



LTAD FRAMEWORK 2.1

Nurturing excellence from pool to podium



Preface

Canada Artistic Swimming was first introduced to "Shaping the Ideal NSO", a guide published by Sport for Life (S4L) in 2014. The guide recommended four steps for National Sport Organizations (NSOs) to follow as they "integrate Long-Term Athlete Development (LTAD) into their core operations". The four steps are further broken down into 21 components and 24 actions, and Sport Canada has linked completion of these identified actions to NSO funding support. Diligently, Canada Artistic Swimming followed these recommendations and implemented a National LTAD Implementation Task Force, comprised of one LTAD representative from each province, to begin the implementation of the components and actions.

In 2015, Canada Artistic Swimming initiated work on these components and actions by re-writing the existing Canada Artistic Swimming LTAD Framework, piloting the entry-level participant AquaGO! program in 17 clubs across Canada, developing the L2T and T2T competitive training programs, and collaborating with PSO Members to produce phase 1 of PLAN 42, a Federal-Provincial-Territorial supported project on aligning the judge's skill assessment matrix with the athlete skill development matrix. Throughout 2015-2016, Canada Artistic Swimming gathered feedback and recommendations for phase 2 of the AquaGO! program and Learn to Train Competitive program implementations via online surveys and e-meetings.

In the early part of 2016, as the updated Framework was being completed, S4L distributed a supplemental resource to "Shaping the Ideal NSO", entitled "Milestones: A Supplement for Shaping the Ideal NSO". The supplement aims to:

- Describe what the actions look like
- Define milestones for the 24 action areas
- Provide "Indicators of Quality" for these actions
- Help guide NSO LTAD Leads, Sport Canada Officers, and Sport for Life LTAD Experts

These steps, components, and actions are the essential building blocks for improving the quality of sport and physical activity in Canada.

The actions outlined by S4L for updating the original sport-specific framework LTAD framework are:

- 1. A rationale supporting the NSO's need to renew the LTAD framework
- 2. Implications of the '10 Key Factors' specific to the sport
- 3. General stage by stage overview
- 4. Detailed Athlete Development Matrix
- 5. Implications for key stakeholders
- 6. Summary

The "Indicators of Quality" can be viewed on p. 69-73 of the "Milestones: A Supplement for Shaping the Ideal NSO" document - (<u>http://canadiansportforlife.ca/resources/milestones-supplement-shaping-ideal-nso</u>)

Our framework resource will be measured against S4L's *"Indicators of Quality"* and all actions must meet or exceed expectations. These indicators of quality have been reflected in the content and design of Canada Artistic Swimming's Long-Term Athlete Development Framework 2.1, which introduces the guiding principles for change that will be implemented by Canada Artistic Swimming over the next quadrennial and beyond (see Implementation Plan on page 57).

PROVINCIAL ARTISTIC SWIMMING ASSOCIATIONS

























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INTRODUCTION

Dear Coaches / Club Executives / Provincial and Territorial Sport Organizations (PTSO's) / Aquatic facilities / Municipal Sport Organizations / Community Sport Organizations / Officials / Parents

Canada Artistic Swimming is committed to collaborating with its partners, members and registrants to create a unified "Artistic Swimming in Canada" family. Our strategic goal is to a build a structure where every person involved in artistic swimming in Canada is connected by the sport's governing body. With all participants in the sport connected, the sport as a whole will be in a stronger position to deliver a solid program aligned with Sport for Life and Sport Canada and the four pillars of the Canadian Sport Policy.

We hope this information will be of benefit to you in your attempt to focus on the development of artistic swimmers as they begin their journey to enjoying artistic swimming, no matter what level of success they achieve as either an amateur or professional athlete, as a lifelong sport.

This resource is an update of Canada Artistic Swimming Long-Term Athlete Development that, in the spirit of "Kaizen" or continuous improvement, builds on the original 2006 Canada Artistic Swimming Long-Term Athlete Development manual. It reflects both newer information, new programs, and lessons learned as Canada Artistic Swimming has worked to implement fundamental changes in the way quality sport is designed and delivered within artistic swimming. It is a work in progress, and as such, will continue to evolve. Enclosed you will find information pertaining to Canada Artistic Swimming's Long-Term Athlete Development Framework 2.1 and how to use it for the purpose of creating a development plan or philosophy for your club or association.

Canada Artistic Swimming believes every athlete should have the chance to participate in the sport of artistic swimming, to learn the skills of the sport, and be given the opportunity to achieve a sense of accomplishment through their participation. The goal of Canada Artistic Swimming is to ensure a meaningful, enjoyable experience for all athletes at all levels, by offering programming that allows our athletes to go about achieving the highest levels possible the right way, thus allowing them a better chance to succeed at the highest level of our sport. Canada Artistic Swimming's programming objectives are athlete-centered, without excluding considerations regarding financial and travel obligations.

Canada Artistic Swimming's Long-Term Athlete Development Program Objectives:

- 1. Standardize artistic swimming programs offered in pools across the country.
- 2. Offer inclusive programs for all.
- 3. Align programming with LTAD principles & teach the skills of the sport.
- 4. Offer opportunities for athletes to achieve a sense of accomplishment at the level of participation chosen.
- 5. Offer opportunities for athletes to participate at the highest levels of the sport.

The information in this document is meant to help artistic swimming clubs, organizations and aquatic facilities determine what their needs are and what programs they have at their disposal for the development of a successful artistic swimming program.

Important Note - Coaches are expected to:

- \blacksquare Read the whole document to understand progressions from stage to stage.
- ☑ Identify the optimal training for your athletes.
- ☑ Identify if an athlete moved up a stage and he/she was not ready for that stage, and to identify remedial programs to minimize the gaps.

ATHLETE DEVELOPMENT - 5 PILLARS OF SUPPORT

The primary audience for LTAD is coaches and instructors. While the coaching and instruction stream is critical to athlete development, so too is identifying how the five primary stakeholder groups (athletes; instructors/coaches; officials; parents; and facility owners/operators) will benefit most from this guide.

Stakeholder	Benefits of LTAD Framework:	By reading this document, the stakeholder will further understand:
Athletes	Athletes will benefit by understanding the big picture behind LTAD and what the document aims to achieve. Regardless of skill level, all athletes fall into the grand scheme of creating champions for life.	 The athlete development pathways made available to pursue the sport. How to mentally and physically prepare for the challenges, failures and successes of competition. The suggested benchmarks for measuring success against his/her peers.
Instructors & Coaches	A highly skilled athlete will have a difficult time maximizing his or her potential without the assistance of experienced, trained and certified instructors and coaches. These professionals understand all facets of the sport and have developed their own unique teaching methods. For instructors and coaches, this document should act as a guide and an educational reference tool as participants' progress through the stages of development.	 The recommended pathway to develop athletes at all levels, including high performance athletes The framework put forth by Canada Artistic Swimming and the National Coaching Certification Program (NCCP) Where each type of instructor or coach fits into the educational framework of artistic swimming in Canada
Officials	Athletes require experienced, trained and certified officials to assess their skills. These skilled volunteers understand athlete development and have acquired skills to properly assess all levels of the sport. For officials, this document should act as a guide and reference tool to better understand how participants progress through the stages of development.	 The recommended pathway to develop athletes at all levels, including high performance athletes The framework put forth by Canada Artistic Swimming and FINA Where each type of official fits into the educational framework of artistic swimming in Canada
Parents	Parents are the primary source of encouraging enjoyment, confidence and physical activity – especially in the earlier stages of athlete development. LTAD will help parents understand the challenges of physical literacy and how best to promote a healthy and active lifestyle. In the later stages, parents can use the document as a guideline to understand where their child is at competitively and also what could happen next.	 The differences between the stages of emotional, physical and mental development The requirements for suggested methods of helping children learn to grow in all facets of their development - physical, emotionally, cognitively and socially How to help teach their child to choose the pathway best suiting their abilities, needs and aspirations How to support the direction and pathway chosen by the child
Facility Owners & Operators	Aquatic facilities and municipal pools are often the place where children first learn to swim and to artistic swim! With such a large outreach, these facilities play very important roles in the implementation of activities covered in LTAD.	 The need for facilities to implement programs fitting within the LTAD umbrella The benefits of facilities aligning with neighbouring clubs, schools, etc. in their community How to educate interested parties, such as parents and staff on the athlete development benefits and goals covered in LTAD

IN & OUT OF SYNC: STATE OF THE NATION

To address the current state of Canada as an artistic swimming nation, we must first reflect on the current artistic swimming system, both its successes and its shortcomings. This analysis was gathered from a number of resources; questionnaires, results, as well as information regarding the current landscape of sport in Canada, available from Sport for Life Society resources.

Successes:

- ✓ There is a formalized athlete talent identification strategy
- ✓ Performance optimization research has provided improved knowledge on skill development
- ✓ The nation has dedicated and passionate coaches, officials and staff (NSO/PSO) committed to improvement
- ✓ Leading in highlight development
- There are multiple professional career opportunities that an athlete can pursue after their amateur career, including working
 as a professional artistic swimmer
- Introduction of the FINA World Series in 2017, and Mixed Duet has been officially included in the FINA structure as of 2016, allowing males to compete in sanctioned international competitions

Shortcomings:

- ➔ Developmental athletes over-compete and under-train
- Advanced training and competition programs are superimposed on young developing athletes
- Preparation is geared to the short-term outcome winning/placing – and not the process of developing the athlete
- Chronological rather than developmental age is used in training and competition planning
- ➔ Coaches largely neglect the sensitive periods of accelerated adaptation to training
- ➔ Fundamental movement skills and fundamental sports skills are not taught properly or consistently across the country
- → The most knowledgeable coaches work at the elite/national level, while less knowledgeable instructors or volunteers often coach at the developmental level where quality, trained coaches are essential for optimum athlete development
- ➔ Parents are not educated about physical literacy and CS4L-LTAD
- The developmental training needs of athletes with a disability are not well understood
- The competition system is not aligned with athlete development
- ➔ Talent identification, talent development and talent transfer are not fully understood and misused
- ➔ There is no integration between physical education programs in the schools, recreational community programs and elite competitive programs
- Athletes encouraged to specialize too early in an attempt to attract and retain participants

Consequences:

- Poor movement abilities and athleticism
- Lack of proper fitness
- 🗷 Limited skill development due to under-training
- Poor habits developed from over-competition focused on winning
- Artistic swimmers may not reach full potential due to inappropriate programs
- Children not having fun as they play adult-based programs
- A lack of systematic development in the next generation of international athletes
- Athletes pulled in different directions by school, club and provincial teams because of the structure of competition programs
- Remedial programs, implemented by provincial and national team coaches to counteract the shortcomings of athlete preparation
- Fluctuating national performance due to poor understanding of talent development, identification and transfer within a developmental pathway
- Athletes failing to reach their genetic potential and optimal performance level
- E Failure to reach optimal performance level in international competitions

CATCH THE WAVE . . .

