



Long Term Athlete Development (LTAD) for Ski Jumping and Nordic Combined

-In accordance with Canadian Sport for Life, and with special thanks to Speed Skate Canada and Canadian Sliding Sports LTAD models-

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Introduction

The following LTAD focuses on the general framework of athlete development regarding growth, maturation, development, trainability, sport system alignment and integration in the sports of Ski Jumping and Nordic Combined. This Long Term Athlete Development plan follows the guidelines set forth by Sport Canada and presents a framework for expectations and success at all stages and levels within the sports of Ski Jumping and Nordic Combined.

This LTAD is an inclusive model that encourages individuals to get involved in lifelong physical activity. It does this by connecting and integrating physical education programs in the school system with elite sport programs and with recreational sport programs in the community. LTAD ensures that all children correctly learn the fundamental movement skills – since all children attend school – and that these skills are introduced during the optimal point in their physical development, which is prior to age 11 for girls and age 12 for boys. Children who are physically educated in the LTAD way will:

- Feel confident and be encouraged to continue to build on these skills through competitive and recreational sport activity.
- Enjoy overall health benefits by developing greater physical literacy, which encourages them to be more physically active through their lives. Increased activity reverses the current trends in childhood and adult obesity and cardiovascular disease.
- Discover a pathway to competition and excellence at the international level.

Long Term Athlete Development is based on the physical, mental, emotional, and cognitive development of children and adolescents. Each stage reflects a different point in athlete development, and ensures that optimal training, competition, and recovery programs are provided through an athlete's career.

This LTAD model defines the best learning and participation environment, at each stage of development, by considering participant physical, mental, cognitive, and emotional factors. The LTAD model:

- Is based on the sport participant's developmental age and not their chronological age and recognizes that children are *not* miniature adults and do not all develop at the same speed.
- Acknowledges that everyone progresses through stages of development and training objectives at their own rhythm.
- Is athlete centred, coach driven and supported by administrators, officials and financial partners.
- Is based on the Canadian Sport for Life model, a multi-sport model developed for all Canadians in all sports.
- Is intended to assist athletes, parents, coaches, officials and sport administrators to make informed decisions about athlete development.
- Allows everyone to participate to the full extent of their abilities.
- Recognizes that competitions must be adapted to the participants' stage of development.



LTAD consists of 7 stages:

The first 3 encourage physical literacy and sport for all:

- 1) Active Start
- 2) FUNdamentals
- 3) Learning to train

The next 3 focus on excellence:

- 4) Training to Train
- 5) Training to Compete
- 6) Training to Win

The final stage encourages life-long physical activity:

- 7) Active for Life

Introduction of LTAD and Guiding Principles

The LTAD plan is a philosophy and a vehicle for change. It is athlete-centred from a child's first involvement in sport until the transition to lifelong physical activity or other sport related activities. It establishes a clear developmental pathway from playground to podium and on to being active for life. The following LTAD is specifically formulated around the sport of Ski Jumping and Nordic Combined with hopes of providing the most efficient and concise pathway to sporting enjoyment and success. The pursuit

of excellence, most often defined as winning or medaling, must be considered in the holistic context of having fun and meeting the objectives related to each stage of development.

Ski Jumping Canada and Nordic Combined Ski Canada are also committed to True Sport which is "... a national Movement of communities and groups across Canada working to share a positive, meaningful and enriching experience for all who participate in sport. The True Sport Movement is based on the belief that good sport can help build lasting strengths in individuals, as well as healthy, vibrant communities and a more socially connected Canada. At the heart of True Sport there are four core values: fairness, excellence, inclusion and fun."

To achieve the LTAD stages of development objects, Ski Jumping and Nordic Combined Ski Canada must continually question what it does. By reviewing Ski Jumping and Nordic Combined Ski Canada's programs objectively, it is possible to retain the best parts of what we do, consider alternatives, and generate new ideas. The LTAD project has provided National Sport Organizations with a well-documented model to study their sport systems and re-align all aspects of competition into coherent systems supporting the long-term development of all participants - athletes, coaches, officials, administrators and volunteers. By reviewing and, if necessary, adjusting the event/competition system so that it supports principles of LTAD, Ski Jumping and Nordic Combined Ski Canada can ensure that skiers will be prepared to perform well in life and in competition, whether at regional, provincial, national or international levels, while administrators and volunteers gain heightened satisfaction from participation.

Defining the Sports/Evolution

Ski Jumping is a form of Nordic Skiing in which athletes descend a ramp (inrun), jump off the end of it (the table) and "fly" as far as they can down the hill. Ski Jumping competitions are judged on distance and style points. The "K" term is the critical point between the take-off point, and the point on the outrun where the hill begins to flatten out. The average takeoff speed on the K89 is 84 km/h. Jumpers follow the hill's contour and are seldom more than 3 meters off the ground. International Ski Jumping Competitions are sanctioned by the International Ski Federation (FIS).

Ski jumping is predominantly a winter sport, performed on snow, and is part of the Winter Olympic Games, but can also be performed in summer on artificial surfaces – hard plastic tracks are used on the inrun, the landing hill is covered in a plastic turf and applied with water from a sprinkler system.

Ski Jumping can be traced back to 1860 when Sondre Norheim of Norway, considered the Father of Ski



Jumping, flew 30 meters. Ski Jumping (men) had its debut in the 1924 Winter Olympics, 90 years later in 2014 Ski Jumping women debuted at the Sochi Olympics. Summer ski jumping made its debut in 1954, resulting in the sport becoming a year-round sport with a very busy winter and summer competition seasons.

Ski Jumpers begin training on small hills - typically 10 - 40 meters (K-point), progressing up to medium hills (up to 74 meters (K-point)). Most international events take place on normal hills (90-meter K-point) and large hills (120-meter K-point) but there is also ski flying hills that are greater than 170 meter (K-point).

The sister sport to Ski Jumping is Nordic Combined which is a competition involving Ski Jumping and Cross-Country skiing. Today, competitions are won based on Ski Jumping distance and style points combined with a Cross-Country skiing time. Athletes start the cross-country race based on their jumping finishing position. The first-place jumper starts first and the following skiers are staggered behind based on a points to time conversion determined from their jumping points. The first skier to finish wins the event.

Historically in Canada there have been small to medium ski jumps in many ski communities across Canada (Revelstoke, BC, Camrose, AB, etc.). However, over time they have disappeared. One of the best ski jumping facilities in Canada from 1963 to 1995 was the Big Thunder Ski Jumping Centre in Thunder Bay, Ontario. This facility closed in 1995 shortly after hosting the FIS Nordic World Ski Championships. Many of the best ski jumpers Canada has produced came out of Big Thunder.

Currently there is one active ski jumping facility in Canada:

Canada Olympic Park in Calgary, AB(Closed) which was built to host the 1988 Olympic Winter Games. COP had 4 jumps that are used frequently during the summer and fall. The K18 for beginners, the K38 for beginner and development jumpers, the K63 for development jumpers, and the K89 which is run only in the summer. Currently, all National Team athletes currently train out of Planica, Slovenia



The newest facility is at Whistler Olympic Park as was built to host the 2010 Winter Olympics. The facility at the park is now home to the K20, K40, HS106, and HS140, all of which are run during the winter season only. Located close to the Olympic Park in Squamish, BC, is a K8 summer jump that the community came together and built as a training jump.

Why does SJ/NC need LTAD?

The LTAD model provides Ski Jumping and Nordic Combined Ski Canada a much needed, intelligent framework and resource to systematically guide the development of skiers from a young age to international competition, and life-long healthy lifestyles.

The concept of LTAD was born out of gaps in a Canadian sporting system builds somewhat reactively over time- a system that, by design, has had to focus more on the short-term needs of sports (e.g. competing and winning) versus the long-term health of sport and lifestyle programming. Thanks to the extensive research and collaboration of Canadian Sport Centres' LTAD expert group, and the agreement by the major sport funding partners in Canada to better align and integrate their financial and human resources into a comprehensive Canadian Sport Policy, the opportunity to create clear building blocks for sport development has arrived. LTAD is now one of the key structural elements in a new Canadian sport system.

Canadian sports, like Ski Jumping and Nordic Combined, are now adopting the concepts of LTAD to develop sport-specific LTAD frameworks, to provide clear and consistent developmental pathways for their respective athlete groups. LTAD is about ensuring that athletes get optimal training, competition, and recovery throughout their careers so they may reach their athletic potentials, and enjoy participation in skiing and other physical activities throughout their lives. Training, competing, and recovery programs are based on an athlete's developmental age rather than chronological age, and are designed to optimize development during critical periods of accelerated adaptation to training. LTAD also considers the physical, mental, emotional, and cognitive development of all participants.

Ski Jumping and Nordic Combined Ski Canada are pleased to present the following LTAD framework. This LTAD framework is meant to provide parents, coaches and athletes with a comprehensive resource for guiding and shaping the successful development of athletes at any stage. Specifically, this document will provide a basis of understanding of Ski Jumping and Nordic Combined, the core principles of LTAD and their relevance to sport developments and guidelines for implementing the key elements of the developmental pathways for Ski Jumping and Nordic Combined.

Glossary of Terms

Adaptation- refers to a response to a stimulus or a series of stimuli that induces functional and/or morphological changes in the organism. Naturally, the level of degree of adaptation is dependent upon the genetic endowment of an individual. However, the general trends or patterns of adaptation are identified by physiological research, and guidelines are clearly delineated of the various adaptation processes, such as adaptation to muscular endurance or maximum strength.

Adolescence- is a difficult period to define in terms of the time of its onset and termination. During this period, most bodily systems become adult both structurally and functionally. Structurally, adolescence begins with an acceleration in the rate of growth in stature, which marks the onset of the adolescent growth spurt. The rate of staturary growth reaches a peak, begins a slower of declarative phase, and finally terminates with the attainment of adult stature. Functionally, adolescence is usually viewed in terms of sexual maturation, which beings with changes the neuroendocrine system prior to overt physical changes and terminates with the attainment of mature reproductive function.

Age

Chronological Age- refers to the number of years and days elapsed since birth. Children of the same chronological age can differ by several years in their level of biological maturation.

