Alpine Ski Fundamentals

LEVEL 100

ALPINE COACHING MANUAL

SPORT EDUCATION

U.S. Ski and Snowboard Association
Sport Education Department

Welcome to Level 100!

Thank you for taking the time to explore this manual to learn the fundamentals for effective coaching in alpine skiing. You are demonstrating to your team that you are working to provide the best coaching possible in this challenging and rewarding sport!

Level 100 is recommended for coaches working with all ages and levels of alpine skiing, from youth to adult and introductory level to world class. The key framework for our discussion will be the USSA Alpine Training System, which provides an optimal blueprint to ensure athletes have the best possible opportunity to fulfill their athletic dreams and talent. In addition to better understanding skiing development, this manual will help you understand and improve your own teaching skills as they relate to skiing. We've also included practical coaching tips and exercises to increase your knowledge and awareness of your own coaching style.

Certification Procedure

Follow these steps for your Level 100 certification:

- ✓ **Participate in the USSA Alpine Skiing Fundamentals Level 100 clinic and pass the skiing evaluation**
- ✓ **Complete the corresponding on-line exam with a passing score of 80% or higher**
- ✓ **Furnish proof of current CPR/First Aid certification, send to education@ussa.org**
- ✓ **Obtain USSA Coaching membership**

For certification questions and comments, contact the USSA Sport Education department at (435) 647-2050 or email education@ussa.org.

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Credits

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Additional Coaching Resources:
Available at educationshop.ussa.org

INTRODUCTION

The philosophy of the U.S. Ski Team is to create good skiers first, then great racers. Alpine ski racing at all levels is measured by the clock, yet the elements that are needed to compete well under the clock are not all objective. The U.S. Ski Team believes that the ski fundamentals are the first step in developing an athlete. The USSA Level 100 on-snow clinic and this coaching manual will describe these basic skiing skills. As can be seen by the skills development pyramid, these skills will be emphasized throughout an athlete's career. Much like building a pyramid, a broad and strong base must be built first to achieve a positive outcome in the long run.

Create good skiers first, then great racers.

Mikaela Shiffrin's strong skiing skills have elevated her to record setting heights. (Getty images)

This message is reinforced by recent scientific research on the development of sport expertise and its relationship with the physiological, cognitive and social development of young athletes. Considering these factors, the USSA has developed the Alpine Training System to guide coaches, clubs, athletes and their parents in programming for training and competition. The Alpine Training System is an essential tool for every coach and will be discussed throughout the Level 100 program.

After safety, perhaps the most important consideration in the development of any athlete is that they have FUN! The length of an athlete's career in the sport can arguably be in direct relation to their enjoyment. This is an important consideration on the long road to the top. The U.S. Ski Team is striving to be the Best in the World and in that pursuit we are promoting sportsmanship, the love of the sport and fun. We believe it is the role of the coach to promote these ideals and deliver a clear message that is creative, motivating and fun.

USSA ALPINE TRAINING SYSTEM

Skills Development Pyramid: A broad base of fundamental skiing skills is essential to build a strong skiing pyramid.

The USSA Alpine Training System (ATS) is the long-term athlete development framework for an alpine coach, athlete or parent to design age-appropriate training and competition plans that allow them to maximize certain critical periods that exist in the development of every skier (see following page). Within each developmental phase, the ATS outlines the recommended progression for an athlete in the domains of sport participation, conditioning, technical and tactical skills, equipment, performance psychology and competition. These recommendations are based on current research by sport scientists on child development and its relation to high performance in athletics. A group of veteran club coaches, U.S. national team and USSA sport science staff have applied these principles to the sport of alpine skiing. As such, it is not just a report of what we have been doing, but rather what we should be doing to maximize the long-term potential of alpine skiers in the United States.

A coach that understands these developmental phases and applies the proper training, equipment, and competition plans within each will be working to bring out the athlete's full potential. Coaching without these age-appropriate needs in mind may lead to short-term success, but will undermine the athlete's long-term potential.

A challenge for the coach is that age-appropriate training is not just tied to the skier's age. Rather, it is factor of the skier's ***biological age*** and ***training age***. **Biological age** refers to the physiological rate of development of the individual, which may vary by as much as five years, particularly in the years during and immediately before and after puberty. **Training age** refers to the amount of time the athlete has spent actively participating in alpine skiing. In order to maximize the long-term potential for each individual athlete, the coach must know the developmental phase of the athlete as outlined in the ATS and understand how to design training and competition programs that take advantage of critical periods for accelerated development that exist in the phases.

Coaching without these age-appropriate needs in mind may lead to short-term success, but will undermine the athlete's long-term potential.

Alpine Training System

Foundation Stage		Pre & Post Puberty			World Class Performance Full Maturation
PHASE 1	**PHASE 2**	**PHASE 3**	**PHASE 4**	**PHASE 5**	**PHASE 6**
Biological Age Pre Puberty **Age** 2–6 years old **Play Age** 1–4 years in sport **Participation** Ski around 1 day a week 20 days a year At least 95% free skiing Play many other sports - gymnastics or balance-based sports	**Biological Age** Pre Puberty **Age** 6–10 years old **Training Age** 1–4 years in sport **Participation** Ski 2–3 days a week 50 days a year At least 90% free skiing Fun races Play many other sports	**Biological Age** Pre Puberty (Before Growth Spurt) **Age** Girls: 10–13: J4 (J5–J3) Boys: 11–14: J4 (J4–J3) **Training Age** 4–8 years in sport **Participation** Ski 3–4 days a week 70 days/year At least 60% free skiing Competition Period: (Jan.–April) Number of race starts: 10–15 Ratio 1:6 (race:training) Play complementary sports	**Biological Age** Puberty (Growth Spurt) **Age** Girls: 11–14: J3 (J4–J3) Boys: 12–15: J3 (J4–J2) **Training Age** 5–9 years in sport **Participation** Ski 4–5 days a week 100 days/year At least 30-50% free-skiing Competition Period: (Dec.–April) Number of race starts: 15–30 Ratio 1:5 (race:training) Play complementary sports	**Biological Age** Post Puberty (After Growth Spurt) **Age** Girls: 12–16: J3 (J4–J2) Boys: 14–17: J2 (J3–J1) **Training Age** 6–11 years in sport **Participation** Ski 4–5 days a week 120-140 days/year At least 15% free skiing Competition Period: (Nov.–April) Number of race starts: 25–max 45 Ratio 1:4 (race:training) Play complementary sports	**Biological Age** Full Maturation **Age** Female: 16+ J2–J1 Male: 17+ J1 **Training Age** Minimum 10+ years in sport **Participation** Ski 4–5 days a week 130–150* days/year At least 10% free-skiing Competition Period: (Nov.–April) Number of race starts: 55* Ratio 1:3 (race:training) *based on the number of disciplines
Conditioning Emphasis					
Emphasis on play, fun, skiing and balance.	Emphasis on play, fun, basic agility, balance and coordination. Incorporate activities that develop explosiveness (0-10 sec) and general endurance	1–2 conditioning sessions per week in season Further development of previous components. Emphasis on aerobic conditioning. Incorporate own body weight training and body awareness training	1–2 conditioning or recovery sessions per week in season Increase aerobic conditioning and balance/agility/coordination, particularly through growth spurt. Begin light external resistance work including bands, med balls, etc.	2–3 conditioning or recovery sessions per week in season Strength and power, introduce progressively more anaerobic training, endurance, complex agility and balance	4–5 conditioning or recovery sessions per week Eccentric strength, power & explosivity. Aerobic training, especially efficiency and recovery work. Core strength. Produce force in skiing specific positions.
Technical and Tactical Emphasis					
Active start – learning and fun environments Ski and play on skis	**Adventure stage – skiing all terrain** Free play, guided free skiing and drills are an integral part of development. On snow time needs to be spent skiing. Apply the fundamental skills in achieving consistent and symmetrical parallel turns with rhythm and timing. Introduction to carving, use of upper and lower body separation for angulation, and pole plant.	**Technical stage – Develop the skills to carve** Positive self talk, work ethic and perseverance, goal setting with a focus on the process and not results Acquire specific technical and tactical skills including gate blocking, speed elements, course inspection, anticipation of terrain, line and turn shape Free ski all terrain with competence, with an emphasis on balance and carving.	**Tactical stage – Learning line and strategy** Actively maintain technical skills through the growth spurt. Emphasize use of tactics to achieve carved turns on the most appropriate line for the athlete. Develop speed and efficiency by refining carving and steering movements to achieve the desired turn radius in courses. Use a variety of course sets, conditions and terrain to teach the skier to adapt to different situations	**Technical and Tactical Refinement stage – event specific technical and tactical skills** Refine technique and tactics after growth spurt. Integrate the increased strength, power and body size to achieve a more optimal line Refine event specific technical and tactical skills (jumps, terrain, traverse, long turns, etc.). Advanced tactics for difficult situations (a-rhythmical course sets, difficult conditions and terrain)	**Mastery or innovation stage – Event specific technical and tactical mastery** Mastery of technical and tactical skills based on the individual's style. Optimizes line for ability level and conditions in race situations Apply equipment innovations.
Equipment Selection & Preparation					
Equipment Selection & Preparation **Skis:** Chest high with a variation based on height, weight and skill level **Boots:** Proper boot fit with soft even forward flex for ankle movement to facilitate a balanced, athletic stance **Protection:** Helmet required at all times **Poles:** Optional - introduce at older levels as skill level develops	Learn USSA rules for all equipment selection **Skis:** 1 pair of skis is sufficient for this group. Head height with a variation based on height, weight and skill level. Introduce ski preparation **Boots:** Proper boot fit with soft even forward flex for ankle movement to facilitate a balanced, athletic stance **Protection:** Helmet required. Older athletes may need shin/arm protection **Poles:** Length = forearm horizontal with pole tip in snow	Adhere to USSA rules for all equipment selection **Skis:** Slalom, GS and super G skis. Develop tuning skills **Boots:** Proper boot fit and flex are critical performance. Boot flexes and responds as it interacts with the ski and plate. **Protection:** Head, arm, hand, shoulder, back, teeth (mouth guard) and shin protection recommended, based on event **Poles:** SL-pole guard for blocking & protection, pole may be slightly shorter. GS-standard length.	Adhere to USSA and FIS rules for all equipment selection **Skis:** Slalom, GS and super G skis. Refine tuning skills **Boots:** Proper boot fit and flex are critical for performance. Boot flexes and responds as it interacts with the ski and plate. Performance considerations may include flex, cant, forward lean, ramp angle and foot beds **Protection:** Head, arm, hand, shoulder, back, teeth (mouth guard) and shin protection recommended, based on event **Poles:** SL-pole guard for blocking & protection, pole may be slightly shorter. GS-standard length	Adhere to USSA and FIS rules for all equipment selection **Skis:** Slalom, GS and super G skis with training skis. Tuning skills continue to improve. Insight into waxing and grinding necessary for speed skiers **Boots:** Proper boot fit, flex and performance. Boot flexes and responds as it interacts with the ski and plate. Performance considerations may include flex, cant, forward lean, ramp angle and foot beds **Protection:** Head, arm, hand, shoulder, back, teeth (mouth guard) and shin protection recommended, based on event **Poles:** SL-pole guard for blocking and protection, may be slightly shorter. GS standard length. Custom pole sizing and contouring for individuals	Adhere to USSA and FIS rules for all equipment selection. Equipment testing including skis, boots, plates, bindings and poles is recommended to maximize performance **Skis:** Race and training skis for all disciplines. Professional support or consultation is recommended for preparation **Boots:** Discipline specific boots may be necessary to maximize performance **Protection:** Head, arm, hand, shoulder, back, teeth (mouth guard) and shin protection recommended, based on event **Poles:** SL-pole guard for blocking & protection, may be slightly shorter. GS standard length. Custom pole sizing and contouring for individuals
Performance Psychology Emphasis					
Fun, variety, positive reinforcement and perseverance. Positive parental support is essential.	**Sampling Years** Teamwork and sportsmanship. Encourage a balanced lifestyle that encourages healthy habits and promotes success in sport and life. Positive parental support is essential. Families get involved with clubs.	**Sampling Years** Positive self talk, work ethic and perseverance with a focus on the process not results. Encourage the use of imagery and visualizing good technique. Demonstrate teamwork and sportsmanship. Positive parental support and club involvement.	**Sampling Years** Positive self talk, work ethic and perseverance, goal setting with a focus on the process and not results.	**Commitment** Develop and refine race day plan. Develop mental rehearsal routines, refine goal setting process, what to focus on, what works on race day, develop "athletic plan" to approach training sessions and life. Document through journaling. Parents continue to support the commitment of the athlete in the sport.	**Specialization and Mastery** Refine performance psychology skills: Imagery; goal achievement; performance planning; attention and focus; self regulatory talk & confidence. Identify optimal performance state. Dealing with competition, risk, failure and fear. Parents continue to support the commitment of the athlete in the sport.
Competition Emphasis					
	Local competition: Innovative with FUN focus interclub competition.	Local racing leads to state and divisional championships which may lead to regional events.	Local racing leads to state and divisional championships which may lead to regional events and Junior Olympics.	Appropriate level and number of race starts ranging from local to national and international competition.	Regional FIS Series, FIS U, NOR-AM and European FIS races Olympics, World Ski Championships, World Jr. Championships, World Cup, European Cup

COACHING SCENARIO:

Coach Susan will be working with a group of 14 and 15 year old girls this season. As would be expected with a group of athletes this age, a couple of her group members are physiologically very mature – they have gone through puberty and are fully developed. One girl in the group, who is 14, is much smaller than the others, and has just started her growth spurt. She is very skilled and is one of the leaders in the group when freeskiing, but gets beat in the races. Coach Susan thinks she has high potential, but she is getting frustrated with her lack of results and seems to be losing focus in her skiing. From a long-term athlete development perspective, what advantages might she have as a late maturer? How can Coach Susan keep her motivated, self-confident and enthusiastic about ski racing?

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Alpine Training System stages and phases

We'll start by defining the developmental stages and phases as outlined by the ATS (see above).

There are three stages across the top that are broken down into phases based on the biological development of the athlete. An important point to notice is that starting in the Pre and Post Puberty Stage, there is overlap in the age ranges to account for individual growth patterns.

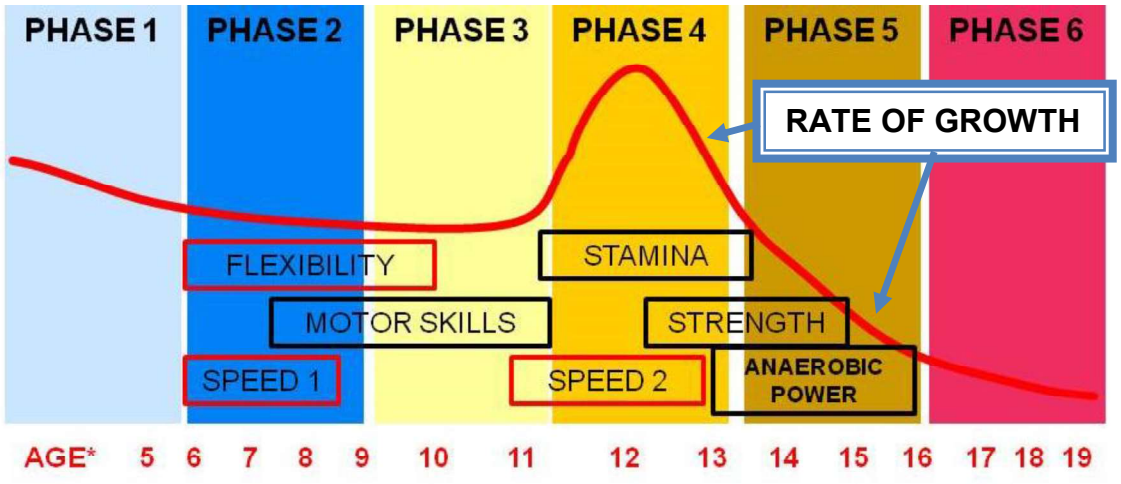
The **Foundation Stage** consists of Phases 1 and 2, and generally represents the young athlete's introduction to the sport. The focus in this stage is on fun first and foremost. Play on skis is an important emphasis. In this stage, athletes of the same age are generally pretty similar in their physiological development. Coaching groups may need to account for differences in experience in alpine skiing, but generally the appropriate training plan will be based on the skier's chronological age.

In the **Pre and Post Puberty Stage**, a group of athletes of the same age may be in very different developmental phases based on their growth stage. The time just prior to, during, and following a child's growth spurt is an important time for coaches to challenge their athletes with the right training stimulus. Mistimed training and competition plans can slow progress and ultimately limit an athlete's long-term potential. This can be challenging for a coach who works with 13 and 14 year olds, for example, as some will be pre-puberty, some in the middle of puberty and some post-puberty. While the same age, and perhaps of the same experience level, these athletes have different training needs.

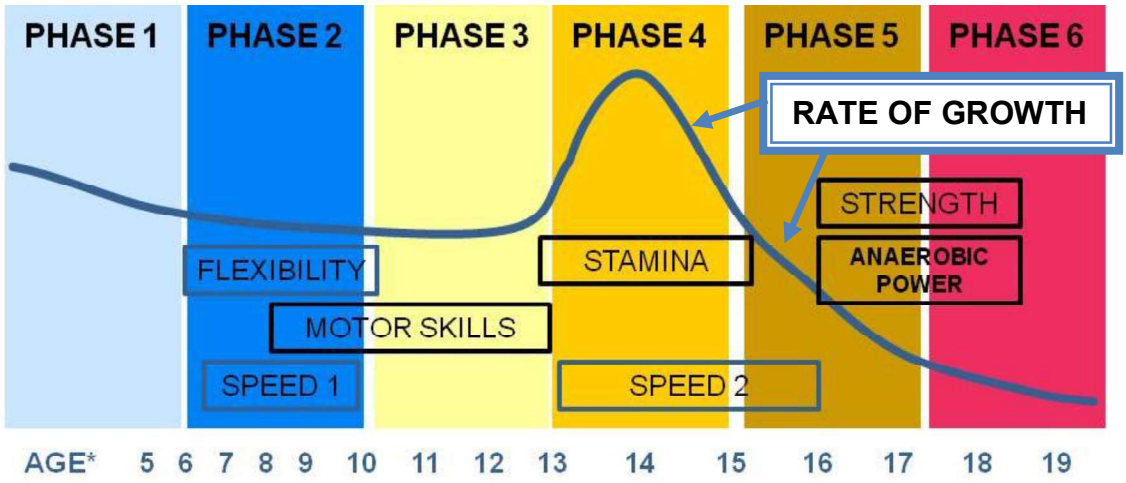
The final stage is **Full Maturation**. For an alpine skier, this is when the fundamental skills combine with strength and power to show the athlete's full potential. Differences in results between athletes of the same age based on how they moved through the pre- and post-puberty stages start to balance out. Note that the starting age range for this phase listed under Phase 6 is for an early developing athlete – that is an athlete with an early growth spurt relative to his or her peers. Later maturing athletes may not move into phase 6 until ages 18, 19 or older.

Sensitivity Windows

One of the key factors in the development of the ATS is to design training, competition, and recovery to take advantage of certain **sensitivity windows**, or critical periods of development, that arise in an athlete's growth cycle. During these sensitivity windows, athletes are able to make gains in a given area at an accelerated rate. Some of these windows are based on age, while others are based on developmental phase which will vary by individual. In the figures below, the sensitivity windows are shown for girls and boys. The rate of growth curve corresponds with the developmental phases and average ages. The sensitivity window boxes outlined in black are based on the growth curve. The other windows are based on age.



Sensitivity windows for girls relating to rate of growth, developmental phase, and chronological age (adapted from Balyi & Way, 2005)



Sensitivity windows for boys relating to rate of growth, developmental phase, and chronological age (adapted from Balyi & Way, 2005)

Flexibility

The sensitivity window for rapid development of an athlete's flexibility is from around ages 6-9 (ATS Phase 2). Note that it is important for athletes to focus on their flexibility through their growth spurt, but that work done during this period is to maintain the gains achieved earlier. Flexibility is an important component for both injury prevention and ease of movement during the performance of a skill.

Speed

Two periods for development exist for speed that are tied to chronological age. The first speed window is from ages 6-8 for girls and 7-9 for boys. This window is optimal for the development of quickness and agility skills, emphasizing change of direction in very short bursts (around five seconds) with full recovery between. Skiing exercises challenging quickness in the skier's movement can be used here. The second window is from ages 11-13 for girls and 13-16 for boys. Speed development in this window should take place over 5-20 second bursts and should emphasize a fast tempo.

Motor skills

The period where athletes can make the most rapid gains in movement skills for sport is from around ages 8-12 (late phase 2 and phase 3). The length of this window depends on an athlete's physiological growth, with rapid gains ending with the onset of the adolescent growth spurt. A broad base of sport skills must be acquired here. The coach must focus on fundamental skills learning using a variety of training methods and environments. Training time should include significant training time outside of gates in a variety of terrain and snow conditions. Habits learned during this time often remain with the athletes for years to come, good or bad. In some cases, bad habits developed during this period can be the main factor keeping them from their ultimate potential. An implication is that skiers who start their growth spurt late may benefit in the long run because they will be in this motor skills window longer.

Endurance/Stamina
This sensitivity window is primarily in phase 4 but carries over into phases 3 and 5 as well. A solid endurance base is essential for alpine skiers to maintain intensity and quality over full day training and competition sessions and for recovery from difficult training days.

Strength
The critical period for gains in strength is relative to peak height velocity (PHV), which is the point during the growth spurt at which the rate of growth peaks before starting to decline. The critical period is different for boys than girls. Girls enter into this window when they achieve PHV. For boys, the window opens 12-18 months following PHV. To prepare for this window of opportunity, young athletes should have practiced many of the core movements in strength training, learning the proper motor skills of strength exercises during the motor skills window, to take full advantage of the strength period and to avoid injury.

It is important to understand that **the five skill areas discussed are all trainable outside of these sensitivity windows, but that gains will not be as rapid**. Because of the importance placed on performance in competitive sports, particularly in the U.S., many young athletes don't get the advantage from proper training in these areas at the right time because of pressures to win in the short term. In time, the resulting deficiencies will keep them from achieving their full potential. As coaches, we must help athletes maximize these early developmental opportunities.

Determining an athlete's biological age
When children enter the adolescent growth spurt, they grow first in the extremities (lower limbs, feet and hands). By periodically measuring sit height and arm span in addition to standing height, the coach or parent can observe this accelerated growth early and adapt the training program accordingly. Directions for taking these measurements are given on the USSA Physical Assessment CD-ROM, or can be found at the Canadian Sport For Life website www.ltad.ca.

IMPLICATIONS FOR THE COACH AND ATHLETE

One of the most important takeaways from the Alpine Training System is the importance of the training done with junior skiers while in the motor skills sensitivity window (phases 2 and 3, or pre-puberty). If they do not establish a broad base of fundamental skiing skills during this period, their deficiencies will stay with them to some degree for the rest of their racing career. Athletes in this phase benefit greatly from ***multi-lateral development***. That is, they naturally and readily adapt sport skills learned in different settings to their current activity. Considering the diversity of conditions and terrain that ski racers encounter, it is clear that athletes in these phases will benefit from and need to ski in all kinds of situations. **Freeskiing**, both structured and unstructured, is an integral part of their development.

An athlete's maturation rate also plays a big part in their skiing development. Early maturing skiers enjoy benefits in size, strength and stamina that tend to help their times on the race course. Since this gain does not come from any special effort on their part, these skiers, and their parents and coaches, often get an inflated view of the skier's potential. This may lead to over-competing and a decreased focus on training, when in fact the skier likely needs extra attention on their skill development. On the other side, late maturing athletes often are at a disadvantage on the race course during the time their same-age peers have grown, making them susceptible to frustration as a result of poor results that don't reflect on their effort and potential. It is important that the coach keeps results in perspective, bases training and competition on the athlete's developmental phase in the ATS and helps athletes see there are opportunities to take advantage of in either situation. One strategy is to find ways for the late maturing athlete to find success, and for the early maturing athlete to be challenged.

The USSA is posting many resources for coaches, parents and athletes regarding long-term athlete development on its website. Visit trainingsystem.ussa.org for more information.