Where do we want to be?

- A National Athlete Development Matrix describing in detail the optimal sequencing and timing of all learning and training activities required to ensure each new skill or training stimulus is built on a solid foundation of previously acquired competencies, or previously developed physical capacities.
- ${\ensuremath{\boxtimes}}$ A deep pool of athletes who are resilient, durable and determined.
- Programs that emphasize aquatic and physical literacy, creating confident and competent athletes, with proper movement abilities and athleticism.
- ☑ Young athletes having FUN through the delivery of child-based programming.
- ☑ Athletes with improved fitness and skill performances due to appropriate training.
- Athletes who reach their genetic potential and optimal performance level with safe, effective programming that minimizes injuries.
- ☑ A developmentally appropriate competition system with appropriate judging criteria and competitive events.
- ☑ A competitive stream that progresses based on the athlete's accomplishment of skills and performance achievements.
- ☑ An implemented and well understood Podium Pathway for targeted artistic swimmers.
- ☑ Routines and figures aligned with Canada Artistic Swimming's identified Winning Style of Performance.
- Offering enhanced training environments for targeted athletes that include access to state-of-art training facilities and world-leading coaches, and that advance support in technology, research, sport science and sport medicine. Enhanced training environments have the required quality daily training hours to achieve competition results and gold medal profile indicators.
- Athletes are supported in their chosen pathway of development, and encouraged to achieve their potential at the highest level of the sport they wish to realize.
- ☑ No remedial training programs will be required by our provincial and national team coaches.
- ☑ Consistent Podium Performances at National and International competitions

KEY FACTORS INFLUENCING ATHLETE DEVELOPMENT

Long-Term Athlete Development is based on sport research, coaching best practices, and scientific principles. LTAD expresses these principles, research and practices as **10 Key Factors** essential to athlete development.



Physical Literacy

"Physical literacy is the motivation, confidence, physical competence, knowledge and understanding to value and take responsibility for engagement in physical activities for life."

- The International Physical Literacy Association, May 2014

Physical literacy is the mastering of **fundamental movement skills** and **fundamental sports skills** that permit a child to read their environment and make appropriate decisions, allowing them to move confidently and with control in a wide range of physical activity situations.



Figure 1: Fundamental Movement Skills and

CS4L Long -Term Athlete Development Matrix v. 1.0 2015

What does this mean in artistic swimming?

By ensuring aquatic and physical literacy is accomplished, athletes have the confidence and competence to continue their development as an artistic swimmer as well as achieve success in a number of other sports and fitness, promoting active for life.

Aquatic Literacy = Artistic Swimmin Swimming Diving Rowing	g Waterpolo Kneeboarding Water-Skiing Windsurfing	Kiteboarding Scuba Diving Paddle Boarding Snorkeling	Sailing Canoeing Kayaking	
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Developing artistic swimmers that are proficient in aquatic and physical literacy reduces the remedial training required in the Train to Train, Train to Compete, Learn to Win, and Perform to Win stages. Athletes in these stages spend a significant portion of their daily training environment on land working on core strength, flexibility, speed and strength development, aerobic and anaerobic endurance, and finally in land drill perfecting routine movements and timing. Being physically literate is directly linked to the success of an artistic swimmer and their chosen path of development. In 2014, national physical skills testing had athletes scoring a national average of 75% on testing, which demonstrates the need to greatly improve this area of training.

Specialization

Sports specialization is defined as intense training in one sport while excluding others. 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.

What does this mean in artistic swimming?

Artistic swimming, due to the highly complex skills could be considered as early specialization, however, the peak performance for artistic swimmers occurs in the mid-twenties, compared to late adolescence for true early specialization sports. In analyzing the average age of podium teams at the Olympic Games (1996-2016), the average age is 24.1 years. Artistic swimming is therefore considered an "**Early Entry – Late Specialization**" sport. Athletes desiring to compete on the international stage need to demonstrate the mastery of specific competencies such as suppleness, speed, fundamental movement skills and sport-specific skills at an early age, typically before their growth spurt.

Further, the Learn to Train stage (8-9 to 11-12 years old) is an important stage for artistic swimming due to the sports' highly kinaesthetic nature and the mastery of such skills listed above (suppleness, speed, fundamental movement skills and fundamental sport skills). Athletes at this stage will learn, develop and acquire the technical sport skills required to pursue a lifelong career in artistic swimming and/or transfer to another sport. It is important that athletes not focus on artistic swimming all year round. Exposing athletes to multiple sports at this stage will strengthen fundamental sports skills (run, jump, move), reduce overuse injuries, and build a better all-round athlete.

Developmental Age

Developmental age, refers to a child's stage of physical, mental, emotional and intellectual maturity. 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 metamorphosis during the first two decades of life.

Key definitions related to Developmental Age:

Growth: observable step-by-step changes in quantity & measurable changes in body size (Height, Weight, Fat %, etc.).

Maturation: qualitative system changes (structural & functional) in the body's progress toward maturity such as the change to cartilage to bone in the skeleton.

Chronological Age: number of years and days elapsed since birth.

Relative Age: refers to differences in chronological age among children born in the same sport program year. Ex): age-group classification based on age as of December 31st of a year – can lead to a December born athlete being almost one year less developed than a January born athlete.

Skeletal Age: maturity of the skeleton determined by the degree of ossification of the bone structure (how far have bones progressed from cartilage to bone, not necessarily in size). **Training Age:** refers to the age where athletes begin planned, regular, serious involvement in training.

General Training Age: refers to the number of years of training in different sports

Sport-Specific Training Age: refers to the numbers of years an athlete has been training in one particular sport.

KEY FACTORS INFLUENCING ATHLETE DEVELOPMENT

What does this mean in artistic swimming?

Athletes, parents, and coaches must understand the implications of an athlete's growth and that there can be large variations in age of the onset of adolescence for both males and females. Figure 2 shows the difference in average age during growth spurts for males and females.



Parents and coaches should measure the athlete's growth to identify if an athlete is considered early, average or late maturation in order to design appropriate expectations, instruction, coaching and competition programs in relation to optimal trainability and readiness during the Learn to Train (ages 8-11) and Train to Train (ages 11-15) stages. Early developers may begin their adolescent growth spurt two or more years earlier than the gender- specific average, and some late developers may be two years behind the average. Figure 3 shows that variations in the age of onset of the adolescent growth spurt has its greatest impact on the duration of the **Learn to Train** Stage.

Athletes each at artistic swimming age 10

The variation in the onset of the adolescent growth spurt for early, average and late males and females is shown schematically in Figure 3.



CS4L Long-Term Athlete Development Matrix v. 1.0 2015



CS4L Long-Term Athlete Development Matrix v. 1.0 2015

How to monitor growth:

Step 1: As soon as a child turns 6 years of age, measure height every three months.

Step 2: Produce a chart with height on the vertical axis and age on the horizontal axis

Step 3: As soon as the parent/coach notices a small deceleration in growth followed by acceleration in growth, start to measure arm span as well as the height of the athlete. Measurements of torso length can also be done while the athlete is sitting on the floor next to a wall with bent knees (90 degrees). The average age for girls in this period of development is 10 years.

Step 4: Charts should be developed to display all three measurements (height, arm span & torso length). Consistent acceleration in growth should be noticed at this time. The athletes' training must be adapted according to the sensitive periods of trainability.

Step 5: PHV is the highest rate of growth acceleration. After PHV is attained, a deceleration in growth will happen. Continue to monitor growth for 12 to 18 months after PHV. The athletes' training must be adapted according to the sensitive periods of trainability. The growth spurt can last anywhere from 1.5 years (for rapid transit) to 3-5 years (for slow transit). Typically a girl grows on average 6cm in the 1st year of her growth spurt, 8cm in the 2nd year, and 6cm in the 3rd year.

KEY FACTORS INFLUENCING ATHLETE DEVELOPMENT

Coaches and parents should also demonstrate a thorough understanding of the phases of growth spurt during adolescence (Figure 4):

- ➔ Onset of growth spurt
- → Period of rapid acceleration in growth
- → Peak height velocity (fastest rate of growth)
- ➔ Period of rapid deceleration in growth
- ➔ Period of slow deceleration in growth
- ➔ Cessation of growth



CS4L Long-Term Athlete Development Matrix v. 1.0 2015

Further, by measuring the growth of their athletes, coaches and parents can track the beginning of the growth spurt, as well as the peak of the growth spurt (Peak Height Velocity or "PHV"), which are critical landmarks for reactive periodization and ensuring coaches train their athletes appropriately as per their development. Team training can occur with respect to the technical, tactical and choreographic abilities, but the physical skills (stamina and strength), psychological and life skills must be trained based on the growth of each individual athlete (Figure 5). The periods of accelerated adaptation are explained in the next key factor.



CS4L Long-Term Athlete Development Matrix v. 1.0 2015

Coaches need to have a HIGH understanding of the developmental age and how to measure the athlete's Peak Height Velocity "PHV" or use the self-assessment of puberty (appendix 3), to ensure appropriate training for each athlete occurs.

Artistic swimming must also take into consideration developmental age in relation to its rules regarding "artistic swimming age" for competition. Since the rule for competitive age is based on the age of a competitor as of December 31 of the calendar year of the competitive season, artistic swimming must consider the concept of a minimal age that is appropriate for competition.

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.

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 athlete can be trained at any age, but there are sensitive periods when individuals are especially responsive to specific types of training. The ten S's have been identified as important to building a complete and holistic plan for developing athletes.

The 10 S's of Training and Performance include five basic physical capacities:

Stamina (endurance)	Strength	Speed	Skill	Suppleness (Flexibility)
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Beyond the five physical capacities, there are five general S's that complete the holistic development of the athlete:

p(S)ychology Structure/ Stature	Sustenance	Schooling	Socio-cultural
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Each of these 10 capacities is trainable throughout an athlete's lifetime. However, research shows that there are **sensitive periods** of accelerated adaptation to training when each of the first five capacities is especially receptive to training. If these sensitive periods are missed, the athlete may never grow to have as much stamina, strength, speed, skill and suppleness as they could have had. There are also other considerations in trainability.

