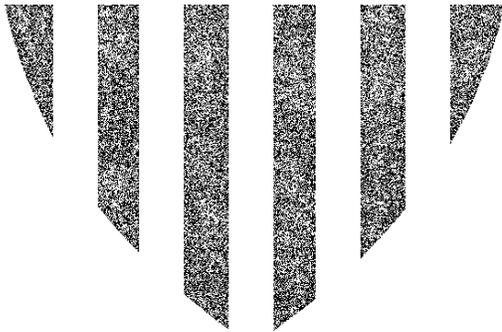


Professional Knowledge and Glossary

2004



Professional Knowledge

Core Concepts

PSIA /AASI Core Concepts

The Core Concepts mission is to help teachers of all snowsports to effectively share their passion for the Snowsports we love. The Core Manual explores the foundation of the learning experience: the connections between the learner and teacher. Building and fostering meaningful relationships and experiences with students and guests. Combined with living up to the standards of professionalism, form the cornerstone of our success as individuals and as an industry.

The following sections can be found in PSIA Core Concepts manual you should get and use one of theses manuals it provides information in a user friendly manner. The manual is the effort of PSIA to help us build relationships with our students, guests and peers. By understanding these concepts we will become aware of the teaching tools we have and be better prepared to teach students in a effective way.

<p>Part 1 Relationships, Experiences And Learning</p> <p>CHAPTER 1: Knowing Yourself</p> <ul style="list-style-type: none"> Why do you want to teach? Be honest with yourself Connect with your students What is your picture of success? Learn about ourselves as teachers <p>CHAPTER 2: Discovering Your Students</p> <ul style="list-style-type: none"> Mental processes How the brain works Sensory contribution Development of the mental processes learning styles and preferences Mutable intelligences <p>Emotions and learning</p> <ul style="list-style-type: none"> Emotional and social development Play Memory <p>Learning to move</p> <ul style="list-style-type: none"> Anatomy 101 Physics Physical growth and development The aging process Gender differences 	<p>CHAPTER 3: Coaching your Students</p> <p>Developing trust</p> <ul style="list-style-type: none"> Confidence The teacher expectations Breaking the ice Interpreting behavior Getting the learner involved Previewing <p>Assessing movements</p> <ul style="list-style-type: none"> Where do we want to go Where are we now (what do you see?) How do we get there <p>Working the learning environment</p> <ul style="list-style-type: none"> Maslows mountain Need for safety and security The need for belonging Need for self-esteem Effective communications Creative practice time Group handling skills Teaching activities Levels of understanding <p>Feedback</p> <ul style="list-style-type: none"> Make sure your feedback is welcome Make sure your feedback meaningful
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<p>Briefing and closure Built your own teaching model Evolution of practice Brain stretchers Steps for building your own teaching model Mental model credo</p> <p>CHAPTER 4: Working Relationships Were all in this together joining the team Be aware Make contributions Acknowledge the contributions of others</p> <p>Resolving conflicts with customers and team members Styles of conflict resolution Be positive Identify the source of conflict Stay focused on the real issues</p> <p>Part 2: Responsibilities</p> <p>CHAPTER 5: Creating Lasting Memories Why people don't come back You make the difference</p> <p>CHAPTER 6: The Mountain Environment Managing Risk in the mountain environment Your responsibility code Choice of terrain Pacing Preparedness Avalanches Coaching proper lift procedures Coping with accidents and injuries</p> <p>Sharing the mountain environment History Climate and weather Wildlife plan live Plant life Summer activities sustainable slope</p>	<p>Fitness equipment Equipment what is optimal gear Customizing your gear</p> <p>Revitalizing your career Appreciating diversity</p>
	<p>A final thought on renewal</p> <p>The Core Concepts manual is the centerpiece of a new cycle of publications for all snow sports instructors: Alpine and Nordic and Snowboarding. It contains information for understanding how people learn and use that information to tailor snowsports experiences for guests. Snowsports-specific technical information to (<i>learn and to turn or slide or glide</i>) is covered by the Alpine Technical Manual. This reinforces the idea that relationships experiences and learning are significant parts of what people are seeking in snow sports the ability to perform the sport itself expresses the quality of these initial building blocks.</p>

Providing Feedback

Characteristics of Effective Feedback

Feedback is a way of helping another person consider changing his/her behavior. Through feedback we learn to see ourselves as others see us. The key ingredients are care, trust, acceptance, and openness.

1. It is descriptive rather than evaluative.
2. It is specific rather than general.
3. It takes into account the needs of the receiver and giver of feedback.
4. It is directed toward behavior which the receiver can do something about.
5. It is solicited, rather than imposed.
6. It is well-timed.
7. It is checked to insure clear communication.
8. When feedback is given in a training group, both giver and receiver have an opportunity to check with others in the group the accuracy of the feedback.

NLT Institute for Applied Behavior Science

Whatever Happened to Individual Corrections?

By Joan E. Heaton

“Wish he would tell me how *I'm* doing!” This was the comment made by my classmate as we rode up the chair lift together. Last spring I spent a week skiing in Colorado. Since powder skiing was relatively new to me, I decided that the best course of action was to take ski school lessons. I paid my money and “got in line” for the ski-off. (I can't tell you the relief I felt when I was placed in the top class!) The lessons progressed as ski school lessons normally do and everyone seemed very happy. But, as our lessons continued, the discussions on the chair lift changed to indicate a growing discontentment. My “chair partners” were asking, “Why doesn't he tell *me* what *I'm* doing?” “Why doesn't he talk to *each* of us specifically?” A lady told me that she never seemed to know if she was doing it right or not! Another lady summed it up by saying, “Whatever happened to individual corrections?”

The move away from the use of individual correction is evident in our association's workshops and clinics. This could be an effort on the part of the association to eliminate the embarrassment and anxiety experienced by some students as a result of the faulty manner in which "individual" correction is given. However, it is also evident that to eliminate the use of individual correction is not the answer to this problem. A keener awareness as to the proper use of "individual" correction is the solution. Perhaps an examination of "feedback" can be of help.

"If a person practices without knowing the results of his actions, improvement in his performance is unlikely." This quote from *Skill in Sport* by Barbara Knapp is based on extensive research in the area of "feedback." Lindsley reports that "a group of radar operators who were not enlightened about their progress on successive trials became less and less accurate as practice went on for six days." "Feedback" or "Knowledge of Results" is one of the conditions necessary to consider for effective learning. It is defined as that information provided to the learner in order to affect subsequent acts. The purpose of this article is to discuss "feedback" in conjunction with ski teaching.

Feedback is one of the conditions necessary to consider for effective learning.

Individual and General Feedback

Feedback can be given on an "individual" and "general" basis. "Individual" meaning those corrections given specifically to one person. "General" meaning those corrections given to a group of students noting common errors within the group. However, in the latter situation, each performer is expected to consider the instructor's comments and in the learner's best judgment, decide which of the instructor's comments pertain to "his" performance. There is considerable doubt that many students have the ability to be so discerning. From personal participation in ski school lessons, clinics, and workshops, it seems that a shift from using "individual" to "general" correction has taken place. This shift could be viewed as a solution to the problems with the ill-use of "individual" correction. It is not! "Individual" correction can serve the learner better than "general" correction. It is more specific and clearly given to a particular individual. This information serves as a guide to the learner in subsequent trials and assists him in analyzing the results of his actions. Although there are those instances in performances when a learner can assess the results of his own actions, such as shooting a goal in basketball, swinging a bat at a ball — the skills in skiing would seem to require assistance from an observer. However, the effectiveness of "individual" correction is dependent upon its proper administration. Extreme caution should always be taken so as not to embarrass or discourage the learner.

"General" correction can also be useful. If many students in a group are making the same error or if time is limited, the use of "general" correction would be the efficient approach. The shortcoming of "general" correction lies in its vagueness. The instructor is counting on the learner to have the ability to know whether or not the correction applies to *him*. For the most part, confusion occurs and the wrong students change their performance. In light of the information available pertaining to the effectiveness of "general" correction, it is thought that "individual" correction is more conducive to effective learning. Certainly, both "individual" and "general" corrections can be useful and each can contribute significantly to learning.

Positive and Negative Feedback

Feedback can be expressed in "positive" and "negative" terms. "Positive" referring to the use of terms describing affirmative action in the performance. Ex. "Push forward." "Negative" referring to the use of terms stating what should not be included in the action. Ex. "Don't sit back." Simply, instead of telling a student what "not to do" tell him what he "should try to do."

Educators are in support of the use of “positive” feedback because of its favorable effect upon the atmosphere of the class and its beneficial effect upon the student’s attitude toward subsequent learning. Traditionally, we hear, “Don’t do this” or “You didn’t do that” to the point that students become so discouraged that they resent and avoid the instructor. It is just as easy to say, Positive: “Stay on your edge!” as it is to say, “Don’t slip!”

It is also noted that all too often only the mistakes in a performance are mentioned. Somehow, the “good” is understood and the errors become the main discourse in the feedback. It is unfortunate when a student’s *only* communication with the teacher is when the learner does something “wrong.” There is a need for instructors to note the achievements of the learner as well as to make more mention of the successes. This supportive role coupled with the use of positively stated corrections can change the attitude of the student from discouraged to encouraged, from defeated to challenged, from “quitting” to taking future lessons!

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Concurrent, Terminal and Delayed Feedback

Feedback can be supplied *during* the action or *after* the completion of the performance. “Concurrent” refers to that feedback given to the learner during the performance. “Terminal” refers to that feedback given when the learner has completed the task. Terminal feedback can be administered immediately or any time after the task has been performed as long as *no* intervening activities have occurred. Students receiving feedback after the instructor has watched *all* members of a class “ski down the hill” are receiving “terminal” feedback. If the last student is the first to receive feedback, then his feedback is “terminal” and “immediate” all others would be receiving “terminal” feedback. If students were to engage in subsequent trials before the instructor gives feedback on the original trial, that feedback is referred to as “delayed.”

Feedback given *immediately* upon the completion of a performance is recommended. “...experiments in practical skill agree that the learner should be given as specific and as immediate information as possible.” Since the performer has just gone through “the motions” of the skill, he can reflect on his actions in light of the instructor’s comments. It is especially true in the performance of motor skills that as time elapses, both the learner’s and the instructor’s recollections of the performance become increasingly vague. The effectiveness of the well-intended feedback is further jeopardized when subsequent trials or other intervening activities are allowed to occur before feedback is given. It becomes increasingly difficult for the learner to recall the particular trial to which the instructor is addressing his comments in “delayed” feedback.

It has also been noted that “concurrent” feedback *can* be distracting to the performer. The instructor’s intended helpful cues *can* interrupt or break the performer’s concentration. Once again, the manner in which feedback is given is extremely important. Certainly, a word at just the right time, when something good is done or in error is made can work wonders! “The closer the exclamation is to the good movement or to the error, the easier it is for the learner to identify the right and wrong actions.”

The use of video taping can be an extremely helpful tool for providing feedback information. It enables the student to *see* in his performance what he may be unaware of or unable to *feel* as he performs. Video tapes also enable the instructor more opportunities to view the performance and thereby analyze more extensively and with greater accuracy. “In many complex skills, action is too fast for the detail to be observed by the human eye and other aids to analysis are necessary.” In order to make the best use of video tapes, it is important to view the tapes as soon after the performance as

possible. After viewing and analyzing the taped performances, time should then be provided for the students to try the skill under the watchful eye of the instructor. These trials soon after the visual feedback, re-enforce the learning to be gained.

The *quality* of the instructor's comments is also extremely important in effective feedback. Whether it be concurrent, terminal, or delayed, every effort should be made to say something that will be helpful. Comments such as "try harder" or "do it again" are simply not good enough. To say, "In order to flatten the ski, rotate the uphill ski." Instructors need to have considerable depth of knowledge of a particular skill so as to analyze the performance of their students and to give helpful, meaningful recommendations for future trials.

Instructors need to have considerable depth of knowledge of a particular skill so as to analyze the performance of their students and to give helpful, meaningful recommendations for future trials.

Descriptive and Prescriptive Feedback

Feedback can also be described in terms that are *descriptive* and *prescriptive*. In ski teaching, it is often referred to as "detection and correction." Descriptive feedback refers to observations shared by the instructor with the student: i.e. "You turned your skis very sharply because you exerted pressure suddenly and at only one point in the turn." Prescriptive feedback refers to the instructor's recommendations for future performances: i.e. "Next time, smooth out your turn by exerting your pressure evenly as you form a big letter 'C'." With this information, the learner knows "what" he did, what he should "try to do," and "how" he can go about doing it. An effort should be made to state both "descriptive" and "prescriptive" feedback in "positive" terms.

In giving feedback, care must be taken not to embarrass, humiliate, or discourage the learner. Extreme care in one's choice of words is paramount, especially if "individual" corrections are to be given to a student "in front" of a group of students. Certainly, the best arrangement for "individual" correction is a private-type, one-to-one situation. For example: Instructor has class ski down to him, one student at a time. Each student is given individual, immediate-terminal, positive, descriptive, prescriptive feedback. Other students should be asked to *stand* away from both the instructor and the student so that feedback to *each* student can be private.

Conclusion

In conclusion, it is thought that the solution to the problem of ill-administered "individual" correction is not to stop using it, but, to learn how to use it effectively. This writer is calling for the return and renewed use of "individual" correction in ski teaching. Instructors should know that in order for feedback to be most conducive to effective learning, descriptive and prescriptive feedback should be stated positively, immediately upon the completion of the performance, and in a one-to-one, private-type situation. Recommendations for future trials should be meaningful and with substance. It just isn't good enough to tell students to *turn* their skis, tell *each* student *HOW*..!

Heaton, Joan E. *Whatever happened to individual corrections?* PSIA Ski Pro, Vol. 14, Number 2, February, 1980.