SKILLSQUEST

To promote and support the development of fundamental skills, USSA has developed a new program called SkillsQuest. A core component of the SkillsQuest program is the skiing skills assessment. This assessment outlines four skiing exercises for each developmental phase of the ATS that skiers can work toward mastery on that will assist them in achieving the broad skill base needed for long-term success on the race course. The exercises (shown below) are broken down into the skill areas of pressure, edging and rotary, with a freeskiing assessment for each phase that evaluates all these areas together.

SkillsQuest	Phase 1	Phase 2	Phase 3	Phase 4	Phase 5	Phase 6
Pressure	Steps & jumps	Pole jumpers	Pole jumpers in tuck	Straight run in wave track	Linked turns in wave track	Camel jump in wave track
Edging	Basic outside ski turns	Outside ski turns	One ski skiing	One ski skiing with lane changes	One ski skiing without poles	One ski skiing hourglass
Rotary	Hockey stop	Straight run to sideslip with edge set	Pivot slips	Sideslip to straight run to sideslip	Hop turns	Vertical brush quickness course
Balance	Freeski with parallel skis	Freeski with pole usage	Freeski – lane changes	Freeski – hourglass	Freeski – varied terrain and snow conditions	Freeski – moguls in "V" shaped corridor

Coaches are encouraged to use these exercises and to develop progressions for these skill areas that will help their skiers demonstrate competence for their developmental phase. Performance in these exercises along with racing performance will give a clearer picture of the skier's abilities than racing results alone.

Eventually, the SkillsQuest program will also include tools for coaches to assist with and reward performance and efforts in the other areas of the ATS, including physical fitness equipment preparation and mental and social skills.

As this program is still in development, look for more information and supporting video on the USSA website.

SKIING FUNDAMENTALS

The U.S. Ski Team has divided the teaching of skiing and ski racing into six fundamental areas and three overlaying goals. This was originally developed for slalom, but after further thought it was agreed that these critical areas were important for all skiing and ski racing.
These fundamentals and goals are laid out in a pyramid to demonstrate the importance of the broad base as well as the ordinal progression signifying that each fundamental is built upon mastery of the previous fundamental.

Balance & Athletic stance

The skier has to be in balance. Being in balance is the underlying fundamental. Balance is described "as being able to do anything at any time". Balance must be achieved in each of the three cardinal planes of movement. When they are combined, an athletic stance results. Being in balance differs from technique in that first we achieve balance, while the body movements, positions, etc. the skier assumes to be in each plane of balance result in technique.

Upper body discipline

Discipline, which results in stability, is essential. An upper body that provides an anchor for the lower body to lever, hinge, and rotate against will allow the skier athletic freedom. The upper body can't just be a bad-mannered passenger flailing around, but must be an active contributor.

Outside ski to outside ski

Skiing is outside ski dominant. This is due to the skier's biomechanics and the physics of the turn. It is possible to turn and balance other ways, but the lion's share of the turns need to be made on the outside ski. Moving from outside ski to outside ski quickly and efficiently must be mastered with leg independence .

Early lower leg activation

The "lower leg" refers to the ankle. It dorsiflexes and has lateral movement capabilities that the best skiers have discovered. "Early" refers to starting the turn with the ankles. While "activation" implies the tension needed in the ankles. Constant tension that pre-innervates the ankle muscles making them proactive rather than reactive.

Ski-snow contact

Skis must be in the snow to turn. Skis pointed to the left or right are not going left or right unless they are in the snow. This provides the opportunity for the tightest arc and the ultimate goal of the skier's center-of-mass taking the shortest line.

Pole usage

Slalom ski racers use their poles to bang the gates out of the way. This is obviously important but the ability to plant, swing, and tap the pole trumps the gate clearing process. While upper/lower body separation get the largest part of a technique conversation, the ability to separate the arm from the torso can make or break any short radius turn.

GENERAL STANCE

Stance in skiing changes every moment of the ski turn. Every joint of the body moves in an economical way to counter external forces evolving from the turn and gravity. Some movements are so slight they are difficult to detect, while others are quite obvious. The blending of all these movements allows the elite ski racer to make it look easy. The linking and blending of movements is what separates those on the podium from those on the last page of the results.

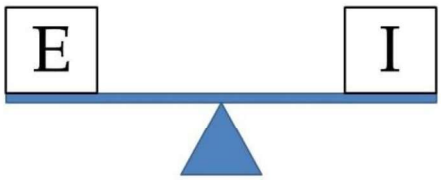
The purpose of the general stance is to create a *reference-of-correctness* in each of the three cardinal planes-of-motion. This reference-of-correctness will be the general position or the heuristic position that the body will return to when balance is perturbed in that plane-of-motion. It is a fundamental stance that is the basis for consistent and fast skiing in the broadest range of situations.

Below are several characteristics that can be part of this reference-of-correctness for the athlete:

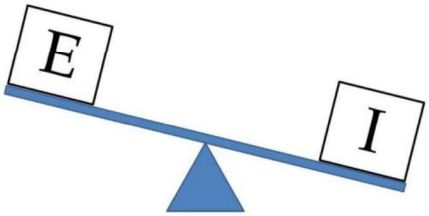
- Feet are hip width apart
- Ankles are of even flex
- Center-of-mass is balanced over the feet
- Back is neutral
- Hands are held out and in front of the body
- Vision is forward
- Muscles are in tension, but not stiff

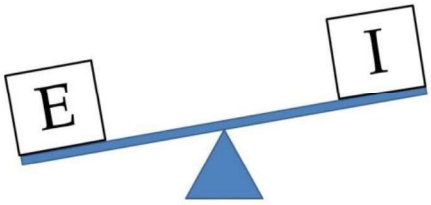
BALANCE/EQUILIBRIUM

A ski racer's technique is the result of using body positions to resist or adjust external forces. A ski racer that has a technique that balances the external forces with appropriate internal forces is in balance. This stability between external and internal forces is what is sometimes referred to as "dynamic balance", or being in *equilibrium* (literally translated as equal+balance).



When the ski racer has more internal force (doing too much of something) they will bias their balance in that direction. Skiing examples could be banking, over-rotating, or excessively pressuring one end of the ski (for example, leaning back).





When the ski racer's internal forces are not adequate to balance or counteract the external forces, they usually skid toward the outside of the turn radius. An example would be not having enough edge and/or pressure to make the ski adequately hold in the snow.

Balance, or equilibrium, is not a black and white or an on and off proposition. A ski racer can be slightly out of balance and make adjustments to find symmetry between the external and internal forces. What is important is that they do not let the forces sway too much in either direction. A ski racer is rarely in perfect balance, although they are constantly searching for it. Balance is a dynamic back and forth, in and out proposition.

TECHNIQUE

While balance is a goal, technique is the body positions the ski racer assumes to achieve the greatest biomechanical advantages to maintain that balance. The challenge of technique is that speed, course sets, snow conditions, hill configurations alter the way the body must align itself to stay in balance.

Technique is what we see. It encompasses the overall body position for every moment of the ski turn. Since the demands of the turn are constantly changing, the forces of the turn are also constantly changing. This requires, not a set of "perfect" body positions, but heuristics that the ski racer can employ as the conditions warrant.

Therefore technique is not static. For every moment in the ski turn the skier's body position will change ever so slightly. The two main factors that drive these continuous changes are the difference in height of the skis relative to each other on the slope and the demands of the ski turn itself.

Let's look first at the height between the skis. When in a traverse, or when one turn ends and another begins, one ski will always be higher on the slope relative to the other ski. In the middle of the turn or when the skis are pointed down the hill, the skis will be at equal height.

Now add the demands of the turn which would include changing edges, increasing and decreasing the edge angle. The ability to hold the edge (as far as the skier is concerned) depends upon the edge angle and the pressure applied somewhere along the length of the ski.

The constantly changing external forces being countered by the skier's effort to create equal internal forces results in a never ending challenge to maintain balance while trying to go as fast as possible for the given course.

Since perfect balance is a gray area at best it should be realized that perfect technique is also going to encounter the same gray area. This should not preclude the ski racer from striving for perfection every moment of the ski run. In fact, it is this attempt that keeps the ski racer in some semblance of balance.

We can break down technique, stance or balanced posture into three **planes of movement**. The ski racer is striving for a reference-of-correctness in each plane. A ski coach can factor each of these three planes in their movement analysis to deduce the weaknesses within a ski racer. Using these planes, each with their own reference-of-correctness, acts as a filter to aid the ski coach to distinguish the myriad of information that they are observing. The references-of-correctness along each plane can then be used to effectively analyze and coach efficient skiing technique.

FORE/AFT BALANCE

Balance along the length of the ski is achieved with the ankles. Tension of the muscles around the ankle is used to lever the skier forward. Conversely, relaxing the tension in these same ankle muscles allows the skier to move back.

Hands held out and forward is an athletic position and needs to be addressed as such. Hands are not a solution to fore/aft balance concerns. The movement of thrusting the hands forward will do little to pull the athlete forward, and often times will be countered with an aft ward movement of the skier's center-of-mass. A similar concern is with the pelvis/hips when they are moved forward. This is often countered with the shoulders moving backwards in response, resulting in no net forward movement of the skier's center-of-mass. Coaching cues should be targeted at the ankles and the desired tension along with the desired positioning of the skier's center-of-mass.

SAMPLE FORE/AFT BALANCE EXERCISES:

- 1000 steps
- Backwards skiing
- Hop turns switching between tip and tails on snow
- Hop turns with tails on snow
- Hop turns with tips on snow
- Leaning far forward, gradually adjust fore/aft positioning toward the aft and return while standing still
- One ski skiing
- Patience turns
- Skating
- Skiing in moguls

Younger and less experienced skiers should focus on a stance that is centered on the ski for most of the ski turn. The older and more experienced racer will utilize a fore/aft movement that has them experimenting with a larger range-of-motion along the length of the ski. This movement will have them more forward at turn initiation and finishing more on the heel of the foot at turn completion. Pressure is always through the bottom of the boot. The high back spoiler on the ski boot should be for emergency use only.

Pressure Control

Ideally we would like the ski to maintain in contact with the snow surface at all times. Besides just staying on the snow, the ability of the ski to maintain a consistent or controlled pressure against the snow during the turn is advantageous.

In reality the ski will experience an increased pressure throughout the turn, but the skill of being able to adjust where and when the pressure is in the turn is a key to efficient, and fast skiing.

This is a difficult skill for the coach to see. The slight vibrations and bouncing of the ski against and in the snow are hardly perceptible. Nonetheless, this "pressure control" skill is a prerequisite for efficient and fast skiing.

Pressure is increased by:

- Reducing the turn radius
- Increasing speed
- Increasing the ski's edge angle
- Extension of the leg(s) (if the skis are on the snow)

Pressure is decreased by:

- Increasing the radius of the turn
- Decreasing speed
- Decreasing the ski's edge angle
- Flexion of the

Pressure can also be adjusted along the length of the ski. Moving the body forward toward the tip increases the tip pressure. Tip pressure is needed for the ski tip to create a groove for the rest of the ski to follow when making a carved turn. Conversely moving the body toward the tail creates pressure at the tail area.

CORE MOVEMENTS

There are four core movements that are used to affect, control and/or manipulate edging and pressure. These movements often occur simultaneously.

- **Vertical movements:** Pressure control movements created by flexion and extension of the ankle, knee and hip joints.
- **Fore/aft movements:** Similar mechanics to the vertical movements except the pressure goals are fore/aft and to maintain dynamic balance.
- **Lateral movements:** Creating edge angles with the skis to maintain balance over the base of support while resisting or managing forces.
- **Rotational movements:** Occur around the vertical axis of the body, used to maintain balance, for appropriate edging and pressuring, and to add additional steering forces for direction (line).

When both skis are on the snow, pressure can be adjusted by shifting more weight toward the left or right ski. This is a valuable component of the pressure control skill that is used for adjusting pressure between skis or to adjust pressure toward (usually) the outside working ski, thereby creating more or less pressure as needed.

SAMPLE PRESSURE CONTROL EXERCISES:

- 1000 steps slow, fast
- Airplane turns landing lightly
- Falling leaf
- Fish hook shaped turns
- Flexion/extension during long turns
- Large radius turns with multiple snow sprays
- Leg extension during the turn
- Leg flexion during the turn
- Long radius turn in the moguls
- Shuffle feet forward and back during the turn
- Ski 50/50 between left and right ski
- Ski 60/40, 70/30, 80/20, 90/10 between outside and inside ski
- Skiing in the crud
- Step turns from downhill ski only
- Step turns from uphill ski only
- Turns on the flexion
- Whirlybirds

SIDE-TO-SIDE BALANCE

Side-to-side balance is challenged as a result of the need to edge the ski. Tipping the ski up onto an edge can be accomplished using different techniques. The technique employed is a result of the size and speed of the turn.

Ted Ligety uses inclination at the top of this turn in the World Cup GS at Sölden, Austria, in October 2011. It is important to note that he has pressure on and control over the outside ski during inclination. (Getty Images photo)

A larger radius and higher speed turn will be effectively managed with a more **inclined** body position. This is a very strong position to resist the high external forces. The bones of the skeleton essentially end up stacked on top of each other creating a straighter skeletal alignment which is used to resist the high external forces which are a result of the high speed. This strong skeletal alignment does not come without a cost though. The resultant position of the upper body extremely inside of the turn must travel an increased distance during the ski turn. When the turn radius is large and there is sufficient time between turns this disadvantage is of less consequence.

Ted Ligety uses angulation at gate passage in the World Cup slalom at Bansko, Bulgaria, in February 2011. (Getty Images photo)

Conversely during turns of shorter radius and slower speeds, the ski racer will rely on more **angulation**. Angulation is the flexion in the hip and/or knee movement used to put the ski on edge. A skier starting the turn in an inclined position will often add angulation as they move into the fall-line.

Angulation is not as strong a position when compared to inclination but it does offer the skier a quicker position in which to move from turn to turn since the upper body does not have to move an appreciable distance.

Whole body inclination should not be confused with **banking**. Banking is the *result* of leaning the body into the turn in an attempt to *achieve* an edged ski. The difference between banking and inclination is that inclination is utilized by the ski racer to resist the high external forces from the turn while banking is used as the turning or edging impetus. Banking involves a large mass of the body and leaves the body in an unstable position. This creates disequilibrium that more often than not has undesired consequences. It should be noted that the two terms have been used interchangeably in the past.

Banking is regarded as an inefficient technique and often accompanies, or is the result of, rotation (usually the upper body) during the turn. This can be a rotational balance problem even though we see the skier out of balance in a side-to-side direction. This will be clarified in the following section on rotational balance.

SAMPLE SIDE-TO-SIDE BALANCE EXERCISES:

- 1000 pole plant exercise
- 1000 steps
- Two step turns
- Arms crossed across chest with short turn
- Changing corridor
- Changing radius
- Double pole plants
- High tuck turns
- Long radius turns in the moguls
- Angulation (aka "Schlopy") drill
- Sideslip drills with edge sets
- Step turns
- Swallow
- Synchronized skiing
- Traversing with downhill hand on downhill knee
- Wedge turns emphasizing angulation
- White Pass turns

ROTATIONAL BALANCE

A ski racing turn is essentially a rotation around a gate. This rotation has forces which need to be dealt with to control balance (or stay in equilibrium). If the rotation of the skis is left unchecked by the skier's upper body, the skier will essentially rotate themselves out of balance. There needs to be a force to counter the skis rotation around the gate.

Rotational concerns are easiest to comprehend or visualize in pivoted short, quick turns. In these turns, the rotational impetus creating the turn is much more dramatic. Even when these short turns are carved there is a rotational component. Putting the ski on edge involves a rotation of the femur within the pelvis. Looking at these two bones in reverse, you would see the pelvis rotating on top of the femur. Sir Isaac Newton would explain it by noting the upper body rotates with the same force as the lower body but in the opposite direction. This is what we see with good ski racers. Their upper body *looks* quiet in space. However, the upper body is actually rotating opposite the lower body. This occurs in all turns but is most dramatic in shorter, quicker turns. In long radius turns, the legs rotate at a much slower pace and therefore the upper body rotates at that exact slower pace as well.

Rotational Impetus:
The force, torque, or energy needed or used to initiate a revolution.

Newton's Third Law:
"*Forces come in Pairs*"
"If one object pushes on another, then the second object pushes back on the first with a force of the same strength"

ROTATIONAL BALANCE EXERCISES:

- Double pole plants
- Hands in front holding shafts of poles horizontally like a tray
- High tuck turns
- Hockey stops
- Wedge swing hops
- Counter rotation emphasis
- Emphasis on facing down the hill
- Garlands
- Hands folded across chest
- Hands in front
- Hands in front as if holding a tray
- Hands in front holding pole shafts vertically like looking through a window
- Hands in front holding shafts of poles vertically like looking through a window
- Hands in front of body
- Hop turns, Pole walks, Speiss, Zottos
- Hop turns, Pole walks, Speiss, Zottos without poles
- Javelin turns
- Moguls
- Pole plants with bamboo gates
- Ski poles strapped on hips
- Turns on outside ski only
- Wedge swing hops with matching

BALANCE

Rotary, edging and pressure skills occur in all ski turns. The ability to manage and modify the rate, duration, and intensity of each is what allows the ski racer to be in more or less balance. Exercises have their impact because they parse out or emphasize a specific skill so that it may be learned to a deeper level.

The following table lists some exercise followed by stars indicating the degree to which that skill may be present in the exercise. Four stars would indicate that the skill is used a lot in the exercise and one star would mean that the skill is much less emphasized. For example in the Airplane turn; an exercise in which the ski racers extends their legs quickly to escape the snow meanwhile rotating their legs and skis in the new direction. This would be highly rotational since the stabilizing the upper body and turning the legs would be a challenge. Taking off and landing would have some component of pressure, while the need to land and manage edging is needed but not challenged as much.

Exercises	*Rotary*	*Edging*	*Pressure*
Airplane turns	****	**	***
Arms crossed across chest with short turns	****	*	*
Angulation (aka Schlopy) drill	*	***	**
Backward skiing	**	****	*
Backward skiing short turns	****	**	*
Bunny hop turns	*	**	****
Camel jump in wave track	*	**	****
Carving leapers	***	***	***
Charleston	***	*	**
Corridor drill	*	***	***
Double pole plants	****	***	**
Edging drill	*	***	**
Freeski hourglass	**	**	**
Freeski moguls in "V" shaped corridor	**	**	**
Freeski with pole plant	**	**	**
Freeski - varied terrain and snow conditions	**	**	**
Garlands	**	****	***
Hands held in front without poles during short turns	****	**	**
Hands in front holding pole shafts horizontally like a tray	****	**	**
Hands in front holding pole shafts vertically	****	**	**
High tuck turns	***	**	**
Hockey stops	****	**	**
Hop turns switching between tip and tails on snow	****	**	***
Hop turns with tails on snow	****	**	***
Hop turns with tips on snow	****	**	***
Hop turns, Zottos, Pole walk, Speiss	****	**	**
Javelin turns	****	**	***
Linked turns in wave track	**	**	****
Long radius turns in moguls	**	**	****
Moguls	****	**	***
One ski skiing	***	****	**
One ski skiing hourglass	***	****	**

Exercises	*Rotary*	*Edging*	*Pressure*
One ski skiing with lane changes	**	****	*
One ski skiing without poles	***	****	**
One thousand pole plant drill	***	*	**
One thousand steps	*	****	**
Outrigger drill	*	**	***
Outside ski turns	**	*	****
Patience turns	*	**	****
Pole jumpers	*	*	****
Pole jumpers in tuck	*	*	****
Pole plants with bamboo gates	****	*	*
Shuffle turns	*	*	***
Sideslip	*	****	**
Sideslip to pivot	****	**	**
Sideslip to straight run to sideslip	****	**	*
Sideslips with edge sets	*	****	**
Skate down fall-line	*	**	***
Skate turns	*	**	***
Slow as you can go turns	**	****	**
Step turns	*	***	**
Straight run in wave track	*	*	****
Straight run to side slip with edge set	****	***	**
Synchronized skiing	**	**	***
Traverses	*	***	*
Turn on the flexion	**	*	****
Turn on outside ski only	**	**	****
Turn shape drill	*	***	***
Two steps and turn	*	***	**
Up and over drill	*	***	**
Vertical brush quickness course	****	**	**
Wedge swing hops	***	**	*
White Pass turns, Hangers	**	****	***

POLE USAGE

Ideally a ski racer should be skilled enough at the mechanics used to maneuver the skis that ski poles would not be needed. However, the challenges the ski racer faces with respect to equilibrium are great, and ski poles can assist in many aspects on the race course. Therefore, while junior racers may be able to get by without consistent pole usage in junior level racing, learning effective pole usage skills is an essential part of a young skier's development.

Pole usage can be found in all ski racing events but will reveal itself most and provide the most variation in slalom.

The direction or trajectory of the pole swing, placement of the touch, and plant are dependent upon the amount of anticipation or counter. As a rule-of-thumb the pole swing direction will mimic or parallel the direction the center-of-mass will be moving through.

The ski pole can be used by itself or both poles can be used together. The skilled ski racer will not just have one method of using the ski pole(s) but will have learned to utilize them in a variety of manners:

- The ski pole swing can be used to stimulate the decrease in ski edge angle, and to encourage the center-of-mass translation into the new turn.
- The pole touch can assist balance at the moment of weight transfer and edge change.
- Firmly planting the ski pole can stabilize the upper body thereby creating a turning force for the lower body to utilize.
- An edge set that coincides with the pole plant can stabilize not only the skis but the upper body of the skier when line is challenged.
- Kinesthetic awareness is enhanced by the touch of the pole on the snow.
- The pole guard or shaft can be used to clear slalom gates.

The pole plant is an advanced movement that requires proper execution of mechanics and timing to be beneficial. Too often learning the proper use of the poles, pole plant mechanics and timing is neglected in the coaching of younger athletes. This is a mistake, because it limits their long-term development as skiers and their total skill package they bring to competition.

GLIDING

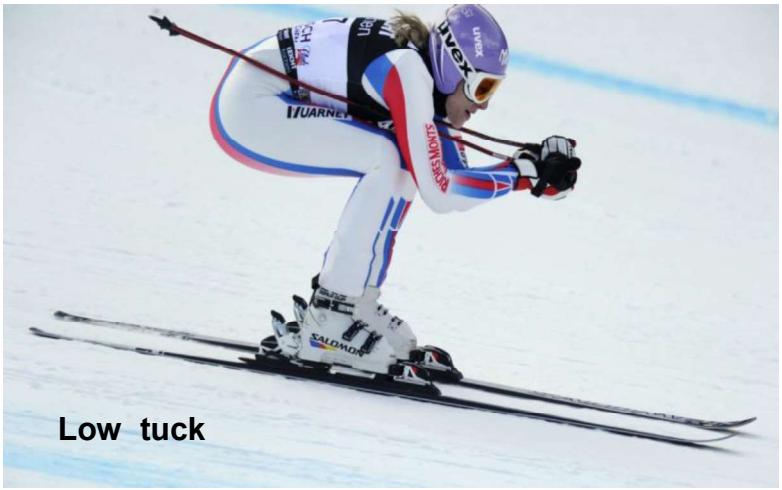
Gliding is composed of two elements: *aerodynamics* and *ski/snow interaction*. While aerodynamics is relatively easy to observe, ski/snow interaction can be quite elusive to see.

High tuck

Aerodynamics refers to the way the skier slices through the air. Air is a viscous fluid and therefore creates resistance. We can feel this resistance when we stick our hand out of a fast moving car window. When the palm of the hand faces the direction of travel, the arm tends to get pushed backward. Turning the hand sideways to the wind reduces the backward push.

> *Drag is proportional to the square of the speed.*

A ski racer standing upright or with outstretched arms will also get bombarded with more air, and as a result be pushed backward or slowed down. Pulling the arms in front of the body or lowering the ski stance will reduce this frontal area that the air sees. A low tuck will provide the optimal aerodynamic advantage since it reduces frontal area. A high tuck will allow more movement of the lower body while sacrificing in small amounts of aerodynamic benefit.



Low tuck

Being in an aerodynamic position obviously sacrifices some athletic freedom. With a lowered stance where the chest is closer to the knees it is more difficult for the athlete to flex and extend the lower body. Holding arms in front of the chest as opposed to out at the sides is like the tight rope walker without his long pole. The ability of the athlete to independently control their body parts is an essential component to being able to stay in a tight tuck.

