



Cross Country Athlete Competencies (2002 Edit)

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INTRODUCTION

The process of developing athletic talent spans the entire formative life of an athlete, and requires the consideration of numerous factors. Talent development is a complex interaction between the athlete's inherent physical and psychological abilities at any particular development stage (point in time), and his or her opportunities to capitalize on

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those abilities. A successful development effort must provide these opportunities at the right time.

To define the best development process for the cross country skiing athlete, the U.S. Ski and Snowboard Association has produced a declaration of recommended cross country athlete competencies. The Cross Country Athlete Competencies constitutes an educated assessment of the skills or “tools ” necessary to ski at a world-class level in modern cross-country competition. Simple definition of the skills present in the “end product ” is insufficient, because it is too far removed from the experience of the developing athlete and his or her coaches and parents. A set of guidelines is necessary to define the track and serve as both targets and markers for each step in the process, and these guidelines must work for all levels of skiers.

In order to improve the development of skiing athletes, it is necessary to identify the entire series of steps involved in the process. These steps begin when a young athlete first puts on skis, and conclude as he or she reaches their full potential. At each point in time along the developmental path, the successful athlete will have a certain set of characteristic skills and abilities, each of which follows logically from some earlier set and lead ultimately to a more refined set. That is the essence of these Cross Country Athlete Competencies. It attempts to create a “road map ” from beginning racer to world-class skier by defining the associated skills at each level. We have done this by presenting not only the skills required to be a world-class skier, but by also identifying the desired intermediate skill levels and the appropriate sequence and timing for the appearance of these skills.

The acquisition of skills, and the achievement of success that follows, will occur at different times in individual athlete’s careers. At some point during a given athlete’s career, he or she will reach their full potential.

A. Competence: The Concept

The word “competence ” implies a proficiency in a particular area. Competence does not imply brilliance or mastery, but precision in the execution of a skill. Competence in a skill is necessary to move forward to the next skill and, ultimately, to world-class performance.

In order to advance into the elite fields of world-class performance, the athlete will need to master the many necessary components of the sport included in this document. This list is not all-inclusive, so mastery of all the included skills does not guarantee a world-class level athlete. Similarly, a lack of competence in a particular area will not by itself cause failure. However, a lack of prerequisite skills will limit the foundation for movement toward the top levels of performance.

The sequence of competency progression presented here is designed to accommodate the normal development process. Ideally, athletes will master skills and attain the requisite level of competence at each level before moving on to the next. The capacity of the human body

to perform the skill in this document is age-related, but the relationship between chronological and biological age is approximate. Therefore, the age groups as they are defined here are approximate and can be expected to vary by as much as two years in either direction. It is important that a complete acquisition of skills take place at each level before the athlete moves ahead to specific skills at higher levels.

B. Domains of Competence for Cross Country Ski Racing

Domains are general areas of skill, ability, behavior, or knowledge necessary for athletic achievement in cross-country ski racing. These general areas are: ski technique, physiological preparation, psychological/social behaviors, training/competition behaviors, equipment knowledge, and education. Each domain is further defined by characteristics of that general skill area. Competencies are levels of achievement attained by the athlete in each domain.

The domains were chosen and assigned a particular grouping with care. Each of the domains was chosen because it is indispensable to a total athletic preparation program:

1. The Technical Skills domain encompasses all aspects of the specific skill demands of cross-country ski racing. It includes skiing skills ranging from the basic balanced stance to elite exploration of skate and classic techniques.
2. The Physiological and Motor Skills domain is derived from the fact that elite performance is based on a foundation of physical fitness, strength, power, and endurance. Athletic development begins with a sound base of motor skill learning and continues through the mastery of sport-specific requirements. Inadequate levels of physical preparation severely limit the development of skills necessary to elite skiing performance. A progression of steps, as outlined in this document constitutes a recipe for planning the age-appropriate acquisition of necessary physical abilities.
3. The Psychological and Sociological Skills domain reflects the reality that development is a social process. Athletes develop within the context of sound relationships, particularly with family, fellow athletes, and fellow students. High-level performance at all ages is a profoundly mental activity. Specific mental skills and techniques enhance performance. These skills can be learned, many at an early age. The psychological domain takes on more importance as the level of competition increases.
4. The Training and Competition Performance domain describes competencies in the planning and periodization of training loads and training program content. Purposeful, goal-directed training leads to the most efficient results. Similarly, competition is included in the overall athletic program in a planned, purposeful manner with events and training loads added or deleted at specific points along the time continuum. Competition validates the training program of skill acquisition.

