify, critique.

Senior Specialist Levels

PSIA-NW recognizes three levels of the senior specialty: Foundations, SS 1 and SS 2. Successful outcomes are based on the individual’s knowledge and application of specific skill ability, educational expertise and experience related to the senior client.

General Requirements

Specialist Level	General Requirements
Foundations	The successful SS Foundations participant will demonstrate <i>knowledge</i> of the technical terms, concepts and models listed below. The successful participant will demonstrate the ability to work Beginning to Intermediate zone senior students that are learning and moving in all green and groomed blue terrain. Requirements of participation include a Registered level in the alpine discipline. Successful completion of SS Foundations is required before participation in the SS 1 educational event OR the participant may present documentation to the PSIA-NW office proving 20 teaching hours of the adult student and participate directly in the SS 1. Successful participants will be awarded a certificate of participation.
SS 1	The successful SS I participant will demonstrate the <i>knowledge and comprehension</i> as well as the <i>application</i> of the technical terms, concepts, and models listed below. The successful participant will demonstrate the ability to work with Beginning to Intermediate zone senior students that are learning and moving in all green terrain and groomed blue terrain. Requirements of participation include a Certification Level 1 in any alpine discipline. Participants will be awarded a Senior Specialist 1 certificate upon successful program completion.
SS 2	The successful SS 2 participant will demonstrate the <i>application and analysis</i> and the ability to <i>synthesize and evaluate</i> the technical terms, concepts, and models listed below. The successful participant will demonstrate the ability to work with Beginning to Advanced zone senior students who are learning and moving in all terrain up to and including groomed black terrain. Requirements of participation include a Certification Level 2 in any alpine discipline. Participants will be awarded a Senior Specialist 2 certificate upon successful program completion.

Movement Analysis and Technical Knowledge

SS Foundations

The successful SS 1 participant will demonstrate the *knowledge* of the technical terms, concepts, and models listed below. The successful participant will demonstrate the ability to recognize specific movement patterns in seniors who are learning and moving in all green and groomed blue terrain.

SS 1

The successful participant will demonstrate the *knowledge and comprehension* as well as the *application* of the technical terms, concepts, and models listed below. The successful participant will demonstrate the ability to recognize specific movement patterns in the Beginning to Intermediate zone senior students who are learning and moving in all green and groomed blue terrain. Workbook completion is mandatory.

SS 2

The successful participant will demonstrate the *knowledge and comprehension* as well as the ability to *apply, analyze, synthesize and evaluate* the technical terms, concepts, and models listed below. The successful participant will demonstrate the ability to recognize specific movement patterns in Beginning to Advanced zone senior students who are learning and moving in all terrain conditions. Workbook completion is mandatory.

Participants will be evaluated based on the following criteria, terms, concepts, and models:

- The Learning Partnership: Student Profile and Instructor Behavior
 - Teaching concepts
 - The Teaching Cycle
 - Guest Description
 - Guest Needs
 - Effective use of the Mountain Playground
 - Wrap Up
 - Class Handling
 - Pacing and low impact movement patterns
 - Intensity
 - Terrain choices, conditions
 - Skiing Concepts:
 - Efficient movement patterns related to the skills concept
 - Senior specific Low Impact/Continuous Movement Model
 - Skeletal alignment
 - Continuous fluid movement
 - Minimizing joint impact
 - Stance and balance
 - CAP Model
 - Cognitive:
 - Developmental milestones
 - Learned movement patterns, behaviors
 - Roadblocks to learning
 - VAK
 - Affective:
 - Client desires, goals and history
 - Gardner's Multiple Intelligence's
 - Maslow's Hierarchy of Needs
 - Erik Erikson's Psycho-social Development Theory
 - Physical:
 - Low Impact/Continuous Movement Model
 - Biomechanics specific to physical outcomes
 - Anatomic/Physiologic components
 - Fatigue minimizing movement patterns
 - Movement Analysis
 - Real versus Ideal Movement Patterns
 - Cause-and-effect relationships
- Equipment Components
 - Boot fit and design
 - Technology of ski design
 - Student centered choices
- Adjunct
 - Stakeholder partnerships
 - Senior program development
 - Anxiety, fear, risk taking
 - Neurologic feedback system