A tuck is difficult skiing position. Learning the tuck in a static environment is a good first step. This can be during dryland training or on a cat track or beginner terrain if the ski area permits. While everybody will create optimal aerodynamics differently there are a few key points for a good tuck:

KEY POINTS FOR A GOOD TUCK:

- Skis parallel
- Vision forward
- Ankles, knees, and hips flexed
- Flat or slightly rounded back
- Hands and elbow in front of chest piercing the air
- Movement from low tuck to high tuck is in hips, not shoulders
- View the tuck as a dynamic, not a static position

From these points, the athlete can work on becoming more athletic by moving up and down from the knees and hips. This is essentially going from a low to high tuck. Kinesthetic awareness of the back can be enhanced by trying to balance a glove on the shoulder blades while flexing and extending the lower body.

During dryland activities the coach can push on the athlete with differing force, challenging the athlete's balance. Since aerodynamics are important in ski racing the athlete should practice moving into and out of the tuck quickly. Games like "Simon says" can be used to practice differing tucks as well as getting into and out of the tuck position. On-snow, during free skiing, games where the athletes mimic the coach can be fun following the coaches track while going into and out of the tuck position. Even just skiing in a high tuck will be found to be a useful exercise in that it ties up the arms and hands which will not be available for balance. The lower body will have to move independently resulting in greater learning of lower body movements and their interaction with the snow.

Interaction of the ski on the snow is largely a pressure control phenomenon. The skier's ability to keep parallel skis with similar edge angles that move simultaneously is critical not only for speed, but for safety. The tactical ability to distribute pressure fore and aft, as well as left to right, is essential to keep the skis running fast. Exercises from the pressure control section must be continually practiced and mastered so that the skier is keeping a consistent and non-fluctuating pressure against the ski.

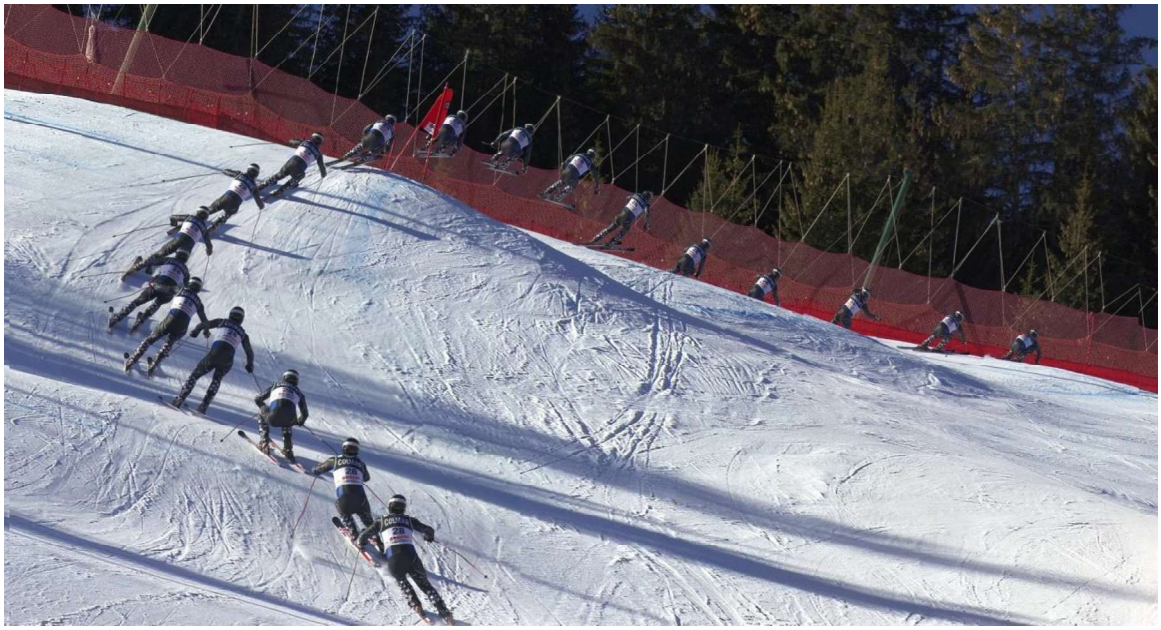
There is always a trade-off with aerodynamics and the ski/snow interaction. When aerodynamics is increased, the optimal ski/snow action is often decreased. Conversely, if we allow the body to be more upright, there is a decreased aerodynamic advantage but a benefit with a larger range of motion of the lower body which can enhance the ski/snow interaction.

The French word "glissement" has crept into the skiing vernacular. It refers to the trade-off between the choices a skier must make, such as this aerodynamics versus ski/snow interaction dilemma. The high tuck could be seen as a compromise between the need for aerodynamics and the range of movement for leg action for ski/snow interaction. The bottom line is the skier must be skilled in both such that they make the best choices in their gliding.

TERRAIN

Skiing terrain is a tactical endeavor. Terrain challenges involve rolls, bumps, side-hills along with sections that go from steep to flat and flat to steep. Competency in these terrain variations will ultimately influence success on the race course.

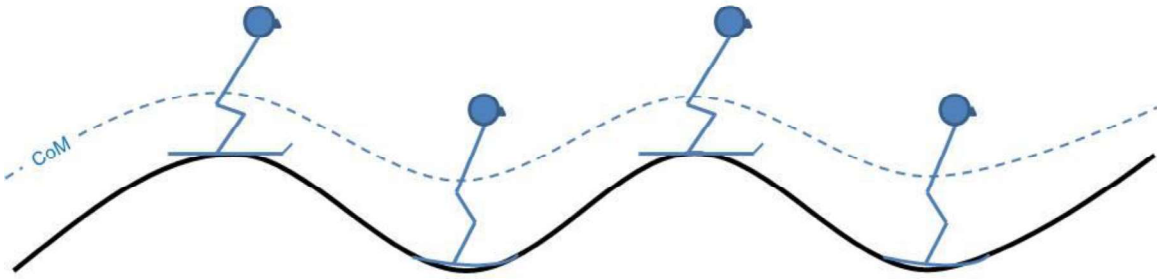
Learning and mastering terrain is best learned out of the gates. This involves skiing in natural or manmade terrain variations. Being able to prepare, absorb, and roll with the terrain are important skills for safety and ski racing accomplishment.



Technique Considerations
Upper body movement should be limited. A tuck position should move from a low tuck to a high tuck with limited movement of the arms outside of an aerodynamic position. At slalom speeds, arm posture is maintained without undue movement(s) to assist balance.

Balance should initially come from the ankles and lower body. Balance from the lower body includes flexing and extending movements which should be independent of the upper body. When upper body movements become undesirable, the coach should check first to make sure lower body mechanics are intact.

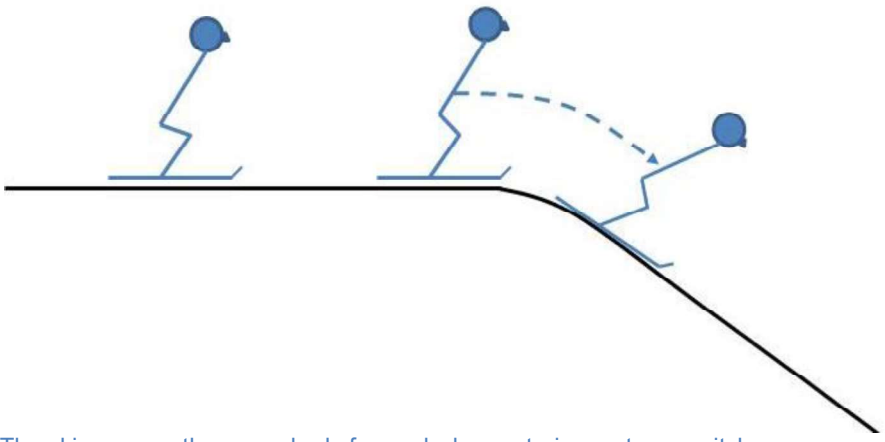
In the bumps or rolls the skier should attempt to keep their upper body at the same relative point in space. This involves absorbing the terrain with a flexing of ankles, knees, and hips enabling the skier to maintain ski/snow contact without an undue rise in the skier's center-of-mass. Meanwhile through the trough the skier extends their lower body minimizing the translation of their center-of-mass and maintaining ski-snow contact



Skier flexes on the upside of the bump and extends the lower body into the trough between the rolls. The dashed line indicates the path of the skier's center-of-mass.

Approaching a bump or roll, the skier extends their knees and hips which will raise and concurrently move their center-of-mass forward. For the ski racer to stay on the snow, this movement must be performed prior to the rise of the roll. As soon as the rise of the bump or roll is encountered the skier either lets the rise flex their legs, or if the rise is dramatic or the speed is extremely fast, the skier will need to actively flex or draw up their legs toward their torso to eliminate or reduce flight time.

As the skier goes down the back side of a roll, either on the snow or in the air, their body should maintain a perpendicular attitude with the snow surface. This starts with the skis being parallel with the snow. The skier coming onto this steeper terrain moves their entire upper body forward toward the ski tips.



The skier moves the upper body forward when entering a steeper pitch.

Movement forward to maintain a perpendicular attitude with the ski slope can be practiced with mogul skiing and with many terrain park features. This can also be practiced standing still to get the feel of extension in the knees and hips.

Skier moving forward from the ankles by extension of the knees and hips.
(Ron LeMaster photo)

Once the skier is comfortable maintaining ski/snow contact over terrain, they can start to use the terrain to gain speed. By extending the lower body on the backside of the bump or "working" the terrain the skier may be able to increase speed.

JUMPING

Being comfortable and stable in the air is an essential skill for all speed events. The skills learned in the air are also passed onto the technical events. The body awareness and control along with the orientation of the skis will further facilitate greater control resulting in more precise ski to snow interaction.

Air time can be learned and refined in terrain parks. Following the progression of: "safety", "fun", and "learning", athletes can find stimulation and satisfaction from their time in the air. Learning air should be like any other skill to be acquired. Starting small and progression as skill and confidence are acquired.

It should be pointed out that skis on the snow are generally faster than skis in the air. There are exceptions, but for the beginning ski racer, staying on the snow in race conditions should be the concern. This should not preclude the beginning ski racer from learning this exciting and fun element of ski racing.

The Press

Phases of the Press	*Technique*
APPROACH	• Weight is even between feet • Move from low to high tuck and forward
TAKE-OFF	• Press hands toward boots and pause • Chest down to thighs • Vision forward
FLIGHT	• Follow through with arms and hands to hips and back out in front • Keep chest down, shoulders roll forward • Skis parallel to slope
LANDING	• Extend legs toward snow • Land quietly • Regain aerodynamics

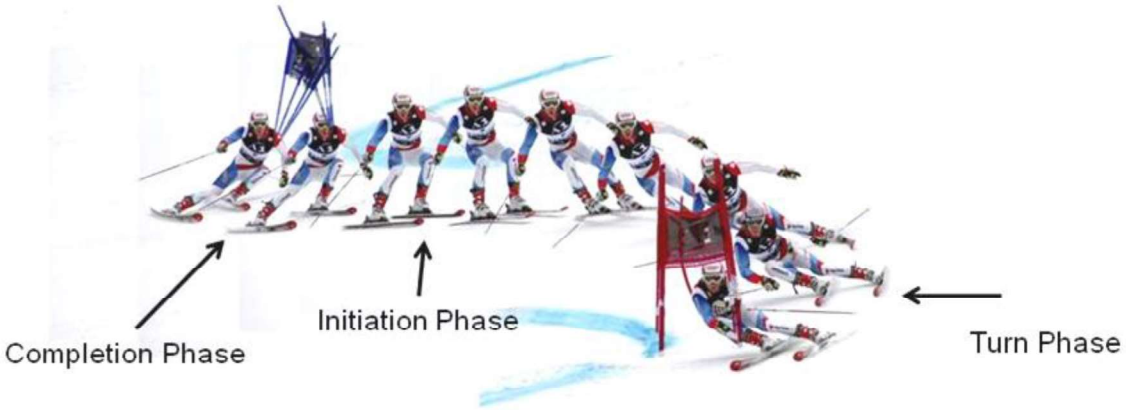
The most common type of jump is the "press". Many of the movements of the press can be classified under pressure control movements. Therefore the beginning athlete can learn a lot just by performing pressure control exercises. Skiing moguls and moving the body forward to drop the tips down is a similar move seen in the take-off of the press. Skiing long radius turns in the moguls will accentuate flexion and extension of the lower body, and long radius turns with small amounts of flight will teach the athlete the landing with skis parallel to the slope.

PHASES OF THE TURN

A traditional way to view the ski turn is by phases. In the past the turn was typically divided into three phases; "initiation", "turn", and "completion", or some similar vernacular. While this has some value, the demands of modern ski racing requires us to take another look at this phase naming strategy.

Viewing the turn as having a completion phase implies that something is completed. A component of modern ski racing is the diminishing time between turns. Today, turns essentially dissolve into one another. This makes the "completion" phase obsolete. This evolution has led to the parody of referring to this transition between turns as the "finishiation" of the turn, comically emphasizing the overlap between the finish and initiation phases.

Sometimes we hear coaches say "he didn't finish or complete his turn". While the turn completion may be location where the athlete is suffering, this is not necessarily where the problem is located. This sort of comment is most likely referring to the shape of the turn. Specifically a turn which is not brought enough across the hill. This is not a turn completion problem but a problem within the turn itself. The athlete either needed more direction at the top of the turn or more shaping through edge and/or pressure during the turn.



Initiation Phase

Turn initiation (in most cases) begins when a ski or the skis cease their turning. The skis are either doing one or a combination of: moving from a previously edged position to less edge (then to more edge), receiving tip pressure, and/or starting to be rotated.

"Redirect":
A turn initiation where the skis are rotated slightly to "redirect" them before edging.

TURN INITIATION TECHNIQUE KEYS:

- The knees and hips (center-of-mass) move from their previous position of being in an inclined position to one of less inclined.
- There can be a weight transfer from the old outside ski to the new outside ski.
- A movement, originating at the ankles, of the center-of-mass forward and downhill toward the inside of the new turn will create tip pressure.
- Since the skier is on a slope, the lead change in the ski tips, hips and shoulders will gradually begin to even up.
- If there is a pole swing it will move in conjunction with the center-of-mass toward the inside of the new turn.
- Timing of all the above facets is critical. As a rule-of-thumb they all happen simultaneously creating a fast and efficient turn initiation.

Turning Phase

During the turning phase, rotation, which may or may not have occurred in the initiation phase will diminish and edging will increase. This may be very early or even later after the gate passage as in a stivoted turn. Forces against the skis will increase, although the more skilled skier will attenuate those forces over a greater part of the arc. Pressure will be translating from the front of the ski toward the middle and aft as the turn progresses.

TURNING PHASE TECHNIQUE KEYS:

- The skis continue to be tipped up on edge as a result of the hip moving to the inside of the turn.
- Inclination morphs into greater angulation.
- The center-of-mass moves from the ball of the foot toward the heel.
- Hip angulation gradually increases through the arc of the turn.
- The upper body appears quiet in space as the hips and shoulders mimic the lead change in the ski tips.
- Outside leg is either left long or extends at or about the fall-line.

Initiation/Turning Phase?

It was mentioned in the beginning of this section that the "completion phase" has disappeared in modern ski racing. This was due to the completion phase overlapping or melding into the upcoming initiation phase. This left us with just two phases; the initiation and turning phases. These two phases can even have an overlap. This blending of turn mechanics has left us with instances where the outside ski is completing the turn, and the inside (or new outside) ski is beginning the upcoming turn.

MOVEMENT ANALYSIS

Examining and breaking down a skiers actions is an important aspect of the ski coach. Without accurate recognition of what the skier is doing the rest of the coaching process breaks down. Verbal “feedback” is one valuable mode in which the athlete receives information. If this feedback is not accurate it will be confusing, frustrating, worthless and detrimental to the athletes progress. Along those same lines the coach may have discovered the most effective communication style for a given athlete. This will be worthless if the message is incorrect even though the coach may be communicating with the most appropriate communication route, if the message is erroneous, the communication method used is insignificant.

Movement analysis in its most basic form consists of seeing what is going on. At this first stage this analysis has no value attached. Nothing is right or wrong. Understanding and appreciating this primary singular step is important. For example: "The knees are flexing during the turn". This may be a less than optimal method to resist forces, but if the athlete is absorbing terrain, it may be a very effective strategy to maintain even pressure under the skis. This first stage of movement analysis cannot be disputed; "the knees are flexing". This is a fact. Whether this is good or bad will depend on other factors when it is put in context.

Movement analysis can be divided into two components. What the skis are doing and what the skier is doing. The skis perform actions to accomplish tasks such as skiing around gates and staying on line. They rotate to achieve a general direction; edge to hold a line and are pressured to make a purchase in the snow. These actions are complimented with the associated skiing movements of rotation, edging, and pressure that the skier performs.

Each of these skills can be viewed with the goal of maintaining balance in the dynamic skiing environment. If the ski racer leans in we can assume they might have need to work on some lateral aspect of balance. If we see them sitting back we may conclude they have an inability to reregulate pressure aft ward. Seeing a ski racer spin out might indicate some rotary problem.

All three of these scenarios involve balance. In fact they go deeper than just indicating that the athlete is out of balance. They indicate the direction, type, and skill that they have as a deficiency.

"Balance":
Always the right answer... but not the entire story! The coach needs to understand the direction that balance is maintained or deficient.

Cause or Effect?

After movement has be described it is usual to try and figure out how to improve on it. This is the prescription to the athlete. It is very important for a ski coach to understand skiing not just on the surface, but the origin of what they are seeing. Often times we are analyzing only the effect; "he sits back", "she leans in", "they over rotate!". Some athletes do assume these basic stance issues, although many times these images are the result or "effect" of some other underlying mechanism.

For example; leaning in during the turn may be just the athlete trying to gain greater edge angle with an inefficient strategy. It may also be the result of the athlete over rotating their turn. In this case the over rotation *resulted* in the lean. To work on lateral balance would not necessarily help this athlete. This athlete would need to learn how to create a more efficient rotary action.

SKI COACHING

"[A coach] must continually be exploring for ways to improve himself in order that he may improve others…"

Ski coaching can be a full time profession or a part-time avocation. Ski coaches ski with athletes, analyze technique, teach skills, provide feedback, devise lesson plans, supervise daily on-snow activity and discipline when necessary. They do all of this while being an important role model for the athletes.

Having this myriad of responsibility can be overwhelming. There are not only a lot of topics, but a lot involved within each of these topics.

Coaching is part ***science*** and part ***art***. While some coaches lean more to the science side, others find that the "art" aspects come more naturally. The best coaches have worked to understand both the science and the art of their sport and coaching. Great coaches are always seeking ways to improve. We expect the same of our athletes – to improve with every training session. If we truly care about our athletes we should constantly be seeking out ways to make ourselves a better coach. The better we become, the better our athletes will become.

What are some of the different aspects of ski coaching that a coach needs to understand?

_____

_____

_____

What are some ways coaches can continue their coaching education?

_____

_____

_____

Ski coaches who are better educated in ski racing and in how to teach skiing are better prepared to analyze and assist their athletes in reaching their goals. Unfortunately coaching is not often black and white. There is not one perfect formula to creating a better or faster athlete. Athletes are all different and their deficiencies are never totally obvious.

Imagine an athlete that is sitting back while skiing. Three coaches with differing expertise watch her skiing through a GS course. The first coach, who is the conditioning coach, declares the reason is that the skier has weak quads. The second coach is an avid reader of sports psychology literature and suggests that the ski racer is fearful of the course. The third coach attended a boot fitting clinic last week and lets the rest of the coaches know that the athlete needs to have her heel lowered in her ski boot.

"When all you have is a hammer, everything looks like a nail."
-Abraham Maslow

Who is right? The athlete may be weak, scared and have boots that need a tweak. How does a coach ever know? How can the coach figure out what is the most important component to work on with the athlete? The answers are not easy, but the most educated and informed coach will have the best chance at figuring out the best way to approach the skier's problem.

Part of the science of coaching is the X's and O's of the sport. In ski racing, this includes the technique and tactics. To understand technique the coach needs to understand the human body and how it moves, while tactics involves a good understanding of physics.

The art of coaching is not totally removed from the science, but is not as black and white. For example there is no gray area when talking about the acceleration of gravity, which is 9.8m/s^2. This can be measured and does not change (when measured in the same place). The art of coaching includes things like the communication and interaction coaches have with athletes and their parents.

How we communicate and perform our lessons can always be subject to debate as to what is the best way to perform. However, when certain guidelines and principles are followed, the odds of doing a good job are greatly increased.

We have all had coaches or teachers that made some positive impact on our lives. Take a minute to list five of the attributes of these leaders that impressed you the most.

_____
_____
_____
_____
_____

COACHING PHILOSOPHY

"One's philosophy is not best expressed in words; it is expressed in the choices one makes…and the choices we make are ultimately our responsibility."

- Eleanor Roosevelt

We often think of coaching as understanding technique and knowing tactics. This is true but what we do with that technical and tactical knowledge is part of our philosophy. We need something to guide our actions while on the slope. Do you criticize an athlete for their poor ski run? What if they have been continually goofing off? Does that change your response?

Philosophy is a personal characteristic. It is different for each individual. It is part of your makeup. Your personal philosophy is constantly evolving.

John Wooden has been called the greatest coach in the history of sports. Coach Wooden took fourteen years to develop his philosophy. It started out as a school project to define success. Although he turned in his school project, he was never totally satisfied with his definition. He continued thinking about it and revising it from 1934 to 1948. He labored with what attributes to include and what those building blocks truly meant. He called it the "pyramid of success". Today it has been cited hundreds of times, and has even been turned into a book.

While Coach Wooden's is very well thought out, you can't borrow his philosophy. A philosophy must come from deep within yourself. You must own it. Philosophy consists of your objectives (the things you value and want to achieve) and your beliefs of principles that help you achieve your objectives.

Your coaching philosophy will influence how you behave as a coach. It will guide you in making decisions. A coaching philosophy describes how you will prioritize different aspects of your coaching. How do you develop your own coaching philosophy?

If your goal is to see that the athletes in your group are going to want to continue to ski race, put the following in order of importance:

Winning	_____	Skill development	_____
Fun	_____	Being with friends	_____
Safety	_____		

If your goal is to make sure your athletes reach their highest ski racing potential, put the following in order of importance:

Winning	_____	Skill development	_____
Fun	_____	Being with friends	_____
Safety	_____		

Are these two lists similar? Why or why not?

Ten thousand students ages 10-18 years old were asked about their feelings about sport. The students reacted to questions such as why they participate, why they quit, and what changes they would make in order to get involved again in a sport they dropped.

While the general public usually regards winning as the priority of coaches, this does not match up with the feelings of the athletes. “Winning” never ranked higher than seventh even among the most competitive athletes. "To have fun" and "to improve my skills" were consistently the first two choices why the students chose to play sports. For their response to why they dropped out from a sport, the top reasons were lack of fun, negative coaching and too much pressure.

Why Children Participate…

- Enjoy / Fun 28%
- Fitness 15%
- Be with Friends 13%
- Compete 13%
- Improve 8%
- Meet New People 8%

Why Children Drop Out…

- Takes too much time 18%
- Coach was negative 15%
- Enjoy other activities more 15%
- It was boring 9%
- Lack of fun 8%
- Parents' emphasis on winning 6%

How important is being on time?

Imagine you are an eleven year old going to a race away from your home ski area. You were told to meet at the ski area base lodge at 8:00am. You show up a couple of minutes before 8:00am and you don't recognize anyone. What is going through your mind?

_____

_____

_____

Alone again

You are a thirteen year old that has not really met any friends on the ski team. You ski up to the chairlift last again. The two coaches whom you have been skiing with today arrive also at the same time. They take one quick glance at you and lower their heads as they double up together. You would be in heaven if one of them chose to ride the lift with you. Without even a word they move in unison together toward the loading ramp. What do you feel like standing there, and on your solo chairlift ride?

_____

_____

_____

COACHING STYLE

"Leadership is a matter of having people look at you and gain confidence, seeing how you react. If you're in control, they're in control."
-Pat Riley

Your coaching style is influenced by your philosophy and is reflected in how you coach. It is the presence or persona that you present to the athletes. Coaching styles can be broken down into three main types: command, submissive, and cooperative[1].