5. The Equipment domain reflects the fact that cross-country ski racing is greatly dependent on the use of the correct equipment. Selection, use, and maintenance of skis, boots, bindings, wax, clothing, and poles is critical to success in the sport. Competence in this area is an important element in an athlete's overall preparation.

6. The Education domain serves to underline the fact that sport-specific knowledge is key in the long-term development of cross-country ski competitors. The end-goal of this education is to provide the athlete with a complete set of tools, such that the athlete can eventually become his or her own coach.

Note: A glossary of terms can be found at the end of this document.

The Early Phase

This is the initial stage of sport involvement, characterized by enjoyment, play, and a gradual acquisition of skills in a social environment that promotes further participation in the sport. This is the time in a child's life to participate in a wide variety of physical activities. This is NOT a time for specialization in cross-country skiing.

A. Ages 12 and Under

1. Technical Domain

a. Basic Skills

- (1) Has fun on snow
- (2) Demonstrates basic athletic stance on skis
- (3) Exhibits natural body mechanics on skis
- (4) Is eager to explore all different types of terrain and snow conditions
- (5) Able to balance on one ski while skiing gradual downhill
- (6) Understands difference between running and gliding
- (7) Can herringbone and snowplow

b. Event Skills

- (1) Skis classic and free technique
- (2) Participates in ski school or ski club program that promotes basic skill competence training

c. Markers

- (1) Basic cross-country skills
 - (a) Good balance
 - (b) Weight shift
 - (c) Proper body position
 - (d) Rhythm

2. Physiological Domain

- a. Engages in physical activity 3-5 hours per week in a variety of activities which emphasize balance and coordination such as soccer, dance, gymnastics

3. Psychological and Sociological Domain

- a. Goal Setting
 - (1) Enjoys the activity and has fun at play and practice
 - (2) Can verbalize reasons for participation in skiing
- b. Performance planning
 - (1) Not applicable to this age group
- c. Attention and focus
 - (1) Listens to and follows instructions
 - (2) Limits and stops disruptive behaviors when asked
- d. Arousal regulation and relaxation
 - (1) Knows and can demonstrate the difference between a tense and a relaxed muscle
- e. Imagery
 - (1) Learns how to dream
 - (2) Uses imagination in play
 - (3) Exhibits knowledge of the five senses
- f. Self concept, self image, self efficacy
 - (1) Exhibits a sense of belonging to the group or program in which he/she is participating
 - (2) Contributes to the activities of the group in a positive way
 - (3) Attempts to improve, tries new skills willingly and eagerly
 - (4) Participates in a variety of social, educational, and sport activities
- g. Competitive personality development
 - (1) Positive participation in games
 - (2) Enjoys personal and team success
 - (3) Completes all projects and programs

4. Training and Competition Performance Domain

Note: Children age 12 and under do not need to participate in structured training, but

Should be encouraged to participate in a variety of physical activities

- a. Recommended Ranges of Cross Country Skiing activity
 - (1) Skis 2-5 days per week from December to March

(2) The content of the skiing time includes the following approximate percentages of activity:

- Undirected skiing 80%
- Skill-oriented games 20%

(3) The training percentage for specific disciplines reflects the following approximate percentages:

- Classic 55%
- Freestyle 45%

(4) Competition starts and levels of competition should reflect the following range:

- 4-6 events
- Club or Youth Ski League level

b. Other Sport activity

(1) Is active in a variety of sports, especially those that will enhance motor skills utilized in cross-country skiing such as in-line skating, alpine skiing, ice hockey, soccer, gymnastics, hiking, biking, and climbing. Enjoys being outdoors.