Stamina (endurance)	The sensitive period of accelerated adaptation for training stamina begins at the start of the growth spurt until the end of the rapid deceleration of growth. Athletes need increased focus on aerobic endurance training during their rapid acceleration of growth, and they should be progressively introduced to aerobic power as their growth rate decelerates.
Strength	Girls and boys have one sensitive period of accelerated adaptation for training strength, but they begin at different times. For boys the period begins 12-18 months after PHV, for girls the sensitive period is immediately after PHV or at the onset of menarche.
Speed	In both boys and girls, there are two sensitive periods of accelerated adaptation for training speed. For girls the first sensitive period occurs between ages 6-8 years, and the second occurs between 11-13 years. For boys, the first sensitive period occurs between ages 7-9 years, and the second occurs between 11-13 years. During the first sensitive period, training should focus on developing agility and quickness of segments; during the second sensitive period, training should focus on developing the anaerobic alactic energy system.
Skill	Girls and boys both have one sensitive period of accelerated adaptation for training skill. For girls, the sensitive period is between ages 8-11 years. For boys, the sensitive period is between ages 9-12 years. These years are often referred to the "skill-hungry years". These ages are approximate. For both girls and boys, the sensitive period for training skill ends at the onset of the adolescent growth spurt. With the sudden acceleration in growth in bones and muscles, there is a commensurate decrease in physical coordination that significantly impedes skills learning and practice for the duration of the growth spurt.
Suppleness (flexibility)	The sensitive period of accelerated adaptation for training suppleness occurs between ages 6-10 years in both girls and boys. However, attention to flexibility should continue during the growth spurt and beyond to prevent injuries as bones, muscles, tendons and ligaments grow.

KEY FACTORS INFLUENCING ATHLETE DEVELOPMENT

(p)Sychology	Sport is a physical and mental challenge; maintaining high levels of concentration while remaining relaxed with the confidence to succeed is a skill essential to long-term performance in any sport. Training programs should include key mental components identified by sport psychologists: concentration, confidence, motivation, and handling pressure.
Structure/ Stature	This aspect of trainability describes the six phases of growth in the human body and links them to the sensitive periods of accelerated adaptation to training. Stature (individual height) is measured before, during, and after maturation to track the developmental age of the athlete. By tracking developmental age, coaches can identify the sensitive periods for training the 5 basic Ss (stamina, strength, speed, skill and suppleness) and adjust training programs accordingly.
Sustenance	Sustenance recognizes a broad range of components that serve the central purpose of replenishing the body, thereby preparing the athlete for the volume and intensity required for optimal training. Sustenance addresses several areas: nutrition, hydration, rest, sleep, and regeneration.
Schooling	Each athlete's school needs (school sports, academic load, timing of exams, etc.) must be considered in the design of training and competition programs. It is essential to have communication and cooperation between the different coaches who deliver training and competition programs. A good balance needs to be established between all factors, and coaches and parents should work together to maintain the balance.
Socio-cultural	The socio-cultural aspects of sport are significant and must be managed through proper planning. Athletes are socialized through their sport beginning at the community level, and eventually their participation can lead them to a diverse array of multicultural experiences if they pursue international competition. Managed correctly, these socio-cultural experiences can be valuable in broadening the social understanding of athletes, including their awareness of ethnicity, culture and national diversity.

What does this mean in artistic swimming?

For the training of artistic swimmers to be the most efficient as possible, implementing sound artistic swimming-specific training throughout the main growth and maturation periods must be a priority, coupled with an understanding and call to action during the sensitive periods of trainability. This includes a strong understanding of the priority of training suppleness prior to the growth spurt, and training and improving segmental speed of artistic swimming specific movements as per the chronological ages of the team. For example, in 2014 a national skills testing pilot (all age groups) resulted in a 66% average score on split testing (to measure athlete flexibility), demonstrating the need to address this sensitive period of trainability. Canada Artistic Swimming and its member associations need to ensure that professional development and coach training involves an understanding of the training of athletic abilities at the right time and stage, and age-appropriate planning and periodization knowledge and strategies.

The sensitive periods of trainability (accelerated adaptation to training) critical for artistic swimming are:

Priority #1 - Coaches must train:

- Suppleness (passive, active and dynamic flexibility) between the age of 6-10 for both males and females
- ☑ Segmental Speed between the age of 6-8 and 11-13 for both males and females

Priority #2 - Coaches must train:

Sport specific skills between the age of 8-11 (females) and 9-12 (males), taking into considerations that an early developer will have a shorter window for this training

Priority #3 - Coaches must train:

- Stamina at the onset of the rapid acceleration of growth until the end of the rapid deceleration of growth.
- Strength immediately following PHV and at the onset of menarche for females, and 12-18 months after PHV for males

Mental, Cognitive & Emotional Development

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

What does this mean in artistic swimming?

The performance demands of artistic swimming as an individual, a pair, or a team, set a unique competitive environment for athletes to develop over many years from the Learn to Train to Perform to Win level. Ensuring athletes are provided the proper mental, cognitive and emotional training is an important factor in holistic athlete development, as well as safeguarding those athletes who may be technically advanced but delayed in emotional growth are not pushed through the development pathway too fast.

Periodization

Periodization is the systematic planning of athletic or physical training. 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. Periodization outlines all annual and seasonal training within a logical schedule to bring about optimal optimal improvements in athlete performance at the right times, while minimizing injury and burnout.

Periodization breaks training into months, weeks, days and individual sessions. It helps coaches organize all aspects of volume, intensity, frequency, duration and type of training, tapering, peaking and competition, and recovery programs through long-term and short-term timelines.

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

Annual Plan

An annual plan works towards peaking for the goal competition of the year. There are three periods in the annual plan: preparation, competition, and transition

Mesocycle

A mesocycle represents a phase of training with a duration of between 2 – 6 weeks or microcycles, depending on the sporting discipline.

Microcycle

A microcycle is typically one week. Each microcycle is planned based on where it is in the overall macrocycle.

Preparation Period

This period consists of the general preparation and specific preparation phases.

Competition Period

This period may contain a few main competitions each containing a precompetitive and a main competition phase.

Transition Period

This period is used to facilitate psychological rest, relaxation and biological regeneration as well as to maintain an acceptable level of general physical preparation.

REACTIVE PERIODIZATION:

Reacting to the tempo of growth of each athlete and adjusting the training, competition and recovery plans according to the sensitive periods of trainability.

KEY FACTORS INFLUENCING ATHLETE DEVELOPMENT

Taper and peaking microcycles are of high importance when creating annual plans. These microcyles are developed to eliminate fatigue produced by training prior to competition. Properly developed taper and peak microcyles ensure athletes are physically and mentally prepared to achieve the performance objectives of the competition.

Periodization is a highly flexible tool. When it is used in combination with proper training techniques, athlete monitoring and athlete evaluation, it becomes an essential component to deliver optimal sport performance and athlete development at all stages of LTAD.

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), mental preparation, the supporting ancillary capacities and life skills. 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.

What does this mean in artistic swimming?

The competition stream of LTAD in artistic swimming is typically a 10 to 15 year process optimizing physical, technical, tactical (including decision making), mental preparation as well as the supporting ancillary capacities and life skills. The length of the process is supported by the average age at the 2016 Olympic Games for podium teams being 24.1 years, and for podium duets being 26.5. At the 2015 FINA World Championships, the average age for podium teams being 22.4 years, and for podium duets being 25.5 years.

It is important that each annual plan is based on identified periods of athletic preparation, taper, competition, recovery and the transition into the next calendar plan. Coaches are trained to prepare and implement appropriate periodized plans as the athletes' age/stage of training.

Provincial and National level competitive athletes will be exposed to a single periodization calendar with one major peak. These athletes will be exposed to five training phases: General Preparation Phase (GPP), Specific Preparation Phase (SPP), Pre-Competition Phase (PCP), Competition Phase (CP) and a Transition Phase (TP).

National Team and Full-Time Training Group athletes may be exposed to single, double or triple periodized plans based on the competition calendar and events for that year. An athlete training under a double annual plan, for example, will include eight training phases: General Preparation Phase (GPP), Specific Preparation Phase (SPP) 1, Pre-Competition Phase (PCP) 1, Competition Phase (CP) 1 Peak One, Specific Preparation Phase (SPP) 2, Pre-Competition Phase (PCP) 2, Competition Phase (CP) 2 Peak Two and a Transition Phase (TP).

Of equal importance is the implementation of quadrennial plans for targeted athletes identified as podium potential athletes to achieve podium success. Podium Potential describes the targeted athlete tracking to podium success based on predictive competition results and gold medal profile indicators. Athletes with podium potential will be monitored in the enhanced training environment and tracked in competition to predict progression towards podium success. Athletes, parents and club coaches are encouraged to understand the concepts of Podium Potential, Podium Pathway, Targeted Excellence and enhanced training environments.

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 main focus.

Stages & Recommended Ratios:			
Stage 8	Sync for Life	Based on the individual's desire.	
Stage 7	Perform to Win	20% training to 80% competition-specific training and actual competition.	
Stage 6	Learn to Win	30% training to 70% competition-specific training and actual competition.	
Stage 5	Train to Compete	40% training to 60% competition-specific training and actual competition.	
Stage 4	Train to Train	60% training to 40% competition-specific training and actual competition.	
Stage 3	Learn to Train	70-90 $\%$ training to 10-30 $\%$ competition-specific training and actual competition.	
Stage 2	FUNdamentals	All activities FUN-based including some structured competition.	
Stage 1	Active Start	All activity based on developing physical literacy and child's passion to play and participate.	

Key points to consider:

- Optimal sport-specific competition ratios are critical.
- Level and length of the competitive season should be aligned with the changing needs of the developmental athlete progressing through LTAD.
- Actual competition, competition specific training and under-training at the L2T and T2T stages result in a lack of basic skills and fitness.
- The appropriate level of competition is critical to technical, tactical and mental development at all stages.
- Schedules are often set by organizations and not by the coach and athlete, making optimal training based on periodization difficult.
- Optimal training-to-competition ratios 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 periodically to ensure ongoing relevance. This is one of the biggest challenges for team sports in LTAD design and implementation.

What does this mean in artistic swimming?