Command Style Coach
This is the dictator. The athletes are expected to respond to the coach's directions. “Johnny, screw in the gates”, “Sally, do 100 hop turns for your warm-up”. The command style coach never asks for an athlete's opinion on any aspect of their ski racing. They know they are the most knowledgeable and experienced, so why ask for the athlete’s opinion? When winning, there may be good team spirit, but when losing there is often dissention. Command style coaches may be disliked or feared by their athletes.

Submissive Style Coach
The submissive style coach resembles a baby sitter. They can be found hanging around at the bottom of an ill-maintained course occasionally giving feedback or hiding behind a video camera. This coach offers little guidance and is generally unprepared. A submissive coach goes with the flow and addresses problems only when they become big issues. The coach may be well liked, but is inadequate.

Cooperative Style Coach
The cooperative style coach shares the decision making with their athletes. This coach listens to concerns that their athletes have and seeks to work together toward their goals. The coach gives instruction and guidance, but also lets the athletes assume responsibilities and self-learning. The cooperative style coach is often well-liked. Their challenge is providing the right balance between directing the athletes and letting them direct themselves.

[1] These three coaching styles come from Successful Coaching, by Rainer Martens, from the American Sport Education Program.

Why, or when, might a coach use a command style of coaching?

_____

_____

_____

What advantages are there to cooperative style coaching?

_____

_____

_____

Regardless of which style a coach leans towards, there is no one style which leads to success. Most coaches possess a blend of styles and an awareness of the advantages and disadvantages of each style. Knowing your coaching style is important, because while it may work best for you, it won't work best for all of your students. Being aware of your tendencies and their responsiveness and adapting as needed is a key to being an effective coach.

You have been coaching with the same group of U10s for a month now. The group interacts well together and skis for all intents and purposes at the same level and speed. Today a new kid is assigned to your group. He is totally new to the team, but fits skill-wise into your group. He is quiet, doesn't have the all important team uniform, and is just an odd fit socially. What can you do to make him comfortable and want to continue with your group?

1.

2.

3.

4.

5.

COACHING ETHICS

"Ability may get you to the top, but it takes character to keep you there."
-John Wooden

Ethics is the study of morals or character; a study of the principles of human duty or the study of all moral qualities that distinguish an individual relative to others.

Moral pertains to an individual's motives, intentions, and actions as right or wrong, virtuous or vicious, or good or bad.

Moral values are the relative worth that is placed on some virtuous behavior.

After the second run of a slalom you find one of your racers on the DQ list for straddling. A radio report from a coach near the proposed incident says the athlete did not straddle. The athlete is in the finish with the fastest combined time. You protest at the jury meeting, and the DQ is overturned. Talking with the athlete just before the awards you find out that she did indeed straddle on the second run. What do you do?

_____

_____

_____

Russell Gough (1997), states in his book *Character is Everything: Promoting Ethical Excellence in Sports*, that ethics is about having the will, the courage and the guts to do what is right. The will, courage and guts -- the character -- more than anything else. Anything, even more than knowing the right thing.

What are some rationalizations for unethical behaviors in ski racing?

1.

2.

3.

Gough (1997) goes on to offer a few thoughts on character:

- Character is built more than built-in. If you want to truly learn to master anything, you must first learn to master yourself.
- When it comes to building good character -- in or out of the competitive arena -- there is no substitute for sweat, hard work, or practice.
- Character is what you are when no one else is looking.
- Character is what you are when everyone's looking.
- Success or excellence or winning, whatever you want to call it, isn't about victories or defeats; isn't about statistics. It's about what you are and what you do with what you are. It's about personal character.

COACHING SITUATIONS

Ski coaches often find themselves in tricky situations. To help you identify your philosophy and ethics, think about these diverse situations you may face. How do you act?

- Your athlete is a pace skier for an event, and trips the wand open a second before they push out of the start.
- Your athlete is competing on skis with a stack height over the legal maximum. 1) It is a speed event and the skis are borrowed from a friend and were the only skis they could get, 2) The parent took the skis to the shop and asked them to put additional risers under foot to help with leverage, knowing the skis would be out of compliance, 3) The race favorite is on skis you suspect are out of compliance and you notice this at the start.
- You arrive to the course and it has been set too close to the trees to be safe in your judgment.
- Your athlete did not meet the academic standards to travel with the team on the grade report just before the Junior Championships.
- Your underage athlete was caught drinking beer with friends on another team on the night before the last race. 1) They are staying with the team and you are responsible for their supervision, 2) They are staying with their parents.
- Your athlete had a hard crash and you suspect the athlete may have had a concussion. They said they are fine, but later complain of dizziness and a headache. They have been skiing very fast, and there is a big race in two days.
- Your athlete's family is struggling financially. There is a race in another region coming up that you think would be an excellent point opportunity for this athlete, especially considering recent training results.
- Your 13 year old athlete is a strong skier, but still needs a lot of technical fundamentals work. Their parents want their child to train with the older group because they are doing more gates on harder terrain. They also want their child to race in the series that has several races on weekends when the main qualification series is off and training is scheduled.
- One of your athletes has a clear straddle, but they are not on the report by the referee (DQ list).

Gough (1997) goes on to say that when you find that you are faced with a difficult situation and you are hesitant about the first choice you should make, you might ask yourself the following questions.

- Is it against the rules? The rules of my association or federation? Of my club? Of the law?
- Is it fair to everyone involved? To my opponents? To my team? To the race officials? To my club? To myself?
- Would my ethical role models do it? Who are my ethical role models? How would they feel about me if I did it? How would I feel about them if they did it? Do I have time to get their advice first? Do I have the courage to do what they would do?

You should probably ask yourself these questions, in order, especially if you are dealing with a concrete rule. Do you really need to go any further down the list if it is against the rules? Also consider that if you say no to any one of these questions, you probably have the answer you are looking for.

Reference: Gough, R. (1997). 'Character is Everything: Promoting Ethical Excellence in Sports' Fort Worth, Texas: Harcourt & Brace.

"Setting a goal is not the main thing. It is deciding how you will go about achieving it and staying with that plan."
-Knute Rockne

PEDAGOGY

Pedagogy is the **art** and **science** of teaching, and sport pedagogy is the art and science of teaching sport skills. Not specific skills such as carving, jumping and gliding, but the process that coaches use to teach all types of skills (ASEP). This process involves planning, group management, giving feedback and many other elements.

How do I coach?
Coming into every training or race day you need to have a game plan. What are the goals for the day and what activities will be done to achieve them? What kind of leader will you be? These are questions that need to be asked before you put on your coaching hat and meet your athletes.

Rules of the classroom
The classroom of the ski coach is the ski hill. Here are some basic rules of thumb to provide safety and elevate the athlete's attention.

- Safety trumps everything
- Always stop or stand on the side of the trail
- Never stand beneath a blind knoll
- Avoid stopping or standing beneath a chairlift
- Athletes should always stop below the group
- Athletes should have their back to the wind when listening to you
- Athletes should have their back to the sun when listening to you

Group organization
How you organize your group on the hill can impact how well they learn or respond to your teaching. Mix it up.

- Line up facing the coach
- Semicircle around the coach
- Circle around the coach
- Coach within the circle

- Huddling up

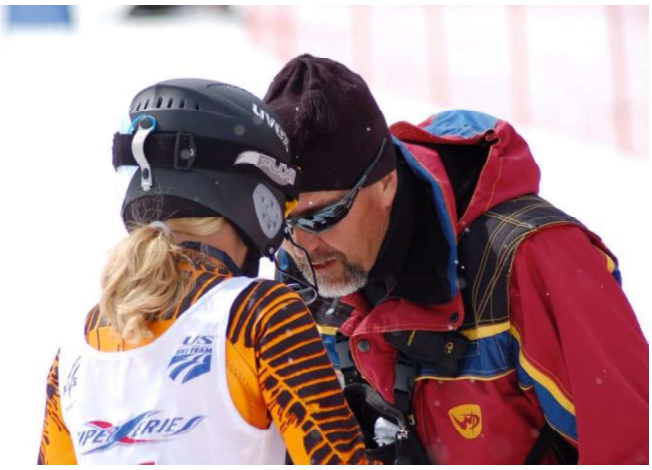
How to ski with a group
Skiing with your group is one of the most fun and important aspects of your coaching day. Keep things moving! You must always strive to present a skiing image that is mechanically efficient. Athletes will ski like their coach. These are some ways to organize the skiing.

- Follow the coach
- Line rotation
- Call down
- Ski in a group
- Buddy system

What to say
To get your message across, keep these things in mind.

- Keep it simple ski-coach (KISS)
- Keep it short
- Praise only when appropriate (don't patronize)
- Use more praise than scolding phrases
- Ask more questions than telling what to do
- Use vocabulary that is familiar to the skiers you are coaching
- Relate new items to previously learned items
- Keep in mind that people tend to remember only:
    - 10% of what we read
    - 20% of what we hear
    - 30% of what we read & hear
    - 50% of what we hear and see
    - 70% of what we say
    - 90% of what we say and do

How to act
Everything you do around your athletes sends a message. Consider the following:



- All comments are positive.
- Criticize the turn not the athlete.
- Get on the physical level of the athlete.
- Use non-vulgar language.
- Keep athlete comparisons between coaches.
- Always speak positively about teammates.
- Drink non-alcoholic beverages and eat nutritious foods in front of athletes.
- No smoking in front of athletes.
- Never abuse equipment or permit athletes to do so.
- Weather and hill conditions are never bad, only a challenge.

When to demonstrate
Learning by watching is a powerful communication method for all athletes. Be sure to use demonstration when teaching

- A new skill
- A skill which is confusing
- A skill which will be wordy if explained
- To an athlete who is a visual learner

How to demonstrate

- Consider, is the skill better seen from the side?
- Consider, is the skill better seen from the front or back? Young athletes cannot rotate the image
- Coach skis first in the group, or choose an older or more proficient athlete
- Cue the athlete with what to watch
- Do you use video? Do you use it too much?

Group Dynamics

It is obvious to see the importance of group in team sports. Even though ski racing is considered an individual sport, group interaction and cohesiveness is important. Ski racers train, travel, and even live together in many situations. Enhancing this important interaction starts with day one for the coach.

Goal: *To create a comfort level for each member of the group, and a feeling of team and group identity.*

Possible methods:

- Name game: Repeat the 1st name, repeat the 1st name then the 2nd, repeat the 1st name the 2nd name then the 3rd, etc.
- Ride chair with different person every time. After a while the natural cliques will develop. This is expected and healthy.
- Find out something interesting about a person and tell the group.

- Partner up.

How important are specific directions?

Brian is told to meet "at the top of the lane". How could ten year old Brian misinterpret these instructions?

_____

_____

_____

You have been coaching with the same group of U10s for a month now. The group interacts well together and skis at the same level and speed. Today a new kid is assigned to your group. He is totally new to the team, but fits skill-wise into your group. He is quiet, doesn't have the all important team uniform, and is just an odd fit socially. What can you do to make him comfortable and want to continue with your group?

_____

_____

_____

INDIVIDUAL EXERCISE:
Read this scenario and underline the coaching blunders by Coach Adolf. Afterwards, discuss as a group.

Coach Adolf is out skiing with his group of U10s. It is hailing and blowing hard. He stops the group in the middle of the run which is under the chairlift to give some verbal feedback. The coach doesn't notice the wind and hail since his back is to the elements.

"Hey Bobby, you lunkhead, don't sit back all the time," the coach says, hitting Bobby on the helmet with his bent ski pole. "You look like Betty with her big @$$ in the back seat," he says while slapping Betty's rear-end. "Here watch me," he says while skiing away from the group.

Bobby and the group are left standing while the coach skis away. They are a bit confused as to what to do next. Finally, they work their way down the hill and stumble upon Coach Adolf under a knoll which is blocking the wind so he could light up his cigarette.

"This wind is &*?#, you can't see anything," says the coach.

Coach Adolf is very tall especially compared to his group of U10s. Standing uphill of Bobby, he looks like a giant.

"Hey dummy," the Coach yells at Bobby, while hitting his skis with his pole. I told you not to sit back. You need more counter-roticipation."

"Okay, let's go. I'll be glad when this %$# day is over so I can get rid of you nitwits and go have a beer."

ENGAGING CHILDREN

As you employ the tools you've gained to become an effective coach, it's essential to connect with and **engage your athletes**. Otherwise, even with the best tools a coach will experience athlete drop out.

Involvement with skiing in a coached and competitive environment will contribute to the following for your young athletes:

- Assists in developing a child's self-confidence
- Improves a child's self esteem
- Provides an opportunity to gain a sense of achievement
- Provides a sense of belonging
- Allows for new friendships to form
- Allows for time to play with their friends
- Provides an opportunity to learn new skiing and life skills
- Teaches core principles including tolerance, cooperation and respect

Understanding and knowing these potential outcomes is an important step towards helping young athletes to have the best possible experience in ski racing.

For young athletes, U12 and younger, intrinsic rewards, such as being involved in the sport of ski racing with their friends, means more to children than the extrinsic rewards of receiving trophies or prizes.

According to U12 and younger athletes, they ski race to:

- Have fun and be physically active
- Make friends
- Learn new skills
- Enjoy competition
- Be challenged

Children drop out of ski racing when their needs (such as those mentioned above) are not met.

What does this mean for coaches?

As a coach it's essential to understand what motivates your athletes, especially U12 and younger, to be involved in ski racing.
Motivation includes:

1. Perceived ability (the athletes belief about their ability in ski racing)
2. Social support (from their friends, parents and coaches)
3. Enjoyment (necessary for sustaining their love of skiing and racing)

These coaching behaviors will help to ensure your athlete's motivation thrives.

Be organized
Appropriate and effective planning will ensure the coach provides a safe environment, while maximizing participation, fun and enjoyment. A carefully planned training session increases the coach's confidence and helps to motivate the athletes.

Recognize achievement and use positive reinforcement
Praise and encouragement are two of the best motivational techniques. The majority of U12 and younger athletes will develop self-confidence and be motivated to try harder when they receive recognition for their efforts, especially when it comes from a coach they respect.

Set challenges for all levels of ability
Coaches often direct their challenges to the middle level of the group. Athletes at the bottom level get turned off because the activities are too difficult, while those athletes at the top level get bored because the activity is too easy. Coaches need to offer variance by skill level to each activity to challenge all their athletes, while offering them the opportunity to experience success.

Use a game centered approach
Young children love to play games. A game centered approach is different to the traditional approach and may still include a skill-based focus. With the game centered approach the game, rather than the technique, becomes the focus of the activity for the athlete. The coach is more of a facilitator; the coach guides the athletes in their understanding of the activity. Design activities that progressively challenge and motivate children to develop an understanding of the strategies, skills and rules required to succeed. The game centered approach provides motivation for most young athletes.

Reduce emphasis on competition
Enjoyment of competition is one of the key reasons children participate in organized sport. However an over emphasis on competition by a coach or parent is often the reason why young children drop out of sport.

For young athletes a motivational environment that fosters hard work and improvement is more conducive to continued participation than an environment based solely on winning.

Success or failure should be determined less by the scoreboard, and more through goal setting. It's important for coaches to provide opportunities for all their athletes to experience success by setting goals, both short and long term. Goal setting has an impactful and positive effect on both motivation and skill development. Frequent feedback is an important aspect of goal setting for motivation. Without frequent feedback it's difficult to track progress and minor, yet important, improvements may not be as obvious.

Provide a supportive learning environment
Good coaches keep their athletes in a safe learning environment. This includes safety from physical harm and from verbal harassment. Other children can contribute to verbal harassment and the results may be detrimental to an athlete's motivation. An unsympathetic coach or bullying from other athletes is often cited as a main reason for a child to drop out of ski racing.

Coaches are important people in the lives of athletes, especially when the athletes are U12 and younger. Without question coaches need to be encouraging, supportive, competent and ethical in all activities.

Coaching is teaching and guiding, not just facilitating the repetition of gate training. Athletes need a goal or intent to remain motivated. Practice is essential to reaching those goals. It's the role of the coach to arrange training and practice time in a way that keeps their athletes engaged in ski racing.

List three ways you could recognize achievement:

1. _____

2. _____

3. _____

You have a group of U10 athletes, it's training day 6 for the season and you notice they are less interested in doing GS gate training. What could you do with them as a group to boost their motivation?

_____

_____

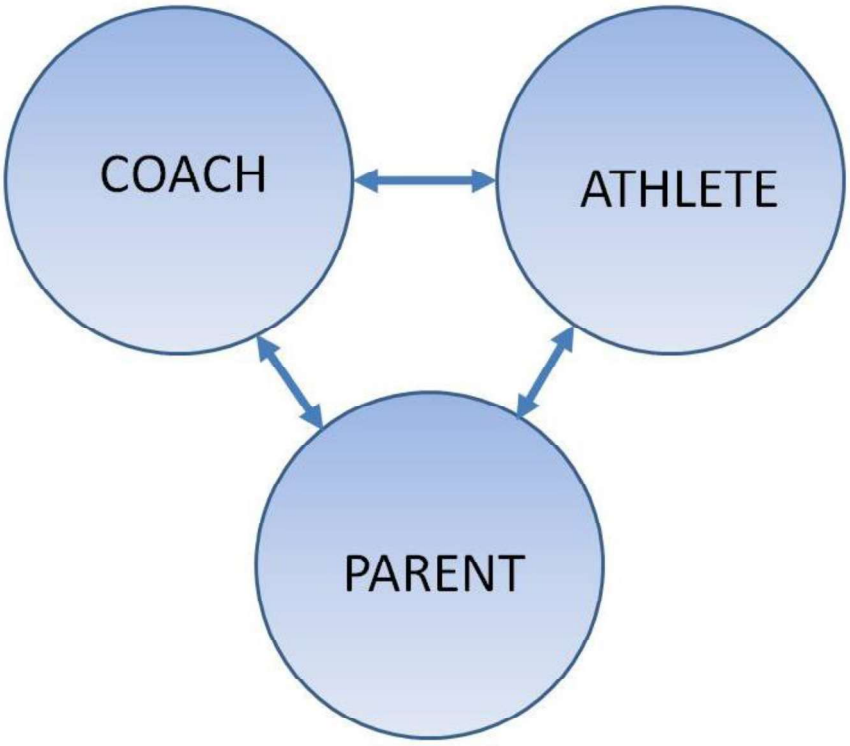
_____

COMMUNICATION

A coach talking to an athlete might be the first image we think of when we mention communication. Natural as this is we need to be aware of other avenues of communication.

Earlier in the "Coaching Styles" section we mentioned the two way communication between the athlete and the coach. The "Cooperative Style" coach was one that listened as much as spoke.

It is natural that we spend most of our coaching time with the athletes. Their parents, even though we only see them on the sidelines, play the ultimate role in the development of the athlete. Communication from coach to parent and parent to coach needs to be fostered also.



Parents have spent a lot of time with their child growing up and can often explain much of their young athlete's behavior. Besides this they will be windows into how the young athlete will respond to you as their coach. Do they see people in position of authority as enemies, or do they have an admiration and respect? Hearing more of the at home background of the young athlete will help us determine their learning styles and give us direction as to the personality and teaching style we want to present to the athlete.

Parent's perception

You are a parent and you see two coaches together talking and laughing at the bottom of a training hill. They appear to be good friends and more interested in each other's conversation than your child's skiing. You pay a lot of money for coaching fees and at times wonder what you are getting for your dollar. As a parent what thoughts going through your head and what emotions do you feel?

_____

_____

_____

While learning styles are important the coach also needs to also understand and be aware of the parent's goals. Not every parent thinks their child will win an Olympic gold medal. In fact, most want their child to learn social skills, skiing skills, and just be athletic and have fun.

Which of the communication paths is most difficult?

What makes this path difficult?

How can the coach make this path less difficult?

TYPES OF LEARNERS

"[There is a] need of forming a theory of experience in order that education may be intelligently conducted upon the basis of experience."
-John Dewey

A learning style is an athlete's consistent way of responding to and using stimuli in the context of learning. Keefe (1979) defines learning styles as the "composite of characteristic cognitive, affective, and physiological factors that serve as relatively stable indicators of how a learner perceives, interacts with, and responds to the learning environment. "Stewart and Felicetti (1992) define learning styles as those "educational conditions under which an athlete is most likely to learn." Thus, learning styles are not really concerned with what learners learn, but rather how they prefer to learn.

Everyone has a particular learning style that when correlated with a similar style of teaching, seems to resonate information and understanding in a more meaningful way when compared to other teaching styles. When you are being introduced to a new skill, or when you are trying to refine a skill would you rather the coach:

Show you what it looks like?
Talk to you about it?
Relay the feeling or sound involved?
Just let you go try it?

Regardless of the communication method the coach uses, every athlete will learn. The breadth and depth of that learning will be enhanced when the coach's teaching style and the athlete's learning style are similar.

There are many models of learning/teaching styles, but two similar methods work well for ski coaching:

- Kolb's Learning Styles
- VAK (Visual, Auditory, Kinesthetic)

Kolb's Learning Styles

David Kolb, a leading theorist on experiential learning developed the Kolb's Learning Styles. According to Kolb, different people naturally prefer a certain learning style or process. Therefore, he proposed a learning style model that separated learners into one of four dominant styles: thinkers, feelers, doers, and watchers.

Thinkers: These are the analytical types. They like to ponder the task prior to and after attempting. If you see a blank stare, it might be because they are lost in thought.

Feelers: Kinesthetic feedback through their body is how they perceive the actions of skiing. They want to know what the task feels like.

Doers: Get out of their way. These ski racers like to experiment and just do it. Don't waste much time telling them. A few cues and off they go.

Watchers: They want to follow the coach or successful athlete. They will want to see the video over and over again.

While every ski racer has a dominant learning style, their actual learning style will be a conglomerate of all four, with one or two being dominant. By observing athletes, the astute coach is able to figure out what style or preference the athlete leans toward.

INDIVIDUAL EXERCISE:
What learning style would the athlete be if you heard:

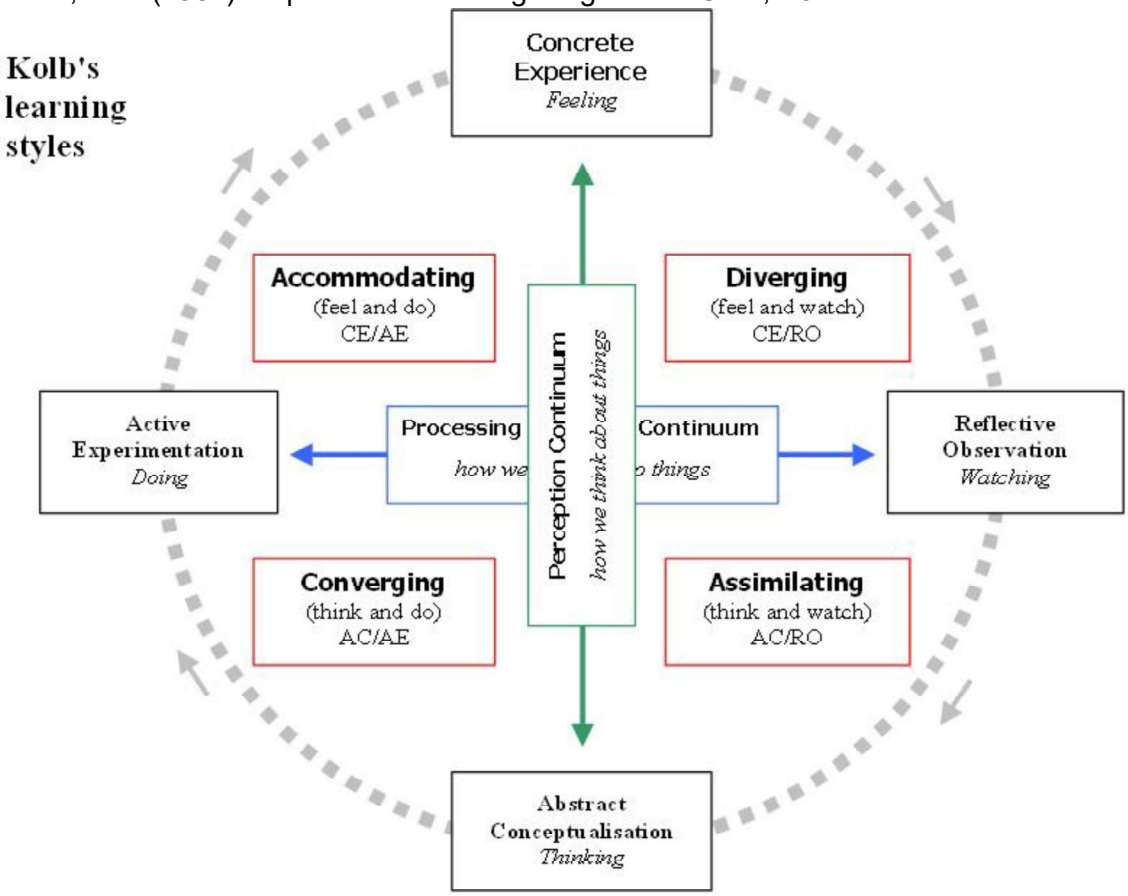
*Show me again*_____

*I didn't feel that*_____

*Why do I want to pressure in the fall-line*_____

*Let me try*_____

Kolb, D.A. (1984). Experiential Learning. Englewood Cliffs, NJ: Prentice-Hall



Kolb Learning Inventory, Quick Activity

4= most like you, 1= least like you... rank each response.