5. Equipment

a. Skis

- (1) Skis on one pair of skis, soft flex, and between nose and forehead in height
- (2) The skis are to be properly waxed by the athlete, parent or club leader for every day of skiing

b. Boots

- (1) Uses boots that allow for natural ankle movement

c. Poles

- (1) Uses one pair of poles for all techniques
- (2) Poles should fit snugly under the armpit

d. Ancillary Equipment

- (1) Clothing should provide appropriate protection from the elements and keep children comfortable for extended periods of skiing
- (2) Eye protection should be worn at all times when skiing
- (3) Uses sunscreen

6. Education Domain

- (1) Learns about sportsmanship
- (2) Learns ski games
- (3) Introduction to the importance of balance and coordination
- (4) Introduction to basic equipment care

- (5) Introduction to basic glide and kick waxing
- (6) Recognizes the different skate and classic techniques
- (7) Learns to prepare (dress) for the elements

The Secondary Phase

In this phase, the athlete has made the transition from simply participating in the sport for only the enjoyment of the activity to seeking increased levels of skill and sophistication. The athlete exhibits an increase in dedication, a higher level of work volume, and a higher quality work ethic.

B. Ages 13 to 15

1. Technical Domain

a. Technical Skills in Training

- (1) Good body position, balance and weight shift
- (2) Demonstrates ability to maintain appropriate balance and stance while skiing in all terrain and under a variety of conditions
- (3) Effective use of different techniques to correspond to changing terrain and conditions
- (4) Changes techniques smoothly and quickly
- (5) Understands concept of changing tempo to suit conditions and terrain ("changing gears ")

b. Classic Skills

- (1) Double-pole
- (2) Kick double-pole
- (3) Diagonal stride
- (4) Diagonal stride without poles

c. Freestyle skills

- (1) Diagonal skate
- (2) Uses V1 skating on both sides
- (3) V2
- (4) V2 alternate on both sides
- (5) Skate without poles

d. Markers

- (1) Basic cross-country skills
 - (a) Complete weight shift
 - (b) Proper body position
 - (c) Rhythm
 - (d) Basic mechanics

2. Physiological Domain

- a. Is engaged regularly in cross-training activities which emphasize balance and coordination, endurance, strength, and speed, such as soccer, mountain-biking, running, gymnastics and swimming
- b. Is introduced to structured training
 - (1) Aerobic training
 - (2) Anaerobic training
 - (3) Strength training
- c. Acknowledges different methods of strength training and technique
- d. Eats right
- e. Knows how to stretch
- f. Always warms-up before stretching
- g. Practices effective hydration daily as well as before, during and after training and competition

3. Psychological and Sociological Domain

In this phase, goal setting is based on personal improvement, and not necessarily on matching national standards

- a. Goal Setting
 - (1) Sets attainable process goals, and reviews them regularly with coach as the measure of progress
 - (2) Sets goals that are specific and measurable
 - (3) Has a dream goal; has written general long range goals
 - (4) Seeks and utilizes feedback in relation to goal achievement
 - (5) All goals are highly individual and improvement based
- b. Performance planning
 - (1) Is organized and prepared for training
 - (2) Develops and follows a basic race day plan
- c. Attentional focus
 - (1) Develops and utilizes strategies for training and competition
 - (2) Inspects race course prior to competition
- d. Arousal regulation and relaxation
 - (1) Incorporates breathing exercises and other relaxation techniques in training and competitions
 - (2) Successfully participates in group relaxation sessions

- (a) Breathing exercises
- (b) Progressive relaxation

e. Imagery

- (1) Can form visual images to practice suggested outcomes
- (2) Can draw and accurately describe terrain features of courses and trails after an inspection
- (3) Begins to use visualization that incorporates all of the senses
- (4) Visualizes positive past and future performances

f. Self-concept, image, efficacy

- (1) Balances ski sport participation with other aspects of life (including education, social, other sports programs, etc)
- (2) Works well with teachers and coaches
- (3) Maintains good grades in school
- (4) Actively practices positive self-talk strategies and records results

g. Competitive personality

- (1) Maintains and evaluates a basic training and competition log with coach's help
- (2) Seeks success, and understands that not winning is part of athletic development

h. Drug awareness

- (1) Avoids all contact with performance enhancing and illegal drugs
- (2) Is able to differentiate between prescription medicine and illegal drugs