Teaching Standards

Foundations	The successful participant will demonstrate the <i>knowledge</i> of the learning partnership, concepts, and models listed. The successful Foundations participant will participate in group discussions related to the teaching cycle and senior teaching model. The successful participant will demonstrate the ability to recognize and demonstrate <i>knowledge</i> of the teaching cycle for seniors who are learning and moving in all green and groomed blue terrain.
SS 1	The successful SS 1 participant will demonstrate the <i>knowledge, comprehension</i> and <i>application</i> of the learning partnership, teaching concepts, and models listed. The successful participant will demonstrate the <i>knowledge, comprehension</i> and <i>application</i> of the teaching model for seniors in the Beginning to Intermediate zone in green to groomed blue terrain. The successful candidate will demonstrate active participation with the group and clinician in demonstrating understanding methodology of the teaching cycle, senior specific models and movement patterns.
SS 2	The successful SS 2 participant will demonstrate the ability to choose appropriate drills and tasks and teach a safe, effective lesson progression or teaching segment that demonstrate the <i>application and analysis</i> and the ability to <i>synthesize and evaluate</i> the technical terms, concepts, and models listed. The successful participant will demonstrate the ability to teach to a spectrum of senior clients from beginning to advanced zones and in all terrain.
SS 2	Professional Knowledge The successful SS 2 participant will be able to demonstrate the <i>application and analysis</i> and the ability to <i>synthesize and evaluate</i> the technical terms, concepts, and models listed related specifically to the senior client including the connection between movements, skills and resultant ski performance as well as the relationship between the teaching cycle and teaching model. The successful participant will demonstrate personal mastery by written, verbal and physical modalities.

Movement Standards

Movements and coordination is based on the definitions of "initial", "elementary", and "mature", as defined in *Core Concepts* (PSIA/AASI, 2001), pg. 20.

The “initial” movement stage is when a skier is unfamiliar with a movement and relies on sensory input and coaching to learn. Often, the movements are very sequential and performed individually. The skier in this stage may show signs of a movement pattern periodically but not consistently.

The “elementary” stage denotes skiers who can perform movements without looking at that body part but still need to think it through and concentrate on the parts. While movements are still sequential, the skier will link them together in a more fluid manner. The skier in the elementary stage will be able to consistently demonstrate a movement pattern but may not be able to apply it in all situations.

The “mature” stage is characterized by smooth, fluid, and automatic movements without showing obvious, conscious thought. Movements can be repeated and applied across a wide spectrum of situations. A skier with mature movements and coordination of movements will be able to smoothly blend movements for a specific outcome and be able to readily change or adapt movements to different terrain situations and snow conditions.

Foundations	Skiing
Participants will be evaluated on the following movements and coordination:	<ul style="list-style-type: none"> • Level 1 Certification Standards • Elementary stage of movement coordination • Ability to demonstrate Ideal movement patterns based on evaluation of Real movement patterns observed in the senior client in the Beginning to Intermediate zone • Ability to demonstrate senior specific tasks and drills to Level 1 Certification Standards

Foundations	Movement skills and Performance
Successful participants will demonstrate the ability to comfortably perform in the following terrain:	<ul style="list-style-type: none"> • All green and blue terrain • Ability to demonstrate senior specific tasks and drills to Level 1 Certification Standards

Foundations	Applied Movements
<p>Movements to be applied at Foundations include the efficient movement patterns of balance, edging, pressure and rotary skills that will affect the performance outcomes of the senior client utilizing the concepts of low impact, low fatigue continues movement patterns. The candidate will be asked to demonstrate movements and techniques that enable the senior skier to meet the following goals: minimize muscle fatigue, minimize high impact to joints, conservation of energy and improved confidence.</p> <p>Applied movements include the utilization of a stacked skeletal alignment to reduce muscle fatigue, continuous flexing and extending movements to reduce impact, balancing movements which include maintaining a strong inside half and rotary movements where the turning of the leg is initiated with the femur rotating within the hip socket.</p>	

SS 1 Skiing	
Participants will be evaluated on the following movements and coordination:	
	<ul style="list-style-type: none"> • Level 1 Certification Standards • Ability to demonstrate senior specific tasks and drills to Level 1 Certification Standards • Elementary to Mature stages of coordination • Ability to demonstrate Ideal movement patterns based on evaluation of Real movement patterns observed in the senior client in the Beginning to Intermediate zone

SS 1 Movement Skills and Performance	
Successful SS I participants will demonstrate the ability to comfortably perform in the following terrain:	
	<ul style="list-style-type: none"> • All green terrain • Blue groom terrain including gentle off-piste conditions and small bumps • Ability to perform senior specific tasks as requested utilizing the low impact/continues movement model including the ability to slip, skid and incline as directed.