TeachingStyles

Compiled by Jo Garuccio

Introduction

Until Muska Mosston entered the teaching scene in the 1970s, leading theorists in the field of education placed the instructional process into two style categories. Teaching methodology followed a formal teacher-centered style or a more informal student-centered style. Mosston, however, proposed a catalog of several distinct styles of teaching that covered the entire continuum from teacher-centered to student-centered. His work had a considerable effect on the teaching profession.

A style of teaching, as defined by Mosston, is basically a set of decisions made in conjunction with the teaching act. As one moves along the continuum from teacher-centered to more student-centered styles, certain decisions are transferred from the teacher to the student. In the command style, decisions are made exclusively by the teacher. By comparison, most of the decisions are on the students' shoulders in the problem-solving method.

According to Mosston, all teaching decisions fall into three categories: *planning*, *execution*, and *evaluation*. These three categories constitute the anatomy of a teaching style. Any given style can be identified by the number and type of decisions made by the student.

- ◆ planning
- ◆ execution
- ◆ evaluation

Planning

Is the student deciding where to perform, what to perform, or how much and how well? If she is, this would indicate that the student had a part in the *planning* phase of the lesson?

Execution

Or, is the student deciding how fast to move or when to start and stop performance? These changes would indicate that a shift in decision making occurred during the *execution* phase.

Evaluation

If a partner offers immediate feedback based on criteria set by the teacher, the *evaluation* process has been moved to the student.

A style of teaching, as defined by Mosston, is basically a set of decisions made in conjunction with the teaching act... According to Mosston, all teaching decisions fall into three categories: *planning*, *execution*, and *evaluation*.

It should be noted that simply asking a student “how does that feel?”, or “why is that better?”, is not a shift in decision making; it’s simply a more humanistic approach to command style teaching. The teacher has often told the students exactly what to do and then simply asked for feedback. If students are given a set of directions and then allowed to perform on their own within a prescribed set of boundaries, the teaching style moves along the continuum to task. But following up the task by simply asking “How does it feel?” does not then transform the teaching style into guided discovery. At this point, the student has still not made any significant cognitive decisions, although they have been asked to sense kinesthetically what is happening.

Each style along the spectrum has advantages and disadvantages, and no one style is best all the time. It is also probable that hybrids of the styles have been or will be developed. Furthermore, research indicates that the most effective teachers vary their teaching behavior from class to class and even within classes.

Changing favored-teacher behavior is no small task. There are many factors to consider including the readiness of students to make decisions for themselves, and the teacher’s ability to curb his decision making behavior. If students have learned primarily through command or teachers are not used to relinquishing some control, a weaning period may be necessary. Go slowly. Start with only one or two decisions and try an alternative style for a small part of the lesson.

Each style along the spectrum has advantages and disadvantages, and no one style is best all the time.

The following information has been compiled to help instructors understand how to effectively structure lessons in the various teaching styles.

Command Style

Execution of command style simply requires that the teacher give a brief, but adequate explanation and an accurate demonstration. The student then follows instructions for performance and the teacher gives evaluation and feedback. New teachers who lack thorough knowledge of the subject matter will feel more comfortable with this style. However, if instruction time is short, and it is necessary to impart some very specific information, the command style may be the preferred choice, although pure command is rare.

Characteristics

1. complete domination of all decisions by the teacher
2. relies heavily on demonstration
3. focuses on teacher and subject matter
4. role of the student is to respond to the teacher’s stimuli

Advantages

1. uniformity—elicits specific responses
2. efficiency

Disadvantages

1. not sensitive to individual needs
2. minimal intellectual involvement

Classic examples of command style teaching would be “follow me” or instructing the class to perform for the teacher in a “call down” fashion.

Task Style

Task style teaching is an extension of command in that the teacher still controls most of the important decisions. Delivery of the task is done by explanation and demonstration, but when it is time for performance, students can now start on their own, perform a certain number of times and then stop on their own. During this time, the teacher is free to observe and offer individual help and feedback.

Characteristics

1. teacher makes all planning and evaluation decisions along with some execution decisions
2. student makes some execution decisions (i.e. task is explained and demonstrated and students start, perform and stop movement all on their own)
3. begin with one task at a time. Later, two to four variations of a task can be demonstrated so students can select the variation to perform.
4. independence from teacher begins to evolve
5. concept of a range of tasks permits everyone in class to participate according to ability

Advantages

1. allows for individualization of instruction
2. allows for private feedback
3. better utilization of time or space

Disadvantages

1. teacher must plan ahead and prepare more
2. student can avoid teacher contact or be overlooked by the teacher

Allowing all your beginner skiers to practice scooter skiing (sliding on one ski) at the same time for a designated number of passes across the teaching area after the initial demonstration and explanation would be a good example of task style teaching.

Reciprocal Style

Reciprocal style can be an effective method for changing the routine in class. However, merely working with a partner is not reciprocal style teaching unless one of the pair is also instructed to give feedback. Simply following or synchronizing with each other is variation of the task style. But, to be effective, give as much assistance to observer as possible without taking over the observer's role and list specific things in the performance to look for.

Characteristics

1. teacher makes all planning decisions, some execution decisions and some evaluation decisions
2. students make some execution and some evaluation decisions
3. evaluation is carried on by another student in the role of an observer, corrector and reinforcer
4. teacher should speak only to teaching partner
5. all points of task summary apply in reciprocal

Advantages

1. immediate feedback
2. one-to-one student teacher ratio
3. mental practice
4. independence from teacher evolves

Disadvantages

1. student interaction may induce physical, emotional or intellectual dangers

An example of reciprocal style teaching in skiing would be the following: after explaining, demonstrating and possibly practicing skiing on the outside ski with the inside light ski off the ground, students would be paired off and instructed to follow each other and count how many times their partner touched the inside foot to the ground before beginning the new turn. Feedback could be given at the end of the run or during the run by counting out loud.

Although the feedback and evaluation is given by the student who is the designated peer instructor, the teacher maintains some control over the evaluation process by dictating the specifics of the feedback. This is especially important when students lack experience and the necessary skills to accurately analyze the total picture. In addition, call class back together to discuss task, answer questions, share suggestions and to assure the execution of the style.

Small Group Style

This style is essentially a variation of reciprocal except that three or more people each have a functional group role—doer, observer or recorder. Otherwise, the characteristics and advantages and disadvantages are the same as reciprocal. Small Group also promotes interaction and communication among group members.

Individual Style

The individual style is generally quite time consuming and probably not as applicable to skiing as it is to large self-motivated physical education classes. After all, students did not pay \$50 so that the instructor could hand out directions and disperse them to work independently. However, it does have implications for situations such as weekly ski classes or groups with diverse skill levels. Staff trainers might want to investigate this style.

Characteristics

1. teacher makes all the preparation and planning decisions, some execution and some evaluation decisions
2. student makes some execution and some self-evaluation decisions
3. extended periods of independence

Advantages

1. increases ability to self motivate
2. increases ability to self-evaluate

Disadvantages

1. must be planned in minute detail
2. teachers and students must be ready
3. qualitative evaluation requires specific cues

The following is an example of a quantitative form of the individual style:

Item I: hop turns with a pole plant
Complete 30 short turns on intermediate groomed terrain.
Do this every day for seven days.

Level I: hop for 0-10 of the 30 turns
Level II: hop for 11 - 20 of the 30 turns
Level III: hop for 21-30 of the 30 turns
Score your attempts.

As you can see, preparing several items like this along with a tally sheet would require extra time; and, a quantitative lesson is easier to prepare than qualitative or instructional individual lessons. However, in certain situations, it could be very effective.

Crossing the Cognitive Barrier

Guided Discovery Style

In the guided discovery style, the teacher must decide on the target during the planning phase—i.e. before the lesson segment. Once the target has been decided, the teacher must determine the probable sequence of steps or questions which will lead students to the target. However, that sequence may very likely change based on the diversity of possible responses. The teacher must know the subject matter thoroughly in order to move the questioning back on track if an answer deviates from the intended response. Furthermore, students can use movement to respond. Answers do not always have to be verbal.

Characteristics

1. teacher makes all planning and evaluation decisions and some execution decisions, but decisions must be modified as a result of student response.
2. student evaluation decisions become intertwined with execution decisions and teacher provides reinforcement for all responses
3. the question and answer process works towards a *single* goal
4. questions must be designed so that question 2 is based on the answer to question 1, question 3 is based on information from question 2 and so on
5. each succeeding question should narrow in on the target until the solution to the final question results in the desired discovery - a funnel effect
6. **the teacher always knows the answer, but students do not**

Advantages

1. intellectual involvement/cognitive development
2. develops self-concept
3. understand process by which subject matter was developed

Disadvantages

1. extremely time consuming
2. more difficult with very large or very heterogeneous groups

Ground rules for the guided discovery style:

1. Always wait for a student response - do not worry about a few seconds of silence.
2. Never give the answer. If there are no answers, ask a simpler question.
3. Always reinforce student responses and ask them to “Go on” or ask for other alternatives. A “no” will inhibit further response.
4. Accept off-target responses and lead the group back on track with more questions,

Before the questioning begins, all students must be brought to a point where common understanding can be assumed. This may necessitate a preliminary statement or two. In addition, it is not necessary to teach the whole lesson in guided discovery. Start with easy concepts. For example, instead of explaining the idea of dynamic balance to your students, see if you can lead them to discover it. Other areas that work well in discovery type lessons include uncovering facts, relationships, limits, and how or why something happens.

The following is an example of a simple guided discovery lesson that has worked well with children in a pre-ski activity:

- | | |
|----------------|--|
| Subject | balance |
| Purpose | to discover a basic athletic ski stance (Level I students) |
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- | | |
|--------------------|--|
| Question 1 | <i>What is one of the most important factors in learning to ski?</i> |
| Anticipated answer | <i>Standing up.</i> |
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|--------------------|---|
| Question 2 | <i>Can you give this ability to remain standing a name?</i> |
| Anticipated answer | <i>Balance or balancing.</i> |
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|--------------------|--|
| Question 3 | <i>Can you show me maximum balance?</i> |
| Anticipated answer | <i>Some students will assume low football type positions and others will stand in various erect positions.</i> |
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|-------------------|---|
| Question 4 | <i>Is this your most balanced position? Check by pushing. Most people will probably assume a lower natural stance than what you really want but wait!</i> |
|-------------------|---|
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|--------------------|--|
| Question 5 | <i>Could you now assume a position of less balance?</i> |
| Anticipated answer | <i>Most will respond by reducing the size of the base.</i> |
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|--------------------|--|
| Question 6 | <i>Now could you move to a position of still less balance?</i> |
| Anticipated answer | <i>Most will now reduce the area of contact between their body and the floor. With two or three more steps, most students will be in a very high position with minimum contact between body and floor.</i> |
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- | | |
|--------------------|--|
| Question 7 | <i>How is the unbalanced position different from the more balanced position?</i> |
| Anticipated answer | <i>Balance is lower and wider; unbalanced is higher and narrower.</i> |
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- | | |
|--------------------|--|
| Question 8 | <i>Can you find the low balanced position again? How long (no hands resting on thighs) can you hold that position?</i> |
| Anticipated answer | <i>After about 30 sec. in a football ready position, the students begin to tire.</i> |
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- | | |
|--------------------|---|
| Question 9 | <i>Could you hold that position for the entire ski day?</i> |
| Anticipated answer | <i>Most students will tell you not very long.</i> |
-
- | | |
|--------------------|--|
| Question 10 | <i>Can you find a position in between the two points that will be very stable but not as tiring?</i> |
| Anticipated answer | <i>An athletic ski stance.</i> |

The student has arrived at the desired answer—an *athletic ski stance*—through a process of discovery orchestrated by the instructor.

Problem Solving Style

In the problem-solving style, students are given a specific question or task and directed to seek out alternative solutions. It may not be the most efficient way to teach a skill, but it is a valuable tool for conceptualization purposes.

Characteristics

1. teacher has reduced decision making in planning, execution and evaluation
2. student now involved in all three phases of decision making
3. single problem may have several solutions
4. reverse funnel effect

Advantages

1. develops conceptualization and acclimatization
2. great cognitive development
3. learn problem solving technique
4. creativity and individuality are developed

Disadvantages

1. does not teach specific skills
2. no uniformity of performance

Problems must be designed so that solutions uncover the following: facts, relationships, preferences or validity, limits, concepts and variations. To develop problems to solve in a given subject matter, analyze the subject matter according to the preceding categories and develop a series of problems in each one.

Problems can range from the simple to the very complex. Here are a few easy examples for ski teaching:

Concept:: edge control

1. Can you move on your skis with minimal or no edging? (options include skid, slide, jump, traverse losing altitude)
2. Can you turn with as little edge as possible? (braquage, long flat ski turns with little shape)
3. Can you move with maximum edge? (edge lock, traverse, crab walk)
4. Can you turn with maximum edge? (fast GS, edge set hops etc.)

After exploring several alternatives, the teacher may wish to draw some conclusion. This can be done with a series of questions, or more than likely moving into a different teaching style.

Summary

Remember, no one teaching style is “best” all the time. An effective teacher uses a variety of approaches depending upon the class and the circumstances surrounding it. In addition, it is also possible to combine styles and produce a “hybrid” that suits your strengths as a teacher. But whatever you do, start slowly and try new things in small doses. After awhile, you will find that you may become quite adept at several more difficult styles.

As for matching teaching and learning styles, according to the specialists in the field, this is still not a very refined process. However, it is possible to quickly assess your student(s) with a couple of questions that will indicate sensory preference, and information processing preference (are they global-conceptual thinkers or linear thinkers?). However, in a group lesson, with several learning preferences present, using a variety of teaching styles throughout the lesson may be your best defense.

References

Dougherty, Neil J. and Bonanno, Diane. *Contemporary Approaches To The Teaching of Physical Education*. Minneapolis, Minnesota: Burgess Publishing Co., 1979.