Developmental age- refers to the degrees of physical, mental, cognitive, and emotional maturity. Physical developmental age can be determined by skeletal maturity or bone age after which mental, cognitive, and emotional maturity is incorporated.

General training age- refers to the number of years in training, sampling different sports.

Relative age- refers to differences in age among children born in the same calendar year.

Skeletal age- refers to the maturity of the skeleton determined by the degree of ossification of the bone structure. It is a measure of age that takes into consideration how far given bones have progressed toward maturity, not in size, but with respect to shape and position to one another.

Sport Specific training age- refers to the number of years since an athlete decided to specialize in a particular sport.

Ancillary Capacities- refers to the knowledge and experience base of an athlete and includes warm-up and cool-down procedures, stretching, nutrition, hydration, rest, recovery, restoration, regeneration, mental preparation, taper and peak. The more knowledgeable athletes are about these training and performance factors, the more they can enhance their training and performance levels. When athletes reach their genetic potential and physiologically cannot improve anymore, performance can be improved by using the ancillary capacities to full advantage.

Childhood- ordinarily spans the end of infancy - the first birthday - to the start of adolescence and is characterized by relatively steady progress in growth and maturation and rapid progress in neuromuscular or motor development. It is often divided into early childhood, which includes preschool children aged 1 to 5 years, and late childhood, which includes elementary school-age children, aged 6 through to the onset of adolescence.

Chronological age- refers to “the number of years and days elapsed since birth.” Growth, development, and maturation operate in a time framework; that is, the child’s chronological age. Children of the same chronological age can differ by several years in their level of biological maturation. The integrated nature of growth and maturation is achieved by the interaction of genes, hormones, nutrients, and the physical and psychosocial environments in which the individual lives. This complex interaction regulates the child’s growth, neuromuscular maturation, sexual maturation, and general physical metamorphosis during the first 2 decades of life.

Competition- is a ‘... sanctioned, scheduled competition which contributes to standings or rankings or qualification and / or leads to a championship. This would not include exhibition games or competitions which do not affect ranking, standings, or qualifying.’ (Competition is a Good Servant but a Poor Master)’

Critical Date(s) for Ski Jumping Ages- is the date at which the athletes are for a competition. Ski Jumping Canada and Nordic Combined use July 1st as the critical date, keeping it in line with the International Ski Federation (FIS) rules.

Critical periods of development- refers to a point in the development of a specific behaviour when experience or training has an optimal effect on development. The same experience, introduced at an earlier or later time, has no effect on or retards later skill acquisition.

Development- refers to “the interrelationship between growth and maturation in relation to the passage of time. The concept of development also includes the social, emotional, intellectual, and motor realms of

the child.” The terms “**growth**” and “**maturation**” are often used together and sometimes synonymously. However, each refers to specific biological activities. Growth refers to “observable, step-by-step, measurable changes in body size such as height, weight, and percentage of body fat.” Maturation refers to “qualitative system changes, both structural and functional in nature, in the organism’s progress toward maturity; for example, the change of cartilage to bone in skeleton.”

Developmental Competitions- are allied with formative evaluation which focuses on the process, physical development and learning. These could be the competition objectives when an athlete participates in a competition but the results are used to analyze the athlete’s development. Specific objectives could be to test fitness, excite skill in competition, try out jumping strategies etc.

Meaningful Competition- implies a chance to succeed and even win but to be successful requires some uncertainty and excitement. Events where jumpers are so spread out that they are essentially “jumping on their own” do not have necessary uncertainty and are neither fun nor worthwhile, providing limited challenge and minimal learning. Excitement is based on meeting and challenging uncertainty.

Peak height velocity (PHV)- is the maximum rate of growth in stature during growth spurt. The age of maximum velocity of growth is called the age of PHV.

Peak strength velocity (PSV)- is the maximum rate of increase in strength during growth spurt. The age of maximum increase in strength is called the age at PSV.

Peak weight velocity (PWV)- is the maximum rate of increase in weight during growth spurt. the age of maximum increase in weight is called the age at PWV.

Performance Competition- is allied to summative evaluation where the outcome is the focus. This would include all competitions that lead to selection to a team, funding, ranking and major championships. These competitions would be important points, perhaps even the goal, in an athlete’s periodization plan.

Physical literacy- refers to the mastering of fundamental motor skills and fundamental sports skills.

Post-natal growth- is commonly, although sometimes arbitrarily, divided into 3 or 4 age periods, including infancy, childhood, adolescence, and puberty.

Puberty- refers to the point at which an individual is sexually mature and able to reproduce.

Readiness- refers to a child’s level of growth, maturity, and development that enables him/her to perform tasks and meet demands through training and competition. Readiness and critical periods of trainability during growth and development of young athletes are also referred to as the correct time for the programming of certain stimuli to achieve optimum adaptation regarding motor skills, muscular and /or aerobic power.

Simulation Competition- would be done in controlled situations within training and practice or in situations such as Saturday morning competition. These would not be sanctioned in any way and for the most part managed by coaches. These would also focus on the process of developing and therefore be formative

Skeletal age- refers to the maturity of the skeleton determined by the degree of ossification of the bone structure. It is a measure of age that takes into consideration how far given bones have progressed toward maturity, not in size, but with respect to shape and position to one another.

Trainability- refers to the genetic endowment of athletes as they respond individually to specific stimuli and adapt to it accordingly. Malina and Bouchard (1991) define trainability as “the responsiveness of developing individuals at different stages of growth and maturation to the training stimulus.”

Windows of trainability- refers to a point in the development of a specific behaviour when experience or training has an optimal effect on development. The same experience, introduced at an earlier or later time, has no effect on or retards later skill acquisition.

Window of Opportunity or Skill- refers to a point in the development when experience has the optimal effect on acquiring motor skills.

10 key factors affecting LTAD success

1) Physical Literacy

Physical literacy is the cornerstone of both participation and excellence in physical activity and sport. Individuals who are physically literate are more likely to be active for life.

- Becoming physically literate is influenced by the individual’s age, maturation and capacity.
- Ideally, supporting the development of physical literacy should be a major focus prior to the adolescent growth spurt.
- The skills that make up physical literacy vary by location and culture, and depend on how much importance a society places on certain activities.

Physically literate individuals:

- Demonstrate a wide variety of basic human movements, fundamental movement skills and fundamental sports skills.
- Move with poise, confidence, and competence and creativity in different physical environments (on the ground, both indoor and outdoor; in the air; in and on water; on snow and ice).
- Develop the motivation and ability to understand, communicate, apps and analyze different forms of movement.

- Make choices that engage them in physical activity, recreation or sport activities that enhance their physical and psychological wellness, and permit them to pursue sport excellence commensurate with their ability and motivation.

2) Specialization

Sports can be classified as either early or late specialization. Well-known early specialization sports include artistic and acrobatic sports such as gymnastics, diving and figure skating. These differ from late specialization sports in that very complex skills are learned before maturation since they cannot be fully mastered if taught after maturation.

Most other sports are late specialization sports; however, all sports should be individually analyzed using international and national normative data to determine whether they are early or late specialization. If physical literacy is acquired before maturation, athletes can select a late specialization sport when they are between the ages of 12 and 15 and have the potential to rise to international stardom at that sport.

Based on sport-specific work done by more than 100 organizations around the world, experts from the sport-specific groups indicated when sport specialization is recommended. This has allowed groupings of sports within early and late specializations.

Early Specialization

- Acrobatic (gymnastics, diving, figure skating)
- Highly kinaesthetic (important to engage in activities that involve snow, water or a horse early on e.g. snowboard, swimming, synchro, equine)
- Demanding and complex motor skill requirement

Late Specialization

- Early engagement
 - Kinaesthetic (alpine ski, freestyle ski, luge, cross country ski)
 - Team (basketball, ice hockey, baseball, rugby, soccer, water polo, field hockey)
 - Visual (tennis, badminton, squash, fencing)
- Standard (typical timing of specialization- majority of sports fit into this category)
- Very late specialization (cycling, wakeboard)
- Very late specialization; Transfer- when the skill developed in one sport allows an athlete to smoothly transition into another sport (rowing, triathlon, volleyball- beach and indoor, bobsleigh)

Specializing early on in a single, late specialization sport contributes to:

- One-sided, sport-specific preparation
- Lack of AEs, poor basic movements and fundamental sports skills
- Overuse injuries
- Early burnout
- Early retirement from training and competition

3) Developmental Age

Children of the same chronological age can differ by several years in their level of biological maturation. Growth, development and rate of maturation is the result of a complex interaction of genes, hormones, nutrients and the environments (physical and psychosocial) in which the individual lives. This combination of factors regulates the child's physical growth, neuromuscular development, sexual maturation, mental, cognitive and emotional development, and general physical metamorphosis during the first two decades of life.

Puberty is characterized by numerous physical changes by which a child's body matures into an adult body capable of sexual reproduction. These events occur over a number of years and include major changes to height, deposition of fat, bone and muscle, transformation of the brain, and acquisition of secondary sexual characteristics (e.g. breast, genitalia, pubic and auxiliary hair growth).

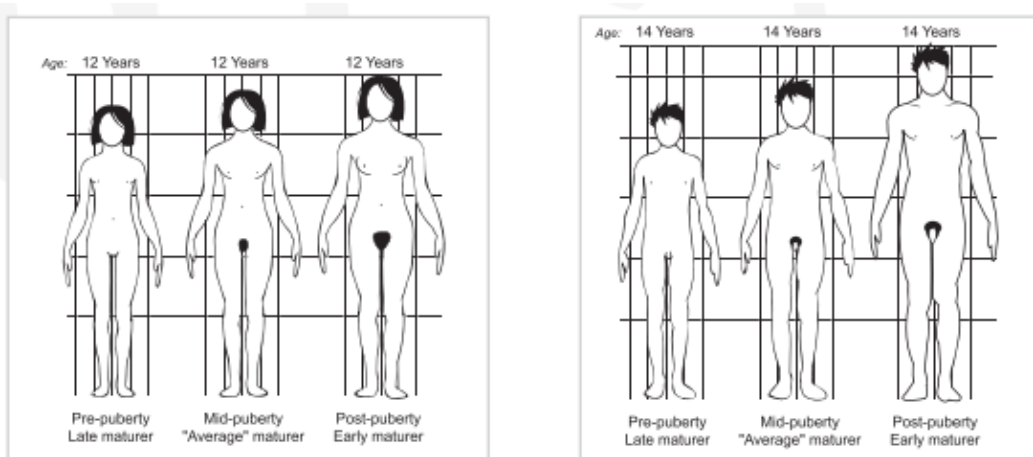
The terms "growth" and "maturation" are often used together and sometimes synonymously. However, each refers to specific biological activities.