SS I Applied Movements	
<p>Movements to be applied at Foundations include the efficient movement patterns of balance, edging, pressure and rotary skills that will affect the performance outcomes of the senior client utilizing the concepts of low impact, low fatigue continues movement patterns. The candidate will be asked to demonstrate movements and techniques that enable the senior skier to meet the following goals: minimize muscle fatigue, minimize high impact to joints, conservation of energy and improved confidence.</p> <p>Applied movements include the utilization of a stacked skeletal alignment to reduce muscle fatigue, continuous flexing and extending movements to reduce impact, balancing movements which include maintaining a strong inside half and rotary movements where the turning of the leg is initiated with the femur rotating within the hip socket.</p>	

SS 2 Skiing	
Participants will be evaluated on the following movements and coordination:	<ul style="list-style-type: none"> • Level 2 Certification Standards • Mature stages of coordination • Ability to demonstrate Ideal movement patterns based on evaluation of Real movement patterns observed in the senior client in the Beginning Zone through Advanced Zone. • Ability to demonstrate senior specific tasks and drills to Level 2 Certification Standards

SS 2: Movement Skills and Performance	
Successful SS 2 participants will demonstrate the ability to comfortably perform in the following terrain:	<ul style="list-style-type: none"> • All green terrain • All blue terrain including variable off-piste conditions and bumps • Groomed and smooth off-piste black terrain • Ability to perform senior specific tasks as requested utilizing the low impact/continues movement model including the ability to slip, skid and incline as directed

SS 2 Applied Movements	
<p>Movements to be applied at Foundations include the efficient movement patterns of balance, edging, pressure and rotary skills that will affect the performance outcomes of the senior client utilizing the concepts of low impact, low fatigue continues movement patterns. The candidate will be asked to demonstrate movements and techniques that enable the senior skier to meet the following goals: minimize muscle fatigue, minimize high impact to joints, conservation of energy and improved confidence.</p> <p>Applied movements include the utilization of a stacked skeletal alignment to reduce muscle fatigue, continuous flexing and extending movements to reduce impact, balancing movements which include maintaining a strong inside half and rotary movements where the turning of the leg is initiated with the femur rotating within the hip socket.</p> <p>Demonstration is required of the ability to utilize forward and diagonal movements to optimize pressure and edge control throughout a series of turns; distribute weight effectively from foot to foot through flexion and extension that keep the skier stacked over the feet and/or balancing on the outside ski; utilization of rotary movements that originate in the feet and legs; movements that are gradual, progressive and continuous throughout the turn; gradual increasing and decreasing of edge angle throughout a turn through edging movements that are smooth and progressive; ability to turn both skis simultaneously and ability to develop different turn shapes for speed control; and the ability to maintain ski snow contact with both skis through stacked skeletal alignment.</p>	

Certification, Level 1 Status

NW Alpine Certification Guide (2010) 23

Level I Requirements

Alpine Certified Level I – National Standards

The following are the current (2010) PSIA Standards. These standards provide a training focus and represent a minimum competency for each level of certification. The premise of the certification standards is based upon the concepts of “levels of understanding” which define stages of learning in degrees of understanding. As certification is a measure of understanding, levels of certification represent stages of 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. Certified Level I members 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 skiing skills, teaching skills 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. It is expected, however, that candidates will be able to show basic competence and knowledge in all of these areas. 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.

Category A: Skiing

Level I certified teachers must be able to ski all green and groomed blue terrain demonstrating consistent balance and control of speed through turn shape. Demonstrations must display an “understandable picture” of the technical elements of Beginner/Novice zone skiing. The turn dynamics are limited by the speeds and terrain appropriate for Beginner/Novice zone skiing and tasks. The general skiing characteristics are outlined in the National Standards in the Reference and Resource chapter.

Category B: Teaching

Level I Certified teachers demonstrate a solid foundation of information and experience necessary to be an effective teacher of Beginner/Novice zone skiers. A basic understanding of how to manage the learning environment for different age and gender situations is required. PSIA-NW Alpine Certification Guide (2010)

Category C: Professional Knowledge

Professional knowledge requirements for Level I Certified teachers reflect a practical awareness of general terms and concepts and an ability to use these concepts in basic lesson situations for Beginner/Novice zone students. Decision making and lesson content will most likely follow preplanned options, with consideration for different skill development emphasis. the administration of the exam.