1. When I learn:

___ I like to deal with my feelings. (CE)
___ I like to be doing things. (AE)
___ I like to think about ideas. (AC)
___ I like to watch and listen. (RO)

2. I learn best when:

___ I listen and watch carefully. (RO)
___ I trust my hunches and feelings. (CE)
___ I rely on logical thinking. (AC)
___ I work hard to get things done. (AE)

3. When I am learning:

___ I tend to reason things out. (AC)
___ I am quiet and reserved. (RO)
___ I am responsible about things. (AE)
___ I have strong feelings & reactions. (CE)

4. I learn by:
___ feeling. (CE)
___ watching. (RO)
___ doing. (AE)
___ thinking. (AC)

5. When I learn:
___ I get involved. (CE)
___ I evaluate things.(AC)
___ I like to observe. (RO)
___ I like to be active. (AE)

AE- Active Experimentation Score: _____ (Doer)
RO- Reflective Observation Score: _____ (Watcher)
CE- Concrete Experience Score: _____ (Feeler)
AC- Abstract Conceptualization Score: _____ (Thinker)

Which two scores are your highest scores?

VAK

The VAK learning style approach uses the three main sensory modalities – visual, auditory, and kinesthetic – to determine the dominant learning style.

- **Visual learners** learn best when presented with graphs and other illustrations, maps, written material, being close to the presenter of the information so that they can interpret their gestures and facial expressions. They like to take notes and ask for repetition of verbal instructions.
- **Auditory learners** do their best when they can listen to a lecture or a fast paced exchange of information. They prefer group discussion where other's point of view are discussed as well as hearing stories and/or jokes that reiterate the information; they rely on verbal cues (or pneumonic devices) for remembering information.
- **Kinesthetic learners** prefer to "just do it" vs. discussion; they enjoy frequent breaks and hands on experience. They may shake a leg, rock in their seat or find other ways to move when being lectured to. They make hand gestures and prefer role play exercises over discussion groups.

Learners use all three modalities to receive and learn new information and experiences. However, according to the VAK theory, one or two of these receiving styles is normally dominant. This dominant style defines the best way for a person to learn new information. The style may not always be the same for all tasks. The learner may prefer one style of learning for one task, and a combination of others for a different task.

For the coach, the key is to present information via all three styles. This allows all learners the opportunity to become involved.

There is evidence to suggest that a strong visual picture as in a skiing demonstration or modeling a technically proficient skier will convey a strong message in spite of the learning style.

MOTOR LEARNING

Motor learning is process of acquiring or gaining proficiency at a goal orientated movement. The actions of the body to edge, pressure, and rotate the skis are acquired through motor learning. This should not be confused with learning that occurs in the classroom which is primarily mental. Learning math results in arriving at an answer to a problem containing numbers, motor learning involves using the body to make some sort of action for movements sake or to accomplish a task.

Motor learning:
is a set of processes associated with practice and/or experience leading to a relatively permanent change in the capability for movement.

Processes implies that there are events or occurrences that when taken together create a change in the state of the athlete. Those processes are created ultimately by electrical stimulation creating chemical changes involving moving the muscles creating a desired outcome around a joint in the body.

Through learning, the body produces a capability for movement. By repetition and experience, a motor proficiency is established and the body is increasingly competent with regards to a skilled response when challenged by similar circumstances in the future.

Unfortunately motor learning is not observable. Just because an athlete executes a skill or maneuver, does not guarantee or should not even imply that the athlete has ownership of that task. The athlete has not learned, they have merely performed. The central nervous system is a highly complex and the processes that underlie the change in capability and the nature of the capability itself are highly complex and these take more than an occurrence or two.

The good news is that motor learning is relatively permanent. Just like riding a bicycle, you never forget. You may lose some competence, and even nerve, but the relative functions that allow you to ride the bicycle are relatively permanent.

Once motor learning has occurred there is a change in the participant. They are not the same as they were previous. Sometimes is it is tempting for the coach to declare that the athlete has learned because of an observed instance. Mood, environment, equipment can all affect an outcome, and sometimes the dice just fall right. These outside variables have an effect on the results but have not been achieved with the changes that are involved via true motor learning.

STAGES OF MOTOR LEARNING

As a coach you have probably noticed that athletes seem to pass through stages of learning. There are many two and three stage models of motor learning. All are based on observation, have similar demarcations and all make intuitive sense. They tend to vary the most with nomenclature. We have broken motor learning into the three following Phases:

Cognitive Phase

When a new task is presented to a learner their concern is understanding what is to be done. Things like what to do and where to go are their questions. A skier trying to get forward at the initiation of the turn might be told to feel the ball of their foot and taken through a static exercise of moving forward until it seems like they understand the idea. Most gains come from additional understanding and realizing the goals of the task. This learning segment is very short lived and has also been termed the verbal-motor stage since learners go from spoken word to movement very quickly.

Associative Phase

Most of the verbal aspects of learning have dropped out by this time. Motor learning is advanced by the learner figuring out the most effective way of doing the task while continuing to make subtle adjustments to their performance. This might be most evident when the athlete is learning to combine skills. As a coach you might be able to see a weight transfer followed by edging and finishing with pressuring the ski. While after experimentation and practice in many differing training environments the athlete begins to integrate these actions in more of one movement as opposed to three. Skiing becomes more consistent. The athlete will spend the most time in this stage.

Autonomous Phase

After years of practice the learner approaches the autonomous phase, named because the movements become mostly automatic. One way to tell if an athlete has entered this phase is their ability to perform a simultaneous task without upsetting the initial task. This could be singing a song, counting by three's or four's, or some physical movement that could normally upset a lesser skilled skier, like skiing with one arm above their head or twirling a ski pole.

PRACTICE

To become better the athlete must practice. While seemingly obvious, we must keep this important commodity at the forefront of our planning and exploited when we are on the hill with athletes.

> *"Practice is the most important variable in learning and mastering a motor skill."*
> *-Richard Schmidt*

Prepractice conditions

Drilling holes in the snow and setting courses is a preparctice condition. Although if the athletes are not prepared mentally even the most appropriate course sets will be less than productive.

Motivation for learning

Motivating the athlete is essential for fruitful learning. If the athlete does not understand the importance of a certain practice session then they will approach it with a different mind-set than if they perceive it as a key in their training. You, as the coach, may believe that running a certain gate combination or performing a certain freeskiing drill is important for an athletes improvement, but if the athletes perception is different they may perform the drill or run the course but lack the gusto that is needed for actual learning.

Making the task seem important

Understanding how a drill or training course fits into an athletes long term plan will create a learning situation where the athlete is more involved. Athletes that just go through the motions are less likely to “try hard” or “give it their all” in training. As coaches we must create a communication path where we listen to what the athlete thinks they need while attempting to convince them of what you perceive they need. When these two ideas become cemented, the athlete “buys into” the plan and they are more able to benefit from the training.

Deliberate practice

When people see "élite" ski racers they often think that a large part of their success is because they possess a certain gene or are "just born to be a great ski racer". As wonderful as this seems, it is not the reality. This "innate" or "natural gift" explanation is only a convenient justification for the athlete's seemingly mysterious achievement.

> Élite in Latin is *electus* or "chosen". No wonder we are easily lead to believe that élite performers are in some way genetically determined!

Successful athletes are the product long hours of practice. While all practice is valuable, the most effective practice in terms of learning comes from deliberate practice. Deliberate practice is defined as activity in which the participant is fully engaged in concentration on some aspect of the activity with the intention of improvement.

In the past we have utilized expressions like: "directed free skiing" and "guided free skiing". While we know "free skiing" or this out of the gates activity is important, the concept of "deliberate practice" takes this free skiing activity one step farther.

Components of Deliberate Practice:

- **The athlete must be motivated to attend to the task.** During free skiing there is a conscience effort toward the task. Imagine the coach has determined that the athlete needs to have their hands in front of their body. The athlete could be assigned some exercise like clapping their hands while skiing GS size turns. Or, the athlete could be out ripping it up with her friends, but constantly in the back of her mind is her hand location. She is constantly attending to the task.

- **The athlete must exert effort to improve performance.** This exertion comes from two sources: mental and physical. This is the mental concentration or attention to the goal, as well as the physical attempts to accomplish the goal. A skier constantly falling into the backseat should be coached to exert ankle flexion by creating tension in his ankles. An internal red light should go on in his brain brighter than any other blunder in his technique whenever he feels the back spoiler. With this feedback, he is mentally exerting effort to this problem. Physically, he knows to create tension in the ankles prior to be shoved in the backseat. He is exerting an effort prior to, during and after each turn as to the success of his task of staying more centered or athletic on his skis.

- **The design of the task should take into account the athlete's knowledge so that the task can be correctly understood after a brief period of instruction.** If an athlete is having difficulty releasing her edges at the beginning of the turn, she needs to have a prerequisite knowledge of how the ski releases from the ankle, what the knee will do, and how the pelvis and rest of the body will follow into the new turn. With this knowledge she will respond to feedback from her coach without confusion.

- **The athlete should receive immediate informative feedback and knowledge of results on their performance.** This feedback can come from the coach, and as body awareness (gross and fine) increases, the athlete will develop their own feedback source.

- **The athlete should repeatedly perform the same or similar tasks.** If the athlete has only learned to turn their skis with upper body rotation, they need to practice exercises and drills that are directed toward that rotary problem. Doing a falling leaf exercise is nice but will only enhance edging skills and will do little to encourage the desired rotation this skier needs. Better to learn hop turns, ski fall-line moguls, or play with short radius turns switch.

Check out SkillsQuest and the USSA Alpine Skiing Guide to Ski Fundamentals for more practice ideas.

PROGRESSIONS

Good skiing consists of a flow of continuous movements through the course and down the hill. This proficiency comes from the connection and timing of many other movements we describe as "technique". Learning and mastering these movements along with the efficient connecting of the movements in a desirable order and timing can be accomplished with progressions.

A progression is a teaching or coaching method used to advance the athlete through the learning continuum or to greater depth of mastery by breaking the area in need into smaller more manageable parts.

First the coach needs to establish the athlete's problem and need. For example imagine the athlete that constantly sits back. The "problem" is sitting back and the "need" is a motor pattern to move him forward on his skis. Breaking this down into smaller manageable steps may look like:

1. Athlete on skis standing on the flats while the coach pushes and pulls ski tips back and forward, while athlete attempts to stay perpendicular with the skis.
2. Athlete traverses slope while moving body forward and aft along length of the skis from the ankles.
3. Athlete traverses slope on downhill ski while moving body forward and aft.
4. Athlete traverses slope on uphill ski while moving body forward and aft.
5. Athlete skates down shallow slope trying to gain speed.
6. Athlete in a traverse makes a deliberate weight transfer off downhill ski to uphill ski.
7. Athlete in a traverse makes a deliberate weight transfer from the downhill ski to uphill ski with extension of the uphill leg only
8. Athlete in a traverse makes a series of uphill steps trying to move forward with each step.
9. Athlete makes a turn with a deliberate weight transfer off downhill ski.
10. Athlete makes a turn with a deliberate weight transfer off downhill ski while downhill ski tail is raised.

A progression is just that "progressive" from the simple to more complex; ending in the desired response. The number of steps is dependent upon what it takes to get the athlete to the desired movement(s). The above example included 10 steps. In reality the coach should be constantly asking themselves should I break this down into more steps or should I skip a step?

Progressions do not have a set number of steps. In fact they may be just one exercise. The coach could also have this "sitting back" athlete just race a peer by skating down the hill. On a beginner slope they could just ski backwards. Hop turns with the tip on the snow. They could ski moguls or terrain in the terrain park with radical terrain changes like flat to steep. Seemingly fun activities for the athlete, meanwhile teaching the athlete how to re-centering on the skis.

See "SAMPLE PROGRESSIONS" on page 74 for more ideas.

FEEDBACK

Feedback is information that is returned back to the athlete informing them of their performance or the results of their performance. Feedback can be classified into two types: *inherent* feedback and *augmented* feedback.

"After practice, feedback is the most important variable in learning and mastering a motor skill."
-Richard Schmidt

Inherent feedback is sensory information from the movement, such as how the snow felt – smooth or bumpy. Pressure on the back of the leg is a sensation that informs the skier that his center-of-mass is aft Hearing very little sound from the skis might indicate a carved turn. For inherent feedback to have value, the ski racer should have an established reference-of-correctness. They can then compare the intrinsic feedback or sensations with a desired orientation. Inherent feedback is the more beneficial type of feedback for learning or adjusting a previously learned motor skill.

Augmented feedback is typically the verbal communication that a coach uses to let the athlete know something about what they just did.

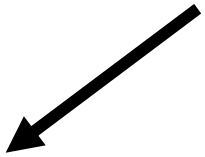
Augmented feedback is information that is made available about the task that is supplemental to, or augments, the inherent feedback. Augmented feedback can be further broken down into *knowledge of performance* or *knowledge of results*. Knowledge of performance is typically letting the athlete know what they did with a body part. "Your outside leg was longer or straight in that turn". Knowledge of results is more objective. "Your outside leg was 10 degrees straighter when your skis were in the fall-line".

Augmented feedback is not limited to verbal feedback. This communication can be by demonstration, pointing to a body part, video replay or other methods.

Verbal feedback can take many forms with some forms more powerful than others. Examples could be:

Descriptive	Prescriptive
“You tipped in”	“You need to stay out over your outside ski”
“You’re sitting back again!”	“Stay forward”
“You forgot your pole plant”	“Plant your pole”

Taking this a step farther...



...Instructive
...by having your shoulders over your outside ski.”
...by flexing your ankles, and extending your knees and hips.”
...by timing the swing with your edge release.”

Descriptive feedback relays a level of information telling the athlete what they did, this is not the most effective form of feedback. The most successful coach spend 50% of their time giving instruction (the next highest single event is praising at 7-14% of their time).

MAKE THE FOLLOWING FEEDBACK BETTER:

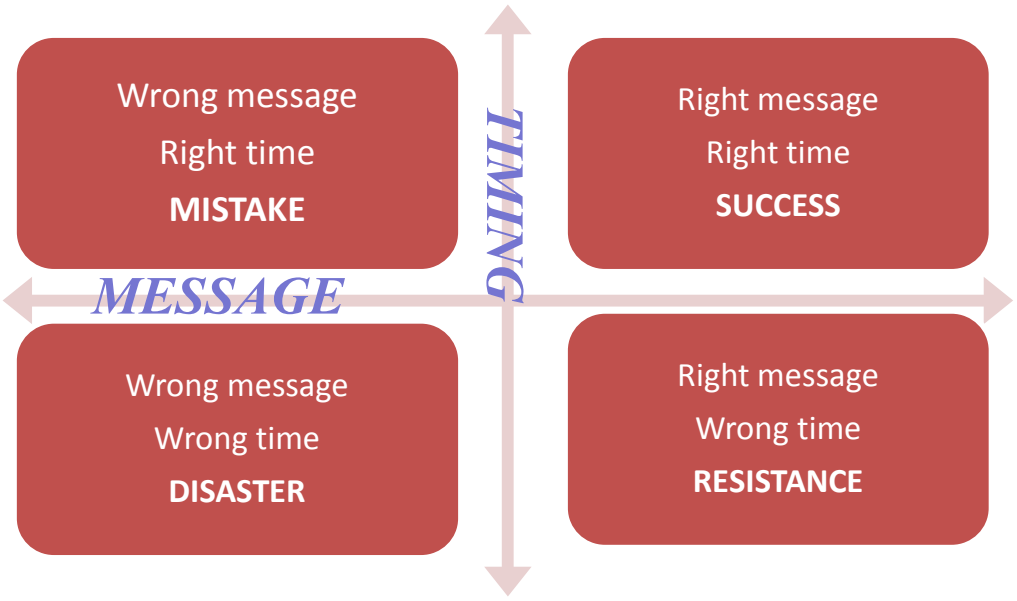
1. "Don't sit back"

2. "Get forward"

3. "Get more aggressive"

4. "Flex your ankles"

Two Critical Components of Feedback



APPENDIX

SAMPLE PROGRESSIONS

These progressions are intended to give the coach examples of how to plan for and teach a new skill or exercise.

Sideslipping with Edge Sets

1. Give the name of the maneuver
2. Explain briefly that it includes three components: sideslip, edge set, and pole plant
3. Since none of these components can be performed without a good stance, parallel position is reviewed
4. Standing on a slope, athletes are given a brief verbal description of parallel position. They immediately assume this position in-place with the coach giving additional cues
5. A quick traverse is then performed in both directions assuming parallel position
6. Standing still again, the athletes are informed and shown that the ankles and knees release the skis
7. The entire group (to maximize practice) initiates a sideslip with a slight extension of the legs while moving the ankles and knees slightly downhill
8. Repeat several times with feedback given while all athletes practice
9. To show the effect of fore-and-aft pressure, a falling leaf exercise is performed. Since practice time is important, several athletes perform the exercise simultaneously
10. Next the entire group performs a sideslip (to maximize practice), this time straight down the fall-line is encouraged.
11. When a successful fall-line sideslip is achieved by the group, the edge set is introduced and explained as the opposite movement that released the skis. The athletic body position is continually encouraged with appropriate feedback given.
12. A stop-and-go Simon-says type game is played with all athletes simultaneously (practice time maximized).
13. Speed play is incorporated into the stop and go game. Go fast, go slow, stop fast, stop slow... Body position and edge set mechanics are encouraged with individual feedback while athletes continually practice.
14. Standing still (in an athletic stance), the pole plant is introduced. First, statically athletes plant the near the three o'clock position. Body position is again emphasized.
15. When all athletes are successful with the pole plant the edge set is added standing on a slope. Now the athlete just increases edge and simultaneously plants the pole creating necessary body angles. All athletes can be doing this together (practice time is again maximized).
16. Now back to the sideslip and edge sets which the athletes are familiar with
17. This time the pole plant is added
18. The stop-and-go game is played again
19. If time permits the speed play exercise is done with the pole plant
20. Lastly some markers are put out to challenge the athlete

Always end a progression with the entire skill.

Whirlybirds

1. Traverse
2. Traverse with fore then aft upper body movements
3. Falling leaf exercise
4. Ski backwards in a wedge on green terrain
5. Ski backwards in a wedge encouraging skis matching
6. Ski backwards with Christy encouraging skidding
7. While skiing backwards have tips seek the fall-line
8. From fall-line make turn up hill
9. From fall-line make turn up hill and start skiing backwards
10. Put entire 360 together
11. Add multiple whirlybirds
12. To make task more difficult put arms at sides, or perform on one ski

Hockey Stop

1. Sideslip
2. Hop turns encouraging counter rotation
3. Straight run to sideslip
4. Straight run to sideslip with counter rotation
5. Straight run to long sideslip
6. Straight run to long sideslip decreasing size of corridor
7. Sideslip
8. Edge sets while not moving
9. Sideslip with edge sets
10. Non-moving edge sets with pole plant
11. Sideslip to edge set
12. Sideslip to edge set with coinciding pole plant
13. Straight run to sideslip to edge set with pole plant

These progressions are not meant to be end-alls. They are examples that could be used in their entirety or picked apart. Steps may need to be added for some athletes and removed for others.

EXAMPLE DAY COACHING

The group meets at a predetermined time, say 8:40. The coach knowing that the athletes will be curious for what the day will look like jumps right into it:

"Today we are going to ski as a group. After warm-up we will go to Bomber Bowl for some free skiing. We are going to have some fun there, because after a while we will give it a go without our ski poles."

Figuring out the rest of the day, the coach needs to get some info from the athletes and get them going:

"Did everyone bring a lunch or lunch money?" "Anyone meeting parents or need to do something outside of the group at lunch time?" "Good because we will do a fun exercise during lunch" "Okay meet you at the bottom of the Summit Lift in 15 minutes at 9 o'clock ready to ski."

After a couple of runs in Bomber Bowl:

"Okay let's put our poles here by this tree where they will be out of the way of the public, and head to the lift", says the coach.

After they all get off the lift:

The coach says, "Let's start off with Baby Bomber to get the feel for this" as he pushes off for the run.

Without stopping, the coach says "Freddy, be sure and move your whole body down the hill". Then again to Sally without really stopping: "Sally, hold your hands up. Pretend you have your poles".

Meanwhile the kids believe they are just free skiing and having fun in Bomber Bowl.

At the lift while the team is partnering up: "Wow, that takes some work. We really have to be aware of that perpendicular body attitude! Everyone do their geometry homework?, ha ha.."

At lunch in the club house the coach uses some of the plastic eating utensils to again make his point about being at right angles to the hill. Then with their boots off has them walking around on their heels to feel the muscle in the front of the leg. "Ah that ought to warm us up". "Okay everyone full of nutritious food and hydrated?" "Meet outside by the skis in 10 minutes"

"So are we going to run gates this afternoon?" says Jimmy.

"Not this weekend" says the coach in a convincing voice. "We are working on that balance thing". "Jimmy, do you think that will help us?"

I dun no? Says Jimmy sounding disappointed. "I guess so". Giving the obligatory remark.

The coach gets down on one knee in front of Jimmy. "Hey buddy, you told me during the goal setting evening you would do anything to go fast".
"Yeah, but…" Jimmy doesn't finish his sentence.

"Yeah, but…. The coach mimics, "this balance work is not just fun but is some of the fundamentals for our skiing in the gates".

The coach stands up and turns toward the rest of the group. "Who thinks skiing without our poles will help make up faster in a race course?"

Hands shoot up. "Hey can you guys ride up with Jimmy and tell him how?"

"Oh yeah, you bet" says one.

After the lift ride and an after a warm-up run. The coach says "let's try this", as he rubs his stomach and pats his head.

"No problem" says one of the kids.

"Yeah no problem" says the coach as he skis off rubbing his stomach and patting his head. "Follow me!:

The kids look briefly in disbelief and with a chuckle jump in behind the coach.

After a couple runs of this drill. The coach asks "who can think of an even harder drill?"

"I can, I can" says Jessica. "Let's ski with our arms crossed".

"Cool" say the coach as he jumps off the cornice with his arms crossed.

Without much thinking the kids follow crossed arms and giggling.

This has been an example of a day outside of the gates with a group of young athletes. The athletes view the day as play although most of the runs are directed practice. The athletes are informed of the day's activities in the beginning and then when the time arises they are informed as to the benefits they get from these fun activities with respect to their personal goals. The coach lets the athletes sell Jimmy on what they are doing which results in even greater buy in with these crazy drills. Then lets the athletes themselves invent drills to continue challenging their skiing skills. Did you notice that this coach did not stand around over explaining the drills when a quick sentence or demo would suffice. Also the coach did not even stop to give feedback. Rather he gave reference to past coaching and just backed it up with quick tips and cues to help with the difficult tasks all while hardly stopping.

ALPINE OFFICIALS MANUAL

The following is taken from the Coaches as Officials Chapter of the 2014/15 USSA Alpine Officials Manual

OVERVIEW

In ski racing, we must all function as team players; no one person can stage a successful competition without the support and cooperation of everyone involved. In order to combine talents in the most effective way and provide this support and cooperation, we must have an understanding of the roles played by others. This understanding will allow coaches, officials and parents to present a professional and objective appearance and viewpoint.