Mosston, Muska. *Teaching Physical Education*. Columbus, Ohio: Merrill Publishing, 1966.

LearningStyles

Learning Style Inventory

Because we often teach the way we learn, understanding our own learning style helps provide insight into how we teach. Likewise, being able to identify learning style traits in students helps us present our lesson in a more effective manner. For instance, a group lesson may be made up of four people who each possess a different dominant learning style. How do you structure a lesson and provide individual attention in a fashion that helps each member of the class? It's important to note that although most people have a dominant learning style, they often exhibit other learning style characteristics as well. The Learning Style Inventory will help you understand learning styles.

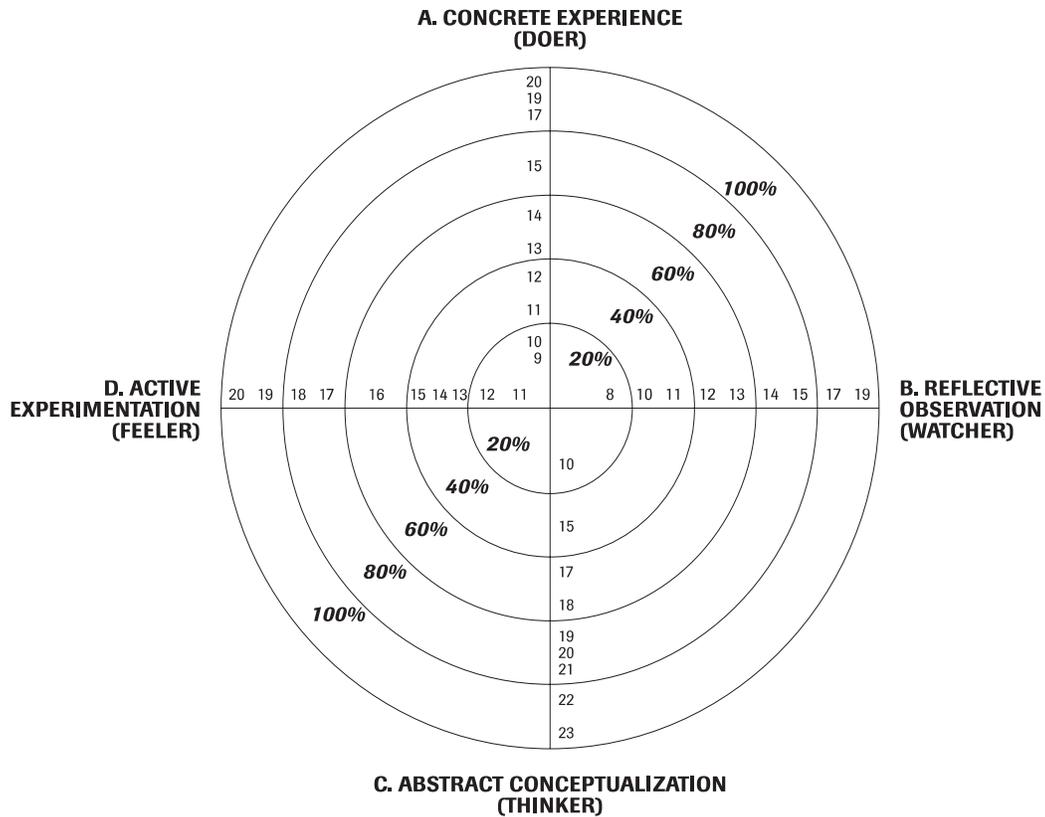
Although most people have a dominant learning style, they often exhibit other learning style characteristics as well.

There are nine sets of four words listed below. Rank each set of words by assigning a 4 to the word which best characterizes your learning style, a 3 to the word which next best characterizes your learning style, a 2 by the next most characteristic word and a 1 by the word least characteristic of you as a learner. To make this test more relevant to ski teaching, associate your thoughts with learning a sport with an element of physical risk. Be sure to assign a different number to each word in each set.

I am:	1. <input type="checkbox"/> discriminating	<input type="checkbox"/> tentative	<input type="checkbox"/> involved	<input type="checkbox"/> practical
I am:	2. <input type="checkbox"/> receptive	<input type="checkbox"/> relevant	<input type="checkbox"/> analytical	<input type="checkbox"/> impartial
I am:	3. <input type="checkbox"/> feeling	<input type="checkbox"/> watching	<input type="checkbox"/> thinking	<input type="checkbox"/> doing
I am:	4. <input type="checkbox"/> accepting	<input type="checkbox"/> risk-taking	<input type="checkbox"/> evaluative	<input type="checkbox"/> aware
I am:	5. <input type="checkbox"/> intuitive	<input type="checkbox"/> productive	<input type="checkbox"/> logical	<input type="checkbox"/> questioning
I am:	6. <input type="checkbox"/> abstract	<input type="checkbox"/> observing	<input type="checkbox"/> concrete	<input type="checkbox"/> active
I am:	7. <input type="checkbox"/> present-oriented	<input type="checkbox"/> reflecting	<input type="checkbox"/> future-oriented	<input type="checkbox"/> pragmatic
I:	8. <input type="checkbox"/> experience	<input type="checkbox"/> observe	<input type="checkbox"/> conceptualize	<input type="checkbox"/> experiment
I am:	9. <input type="checkbox"/> intense	<input type="checkbox"/> reserved	<input type="checkbox"/> rational	<input type="checkbox"/> responsible
	A _____	B _____	C _____	D _____
	add lines 2 3 4 5 7 8	add lines 1 3 6 7 8 9	add lines 2 3 4 5 8 9	add lines 1 3 6 7 8 9

Add the numbers in each of the four columns as indicated by the numbers below the tally lines. Enter these values in their proper axis on the target on the next page. A = Concrete Experience (Doer), B = Reflective Observation (Watcher), C = Abstract Conceptualization (Thinker), and D = Active Experimentation (Feeler). Once totals have been entered on the target you can determine your type of learning style and read the description.

Dick Leider, Human Renewal Associates



What Kind of Learner Are You?

A. Concrete Experience (Doer or Trial and Error): People in this category tend to be pragmatic, practical, and functional; they are searchers who see a purpose in learning; they are good problem-solvers and work well with others. These learners want to “do” and may become anxious with too much standing around.

B. Reflective Observation (Watcher or Visual): These people like to get the picture and like to know the purpose of practice. They need to watch others, are good listeners, introspective and contemplative. Good demonstrations are important to this learner and verbal communication needs to be image-oriented to be effective.

C. Abstract Conceptualization (Thinker or Cognitive): Such people are analytical, logical, thorough and theoretical. They would rather read than listen to lectures and are often loners or dreamers. At times they are meticulous to a level of obsession. This person has read every ski magazine on the rack and is particularly receptive to technical discussions on lift rides.

D. Active Experimentation (Feeler or Kinesthetic): People of this nature are receptive learners; they learn predominantly through “gut” intuition. They try many things to find a way, tend to be emotional and learn by doing and by evaluating on the way. These people are also “doer” oriented and tend to be kinesthetically aware, picking up movement patterns quickly and being bored with analytical talk.

Teaching Children

Changing Perceptions

During the past several years, ski areas have experienced an increased demand for ski services offered to children. This has initiated the specialty area of the children's ski school with instructors who work exclusively with children. In recognition of the importance of providing quality ski lessons to all students, PSIA-I is including information related to teaching children into Certified Level I, II and III Exam format.

The following information, from *Child Centered Skiing: The American Teaching System for Children*, provides a quick reference for material directly related to the children's ski school as well as more general information on child development, etc.

Maria Montessori (1870-1952)

Maria Montessori devoted her life to the study of children's physical, psychological, intellectual and spiritual development. The work of Montessori was selected as the theoretical and philosophical foundations of the American Teaching System for Children because it focuses on the development of the whole child. The term Child-Centered Skiing was chosen because it reflects this concept of considering the whole child in the ski teaching methodology. The child is the center of focus and the lesson is tailored to best suit the abilities and interests of the child.

Maria Montessori devoted her life to the study of children's physical, psychological, intellectual and spiritual development.

The Prepared Environment

The success of the lesson depends on the learning environment; it either ensures the success or dooms the lesson to failure. When working with children, in a high risk sport such as skiing, the prepared environment is a necessity, not a luxury. It can be described as any specially prepared environment designed to ensure success when learning new skills. In skiing, the environment may include an indoor pre-ski facility, an on slope pre-ski station and/or skill stations.

Benefits of a well prepared environment include minimal adult/instructor intervention. The area can facilitate ease of movement and safety while new skills are being taught and can encourage error prevention rather than correction.

A terrain garden can be considered a form of a prepared environment. PSIA guidelines for a terrain garden state "...a controlled practice environment offering manicured terrain features and skill developing conditions to help skiers learn to ski." A terrain garden can also offer a visually appealing and exciting environment for the student, such as adding brightly colored flags, poles to ski around, etc.

Skill Stations

The skill station concept allows a child to learn basic skiing skills at his/her own rate. One skill station model may include several on-hill areas, each with a specific focus. The child is allowed to progress from one station to the next based on his individual development. Station groups are split according to age and ability to create more compatible situations. Each station introduces a specific skill or movement and when the skill is sufficiently learned, the student may progress to the next skill level. This concept can successfully motivate a child by helping to set attainable goals and reducing stress and anxiety in the ski lesson.

The “Can Do” Teaching Approach and the CAP Model.

In any teaching situation, the instructor must understand the abilities of the student to know what they can do. Too often we hold adult expectations of our child learners and focus on their limitations. We have finally entered the child’s world to understand how they think, feel, move and learn. By focusing on what kids “CAN DO” we can develop a positive, Child-Centered teaching approach. This idea led to the creation of the CAP model by the PSIA Junior Education Team. The CAP model is a tool instructors use to help assess the ability level of their students in the Cognitive, Affective, and Physical domains. What they ‘can do’ based on their degree of intellectual, emotional, and physical development. After becoming familiar with the CAP model instructors will see how useful it is in setting up successful learning situations for all students, children and adults

Children do not simply possess less knowledge than adults, they process this information differently.

It’s not that different!

None of this information is new, we’ve just put it in a slightly different format for easy understanding and use in the PSIA-I Online Study Guide. For further studies and information on how to get started with the Accredited Children’s Educator (ACE) program, contact a Children’s Mountain School supervisor, the KID’s section of the www.psia-i.org website or the PSIA-I Division office.

Children View the World Differently Than Adults

Children do not simply possess less knowledge than adults, they process this information differently. How children view the world is very important to understand so that we can communicate with them on a level that they can understand. The theory of cognitive development can offer explanations on what children are capable of at certain stages of mental development. This can help the instructor better plan his lesson and set realistic, attainable goals for the student.

Piaget’s Stage Theory of Cognitive Development

With the work of Swiss theorist Jean Piaget, we now have a glimpse into the working of the child’s mind. Piaget spent more than 60 years observing, studying, researching and writing about children’s cognitive (mental) development. Piaget proposed four major stages of cognitive development that are experienced by children: sensorimotor stage, preoperational stage, concrete operations, and formal operations.

- ◆ Sensorimotor
- ◆ Preoperational
- ◆ Concrete Operations
- ◆ Formal Operations

The first stage of cognitive development is called the *Sensorimotor Stage*, the period from birth to approximately 2 years of age. This infant relies on touching, feeling, seeing and using her senses to find out about the world. Her world is her immediate environment and she interacts with it on a motor level. During this stage, a child learns to differentiate herself from others and the environment and learns that things and even people continue to exist when she is not interacting with them.

When a child begins to use language, she enters the *Preoperational Stage*, the second stage of mental development. This child can now interact with the world verbally as well as on a motor or physical level. The child differentiates between thought and action. This is a time of make believe play. During the Preoperational Stage, which continues until seven or eight years old, a child reasons and explains events based on how things look to her. Everything is seen from her point of view; in fact the child is not aware that others may have a different point of view.

The stage of *Concrete Operations* occurs from approximately age seven until adolescence or beyond. It is characterized by the ability to differentiate appearance from reality. At this stage however, the child can not yet reason about abstract concepts. Children do not simply possess less knowledge than adults, they process this information differently.

The stage of *Formal Operations* is marked by the potential for thinking in terms of concepts and abstractions, rather than relying on concrete or real objects or events. This stage of development determines what and how a child learns. As instructors we should understand the basic principles of children's thinking. The late Pre-Operational stage (between four and seven years old) coincides with the age children may first be exposed to ski instruction. It is important to understand that stages represent levels of development, not chronological age. Many five year olds will demonstrate abilities normally observed in older children; and many eight, nine, and ten year olds can be seen operating on a level typically identified with children as young as four or five. Therefore, the best age to introduce a child to skiing is when he/she is developmentally ready to handle the experience, both mentally and physically.

Skill Sequencing

Skill sequencing is a technique for ordering skills into a progression that facilitates learning. Specifically, each progression moves the student through ordered stems from the easiest level of skill development to the more challenging facets of an activity. The skill sequencing cycle is represented by six steps. They include:

1. Identify competencies;
2. Isolate difficulty;
3. Divide skills into component parts (subskills);
4. Incorporate variations into skill sequences;
5. Organize skills, subskills and variations into progressions;
6. Evaluate the progression.

A child may not be capable of performing a skiing skill at the simplest level (lack of readiness or ability), or she might not have learned the necessary prerequisite skills (lack of prior experiences).

Each child is unique and matures at his or her own rate. As children become older, differences in degree of control, coordination, interests and self direction become greater. To teach different level classes effectively with children who have a variety of experience bases, a sound technical understanding of skills and skill variations is necessary. This foundation of understanding is basic when developing a logical progression, the center of the learning process.

Each child is unique and matures at his or her own rate. As children become older, differences in degree of control, coordination, interests and self direction become greater.