References

Bumps for boomers

<http://www.bumpsforboomers.com/index.htm>

Bumps for Boomers.doc

BUMPS FOR BOOMERS ® is an innovative Aspen-based ski lesson program that quickly teaches aging Baby Boomers how to confidently ski mogul and powder terrain previously considered beyond their capabilities.

Aging skiers a vibrant market for industry

http://www.fiftyplusadvocantes.com/ews_article.php?id=13

Aging Americans Ripe for Snow Sports.doc

Dick Arner hopped on his bicycle early one day last summer and rode 18 miles to Alta. Uphill. Pedaling high into the oxygen-thin air of the Wasatch Mountains, he arrived at the ski resort village, 8,500 feet above sea level, and purchased his season ski pass. Not bad for a guy who's 71.

Physiology of Aging

<http://ist-socrates.berkeley.edu/~aging/ModuleProcess.html#anchor157481>

Physiology of Aging.doc

As we age, we undergo a number of physiological changes which affect not only how we look, but how we function and respond to daily living. Overall, the changes in the later life span described below involve a general slowing down of all organ systems due to a gradual decline in cellular activity.

Ski resorts expand grooming for aging boomers

By Associated Press

<http://www.msnbc.msn.com/id/9917842/>

Ski resorts expand grooming for aging boomer.doc

The ski slopes that baby boomers used to shred when they were young and reckless are being toned down in a bid to keep them coming back for more.

Sports and Performance Psychology

<http://selfhelpmagazine.com/articles/sports/index.shtml>

Index of Sports Psychology Articles

Belief, self-talk and performance enhancement

By Joe Kolezynski M.B.A., M.A.

<http://selfhelpmagazine.com/articles/sports/selftalk.html>

BELIEF.doc

In many of these cases the factor that separates their performance from the competitions has been found to be rooted in their belief as to their ability to outperform the competition.

How to reach your achievement zone

By Shane M. Murphy, Ph.D. & Annemarie Infantino Murphy, Ph.D.

<http://selfhelpmagazine.com/articles/sports/achizone.html>

HOW to REACH YOUR ACHIEVEMENT ZONE.doc

What does it take to do your very best, even when the pressure is on? Have you ever watched Olympic athletes as they compete and wondered how they deal with the turmoil they experience?

Thought Awareness, Rational Thinking & Positive Thinking

<http://www.mindtools.com/stress/PerformanceStress/ThoughtAwareness.htm>

Thought Awareness.doc

In preparing for a performance, you may have a whole range of fears, anxieties and negative thoughts associated with the upcoming event. While this is completely normal and is something that everyone experiences, it is important that you deal with these; otherwise, they can undermine your self-confidence.

Senior Factoids

http://www.jfcs.org/Services/Seniors/Senior_Factoids/default.asp

Senior Factoids.doc

Facts about Seniors.

Seniors Find New Skis Short on Length

http://www.psia.org/psia_2002/education/TPSArticles/newtechnologies/tpsfall99seniors.asp Seniors Find New Skis Short on Length.doc

Elan skis were originally designed for nevers, to make a beginner's first lessons so rewarding that he or she would continue to ski. But the skis delighted an entirely different demographic--the teachers who tried them out at an instructional clinic last season. It took only a few runs before these skilled individuals were asking where they could get a short pair of their own.

Senior Skiers Derive Parabolic Pleasure

http://www.psia.org/psia_2002/education/TPSArticles/shapedskis/tpsfall96seniorparabolic.asp Senior Skiers Derive Parabolic Pleasure.doc

We went to custom-fitted boots and 163-cm parabolic skis. (I had previously been skiing on 185-cm skis, and Dick's were 195 cm). We're now skiing more and enjoying it more, even in questionable weather and conditions.

Aging Successfully: The Importance of Physical Activity in Maintaining Health and Function

Marc T. Galloway, MD and Peter Jokl, MD

<http://www.jaaos.org/cgi/content/abstract/8/1/37> Aging Successfully.doc

Exercise on a routine basis is an important component of successful aging. It has been shown that many age-related declines in musculoskeletal function can be markedly reduced by participation in some form of regular exercise.

The Aging Athlete, Dr. Darrell Menard and Dr. William D. Stanish (1989)

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