The design of age and/or stage relevant competition or assessment/performance systems is a crucial element in the overall development of individual athletes and the LTAD program as a whole. For example, currently athletes in the Learn to Train stage may be competing at up to 6 "FINA-style" competitions per season (required or invitational).

Canada Artistic Swimming in partnership with their members and registrants is undertaking competition structure review to ensure an LTAD aligned competitive structure is in place to optimize and improve athlete development and create an improved athlete development pathway, whether to international podium or active for life participation.

Excellence takes time

How long does it take for athletes to reach the top of their game? About 10,000 hours of training and competing. For most athletes, that translates into about 10 years. Other evidence indicates that elite athletes require 8 to 12 years of practice to reach levels of excellence. This translates into an average of 3 hours of daily training, applied practice and competition over 10 years. Again, this is an average over the span of 10 years. It is not desirable to see children formally "training" in one sport for three hours every day when they are 7 years old. Training hours increase during adolescence, and this rounds out the average.

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. However, the three or four other sports the athletes participated in before they specialized have usually not been taken into account.

LTAD emphasizes a multi-sport approach: all former activities should be included as they are an integral part of the 10,000 hours. Children who play more than one sport see improved ability in every activity. Besides preventing burnout, practicing a variety of sports improves learning in all movement and sport skills. Multi-sport advantage is quite often seen in high-level athletes who participated in multiple sports during their childhood.

What does this mean in artistic swimming?

Artistic swimming is considered an "Early Entry – Late Specialization" sport. The LTAD pathway requires a significant investment of time devoted to training, practice and appropriate competition experience coupled with a multisport/activity background. Due to the sport being early entry but late specialization, it may take a artistic swimmer longer than 10 years to reach pinnacle performance levels. This is supported by the calculation of the average ages of podium teams and duets at the Olympic Games (1996-2016) and FINA World Championships. Olympic podium teams average 24.1 years and duets average 25.4 years, and World Championship podium teams average 24.9 years.

System Alignment & Integration

Based on CS4L principles, LTAD promotes system alignment and integration between sport clubs, provincial/territorial and national sport organizations. CS4L addresses the overarching system and structure of sport and physical activity in Canada, including the relationship between school sport, physical education and high performance sport at all levels from policy to program delivery. LTAD calls for system alignment and integration by bringing together athletes, coaches, clubs, school sports, recreational, provincial and national organizations to build a better sport system in Canada.

What does this mean in artistic swimming?

The over 10,800 stakeholders currently involved in Canadian artistic swimming (the NSO, PSOs, Athletes, Coaches, Officials, Parents, Volunteers, etc.) need to embrace the National LTAD Framework and commit to supporting its strategies, mandates and best practices. Synergies can result from positively harnessing the different roles and responsibilities of each stakeholder in order to both ensure and progress the future of artistic swimming in Canada.

Continuous Improvement - Kaizen

The LTAD framework is based on the principle of continuous improvement, both in its dynamic evolution and in its application. We never assume that LTAD in its current form is ever complete or final. We operate from the position that it represents the best practices in coaching and athlete development as they are understood today. By applying a willingness to always seek improvements in our understanding and practice, LTAD will continuously evolve to accommodate new breakthroughs in sport science research, new innovations in technology, and evolving best practices in coaching.

What does this mean in artistic swimming?

The Canadian artistic swimming community as a whole must constantly strive to implement excellence at all levels of participation from community pools to international podiums, as well as continually improve and advance all areas and programs of artistic swimming in Canada. This may be demonstrated by the ongoing collaboration and alignment of the PSOs with the NSO, the NSO and PSOs with member clubs, and the ongoing work of the Canada Artistic Swimming LTAD working groups and task forces in action dedicated to the advancement of artistic swimming in Canada.



THE FRAMEWORK

Artistic Swimming Long-Term Athlete Development is a Canada Artistic Swimming specific adaptation of the Long-Term Athlete Development model (LTAD) developed by Sport Canada/Canadian Sport for Life. LTAD is a scientific model for periodized athlete training and development that respects and utilizes the natural stages of physical, mental, and emotional growth in athletes.

The greater the quality of preparation, the greater the likelihood that athletes of all abilities will remain active throughout their lifetimes, and the greater the likelihood that the performance peaks of those who pursue excellence will be higher and maintained over a longer period. Sport research shows that rushing into competition frequently results in technical, physical, tactical, psychological, and emotional shortcomings that hinder performance. While premature competition actually detracts from performance and achievement, progressive athlete development that follows a balanced formula of training, competition, and recovery tends to produce longer involvement in sport and higher achievement.

Our LTAD Framework is designed to:

- Promote lifelong enjoyment of athletic activity.
- Provide a structured athlete development pathway.
- Describe the Podium Pathway for elite athlete development.
- Create podium success.
- Provide equality in access and opportunities to athletes throughout Canada.

LTAD encourages athletes to enjoy artistic swimming and improve their performances through:

- Logical and integrated training and practice programs.
- Application of growth, development, and maturation principles.
- Optimal structure for competition at all stages of LTAD.

To produce both lifelong wellness and international excellence, an integrated model of athlete development that is athlete centered is needed. The model must respect the physical, mental, and emotional maturation of the athletes. This is the science and the motivating spirit behind the design of the Long-Term Athlete Development model for Canadian artistic swimming.



The **Athlete Development Matrix (ADM)** is defined as, the collection of skills and attributes of athletes progressing through the stages of the Long-Term Athlete Development Framework.

The **Podium Pathway** describes the sport-defined excellence stages of athlete development and specifically applies to athletes on a trajectory toward podium results at the highest level of their sport. Podium Pathway encompasses both the Podium Results Track and the Gold Medal Profile.

The **Gold Medal Profile** is the collection of skills and attributes that underpin the performances of athletes capable of stepping onto the Olympic Podium and the metrics by which those skills and attributes are tracked over time.

The **Podium Results Track** is the progression of performance benchmarks (derived from competition results) required to move through the excellence stages of athlete development and successfully reach the Para/Olympic podium

Winning Style of Play/Performance is the tactical, evidencebased conceptualization of what it takes to be the best in the world. It includes the measurable tactical outcomes in all areas of competitive play/performance, and ongoing collection of evidence regarding team performances.

THE FRAMEWORK



Canada Artistic Swimming's eight-stage LTAD program and podium pathway is structured for entry-level participants interested in trying artistic swimming and learning the basics of the sport, as well as for athletes looking for a competitive program that facilitates achieving the highest levels of artistic swimming the right way, thus allowing them a better chance of success at the most elite level of the sport.

The program is structured for participants to enter the competitive programs between the ages of 8 to 14 years of age, whether they are progressing from an entry-level artistic swimming program or joining artistic swimming after participating in another sport.

The main objective of the first two stages (Stage 1 - Active Start and Stage 2 - FUNdamentals) is to have fun in the water while encouraging physical literacy and learning fundamental movement skills.

Moving into Stage 3 – Learn to Train (L2T) athletes will be building their artistic swimming technical foundation and physical literacy skills whether in the entry-level artistic swimming swim program or the "New Competitors" program.

Stage 4 - **Train to Train** (T2T) offers the opportunity for these "Developing Competitors" to be identified within the Podium Pathway. Athletes will develop the competitive foundation, be challenged and build pride in themselves and the sport.

In Stage 5 - **Train to Compete** (T2C) athletes have developed into "Advanced Competitors" and are mastering the competitive foundations. Further, athletes are preparing to transition to the Learn to Win and Perform to Win programs.

The Stage 6 - Learn to Win(L2W) program for "Advanced Competitors" supports athletes competing at the Senior level (Club, Provincial Team, University or the Full-Time Training Group), and the Stage 7 - Perform to Win(P2W) program is designed for "Performance Competitors" with the Full-Time Training Group competing at the very highest level of the sport and pursuing international excellence.

Lastly, the Stage 8 - **Sync for Life** program is for participants who wish to continue to participate in artistic swimming as a professional athlete, masters athletes, recreational participant, as a coach or an official. This stage focuses on supporting and facilitating lifelong participation in the sport.

Canada Artistic Swimming's Long-Term Athlete Development Framework 2.1 - last revised April 2019

THE FRAMEWORK

	Stage 1	Stage 2	Stage 3	Stag	e 4	Stage 5	Stage 6	Stage 7	Stage 8
CANADA - ARTJSTIC SWIMMING	Learn to Swim/ Water safety Age F 5-6 M 5-6	Having FUN learning the FUN damental movements Age F 6-8 M 6-9	Building the synchro technical foundation and physical literacy Age F 8-11+/- M 9-12	"Being Ide Phase 1 Age F11-12+/ M12-14+/- M	ntified" Phase 2 Age 13-15+/- M 14-16+/-	"Building Podi the C Age F 15-18+/- M 16-19+/	um Potential for entre" Age F 18+ M 19+	Perform to Win	SYNC for Life
TRAINING FREQUENCY ANNNUAL % OF COMPETITIONS / COMPETITION-SPECIFIC	1 day/week	1-2 days/week	1-4 days/week 10-30%	2-5 days/week 40%	3-6 days/week 40%	3-6 days/week 60%	4-6 days/week 70%	4-6 days/week 80%	Unspecified
TRAINABILITIES / COMPETENCIES	Suppleness Rhythm Musicality Basic Human Movement	Suppleness Speed (<ssec) Rhythm & Musicality Fundamental Movement Skill (FMS) Physical Literacy</ssec) 	Suppleness Fundamental Movement Skill (FMS) Synchro Technical Skill Foundation	Speed A Develop Synchro Skill Stamina (dependant on growth spurt)	cquire Synchro Skills Stamina Strength (dependant on growth spurt)	Refine synchro skills Develop and Acquired Ideal Performance state	Accomplished level of synchro skill Acquire Perform on Demand	Refined Perform on demand	
LEARN TO PROGRAM	Aqu	aGO!							
EVALUATIONS	Level 1-2	Level 3-6							
INSTRUCTORS National Cearling Creating Program	AquaGO! Instructor	AquaGO! Instructor							
COMPETITIVE PROGRAM			New Competitors	Developing C	ompetitors	Advanced	Competitors	Performance Competitors	Masters
COMPETITIVE PROGRAM EVALUATION			STAR 1-6	SuperST	AR 1-5 Podium ID and Development	Podium Results Gold Me	Track Benchmarks dal Profile	Winning Style of Performance	
COMPETITIVE AGE GROUP			9-10, 11-12 (F) 10-11, 12-13 (M)	11-12 (F) 12-13 (M)	13-15 (F) 14-16 (M)	Junior	Senior / University	Senior	Masters
PROVINCIAL TEAMS* *PSO mandates					13-15	Junior	Senior		
NATIONAL TEAMS					13-15*	Junior	1st Quad Olympic Team Centre of E	2nd Quad Olympic Team xcellence	
COMPETITIONS			Skills event Festivals Regional Provincial	Skills ev Regior Provinc Festivals	rents hals cials / Canadian Espoir International Competitions	Skills events Regionals Provincials Canadian Open Canada Winter Games International Competitions	Provincials University Canadian Open Canada Winter Games International Competitions	Canadian Open FINA World Series PanAm Games World Championship Olympics	University Masters National Championships Masters World Championships
COACHES National Ceaching Program			Competition Introduction	Competition Development Competition Introduction		Competition Development Competition Introduction	Competition Development Advanced Gradation	Competition Development Advanced Gradation	Competition Introduction Competition Development
COACH PROFESSIONAL EDUCATION		Coaching Association	synchrocoach.ca of Canada Continuing	Educations modules			synchro Advanc	coach.ca ed CPE's	synchrocoach.ca
JUDGING SYSTEM			Adapted	FINA with % values altered		FINA Judging Scale	FINA Judging Scale	FINA Judging Scale	FINA Judging Scale
JUDGING LEVEL			Level 1 & 2	Level 1,	2, 3, 4	Level 1, 2, 3, 4	Level 1, 2, 3, 4	Level 1, 2, 3, 4	All levels