The goal of skill sequencing is to plan a logical progression of skills that leads to the proficient use of widely applicable, integrated movement patterns. Ease of learning depends on prior learning of prerequisite skills. It is important that a student not be rushed from one skill to the next before that specific skill is learned. This can create frustration when the student's basic skills don't support the new skill being introduced. If the student is having difficulty with a new skill, perhaps the instructor should re-evaluate the progression.

Skill sequencing is a technique for ordering skills into a progression that facilitates learning... The goal of skill sequencing is to plan a logical progression of skills that leads to the proficient use of widely applicable, integrated movement patterns.

Perceptual Motor Skill Development

It is important to understand the basic motor abilities involved when we are helping a child learn a physical skill such as skiing. The development of controlled movement depends on the sensory input, perceptual and motor systems and their integration. Fundamental movement skills are the basis of all skill development. The majority of children under the age of six have not developed mature fundamental movement skills (running, galloping, hopping, skipping, sliding, jumping and so on).

The majority of children under the age of six have not developed mature fundamental movement skills (running, galloping, hopping, skipping, sliding, jumping and so on).

Sensory input refers to the information that comes to a person through her senses: sight, hearing, taste, smell and touch. We also receive information at an unconscious level from the vestibular system (information from the inner ear about movement and space) and the proprioceptive system (nerve endings in the muscles, joints and tendons). When any of the sense systems or organs are given information, it is relayed to the brain where it is organized and given meaning. Information children receive from the senses is lost at a faster rate than adults (within 1-5 seconds after the stimulus, children lose 50% or more of the information).

Perception refers to the brain's interpretation of received information. The sensory modalities are the means by which information is brought in and processed by the brain. They are channels for information. When we use the term modality - i.e. kinesthetic modality, visual modality, and auditory modality, both the sensory input (or reception) and the brain's interpretation are included. The kinesthetic modality is our primary source of information and movement. All other modalities relate to the kinesthetic system.

Actions are Motor Responses based on our interpretation of information received through our senses. The development of motor responses (physical development) is an orderly and predictable process. Both growth and function follow a two directional pattern. Before and after birth, the body gains control of its muscles from the head to the feet. The nervous system develops from the brain down the longitudinal axis of the body. The body also gains control from the center out. Relative to skiing, children will:

1. Control the head before the trunk;
2. Control the trunk before the legs;
3. Control the arms before the hands and fingers; and
4. Control the hips before the legs, feet or toes

Control of the large (gross) muscles of the body occurs before control of the small (fine) muscles. Therefore, skiing maneuvers must be well learned before refinement begins.

The connection between the nervous system and muscular system evolves. As a child develops, he may experience a large growth spurt in a relatively short period of time. Muscle and bone growth may exceed nerve development, in that nerve growth occurs at a slower rate. The child may experience a lack of coordination until the nervous system can catch up to the muscle and bone growth.

Efficiency in movement depends on the development of many abilities: spatial orientation, body image, balance, laterality and directionality.

Sensory input refers to the information that comes to a person through her senses: sight, hearing, taste, smell and touch.

Younger Children

First, let's look at the younger child. We teach a lot of these kids. This is the kindergarten (plus) age group. These kids are beginning to enjoy interacting with other kids. They can follow basic directions. They are just starting to believe that mom and dad will come back after the lesson. Separation anxiety may still be a problem, but they are beginning to adjust better to being on their own. They love to play games and "make believe." Some other characteristics include:

- ◆ They possess a short attention span. Action oriented.
- ◆ They cannot reverse directions or thought process. If they receive directions to the lunch room, they will not be able to return by mentally reversing instructions.
- ◆ They are usually not competitive, playing is winning.
- ◆ Head is large in proportion to body, trunk longer than legs.
- ◆ The whole body moves as a unit. No upper/lower body separation.
- ◆ Gross motor skills develop before refined motor skills.
- ◆ May not yet be cross lateral. Cross laterality affects balance and overall movement patterns.
- ◆ Egocentric. They are #1 priority and view the world only from their perspective.
- ◆ They learn from the head down and the trunk out.
- ◆ They can usually only remember the last few words spoken to them (keep tasks short and simple).

To effectively teach kids we must explore their developmental stages...Child development specialist Jean Piaget, proposed four major stages of development.

Older Children

Now, let's look at the older child. This is roughly the 7-12 age group. These kids are becoming more socially aware and are influenced by their peers. These kids are more self reliant and comfortable in group situations, due to their experiences in school, sports, camp, etc. Some other characteristics include:

- ◆ They can reverse directions. This means that they can receive instructions to the lunch room and mentally reverse the directions to find their way back.
- ◆ Can sequence three or more tasks.
- ◆ They are experiential learners.
- ◆ Can understand rules and consequences. Cause and effect.
- ◆ Upper body can move in opposition to lower body.
- ◆ Gross motor development is complete, control of fine motor is established.
- ◆ A large growth spurt is common to this group and may effect coordination.
- ◆ Will rehearse gross motor movement to achieve perfection. Becoming self motivated.
- ◆ They are becoming competitive, self worth is tied to accomplishment.
- ◆ Want to formulate their own rules, to be included in the process.
- ◆ At around age 10, their CM is becoming more proportioned to that of an adult. An effective scale of this development is:

This ratio is Upper Body Mass : Lower Body Mass

Age 5-6	60:40
Age 8	50:50
Age 10-12	40:60

How We Teach: The Instructor

Now that we have a picture of *who* we are teaching, we can adapt *how* we teach to suit their needs. Consider the elements of a quality lesson, using the Teaching Cycle. Let's explore how we can adapt each of these elements, given the characteristics of children learners, to create a positive "learning partnership":

Use **P-D-A-S** to remember all the parts of the 'Kid's Teaching Cycle'. That is, Play - Drill - Adventure - Summary. Play is how the instructor initially introduces the lesson and assesses the needs and objectives of the child. Drill refers to the activities that are presented to the child to meet the chosen objectives. Adventure is the time when instructors allow children to practice new skills in various scenarios (e.g., easy bumps, the 'bear trail', the 'miner's camp', gate skiing, terrain gardens, etc...). Summary is the time when the instructor reminds the student and parents of what the child practiced, teaching cues used, and what they learned.

PLAY

1. Introducing the Lesson

Younger Children: These children want to feel comfortable and secure. They need eye contact and a feeling of being part of a team. It's important to be in their physical plane (kneeling down to look them in the eye).

Older Children: These guys are interested in fun. A sense of humor is important. "School" can have negative connotations, "Coach" can be more inviting. Team spirit is important.

The first few minutes of any lesson are the most important to establish trust and develop a positive rapport between the student and the teacher. This is the foundation of the Learning Partnership.

2. Assessing Needs

Younger Children: Success oriented (just participating is enough to feel successful). They need positive reinforcement for everything. They do not yet understand the goal setting process.

Older Children: Need to be part of the goal setting process. Like to keep moving and be challenged. They need to be ready to leave the Comfort Zone in order to move on to learn new skills.

DRILL

3. Planning Objectives (Activities)

Younger Children: Boundaries are important. Too much open space can be scary (prepared environment often very useful). Keep tasks simple, short and specific. Not very tolerant of repetition. Develop large muscle first, then small muscle movement.

Older Children: Target activities for the success of the whole class (they are sensitive to being the worst in the class). They like more challenge and to go from the "known" to the "unknown." Use easy terrain to allow for self testing of limitations, then increase difficulty. Like to connect activities to what they are doing. Want a "taste" of steeps, bumps or ice.

4. Presenting Information

Remember this old adage: “I hear and I forget, I see and I remember, I do and I understand.” -Confucius

Younger Children: Be clear and simple. Too much stimulus can cause them to turn inside themselves and ignore the teacher (i.e. do not explain the demo while you are giving a demo, they can only focus on one directive at a time). Command/Task oriented teaching approach can be effective.

When demonstrating, remember that large movements are easier to see and do. The instructor should focus on one item at a time (i.e. arms or feet). They will try to copy all of your movements so keep them simple. They may not be able to reverse a demo (i.e. if you perform a wedge while facing the child, they may attempt a herringbone). Keep teaching cues simple and try to use the words or descriptions of the child when appropriate.

Older Children: Don't talk...DO! Introduce light competition. Information must appear relevant (they need to know “why” they are being asked to do something). They are more into Guided Discovery, Target Approach and Problem Solving. They may be starting to deal in abstract concepts (at 10-12 yr.). Use teaching cues to keep the need for lengthy explanations to a minimum. Again, teaching cues should be simple, easy to remember and relevant, using the words or descriptions that the students ‘discover’ when possible.

When demonstrating, these children imitate your movements well. Generally, they take in what you do, not what you say. They may notice subtle changes in your demonstrations, so be specific in what you show them. They may challenge you if they see an inconsistency.

ADVENTURE

5. Practicing

Younger Children: Practice the move, then switch the focus. These children do not have much patience for repetition, however, you can have them practice the same move if you make it interesting each time (i.e. changing the name or the exercise of the terrain).

Older Children: Feedback becomes intrinsic but they still want external stuff. They enjoy exploration and adapting what they are learning. They are more tolerant of repetition, they are beginning to understand the outcome of effective practice. They will take constructive feedback and attempt change.

6. Checking for Understanding

Younger Children: Their body movements tell all. If concepts are not understood, use alternative words (i.e. arrowhead or piece of pizza for a wedge). Kids will relate to words they can understand. Arms are used for balance, trunk used for turning (understanding the basic biomechanics of children is important to understand how and why they move).

Older Children: If they understand, they will be trying it! If they do not get it, they will be distracted and will distract others. They have no desire to do it perfectly (close is OK). Pay attention to body language. They are loyal followers if the “coach” is there for them. Use this opportunity to cement the learned material (for summary).

SUMMARY

7. Summarizing

Younger Children: This child might say “Yippee, I can make a piece of pie with my skis...I love my teacher...I want to come back” Communication with the parent is important. The teacher should be able to explain the students progress and future direction.

Older Children: These students may finish the lesson with “It’s fun to ski with an instructor. I can’t wait until tomorrow” or “That coach dudette is cool...I want to be like her...I’ll be back.” The student will tell the parents all about their experience. Be sure they know what they were working on, not just how to do it!

Use the CAP Model to summarize the lesson in terms of cognitive, affective, and physical experience of the student.

We would like to recognize the following sources for the material in this handout.

References:

Child Centered Skiing: The American Teaching System for Children, Bodie, Workman and Peterson, 1988.

Children’s Instruction Manual, PSIA, Lakewood, CO, 1997.

Core Concepts: For Snowsports Instructors, Maggie Loring, Education Steering Committee, PSIA, Lakewood, CO, 2001.

The Children’s Teaching Model, Alexandra Smith-Boucher. Vail/Beaver Creek Children’s Ski School Handbook.

Originally compiled by the PSIA Western Division Children’s Committee to be used in PSIA-I Master Plan, 1991. Revised and updated for PSIA-I Online Alpine Study Guide, 2002.

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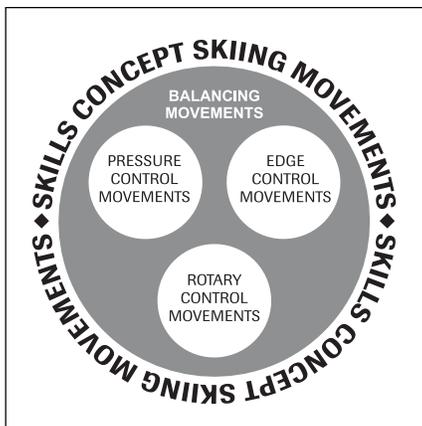
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Professional Knowledge

Technical Concepts

Skiing

The Skills Concept



The Skills Concept refers to PSIA's philosophy that the maneuvers, progressions and exercises taught should encourage the acquisition and refinement of *skills*. PSIA has identified four skiing-related movements referred to as *theskiing skills*. The skills include: balancing movements; edge-control movements; pressure-control movements; and rotary movements.

Although the skills can be useful in analyzing mechanical concepts, they can also lead to confusion if the instructor does not understand how one movement affects all other movements.

Movements associated with the skills are present in virtually all skiing maneuvers. Although instructors may focus on individual movements to achieve specific outcomes, effective use of the Skills Concept requires that instructors understand how the skills relate to each other. The

importance of this *skill blend*, and how to effectively teach movements, is perhaps the most misunderstood aspect of the Skills Concept.

Too often, instructors set out to “teach edging” or “teach rotary” without understanding the movements that lead to mechanically sound and efficient skiing. For example, edge change—the release of one's edges and the engaging of the other edges—is the most fundamental aspect of turning. However, tipping the ankles and legs to flatten and release a ski's edge does much more than just change edge angle:

- ◆ The movement of the leg to tip the old ski off edge also contributes to the new ski tipping onto its inside edge.
- ◆ The release of the old edge causes that ski to lighten and encourages a weight transfer to the new ski.
- ◆ The tipping of the legs to release and engage the edges requires a natural rotation of the legs which helps steer the tips of the skis into the turn.

Although the skills can be useful in analyzing mechanical concepts, they can also lead to confusion if the instructor does not understand how one movement affects all other movements. Remember, good skiing comes from blending movements, not from performing individual movements.

Skiing Standards

The Skiing Standards is a model of skiing performance which might demonstrate the stages of skiing that skiers pass through as their skills develop. The Standards maneuvers include: wedge turns; wedge christy turns; open parallel turns; and dynamic parallel turns. These maneuvers are not intended as teaching targets. We do not teach Standards maneuvers; we teach people movements that help them ski. The type of turn made by an individual is just an indicator of their level of skiing proficiency.

Features of Good Effective Skiing

The following statements describe features that are present in skilled skiing. The bulleted text describes what those features look like while skiing. This descriptive way of viewing skiing can be used by all instructors to evaluate student progress and to help plan lesson objectives. The exact wording of these features is less important than an understanding of the underlying concepts and why they are common to good skiing.

Skilled skiers...

maintain fore and aft balance over the feet.