- **Growth** refers to observable step-by-step changes in quantity and measurable changes in body size such as height, weight, and fat percentage.

- **Maturation** refers to qualitative system changes, both structural and functional, in the boy's progress toward maturity such as the change of cartilage to bone in the skeleton.

Development refers to both biological and behavioural contexts. In terms of the biological, "development

refers to the



processes of differentiation and specialization of pluripotent embryonic stem cells into different cell types, tissues, organs and functional units" (Malina, Bouchard, & Bar-Or, 2004, p. 5). For behavioural, this term "relates to the development of competence in a variety of interrelated domains as the child adjusts to his or her cultural milieu - the amalgam of symbols, values and behaviours that characterize a population" (p. 5).

Development refers to "the interrelationship between growth and maturation in relation to the passage of time. The concept of development also includes the social, emotional, intellectual, and motor realms of the child."

Chronological age refers to the number of years and days elapsed since birth. Children of the same chronological age can differ by several years in their level of biological maturation.

Developmental age refers to the degree of physical, mental, cognitive, and emotional maturity. Physical developmental age can be determined by skeletal maturity or bone age after which mental, cognitive, and emotional maturity is incorporated.

Skeletal age refers to the maturity of the skeleton determined by the degree of ossification of the bone structure. It is a measure that takes into consideration how far given bones have progressed toward maturity, not in size, but with respect to the progressive change from cartilage to bone.

Training age refers to the age where athletes begin planned, regular, serious involvement in training.

General training age refers to the number of years in training in different sports.

Sport-specific training age refers to the number of years an athlete has been training in one particular sport.

The tempo of a child's growth has significant implications for athletic training because children who mature at an early age have a major advantage during the Training to train stage compared to average or late maturers. However, after all athletes have gone through their growth spurt, it is often the late maturers who have greater potential to become top athletes provided they experience quality coaching throughout that period.

LTAD requires the identification of early, average and late matureness in order to design appropriate training and competition programs in relation to optimal trainability and readiness. The beginning of the growth spurt and the peak of the growth spurt (Peak Height Velocity are significant landmarks for LTAD applications of training and competition design).

4) Sensitive Periods

A sensitive period is a broad timeframe or window of opportunity when the learning of a specific skill or the development of a specific physical capacity is particularly effective. The entire period of childhood can be viewed as a sensitive period for mastering fundamental movement skills (Gallahue and Donnelly, 2003).

Trainability during the sensitive periods of accelerated adaptation to training refers to the body's responsiveness to training stimuli at different stages of growth and maturation. The physiological systems of the athletes can be trained at any age, but there are sensitive periods when individuals are especially responsive to specific types of training.

The sensitive periods of accelerated adaptation to training that occur before adolescence are based on chronological age, while those that occur during or after adolescent growth are based on their relationship to maturational markers (Balyi, 2001), such as the onset of the adolescent growth spurt or PHV itself (the peak growth rate after which growth decelerates), and the onset of menarche. Sensitive periods for stamina, strength and skills are identified using maturational markers as well. The trainability of speed and suppleness are based on chronological age (all available research is based on chronological age).

The Ten S's of Training and Performance

1. **Stamina (Endurance)**

The sensitive period for stamina development occurs at the onset of the adolescent growth spurt. Aerobic capacity training is recommended before athletes reach peak height velocity (PHV). Aerobic power should be introduced progressively after PHV when growth rate decelerates.

2. **Strength**

The sensitive period for strength in girls is immediately after PHV or at the onset of menarche, while for boys it is 12 to 18 months after PHV.

3. **Speed**

For boys, the first sensitive period for speed occurs between the ages of 7 and 9 years, and the second occurs between the ages of 13 and 16. For girls, the first sensitive period for speed occurs between the ages of 6 and 8 years, and the second occurs between the ages of 11 and 13.

4. **Skill**

The sensitive period for optimal skill training generally takes place between the ages of 9 and 12 for boys and between the ages of 9 and 11 for girls, or more precisely before the onset of adolescent growth spurt (the “skill hungry” years).

5. **Suppleness (Flexibility)**

The sensitive period for suppleness for both genders occurs between the ages of 6 and 10. Although flexibility training during puberty yields good results, special attention should be paid to flexibility during the adolescent growth spurt, due to stresses on muscles, ligaments and tendons by their rapidly growing bones.

6. **Structure/Stature**

Stature is the height of a human. In terms of training and performance, it refers to the process where the instructor, coach, teacher or parent records regular measurements before, during and after maturation. The purpose is to track growth and identify the onset of the adolescent growth spurt, PHV and whether athletes are early, average or late maturing. The tracking of stature as a guide to developmental age allows for planning to address the sensitive periods (Virus, 1995; Virus et al., 1998; Virus et al., 1999) of physical development (endurance, strength, speed and flexibility) and skill development. Measurements should be done every three months, measuring the athlete's standing height, sitting height and arm span.

7. **Schooling**

In designing an effective training program, the demands of school must be considered. These include integrating academic loads and duties, school related stresses, and the timing of exams. When possible, training camps and competition tours should complement, not conflict, with the timing of major school academic events.

Stress should be monitored carefully to ensure that over-stress does not occur. (Over-stress can occur from the cumulative effects of everyday stresses of life, such as schooling, exams, peer groups, family and romantic relationships, as well as increased training volume and intensities, or competition). Stress caused by conflicting demands made on athletes from club, school and representative teams is of particular concern. Communication between all coaches involved in the athlete's training and competition programs is essential.

8. (p)Psychology- Mental Fitness

Mental fitness concepts and strategies can be introduced to athletes at an early age. Initially, this involves instilling foundational principles such as having a positive attitude, positive focus and imagination, while emphasizing effort and fun. As an athlete progresses through the seven stages of LTAD, mental skills and strategies are introduced and developed to help her handle the increasing pressures and demands of competitive sport. The acquisition of mental fitness is a dynamic process that fluctuates depending on

- the time and effort put towards developing the mental skills and attributes, and
- the athletes' openness to self-learning and reflecting on competitive experiences.

To provide athletes with the opportunity to reach their personal performance potential, it is imperative that mental fitness be incorporated throughout their long-term development.

9. Sustenance

Training, participation in sport and physical activity and competition can lead to significant levels of fatigue in athletes. Recovery is the process whereby the body rids itself of fatigue. At the same time, the body adapts to the training stimulus and regains the capacity to produce the strength, endurance and power required for other physical activity, training or competition.

A variety of methods and modalities can be used to facilitate the recovery process and help the athlete to regain his or her capability to sustain the repeated demands of training, participation or competition. These include nutrition, hydration, rest, sleep and the use of techniques such as massage, contrast baths, ice baths and warm water jets. The need and use of specific recovery strategies, as well as the frequency at which they should be employed, will vary according to the stage of LTAD and the athlete's level of competition.

Optimal management of the recovery process also requires careful attention to be given to the other life activities of the athlete outside of sport. Outside life can also be demanding and represent significant sources of both fatigue and stress.

Poor planning, excessive training and participation in too many competitions can all induce severe levels of fatigue. The same detrimental outcome can come from the improper management of the athlete's recovery process.

10. Socio-Cultural

The socio-cultural aspects of sport are significant and must be managed with proper planning. Socializing via sport will ensure that general societal values and norms are internalized through sport participation. This occurs at the community level and as an athlete progresses through the LTAD stages, leads to international exposure.

Exposure to various cultures provides broadening of perspectives, including ethnicity awareness and national diversity. Within the travel schedule, recovery can include education related to the competition location, including history, geography, architecture, cuisine, literature, music and visual arts. With proper planning, sport can offer much more than simply commuting between hotel room and competition.

Sport specialization refers to the sport subculture in a sport. Sport subcultures are very diverse; just consider the differences between rugby, gymnastics, soccer or swimming subcultures. Within each sport subculture, it is important that coaches and parents guard against group dynamics that create a culture of abuse or bullying. Ethics training should be integrated into training and competition plans at all stages of LTAD.

Overall socio-cultural activity is not a negative distraction or an interference with training or competition activities. It is a positive contribution to development of the participant as a person.

5) Mental, Cognitive and Emotional Development

Mental, cognitive and emotional factors are essential to each athlete's development. Not only is holistic development- which encompasses all the above factors, in addition to physical development- beneficial to the individual, but these skill sets are all interlinked.

Just as physical and technical skills require long-term and sequential development, so too do the psychological aspects of athlete development. This includes a range of knowledge sets, such as the underpinnings of fair play and ethical sport, mental skills for performance, emotional regulation, sequencing and decision-making.

Programming should be designed to deliver all aspects of athlete development in a complementary manner, including mental, cognitive and emotional components.

Training, competition and recovery programs should consider the cognitive, moral and emotional development of each athlete. This is not simple, since there are no easily visible markers for the transitions between stages of cognitive, moral and emotional development.

Intellectual Development: Children go through both the sensorimotor and pre-operational stages during the Active Start stage. During the first couple of years, children explore the world around them through movement and sensory experience. They begin to understand that objects are permanent by the end of their first year, and by age two they are generally able to plan and execute movements to get what they want, such as moving an object to get an object behind it. Between ages two and seven, children begin to grasp language and develop the ability to talk about things that are not present, though they still maintain a self-centred point of view. Role playing and symbolism, such as a blanket draped over a chair representing a fort, become important at this stage.

The concrete operational stage covers the next three LTAD stages. Moving from 'FUNDamentals' through 'Learn to Train' and into 'Train to Train', individuals continue to develop logic. They begin to understand how the world operates, though abstractions – game plans or team strategy – can still be difficult to grasp until the early stages of 'Learn to Train'. Comprehension of "reversibility" and the consequences of some actions (i.e. kicking a basketball being a foul, and five fouls means dismissal from the game) comes into play during 'Learn to Train' as well.