* exact parameters to be determined annually

July 2018

THE PROGRAMS

Canada Artistic Swimming's athlete development programs include the AquaGO! entry-level program, and the competitive programs for Learn to Train (STAR), Train to Train (SuperSTAR), Train to Compete, Learn to Win and Perform to Win. All programs are grouped by age to align with the principles of physical literacy, developmental age, and sensitive periods. By understanding the importance of growth and maturation, coaches can adequately monitor the development of their athletes and be able to identify if their athletes are early, average or late maturers. Subsequently, they can then move them accordingly and seamlessly through the stages if they fall outside of the norm of the average maturer.

Canada Artistic Swimming's athlete development program is anchored in the science and research which correlates developing strong basic fundamental movements with achieving the highest level of success in sport, and subsequently being active for life. Athletes with strong physical literacy skills show greater success in their sport of choice, have fewer injuries and enjoy a longer sport career.

Our program's foundation embodies the 10 key factors influencing long-term athlete development, and an influential component of Canada Artistic Swimming's Athlete Development Program is ensuring the sensitive periods of trainability* are developed at the appropriate stages.

Fundamental Sports Skills	 Based on developmental age, before the growth spurt Training occurs during FUNdamentals and either during Learn to Train (early maturer), Train to Train Phase 1(average maturer) or Train to Train Phase 2(for late developers)
Suppleness	 Based on chronological age, 6-10 years of age Training occurs during FUNdamentals and Learn to Train
Stamina	 Based on developmental age, during the growth spurt Training occurs either during Learn to Train (early), Train to Train Phase 1(average) or Train to Train Phase 2 (late)
Strength	 Based on development age, immediately after Peak Height Velocity (PHV) or at the onset of menarche Training occurs either during Train to Train Phase 1(early), Train to Train Phase 2 (average) or Train to Compete (late)
Speed	 Based on chronological age Training occurs during FUNdamentals for speed 0-5 seconds and during Train to Train Phase 1 for speed 5-20 seconds
Fundamental Artistic Swimming Skills	 Based on developmental age, before the start of the growth spurt Training occurs either during Learn to Train (early), Train to Train Phase 1(average) or Train to Train Phase 2 (late) Includes rhythm and musicality and core strength

* **Trainability:** The physiological system of each athlete can be trained at any age, but there are sensitive periods in the athlete's development when the body is especially responsive to specific types of movement and skills training. To reach their genetic potential, athletes need to receive the right type of training at the correct stage of development. If these critical periods are missed, athletes may grow to be fast, high in the water and perform figures well, but they will never be as fast, be as high or be as strong in figures and routines as they might have been with timely specialized training.

For each skill, the optimum period may be a different stage. For example, it is critical for the fundamental artistic swimming skills (sculling, positions, propulsion, etc.) be emphasized at the Learn to Train stage (Females 8-11/Males 9-12 years) before the athlete reaches their growth spurt. It is vital that coaches, parents and club administrators are aware of these critical periods of "accelerated adaptation" so that they become fully exploited.

THE AQUAGO! PROGRAM



AquaGO! is the nation-wide grassroots foundation program for artistic swimming in Canada and is the launching pad for all other programs delivered by Canada Artistic Swimming. This new program reflects the current science behind long-term athlete development (LTAD) in the sport of artistic swimming, thus focusing on developing aquatic literacy as well as providing an introduction to the sport.

Led by certified instructors, the program is designed to meet the needs of children who will find the content fun to learn while participating in a safe and welcoming environment that incorporates a variety of basic physical and athletic skills in and out of the water. Children may use their new acquired skills to advance further in the sport of artistic swimming or may transfer them to other aquatic and land-based activities.

The AquaGO! Program:

- Can be delivered in 10-week session blocks, three times per season ex) Fall/Winter/Spring
- Can also be delivered as an annual program of +/- 24 weeks
- Annual delivery plan offers year-long planning with three periods of evaluation throughout the year
- Is based on four program pillars and is delivered via a 6-level progression.
- Has performance benchmarks for swimming fundamentals, artistic swimming skills, athletic abilities and flexibility outlined for each session/evaluation period
- Distributes rewards at the successful achievement of each program pillar within each level
- Rewards participants with a swim cap for each level completed
- The technical, tactical, physical, psychological and life skills that are part of the AquaGO! program are competency based
- The AquaGO! program is designed for a participant to progress through the levels at their own rhythm, based on their developmental age for physical, mental, emotional and cognitive skills.
- The AquaGO! levels are built to support the entry level/beginner/recreational participant through LTAD Stages 1-4*.
- Participants can progress through the AquaGO! program until the age of 15 and then can transition into the Sync for Life program.
- Resources for instructors/coaches include the AquaGO! Instructor Workshop and the AquaGO! Program Guide.
- The AquaGO! Program Guide gives clubs/instructors/coaches/administrators/aquatics coordinators is a thorough how-to guide for the AquaGO! program as well as a technical overview.
- The AquaGO! Instructor Workshop includes the thorough technical information regarding the program including the breakdown of skills with respect to each athletic ability: fundamental sports skills (physical literacy), suppleness, stamina, strength, speed and fundamental artistic swimming skills; the competencies required to be achieved at each level, and the evaluation process and details for each level.

Targeted to ages 5-6 AquaGO!				Targeted to ages 6-9 (FUNdamentals)		
Program	Level 1	Level 2	Level 3	Level 4	Level 5	Level 6

*AquaGO! levels 7-12 (working name of "AquaGO! 2") is in development

AQUAGO! LEVELS 1-2

MAIN GOAL: To teach children water safety and learn to swim

Whether in the bathtub, sprinkler, pool or lake, children at the Active Start stage discover that water can be a fun playground. Parents and trained instructors emphasize safety and comfort in the water as children progress from playing in suds to learning the basic swimming strokes. Throughout this stage, children also learn that running, jumping, skipping, and other movement skills are enjoyable parts of daily life.

Training aspects covered:

- ✓ Sculling
- ✓ Floating
 - ✓ Rolling
- 🗸 Skipping
 - ✓ Jumping

- Twisting
- Balance
 Balance
 Balance
 Second Second

✓ Swimming

Additional abilities covered:

- ✓ Rhythm & Musicality
- ✓ Patterns & Shapes

Technical Instruction:

- Introduce artistic swimming by encouraging children to enjoy the water, learning floating, rolling, and basic swimming strokes.
- Encourage children to develop fundamental movement skills such as jumping, skipping, twisting, rolling, agility, balance, and coordination on land.
- Provide structured physical activity that encourages all movement and motor skills, and ensure children are receiving unstructured physical activity/active play time every day.
- All children should be enrolled in structured gymnastics, ballet and team sport activities based on their age and ability.

Class format: 10 min welcome & land warm-up, 3 x 15 min land/water stations, 5 min wrap-up (see p.29 Program Overview)

Partners Involved: AquaGO! Instructors, clubs, parents, aquatic facilities, gymnastics programs, ballet instructors, team sport programs, daycare facilities, pre-schools, and schools.

Resources: AquaGO! Program Guide, AquaGO! Instructor Workshop, Canada Artistic Swimming – A Parent's Guide to Artistic Swimming

Snapshot of Level 1-2 Sessions:	About Levels 1-2:			
	Swimmers per group	Performance Opportunities		
 Land exercises include basic movement skills All artistic swimming movements need to 	Ratio: 1 instructor for 4 participants	Swimmers in this stage should have the opportunity to perform for an		
be accomplished on land before trying in the water	Levels to accomplish	class, or in a club Watershow.		
 Important focus on water safety and swimming fundamentals: floating and kicking. Participants will work on musicality through 	AquaGO! Level 1 AquaGO! Level 2	Performances should be fun, with creative group routines and engaging music. There is no participation in competition.		
games on land.	Special Rules	Equipment Required		
Children in this stage should participate in a wide range of sporting activities each week with 1 artistic swimming session per week and 2-4 sessions of other sports/activities per week.	Ensure proper supervision at all times near swimming pool, lakes, rivers. Ensure highest level of water safety at all times.	Swimsuit, nose clip, goggles, swim cap, stereo, music, hula hoops, flutter boards, noodles, mermaid tails, shark fins, pirate accessories		

AQUAGO! LEVELS 3-6

MAIN GOAL: To develop fundamental movements and basic fundamental artistic swimming skills in a fun environment

Children require a structured, fun and stimulating environment in this stage that focuses on developing the ABC's of athleticism (agility, balance and coordination) as well as speed and basic artistic swimming specific skills - suppleness, swimming, propulsion, positions, sculling, patterns and rhythm. Programs must be developed that keep their interest and promote a positive impression of the sport without any focus on structured competition. Children should be introduced to simple rules and ethics as well as encouraged to cooperate within a group environment.