4. Training and Competition Performance Domain

a. Recommended Ranges of Cross Country Skiing Activity

- (1) Skis 4-6 times per week in the winter
- (2) Skiing in the non-winter season not necessary
- (3) The content of the training time includes the following approximate percentages of activity:
 - Undirected skiing 55%
 - Directed skiing and technical drills 45%
- (4) The training percentage for specific events reflects the following approximate percentages:
 - Classic 50%
 - Freestyle 50%
- (5) Competition starts and levels of competition should reflect the following range:
 - 8-16 total events
 - Divisional and Regional (National for J2s)
 - Race Distance: 1-5 km

- b. Range of yearly training hours:
 - (1) 250-350 hours per year
- c. Off-Season/Dry-land or Other Sport activities
 - (1) Is active in a variety of sports, especially those that will enhance motor skills and help develop endurance systems in cross-country skiing. Examples would be running, soccer, biking, hiking and swimming. However, the athlete should have a winter sport focus during the winter season
 - (2) Is an active participant in a club conditioning program focusing on skill acquisition and general physical preparation for cross-country skiing
 - (3) Plays a variety of sport games for recreation and enjoyment
 - (4) Beginning to learn the concepts of ski walking and hill-bounding, and roller-skiing
- d. Periodization
 - (1) Has an active rest period between winter and summer season. Uses a four period training design: active rest, variety of base training, race preparation, winter training and competition

5. Equipment

- a. Skis
 - (1) May be using classic and freestyle skis for racing. Skis should be selected to fit the skiers' weight and height according to manufacturer's recommendations. A skier does not need more than one pair of skate and one pair of classic skis. Fit is critical!
 - (2) Is responsible for maintaining skis at all times.
- b. Boots
 - (1) Classic and Freestyle specific boots may be used
 - (2) Individual adjustments or modifications are made for all anatomical needs for boots to fit properly
- c. Poles
 - (1) Should be using poles specifically for classic or freestyle. Classic poles should fit snugly under the armpit. Freestyle poles should extend to the chin or mouth
- d. Ancillary Equipment
 - (1) Hill-bounding poles (slightly shorter than normal classic poles)
 - (2) Athlete wears appropriate footwear and clothing during all physical activities
 - (3) Athlete has a backpack for extra clothing, water bottle, water bottle carrier, waxing equipment, etc.
 - (3) Athlete has long underwear, windbreaker, warm-up jacket and pants, hat, gloves, racing gloves, wind briefs and/or jog bra

6. Education Domain

- (1) Introduction to basic physiology and training theory
- (2) Introduction to training planning
- (3) Masters the fundamentals of technique
- (4) Recognizes what makes good technique
- (5) Begins to listen to his or her body
- (6) Introduction to the concept of team cohesion
- (7) Maintains equipment with coach's help
- (8) Race waxes for classic and skate events with coach's help
- (9) Exhibits knowledge of competition day routine
- (10) Introduced to nutrition and hydration

The Specific Phase

In this phase the athlete makes cross-country ski racing their primary sport. Participation in other sports should compliment cross-country ski training.