GENERAL RESPONSIBILITIES

Coaches have numerous responsibilities. This chapter discusses some of the responsibilities of a coach at competitions to the competitor, the event organizers and race officials. It also discusses the coach's responsibility to project a professional image.

For all USSA-sanctioned *non-FIS events*: All Jury members, Jury Advisors (Start Referee or Finish Referee), Chief of Course and Course Setters need to be current members of USSA as a Coach (which includes an Officials' membership), or an Alpine Official. ***NOTE: USSA members whose status is PENDING on the USSA website membership roster may not serve as Jury members, Jury Advisors, Chief of Course or Course Setters.***

For USSA-sanctioned *FIS events*: If a FIS Federation lists a foreign coach on their entry form, the Federation is offering their guarantee that the coach has the knowledge and ability to fulfill the duties of a Team Captain: e.g. serve as a Jury member or set a course. With this understanding, the above individuals may also be qualified members of a foreign federation recognized by FIS.

For USSA-sanctioned *FIS and non-FIS events*: Unless an exception has been granted (e.g. CAN-AM events), coaches must have a current Coach Membership to participate in any capacity, e.g. on-hill coaching, at any USSA event. In addition to the USSA membership requirement, USSA member coaches who wish to serve as Referee, Assistant Referee or Course Setter at any USSA-sanctioned event – either scored or non-scored – must be certified Referees.

NOTE: For USSA scored events, Jury Advisors (Start and Finish Referees) must be a certified Referee, Jury Advisor or Chief of Race; they should be a certified Referee, Jury Advisor or Chief of Race for USSA non-scored events. *When online Competition Official (CO) certification becomes available, Jury Advisors at USSA non-scored events must – at a minimum – be certified Competition Officials.*

Failure to observe these requirements for USSA-sanctioned events will invalidate liability insurance.

RESPONSIBILITIES AT AN ALPINE COMPETITION

The coach has three main responsibilities at an alpine competition:

1. Represent their athletes in all aspects of the competition to the best of their ability.

2. Assist event organizers and race officials in assuring quality competition that is fair for

all competitors.

3. Project a professional image to competitors, officials, parents and the skiing public.

Coaches must accept these responsibilities, but first and foremost they must remember they are there for the competitor.

RESPONSIBILITIES TO THE COMPETITOR

The following are the responsibilities of the coach to the competitor as they pertain to a competition, as well as some general statements as to how these responsibilities should be met.

1. **ON-HILL SECURITY/PROTECTION:** It is each individual coach's responsibility to verify the overall on-hill security/protection of their athletes at all competitions:
   a. Check courses, start area, spill zones, finish area and other on-hill course/security protection.
   b. Voice concerns to the Jury.
   c. Assist athletes to warm up (in a secure environment), train and race at their ability.
   d. Remove competitors with questionable ability from an event.

2. **RULES:** Each coach has the responsibility to assure their competitors know and understand all of the USSA/FIS rules that pertain to the race. The coach should:
   a. Be well versed on the rules and communicate the rules to the competitors.
   b. Make sure pertinent rulebooks are part of the race day equipment.
   c. Make sure competitors follow the rules.
   d. Set a good example by following and enforcing the rules and demonstrating an appreciation for them. *Coaches who do not observe the rules or who are engaged in obvious manipulation of the Official Results and Penalty may be sanctioned; suspected penalty manipulation will result in an event not being scored until it can be fully reviewed.*
   e. Accept the responsibility to assure all competitors follow the same rules and standards.

3. **RACE SCHEDULES AND REGULATIONS:** A coach must know the event schedule and ski area requirements and must assure their competitors understand and observe them:
   a. Read all pre-event information.
   b. Attend Team Captains' Meetings.
   c. Check Official Notice Board for Report by the Referee* and other updates.
   d. Relay information to competitors.
   e. See that rules are enforced, especially in regard to competitors' security/protection.

   * Report by the Referee must be reviewed regardless of a coaches' belief in competitors' status

4. **ATHLETE REPRESENTATION:** A coach represents their athletes at all formal race activities (Team Captains' Meetings, Jury Meetings, etc.):
   a. Check race entries prior to Team Captains' Meeting.
   b. Check Seed Board for proper points and seeding.
   c. Check Report by the Referee for DNS's, DNF's and especially DSQ's after each run.
   d. Advise and assist competitors with Protest(s), if appropriate.
   e. Represent competitor(s) at Jury Meetings.

RESPONSIBILITIES TO THE EVENT ORGANIZERS AND RACE OFFICIALS

The following are the responsibilities of the coach to the event organizers and race officials.

1. **JURY:** Each coach should be qualified and willing to serve as Referee or Assistant Referee as needed:
   a. Keep current on the rules by attending officials' and coaches' continuing education clinics.
   b. Know responsibilities of the Referee.
   c. Have current Referee certification and USSA Coach Membership and review provided educational materials. (Coach Membership also includes Official.)
   d. Fulfill all reporting requirements.

2. COURSE SETTER: Each coach should be qualified and willing to serve as a Course Setter as needed:

   a. Know current course setting specifications and adhere to them.
   b. Work with Jury and organizers.
   c. Be prepared with own drill, wrench, and other course setting equipment as needed.
   d. Set a fair and legal course appropriate for the ability of the field.

2. **ORGANIZATION SUPPORT:** As the liaison between organizers and competitors, a coach should give organizers proper support:
   a. Assure that all entries are submitted within the proper time frame.
   b. Communicate all required information to competitors.
   c. Verify that competitors attend all required functions (banquets, awards, etc.).
   d. Require that competitors observe all rules.
   e. Communicate injury information to Technical Delegate/Jury even if injury occurred on a warmup/training course provided by the Organizing Committee.
   f. Be courteous and respect all officials and race workers.
   g. Set a good, professional example.
   h. Volunteer to assist on the Jury.
   i. *Thank all officials and race workers.*

RESPONSIBILITY TO PROJECT A PROFESSIONAL IMAGE

The third area of a coaches' responsibility is to project a professional image at all times during all competitions. Coaches not only represent themselves, they also represent their athletes, clubs, athletes' parents, the ski association and the sport in general:

1. Realize that appearance and actions must reflect favorably upon the individual and the sport.

2. Treat the organizers, officials and area operators in a courteous, professional manner.

3. Promote the sport and its image in a favorable fashion to the skiing public.

4. Work with the press and media in a positive, professional manner.

RULES TO KNOW

The best way for a coach to learn the rules of competition is to attend their division's officials training. Coaches should take the referee course. We recommend that all coaches do this by their second year (courses are usually offered in the fall). These are minimum standards of knowledge for a Level 100 coach (references to the rules numbers in the USSA Alpine Competition Regulations, or ACR, are included).

1. **Before the start**
   - *Slipping - teach to slip vertically, not sliding through each gate*
   - *If the racer loses their bib, they should let the start referee know as soon as they get to the start to get a replacement bib*
2. **In the start**
   - The racer may start any time between 5 seconds before and 5 seconds after the start command “GO” or within 10 seconds after “GO” in Slalom.
   - *If they start outside this window they may be disqualified (false start 613.7)*
   - *If they arrive late to the start, they may granted a provisional run (delayed start 613.6)*
   - *The racer must start with their poles planted in the ground (613.3)*
3. **During the race**
   - **INTERFERENCE**
     - *Grounds for interference include any blocking of the course by a person or object, absence of a gate knocked down and not replaced, other similar incidents beyond the control of the racer that cause a lengthening of the racing line and affect the time (623.2)*
     - *Racer MUST STOP IMMEDIATELY and request a re-run from the nearest jury member (623.1.1)*
     - *The coach may also make this request, but only if the racer stops*
   - **Yellow flag zone - speed events**
     - *Athlete must stop immediately*
     - *If DH training run, skier will likely be re-started at that point*
     - *Let the athletes know where the yellow flag zone is during inspection*
   - **Clear disqualification**
     - *Racer must immediately exit the course after committing a clear DQ or could face sanctions for future races*
   - **Hiking**
     - *If hiking a long way, the hiking racer should let an oncoming racer pass before continuing to avoid obstructing that racer, may be grounds for DQ*
     - *The skier must exit the course if overtaken by another skier.*
     - *Skier may not continue in DH, Super G or USSA GS after a fall or stopping.*
   - **Lose a ski**
     - *In USSA races, you cannot put a ski back on and finish*
     - *A racer can finish on one ski if the ski is lost no more than 2 gates from the finish in SL/GS/SG and 1 gate from the finish in DH (U629.4)*
   - **Passage of the gate**
     - *Racers need to understand the concept of gate line, and the difference between open and closed gates*
     - *A gate has been passed correctly when both the competitors' ski tips and both feet have passed across the gate line (661.4.1)*

  - *Where there is no outside pole, both feet and ski tips must have passed the turning pole on the same side, following the natural race line of the course. If the racer has not correctly passed the imaginary line from turning pole to turning pole and does not follow the natural race line, then he has to climb back up and pass around the missed turning pole (804.3).*
  - *If a gate is out, the racer must either pass where the gate was (dye mark) or stop to request a re-run (661.4.1.3)*
- **DQ list**
  - *The athletes are ultimately responsible for checking the DQ list, although the coach should always check and be aware of the short protest window*
  - *Protests must be submitted within 15 minutes of the posting of the DQ list, and must be made by the coach in writing*
- **Protests must be made**
  - *Of a DQ within 15 minutes of the posting of the DQ list*
  - *Of the condition of the course within 60 minutes prior to the race start*
  - *Against the timing within 15 minutes of the posting of the unofficial results*
  - *Against another competitor's equipment within 15 minutes of the finish of the last competitor*
- **Equipment**
  - *Helmets designed and manufactured for the particular discipline of ski racing being contested are required for all competitors and forerunners in all USSA events and official training. Helmets must bear a CE mark and conform to recognized and appropriate standards such as CEH.Din 1077, ASTM F2040, SNELL S98 or RS 98*
  - *Maximum binding stack height is 50mm*
  - *Maximum boot sole height is 43mm for all ages*
  - *Minimum acceptable dimensions for ski length, radius, and width should be checked yearly*
- **Duties of the referee (601.4.10)**
  - *Drawing of the start numbers (scored races)*
  - *Inspection of the course immediately after the set*
  - *May change the course by adding or removing gates, only if necessary for a safe, legal, and fair race*
    - *Only the referee has this right*
    - *Referee must inform the course setter of any changes*
  - *Must review the gatekeeper cards and start and finish referee reports and complete the Report of the Referee (DQ list) in a timely fashion after each run*
  - *Be available for any jury meetings*
  - *Referee must have a current USSA coach or official membership with current referee certification (officials continuing education required every other year)*
- **READ the rules section of the Competition Guide**
- **Bring the ACR with you to events**

Coaches must be a certified referee in order to set courses at FIS, USSA scored, Junior Olympic, and Junior Olympic qualifying events. They must be current certified referees to referee at any USSA event.

USSA SPORT EDUCATION PROGRAM:
Building Towards Success

The USSA Sport Education Department works closely with the Alpine Officials group to improve the quality and professionalism of our alpine events. Successful coaches must have a strong working knowledge and respect for the rules as outlined in the FIS ICR and USSA ACR, (Alpine Competition Regulations found in Chapter 8 of the USSA Competition Guide).

Officials' training is arranged through region/state/division officials' organizations. Look for details at http://alpine.usskiteam.com/alpine-programs/officials/certification. USSA Sport Education encourages all member coaches to attend these training sessions and become certified Referees regardless of their coaching level or experience. To maintain official's certification, biennial attendance at Officials' Continuing Education Clinics is required. This is in addition to the continuing education requirements to keep coaching certification status current.

USSA COACHES' CERTIFICATION STRUCTURE

USSA Sport Education offers on-snow clinics and presentations as well as on-line courses and webinars to all of its member coaches. To support the professional development of coaches, these clinics are structured in a progression that allows a coach to continually upgrade their educational background in alpine ski racing. Through these levels of courses, coaches can obtain certification. An outline of the certification process is below:

Entry Level Coach – All USSA member coaches who are not certified will be required to review and complete a "Fast Start Coaching Course" every three years before their membership will be valid. This on-line course covers the essentials of coaching, including general coaching responsibilities, long-term athlete development, planning, coaching ethics, risk management, and rules of sport. These coaches will also be linked in with continued learning opportunities specific to their needs and the athletes they will be coaching.

Level 100 Coach – The Level 100 coach will have attended an on-snow Alpine Ski Fundamentals clinic and passed the corresponding on-line exam, and have current First Aid/CPR certification. It is recommended that all Level 100 coaches also become certified alpine Referees. Coaches without significant experience with course setting must also complete the Introduction to Course Setting course prior to attending the Level 200 clinics.

Level 200 Coach – The Level 200 coach will have attended an on-snow clinic in Alpine Technique and Tactics and passed the corresponding on-line exam. They must complete the General Coaching Principles course offered by the American Sport Education Program (ASEP). Level 200 coaches must also complete additional course work in sport science areas supporting their coaching needs. Level 200 coaches must be Level 1 Alpine Referees.

Level 300 Coach – The Level 300 coach will have attended on-snow clinics in Advanced Slalom, Giant Slalom, and Speed Technique and Tactics and have passed a written exam, skiing assessment and movement analysis assessment. Level 300

coaches also must complete additional course work in sport science topics. Level 300 coaches must also earn Level 2 Referee certification through their activity record as Jury members at races and recommendation from upper level officials.

Elite Level Coaching – Top level coaches will also have opportunities to develop and enhance their coaching knowledge through the return of the USSA National Coaching Academies. These academies offer longer blocks of intensive on-snow and classroom training with national team staff and other experts in skiing and related fields. Additionally, apprentice and mentoring opportunities with the U.S. Ski Team staff may be coordinated through the USSA Sport Education Department.

Continuing Education requirements for each level will ensure that all coaches remain current and up-to-date in the latest developments and advances in coaching their sport. All certified coaches are required to complete one full continuing education credit every two years. There are many options available to meet this requirement.

NOTE: *Coaches' Continuing Education is not the same as Alpine Officials' Continuing Education; biennial attendance at an Alpine Officials' Continuing Education Clinic is required in order to retain Alpine Officials' Certification.*

For more information about coach education and certification, contact the USSA Sport Education office at (435) 647-2050 or email education@ussa.org. You can also find information on the web at http://alpine.usskiteam.com/alpine-programs/coaches.

USSA BACKGROUND SCREENING

Over 75% of USSA's membership is under the age of 18. In order to help ensure that these members are in a secure environment, USSA has implemented a strict policy that is in keeping with the standards of many youth sports organizations, schools and recreational programs in the US. All USSA employees, member coaches and officials are subject to the background screening process.
Background re-screening will be required every three years for all USSA employees, coaches and officials. Approximately 1/3 of the membership will be re-screened during any one-year period with the remaining re-screening completed during the next two-year period.

Program is more fully explained on the USSA website or at:

http://my.ussa.org/membership/start.

FIS RULES FOR CONDUCT

I. Rules for the Conduct of Skiers and Snowboarders
(Wording 2002)

1. Respect for others
A skier or snowboarder must behave in such a way that he does not endanger or prejudice others.

2. Control of speed and skiing or snowboarding
A skier or snowboarder must move in control. He must adapt his speed and manner of skiing or snowboarding to his personal ability and to the prevailing conditions of terrain, snow and weather as well as to the density of traffic.

3. Choice of route
A skier or snowboarder coming from behind must choose his route in such a way that he does not endanger skiers or snowboarders ahead.

4. Overtaking
A skier or snowboarder may overtake another skier or snowboarder above or below and to the right or to the left provided that he leaves enough space for the overtaken skier or snowboarder to make any voluntary or involuntary movement.

5. Entering, starting and moving upwards
A skier or snowboarder entering a marked run, starting again after stopping or moving upwards on the slopes must look up and down the slopes that he can do so without endangering himself or others.

6. Stopping on the piste
Unless absolutely necessary, a skier or snowboarder must avoid stopping on the piste in narrow places or where visibility is restricted. After a fall in such a place, a skier or snowboarder must move clear of the piste as soon as possible.

7. Climbing and descending on foot
A skier or snowboarder either climbing or descending on foot must keep to the side of the piste.

8. Respect for signs and markings
A skier or snowboarder must respect all signs and markings.

9. Assistance
At accidents, every skier or snowboarder is duty bound to assist.

10. Identification
Every skier or snowboarder and witness, whether a responsible party or not, must exchange names and addresses following an accident.

EQUIPMENT

Ski racing success is dependent on the selection, preparation, and maintenance of appropriate and approved (USSA, FIS) equipment for each discipline.

PHASE 1	PHASE 2	PHASE 3	PHASE 4	PHASE 5	PHASE 6
Biological Age Pre Puberty **Age** 2–6 years old **Play Age** 1–4 years in sport	**Biological Age** Pre Puberty **Age** 6–10 years old **Training Age** 1–4 years in sport	**Biological Age** Pre Puberty (Before Growth Spurt) **Age** Girls: 10–13: J4 (J5–J3) Boys: 11–14: J4 (J4–J3)	**Biological Age** Puberty (Growth Spurt) **Age** Girls: 11–14: J3 (J4–J3) Boys: 12–15: J3 (J4–J2)	**Biological Age** Post Puberty (After Growth Spurt) **Age** Girls: 12–16: J3 (J4–J2) Boys: 14–17: J2 (J3–J1)	**Biological Age** Full Maturation **Age** Female: 16+ J2–J1 Male: 17+ J1 **Training Age**
Equipment Selection & Preparation					
Equipment Selection & Preparation **Skis:** Chest high with a variation based on height, weight and skill level **Boots:** Proper boot fit with soft even forward flex for ankle movement to facilitate a balanced, athletic stance **Protection:** Helmet required at all times **Poles:** Optional - introduce at older levels as skill level develops	Learn USSA rules for all equipment selection **Skis:** 1 pair of skis is sufficient for this group. Head height with a variation based on height, weight and skill level. Introduce ski preparation. **Boots:** Proper boot fit with soft even forward flex for ankle movement to facilitate a balanced, athletic stance. **Protection:** Helmet required. Older athletes may need shin/arm protection. **Poles:** Standard length = forearm horizontal with pole tip in snow.	Adhere to USSA rules for all equipment selection **Skis:** Slalom, GS and super G skis. Develop tuning skills. **Boots:** Proper boot fit and flex are critical for performance. Boot flexes and responds as it interacts with the ski and plate. **Protection:** Head, arm, hand, shoulder, back, teeth (mouth guard) and shin protection recommended, based on event. **Poles:** GS-standard length. SL-pole guard for blocking & protection, pole may be slightly shorter.	Adhere to USSA and FIS rules for all equipment selection **Skis:** Slalom, GS and super G skis. Refine tuning skills. **Boots:** Proper boot fit and flex are critical for performance. Boot flexes and responds as it interacts with the ski and plate. Performance considerations may include flex, cant, forward lean, ramp angle and foot beds. **Protection:** Head, arm, hand, shoulder, back, teeth (mouth guard) and shin protection recommended, based on event. **Poles:** GS-standard length. SL-pole guard for blocking & protection, pole may be slightly shorter.	Adhere to USSA and FIS rules for all equipment selection **Skis:** Slalom, GS and super G skis with training skis. Tuning skills continue to improve. Insight into waxing and grinding necessary for speed skiers. **Boots:** Proper boot fit, flex and performance. Boot flexes and responds as it interacts with the ski and plate. Performance considerations may include flex, cant, forward lean, ramp angle and foot beds. **Protection:** Head, arm, hand, shoulder, back, teeth (mouth guard) and shin protection recommended, based on event. **Poles:** GS standard length. SL-pole guard for blocking and protection, may be slightly shorter. Custom pole sizing and contouring for individuals.	Adhere to USSA and FIS rules for all equipment selection. Equipment testing including skis, boots, plates, bindings and poles is recommended to maximize performance. **Skis:** Race and training skis for all disciplines. Professional support or consultation is recommended for preparation. **Boots:** Discipline specific boots may be necessary to maximize performance. **Protection:** Head, arm, hand, shoulder, back, teeth (mouth guard) and shin protection recommended, based on event. **Poles:** GS standard length. SL-pole guard for blocking & protection, may be slightly shorter. Custom pole sizing and contouring for individuals.

The Alpine Training System (ATS) is a good general reference for equipment.

Boots are the link between the skier's movement and the action of the skis. To balance and accurately transmit pressure to the skis, the fit needs to be snug and uniform around the athlete's foot. Boots may need to be adjusted to an athlete's biomechanics for optimal fit and function. Considerations include forward lean and ramp angle adjustments for fore/aft balance, and footbeds, cuff adjustment, and canting for lateral balance. The buckles, ladders, power straps, and soles need to be maintained, DIN compliant, and meet USSA and FIS specifications.

Well-fitting boots should feel snug – like a firm handshake – without having to buckle them tightly. Often parents buy boots too big to allow for growth that they don't actually fit until the following year! To check sizing, have the skier stand in the shell (liner removed) and slide the foot forward so the toes just touch the end. When you look behind the child's heel, there should not be more than a ¾ inch space. This allows room for growth. If the skier's feet have stopped growing, then ¼ to ½ inch will provide a closer fit. A young skier can start the season with medium-thick socks and then change to thin socks if his or her feet grow. But wear only one pair of socks; if it's necessary to wear two pairs to obtain a snug fit, then the boots are too big. Socks specific for skiing are warm and wick away moisture.

In order to flex a boot well, the boot needs to fit well; not be too big. It's important to have contact along the whole length of the tongue and not just at the top buckle. This will help

to eliminate shin bruising and keep the heel back so the skier is in position to flex forward.

Boot flex is determined by the skier's weight, ability level, and how fast he or she skis. Since ski boots get stiffer in the cold, a skier needs to be able to comfortably flex a boot inside to know it won't be too stiff when skiing. To see if a child can flex the boot, have him or her bend one leg at a time. Make sure the child flexes the boot and does not just move forward and back inside the cuff. A good test is to see if the child can jump and land comfortably, and walk comfortably. These actions are very hard to do if a boot is too big or too stiff. Boots can also be too soft; it should take some effort to flex a boot.

Skis need to comply with USSA and FIS specifications for the event. Length should complement the skiers height and flex characteristics need to accommodate and be in proportion to the skiers weight, strength, and skiing ability. Ski length for athletes younger than FIS age should be between the chin and nose, while the forehead area is a good rule-of-thumb for GS.

Bindings need to be a current indemnifiable model with the release checked regularly by a certified binding technician.

Goggle are the preferred over sun glasses for all skiing activities, and should always be worn when running gates (FIS recommendation).

When appropriate the athlete should have pole guards, face protection, mouth guards, shin guards, forearm protectors, back protectors, and protective under garments.

Competition Equipment Rules

Alpine FIS and USSA Equipment Rules 2015-16		OWG, WSC, WC, WJC, all COC including NAC		FIS/ENL		USSA U19 (16 years old) and older *		USSA U16 (15 and 14 years old)		USSA U14 (13 and 12 years old)		Masters ***
		Men	Women	Men	Women	Men	Women	Men	Women	Boys	Girls	Men & Women
Minimum Ski Length	DH	218 cm	210 cm	213 cm	205 cm	210 cm DH or SG	205 cm DH or SG	DH or SG **		DH or SG **		see note below
	SG	210 cm	205 cm	205 cm	200 cm	200 cm	195 cm	183 cm - SG or GS **		SG or GS **		
	GS	195 cm	188 cm	190 cm	183 cm	180 cm	175 cm	GS **		GS **		
	SL	165 cm	155 cm	165 cm *(155 cm for 16 year olds)*	155 cm	165 cm *(155 cm for U19 men)*	155 cm	SL **		SL **		
Minimum Ski Radius	DH	50 m		50 m		45 m		DH or SG **		DH or SG **		see note below
	SG	45 m	40 m	45 m	40 m	33 m		27 m		SG or GS **		
	GS	35 m	30 m	35 m	30 m	23 m		17 m		GS **		
	SL	no rule		no rule		no rule		no rule		no rule		
Profile Width Under Binding	DH	max 65 mm		max 65 mm		not restricted		not restricted		not restricted		see note below
	SG											
	GS											
	SL	min 63 mm		min 63 mm		min 63 mm		not restricted		not restricted		
Maximum Binding Stack Height *Measurement includes ski + plate + binding*		50 mm		50 mm		50 mm		50 mm		50 mm		50 mm
Maximum Boot Height *Measurement from sole to top of foot bed*		43 mm		43 mm		43 mm		43 mm		43 mm		45 mm

* In USSA U19 (16 years old) and older racing, athletes may use equipment that conforms to either the rules as outlined for USSA racing or as outlined for FIS/ENL racing. Athletes are encouraged to use equipment that conforms to FIS/ENL to enhance their adaptation to those specifications.