The formal operational stages take place during the 'Train to Train' and 'Train to Compete' stages and remains the dominant stage for the remainder of life. The ability to think about abstractions becomes

prevalent. Logical thought and deductive reasoning emerge, and systematic, long-term planning becomes part of the individual's thought process. Individuals fully understand the rules of the game and the consequences of their actions.

Emotional Development: Individuals go through eight stages of emotional development (so long as they're cared for and raised well), though the first five are most important to coaches or parents engaged in LTAD. *Hope*, *Will* and *Purpose* are all covered by Active Start. *Hope* is the first year of life when children begin trusting adults. *Will* is where children learn to explore and begin to develop autonomy, lasting until age three. Between ages four and six – *purpose* – children will develop initiative through learning to plan and doing things on their own.

Competence spans 'Active Start' to 'Train to Train'. This is where children begin judging and comparing their and others' behaviour. They recognize differences in abilities and if they judge themselves to be inferior to others, they may withdraw from participation. *Fidelity* ranges from the end of 'Learn to Train' through 'Train to Compete' and encompasses the self-reflection period of one's youth. It's important for children to explore their own world and thoughts without pressure from parents or coaches to be a certain role, which can lead to confusion.

A major objective of LTAD is a holistic approach to athlete development. This includes emphasis on ethics, fair play and character building throughout the various stages, an objective that reflects Canadian values. Programming should be designed considering athletes' cognitive ability to address these concepts.

6) Periodization

Simply put, periodizing is time management. As a planning technique, it provides the framework for arranging the complex array of training processes into a logical and scientifically-based schedule to bring about optimal improvements in performance.

Periodizing sequences the training components into weeks, days and sessions. Periodization is situation-specific, depending upon priorities and the time available to bring about the required training and competition improvement. In the LTAD context, periodization connects the stage the athlete is in to the requirements of that stage.

The terminology that describes the smaller subsets of time (organized blocks of training or competition into meso and micro cycles). Meso cycles are usually three to four weeks, while micro cycles are, by convention, usually just seven days.

Periodization organizes and manipulates the aspects of modality, volume, intensity and frequency of training through long-term (multi-year) and short term (annual) training, competition and recovery programs to achieve peak performances when required.

Single, double, triple and multiple periodization formats follow the same principles with frequently introduced preventative breaks; that is, programmed and prioritized recovery and regeneration elements.

Periodization, far from being a single fixed process or methodology, is in fact a highly flexible tool. When used appropriately in conjunction with sound methodology and ongoing monitoring and evaluation, it is an essential component in optimal sports programming and athlete development at all levels.

LTAD addresses this requirement by developing periodization models for all stages, taking into consideration the growth, maturation and trainability principles that are unique to the primary

development stages – the first two decades of life – yet seamlessly integrate with the subsequent stages of athletic performance and life.

LTAD is typically a 10 to 12-year process that optimizes physical, technical, tactical (including decision making) and mental preparation, as well as the supporting ancillary capacities. Within LTAD is quadrennial planning; this refers to the four-year Olympic and Paralympic cycle for elite athletes, and the annual plan, which is based upon identified periods of athletic preparation, competition and the transition into the next calendar plan.

7) Competition

Optimal competition calendar planning at all stages is critical to athlete development. At certain stages, developing the physical capacities take precedence over competition. At later stages, the ability to compete well becomes the focus.

Active Start- No specific ratios – all activity based off developing physical literacy and child’s passion to play and participate.

FUNDamentals- All activities are FUN-based and include some structured competition.

Learn to Train- 70% training to 30% competition-specific training and actual competition.

Train to Train- 60% training to 40% competition-specific training and actual competition.

Train to Compete- 40% training to 60% competition-specific training and actual competition.

Train to Win- 25% training to 75% competition-specific training and actual competition.

Active for Life- Based on individual’s desire.

Key points to consider:

- Optimal sport-specific competition ratios are required for all stages of LTAD.
- Level and length of the competitive season should be aligned with the changing needs of the developmental athlete progressing through LTAD.
- Over-competition and under-training at the ‘Learn to Train’ and ‘Train to Train’ stages result in a lack of basic skills and fitness.
- The appropriate level of competition is critical to technical, tactical and mental development of all stages.
- Schedules are often set for team sports by leagues and organizations and not by the coach and athlete, making optimal training based on periodization difficult. For individual sports, individual competition schedules can be selected by the coach and athlete based on the athlete’s developmental needs.
- The current competition structure is based on tradition. It should be planned to enhance optimal training and performance of the athlete depending upon their LTAD stage.
- Competitions in Canada must be created and scheduled strategically, with due regard for the optimal performance of an athlete and their tapering and peaking requirements.

- Optimal training-to-competition ratios for individual sports vary greatly and must be determined on a sport-specific basis.
- While International and National calendars are usually well integrated, a systematic sport-specific competition review needs to be undertaken. This is one of the biggest challenges for team sports and a significant challenge for individual sports in LTAD design and implementation.

The area of competition format is where the art of design builds on the science of sport. There is no standard design – no easy answer – because there are both a multitude of situations and solutions. The intent is to design a competition that considers the principles of successful tiers while putting children’s enjoyment of sport first. Creating the right competition format is critical because we know that those who stop enjoying a sport stop participating and lose out on future improvement and long-lasting health benefits.

The first challenge in competition design involves the grouping of the participants. Typically, this is done based on chronological age because it is the easiest option from an administrator’s perspective. However, such groupings create large disparities because of the various rates at which children develop. As discussed earlier, meaningful competition can be achieved by creating groups that are tiered based on skills. This allows some athletes to play up and, in sophisticated programs, to play down.

Among the weaknesses in grouping based on chronological age is the fact that experience is not considered (e.g., of two 9-year-old soccer players, one may have seven years of experience; the other, two years). Further, this sort of grouping creates a fixed cutoff date resulting in the relative age effect. In individual sport, the relative age effect can be addressed by basing competition off the athletes’ age on the competition date (e.g., all the 9-year-olds jump against each other instead of all the kids born in 2008 jumping against each other). Then, instead of having a cutoff date such as January 1st, all the children of a birth year compete against each other regardless of the date. By using athletes’ age on a date, kids compete against others of their age at the time of the competition. In this way, kids can be the oldest or the younger and in the middle of the age grouping, thus eliminating the birth month bias where kids are either always the oldest, middle, or youngest depending on their birthday.

This is a problem that Ski Jumping and Nordic Combined Ski Canada is actively trying to rectify for our younger athletes. Note that as athletes progress up in the hill size, this becomes less of a factor. We are dedicated to ensuring fair competition and experiences that birth fun-based progress while granting athletes’ healthy experiences that inspire and further growth.

8) Excellence Takes Time

It has been suggested that a minimum of 10 years of practice (sometimes stated as 10,000 hours) is needed for expert performers in any field to reach the elite level (Ericsson, Charness, Feltovich, & Hoffman, 2006). Other evidence indicates that elite athletes require at least 11 to 13 years of practice to reach levels of excellence (Gibbons, Hill, McConnell, Forster & Moore, 2002). The essential lesson is the same: there are no shortcuts to achieving excellence.

Participant development is a long-term process and elite participants will require approximately a decade or more of practice to achieve international standing. As part of this process, short-term performance goals must never be allowed to undermine long-term athlete development (Viru, 1995).

For some sports, the road to excellence is not paved in hours, but through deliberate practice repetitions. Shooting or archery would be measured in number of shots an athlete has taken; golf would be measured in number of swings; in parachuting, an athlete's excellence is related to the number of jumps.

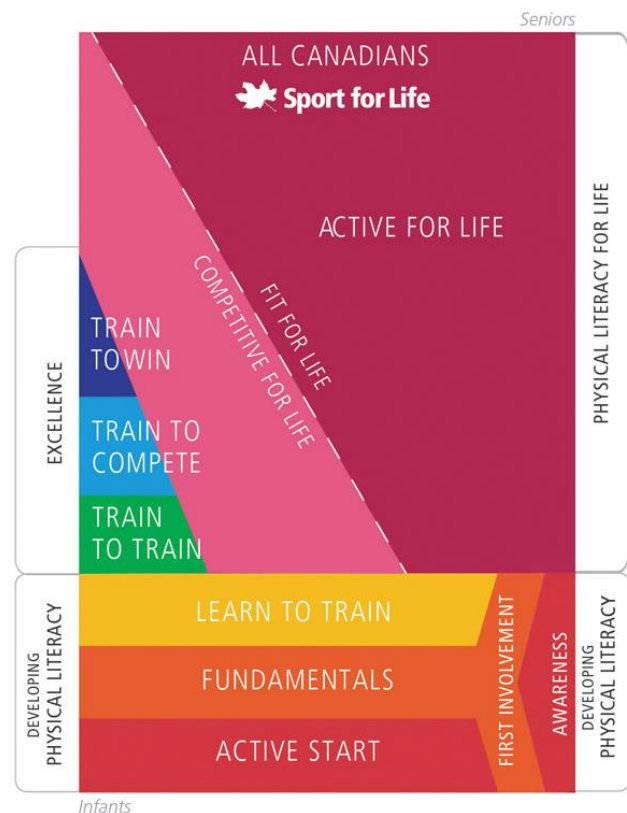
The United States Olympic Committee's 'The Path to Excellence' study (Gibbons et al., 2002) provides empirical evidence and a comprehensive view of the development of U.S. Olympians who competed between 1984 and 1998. The results reveal that:

- U.S. Olympians begin their sport participation at the average of 12.0 for males and 11.5 for females.
- Most U.S. Olympians reported an 11- to 13-year period of talent development from the time they began their sport to when they made an Olympic team.
- U.S. Olympic medalists were younger than non-medalists by 1.3 to 3.6 years during the first five stages of development, suggesting that medalists were receiving motor skill development and training during the skill hungry years.