The key objectives of Levels 3-6 of the AquaGO! program are to:

- ✓ Introduce and develop fundamental sport skills
- Introduce, develop and consolidate flexibility \checkmark
- Introduce and develop relative strength and core strength

Training aspects covered:

- Speed (<5 seconds)
- \checkmark Swimming
- **Body Positions** \checkmark \checkmark
 - Twistina
- Aailitv Balance
- Sculling \checkmark
 - ✓ Skipping
- Jumpina
- ✓ Coordination
- ✓ Balance
- ✓ Rollina

- \checkmark Introduce, develop, and accomplish speed (<5 sec)
 - Become proficient with musicality and rhythm

Additional abilities covered:

- Suppleness (Flexibility)
- ✓ Rhythm & Musicality
- Patterns & Shapes

Technical Instruction:

- Developing speed and suppleness are critical competencies to cultivate at this stage, along with all fundamental motor skills • (balance, rolling, skipping, twisting, jumping).
- Athletes develop relative strength and excellent core strength through a multi-sport land training program. •
- Artistic swimming specific skills such as basic sculling, basic positions, routine patterns and propulsion are developed. •

Class Format: 10 min welcome & land warm-up, 3 x 15-20 min land/water stations, 5 min wrap-up (see p.29 Program Overview)

Partners Involved: AguaGO! Instructors, PSOs, clubs, aguatic facilities, gymnastics programs, ballet instructors, team sport programs, schools

Instructor/Coach Training: Online training(artisticswimmingcoach.ca, coach.ca, etc.), AquaGO! Instructor Workshop

Resources: AquaGO! Program Guide, AquaGO! Instructor Workshop, Canada Artistic Swimming - A Parent's Guide to Artistic Swimming

Snapshot of Level 3-6 Sessions:Land warm-up including FMSSwimmingSpeedBasic PositionsStrengthBasic ScullingCore StrengthRoutine propulsionSuppleness/ FlexibilityCreative routine skillsChildren in this stage should participate in a wide range ofsporting activities each week with 1-2 artistic swimmingsessions per week and 2-4 sessions of othersports/activities per week. The sensitive periods oftrainability for speed and flexibility occur during this stagefor both girls and boys. Other sports recommended at thisstage are gymnastics, ballet and team sports where hand-eye coordination is dominant (hockey, tennis, baseball).		About Levels 3-6:					
		Swimmers per group	Performance Opportunities				
		Ratio: 1 instructor for 6 participants (levels 3-4) and 1 instructor to 8 participants (levels 5-6)	No competition. Participation in end of class demos and club watershows. Performances				
		Levels to accomplish	group routines with engaging music.				
		AquaGO! Level 3 AquaGO! Level 5 AquaGO! Level 4 AquaGO! Level 6					
		Special Rules	Equipment Required				
		N/A	Swimsuit, nose clip, goggles, swim cap, stereo, music, running shoes, shorts, hula hoops, flutter boards				

AQUAGO! LEVELS 7-9 (in development)

MAIN GOAL: To build the participants' artistic swimming skills, as well as their physical literacy skills

Participants in Stage 3 (levels 7-9) of the AquaGO! program continue to discover what artistic swimming is all about and how much fun it can be, all while working on physical literacy skills, flexibility and building their foundation of artistic swimming specific skills. The program continues to build physical literacy through programming that requires the participant to become proficient in fundamental movement skills, fundamental motor skills and fundamental sport skills.

 \checkmark

The key objectives of levels 7-9 of the AquaGO! program is to:

- \checkmark Continue to develop and master fundamental sport skills
- ✓ Continue to develop and master flexibility
- Continue to develop relative strength and core strength \checkmark

Training aspects covered:

- \checkmark Suppleness
 - ✓ Rolling \checkmark Skipping

 \checkmark

Climbing \checkmark Running

 \checkmark

✓ Agility ✓ Balance

 \checkmark

 \checkmark Jumping

Twisting

- Balance **Body Positions** \checkmark
- Continue to develop and accomplish speed (<5 sec) Become proficient with musicality and rhythm \checkmark
- ✓ Patterns & Shapes

Technical Instruction:

Coordination

- Mastering suppleness and physical literacy (all fundamental movement skills "FMS" including balance, rolling, skipping, twisting and jumping) are the critical competencies to train during stage 3.
- Athletes develop relative strength and excellent core strength through a multi-sport land training program.
- Artistic swimming specific skills such as basic sculling, basic positions, routine patterns, swimming and propulsion are • developed.

Class Format: 15 min land warm-up, plus 75 min land/water stations (approx. - see p.29 Program Overview)

Partners Involved: AquaGO! Instructors, PSOs, clubs, aquatic facilities, gymnastics programs, ballet instructors, team sport programs, schools

Instructor/Coach Training: Online training (artistics wimming coach.ca, coach.ca, etc.), AquaGO! Instructor Workshop

Resources: AquaGO! Program Guide, AquaGO! Instructor Workshop, Canada Artistic Swimming – A Parent's Guide to Artistic Swimming

Snapshot of Level 7-9 Sessions:		About Levels 7-9:					
		Swimmers per group	Performance Opportunities				
Land warm-up including FMS Swimming Speed Basic Positions Strength Basic Sculling Core Strength Routine propulsion		Ratio: 1 instructor per 8 participants Levels to accomplish	No competition. Participation in end of class demos and club watershows. Performances				
Suppleness/ Flexibility Basic rules Introduction to positive thinking Making decisions Maintaining focus	Pattern skills awareness Assuming responsibility Setting and completing simple goals	AquaGO! Level 7 AquaGO! Level 8 AquaGO! Level 9	should be fun, with creative group routines with engaging music.				
		Special Rules	Equipment Required				
Other sports recommended at this stage during fall, winter and spring are gymnastics, ballet and dance. During the summer months, team sports where overall coordination is dominant (canoe/kayak, lacrosse, soccer, tennis, and baseball) are recommended.		N/A	Swimsuit, nose clip, goggles, swim cap, stereo, music, running shoes, shorts, hula hoops, flutter boards				

- ✓ Rhythm & Musicality
- Propulsion
- Swimming

AQUAGO! LEVELS 10-12 (in development)

MAIN GOAL: To support the ongoing development of artistic swimming skills and maintain physical literacy

Participants in Stage 4 of the AguaGO! program love what artistic swimming is all about and how much fun it can be, all while maintaining physical literacy, flexibility and building their foundation of artistic swimming specific skills. The program maintains physical literacy through programming that requires the participant to become proficient in fundamental movement skills, fundamental motor skills and fundamental sport skills.

The key objectives of levels 10-12 of the AguaGO! program is to:

- Continue to develop and master fundamental sport skills \checkmark
- Continue to develop and master flexibility
- Continue to develop relative strength and core strength

Training aspects covered:

✓ Suppleness

Coordination

- \checkmark Rollina \checkmark Skippina
- Agility Balance \checkmark
 - \checkmark Jumping Twisting

 \checkmark

Body Positions Rhythm & Musicality

Runnina

Balance

✓

- Continue to develop and accomplish speed (<5 sec) \checkmark
- Continue to develop fundamental artistic swimming skills
- Become proficient with musicality and rhythm ✓
 - Patterns & Shapes
- Transitions
- Sculling
- **Technical Instruction:** Support refinement of fundamental movement skills and suppleness, and continue to develop speed (critical period of trainability).
- Athletes develop relative strength and excellent core strength through a multi-sport land training program.
- Artistic swimming specific skills such as basic sculling, basic positions, basic transitions, routine patterns, swimming and • propulsion are developed.

Class Format: 15 min land warm-up, plus 75 min land/water stations (approx. - see p.29 Program Overview)

Partners Involved: AquaGO! Instructors, PSOs, clubs, aquatic facilities, gymnastics programs, ballet instructors, team sport programs, schools

Instructor/Coach Training: Online training (artisticswimmingcoach.ca, coach.ca, etc.), AquaGO! Instructor Workshop

Resources: AquaGO! Program Guide, AquaGO! Instructor Workshop, Canada Artistic Swimming – A Parent's Guide to Artistic

Snapshot of Level 10-12 Sessions:		About Levels 10-12:					
		Swimmers per group	Performance Opportunities				
Land warm-up including FMS Speed Strength	Swimming Basic Positions Basic Sculling	Ratio: 1 instructor per 8 participants	No competition. Participation in end of class demos and club watershows. Performances should be fun, with creative group routines with engaging music.				
Core Strength	Routine propulsion	Levels to accomplish					
Suppleness/FlexibilityPBasic rulesDDevelop breath holdingwDevelop positive thinkingS	Develop responsibility & work ethic Setting & completing goals	AquaGO! Level 10 AquaGO! Level 11 AquaGO! Level 12					
Introduce & develop leadership		Special Rules	Equipment Required				
Other sports recommended at this s spring are gymnastics, ballet and da months, team sports where overall (canoe/kayak, lacrosse, soccer, ten recommended.	stage during fall, winter and ance. During the summer coordination is dominant nis, and baseball) are	N/A	Swimsuit, nose clip, goggles, swim cap, stereo, music, running shoes, shorts, flutter boards, yoga mat				

- Propulsion
- Swimming

AquaGO! Program Overview

AquaGO! Program Sj	pec	ifics:												
LTAD Sta	ge:	Activ	e Start	FUNdamentals		Learn to Train			Train to Train					
Chronological A	ge:	F/N	15-6		F 6-8 / M F 6-9			F 8-11 / M 9-12			F 11-15 / M 12-16			
Lev (*Levels 7-12 are in developm	/el: ent)	1 2		3	4	5	6	7	8	9	10	11	12	
Rewa (stickers and swim ca	rds ap):	orange green		yellow	red	blue	purple	TBD	TBD	TBD	TBD	TBD	TBD	
Training Frequency/we	ek:	1 day p	er week		1-2 days	per week		1-2 d	ays per v	week	1-2	days per w	reek	
Athletic Abilities:														
Physical Literacy (ABC'S, RJT, KGB's, CPK's)*		5.	5-10 5-10			15			15					
Swimming Fundamentals	s		15		10-	-20			15			15-25		
Suppleness (Flexibility)	ute	-	10		10	-15		25 (la	and & w	ater)	25 (land & wa	iter)	
Strength & Core	Min		5		Į.	5		15			15-20			
Speed		5			ļ	5		10 (land & water)			10-15 (land & water)			
Rhythm/ Dance			5		5		above abilities			above abilities				
Artistic Swimming Fundan	nent	al Skills	:											
Figures:														
Basic Sculling 7.5			5-10				10			10-15				
Basic Positions 3 7.5		5-10			10				10-15					
Basic Transitions	Basic Transitions 0		0	5-10			5				5-15			
Routines:	Σ			1				<u> </u>	10			10,00		
Creative routine skills			0		5-	·10			10 5		5-15			
Total Training time / we	ek:	1.0 per	hour week	1.0-1.25 hours per week			2.0 hours per week			2.0-3.0 hours per week				
Practice other spor	ts:	Winter/Spring/Fall: 1-2 other activities (gymnastics, ballet, dance) Summer: 1-3 other activities (team sports, RJT)												
Volume of training	ng:						Lo	W						
Intensity of Traini	ng:						Lo	W						
Delive	Delivery: Clubs and Aquatic Facilities													
Evaluations:			Specific competencies achieved for each level											
Competitions:			None											
Coach Certification:				AquaGO! Instructor NCCP Fundamental Movement Skills (optional)										