- ◆ the ankles, knees, hips, and spine bend and unbend to maintain balance over the feet and manage pressure on the skis
- ◆ flex in both ankles keeps the shins in contact with the fronts of both boots
- ◆ independent flexing and extending of the legs allows the body to move with the feet and skis over the terrain and through turns
- ◆ the skis flow over the terrain

direct balance toward the outside ski in turns.

- ◆ independent bending and unbending of the legs controls the transfer of balance from ski to ski
- ◆ the inside half of the body leads the outside half of the body through the turn
- ◆ the outside ski bends in a progressive arc, more or less from the middle

direct movements of the upper body toward the desired direction of travel.

- ◆ vision and focus are in the intended direction of travel
- ◆ the hands are forward
- ◆ the body faces the intended direction of travel (not necessarily "down the hill"; not necessarily "with the skis")
- ◆ the inside hand, shoulder, and hip lead through the turn
- ◆ the pole swing compliments the skier's movement into the new turn

release and engage the edges of the skis

- ◆ the legs and hips move diagonally (forward and laterally) to control the tipping of the skis and to direct the body through the edge change and maintain balance over the feet
- ◆ both skis tip at the same time with continuous and progressive movement
- ◆ the shins maintain contact with the fronts of the boots
- ◆ gliding of both skis is uninterrupted through the edge change

guide the skis through turns

- ◆ the shape of the turn is appropriate for the situation and incorporates the use of ski design (shape) whenever possible
- ◆ tipping and turning movements of the skis originate in the lower body (the feet and legs) and are continuous through the turn and from turn to turn
- ◆ the upper body is stable, continuously moving in the intended direction of travel
- ◆ the legs turn more than the upper body

Why maintain fore and aft balance over the feet?

- ◆ The skier must control fore and aft balance in order to align the ankles, knees, hips and spine and allow those joints to move freely (bend, unbend or rotate). Freely moving joints allow the skier to absorb or transfer pressure to the skis by bending or resisting bending, and to guide the skis with tipping and turning motions of the legs.
- ◆ Fore and aft balancing movements allow the skier to manage how pressure is distributed along the length of the ski (toward the tip, middle, or tail of the ski).

Why direct balance toward the outside ski in turns?

Balance must be directed toward the outside ski in order to bend the outside ski into an arc and take advantage of ski design (sidecut and flex characteristics).

Why direct movements of the upper body toward the desired direction of travel?

The disciplined movement of the body in the desired direction of travel:

- ◆ is necessary to maintain balance over the feet and keep the bulk of the skier's body mass moving toward the skier's destination, even while the skier uses the feet and legs to guide the skis from turn to turn.
- ◆ provides strength and stability for lower body movements.

Why release and engage the edges of the skis?

Edge release and engagement, which allows the skier to stop shaping one turn and start shaping another, is the most fundamental aspect of turn initiation. The same movements that release and engage the edges (sidecut) of the skis continue throughout the turn, increasing or decreasing edge angle in order to smoothly shape the turn or make the transition from one turn to another.

Why guide the skis through turns?

A skier must constantly guide the skis through turns in order to control speed and change the path of travel. To accomplish these goals and still allow the body to move smoothly toward the skier's intended destination, the tipping and turning movements used to guide the skis through a desired turn shape should generally begin in the feet and legs.

Progressions

Progressions organize lesson flow from the simple to the complex and from the easiest to the more challenging levels of performance. Instructors often adhere to a definition of progression development that is very linear, mechanical, and uninteresting to the student skier. Experienced instructors seamlessly weave together skiing and learning within a progression that is invisible to the learner. A progression may be as simple as introducing a concept, practicing it, and then exploring it in different situations. The following example shows a progression that keeps a lesson simple and moving:

- ◆ Greet the class and take a few warm up runs to determine objectives and get moving.
- ◆ Introduce a simple concept that fits student needs and desires, like "turn initiation."
- ◆ Provide and practice a simple task to develop the desired movement pattern.
- ◆ Introduce a teaching cue such as "roll off the old big toe and roll onto the new big toe" to help students focus while skiing.
- ◆ Practice, practice, practice, first on easy terrain and then expand to more varied and difficult terrain, all the while keeping the same focus. Explore the mountain—ski!
- ◆ Provide individual feedback as appropriate and modify teaching cues when necessary to reinforce desired movements.
- ◆ Finish the day with a run on easy terrain to reinforce the original concept.

Although there is structure to the preceding progression, it allows more flexibility and spontaneity than the traditional Step 1, Task 1, Step 2, Task 2, Step 3, Task 3 interpretation commonly associated with progressions.

Turn Shape and Turn Phases

Turning is the primary source of a skier's speed control. Turn shape—round, hooked, elliptical, zig zag, elongated, skidded or carved—is a major factor in how a turn controls speed. Note that speed control does not necessarily mean slow, it can also mean minimizing speed loss, as in racing.

Turns are often referred to as having either three *phases*, depending on their shape. Turns that have a distinct beginning and end—such as turns linked with traverses—can be defined with four phases. Turns that are linked without interruption can be defined with three phases. Although useful for analysis and discussion, in practice, the phases of turns should blend together in continuous linking arcs.

Initiation Phase

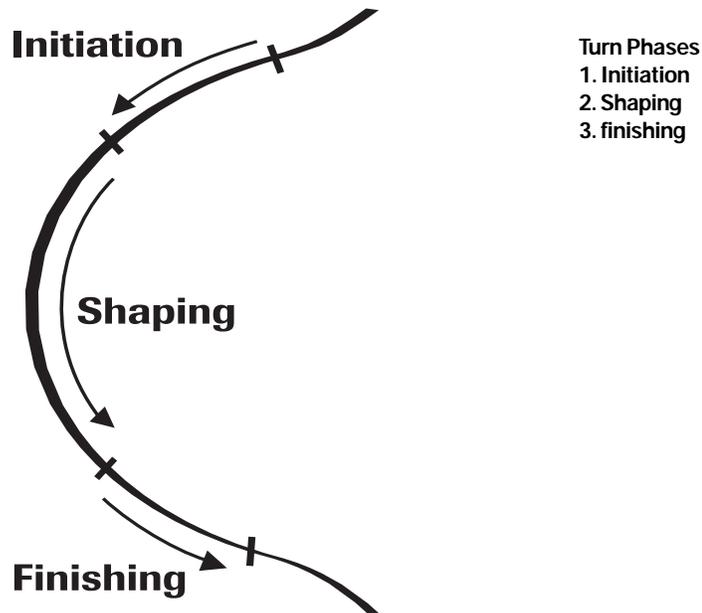
This is where the turn begins. The mass of the body moves over the skis and to the inside of the new turn. This involves changing the edge and shifting weight from one ski to the other.

Shaping Phase

The skier guides the skis through the apex of the turn and accelerates as skis begin to point downhill. Many skiers try to get through the shaping phase too quickly in hopes of limiting acceleration.

Finishing Phase

The skier completes the turn while simultaneously preparing for the next turn. The edging of the skis and inclination of the body lessen as the skier allows the center of mass to come over the top of the skis (or the skis to move under the skier's body).



Terminology Lists

Doctors, lawyers, engineers, and virtually all professionals communicate through descriptive words specific to their field. Knowing and understanding terminology specific to a profession has two important values: experts in the field can communicate more accurately through descriptive words that refer to unique aspects of their occupation, and the process of learning the language leads to a greater understanding of the various aspects of the occupation.

The following terms are broken down into three categories: Certified Level I, Certified Level II, and Certified Level III. Candidates for certification are expected to know the definitions—and understand the practical meanings—of the terms in all categories through their certification level; i.e., a Certified Level III candidate should be familiar with the terms in all three categories.

Certified Level I

absorbing	fall line	sideslip
alignment	flexion	sidecut
alpine technical manual	skills concept	skidding
angulating	gliding wedge	skills
anticipation	gravity	skills concept
athletic stance	hockey stop	sliding
balancing	independent leg action	slipping
braking wedge	leverage	steering
camber	matching	stemming
carving	method	traverse
core concepts	reinforcement	turn radius
center of mass	open parallel turn	turn shape
christy (christie)	phases of the turn	unweighting
comfort zone	positive reinforcement	wedge christy
edge angle	pressure control	weight transfer
edge change	progression	wedge turns
edge control	rotary movements	
extension	rotation	

Certified Level II

Level II candidates are responsible for terms in the Certified Level I list in addition to those in the list below.

C.A.P. Model	kinesthesia	rotary push off
counter rotation	kinesthetic manipulation	sequential leg rotation
cognitive	knee angulation	simultaneous leg rotation
cross over	lateral step	tactic
cross under	lead change	technique
dynamic balance	learning style	teaching style
dynamic parallel turn	open stance	turn shape
feedback	pole action	unweighting
flexibility	pressure transfer	versatility
flow	proprioception	
garland	rebound	
independent leg action	reverse camber	
inclination	rhythm	

Certified Level III

Certified Level III candidates are also responsible for terms suggested for Certified Levels I and II in addition to those in the list below.

abductors	concentric contraction	hinge joint
adductors	deflection	inertia
aerobic	down unweighting	intrinsic
anaerobic	eccentric contraction	isometric contraction
AlpineTechnical Manual	equilibrium	laterality
ball and socket joint	extensors of the knee and hip	momentum
banking	extrinsic	musculo-skeletal system
biomechanics	flexors of the knee and hip	rebound unweighting
blocking	friction	retraction

Equipment Information

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The following information briefly summarizes a few important points concerning equipment. Certified Level I and II instructors will probably find most of the information needed to satisfy the certification outcomes in the mechanics category, but Level III instructors will also need information concerning canting and alignment.

Terms

Longitudinal flex refers to the stiffness of the ski from tip to tail. It is strongly related to camber and therefore difficult to determine how a ski will perform by simply giving it the “flex” test.

Camber is the arch formed by the ski when placed on its running surface in a relaxed position. Numerous camber and flex patterns in modern skis contribute to the actual performance of the ski.

Torsional stiffness refers to the ski’s resistance to twisting. Skis with high torsional stiffness tend to perform better on hard snow and at high speeds. Torsionally softer skis are more forgiving and tend to perform better at lower speeds and in softer conditions.

Sidecut is the long hourglass curve formed by each side of the ski from tip to tail when viewed from above. Sidecut is one of the determinants of turn radius. A more pronounced sidecut gives the ski greater short turn capability.

Waist refers to the narrowest part of the ski. In older skis, it was usually one half of the distance between the shoulder and heel (see diagram) of the ski. In newer racing skis, it can be up to ten inches behind that point.

Ski width is interrelated with sidecut. A ski can be very wide and flared at the tip and tail or very narrow. Narrow skis are very quick from edge to edge and more precise on hard surfaces but lack buoyancy in soft snow.

Dampening refers to the ability of the ski to absorb energy and vibrations. GS skis are generally more damp than slalom skis.

Ski length can be chord length or running surface length.

Chord length is the straight line distance between ski extremities.

Running surface length is the contact area of the ski when pressed into the snow. European manufacturers tend to use running surface for determining length while some use chord length. Thus it’s possible to have two pair of 185 cm skis that are slightly different lengths.

Shorter skis are easier to pivot or twist and overpower after an error. They are safer and make recovery easier. Longer skis are more stable at high speeds and less easily deflected.

When discussing ski length with students, it is necessary to take into account their present ability and capabilities, weight and strength, and what type of skiing they do including speed, terrain, turn radius, and snow conditions.

Ski Construction

Ski construction methods and materials are very complex issues. For our purposes, it is sufficient to understand that skis today use cracked or single piece steel edges, a base material that is usually a polyethylene with a molecular similarity to wax, core materials usually of foam or wood and a structural laminate of fiberglass or aluminum that is either layered or wrapped or both around the core. As for “cap” skis, their most common characteristic is the single sheet of material that covers their top and sides from edge to edge and tip-to-tail. Other than that, the general construction is not that different and even the manufacturers will admit that the performance of their skis is based more on the quality of construction, the blend of materials and the shape than the “cap construction” (Wardlaw, 1993).

If you wish to know more about ski construction, *Skiing Mechanics* by John Howe, *Ski Tech* (September 1993), or the manufacturers themselves can give you a more in-depth overview. However, for both you and your students, the bottom line is not how the ski is made but how it actually performs. Different construction methods can yield similar properties.

Skis

When choosing skis, remember the following information. Flex maybe stiffer for heavier or faster skiers and softer in moguls and bumps. Torsional stiffness needs to be high to hold on ice yet soft enough to release when a skid is needed. Length should be long enough for stability and short enough for maneuverability. Side camber and ski width are a compromise and depend upon the type of skier and his/her preferences on turn radius (Howe, pg. 31).

Bottom and edge condition are also factors to be considered when discussing equipment. A smooth gliding quality of the base facilitates turning and square edges definitely perform better than round ones. In addition, the base should be relatively flat with enough bevel to promote easy turn initiation and edges should always be deburred. In a poor snow year, beginners and intermediates who rely on rental equipment are often at a great disadvantage when skis have not been tuned properly.

Skis are often classified in categories that include racing, high performance, specialty, sport, recreational, and subcategories such as fall-line, cruisers, short carvers or all mountain skis. To make matters more confusing, essentially similar skis from two separate companies will be placed in totally different categories. Some manufacturers even place their skis in two of the above categories, as in a high performance all mountain ski, or a sport all mountain ski. However, it is safe to say that most GS racing skis should be skied in lengths that are at least some where around or above the forehead, while sport and recreational skis and some specialty skis can be skied shorter. A ski listed as “fall-line” leans towards shorter turns, and the term “cruiser” denotes bigger turns. “All mountain” skis are not designed with a specific tendency.

If possible, when helping students with skis, escort them to a well-versed shop employee and describe their abilities and desires. The employee can usually pick out several skis that will fit the skier. If you are well schooled in several product lines, you might also be of help.