Lately, the validity of the 10,000 hours has been questioned. It has been suggested that when athletes specialize in certain sports, they can achieve excellence in a much shorter period (Tucker, 2012). However, the three or four other sports the athletes participated in before they specialized has usually not been accounted for. LTAD emphasizes a multi-sport approach: all former activities should be included as they are an integral part of the 10,000 hours. Whether it is 10,000 hours, more, or less, excellence always takes time.

9) System Alignment and Integration

- CS4L- LTAD (Canadian Sport For Life-Long Term Athlete Development) is the core business of national, provincial/territorial and local sport organizations.
- CS4L- LTAD is a tool for change towards full system alignment and integration.
- A seamless, sport-specific LTAD should be based on national and international normative data, both sport-specific and sport science.
- LTAD plans for athletes with a disability need to be developed on a sport-by-sport basis considering the specific needs of individuals with a congenital or acquired disability.
- After a sport's LTAD design is completed, a sport-specific system of competition should be established that matches the competitive needs of developmental athletes during the 'Active Start', 'FUNdamentals', 'Learn to Train' and 'Train to Train' stages.



- LTAD is an athlete-centered approach designed around the needs of athletes and institutionalized by rationalization of the system by sport governing bodies.
- The process of designing and implementing LTAD programs is athlete centered, coach driven and administrative, sport science and sponsor supported.
- LTAD has a strong impact on the coaching education curriculum. Development readiness will replace ad hoc decision-making about programming preparation.
- Activities of schools, communities, clubs, PSOs and NSOs should be fully aligned with and integrated through CS4L-LTAD.

10) Continuous Improvement- Kaizen

The Ski Jumping and Nordic Combined Ski LTAD framework is based on the principle of continuous improvement, both in its dynamic evolution and in its application. The concept of continuous improvement is drawn from the respected Japanese industrial philosophy known as *Kaizen*.

LTAD is a dynamic framework that utilizes continuous adjustments based on key principles. Continuous improvement ensures that:

- CS4L-LTAD responds to and incorporates scientific, coaching and sport-specific innovations and observations and is subject to continuous research in all its aspects.
- CS4L-LTAD, as a continuously evolving vehicle for change, reflects all emerging facets of physical education, sport and recreation to ensure systematic and logical delivery of programs to all ages.
- CS4L-LTAD promotes ongoing education and sensitization of all stakeholders in the fields of sport, recreation, physical activity and education about the interlocking relationship between physical education, school sport, community recreation, lifelong physical activity and high performance sport.
- CS4L-LTAD promotes integration between sectors based on common principles and shared goals.

Consequently, all partners are invited to contribute to the ongoing evolution and development of CS4L-LTAD, for the benefit of all Canadians.

Stages of LTAD specific for the sports of Ski Jumping and Nordic Combined

The following statements and stage outlines are designed to help Ski Jumping and Nordic Combined Ski Canada's standing committees and members understand the recommendations for each specific stage of development. All Ski Jumping and Nordic Combined Ski programs must consider all developmental constructs to achieve the stage objectives. They are based on the vertical strength the LTAD pathway has developed based on the concepts, constructs, and related recommendations compatible with each stage's recommendations and objectives.

1) Active Start (Males and Female 0-6)

Learn fundamental movements and link them together into play. Physical activity is imperative for healthy child development. It enhances development for brain function, coordination, social skills, gross motor skills, emotions, leadership, and imagination. Physical activity also helps children to build confidence, positive self-esteem, maintain body weight, and helps build strong bones, muscles, increases flexibility, reduces stress, and improves fitness.

Physical activity should be fun and an exciting part of a child's daily life, rather than being something required. Active play is the way young children develop physical literacy.

The 'Active Start' period is fundamental in the Ski Jumping and Nordic Combined Ski LTAD as it provides the child a solid base to grow from and enjoy the sport with the tools needed. All activity in the 'Active Start' stage should be based off fun, and grow from multiple physical activities.

2) FUNdamentals (Males 6-9, Females 6-8)

This stage is dedicated to learning all fundamental movement skills and building overall motor skills. Skill development in the 'FUNdamentals' stage should be well-structure, positive, and FUN.

The first window of accelerated adaptation to speed occurs at ages 6 to 8 for girls and 7 to 9 for boys. Bypassing the specialized skill development in the 'FUNdamentals' stage is detrimental to the child's future engagement in physical activity and sport. No periodization takes place; however, all programs are structure and monitored.

If children later decide to leave the competitive stream, the skills they acquire during the 'FUNdamentals' stage will benefit them when they engage in recreational activities, enhancing their quality of life.



The 'FUNdamnetals' in relation to Ski Jump and Nordic Combined consist of focusing on the "10 S's" of Training and Performance. The priority and 'checklist' of skills are outlined in the appendix found at the end of this document.

Regarding Ski Jumping and Nordic Combined Ski development, **all physical activity**- which improves agility, balance, and coordination, **is the main training focus of this stage**. Flexibility (to develop and maintain an optimal range of motion) is one of the key focuses of this stage, alongside general aerobic development (which should be introduced through playing games).

- Speed/Power development should be based on agility, speed and multidirectional movement
- Summer activities: individual and team sports – running, biking, swimming, rollerblading, and basic gymnastics
- Winter activities: alpine skiing, cross-country skiing and ice skating

Sport Specific Objectives:

The main objective for this stage is to properly introduce children to sports of Ski Jumping and Nordic Combined with the goal of connecting them mentally with the sport they play.

ALL activities should be grounded in FUN and include some structured competition that emphasizes the process and technique. Travel should only consist of day trips and be based on having a joyful experience that emphasizes the process over results (for example: cross country, alpine skiing, biking, and hiking).

3) Learning to Train (Males 9-12, Females 8-11)

The main objective throughout the 'Learning to Train' stage is to learn overall sports skills. One of the most important periods of motor development for children is between the ages of 9 and 12. This is a window for accelerated adaptation to motor co-ordination.

Early specialization in late specialization sports can be detrimental to later stages of skill development and to refinement of the fundamental sports skills. It is important to note that Ski Jumping and Nordic Combined are classified as early specialization sports.

At this stage, children are developmentally ready to acquire the general sports skills that are the cornerstones of all athletic development.

The emphasis during 'Learning to Train' in relation to Ski Jumping and Nordic Combined consists of the '10 S's' of Training and Performance. The priority of skills and a skill checklist for this stage can be found in the appendix at the end of this document.

Sport Specific Objectives:

The main objective of this stage is to properly introduce the sports of Ski Jumping and Nordic Combined to the athletes with the goal of connecting them mentally with the sport they play.

- Teaching sport specific position (ski jumping) should be incorporated into warm up. Like the previous stage, all technical elements (in run, take-off, flight and landing) should be mastered **OFF THE HILL** at this stage.

- After 2-4 years, athletes should be able to jump with optimal technique (16.5 pts for style in competition), 35 meters on K38 from gate 4 Summer/Winter (without wind)/ 55m on K63 from any gate (without wind). (Coaches: or 90% of K-point from a competition gate?)
- Cross Country Skiing should be incorporated into training 3-4 times a week, consisting of 40-60 minute sessions. Technique should be a special focus but for no longer than 20 minutes at a time.
- After 2-4 seasons, athletes should be 90% proficient with cross-country technique (Left-Right hand off-set, one and two skate).
- An introduction and integration of mental training into specific practices:
 - Team building, goal setting
 - Relaxation skills
 - Focus skills should start to develop (both on and off the hill)
 - Training journals and online tracking are introduced into the athlete's normal routine
- An athlete's season at this stage should consist of 70% training and 30% competition-specific training. Competition should be conducted locally (aside from the occasional trip down to Park City, USA for events such as the *Spring Tournee*). All training should be firmly coach run, based on having fun, and process-driven.

4) Training to Train (Males 12-16, Females 11-15)

The main objective of this stage is to build an aerobic base, develop speed and strength towards the end of the stage, and further develop and consolidate sport specific skills.

Training year runs from May 1st to March 31st; athletes will be granted several off weeks throughout the year for mental and physical regeneration (family vacations, school commitments, etc.). These off-weeks should be communicated in advance and are a part of the periodization and yearly training program created by an athlete's coach.

During 'Training to Train', young athletes consolidate their basic sport-specific skills and tactics. This is a window of accelerated adaptation to aerobic, speed, and strength training.

Optimal aerobic trainability begins with the onset of PHV, the major growth spurt during maturation.

During competitions athletes play to win and to do their best, but the major focus of training is on learning the basics as opposed to competing.

This is the most challenging and critical stage for Ski Jumping and Nordic Combined athletes as it encompasses both opportunity and vulnerability in terms of growth and development. This is the period where athletes tend to undergo physical changes at a faster rate than when they were younger. Flexibility, posture and technique become very important. At this time of accelerated growth, these elements can be compromised through a reduced range of motion, which creates abnormal physical movement patterns. Supervision and monitoring becomes critical as these changes occur. Although the volume of training increases, quality and performance decreases are common during this time. This LTAD actively tries to lay a foundation to combat this trend in performance.

The emphasis during ‘Training to Train’ in relation to Ski Jumping consists of the ‘10 S’s’ of Training and Performance. The priority of skills, alongside a skills checklist can be found in the appendix at the end of this document.

Physical literacy objective in this stage surround the development of endurance, strength, speed, and sport specific skills and fitness. As athletes are hitting their Peak Height Velocity (PHV), ability and mobility are very important focuses throughout this stage.

The importance of warm up, cool down, mobility, nutrition and mental skills are essential to the performance and critical for success at this stage. An athlete’s coach should have good communication skills and a program that emphasizes these factors.

Sport Specific Objectives:

Psychological training objectives should be almost engrained and athletes should be comfortable maneuvering and honing them with their coach. Proficiency in mental skills should be the norm and not the exception at this stage, especially when analyzing competition simulation drills.

Competition at the ‘Training to Train’ stage should take up 40% of the season, with 60% of training dedicated to preparing and executing competition simulations.

- 4-6 Club and National Level Competitions.
- 2-4 NorAm club level competitions.
- Park City, Utah, USA (for summer camps range from 1x for 12-13 year olds, 2x for 14-16 year olds).
- Steamboat or Park City trips (for athletes 13+ range from 1-2x a season).
- Whistler- only athletes who can consistently jump 90% of K89m, 3 out of 4 jumps with restricted speed).