C. Ages 16 to 20

1. Technical Domain

a. Technical Skills

- (1) Applies all skills (which were previously developed) in racing

b. Markers

- (1) Advanced cross-country skills
- (2) Capable of critical self-analysis of technique

2. Physiological Domain

a. Implements a periodized training program, with the understanding that improvement requires quality training AND quality recovery

b. Understands and implements the following training concepts:

- (1) Aerobic Threshold
- (2) Lactate Accumulation
- (3) Maximum Heart Rate
- (4) Training Zones
- (5) Distance Training
- (6) Interval Training

c. Training Methods and Practices

- (1) The majority of training for cross-country skiing is low-intensity aerobic training

- (2) A small percentage of training for cross-country skiing is anaerobic
- (3) Uses aerobic training for recovery between interval training sessions
- (4) Uses interval training to improve
- (5) Uses plyometrics for power development 1-2 times/week
- (6) Understands and uses the following activities:
 - (a) hill-bounding
 - (b) explosive strength
 - (c) explosive exercises
- (7) Knows the RICE system for injury treatment, and applies RICE appropriately
- (8) Practices effective hydration/rehydration techniques
- (9) Demonstrates good eating habits, including proper carbohydrate loading and reloading techniques

d. Markers

- (1) Shows improvement in technique, endurance, speed, and strength

3. Psychological and Sociological Domain

a. Goal setting

- (1) Develops weekly, monthly, and yearly goals specific to each phase of the planning cycle
- (2) All yearly periods contain goals for all domains

b. Performance planning

- (1) Develops and utilizes a competition day routine / plan
- (2) Develops and utilizes a plan/method for dealing with unforeseen events
- (3) Is developing a plan to maintain focus during competition

c. Attentional focus

- (1) Identifies and utilizes cue words

d. Arousal regulation and relaxation

- (1) Understands the concept of an optimum performance state
- (2) Understands anxiety, and has an elementary coping strategy to deal with it
- (3) Understands and utilizes the concept of activation

e. Imagery

- (1) Logs mental training
- (2) Understands the two perspectives of internal and external imagery

f. Over-training / Body Awareness

- (1) Able to identify symptoms of over-training
- (2) Recognizes relationship between over-training and performance
- (4) Learns to monitor fatigue-level using heart-rates

- g. Self-concept, image, efficacy
 - (1) Accepts responsibility
 - (2) Understands role of self-confidence in performance
 - (3) Engages in positive self-talk
 - (4) Understands the difference between true confidence and over-confidence
 - (5) Completes High School education
- h. Competitive personality
 - (1) Accepts personal responsibility for training effort, quality, and results
 - (2) Participates fully in personal program design
- i. Drug awareness
 - (1) Avoids all contact with performance enhancing and illegal drugs
 - (2) Is able to differentiate between prescription medicine and illegal drugs
 - (3) Has knowledge of USOC banned substance list

4. Training and Competition Performance Domain

- a. Recommended ranges of cross country skiing activity
 - (1) Trains 5-12 sessions per week year-'round
 - (2) The content of the training time includes the following approximate percentages of activity:
 - Undirected skiing 70%
 - Directed Skiing and Technical drills 30%
 - (3) The training percentage for specific events should reflect these approximate percentages:
 - Classic 50%
 - Freestyle 50%
 - (4) Competition starts and levels of competition should reflect the following range:
 - 16-30 total events
 - Divisional and Regional and National levels
 - Possible International starts
- b. Range of yearly training hours:
 - (1) 350 -600 hours per year

Athlete Age	16	Suggested Hours	350+
	17		400+
	18		500+
	19		600+
	20		650+
 - (2) Recorded training hours should include endurance activities and strength training where the athlete's heart rate is over 120 (approx.) beats per minute.

(3) Recorded training hours DO NOT include yoga or stretching, which should be noted in the athlete's training log, but not added to training volume totals.

c. Other Sport activity

(1) Is active in other sports, especially those that will enhance motor skills and develop endurance systems in cross-country skiing. He / she should have a winter sport focus year-'round

(2) Participation in other sports outside of the ski season is encouraged, and should compliment cross-country ski training

d. Periodization

(1) Has an active rest period between winter and summer season (4-6 weeks)

(2) Uses a refined four period training program

(3) Uses a 3 or 4 week periodized training plan

e. Training plans

(1) The training and competition plan should be personalized, flexible, monitored, and evaluated

(2) The athlete keeps a detailed training log, which is evaluated on a monthly basis

(3) The athlete listens to his or her body, rather than blindly pursuing hourly training volume goals

f. Evaluation and assessment

(1) Performs a variety of standardized field tests throughout the year (running and roller-skiing)