Bindings

Bindings are designed with one simple objective in mind; keep the boot attached to the ski until an abnormal force requires a release. Although people may have a manufacturer preference, all modern bindings are safe as long as they match the weight and ability of the skier and are adjusted properly by a certified binding mechanic. See a binding mechanic for questions about the function of older binding.

In addition, boot soles on the market today are made to certain standardized specifications and should be compatible with most bindings. Occasionally, you will see a student with an old pair of boots manufactured before these standards were put into effect. Again, if equipment is questionable, a certified technician should be the final judge.

As bindings increase in quality, boot to ski contact and elasticity are usually enhanced. Faster, stronger, skilled and heavier skiers will require stronger boot ski contact, increased shock absorbing capabilities and more elasticity from a binding, but still must be able to release when necessary.

Generally speaking, a binding functions best when it can be set in the middle of the DIN range for the user. The DIN setting is a function of weight, boot sole length and ability and should be adjusted by a certified binding mechanic.

Boots

Boots are probably the most important part of the equipment package. It is difficult to perform with ill-fitting boots, regardless of the ability of the skier. The major link between your leg and the ski is the boot. It needs to be comfortable, yet secure enough to allow the skier to transmit pressure, rotary and edging movements to the ski. As a skier increases in ability, it takes a stiffer boot and closer fit to accomplish the skills above.

Poles

Poles really have not changed much in the last fifteen years. Less expensive poles use lower quality alloys and are subject to bending. Higher priced poles are lighter, use heat-treated aircraft alloys and are more likely to break or crack rather than bend. Baskets have gotten smaller and lighter and breakaway grips are available. Grips with straps are recommended since they permit proper pole action.

To determine proper pole length, turn the pole upside down and slide the hand up under the basket. The forearm should be parallel to the floor. Another theory states that with the arms relaxed and bent at 90 degrees at the elbow and the forearms horizontal to the snow, the pole should penetrate the snow to the basket (Howe, pg. 42). A third method puts the top of the pole at sternum height. In the end, personal preference should rule once the pole is approximately the correct height.

Recommendations

Beginner/Novice Zone Skiers

Boots

At this level, boots should be snug when buckled lightly to moderately. If boot buckles are on the maximum setting, the boot is probably too big. Skiers in this category will need a little room to “wiggle” in the toe box and the heel should be relatively secure when the boot is tightened. Medium to soft flexing boots are recommended.

Boot size at this level will generally correlate with shoe size—depending on the manufacturer—or will be the measured mondo-point size. Down-sizing for a more precise fit is not necessary. Most beginning skiers will have rental equipment with very little adjustment capabilities. . If the student complains of pain in the shin area, check their sock type, the amount of clothing stuffed into their boot and the amount of space between their shin and the boot (too much space produces shin bang). Shin pain at this level is often closely related to one of these factors. Either remedy the situation or, if all else fails, have the student try a boot from another company.

A student who wishes to purchase boots at this stage should be encouraged to buy a boot with at least some adjustments. Most companies offer several possibilities in mid-entry, or conventional models that are soft flexing but offer performance growth.

As for children, it is best to fit them as closely to the correct size as possible, especially if the boots are rented. If parents choose to buy boots, they should not expect to get more than two years out of a boot. If they try for more time than that, the boot will be too big and the child will be more prone to twisting injuries, not to mention the fact that skill progress will be greatly inhibited. Socks only go so far!

Skis

For beginning skiers, ski length is likely the most important issue. Beginning skis or teaching skis may vary from 110 cm to 150cm depending on students height, weight and age. Conventional skis should be roughly at nose height. As the skier gains proficiency, skis could be lengthened.

Most skiers in this category will be on rental equipment and choosing a ski will not be an issue. Most rental skis are essentially the same they are soft flexing and very forgiving.

However, instructors should be observant and check rental skis for gouges, dryness, burred edges or concavity of the base if the student has excessive trouble turning or catches edges. If you do not know how to do this, politely ask the shop to do it. And, if possible, politely ask to change the skis. Most rental managers will work with you as long as you keep accusations out of the picture and the best interest of the guest at heart. It's easy for new skis to be concave or old ones to be in poor shape if the snow cover has been thin.

Children in Levels Beginner/Novice Zone should be on skis that are chest to chin height, depending on the child's age and developmental level. Shaped skis can be shorter.

Bindings

Bindings for skiers in Beginner/Novice Zone are generally rental bindings with lower DIN ranges and less elasticity and boot-hold characteristics.

If students buy equipment at this stage,

encourage them to move up in quality. They will want the added elasticity etc. as they progress. However, a binding in the mid range of prices will be sufficient, provided it meets the skier's weight and ability qualifications.

Children should be in "kids" bindings unless they are over 100 pounds and even then, many children's bindings will accommodate a 120 pound child and an adult boot sole. A child on old equipment who is constantly having trouble with bindings etc. may have an incompatibility problem. Let a certified binding mechanic make the call.

Poles

Encourage students to use grips with straps. If they are worried about hand injuries, tell them to look for breakaway straps. However, at this level, anything will work.

Clothing

At the novice level, some clothing guidelines may be necessary for students. Strongly recommend eye protection at all times, and hats on cold and snowy days. Most adults can make these choices for themselves, but children may need some prodding. In addition, pants, jackets and mittens with water resistant capabilities will be much more comfortable than jeans and sweatshirts.

Intermediate Zone Skiers

Boots

Skiers at this stage should be out of rental or beginner boots. The most important factor is certainly fit and most companies offer mid-level to advanced boots in mid-entry and conventional four buckle models, giving skiers options for foot variations. Boots at this level should be laterally stiffer than beginner boots, to allow for the increasing ability to place the ski on edge, and should have the following features: moderate flexibility, heel and forefoot retention capabilities, and possibly flex adjustments. A cuff cant, forward lean adjustment, and a power strap will also increase performance.

If students at this level have the monetary means, any boot but the very top recreational and racing models would be fine. In fact, if the student is strong and aggressive, a top recreational boot will not hinder performance, although it may not be necessary. A race boot, however, would lack forgiveness.

Children at this stage will often benefit from being in a "kid's" boot. Be aware of parents who put skinny preteens with big feet in adult boots. The children are not heavy enough to bend them adequately.

Students with fit problems may benefit from a custom footbed.

Skis

There are many possibilities for skis at this stage. The skier's abilities, strength, weight, desires, and where and how often they ski should all be taken into consideration when choosing skis. Shaped skis now dominate the market at all levels and should be sized shorter than conventional skis. Conventional ski length for this level should increase to at least forehead height. Generally, skis in the sport and recreation categories will be suitable, although, some easy-to-turn high performance skis may offer a viable option.

Intermediate skis will generally increase somewhat in torsional stiffness while retaining adequate longitudinal flex. New materials have created skis that are softer longitudinally without losing the torsional rigidity needed for good edging. Thus, many manufacturers produce skis that are easy to turn yet hold well and will not inhibit performance progress. Race skis that require precise edging movements are not recommended at this time.

Children at this stage will still be fine in most “kid’s” skis. Conventional length skis for this level should be anywhere from chin to forehead, depending on age and developmental level. Again, shaped skis should be shorter. Unless a child is an advanced skier or racing, head height is long enough for conventional skis and too long for shaped skis.

Bindings

Bindings in the intermediate to advanced ranges are recommended depending on the skier type. Skiers at this level need

increased boot to ski contact and elasticity, but rarely need a race binding. It is generally preferred that binding settings be approximately the middle of the DIN range although modern bindings also function well at the extreme ranges too.

For children, bindings will essentially be the same as the lower levels, although DIN setting will be increased slightly due to increase in ability.

Poles and Clothes

Same as 1-4.

Advanced zone skiers

Boots

Advanced and expert skiers should seek boots that precisely transmit edging, pressuring, and steering movements of the leg and foot to the ski. Most of the high performance boots will be a conventional overlap boot, but several manufacturers make excellent rear-entry boots suitable for advanced and expert skiers.

Boots at this level will generally have more lateral stiffness than their intermediate counterparts and more fit adjustments. Cuff cants (which technically are not cants) and flex and forward lean adjustments are usually standard. Some boots also have boot sole adjustments. Many also come with foam or silicone injected liner options and are excellent answers for the foot with irregularities, such as high insteps, narrow heels, bone spurs, or wide forefeet.

Students at this level should be encouraged to look for a very snug fit and to buy custom inner soles from a reputable shop. Those with extreme problems may also wish to see a sports podiatrist.

Advanced and expert skiers should also check their knee and leg alignment with a properly trained technician. It could be the best lesson they will ever have! (Note: Level III instructors should understand the basic mechanics of alignment, how to detect problems, and where to get them

fixed. Read *The Athletic Skier*, by Warren Witherell and David Evrard, and *Snow Country*, October, 1993, for thorough discussions of boot canting.

Children at this level will do well in a “kids” junior race boot or soft version of an adult boot.

Skis

Advanced and expert skiers have many choices when it comes to skis. Skiers at this level should be looking at all the high performance skis and possibly the race models, depending upon personal desires. ski length can vary from a modern slalom 155 cm to a modern Giant slalom of 191 cm. A all mountain ski could be short or long depending on the skier. Follow manufacturer’s recommendations for weight and skier type in each particular model. In other words, a skier looking for a shorter ski should probably avoid a GS race ski and pick a ski that is more suited to shorter lengths. A skilled salesperson can be a great help.

As for what to buy, its everybody’s guess! At this point it is best to determine just exactly what the skier plans to do with the ski. Will he/she ski more ice or more powder? Short turns or cruise? Fast or conservative. There is a ski for just about every wish, but most likely there is not a ski that will do everything equally well. Some compromise will be necessary.

Children at this level would do well on “Kid’s” high performance or race skis or softer adult skis.

Bindings

Advanced and expert bindings offer greater boot to binding contact and better elasticity. Some even offer shock absorbing and free flexing capabilities. However, all but the heaviest or fastest skiers will get excellent, safe, performance out of upper end bindings that are not categorized as race bindings. Most of the top

performance bindings offer a wide DIN range and are suitable for many different weights and abilities.

The most important concern is that skiers at this level have their bindings adjusted by a certified binding mechanic and set at the recommended DIN number.

Children - same as above

Poles and Clothing

Same as 1-4.

Alternative Equipment

The ski industry has experienced a major revolution in ski design in recent years with the introduction of new construction methods and new ski designs. Super-sidecut skis, wide-body skis, and super-short skis are changing the way we ski and offering new skiing opportunities to a wide range of skiers. People are arriving at ski school with a wide variety of skis attached to their feet. Well-rounded ski instructors have already familiarized themselves with the possibilities these skis offer their students. Some ski schools are offering special programs promoting and utilizing the new ski designs.

Super-Sidecut Ski

Skis with very exaggerated sidecuts were introduced to consumers in 1992. These skis offer enhanced carving characteristics and the promise of easier learning.

Traditional skis vary by 10 to 20 mm in width from tip to tail. Super-sidecut skis vary 25 to 55 mm in width. This dramatic shape allows easy edge engagement. Soft flex, combined with a wide tip, allows the ski to deflect and bend into reverse camber with relatively little edge angle and pressure.

Anecdotal evidence suggests these skis may shorten the learning curve, allowing the sensation of riding a gripping arc with a less polished skill blend. Speed control is achieved more by a round turn shape

rather than by skidding or “checking” with the edges. Specialized ski school programs introducing skiers to the different skill blend and sensations allowed by super sidecut skis enhance the familiarization with this new equipment.

Manipulation of several design variables dramatically influence the feel of different models, e.g. longitudinal flex, torsional rigidity, placement of the waist along the length of the ski and recommended base and edge bevel. Although soft flex and large surface area at the extremities allow for flotation in powder, the narrow waist allows the skier to sink deep in the snow, requiring greater balance and guiding skills than the wide-bodied skis.

Wide-Bodied Skis

Substantially wider skis—125 to 135 mm wide at tip—were introduced to the public in 1990 to make deep snow easier to ski. Sized 20 to 30 cm shorter than traditional skis, they allow for easier turning, more flotation, and a larger balance “sweet spot.” The widest of the wide-body skis perform best in the conditions for which they were designed, unbroken deep snow. When used on packed snow they exhibit a strong tendency to roll off edge and may promote undesirable movements.

Recent additions to this category range from 110 to 125 mm at the tip. These skis are somewhat less buoyant in the deepest

snow, but perform better than the wider skis on firm snow. The narrower end of the wide-body skis can be skied close to traditional sizing in length and retain stability at higher speeds.

Super-Short Skis

Super-short skis are approximately 60 to 130 cm long. These skis are not necessarily designed to replace conventional skis, but rather add to variety of skiing. These skis are also excellent tools to help skiers improve balance and learn to carve.

Twin tips

These skis are the newest on the market. The turned up tail make it possible to ski backwards, spin, land facing backwards the are used to free ride, ride in the terrain parks and half pipes .

References

Mahre, Steve and Phil. *No Hill To Fast*. Simon and Schuster: New York, 1985.

Howe, John. *Skiing Mechanics*. Poudre Press: Colorado, 1983.

Wardlaw, Tait. *Ski Tech*, Sept. 1993; 93-94
Ski Directory.

Snow Country, October, 1993; Special
Section.

Anatomy and Physiology

Skeletal Structure

The purpose of the skeletal structure is to serve as scaffolding for soft tissue; bones serve as rigid levers for muscular activity. The parts of the skeletal structure include:

- ◆ *upper extremity and shoulder girdle*: includes scapula, clavicle and sternum and bones of arms, wrists and fingers.
- ◆ *lower extremity and pelvic girdle*: includes hips, sacrum and the bones of the legs, ankles and feet.
- ◆ *spine*: central skeletal axis.
- ◆ *ligaments*: connect bone to bone; structural stability for joints.