5) Training to Compete (Males 16+, Females 15+)

The main objective of this stage is to consistently prepare, perform, compete, and optimize the athlete’s physicality (or ‘engine’). Position-specific skills are also a large part of this stage, and technique is of utmost importance.

All the objectives of ‘Training to Train’ must be achieved before the objectives of ‘Training to Compete’ can begin.

The main training season for the ‘Training to Compete’ stage runs from May 1st until March 20th. Within the season there are several off weeks which are dedicated to regeneration, and will be specifically built into the Yearly Training Program (YTP) and communicated to the athlete by his or her coach.

Specific training hours per week range between 15 and 20.

The emphasis during ‘Training to Compete’ in relation to Ski Jumping and Nordic Combined consists of the ‘10 S’s’ of Training and Performance, and a skills checklist for this stage can be found in the appendix at the end of this document.

The main Physical Literacy Objects consist of:

- Developing event specific physical preparation.
- Developing sport specific skills and fitness.
- Integrating physical, mental, cognitive, and emotional development.

Sport Specific Objectives:

- Number of jumps for the year: 500 to 600
- Jumping hill size and usage %:
 - Females: K63- 30%, K89- 60% and K120- 10%
 - Males: K63- 20%, K89- 60% and K120- 20%
- At this stage, the Ski Jumping sport specific stream will have a decrease in the volume of general physical training while weight/power training will become more sport specific.
- Nordic Combine's number of hours dedicated to endurance/aerobic during the year is 240- 260 hours
- At the end of the 'Training to Compete' stage athletes participating in Nordic Combined should have optimal cross-country skiing technique.

Psychological Training objects should be natural and engrained:

- Incorporating mental preparation into pre-competition routine
- Introduction of a professional sport psychologist (in a group setting)
- Refining of relaxation and focusing skills
- Proficiency with training journals/ online monitoring for physiological response to the prescribed training
- Continuing to pursue individual goals and benchmarks within the team setting

Competition/Travel:

An athlete's season should consist of 40% training to 60% competition specific-training and actual competition. When breaking this down to competitions, the itinerary looks like this:

- 4-6 Club and National Level competitions.
- 2-4 NorAm club level competitions:
- 2-4 FIS Cup, COCJ- COCNC - WJCH- (WC Females only if appropriate)
- Athlete selection is based on sport and physiological expectations.
 - BMI +2kg or less, or jump hill performance.
 - Jump specific performance expectation: 8 to 10 jumps (without wind) in Calgary.
 - Female: K63m, gate: 10, 60m +, K89, gate: 10, 90m.
 - Male: K63, gate: 8, 63m +, K89, gate: 8, 95m.

6) Training to Win (Males 21 +/-, Females 21+/-) (Consistent Performance)

The training year for 'Training to Win' athletes runs from the 1st of May until the 30th of March. In this stage training is broken down into periods depending on competition schedule and season (single, double and multiple). Event specific motor skills are refined.

Training hours range from 20 to 30 depending on the YTP which should be communicated to the athlete from their coach.

Ski Jump Sizes:

- COP – K89 Jump (Closed)
- WOP – HS 106, HS 140, HS 20, HS 40 (HS 106 , HS 140 not available for training HS 20, HS 40 only available ~12 days a year in winter)
- International travel only option for summer training and HP training on HS 106 or HS 140.

The main objective in this stage is to achieve podium performances. Maximize fitness preparation and sport specific skills as well as performance. ‘Training to Win’ is the final stage of athletic preparation.

All the athlete’s physical, technical, tactical (including decision-making skills), mental, personal, and lifestyle capacities are fully established and the focus of training has shifted to the maximization of performance.

World class able-bodied and disability sport performances require world-class equipment that is fine-tuned to the demands of the event and the requirements of the athlete.

Physical Literacy Objectives (Development Phase):

- Maximize event specific preparation for high performance results.
- Continue with integration of physical, mental, cognitive and emotional development.
- Strive for competitive consistency, especially in high pressure situations.
- Introduce a formal IST member (e.g. massage, physiotherapy).
- The athlete is transitioning into a “full time” and elite athlete.

Physical Literacy Objectives (Elite Phase):

- Maximize event specific preparation for results at the Olympic Games, World Championships and World Cup level.
- Maximize training for performance, competition and recovery activities in support of an elite athletics career.
- Achieve competitive consistency, especially in high pressure situations.
- Work with IST to maximize performance.
- Plan for retirement from athletic career/competition (integration of ‘Game Plan’ initiatives).

Sport Specific Objectives

- Number of Jumps for the year: 400 to 500.
- Jumping hill size and usage %:
 - Females: K63- 10%, K90- 80%, and K120 - 10%
 - Males: K89- 50% and K120- 50%

- Multiple training periods play the main role in designing sport specific training plans for Nordic Combined athletes. These times will be communicated to the athletes by their coaches and should be based on their scientifically-grounded YTP.

Psychological Training objects (should be naturally engrained and consistently fine-tuned):

- Mastering mental training as a part of pre-competition and competition routine.
- Individual professional sport psychologist integration.
- Applying all mental skills to training and competition.
- Maintenance of training journals and online monitoring (to track physiology and its effects).
- Continue to pursue individual goals and benchmarks within a team setting.
- Preparation of exit strategy from High Performance sport and integration into life (in alignment with 'Game Plan' initiative) .

Competitions

- An athlete's year in the 'Training to Compete' phase should consist of 25% training to 75% competition-specific training and actual competition.
- Competition quantity per year, for specific purpose depending on the athlete's specific development:
 - 1-2 National Level competitions
 - 20-24 World Cup, World Championships, Olympic Winter Games

7) Active for Life (Enter at Any Age)

This stage focuses on an athlete's smooth transition from their competitive career to lifelong physical activity and participation in sport. It's important that throughout all stages we encourage an active lifestyle so that when an athlete decides to transition from competitive SJ/NC that we have provided them with a basis of physical literacy to continue an active lifestyle.

Canada's sport system should encourage athletes to move from on sport to another because of their ability to transfer athletic literacy and skills. For example, a sprinter retires from athletics and picks up bobsled, or a 12-year-old basketball player discovers canoeing.

A positive experience in sport is the key to retaining athletes after they leave the competition stream. Sport must make a paradigm shift from cutting athletes to re-directing them to sports where they are pre-disposed to train and perform well.

We also encourage retiring athletes to stay connect with the SJ/NC community by actively volunteering, becoming an official or competing for fun.

Physical Literacy Objectives

- To develop a solid base of physical skills as required in SJ/NC or any other sport.
- Activity which improves agility, balance and coordination are the main training focus at this stage.
- Flexibility is integral to maintaining an optimal range of motion.

- General aerobic development should be delivered mainly through activities that are fun.
- Speed/Power development should be based on agility, speed and multidirectional movement.

Sport Specific Objectives

- Number of jumps per year: athlete dependent.
- Number of competitions per year: athlete dependent.

Summary of the Developmental Constructs

Physical Anatomical Developmental Constructs

- Pre-puberty stages of development have no need to have gender specific events/competitions.
- Puberty is a period of rapid growth during which the length of limbs may grow rapidly, therefore severely challenging skills development.
- Puberty is a time of maximal individual differences within a chronological age.
- During puberty, there is a need to minimize the chronological age differences between individuals.
- Post puberty, most growth is complete.
- Post puberty stages of development require gender specific competitions.

Physiological Developmental Construct

- Windows of trainability should be a major determinant of Ski Jumping Canada's competition and event activities for each developmental stage.

Neurological Developmental Constructs

- Events, competitions and activities should focus on physical literacy as well as ski jumping skills during the late childhood stage.
- The neurological system is almost fully developed when the child starts puberty.
- Activities should account for neurological maturation especially agility, balance, co-ordination and flexibility during the late childhood developmental stages.
- Precision in skills can be achieved due to the relatively advanced neurological development.

Cognitive Developmental Constructs

- It is important to note that cognitively, participants are *children* and are *not* miniature adults during the 'FUNdamentals' and 'Learning to Train' developmental stages.
- Children's ability to focus on dynamic issues is limited until they reach late puberty.

- Competition requires ability to analyze performance. Until early puberty, competitions should be managed so children are able to analyze their success and failure.
- The transitions from ‘Learning to Train’ to ‘Training to Train’ includes the child gaining the understanding on where they rank competitively within a group. They form an opinion on whether they are good or not.
- Until the later stage of puberty children are generally not capable of having a complete understanding of rules and the ability to interpret them.

Self-Concept and Self Esteem Developmental Constructs

- As self-concept is developing, events/competition must be meaningful and fair (i.e. each child must have a reasonable chance to succeed).
- Self-concept should be well established and is an important factor in having the ability to compare and interpret winning/losing.
- Children start to self-actualize with self-expression being important during late adolescence.
- Body image, self-esteem and clothing are interlinked.

Social Affiliation and Play Stage Developmental Constructs

- For preschool children, primary affiliation is with parents and this gradually changes to significant others and peers by the teenage years.
- At 10 years of age children reach a stage where team sports are important.
- At 12 years of age children start to have individualized leisure preferences.
- Sports needs to offer a strong social environment during all stages of development.
- The social environment is especially important during the early teenage years.
- By early adulthood (15 years and older) they have the capacity for self-actualization.
- By early adulthood (15 years and older), there is also a need to be self-directed and independent.
- By late adolescence teenagers are starting to make decision regarding school and career which must be balanced with sport.

Role of Competition Developmental Constructs

- Competition can be categorized into three types: “Performance Competitions”, “Developmental Competitions” and “Simulation Competitions” based on the objectives for the competition and how the competition results are used.
- There must be clear enunciated objectives for each competition related to the relevant stage of developmental objectives.
- The way competition results are used must be considered in an athlete’s long-term development plan.

Periodization and Competition Developmental Constructs

- Physical literacy including physical development take precedence over competition, periodization and the competition calendar for the early stages of development (‘Active Start’ to ‘Learning to Train’).
- There will be a transfer from a priority of developing physical capacities to competition for the ‘Training to Train’ and ‘Learning to Compete’ stages of development.