* ABC = agility, balance, coordination

RJT = run, jump, throw

KGB's = kinesthesia, gliding, buoyancy, striking with an object (ie: hitting a baseball with the bat)

CPK's = catching, passing, kicking, striking with body (ie: kicking a soccer ball with foot)

The **Canada Artistic Swimming Competitive Program** consists of programming for **Learn to Train** up to **Sync for Life** athletes, who meet the recommended minimum age requirement of 9 years of age on or before December 31st of the competition calendar year:

Stage		Chronological Age* *on average	Competitive Program	Program Goal		
8	8 Sync for Life Any age		Masters	"Sync for Life"		
7	Perform to Win	F18+/M19+	Performance Competitors	"Perform to Win"		
6	Learn to Win	F18+/M19+		"Building the podium		
5	Train to Compete	F15-18/M16-19	Advanced Competitors	potential"		
4	Train to Train	Phase 1 F11-12/M12-14 Phase 2 F13-15/M14-16	Developing Competitors	"Being Identified"		
3	Learn to Train	F8-11/M9-12	New Competitors	"Building the foundation"		

Swimmers may enter the Competitive Program from AquaGO! levels 3-9. It is also possible that a first-time artistic swimming participant with the desired amount of general training age experience in complementary sports (such as gymnastics, dance, diving, or swimming) may directly enter into the Competitive Program.

The **Learn to Train** stage is a critical stage for artistic swimming due to the sports' highly kinaesthetic nature, where the mastery of skills listed above (suppleness, speed and fundamental movements) is essential. "New Competitors" at the **Learn to Train** stage are learning the fundamental components of each skill, usually through structured practice or training sessions. The key objective is to automate the process so that the athlete is able to perform the skill with a degree of consistency and with good mechanics. Athletes learn, develop and acquire the technical sport skills required to pursue a life-long career in artistic swimming and or transfer to another sport.

Moving into the **Train the Train** stage, the competitive program is divided into two phases; Phase 1(for ages F11-12/M12-14) and Phase 2 (for ages F13-15/M14-16). During this stage these "Developing Competitors" repeatedly perform the basic skills and transitions with accuracy and consistency. Athletes develop power and accuracy for required skills and are able to perform the basic skills and transitions in competition, on demand, as part of their athletic repertoire.

In addition, once a skill or physical capacity (suppleness/speed) has been achieved there is a need to ensure that capacity is not de-trained and skills do not deteriorate. In general, a skill or level of conditioning can be maintained with a lower level of training or practice than was necessary to reach the refined stage.

When athletes progress to the **Train to Compete** stage they evolve into "Advanced Competitors". During this stage the accurate performance of skills is highly automated in competition, and the athlete is capable of adjusting their acquired skills to rapidly changing circumstances and sub-optimal conditions. Athletes may also develop new variants of the skill.

Athletes transitioning to the **Learn to Win** stage, are still designated as "Advanced Competitors" but participating at the Senior (18+/19+) level. These athletes continue to master the competitive foundations built at the Train to Compete stage and build their elite skills to transition to the Perform to Win stage. Athletes participating as "Advanced Competitors" are introduced to training with an integrated support team of experts in sport science in some capacity. Many athletes remain within their club at this level, however, with the emergence of Regional Training Centres, athletes at the top of these stages may train at these centres as well as potentially with the Full-Time Training Group.

COMPETITIVE PROGRAM

Embedded in Canada Artistic Swimming's Competitive Program is the **Podium Pathway**, which is defined as the sport-defined excellence stages of athlete development and encompasses the concepts of podium potential, podium success, podium results track/winning style of performance and gold medal profile.

Targeted Excellence commences in artistic swimming at the Train to Train stage. **Targeted Excellence** involves the targeting of **podium potential** athletes to achieve **podium success**. From the pool of athletes in Train to Train and Train to Compete (for late maturers), **Podium Identification & Development** is the entry point to the Podium Pathway, which is characterized by deliberate athlete identification and development processes using podium results track benchmarks and gold medal profile indicators. Identified athletes enter Canada Artistic Swimming's targeted excellence program and are supported both nationally and provincially through enhanced training opportunities including camps, national and provincial team program, and attending national and international competitions.



Podium Potential describes the targeted athlete tracking to podium success based on predictive competition results and gold medal profile indicators. Athletes with podium potential will be monitored in the enhanced training environment and tracked in competition to predict progression towards podium success.

Podium Success is the desired performance end state. It describes athletes achieving podium performances on the FINA World Series Circuit, at World Championships and/or Olympic/Paralympic Games.

COPSIN represents the Canadian Olympic and Paralympic Sports Institute Network.

The **Perform to Win** stage is for "Performance Competitors". These Full-Time Training Group athletes will be training at the highest level with support from an integrated support team of experts in sport science and other areas required to support performance athletes. These athletes have accomplished results on the podium track and the necessary skills and attributes outlined in the gold medal profile. These "Performance Competitors" strive for accurate performance of the most difficult technical skills of the sport, with multiple variants. These athletes can repeat on demand the "Winning Style of Performance", which will culminate in the ultimate pinnacle podium performance.

The Sync for Life stage within the competitive program offers the opportunity for University and Masters participants to enjoy the sport while pursing competitive opportunities available for adult competitors. Competitive opportunities include University Championships and Masters Nationals, Masters World Championships as well as various Masters international invitational opportunities. Further, provinces may also include Masters events within their provincial competition structure.

PODIUM PATHWAY

- Athletes enter the development pathway at the base via Stage 1-3 (Active Start, FUNdamentals and Learn to Train) programming offered by club and municipal programs.
- Athletes progress to T2T Phase 1 where NSO/PSO's identify and develop athletes with podium potential, offer the opportunity to train in enhanced training environments and track results to predict progression towards podium success.
- In the Train to Train (Phase 2) athletes have the opportunity to be identified for a National 13-15 Team as well identified as an athlete with national team podium potential, which may include invitations to enhanced training environment opportunities. PSO led initiatives may include a 13-15 Provincial Team Program and a 13-15 development program where athletes receive supplementary support above and beyond what their club program can offer.
- Athletes progress through the system to the Train to Compete Junior stage. Podium potential athletes will be identified both provincially and nationally. These athletes have the opportunity to vie for entry into a Regional Training Centre as well as the Junior National Team Program. Province's may also offer a Junior Provincial Team program and/or development program.
- The pinnacle of the pathway is the Learn to Win and Perform to Win stages where athletes vie for entry into the Full-Time Training Group and to represent Canada at elite international competitions.



MAIN GOAL: To master physical and aquatic literacy skills, accomplish targeted physical capacities, and build the foundation of artistic swimming skills.

Athletes at the Learn to Train (L2T) stage discover what artistic swimming is all about and how much fun it can be. Trained coaches establish a culture of challenge and fun as they address mastering physical and aquatic literacy, suppleness and segmental speed, and build the foundation in artistic swimming-specific skills and techniques; swimming, propulsion, positions, sculling, patterns and rhythm. Swimmers are provided competitive opportunities at the local and provincial level. Talent identification occurs at the end of L2T stage and is based on a number of factors including suppleness, skill and genetic predisposition.

The key objectives of the Learn to Train program is to:

- \checkmark Consolidate and accomplish fundamental sport skill
- Consolidate and accomplish suppleness (flexibility) ✓
- Consolidate and accomplish relative strength/ core \checkmark
- Consolidate and accomplish segmental speed (<5sec)
- Become proficient with musicality and rhythm. ✓
- Introduce ancillary capacities \checkmark

Acquired competencies will assess the level of mastery of fundamental sport skills and artistic swimming technical specific skills. The artistic swimming focus in the Learn to Train program is to refine the horizontal figure and artistic swimming routine skills (ie: layouts), consolidate and refine ½ vertical figure and routine artistic swimming skills (ie: inverted tuck and front pike), and develop and consolidate the vertical figure positions (ie: bent knee, fishtail).

Training aspects covered:

Athletic Capacities:

✓ Suppleness Agility

Balance

✓

✓

✓ Rolling Skipping

✓ Twisting

Jumping

- ✓ Running

Coordination

- ✓ Climbing
- ✓ Segmental
- speed

Artistic Swimming Specific Capacities:

- ✓ Body Positions
- ✓ Sculling
- ✓ Patterns & Shapes
- ✓ Rhvthm & Musicality

Technical Instruction:

- Mastering suppleness, segmental speed, physical and aquatic literacy (all fundamental movement skills "FMS", including balance, rolling, skipping, twisting and jumping) are the critical competencies to train during the Learn to Train stage.
- Athletes develop relative strength and excellent core strength through a multi-sport land-training program.
- Artistic swimming specific skills such as basic sculling, basic position, routine patterns, swimming and propulsion are • developed.

Land to Water Ratio: 1:1(land training : water training)-> example 60 min on land and 60 min in the water

Partners Involved: PSOs and Clubs, gymnastics programs, ballet instructors, team sports programs

Coach Training: Online training, Competition Introduction

Resources: Learn to Train (STAR 1-6) Technical Package, Learn to Train Coaches Manual, Competition Introduction Course/Manual/Evaluation, Canada Artistic Swimming - A Parent's Guide to Artistic Swimming

- ✓ Swimming
- ✓ Propulsion

New Competitor:

The New Competitor athlete development program consolidates and refines physical and aquatic literacy through programming that requires the athlete to become proficient in fundamental movement skills, fundamental motor skills and fundamental sport skills. Athletes participating in the New Competitors program will be evaluated on specific skills and competencies during evaluations (STAR 1-6) and competitions. The evaluation structure is based on skill mastery and is independent of the FINA structure. An example is to evaluate mastery of fundamental movement skills, physical literacy and basic transition competencies instead of FINA figures. In the routine component, the times and structure of the routine will be different than those suggested in FINA as well as the number required to make a team as examples.