** Where the rule above only notes an event (no measurement listed), or combination of events, (e.g. U14 SG as SG or GS) the requirement is that the ski must be marked by the manufacture with that event designation.

*** USSA Masters rules conform to the FIS Masters equipment rules. USSA recommends that competitors in USSA Masters events compete on equipment designed for the particular discipline (DH, SL, GS, SG), but does not make any recommendations in regards to ski length, radius or profile width.

*** For FIS Masters Competitions, equipment rules in regard to ski length (except SG), radius and profile width are recommendations. The minimum ski length for SG skis is compulsory for MAS races. No length, width or ski radius restriction for ladies above 55 and men above 65 years of age. The FIS recommendations for ski length, ski radius and profile width can be found in the current *FIS Specifications for Competition Equipment*.

NOTE: U12 and younger athletes should limit skis based upon the recommendations in the Alpine Training System and the Course Setting matrix. U12 - 2 pairs (SL, GS), length skill/size appropriate. U10 - 1 pair (multi-event), length skill/size appropriate.

USSA AND FIS HELMET REGULATIONS

During the USSA Congress in May 2015, the Alpine Sports Committee passed regulations updating the requirement for U14 and older athletes related to the use of helmet for GS, SG, and DH meeting the new FIS standards. Following are the complete USSA helmet regulations including those changes as published in the 2015 Alpine Competition Guide.

Equipment is the responsibility of the athlete and in the case of a minor, their parent or guardians. Equipment must be maintained and utilized in accordance with the manufacturer's instructions.

In FIS competitions, international competition rules will apply.

Helmets designed and manufactured for the particular event of ski racing being contested are required for all competitors and forerunners in all USSA events and official training . Helmets must bear a CE mark and conform to recognized and appropriate standards such as CEH.DIn1077, ASTM F2040, SNELL S98 or RS 98.

For the season 2015, it is recommended that athletes U14 and older use helmets that meet the new FIS standards for all USSA GS, SG, and DH competitions. Beginning in season 2016 athletes U14 and older must use helmets that meet the new FIS standards for all USSA GS, SG, and DH competitions.

In Kombi competitions beginning in season 2015, athletes must use the helmet that meets the standards for the faster discipline being contested.

Helmets must cover the head and ears. Helmets with spoilers or edges that stick out are not permitted. Protective features integral to the event being contested, such as chin guards on SL helmets are permitted. Soft ear protection is only permitted for helmets used in SL.

Helmet mounted cameras are not allowed on helmets in official training or competition.

USSA does not wish for officials to disqualify, or deny entry or starts to an athlete because the athlete has personalized his/her helmet with stickers, glitter, helmet cam mounts or other applications.

USSA does not specify nor recommend nor make any warranties as to the fitness for use of any particular ski helmet design or brand name. USSA undertakes no responsibility, liability or duties to any competitor in connection with the requirement that helmets be utilized. It is the sole responsibility of the competitor to select an appropriate helmet for accident protection in ski racing.

Caution: Age and use affect the protective qualities of all safety helmets. Some older helmets and any helmets that have been damaged either in a racing fall or from other impact may no longer provide sufficient protection – even if there are no visible indications of damage.

Anyone with questions regarding their helmet should contact the manufacturer for any specific guidelines regarding its safety or use.
Phase-in of new FIS helmet regulations in FIS and USSA

- Season 2012-13 required for all FIS World Cup GS, SG, and DH competitions
- Season 2013-14 required for all FIS alpine GS, SG, and DH competitions
- Season 2014-15 recommended for U14 and older USSA alpine competitions
- Season 2015-16 required for U!4 and older USSA alpine competitions (scored and non-scored including masters)

CONCUSSION

The USSA values the welfare of all USSA athletes. Concussion management of skiers is an important issue. It is our responsibility as clubs, officials, coaches and parents to ensure that athletes suspected of sustaining a concussion are managed carefully, and that their return to sport program is cleared by a qualified health care provider.

USSA Concussion Policy

All USSA members, and their parents, are required to review and acknowledge the USSA Concussion Policy which is captured below.

USSA and Utah House Bill 204: Legal Issues with Concussion Injuries

USSA is a Utah Corporation; all USSA members and activities are bound by Utah law requiring Utah based Amateur Sports Organizations to implement a concussion policy and concussion management protocol applying to minors (under age of 18). USSA Clubs operating in states other than Utah may also be subject to state law with different provisions than Utah. Check out this resource to learn about the concussion laws in your state. http://nflhealthandsafety.com/zackery-lystedt-law/states/

USSA Concussion Policy for Members

Any USSA athlete suspected of having sustained a concussion/ traumatic brain injury must be removed immediately from participation in USSA sporting event (e.g. sanctioned training, practice, camps, competitions or tryouts), by the Technical Delegate or USSA member coach overseeing such sporting event. The minor athlete will be prohibited from further participation until evaluated and cleared in writing to resume participation in USSA sporting events by a qualified health care provider trained in the evaluation and management of concussive head injuries. The health care professional must certify to USSA in the clearance letter that he/she has successfully completed a continuing education course in the evaluation and management of concussive head injuries within three years of the day on which the written statement is made.

Upon removal of a minor athlete from participation for a suspected concussion/traumatic brain injury, the USSA TD or member coach making the removal must inform USSA Competition Services. Athletes who have subsequently been medically cleared to resume participation must provide such medical clearance (as described above) to USSA Competition Services in order to be permitted to participate in USSA sporting events.

About Concussion

A concussion is a type of traumatic brain injury (TBI) caused by a bump, blow, or jolt to the head. Concussions can also occur from a fall or a blow to the body that causes the head and brain to move quickly back and forth. Doctors may describe a concussion as a “mild” brain injury because concussions are usually not life-threatening. Even so, their effects can be serious.

Risk of Continued Participation
A repeat concussion that occurs before the brain recovers from the first—usually within a short period of time (hours, days, or weeks)—can slow recovery or increase the likelihood of having long-term problems. In rare cases, repeat concussions can result in edema (brain swelling), permanent brain damage, and even death.

Frequently Asked Questions

The USSA Concussion Policy refers to minors, what about seniors?
The policy applies to all USSA participant members and requires review and signature by all members. So the policy refers to all members but requires or mandates that minors be benched in the case of suspected concussion. However, under the authority of the USSA Head Coach or Technical Delegate, any athlete could be benched in competition or training regardless of age due to suspected concussion. Only minors are required to be placed on USSA medical hold pending clearance from a licensed health care provider trained in concussion management.

What does a TD or Head Coach do to react to a suspected concussion?
1. Bench the athlete.
2. Notify athlete's coach.
3. Coach and or TD notify parents.
4. TD or Coach completes American Specialties First Report of Accident and emails it to USSA
5. TD or Coach presents athlete and/or parent and/or coach with the Concussion Medical Evaluation Form and parent's letter that must be completed prior to return to sport.

A athlete is suspected of a concussion injury during Friday's training, how do they compete in Saturday or Sunday competition?
If the TD/ jury are willing to accept a signed Medical Evaluation Form authorizing the athlete to return to sport, the athlete could be allowed to return to sport. The form must then be included in the official result packet and USSA must be notified of the clearance.

How does a Race Organizer know if an athlete is on a concussion hold?
USSA will host a roster of athletes who are on USSA membership hold or suspension due to medical reasons. The roster will be available on the website and will be updated regularly to reflect the athletes who are on hold and also to remove the athletes who have been cleared.

Who is authorized to place an athlete on medical hold due to suspected concussion?
In the case of USSA competition or official training the TD has the authority. In the case of club training, the USSA Coach who is in charge of the training session.

Many states have Concussion Law, what takes precedence?
The USSA Concussion Policy requirements must be followed. However many states have also enacted head injury laws that may include additional requirements/restrictions. Please review the law for your state and, if required, contact USSA for direction. Additionally, if working in another state, you may wish to discuss with the Head Coach or Chief of Race, how the local club usually handles head injuries. This is a developing area of responsibility and it is important to be aware that USSA may provide further guidance in the future.

Does this USSA policy and procedure regarding concussion apply to FIS races in the USA?
Yes, USSA is responsible for the conduct of those events held within the USA, these decisions by the TD and Jury need to be in concert with the FIS rules. In the case of foreign minor athletes attending USA FIS races it would be advisable for the TD to alert all of the Team Captains of the USSA concussion policy and procedures.

What if a member coach influences the decision of the TD and jury to bench an athlete for the purpose of advancing his own athlete?
Unethical behavior of this nature will not be tolerated, all athletes are entitled to due process, the TD and jury will endeavor to provide due process in all decisions relative to competition.

What if a coach enters an athlete who had a concussion previously?
The coach and home club could be liable in this situation. It is critical that USSA coaches respond to and report on suspected concussion injuries in order to protect the welfare of the athlete and to be accountable to their home club. Suspected concussion injuries that occur in training must be reported by the coach to USSA on the standard American Specialties Insurance First Report of Injury with email or fax to USSA in order that the athlete can be placed on USSA Membership Medical Hold.

What symptoms may be utilized by the competition TD or USSA Member Coach in identifying a suspected concussion?
Concussion symptoms differ with each person and with each injury, and may not be noticeable for hours or days. More complete information is available at: http://www.cdc.gov/concussion/HeadsUp/online_training.html

Common symptoms include:

- *Headache*
- *Confusion*
- *Difficulty remembering or paying attention*
- *Balance problems or dizziness*
- *Feeling sluggish, hazy, foggy, or groggy*
- *Feeling irritable, more emotional, or "down"*
- *Nausea or vomiting*
- *Bothered by light or noise*
- *Double or blurry vision*
- *Slowed reaction time*
- *Sleep problems*
- *Loss of consciousness*

How do I locate a medical professional to help manage and clear the injured athlete?
Club leaders should identify a volunteer medical coordinator to help network and route various medical issues for the local athlete. Other resources could include inquiring with USSA about their recommendations. Another recommendation for concussion management at the club level is ImPACT. Check out the services they provide by visiting their website and locate a qualified medical provider trained in concussion management. http://www.impacttest.com

For parents, we recommend the imPACT testing so that they have an impartial opinion on the status of their child's concussion. Kids often are keen to get back too soon, and will underplay the effects. As we know this can be extremely dangerous, and so with the testing the decision is pretty black and white, and takes the onus off of the parents being the "bad guys".

Is our Club covered under USSA policy and procedures for concussion issues or do we, as a club, need to also have a policy?
We recommend that the club has their own policy in order to adhere to and be in compliance with both State Law and with USSA policy. You are welcome to use or adapt our policy as much as possible. The important thing is that you adhere to the law.

For more information: CDC

Centers for Disease Control and Prevention
http://www.cdc.gov/concussion/

"A bruised brain cares little for an "A" type personality. It is actually counter productive when it comes to healing a concussion. You need to chill. Not easy to do when you're a doer. I went and met with neurologists, did cat scans, did cranial massage, acupuncture, you name it I tried it. Sitting and waiting out an injury is counter intuitive to the go-getter personality of a world class ski racer. We are wired to ask "How can I do this faster?"; "How can I get healthy faster?"; "How can I get back racing sooner?" "Physio therapy does not work on a bruised brain. Pushing through the pain makes it get worse. And going back too soon can be extremely dangerous and can end your career. It happened to me."

– Cary Mullen

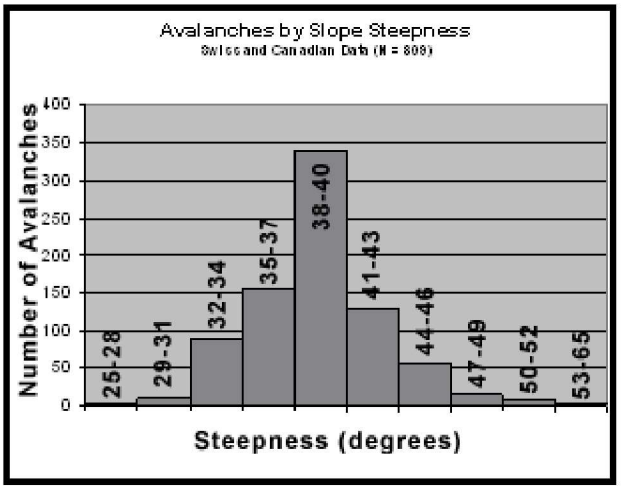
AVALANCHE

Why Worry about Avalanches?
Avalanches are dangerous. In most of the Rocky Mountain States, avalanches kill more people than any other natural hazard—an average around 30 people per year in the U.S. The typical avalanche victim is a male between about 16 and 30 who are very skilled at their sport, yet their avalanche skills lag far behind their sport skills. In other words, most of the USSA athletes are typical avalanche victims.

The kind of avalanche that causes most of the problems are what we call "dry slab avalanches" meaning that a cohesive plate of snow breaks out and suddenly slides off the mountainside like a magazine sliding off an inclined table. In almost all avalanche accidents, the avalanche is triggered by the victim, or someone in the victim's party.

Avalanches are kind of like a monster in a horror film. They lie perfectly concealed beneath the perfect façade—usually enticing powder snow—just waiting for someone to come along to collapse a buried weak layer and that collapse travels outward in all directions until the slope shatters like a pane of glass. It feels like someone pulls the rug out from underneath you and suddenly, there's no escape. The avalanche quickly picks up speed and tumbles you to the bottom of the slope. One out of four victims are killed by trauma by hitting trees and rocks at freeway speeds on the way down. Then the avalanche debris instantly sets up like concrete; you are frozen in place and you can't just pop up out of the snow. Thus, three out of four people die from asphyxiation by rebreathing their own carbon dioxide while buried under the snow, which usually occurs within the first 15 minutes.

Where do Avalanches Occur?
Since most of us have grown up learning our skills at resorts or on prepared cross country tracks, we don't have to learn about avalanches because, at resorts, the ski patrol knock down avalanches in the early morning with explosives before the public arrives, making resorts very safe, and most cross country tracks are located in avalanche-safe areas. But the instant we step across a resort rope line or travel off piste, suddenly, we have to be our own avalanche expert.



The concept of off piste can be tricky for Americans to grasp when they go to Europe. In the U.S. and Canada, there are almost always rope lines with signs that differentiate safe areas from dangerous areas but in Europe, there are only small poles with colored circles that mark the edges of the piste. The ski patrol make it safe on piste but off piste can be very dangerous, even though there's sometimes just a narrow strip of land between ski runs.

What We Can Do About It
Follow the 5 "Get the" points:

Get the Gear
Everyone who goes into uncontrolled, avalanche terrain needs to have basic avalanche rescue gear including an avalanche transceiver, which allows us to quickly locate buried victims, a shovel to dig them out and a probe to locate the buried victim precisely before you start digging. Most people also use an avalanche airbag backpack. If you're caught, you simply pull the ripcord, which inflates an airbag that helps float you to the surface of avalanche debris. This gear is important, but statistically, it will only save about half the victims involved in a serious avalanche accident.

Get the Training
When you take an avalanche course you will learn all the essential avalanche skills: how to recognize avalanche terrain, how to travel in avalanche terrain, how to recognize obvious signs of snowpack instability, how to match the danger of the snowpack with appropriate terrain, how to make decisions and how to pull off a rescue if something goes wrong. Visit www.Avalanche.org in the U.S. or www.Avalanche.ca in Canada for a complete list of classes and other resources.

Get the Forecast
In most mountainous areas around the world, professional avalanche workers issue daily avalanche forecasts that tell you where it's safe, where it's not safe, how to recognize and avoid the hazard. For backcountry travelers, it's like reading the daily newspaper. To get the latest forecasts:

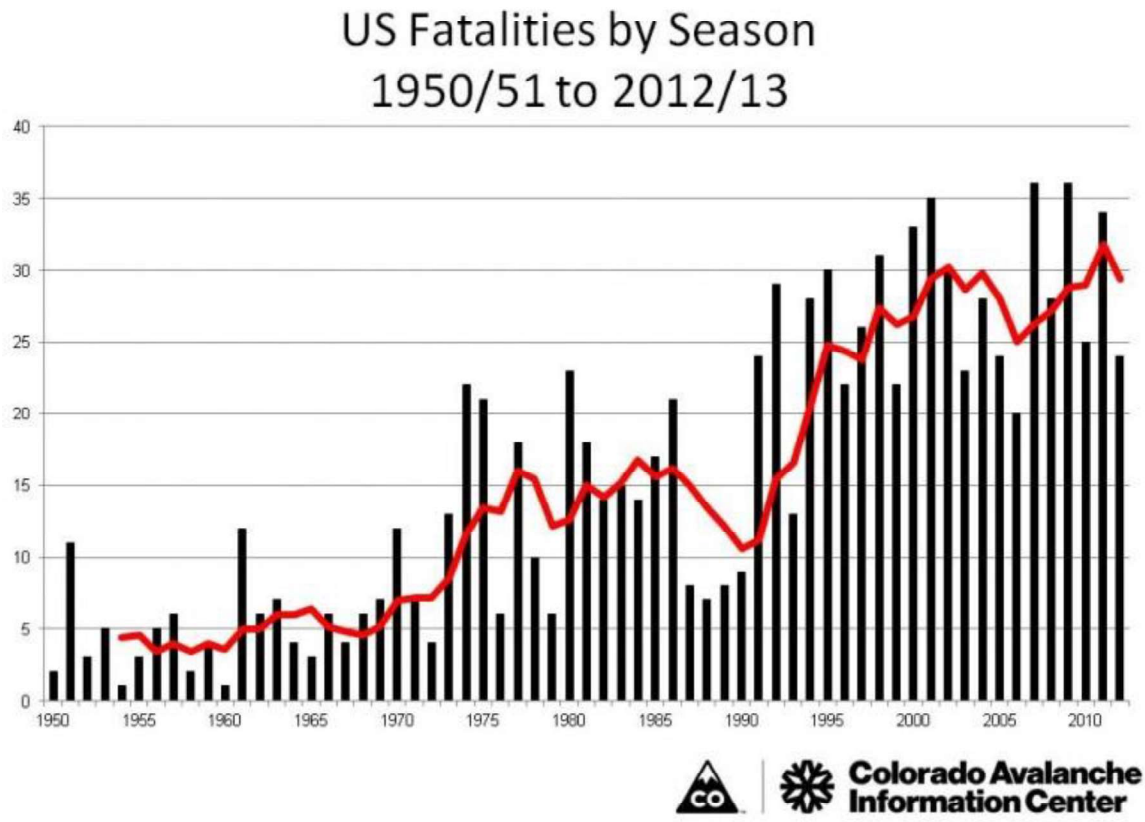
In the U.S., visit www.Avalanche.org
In Canada visit www. Avalanche.ca
In Europe, visit www.Avalanches.org

Get the Picture
Pay attention to obvious clues while traveling in uncontrolled avalanche terrain:

- Recent avalanches
- Collapsing or cracking
- Recent wind drifting
- Recent heavy snow
- Recent thaw

Get Out of Harm's Way

- What will happen if it slides? Pay attention to consequences.
- Don't linger at the avalanche track or the bottom of an avalanche path—stay off to the sides.
- Don't expose everyone at once – always leave people in safe areas to do the rescue if something goes wrong.



ADDITIONAL RESOURCES

Forest Service National Avalanche Center

For a more in-depth tutorial visit WWW.FS.AVALANCHE.ORG

More people are killed during Considerable Avalanche Danger than any other Danger Rating.

ICON	DANGER	TRAVEL ADVICE / LIKELIHOOD
4 5	EXTREME	Avoid all avalanche terrain. Natural and human-triggered avalanches certain.
4 5	HIGH	Very dangerous avalanche conditions. Travel in avalanche terrain not recommended. Natural avalanches likely; human-triggered avalanches very likely.
3	CONSIDERABLE	Dangerous avalanche conditions. Careful snowpack evaluation, cautious routefinding and conservative decision-making essential. Natural avalanches possible; human-triggered avalanches likely.
2	MODERATE	Heightened avalanche conditions on specific terrain features. Evaluate snow and terrain carefully; identify features of concern. Natural avalanches unlikely; human-triggered avalanches possible.
1	LOW	Generally safe avalanche conditions. Watch for unstable snow on isolated terrain features. Natural and human-triggered avalanches unlikely.

Check out WWW.AVALANCHE.ORG for United States Avalanche Centers & Avalanche Advisories

Websites
- www.fsavalanche.org
- www.americanavalancheassociation.org

Take A Class
- www.avalanche.org

Books
- Snow Sense *by Jill Fredston and Doug Fesler*
- Staying Alive in Avalanche Terrain *by Bruce Tremper*
- The Avalanche Handbook: 3rd Edition *by David McClung and Peter Schaerer*

Full Avalanche Danger Scale

The avalanche danger rating is only a starting point. **YOU CONTROL YOUR OWN RISK** by choosing where, when and how you travel.

EXERCISES

Exercises are used to enhance skiing skills. They can be used by themselves or be steps in a progression. Exercises should be difficult for the athlete, and as such, my need to be presented in a progressive manner for the athlete to gradually gain competence and movement mastery. Building and working on skills, you may need to also alter the exercise to give greater emphasis to the targeted skill. There is no exact or perfect way to do exercises, and by presenting them here, don't let the descriptions interfere with your goal of progressing the skillfulness of your athlete. These description should only act as a starting place for your education, experience, and imagination to modify into a tool for your athlete progression.

Airplane turns: From a traverse, the skier extends off both legs jumping in the air which coincides with the turn, lands and repeats. Starting out with a small bump assists the jump.
Arms crossed across chest with short turns: Without poles the arms are across the chest so that the hands are on opposite shoulders. With this position short radius turns are performed. Do this in the moguls for a greater challenge.
Angulation (aka Schlopy drill): With one hand on its ipsilateral hip and the other arm extended over the head. The hand on the hip is used as a push in and torque the hip into a more countered position during the ski turn. The hand over the head assists in creating the "angulated" body position.
Backward skiing: Skiing backwards, starting with a wedge and progressing to parallel and then to short radius parallel turns.
Bunny hop turns: Make small leg extensions or "hops" throughout a large turn.
Camel jump in wave track: see SkillsQuest Phase 6.
Carving leapers: Similar to the "airplane turns" but with take-off from an edged ski and landing on an edged ski into a carved turn.
Charleston: Short linked turns initiated on the inside ski, with the flailed outside set back to the snow at the fall-line.

Corridor drill: In a 12-18 meter corridor, carved turns using the entire width with turn apex at the corridor.
Double pole plants: 1: Planting both poles on right and left sides of the skis either on edge set or edge release. 2: Planting both pole on the downhill side of the outside or downhill ski.
Edging drill: A GS course drill in which the gates are progressively set wider. The skier attempts to make clean carved turns throughout the progression.
Freeski - hourglass: see SkillsQuest Phase 4.
Freeski moguls in "V" shaped corridor: see SkillsQuest Phase 6.
Freeski – varied terrain and snow conditions: see SkillsQuest Phase 5.
Garlands: From a traverse, an edge release followed by a shallow turn back to the original traverse and repeated.
Hands held in front without poles during short turns: Short radius turns with hands held as if holding poles but without poles.
Hands in front holding pole shafts horizontally like a tray: Hands are in a similar position in space as if they were holding poles conventionally. Although now the poles are held level with one hand near the basket and the other near the grip. The skier's palm may be facing

up or down. Palms up (supinated) tends to bring the elbows in toward the body, and palms down (pronated) tends to rotate them out.

Hands in front holding pole shaft vertically: Holding poles straight up-and-down in each hand either by the shaft or by the grip with the baskets in the air.

Hanger: see White Pass turn.

High tuck turns: In a high tuck skier skis short or tight GS size turns.

Hockey stop: From a straight run or the end of a turn, the skier pivots both skis simultaneously sideways and performs edges aggressively to a stop. A pole plant usually accompanies the edge set at the stop such that the pole tip and stop coincide leaving the skier in a position of stability.

Hop turns switching between tips and tails on snow: Hoe turns with a turn or two with either the ski tips or tail down on the snow followed by a turn or two with the ski tails down or on the snow.

Hop turns with tails on the snow: A series of hop turns with the ski tails on the snow and the tips in the air (5-10 cm).