- The ability to compete becomes the focus for periodization and the competition calendar for the later stages ('Training to Compete' and 'Training to Win').
- Different jump heights should be integrated in Ski Jumping until the 'Training to Train' stage of development.
- Periodization and competition calendar must be taken into consideration in the planning of feature events and competitions.
- There must be an emphasis and opportunity to develop competitive strategies and skill to meet the basic objective for the 'Training to Compete' and 'Learning to Compete' stages of development.
- 'Competition Training' will be a priority and periodization a critical part of the planning process for the 'Learning to Win' and the 'Training to Win' stages of development.
- The competition calendar must consider periodization for each stage of development.
- The competition calendar must consider life style and personal development factors such as education and examination schedules.
- Selection policies and championships must be compatible with each stage of development.

Relative, Biological and Chronological Age Developmental Constructs

- Biological or maturational age is an important factor to consider in grouping athletes particularly during puberty but is not practical for establishing age categories.
- Biological or maturational age is observable and easily measured, however, it does not necessarily reflect maturity in other domains such as social and psychological maturation. Therefore, decisions should include biological age but must consider the other developmental domains.
- Minimizing the effect relative age will improve the fairness of chronological age categories. The objective is to offset the relative age effect for individuals with birthdays close to the arbitrary age category date.
- Another option is a definition of chronological age being the age in years at the first day of an event/competition. This would mean almost random changes from week to week and a championship could be defined by the date of the event/competition.

Gender Differences and Age Developmental Constructs

- Boys and girls should participate together in the same activities and jumps for the 'Active Start', 'FUNdamentals' and 'Learning to Train' stages.
- Competitions and jumps should be in gender specific categories for 'Learning to Train', 'Learning to compete', 'Training to Compete', 'Learning to Win', 'Training to Win' and 'Active for Life' stages of development.
- Other formats such as 'Ability' or 'All Points' competitions could still be useful at local club levels for all stages of development.

Impact of Canadian Sport for Life (CS4L) Long-Term Athlete Development

On Parents

Few parents who were physically inactive as children become active as adults. Inactive adults tend to result in inactive children and the reverse is also true. Encouraging children to enjoy moving and promoting confidence in movement skills at an early age helps to ensure later participation in physical activity.

CS4L, including LTAD, can help to:

- Provide a framework for parents to understand physical literacy and its implications on a healthy lifestyle through lifelong physical activity and on competitive sport involving for all Canadians, including those with a disability.
- Facilitate the understanding of physical, mental, cognitive and emotional development.
- Facilitate the understanding of special requirements such as proper hydration, nutrition and recovery for the growing child.
- Enable parents to help children to choose a pathway in physical activity and sport.
- Encourage parents to understand and support changes in the competition schedule and structure of their child's sport.

On Coaching

To be successful, an athlete development framework such as LTAD requires highly skilled, trained or certified coaches who understand the stages of athlete development and the various interventions that should be made.

CS4L, including LTAD, can help you to:

- Have a significant impact on coaching education curriculum and sport-specific coaching education by NSOs.
- Identify a need for part-time and full-time coaches who will specialize in coaching developmental athletes.

On the Sport System

The Canadian Sport Policy 2012 contains five major goals and five major outcomes:

Goals:

1. Introduction to sport
2. Recreational sport
3. Competitive sport
4. High performance sport
5. Sport for development

Outcomes:

1. Excellence
2. Enhanced education and skill development
3. Improved health and wellness
4. Increased civic pride, engagement and cohesion
5. Increased economic development and prosperity

CS4L, including LTAD, will ensure:

- An increasing number of children develop physical literacy resulting in the improved health and wellness of society.
- That a significantly higher proportion of Canadians from all segments of society are involved in quality sport activities at all levels and in all forms of participation.
- A great number of children will have an athletic foundation that can be developed through developmentally appropriate training, competition and recovery programs towards achieving world-class results at the highest level of international competition through fair and ethical means.
- That the essential components of an ethically based, athlete/participant-centred development system are in place and are continually modernized and strengthened as required; the components of the sport system are more connected and coordinated as a result of the committed collaboration and communication amongst the stakeholders.

These goals can be achieved through the system-wide integration for Canadian Sport for Life including Long-Term Athlete Development.

CS4L, including LTAD, can help you to:

- Signal radical changes to the structure and delivery of programs.
- Cause realignment or rescheduling and restricting of competition calendars.
- Provide clear pathways for athlete/participant progression.
- Help athletes attain higher and more sustained levels of success.
- Provide athlete-centred planning and decision making.
- Provide a basis on which to monitor and evaluate the effectiveness of programs.
- Provide a framework so that all stakeholders understand their role in programming interventions at each stage.

Summary

Ski Jumping and Nordic Combined Ski Canada's Guiding Principles for Competitions and Events

Competition is central to the Ski Jumping and Nordic Combined Ski experience, enabling participants to jump and compete at all stages of development. Event/competition experiences offers members many things: for athletes, an opportunity to measure the impact of practice, improvement of skills, and a battle of wits as each uses different tactics; for coaches, an opportunity to evaluate program effectiveness; for volunteers, officials and event organizers, an opportunity to provide a sense of pride and accomplishment, develop personal skills and hone team organizational skills. For all, competition provides an opportunity for social interaction, an incentive to work for further improvement, and an opportunity to gauge one's improvement against one's self and others.

Competition: Servant or Master

It is natural that coaches, parents, and athletes want to win; competition often drives training, dictating the type, volume, intensity and frequency of training. In an individual sport winning and personal best times are the most obvious and often thought of as important benchmarks for success. However, the objectives of each stage of development must also be considered in defining events/competitions and the establishment of benchmarks of success.

The primary objectives of physical and sport literacy – critically important for younger participants and the basic skills and knowledge which form the foundation for long term success – must be considered at least as important as winning. At the early developmental stages, physical and sport literacy goals are more appropriate than winning for long-term development as both a person and as an athlete. If **competition** is to be a **good servant** rather than a **poor master**, the nature of the activities in ski jumping events and competitions should reflect the appropriate goals for each developmental stage, including reinforcement of social, psychological and physical development objectives. Ski Jumping must provide events/competitions appropriate for athletes in each stage of development from the 'Learning to Train' through the 'Training to Win' stages of development as part of *Canadian Sport for Life*, for lifelong participation in skating from the local to international levels.

In short, LTAD is about developing athletes the right way – with a long-term, systematic approach that centers on what an athlete truly needs to be successful and healthy. The LTAD framework arms parents, coaches and athletes with educated guidelines to craft a solid foundation of physical literacy and fitness needed to propel an athlete/would-be jumper to competitive success and/or lifelong health, well-being, and enjoyment of sport.

The widespread implementation of the Ski Jumping and Nordic Combined Ski LTAD framework would unite the SJ/NC organizations (clubs, Provincial and National Sport Organizations) in employing a consistent programming philosophy and a design strategy created to capitalize on key development windows, where possible, and help athletes hone the physical, mental and tactical skills critical to Ski Jumping and Nordic Combined success. Positive communication and collaboration between SJ/NC organizations around the LTAD framework would also allow for creative approaches to talent identification and recruitment to be generated, and potentially for the development of novel opportunities to engage young athletes in SJ/NC-based or related activities earlier.

Long Term Athlete Development

Canadian Sport for Life through **LTAD** is a national program developed to be the basis of planning for sport excellence and well-being of Canadians. The LTAD is a recent model based on current scientific information available on children and adults. Ski Jump and Nordic Combined Canada use the LTAD model to provide appropriate developmental-stage programs. Fundamental to the long-term development of individuals is an event/competition system compatible with and reinforces the objectives and outcomes of each LTAD developmental stage.

- A paradigm shift in the way Canadian sport is designed and delivered, and gives meaning to the concept of an athlete-centered approach.
- A philosophy and a vehicle for change.
- Athlete-centered for a child's first involvement in sport to the transition to lifelong physical activity or other sport related activities, and includes development of athletic performance to the highest level of which the individual is capable and to which they desire to aspire.
- Integrates the needs of athletes with a disability into the design and delivery of sport programs.
- Provides a framework for reviewing current practices, developing new initiatives and standardizing programs.
- Establishes a clear development pathway from playground to podium and to being active for life.
- Identifies the shortcomings in Canada's sport system and provides guidelines from problem solving.
- Provides guidelines for planning for optimal performance at all stages of athlete development.
- Provides key partners with a coordinated structure and plan for change.
- Identifies and engages key stakeholders in delivering quality sport and physical activity programs in sport, recreation, education and health.
- Provides an aligned and integrated framework for delivering systems including:
 - Long-Term Athlete Development: technical, physical, tactical and behavioral
 - Long-Term Coach Development
 - Long-Term Officials' Development
 - Long-Term Community Development
 - Long-Term Volunteer Development
 - Sport and physical activity programs and services in NSOs, PSOs, recreational organizations, clubs and schools.

Ultimately, through the application of the SJ/NC LTAD framework, it is hoped that a strong team of Ski Jumping and Nordic Combined athletes, capable of achieving and repeating podium-worthy performances, can be developed, and will raise the bar of performance on the world stage.

Appendix: Skill Checklists

Active Start

Physical activity should be fun and an exciting part of a child's daily life, rather than being something required. Active play is the way young children develop physical literacy. All activity within 'Active Start' should be based off fun, and grow from multiple physical activities.

FUNDamentals

Ski Jumping	Description	Completed
Training Hours Per Week		
Skill Development – Speed		
Skill Development – Strength		
Skill Development – Flexibility	The athlete demonstrates and understanding as to why flexibility is important in ski jumping,	
	<u>Advanced:</u> Athlete demonstrates resounding (what does this look like) knowledge regarding the importance of flexibility.	
	<u>Advanced:</u> Athlete can touch their toes with one hand while their knees are straight. They can maintain this position for 20 seconds.	
Skill Development - Balance	<u>Advanced:</u> Athlete has a good sense of balanced skiing on 1 ski down the K18/K38 landing hill.	
Skill Development – Technical		
In Run	Demonstrate the 5 main points of in-run position (both on and off the ski hill).	
	Control his/her skis and has good balance while skiing down the landing hill in the in-run position. The athlete can hold the position through a transition curve, can coordinate his/her arms, legs, and body movements.	
	<u>Advanced:</u> Able to do 3 correct in-run-up-in-run on the k18 and k38 landings.	
Take Off		
Flight	The athlete understands the 'V-Idea'.	
	Demonstrate that they jump with their ski tips wider than the tails.	
Landing	Demonstrate the telemark position (both on and off the ski hill).	
	Knows the difference between coming to a stop on sawdust, grass or snow.	
	Athlete knows how to fall and recovery safely (falling to the side, back and offset forward).	