Muscular System

The purpose of the muscular system is to change the relative position of the bones. The change is accomplished through a process of muscle contraction. The major muscle groups of the body include:

- ◆ *upper extremity and shoulder girdle*: includes deltoids, trapezius, and pectorals.
- ◆ *lower extremity and pelvic girdle*: includes quadriceps femoris, biceps femoris (hamstrings), adductors and abductors, hip flexors and extensors, gastrocnemius and muscles in the ankle and foot.
- ◆ *spine*: includes erector spinae and muscles of the trunk (abdominals, oblique).
- ◆ *tendons*: connect muscle to bone.

Types of Contractions Specific to Skiing

- ◆ *concentric*: muscle shortens
- ◆ *eccentric*: muscle lengthens with contraction; any gravity-resisting contraction is usually an eccentric contraction; strongest of the contractions but tears muscle down more.
- ◆ *isometric*: muscle does not change in length—certain muscles often contract isometrically when they act as stabilizers.

Muscles Specific to Skiing

- ◆ *extensors of the arm*: primarily the triceps; triceps important in all athletic activities where extension of the arm and fixation of the arm extension is required, i.e. pole placement and recovery from falls in alpine skiing.
- ◆ *extensors of the knee*: primarily the quadriceps femoris or thigh muscle; composed of rectus femoris, vastus medialis and vastus lateralis.
- ◆ *extensors of the hip*: primarily the gluteus maximus which is composed of several muscles; also serves as stability for the pelvis in conjunction with the rectus abdominus.
- ◆ *flexors of the knee*: primarily the gastrocnemius and soleus, and the sartorius which also flexes the hip.

- ◆ *flexors of the hip*: rectus femoris (part of quad group) and sartorius which also rotates the hip externally and abducts it.
- ◆ *abductors and adductors*: consist of several muscles; adductors adduct the thigh and assist in flexing and externally rotating the hip joint; abductors abduct the thigh and assist in internal rotation.
- ◆ *back and abdominal muscles*: stabilize trunk and pelvis; strong abdominal muscles are also needed for rotational movements in quick short turns.

Joints

Joints serve as connection points between bones. There are basically two types of joints.

- ◆ *ball and socket*: allows rotational movement; ex. hip joint
- ◆ *hinge joint*: allows flexion and extension; ex. knee and superior ankle joint (inferior ankle joint allows rotation i.e. pronation and supination) Note: the knee allows only a very small amount of rotation, and only in the flexed position.

Energy Systems

There are two basic energy systems which make it possible for muscles to function during exercise. The type of exercise being done determines which system plays the dominant role in exercise.

- ◆ *aerobic*: means with oxygen; activity takes place in the presence of oxygen and is generally long and continuous. Teaching skiing all day is a good example of aerobic activity.
- ◆ *anaerobic*: means without oxygen; activity takes place without oxygen and is short in duration. There are actually two anaerobic systems. The ATP-PC system utilizes energy stored directly in the muscle. It does not depend on long chemical reactions or the transport of oxygen. It supplies energy for activities that take only a few seconds to complete. A push from the starting gate or a 100 meter sprint are good examples. The glycolytic system or lactic acid system is the system we are most familiar with and it involves activities that last up to 3 minutes, at intensity levels over 80% of Max VO₂. A run in a slalom course or a nonstop run in the bumps would be good examples.

A knowledge of energy systems makes it possible to accurately assess the potential for both personal and student skiing performance.

- ◆ *personal performance*: with a good aerobic base, we will tire less easily and be able to perform on the job more efficiently. We will also be better able to utilize interval training, i.e. high intensity bouts followed by rest or active recovery; intervals, depending upon the amount of rest between them, are used to train the anaerobic system and also raise the lactate threshold so that we perform better in more intense situations. Example: short turns on steep terrain.
- ◆ *student implications*: remember most students will be in an anaerobic state much more than us. They are less efficient and therefore will be more intense physiologically at different tasks. This means that their heart rates will be quite high when they finish more difficult runs and they will require adequate recovery time. They will also become anaerobic much more easily when tired. Beware at the end of the day!

Note: Unless we are running a 50 meter dash or the Wasatch 100 Mile endurance race, we generally use parts of all energy systems. It's just that we may be predominantly in one or the other.

Bibliography

An important part of the professional development of a ski instructor is reading. The purpose of this bibliography is to identify a basic list of books we as ski instructors should be aware of and be reading. Not included are lists of periodicals and videos which you will find on your own. This is by no way a comprehensive list. You should seek out additional information. Good luck and happy reading!

Anatomy & Physiology. Tortora, G. & Anagnostakos, N. (1978). New York: Harper & Row.

The American Teaching System: Alpine Skiing. Warren, J. & Still, S. (1993). Printed in the United States.

The Athletic Skier. Everard, D. & Witherell, W. (1993). Boulder, CO.: Johnson Printing.

Child Centered Skiing: The American Teaching System for Children. Peterson, R., Bode, D., & Workman, C. (1988). Salt Lake City: Publishers Press.

Free Heel Skiing. Parker, P. (1988). Chelsea, VT: Chelsea Green Publishing Co.

Inner Skiing. Gallwey, T. & Kriegel, B. (1977). New York: Random House.

PSIA Alpine Manual, (1996). Printed in the United States

PSIA Adaptive Manual, (1997). Printed in the United States

PSIA Children's Instruction Manual, (1997). Printed in the United States

PSIA American Teaching System Alpine Instructor Handbook. Porter, M. & Still, S. (1989).

PSIA Children's Teaching System Instructor Handbook. Hall, Johanna. (1992).

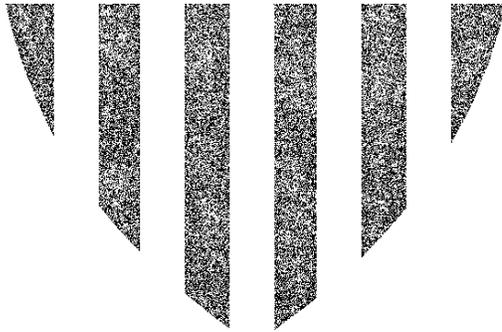
Race Skills For Alpine Skiing. Foster, E. (1994). Harrisonburg, VA: RR Donnelley & Sons Company.

Teaching Concepts: ATM. Abraham, H. (1980). Boulder, CO: Printed in the United States.

Skiing Mechanics. Howe, J. (1983). LaPorte, CO: Poudre Publishing Company.

- Skiing Right*. Abraham, H. (1983). New York: Harper&Row.
- Skiing: An Art, A Technique*. Joubert, G. LaPorte, CO: Poudre Publishing Company.
- How the Racers Ski*. Witherell, W. (1972). W.W. Norton & Company, Inc. New York.
- Teaching Physical Education: From Command to Discovery*. Mosston, Muska. (1966). Columbus, OH: Charles E. Merrill Books, Inc.
- The White Book*. Lash, Bill. PSIA, Lakewood, CO.
- US Ski Team Training Manual*. The National Alpine Staff. (1977). Park City, UT: published by the U.S. Ski Team.
- World Cup Ski Technique: Learn and Improve*. Major, J. & Larsson, O. (1978). LaPorte, CO: Poudre Publishing Company.
- World Class Ski Tuning: The Manual*. Howden, M. (1985). Portland, OR: WCST Publishing.
- Alpine Technical Manual*. (2002) Professional Ski Instructors of America Educational Foundation, Lakewood Colorado
- Core Concepts*. (2002) Professional Ski Instructors of America Educational Foundation, Lakewood Colorado

Glossary of Terms



PROFESSIONAL SNOWSPORTS INSTRUCTION IN THE INTERMOUNTAIN WEST

- ABILITY:** basic building blocks, depending on both genetic and learning factors, used in the development of skills.
- ABDUCTORS:** see the anatomy and physiology section in the Professional Knowledge, Technical Concepts of this manual.
- ADDUCTORS:** see the anatomy and physiology section in the Professional Knowledge, Technical Concepts of this manual.
- AEROBIC:** see the anatomy and physiology section in the Professional Knowledge, Technical Concepts of this manual.
- ANAEROBIC:** see the anatomy and physiology section in the Professional Knowledge, Technical Concepts of this manual.
- ALPINE TECHNICAL MANUAL:** The technical manual for the Professional ski Instructors of America
- ABSORBING:** the action of equalizing pressure increases and decreases a skier experiences in conjunction with terrain rises and terrain drops.
- ALIGNMENT:** a condition of close cooperation or proper coordination. In skiing, alignment can be said to have been achieved when the resultant of forces acting upon the skier's center of mass pass through the outside foot (in some cases, such as straight running, the resultant of forces may pass through the base of support formed by both feet). Alignment implies that the skier's body (CM) is neither too far forward or backward, or inside or outside the turn, in relation to the feet.
- ANGULATING:** moving in the diagonal and lateral planes in a flexing and extending fashion. These movements affect balance, turning, edging and pressure control.
- ANTICIPATION:** (a) 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. (b) mental anticipation for any action on skis precedes the physical execution of movements.
- ATHLETIC STANCE:** a balanced position with the hips directly aligned over the feet with pressure over the arch of the foot.
- ATS:** American Teaching System.
- ATSC:** commonly used to refer to *Child Centered Skiing, The American Teaching System for Children* by R. Peterson, D. Bode and C. Workman.
- ATSH:** commonly used to refer to the *American Teaching System Alpine Instructor Handbook*.
- BALL AND SOCKET JOINT:** see the anatomy and physiology section in the Professional Knowledge, Technical Concepts of this manual.
- BALANCING:** the action of maintaining equilibrium. Balance may be dynamic or static.
- BANKING:** see inclination
- BIOMECHANICS:** the study of living creatures in motion; the application of the principles of mechanics to the structure, functions, and capabilities of living organisms.
- BLOCKING:** the action of stabilizing the torso through pole contact with the snow in conjunction with the initiation of a turn.
- BRAKING WEDGE (A):** a ski to snow alignment which serves to control speed (A- Stance with tips held in, tails out) by applying pressure on the inside edges of the skis (big toe side), creating a slowing action.
- CAMBER:** the arch formed by the ski when placed on its running surface in a relaxed position. Camber and flex patterns in modern skis contribute to the ski's performance.
- C.A.P. Model:** a teaching model describing how child development affects learning and performance including: Cognitive Development, Affective Development, and Physical Development.
- CAPABILITY:** the physical readiness of a person, including maturational level, previous experience, genetic endowment, and state of physical fitness.
- CARVING:** a turning of the skis with little lateral slippage of the skis over the snow, tails follow in the line of the tips.
- CENTER OF GRAVITY:** the balance point or the point at which the weight of the body is concentrated.
- CENTER OF MASS:** (also referred to as the Center of Gravity) the point in the skier's body where the skier's mass or weight is most concentrated, usually in region of navel; however, as body flexes and moves, the Center of Mass also moves.

- CENTRIFUGAL FORCE:** centrifugal ("center-fleeing") force refers to the force that tends to pull an object outward when rotating about a center. Thus, a skier whose skis are describing an arc experiences centrifugal force, a pulling sensation on the body toward the outside of the turn.
- CENTRIPETAL FORCE:** centripetal ("center-seeking") force is the force which tends to pull an object toward a center. In skiing, centripetal force is exerted on a turning ski's edges and bottoms by the snow.
- CHECKING:** the action of slowing down or stopping a skidding of the skis on the snow.
- CHRISTY (CHRISTIE):** a phase of a turn where both skis skid on corresponding edges (matching phase for wedge christies).
- COGNITIVE:** the process of knowing; knowledge or the capacity for it.
- COGNITIVE DEVELOPMENT:** changes in the development of people's mental structures, how these structures organize perceptions, and, in turn, how they are reorganized by people's interactions with the world.
- COMFORT ZONE:** that state in which the student is not threatened by the environment or the tasks to be performed.
- COMMAND STYLE:** a method of teaching where the instructor is the exclusive controller of the preparation, implementation, and evaluation of the entire lesson.
- CONCRETE OPERATIONAL STAGE:** Piagetian period of development emerging at approximately seven years of age characterized by the ability to do cognitive processing when concrete objects are available; mental manipulation of abstract concepts does not occur at this stage of development because the individual still relies on the use of concrete objects (things she can see, feel, smell, etc.) Many adults use this level of cognition to process and understand information.
- CONCRETE REFERENCE:** using words which have a physical reference in the child's reality (e.g. using white and black to code left and right; raise your white leg or stand on the big toe side of your white foot).
- COUNTER ROTATION:** turning the skis by twisting the torso and legs in opposite directions. The simultaneous and opposite movements of the torso and lower body generate torque. (Newtons' law of action and reaction applies.)
- CROSS-LATERAL MOVEMENT:** the coordinated use of arms and legs on opposite sides of the body.
- CROSSOVER:** moving the body's center of mass over the skis from inside on one turn to the inside of the next turn.
- CROSS UNDER:** movement of the feet under the body's center of mass from the outside of one turn to the outside of the next turn.
- DEFLECTION:** a change of direction resulting from the interaction between the skis and the snow..
- DEVELOPMENTAL LEVEL:** the physical skill level of a person.
- DEVELOPMENTAL STAGES:** specific periods of growth and development where certain universal physical, cognitive, and social characteristics are demonstrated; the periods as defined by Piaget are hierarchical and invariant, but the rate at which children progress through those periods is unique to each child.
- DOWN UNWEIGHTING:** unweighting which occurs when the center of mass is lowered by flexing the hips and knees (intensity will depend on how quickly the leg muscles are relaxed); may also occur when legs are actively retracted (absorption).
- DYNAMIC BALANCE:** continually adjusting to the changes in forces and the physical environment to maintain equilibrium while moving.
- DYNAMIC PARALLEL TURN:** an active parallel turn performed at moderate to high speed displaying a high degree of steering, edging, and pressure skills.
- ECCENTRIC CONTRACTION:** see the anatomy and physiology section in the Professional Knowledge, Technical Concepts of this manual.
- EDGE:** the part of the ski where its sidewalls meet its running surface.
- EDGE ANGLE:** the degree of tilt of the ski about its longitudinal axis in relation to the snow surface.