Hop turns with tips on the snow: A series of hop turns with the ski tips on the snow and the tails in the air (5-10 cm).

Hop turns, aka Zottos, Pole walk, Speiss: see SkillsQuest Phase 5 Hop Turns.

Javelin turns: An outside-ski turn, in which the tip of the inside ski is crossed over the outside ski (up to 90 degrees) during the turn and is switched in every turn.

Linked turns in wave track: see SkillsQuest Phase 5.

Long radius turns in the moguls: Large radius turns are superimposed over a mogul field.

Moguls: Skiing moguls conventionally with one pole, no poles, one ski, or one ski no poles.

One ski skiing: Skiing on only the right or left ski. For beginners; by lifting either the right or left ski off the snow throughout the entire turn and transitions. For the more advanced; skiing without the right or left ski.

One ski skiing hourglass: see SkillsQuest Phase 6.

One ski skiing with lane changes: see SkillsQuest Phase 4.

One ski skiing without poles: see SkillsQuest Phase 5.

One thousand pole plant drill: Medium to longer radius turns in which the ski pole is continuously planted or touched to the snow. On the traverse the downhill pole is continuously touched to the snow, then at weight transfer/cross-over, one double pole plant followed by only the outside pole touching which ends up as the downhill pole touching again on the traverse.

One thousand steps: Turns in which the skis are continuously stepped up and down throughout the entire turn and connecting phases. The stepping tempo can be anywhere from slow to fast.

Outrigger drill: The arms and poles are extended on both sides of the skier (as wings of an airplane or outriggers). With the arms and poles forming a straight line through the torso, the pole on the outside of the turn touches the snow on the outside of the turn and downhill part of the traverse. Then as the next turn develops, tip to the other side at or about the fall-line

Outside ski turns: see SkillsQuest Phase 2.

Patience turns: From a slow sideslip the skier moves their center-of-mass forward while gradually flattening the skis resulting in the ski tips slowly seeking the fall-line. Drill emphasis is over when skis have pivoted about 30 degrees.

Pole jumpers: see SkillsQuest Phase 2.

Pole jumpers in tuck: see SkillsQuest Phase 3.

Pole plants with bamboo gates: Holding bamboo gates at normal ski pole height, the bamboo gates are utilized just as regular ski poles in short turns.
Shuffle turns: Medium to longer radius turns in which the skis are continuously pushed forward and backward under the torso throughout the turn.
Sideslip: From a traverse position the skis are flattened until they slip sideways for a distance.
Sideslip to pivot: Sliding sideways downhill with skis perpendicular to the fall-line, the skis are pivoted to a straight run staying within the original a ski-width size corridor.
Sideslip to straight run to sideslip: Sliding sideways downhill with skis perpendicular to the fall-line, the skis are pivoted to a straight run (lasting about 2 seconds) while staying in the original ski width corridor. The skis are then pivoted back to a sideslip that is in the same fall-line as the original corridor.
Sideslips with edge sets: From a traverse position the skis are flattened until they slip sideways for a distance where the edges are rather aggressively engaged. Repeat.
Skate down fall-line: On a shallow hill, With or without a race partner, skate with the intent of gaining speed with each skating motion down the hill.
Skate turns: From the traverse part of the turn extend off the downhill ski to a diverging uphill ski and uphill edge. From there roll the uphill ski flat and to the new inside edge making a turn.
Slow as you can go turns: On flat to moderate slopes, ski short to medium radius turns keeping the skis on the snow with tips and tails equidistant apart throughout. A more advance version omits all pole movement.
Step turns: From the traverse part of the turn extend off the downhill ski to a parallel positioned uphill ski. The uphill ski can be either flat or on its uphill edge. For a more advance version the athlete focus' their extension only on downhill ski, then contrast with only extension from the uphill ski.
Straight run in a wave track: see SkillsQuest Phase 4.
Straight run to side slip with edge set: see SkillsQuest Phase 2.
Synchronized skiing: With two or more skiers skiing short to medium size turns performing all movements at exactly the same time.
Traverses: Crossing the hill rather perpendicular to the fall-line. This can be performed with many types of skill emphases.
Turn on flexion: From a very flexed position (ankles, knees, & hips) make a turn and start extending when the skis are in the fall-line or later.
Turn on outside ski only: see SkillsQuest Phase 2.
Two steps and turn: Same as "Step turns", with the addition on two steps before the turn.
Up and over drill: From a traverse on the uphill ski's uphill edge, the skier extends to a rather tall standing position. This posture can be held for a second or two depending on the amount of hill space. From this tall position the skier moves their center-of-mass forward and laterally in a diagonal direction down the hill and makes a turn.
Vertical brush quickness course: see SkillsQuest Phase 6.
Wedge swing hops: Hop turns that initiate from a converged ski attitude landing on the inside edge of the downhill ski at which time the inside leg is matched to the landed leg, then repeated.
Whirlybirds: Parallel skis are rotated 360 degree without a step. This is performed clockwise and counter-clockwise.
White Pass turn (Hanger): A turn initiated on the inside ski. At the fall-line the outside ski is placed on the snow and pressured to finish the turn. After a lengthy traverse on the downhill ski the turn is repeated.

GLOSSARY

A

ab·sor·bing: /əbˈzɔːbɪŋ/ *v.* Body movements such as flexing and extending to help reduce, increase, or maintain the pressure on the skis base or edges that results from terrain variations or turn dynamics.

aero·dy·nam·ics: /ar-ō-d ī-ˈnam-iks/ Refers to how well an athlete moves through the air. The smaller the skier can make themselves usually the more aerodynamic they are.

aft: /ˈaft/ *adv*. Toward the rear or tail of the ski(s).

align·ment: /əˈlaɪnmənt/ **1:** The positioning of the body so that the forces derived from the interaction of the skis on the snow pass through the body's center of mass to produce the intended movement. **2:** The interrelationship of the ski boot forward lean, zeppa, canting, and the binding's delta angle on the stance of the skier.

an·kle an·gu·la·tion: /ˈaŋ-k əl/ Rotation of the ankle to assist with edging the ski.

an·gu·la·tion: Creating lateral angles in the body for balance while resisting the external forces from the turn or gravity. This can occur with the hip, knee, ankle, or a combination of the three. –Syn. comma position.

an·tic·i·pa·tion: /anˌtisəˈpāSHən/ *n.* **1:** A movement in preparation for turning, during which the upper and lower body are brought into a twisted relationship. The consequently stretched muscles are quicker and stronger in contracting and causing movement. The hips play an intermediary role. A skier can anticipate by twisting the torso in relation to the legs, or the legs in relation to the torso. Usually, both mechanisms interact with one being dominant. **2:** Mental expectation for any action on skis precedes the physical execution of movements.

apex: /ˈā-ˌpeks/ The point in a ski turn that coincides with the fall-line.

arc: /ɑrk/ The curved track left by a carved turn.

ath·le·tic stance: /aTHˈletik stans/ A body posture such that the skier is biomechanically aligned in their joints and muscle lengths so they can react optimally to external forces or respond with agile movements as the demand dictates.

B

banking: The action, or result, of tipping the entire body toward the inside of the ski turn. Usually has a negative connotation.

blocking pole plant: The action of stabilizing the torso through pole contact with the snow in conjunction with the edge set at turn completion. –Syn. breaking pole plant.

C

carving: The skis, traveling along their longitudinal axis through the arc of a turn, where the tails follow as closely as physically possible the same path as the tips of the skis.

catching the edge: *slang.* Establish balance and pressure quickly on new outside ski.

center-of-mass: The point in the skier's body where the skier's weight is concentrated during a specific body posture. –Syn. CM, CoM, center of gravity. The terms "center-of-mass" and "center-of-gravity" can be used synonymously.

cen·trif·u·gal force: /senˈtrif(y)əgəl fɔrs/ A pseudo-force, or effect, that is "felt" when the skier is attempting to following a curved path.

cen·trip·e·tal force: /senˈtripətl fɔrs / A force that causes a body to follow a curved path; always directed toward the center of the curved path. In skiing centripetal force is exerted on a turning ski's edges and bottoms by the snow.

clean skis: *slang.* Ski-snow interaction that has very little friction and braking.

come from behind: *slang, archaic.* Tactic where the ski racer performs a large percentage of his or her turn above the gate.

co·or·di·na·tion: /kō¸ôrdnˈāSHən/ Behavior of two or more joints in relation to each other to produce skilled activity.
coun·ter: /ˈkountər/ To oppose or to go to the opposite way. In skiing, typically referred to a relationship in which the lower body turns against or opposes the upper body or vice versa.
countering movements: Movements that place the upper and lower body in a twisted relationship, for example, allowing the feet to continue to turn while stabilizing the upper body with a pole plant. Skiers generally use countering movements to put the body into an anticipated position.
counter position: A body position in which the chest does not face the direction of travel. In a traverse the chest faces downhill, in a turn it faces the outside of the turn.
counter-rotation: Movement of the upper and lower body about the vertical axis in opposite directions.
cross-over: Moving the body's center-of-mass (CoM) forward and across the skis. The CoM moves from the inside of one turn to the inside of the next turn.

D

deep: *slang.* A tactic where the ski racer gives lateral distance to the gate. Not to be confused with vertical distance.
de·lib·er·ate prac·tice: /diˈlibərit ˈpraktəs/ *adj. v.* Repetitious training that has a specific focus.
DIRT: Acronym for Duration, Intensity, Rate, and Timing. Used in ski instruction and coaching when talking about ski technique.
dirty: *slang.* The result of a stivot, redirect, or skid at turn initiation.
downhill ski: 1: The ski which is most down the hill or lower in elevation than the other ski. **2:** Type or variety of ski used for the downhill ski racing event.
drag: The force that opposes an object's motion. In skiing this is usually through the air and on the snow.

E

edge angle: The degree of tilt of the ski about its longitudinal axis in relation to the supporting surface. Skis placed flat on the snow have an edge angle of 0°.
edge change: Tipping a ski from one edge or set of edges to a new edge or set of edges.
edge control: The ability to maintain proper adjustment of the angle between the skis' running surface and the snow for the ski maneuver being performed.
edge control movements: Movements that increase or decrease edge angles.
edge lock: A situation where the ski is aggressively edged with the intent of staying on the edge.
edge release: Flattening the skis by changing the angle of the edge relative to the slope.
edge set: A purposeful edge engagement that provides a platform for the next turn.
edging: The interaction of the ski with the supporting surface (snow) and, more specifically, relates to the angle between the running surface of the ski and the snow.
edging movements: Movements that increase or decrease edge angle.
e·qui·lib·ri·um: /¸ēkwəˈlibrēəm,/ *n.* A state of equal internal and external forces to create balance.
ex·ten·sion: /ikˈstenSHən/ n. **1:** An unbending of a joint between the bones of a limb by which the angle between the bones is increased. **2:** Lengthening or straightening of the muscle; any movement resulting in an increase of a joint angle.
ex·ten·sors: *n.* Muscles that enable extension at a joint.
external forces: An outside force affecting performance.

F

fall-line: The imaginary path, through any single point on the slope, that follows the steepest descent. The fall-line is the trail on which a ball would roll if it were released down the slope.

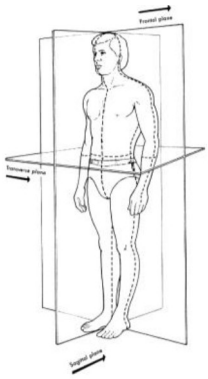
FIS: Acronym for Fédération Internationale de Ski (International Ski Federation). The governing body for international ski racing.
flex·ion: /ˈflekSHən/ *n.* A bending of the joint between the bones of a limb that diminishes the angle between the bones.
flex·ors: /ˈflekˌsər,-ˌsôr / *n.* Any muscle which creates flexion.
flipping the ski: *slang.* In slalom, it refers to the rapid rotation of the ski from its uphill edge to its new downhill edge very rapidly, as opposed to "rolling the ski" which is slower. It is intended to offer the skier early edge and allow for early pressure.
force: An agent or action that produces a change in the speed and/or direction of a body's motion. External forces include gravity, air resistance, and ski-to-snow and pole-to-snow interactions. Internal force is generated by muscle contractions.
fore: Toward the tips of the skis. In front of the bindings.
fric·tion: /ˈfrikSHən/ *n.* Resistance to an object sliding across a surface. A ski sliding on ice experiences less friction than a ski sliding through wet snow.
fron·tal plane: /ˈfrəntl plān/ *adj.* A vertical plane or any plane parallel to it that passes through the body from side to side, dividing it into anterior and posterior halves. –Syn. lateral plane, coronal plane.
full gas: *slang.* Going 100%.

G

gate: 1: Two or four poles in which the skier must ski between. **2:** Slang for "pole".
glide: Using the least amount of edging necessary to achieve the desired direction of travel.
gliding: Forward sliding of the skis, either in a direct line down the hill or through a turn.
glisse·ment: /glees-ma*hn*/ *French* Referring to optimizing the actions of the skier and ski in which there is limited distraction from achieving the goal of the turn or run. A carved turn has more glissement than a skidded turn. A damped ski has more glissement than a vibrating ski. A tuck has more glissement than a standing position.
grounded: *slang.* Keeping the ski on the snow.

H

hip angulation: Internal rotation of the femur, with slight adduction and flexion of the hip of the outside turning leg along with external rotation of the inside leg's femur and hip flexion.
hip ro·ta·tion: /hip rōˈtāSHən/ *n.* Turning the hips, usually in the direction of the intended turn, for positive or negative effects.
hor·i·zon·tal depth: /ˌhôrəˈzän(t)l/ /depTH/ The horizontal distance the ski racer is from from gate.
hor·i·zon·tal dis·tance: /ˌhôrəˈzän(t)l //ˈdistəns/ The length (usually in meters) across the hill in which the turning gate is set.
hor·i·zon·tal plane: /ˌhôrəˈzän(t)l// plān / *n.* A horizontal plane or any plane parallel to it which passes through the body, near the navel, dividing it into upper and lower haves of equal mass. –Syn. transverse plane.



I

in·cli·na·tion: /ˌinkləˈnāSHən/ *n.* Deviation from a vertical body position. Specifically, inclination refers to the angle formed by the head-to-feet axis of the body and the line of action. A skier is inclined when angulating or banking. This term is used to describe the overall appearance of the body in relationship to a vertical reference. Inclination may be sideways in the frontal plane or forward/backward in the sagittal plane.
inside arm clear: Method in slalom ski racing in which the inside arm, or arm closest to the gate, is used to move the gate

out of the way such that the ski racer can take a tighter path to the gate.
inside ski: The ski which is most inside the arc of the turn.
internal force: A force produced by the muscles of the body.

K

kin·es·thet·ic: /kɪn əsˈθɛtɪk/ *adj.* The body's sense of motion.
ki·netic en·er·gy: /kəˈnetik ˈenərjē/ *n.* Energy of motion.
knee angulation: An appearance of a lateral angle of the skier's knee that is from the internal rotation of the femur with adduction and flexion of the knee.

L

lateral movements: Side-to-side body movements used to create edge angles and to maintain body balance while managing or resisting forces.
lateral space: The amount of horizontal distance across the hill that the ski racer allows when approaching the gate.
left foot turn: A ski turn where the left foot (ski) is on the outside of the ski path. A left foot turn would be a right hand turn.
linked turns: Ski turns without or with limited traverse such that the completion and initiation phases blend seamlessly together.
lower body: The parts of the body that includes the legs. Specifically the femurs down to the feet. Not the pelvis.

M

meter: Equal to 39.37 inches.
method: The process whereby a sport is taught. Methodology is the overall approach to, or orderly arrangement of, the process of teaching various movement options.
movement analysis: The process of assessing a skier's ability – the movement patterns and skill blending – and identifying the cause-and-effect relationships. The coach analyzes the separate components of the athlete's movements to determine the focus of the training and identify the steps that will produce the desired results. –Syn. movement assessment, observational assessment, observation, systematic observation, qualitative assessment, qualitative analysis, skill analysis, visual analysis, subjective analysis, clinical diagnosis, error detection, and eyeballing.

N

Newton's 1st law of motion: An object continues in a state of rest or constant velocity unless acted on by an external force.
Newton's 2nd law of motion: The resultant force acting on an object is proportional to the rate of change of momentum being in the same direction as the force.
Newton's 3rd law of motion: If one object exerts a force on another then there is a simultaneous equal and opposite force on the first object exerted by the second.
Newton's laws of motion: The relationship between force and motion formulated by Sir Isaac Newton.

O

outside arm clear: Method in slalom ski racing in which the outside arm is used to move the gate out of the way such that the ski racer can take a tighter path to the gate. –Syn. "cross-block".
outside edge: 1: The left hand edge of the left ski and/or the right hand edge of the right ski. **2:** The ski edge which is farthest from the center of the skier or ski turn.
outside ski: The ski which is on the outside of the arc during a ski turn.

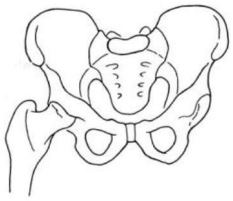
P

parallel position: A body position that is continually changing throughout the turn but maintains parallel skis, and an aligned lead of the inside of the body to allow for equal ankle flexion. Skier's ankles, knees, hips and

shoulders are aligned corresponding to the lead (inside) ski.

parallel turn: A turn made on corresponding ski edges with simultaneous edge release and engagement. The skis remain parallel throughout the turn as opposed to converging or diverging.

pel·vis: /ˈpelvis/ *n.* A cone-shaped bony ring made up of the right and left pelvic bones joined in front and in back.



picking up the ski: *slang.* Finding the inside edge of the new outside ski early in the turn.

pin (pin it): *slang.* Go for it!

pinch: 1: A turn that is overly tight on the gate resulting in insufficient space for the ski racers body. **2:** A turn that decreases radius after the gate, creating a "comma" shaped turn.

pipe: *slang.* A carved turn.

pivoting: Turning the skis about an axis perpendicular to the running surface which results in the skis being displaced at an angle to the skier's direction of travel.

pole: The FIS term for the tall (1.8m) red and blue sticks placed in the snow that ski racers ski around.

pole plant: Touching or brushing the pole tip in the snow as a signal to change direction, to assist with the change of direction, to help stabilize the upper body, or to help maintain balance.

pole swing: Movement of the ski pole in the direction of the new ski turn center either from the movement of the skier's center-of-mass or from the skier's wrist and arm motions.

pole touch: A more modern term which replaces pole plant when the tip of the pole is touched to the snow surface rather than firmly inserted into the snow surface.

pole use: Movements that involve the ski poles, such as swinging, touching, planting, or gate clearing using the ski poles. Timing, placing, and technique of the pole movements affect rhythm and timing of the turn as well as direction and outcome of body movements.

pressure: The distribution of force over an area. Pressure underneath the ski can be fore/aft, side-to-side, or ski to ski.

pressure control: The action of actively adjusting the pressure exerted by the skis against the snow.

pressure control movements: Movements that may affect pressure on the skis. Pressure control and manipulation is achieved through leverage, flexion, extension, redistribution of weight from foot to foot, increasing and decreasing edge angle, muscle tension, changing turn shape and size, etc.

pro·gres·sion: /prəˈgreSHən/ *n.* Ordered steps of learning on a continuum of easiest to mastery.

pull radius: *slang.* Shortening or tighening the turn radius.

R

rebound: The recoil or springing back of a decambered ski. When a skier bends the skis through the turn (i.e., decambering) and then releases the pressure and forces, the skis can rebound and create a snappy linkage from turn to turn.

redirect: A turn initiation technique where the skis are pivoted slightly to "redirect" them before they are edged and pressured. The amount of pivoting is much less than a stivot.

reference-of-correctness: Refers to body position(s) that are regarded as vital to the maintenance of dynamic balance.

re·trac·tion: /ri-**trak**-sh*uh* n/ *n.* Flexion of the legs as a result of muscular effort causing the skis to come to the body (active retraction) or allowing the legs to fold due to a terrain change such as a bump (passive retraction).

right foot turn: A ski turn where the left foot (ski) is on the outside of the ski path. A right foot turn would be a left hand turn.

rolling the ski: *slang, archiac.* Movement of the ski from its uphill edge to its new downhill edge. Older term that has been replace with "flipping the ski".

rotary movement: Movements that increase, limit, or decrease the rotation of the skis. Rotary movements can be either with the entire body, or with the lower body rotating in the opposite of the upper body.
rotary push-off: A mechanism of pushing off from one or both feet in a manner that imparts a rotary motion to the body about its vertical axis. A pushing off that creates a pre-rotation and an up unweighting.

S

sag·it·tal plane: /ˈsajitl plān/ *n.* Vertical plane, or any plane parallel to it that passes through the body from front to back, dividing it into right and left halves. –Syn. anteroposterior.
se·quen·tial leg ro·ta·tion: /siˈkwenCHəl leg rōˈtāSHən/ *adj.* A non-simultaneous rotation of the legs such that one leg is used as a platform against which the opposite leg is rotated. Diverging, converging step turns are examples.
shelf: The squared off edge that is left on the gate side of a rut.
si·mul·ta·ne·ous leg ro·ta·tion: /ˌsīməlˈtānēəs leg rōˈtāSHən/ *adj.* Rotation of both legs at the same time.
skidding: The composite result of ski moving forward (sliding) and sideways (slipping).
skill(s): 1: Movements that are dependent on practice and experience for their execution, as opposed to being genetically defined. **2:** The level of proficiency on a specific task or limited group of tasks acquired through practice and experience. **3:** A learned movement that is controlled, coordinated, and efficient. **4:** Indigenous movements that have fundamental or basic intrinsic features that the sport could not do without.
skillful: 1: consists in the ability to bring about some end result with maximum certainty and minimum outlay of energy, or time and energy. **2:** is the process of mastering redundant degrees of freedom in the moving organ. A conversion to a controllable system.
sliding: Forward movement of the skis in the direction of their longitudinal axis.
slipping: Movement of the skis sideways. Slipping can occur with the skis perpendicular to the line of travel (sideslipping) or in other orientations, such as in a turn.
snow contact: The skis and edges maintain contact with the snow.
square position: *slang.* Skier stance where the hips and shoulders are perpendicular to the longitudinal axis of the skis.
steering: The muscular guidance of the ski into the turn by a twisting action of the lower limbs resulting in the change of the skier's direction.
stalancing: *slang.* Refers to staying in balance while in motion using stance as a tool.
sti·vot: A high speed skid at turn initiation used in alpine ski racing to improve line while maintaining speed. "st" from steering and "ivot" from pivot.
straddle: When each leg goes to a different side of a race gate.
strong inside half: *slang.* Cliché that refers to body alignment where pelvis and shoulders align with the lead change of the skis.

T

tac·tics: /ˈtaktik/ *n.* The strategic application of technique and line, based on experience and skill, to a given turn or turn sequence, terrain or snow condition.
tech·nique: /tekˈnēk/ *n.* The manner in which fundamental elements of skiing are executed. A movement option for accomplishing a given goal.
timing: The precise sequencing of the various turn phases in relation to the fall-line, rhythm, and set of the gates, speed and terrain conditions, all the while maintaining dynamic balance and the optimal line.
trav·erse: /trəˈvərs/ *v.* To ski across the slope in a horizontal or diagonal path.
turn shape: The geometric form of the turn made by the skis in or on the snow: round, ellipse, angled, elongated, etc.

U

unweighting: Taking varying amounts of weight off the skis to manipulate and control pressure.
uphill ski: The ski that is of higher elevation when compared to the other ski when on a slope.
upper body: Part of the human body that includes head, arms, and torso (which includes the pelvis).
up-weighting: Pressure created under the skis by active extension of the legs.
up-unweighting: Unweighting accomplished by slowing or stopping an extension. The intensity of the lightness depends upon the rapidity of the extension and the speed with which such movement is slowed or stopped.

V

vertical dis·tance: /ˈvərtikəl//ˈdistəns/ The length (usually in meters) down the hill in which the turning gate is set.
vertical space: The amount of uphill/downhill distance that the ski racer allows above the gate.

W

wall: 1: A body alignment mnemonic that refers to the ski tips, boots, knees, hips, shoulders, and hands remaining parallel throughout the entire turn**. 2:** A gate drill set with dye or brushes to teach horizontal depth where to pressure in the fall-line.
weight transfer: Shifting the center of mass across the vertical axis of the skis.

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