	Most of their jumps (80%) on K-18 are past 7 meters can we word to be X% of hill size	
	Advanced: athletes [at this stage] demonstrate that 80% of their jumps are past 10 meters (or % of hill size) with telemark and “V” and that some of their jumps are past 12.5 meters with a telemark and “V”	
	Advanced: telemark set on the K18/ K38 landing - hold tele through transition curve!	
	Advanced: Able to do 3 tele-up-tel/hop-tele on the K18/ K38 landing.	
Team Relations		
Sport Psychology	(mental preparedness, journaling, relaxation, focus, etc.)	
Training Tool: Video Analysis		
Training Tool: Imitations	Advanced: Athlete knows, understands, and can demonstrate the 6 phases of the ski jump and can show all of them using imitations.	
	Advanced: Athlete can properly perform in-run imitations (5 x 5 second in-run sets on at; from 8” to 20” high box, drop right into a correct in-run position	
	Advanced: Athlete can quickly switch from the flight position to the telemark position jumping off a bench (10 out of 10 telemark landings off a 15” bench	
Training Tool: Gymnastics	Athlete has practiced their balance and coordination through gymnastics on the trampoline (including flight position and telemark landing),	
	Athlete has practiced their balance and coordination through gymnastics on the the balance beam (walk on toes one way, turn around, walk back; flight position and reverse telemark imitations).	
	The floor- 5 forward rolls, 5 backward rolls.	
Testing	Need details on the types of tests and target scores?	
Other	Understands (and obeys) hill etiquette	

Nordic Combined (Cross Country)	Description	Completed
Training Hours Per Week		
Skill Development – Speed		
Skill Development – Strength	Advanced: Athlete has a good balanced stance over their skis	
Skill Development - Stamina	Advanced: Athlete can adequately skate ski and ski continuously for 15 minutes using the offset and two skate style.	
Skill Development – Flexibility		
Skill Development – Technical		

Cross Country Skiing	Athlete can adequately maneuver with cross country skiing equipment.	
	While cross-country skiing, athlete can climb up hill utilizing the herringbone ski technique, and can demonstrate both classic and skating style while cross country skiing.	
	<u>Advanced:</u> Athletes can do skate style and maintain good balance while cross country skiing.	
	<u>Advanced:</u> Aware of 6 Phases/Ability to demonstrate basic technique of the offset /2 skate skiing styles.	
	<u>Advanced:</u> Athlete can skate ski lightly up hills without stopping and feels confident while going down a small hill.	
	<u>Advanced:</u> I can use double poling technique while skating on the flats and light downhill.	
	<u>Advanced:</u> Athlete skis confidently while making turns and cruising over a series of rollers.	
	<u>Advanced:</u>	
<u>Training Tool: Video Analysis (?)</u>		
Testing	<u>Need details on the types of tests and target scores?</u>	
Other	Understands (and obeys) cross country course etiquette	

Learning to Train

Ski Jumping	Description	Completed
Training Hours Per Week		
Skill Development – Speed	Athlete can run 20 meters in less than 4.5 seconds	
	<u>Advanced:</u> Athlete can run 20 meters in 4.0 seconds	
Skill Development – Strength	Athlete can jump over 140 cm – two feet together	
	<u>Advanced:</u> Athlete can jump over 170 cm – two feet together	
	Athlete can do 5 sets of 20 squats with 30” break in between,	
	Athlete can hold the in-run position for 1 minute.	
Skill Development - Balance	On the balance beam- athlete can hop up and set in a telemark landing.	
Skill Development – Flexibility		
Skill Development – Technical		
In Run	Athlete can control their skis, has good balance while skiing down the landing hill in the in-run position, and can hold it through the transition curve.	
Take Off	Athlete demonstrates the fundamentals and knowledge as to why the take-off movement is the most important part of the jump.	
	At least 80% of the athlete’s jump timing is well controlled. The athlete’s shoulders and arms are in control; and they only use their legs to power the jump.	
	Athlete locks their legs and pulls their toes to enter the flight position;	
	Athlete can adjust the direction of take-off according to the size of a jump (k-18 and k-38).	
Flight		
Landing	The athlete can coordinate their body movements and know the difference between coming to a stop on sawdust and snow.	
	The athlete can telemark in difficult conditions through practicing the following: a. From an 8” to 20” high box placed before the incline.	
	The athlete knows how to lift one leg to the flight position and drop into the telemark position.	

	At least 80% of the athlete's jumps on the k38 are past the 25m with the telemark and "V" (28m with the telemark and "V" for "Gold R").	
	<u>Advanced:</u> At least 80% of the athlete's jumps on the k38 are past the 28m with the telemark and "V"	
Team Relations		
Sport Psychology	(mental preparedness, journaling, relaxation, focus, etc.) details	
Training Tool: Video Analysis		
Training Tool: Imitations	Athlete can perform a take off well in imitations (off the hill).	
Testing	Need details on the types of tests and target scores?	
Other		

Nordic Combined (Cross Country)	Description	Completed
Training Hours Per Week		
Skill Development – Speed		
Skill Development – Strength		
Skill Development - Stamina		
Skill Development – Flexibility		
Skill Development – Technical		
Cross Country Skiing	Athlete can switch between the two skate and off set skate techniques according to terrain demands.	
	They understand the dynamics and timing of weight transfer in skate skiing.	
	Athlete can switch between slow, medium speed and sprint according to the terrain specifications and part of the race course.	
	The athlete's upper/lower body movements are fully coordinated and they demonstrate a good sense of balance in skate skiing.	
	The athlete can also glide 10m on one ski without falling or touching the snow.	
<u>Training Tool: Video Analysis (?)</u>		
Testing	Need details on the types of tests and target scores?	
Other		

Training to Train

Ski Jumping	Description	Completed
Training Hours Per Week		
Skill Development – Speed	Athlete can sprint 30 meters in 5.3 seconds.	
Skill Development – Strength	Athlete’s long jump is over 180cm; three long jump attempts are over 540 cm.	
	Athlete can do 10 single leg squats on each leg,	
Skill Development - Balance		
Skill Development – Flexibility	flexibility is over 5 cm (can reach under feet with hands when standing on a bench).	
Skill Development – Technical		
In Run	Athlete effectively pulls of the bar into the in-run set and holds the proper balanced in-run position until the take-off.	
Take Off	They can control their timing and direction at takeoff 90% of their jumps.	
Flight	Athlete is quick to get into the flight position.	
	Arms are quiet and flight remains stable through landing.	
	The athlete does the “V” in 100% of their jumps.	
Landing	80% of the athlete’s jumps on the k-38 are past 35 m with telemark and past 45 meters on the k-63.	
Team Relations		
Sport Psychology	(mental preparedness, journaling, relaxation, focus, etc.) details	
	They are 100% focused when ski jumping, cross country skiing or doing imitations.	
	Athlete has developed their own race day start routine, and is aware of the importance of mental training and can use some elements of it in regular practices and competition day.	
Training Tool: Video Analysis		
Training Tool: Imitations		
Testing	Need details on the types of tests and target scores?	
Other	Athlete understands the basics of good nutrition and how to fuel and athletic body while training.	

	Athlete understands how their jump is scored	
Nordic Combined (Cross Country)	Description	Completed
Training Hours Per Week		
Skill Development – Speed		
Skill Development – Strength		
Skill Development - Stamina	Athlete can ski continuously for 25 minutes easily while using a variety of skate skiing techniques.	
Skill Development – Flexibility		
Skill Development – Technical		
Cross Country Skiing	Athlete’s stance is balanced and whole-body movements are well coordinated.	
	Athlete looks for speed and knows how to pace herself properly, so she skates efficiently from start to finish.	
Training Tool: Video Analysis (?)		
Testing	Need details on the types of tests and target scores?	
Other		

Training to Compete

Ski Jumping	Description	Completed
Training Hours Per Week		
Skill Development – Speed		
Skill Development – Strength		
Skill Development - Balance		
Skill Development – Flexibility		
Skill Development – Technical		
In Run		
Take Off		
Flight		
Landing		
Team Relations		
Sport Psychology	(mental preparedness, journaling, relaxation, focus, etc.) details	
Training Tool: Video Analysis		
Training Tool: Imitations		
Testing	Need details on the types of tests and target scores?	
Other		

Nordic Combined (Cross Country)	Description	Completed
Training Hours Per Week		
Skill Development – Speed		
Skill Development – Strength		
Skill Development – Flexibility		
Skill Development – Technical		
Cross Country Skiing		
Training Tool: Video Analysis (?)		
Testing	Need details on the types of tests and target scores?	
Other		

Training to Win

Ski Jumping	Description	Completed
Training Hours Per Week		
Skill Development – Speed		
Skill Development – Strength		
Skill Development - Balance		
Skill Development – Flexibility		
Skill Development – Technical		
In Run		
Take Off		
Flight		
Landing		
Team Relations		
Sport Psychology	(mental preparedness, journaling, relaxation, focus, etc.) details	
Training Tool: Video Analysis		
Training Tool: Imitations		
Testing	Need details on the types of tests and target scores?	
Other		

Nordic Combined (Cross Country)	Description	Completed
Training Hours Per Week		
Skill Development – Speed		
Skill Development – Strength		
Skill Development - Stamina		
Skill Development – Flexibility		
Skill Development – Technical		
Cross Country Skiing		
Training Tool: Video Analysis (?)		
Testing	Need details on the types of tests and target scores?	
Other		

Active for Life

This stage focuses on an athlete's smooth transition from their competitive career to lifelong physical activity and participation in sport. It's important that throughout all stages we encourage an active lifestyle so that when an athlete decides to transition from competitive SJ/NC that we have provided them with a basis of physical literacy to continue an active lifestyle.