(2) Training and competition periods are evaluated by the athlete and the coach

5. Equipment

a. Skis

(1) The athlete is responsible for all ski preparation and maintenance, and assures skis are properly waxed and maintained at all times

(2) The athlete carries appropriate kick wax and cork or roller-ski carbide tips while training

b. Boots

(1) Both classic and skating

c. Ancillary Equipment

(1) Both classic and skate roller-skis

(2) Helmet for roller-skiing

(3) Uses road-tips on poles when roller-skiing

6. Education Domain

- (1) Understands and utilizes basic exercise physiology
- (2) Understands and utilizes basic training theory
- (3) Possesses sport knowledge comparable to Level One Coaches' Education
- (4) Understands and utilizes basic nutrition and hydration
- (5) Selects equipment with coach's help
- (6) Maintains equipment
- (7) Can race wax for both classic and skating events
- (8) Develops training program with coach's help
- (9) Can analyze technique through video review
- (10) Understands his or her own capacity for training with help from coach
- (11) Begins to explore his or her personality and individual needs

The Late Phase

This stage of talent development is the phase in which the athlete attempts to reach his or her full potential.

D. Ages 21 and Over

1. Technical Domain

a. Technical Skills

- (1) Masters all techniques

b. Markers

- (1) Achieves a high percentage of weekly, monthly, and yearly training goals
- (2) USSA National Ranking
- (3) FIS International Ranking

2. Physiological Domain

- a. All physiological training components are individualized
- b. Completes appropriate training volume. Training is periodized by the week, month, and year
- c. Begins to spend time training and competing at different altitudes

3. Psychological Skill and Sociological Domain

a. Goal setting

- (1) Sets and reviews goals for all levels of athletic activity

- b. Performance planning
 - (1) Capable of evaluating past training and competition plans, and creating future plans
 - (2) Able to cope positively with forced breaks in training
- c. Attentional focus
 - (1) Has mastered training and competition focus techniques
 - (2) Maintains focus during events and competitions
 - (3) Has mastered distraction control and event refocusing
- d. Arousal regulation and relaxation
 - (1) Has mastered methods of arousal regulation and relaxation
- e. Imagery
 - (1) Has mastered the use imagery to enhance performance
- f. Self-concept, image, efficacy
 - (1) Completes undergraduate degree
 - (2) Effectively uses positive self-talk
 - (3) Possesses true confidence
 - (4) Seeks a balanced lifestyle
 - (5) Makes decisions as a 24 Hour/Day Athlete
- g. Competitive personality
 - (1) Leaves no possible preparation domain unaddressed
 - (2) Exhibits a disciplined work ethic
 - (3) Seeks competition. Attempts to reach full potential through challenging competition
 - (4) Wins and loses gracefully

4. Training and Competition Performance Domain

- a. Recommended ranges of cross-country skiing activity
 - (1) Trains 5-12 sessions per week year-'round
 - (2) Utilizes summer skiing opportunities when available and appropriate
 - (3) Although most training sessions are unsupervised, the athlete has specific training goals for each session
 - (4) The training percentage for specific events should reflect these approximate percentages:
 - Classic 50%
 - Freestyle 50%
 - (5) Competition starts and levels of competition should reflect the following range:
 - 25-35 total competitions (not including time trials)
 - National and international level

- b. Range of yearly training hours:
 - (1) 600-800 hours per year
- c. Other sport activity
 - (1) Focuses on cross-country skiing and uses other sports for recreation, general fitness and motor skill enhancement
- d. Periodization
 - (1) Uses an individualized periodization plan to maximize performance
- e. Training plans
 - (1) Effectively uses past training plans to develop optimal current plan
 - (2) Takes calculated training risks in order to fulfill true potential
- f. Evaluation and assessment
 - (1) The athlete and coach meet regularly to evaluate progress

5. Equipment

- a. Is responsible for having all equipment in perfect working order, to World Cup standards, at all times

6. Education Domain

- (1) Has knowledge comparable to Level Two Coaches Education
- (2) Understands basic exercise physiology
- (3) Understands advanced training theory
- (4) Writes personal training program
- (5) Understands his or her own capacity for training and puts it to use in planning and evaluation
- (6) Understands and implements all aspects of World Class technique
- (7) Understands nutritional and hydration needs of elite athletes
- (8) Capable of evaluating his or her progress towards goals
- (9) Maintains good relationships with sponsors
- (10) Can select and maintain equipment
- (11) Can race wax for all conditions
- (12) Understands and accepts themselves

Definition of terms

Aerobic training: low to medium intensity training that can be sustained for a medium to long duration.