- EDGE CHANGE:** the action of tilting from one edge to the other. This action is the most fundamental aspect of turning. It can be performed while the skis are in contact with the snow or without such contact.
- 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 RELEASE:** flattening the skis by changing the angle of the edge to the slope.
- 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.
- EFFICIENCY:** the ability to perform competently with minimal effort.
- EQUILIBRIUM:** a state of balance.
- EXECUTION:** the learner's physical participation or performance of a skill.
- EXTENSION:** lengthening or straightening of the muscle; any movement resulting in an increase of a joint angle.
- EXTERNAL FORCE:** an outside force affecting performance.
- FALL LINE:** the imaginary line that follows the greatest angle of the slope. There is at least one fall line through any point on the hill
- FEEDBACK:** the impressions, feelings, or concepts that a person derives from learning experiences.
- FLEXIBILITY:** the range of motion around a specific joint area; the ability to change one's behavior/movements when conditions change.
- FLEXION:** contraction of the muscle; any movement resulting in a decrease of a joint angle.
- FLOW:** a factor in the quality of movement which is continuous, uninterrupted, sustained, or free.
- FLYING WEDGE:** using a wedge stance, the skier braces against the outside ski in the turn; a skier is continually moving from one leg braced balance to two-legged balance, then back to one leg braced balance.
- FLUIDITY:** smooth, coordinated movement.
- FRICION:** the force between surfaces that opposes sliding motion.
- FUNCTIONAL SKIING:** a way of skiing that meets all the demands of specific situations; a modern approach to skiing which maintains that form follows function.
- GARLAND:** making a series of direction changes which do not lead the skier to reverse direction across the fall line. (A direction change is to be understood as a deviation from a straight-line motion.)
- GLIDING WEDGE:** moving with skis in a position convergent to one another (tips in and tails out) and yet with little friction between the edges and the snow; provides an efficient base from which the skier can begin turning.
- GOAL:** the result toward which effort is directed.
- GRAVITY:** the vertical pull toward the center of the earth which, in skiing, has components which hold the skier to the slope and move the skier downhill.
- HIP ROTATION:** generating rotary momentum by slowing or stopping a turning movement of the hips sometimes referred to as "blocking" the turning of the hips; refers to the movement of the hips around the vertical axis (midline) of the body.
- HOCKEY STOP:** a skidding stop accomplished by a quick pivot of both skis from a straight run into a vertical side slip and stop. In skiing, the body and direction of travel remain oriented to the fall line.
- IINCLINATION:** deviation from a vertical body position. This term is usually used to describe the overall appearance of teh body in relationship to a vertical reference.
- INDEPENDENT LEG ACTION:** using the legs separately from one another to fulfill specific functions in skiing, e.g., transferring weight, pedaling, skating, stemming, stepping or rotary movements of one leg.
- INDIVIDUAL STYLE:** a method of teaching which allows for extended periods of independence by the learner based on teacher preparation and planning decisions.
- INERTIA:** the tendency of the body to remain at rest if at rest; or if moving, to keep moving in the same direction, unless acted upon by an outside force.
- INITIATION PHASE:** a new turn is beginning; the phase of a turn during which the changing of the edges allows the skis to be turned or the direction change to be started.

- INTERNAL FORCE:** a force produced by the muscles of the body.
- JOINT:** the movable or fixed place or part where two bones or elements of a skeleton are joined, such as the shoulder, hip and knee.
- KINESTHESIS:** the internal awareness of knowing what the body parts are doing, whether performing stationary or moving activities, including coordinated vestibular, tactile, and proprioceptive feedback.
- KINESTHETIC FEEDBACK:** the body's ability to recognize the body's position and movement through space and time; the interpretation of coordinated vestibular, tactile and proprioceptive stimuli.
- KINESTHETIC MANIPULATION:** physically moving a person's body parts to give a feeling connection for the correct/incorrect position.
- KNEE ANGULATION:** lateral movement of the knees accomplished through flexion of the knee joint and rotation of the leg at the hip and ankle.
- LATERALITY:** an internal sense of sidedness—one's own left and right. Children begins distinguishing between left and right at five or six years of age; however, laterality is often not fully developed until much later.
- LATERAL STEP:** a step on skis to one side or the other.
- LEAD CHANGE:** a movement of the skis which occurs when body alignment is efficient; the inside ski in the turn moves ahead of the tip of the outside ski while turning.
- LEARNING:** changes in behavior resulting from experience; the strength of an association between a stimulus and a response.
- LEARNING PARTNERSHIP:** PSIA's name for the teaching and learning relationship created between the instructor and the student.
- LEARNING STYLE:** an individual's preference for learning. There are four commonly referred to learning styles, each of which is known by different names: visual (watcher or reflective observation), cognitive (thinker or abstract conceptualization), kinesthetic (feeler or active experimentation), trial and error (doer or concrete experience).
- LEVEL OF DEVELOPMENT:** this refers to a person's physical, mental or social maturity, not to chronological age.
- LEVERAGE:** applying pressure fore and aft of the mid-foot balance point on the skis; deliberate application of pressure to the front and middle or back of the skis to optimally use the skis' design to aid in turning; a form of pressure control.
- MATCHING:** the movement toward aligning the direction of the skis after they have been brushed or stepped into a wedge position. Matching implies that the skis are brought either from positions of divergence or convergence toward a parallel relationship.
- 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.
- MOMENTUM:** a property of a body (object) in motion. The momentum of the body is equal to its mass times its velocity.
- MONTESSORI, MARIA (1870-1952):** a medical physician, child development specialist, and educator who devoted her life to the study of children's physical, psychological, intellectual and spiritual growth; responsible for the Montessori Method, a developmental approach to educating children.
- MOTIVATION:** an inner urge or sense of purpose which causes a person to act.
- MOTOR LEARNING:** a change in performance as a result of practice and/or past experience.
- MOVEMENT PATTERN:** a method of moving from one position in space to another.
- MUSCULO-SKELETAL SYSTEM:** the system of muscle and bone working together to create action.
- OPEN PARALLEL TURN :** a turn where both skis skid on corresponding edges from initiation through completion.
- OPEN STANCE:** a natural stance with the feet approximately hip-width apart that allows for efficient movement of the legs.
- PERFORMANCE ANALYSIS:** the process of error detection and correction.
- PERFORMANCE:** the execution of a skill; not the stimulus-response connection or learning.
- PERIOD OF INSTRUCTION:** Montessori's description of the years 6-12, marked by physical and mental changes, especially calmness; children become group oriented and develop reason.

- PERIOD OF SOCIAL DEVELOPMENT:**
Montessori's term for the years 12-18, when children go through a pubescent period of physical and mental transformation.
- PHASES OF THE TURN:** see initiation phase, shaping phase and finishing phase.
- PIAGET, JEAN (1896-1980):** the world's foremost authority on children's cognitive development; theory focus is on the interaction of the child with the environment as the child develops an understanding of reality.
- PIVOT:** 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 ACTION:** the total realm of ski pole usage while skiing.
- POLE PLANT:** touching or brushing the pole in the snow as a signal to change direction, to assist with the change of direction, to help maintain balance, to propel a skier into the turn, etc.
- POSITIVE REINFORCEMENT:** the presentation of reinforcement strengthens the behavior.
- PRACTICE:** repeated trials to learn a skill.
- PRESSURE CONTROL MOVEMENTS:** the action of actively adjusting pressure distribution between the skis and the snow..
- PROBLEM SOLVING:** a style of teaching in which the instructor guides the learning situation through the use of questions and directs the learner to seek out alternative solutions.
- PROGRESSION:** ordered steps of the learning experience from the easiest level of skill development to more challenging. Most ski lessons actually consist of many small progressions nested within a broader lesson plan progression.
- PROPRIOCEPTION:** a term which may be used to include what is traditionally referred to as kinesthesia; indicates position and movement of the body and body parts as well as the forces in an within the body and its parts.
- REBOUND:** the recoil or effect of springing back in response to the forces of compression exerted on the body mass of the skier, the skis, and the snow.
- REBOUND UNWEIGHTING:** unweighting resulting from the defensive and opposite reaction of the body to a compression.
- REGRESSION:** the tendency to fall back on earlier, stereotyped or inflexible behavior when experiencing difficulty.
- REINFORCEMENT:** the law of effect; a stimuli which strengthens a skill or behavior after a response is made.
- REPETITION:** the act of performing a movement again in practice (the law of exercise).
- RETRACTION:** a muscular action which pulls the legs up under the skier. Retraction (avalement) is used to absorb pressure increases due to terrain changes or the effects of turn dynamics. Active retraction of the legs also allows a skier to disengage the skis' edges from the snow.
- REVERSE CAMBER:** the deformation of the ski under pressure exerted in its longitudinal plane ("decambering). Reverse camber, combined with ski sidecut, permits the ski to follow a carved arc.
- RHYTHM:** rhythm denotes regular patterned flow in skiing.
- ROTARY MOVEMENT:** circular movement about an axis.
- 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. This mechanism is common in beginner skiers.
- ROTATION:** a process of transmitting the rotary momentum of the torso and hips around the vertical body axis to the feet and skis.
- SENSORIMOTOR STAGE:** Piagetian period of development birth to approximately two years of age when a child learns to differentiate herself from others and the environment through the use of body senses and motor activity.
- SEQUENTIAL LEG ROTATION:** the rotation of one leg while using the other as the supporting or stabilizing base.
- SIDESLIP:** a movement of the skis sideways.
- SIDESTEP:** skis are placed across the fall-line as the skier takes small, lateral steps to support good edge contact and maintain balance; while side stepping (up or down the slope), skis are placed on edge (big toe side of downhill ski and little toe side of uphill ski).

- SIMULTANEOUS LEG ROTATION:** the legs move in the same direction more or less at the same time.
- SKATING STEP:** an extension from the inside edge of one ski (as in ice skating) onto the other ski; skis are in a position divergent to one another.
- SKIDDING:** the composite result of skis moving forward and sideways and pivoting. (ATS)
- SKIING STANDARDS:** PSIA's maneuvers that are identified as standards
- SKILL:** A learned movement that is controlled, coordinated, and efficient
- SKILL BLEND:** the manner in which the Skills are applied in skiing situations to achieve a desired result. Skill blend acknowledges that efficient skiing requires a refined integration of all basic movements.
- SKILLS DEVELOPMENT:** skill is a relative quality, not to be defined in absolute terms. Performance displayed by an individual may be so outstanding as to warrant his being considered skilled, by comparison with a group of his peers on the neighborhood field. The same person, when placed with members of the varsity team may appear relatively unskilled. Skill, as demonstrated by performance, is an indication of what has been learned. Skill and performance can be greatly influenced by a host of factors that may have psychological or emotional origins. However, it is usually thought that the highly skilled individual will be able to perform fairly consistently, regardless of the factors present that may cause the "average" person's performance to fluctuate. A good working definition, rendered by E. Fleishman is the following: "The term *skill* refers to the level of proficiency on a specific task or limited group of tasks, e.g., it is task-oriented."
- SKILLS CONCEPT:** PSIA's basis for discussing the skiing movements and skillful skiing. The skills concept provides snow sport instructors with base from which to evaluate prioritize and develop student performances. The theory that all skiing movement can be categorized into four major headings: balance, rotary movements, edge control movements, and pressure control movements.
- SLIDING:** the movement of the skis in the direction of their longitudinal axis.
- SLIPPING:** a movement of the skis sideways.
- STEERING:** the result of the skier's muscular effort to guide the skis along the desired path; a twisting of the foot or leg coordinated with as much use of the ski design as is available for each circumstance.
- STEM CHRISTY:** a turn initiated with a stemming of the uphill ski to a position convergent with the other ski (skis are on inside edges) and completed in a parallel christy.
- STEMMING:** the displacement of one ski to a position convergent with the other ski; skis are on inside edges.
- STEP TURN:** a type of turn where, during the preparation or initiation of the turn, the skier steps from one ski to the other and displaces the ski being transferred to forward, or the side in a convergent, divergent or parallel position.
- STUDENT PROFILE:** the characteristics, background, learning preferences, beliefs, attitudes, values, and motivation that a person brings to a learning situation.
- TACTIC:** the method used to gain a desired objective.
- TASK STYLE:** a method of teaching where the instructor selects the task to be learned, the objectives and supporting activities. The person is self-directed and self or peer evaluation is used.
- TECHNIQUE:** the choice made among the movement options available to accomplish a given goal.
- TERRAIN UNWEIGHTING:** unweighting accomplished by skiing over changes in terrain such as a bump or drop off.
- TRAVERSE:** sliding in a direction which deviates from the fall-line.
- TURN RADIUS:** the size of a turn as defined by the length of the radius of the circle which would be described by the turn, e.g. a "short radius" or "long radius" turn.
- TURN SHAPE:** the shape of the turn made by the skis: round, ellipse, angled, elongated, etc.
- TURNING:** the action of reorienting the skis' and the body's direction of travel; implies a change in the path of the body's center of mass. (Pivoting the skis is different in that it coincides with no change in direction of the body.)

UNWEIGHTING: an action of reducing or eliminating pressure of the skis in the snow.

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.

VERSATILITY: the ability to adapt or the capacity to do many things.

VISUALIZATION: a mental playback of an action which has been performed; you watch yourself much as you would watch a movie rerun; a disassociated state whereby the individual is watching an internal movie or seeing a still picture of self or others.

WEDGE CHRISTY : a turn initiated in a wedge stance and completed with a matching and skidding of the skis (christy phase).

WEIGHT TRANSFER: shifting the weight of the body from one side of the vertical axis to the other, a form of pressure control.

WEDGE TURNS: turns made with the skis in an "A" or wedge stance—tips in, tails out.

YOUR TEACHING MODEL: PSIA's philosophical approach to the methodology of ski instruction based on the coaching your students in the core concepts.