Anaerobic capacity: the ability to sustain a high intensity activity for short repetitions

Anaerobic power: the ability to move a heavy load fast.

Anaerobic threshold: the intensity level in which anaerobic energy-production methods start to be utilized.

Anatomical adaptation: the adjustment of the muscle's neurologic system in response to increasing loads.

Balancing: maintaining, regaining or improving the body's state of equilibrium.

Bounds: bounding ski imitation.

Coordination: the accuracy component of agility.

Cognitive response: response resulting from a thought or thought process.

Development: a change, usually positive, in functional capability.

Directed skiing: skiing with a coach to accomplish specific goal(s).

Electrolyte: having to do with essential salts.

Ergogenic: increases potential for work output or performance.

Extension: An unbending of a joint between the bones of a limb by which the angle between the bones is increased.

External forces: Forces existing in nature.

Flexion: a bending of the joint between the bones of a limb that diminishes the angle between the bones.

Hypertrophy: increase in muscle size.

Interval training: training that involves periods of intensity interspersed with rest.

Intuitive response: an automatic response without the effort of reasoning.

Over-training: the point at which normal rest does not suffice in the recovery process.

Performance team: the sum of those individuals who have a direct influence on the skill development of an individual athlete.

Plyometrics: explosive jumping exercises that utilize the neuromuscular components of the stretch shortening cycle.

Power: performance of work expressed per unit of time.

Progression: ordered steps of learning on a continuum of easiest to mastery.

Recovery: the act of resting, active or passive.

Rep: repetitions of an exercise performed without interruption.

Rest interval: the recovery time between bouts of exercise.

RICE: acronym for Rest, Ice, Compression, Elevation.

Set: a cumulation of repetitions.

Simulation training: competition rehearsal as close to race conditions as possible.

Speed: the rate of travel or the quickness component of agility.

Spent: Norwegian terms for ski-specific plyometric exercises.

Static stretching: a stretching method in which the stretch is held for a period of time.

Technical drills: exercises that aim to improve technique.

Training periods: specific blocks of the annual training plan.

Undirected skiing: skiing without specific guidance.

Weight transfer: shifting the center of mass from ski to ski.

Work interval duration: the amount of time performing an exercise.

Work interval intensity: the fervor with which the work interval is performed.

Work/Rest ratio: the exercise to recovery proportion.

References

- Bloom, B.S. (1985). *Developing talent in young people*. NY: Ballantine Books.
- Gallahue, D.L. (1993). *Development of physical education for today's children*. (2nd ed.). Dubuque, IA: Brown and Benchmark.
- Harman, E.A., Rosenstein, M.T., Frykman, P.N., Rosenstein, R.M., & Kraemer, W.J. (1991). Estimation of human power output from vertical jump. *Journal of Applied Sports Science Research*. 5(3), 116-120.
- Jackson, A.S. & Pollock, M.L. (1978). Generalized equations for predicting body density of men. *British Journal of Nutrition*. 40, 497-504.
- Jackson, A.S., Pollock, M.L. & Ward, A. (1980). *Generalized equations for predicting body density of women*. *Medicine and Science in Sports and Exercise*. 12(3), 175-182.
- Shermer, M. (1996). Gould's dangerous idea. *Skeptic*, 4(1), 91-95.
- Siri, W.E. (1956). "Gross composition of the body". In *Advances in Biological and Medical Physics*. Vol. 4. Edited by J.H. Lawrence, and C.A. Tobias. NY: Academic Press.