The details of the program are explained in the Learn to Train Technical Package and Learn to Train Coaches Manual. This includes the breakdown of skills with respect to each athletic ability: fundamental movements (physical and aquatic literacy), suppleness, strength/core strength, speed, swimming/stamina, ballet/dance, rhythm & musicality and artistic swimming skills; the competencies for each level; the NCCP requirements; and a recommended competition structure.

Snapshot of Learn to Train (L2T) Training:

- Land warm-up (FMS)/cool down Basic Positions Segmental speed Strength **Core Strength** Suppleness/Flexibility Pattern skills awareness
 - Basic Sculling Routine propulsion Creative routine skills Relaxation techniques

Basic rules Assuming responsibilities Introduction to positive thinking Setting and completing simple goals **Dealing with failure**

Basic imagery Maintaining focus Making decisions **Team cohesion** Swimmina

*Periodization will provide the principle of sequencing for all of the above activities to avoid interference between them.

Other complementary sports recommended at this stage during fall, winter, spring and summer are gymnastics, ballet and dance.

L2T TRAINING METRICS:

- → LAND: WATER = 1:1
- → TRAINING LOAD:

3 artistic swimming sessions per week in addition to 3 other complementary disciplines per week, e.g.: swimming, ballet, gymnastics, diving, and drama/theatre

➔ TRAINING TO COMPETITION RATIO: 70% Training to 30% Competition Specific Training and actual Competition

About Learn to Train:							
Swimmers per Team	Special Rules						
4-10 swimmers per team	Refer to the L2T Technical Package						
Competition Format	Equipment Required						
Regional & Provincial events in: Speed (land & water) Flexibility (land & water) Basic Sculling Basic Positions Propulsion Routine with expectations (required elements)	Training suits, nose clips, goggles, swim caps, competition suit, club outfit, running shoes, shorts, tubing, yoga mat, water bottle, flutter boards						
Specialization	Evaluators						
No specialization at this stage.	Judges, Evaluators, Coaches						

Influence of growth and maturation factors on training, competition, and recovery:

TRAINING COMPETITION Coaches and parents should be Competitive athletes may vary • ٠ taking the athletes standing and greatly in physical stature nearing sitting height and arm span the end of Learn to Train as we can measurements every three months. have early, average and late Training skill, segmental speed and maturing athletes. • suppleness are critical at this stage. Developmentally appropriate competition system with Growth and maturation at the end of appropriate judging criteria and Learn to Train is prevalent for early competitive events. maturers. Coaches with early maturing

• athletes are developing the physical capacity as per the individual athlete growth spurts and peak height velocity

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RECOVERY

- Coaches, parents, and athletes need to be educated on the various rest and recovery tools required for Learn to Train athletes.
- The importance of sleep quality, sleep phases and common sleep disturbances are critical in coach, parent and athlete education.
- Other recovery techniques, such as hydration, nutrition, and regeneration techniques are integral to introduce during Learn to Train
- Athletes in their growth spurt need more sleep and recovery to promote ultimate growth.

Supporting data for Learn to Train strategies:

- New Competitors account for approximately 27% of membership, therefore a critical stage to develop for advancement in the athlete development pathway.
- 2014 National testing identified that athletes' under the age of 11 need to . improve significantly to accomplish a refined (close to perfection) score in the physical literacy, flexibility and fundamental artistic swimming tests (land tests completed).
- 2014 National testing on 16 general athletic skills reflected a 61% overall score • from all athletes aged 9-10.
- Specifically highlighting flexibility, a key skill to master before the Train to • Train phase, athletes aged 9-10 tested in 2014 scored an average of 51% on split testing, a near-failing grade.
- Specifically highlighting strength (using medicine balls, swiss balls, own body • weight and sport specific devices used at this stage) during the Learn to Train stage, athletes aged 9-10 tested in 2014 scored an average of 73% on plank, and 61% on push-ups. This identifies that this area still needs improvement.

L2T Best in Class

- ☑ Chinese Artistic Swimming implemented a National Land Routine of flexibility and strength skills for all of their under 10 competitors.
- China also includes speed swimming at their Artistic Swimming Provincial Games
- ☑ France implemented National Standards of Excellence for physical and artistic swimming specific skills for competition eligibility.

Program Specifics:								
LTAD sta	Learn to Train							
Competitive Program:			New Competitors					
Chronological Age:				F 8-11/	′ M 9-12	2		
				ST	AR			
Evaluat	ion:	1	1 2 3 4 5 6					
Rewa		TBD						
Training Frequency/we	eek:		Ę	5-6 day	/wee	k		
Total training hrs/we	eek:		1	0-12 hr	rs/wee	k		
Athletic Capacit	ies:		2	-3 day	s/ wee	k		
Physical Literacv*				1	5			
Swimming Fundamentals				4	0			
Suppleness (Flexibility)	lay	(ac	2 compl	20-30m lished	hin dail by end	y of sta	ae)	
Strength/Core	s/ c	(00		1	0	0.010	907	
Segmental Speed	Ite	10min daily (high intensity)						
Speed of locomotion	lin	Trained in swimming (60)						
Ballet	2	25						
Musicality & Rhythm		Integrated into training						
		â	above a	abilitie	S			
Artistic Swimming Specific Capacities:				3 days	/ week	ĩ		
Figures:				7	5			
Basic Sculling			(2	0)				
Basic Positions	p/			(4	0)			
Basic Transitions	tes			(1	5)			
Routines:	n			4	5			
Free routine techniques	Σ			(3	0)			
Creative routine skills				(1	5)			
Practice other sports:			Winter/Spring/Fall/ Summer: Complementary activities such as swimming, gymnastics, ballet, dance					
Volume of train	ing:			Med	lium			
Intensity of Training:			Medium - High					
Delivery:			1	Membe	er Club	S		
Evaluatio	ons:	Specific competencies for each Star						
Competitio	Skills Event / Provincial / Festival							
Coach Certificat	Competition Introduction NCCP Fundamentals							

*ABC = agility, balance, coordination, RJT = run, jump, throw, KGB's = kinesthesia, gliding, buoyancy, striking with an object (ie: hitting a baseball with the bat), CPK's = catching, passing, kicking, striking with body (ie: kicking a soccer ball with foot)

Performance Benchmarks:

Athletes finishing the Learn to Train New Competitors programs, will have accomplished the following individual performance benchmarks:

- ☑ Suppleness: Land Splits: R/L/Centre; Needle: R/L; Water splits (supported): R/L/Centre; Bridge; Prone shoulder extension = completed checklists
- ☑ CANSkip Level 1
- ☑ Speed lower body: Ballet Leg speed test skills testing
- ☑ Speed lower body: 25m front flutter kick on or under 22 sec
- ☑ Speed upper body: 25m Propeller on or under 25 sec
- ☑ Speed total body: 25m Freestyle on or under 20 sec
- ☑ Core strength: Level 3
- ☑ Fundamental movement skills: see page 9
- ☑ Sculling: flat, propeller, paddle/barrel, alligator all 25m, support scull for 15 sec

Accomplished at "Good" judgement level as per FINA manual in Design and Control:

- ☑ Eggbeater and eggbeater boost two arms
- ☑ Layouts and Bent Knee Layout
- 🗹 🛛 Ballet Leg
- ☑ Flamingo
- ☑ Front Pike Position
- ☑ Inverted Tuck
- 🗹 Crane/Fishtail
- Bent Knee Vertical
- ☑ Vertical
- ☑ Vertical Thrust
- ☑ Descents (vertical)
- 🗹 Crane/Fishtail Join
- ☑ Split positions
- 🗹 Surface Arch
- 🗹 Walkout
- ☑ Front Pike Pulldown

Accomplished Style of Performance in a team context:

- Minimal artistic swimming errors
- Covers 1 lap per 1 minute of routine (corner to corner)
- Pattern changes above water: 6-12 per lap
- Hybrids made up of the skills listed above, must include a split position, a ballet leg, no arm eggbeater boost
- Propulsion segments: 4-8 per lap
- ☑ Eggbeater no arms height-check 6.5 or higher
- ☑ Single leg height-check 7.5 or higher for dynamic movements, with at least one sustained position
- ☑ Include one cadence segment in arms or a figure
MAIN GOAL: Develop the competitive foundation, loving challenges and building pride, while providing the opportunity for talented athletes to be identified

At this stage, elite clubs and national teams may express interest in recruiting talented young athletes. Talent identification is based on a number of factors, including suppleness, skill and genetic predisposition. Care must be taken to protect the long-term interests of each athlete. Athletes learn that hard work can be rewarding and fun. They enjoy the sense of pride and satisfaction that comes when meeting a challenge head on. The demands of skill training as well as training loads should increase, thus encouraging improvement in mental toughness, concentration and diligence. Athletes tend to be self-critical and rebellious but have a strong commitment to the team. Athletes will be faced with the decision to move from L2T to T2T or to move in the Sync for Life for more recreational participation in artistic swimming. During this stage trained coaches address the sensitive periods of trainability to train SPEED, STAMINA and STRENGTH in order to maximize the athlete's development. During competitions, athletes compete to achieve their best, but the major focus of training is on building an aerobic endurance base, developing speed and strength, and consolidating artistic swimming specific skills as opposed to competing.

The key objectives of the Train to Train program is to:

- Consolidate fundamental artistic swimming specific skills (basic sculling, basic positions, basic movements, patterns, propulsion, synchronization, execution)
- ✓ Refine fundamental movement skill
- Maintain suppleness (flexibility) (critical during the growth spurt)
- Individually tailor training programs of athletic abilities based on athlete's developmental age
- ✓ Develop strength and core (critical after PHV)

- Provide opportunities for athletes to pursue either a national or international stream of competition based on talent predisposition and commitment level.
- Consolidate stamina
- ✓ **Refine speed** (critical between 11-13 years of age)
- Develop ancillary capacities
- Place special emphasis on optimum preparation by 'modeling' competitions
- Introduce Taper and Peak at the end of this stage
- Acquired competencies and trainability guide the advancement through the levels. The artistic swimming focus in the Train to Train program is to consolidate, refine and maintain basic sculling, basic positions and propulsion skills; develop, consolidate and refine figure transitions and routine propulsion, patterns, entries, and transitions; and to develop and consolidate creative routine skills.
- The Train to Train athlete development program builds on the athletes' athletic foundation, while developing athletic abilities that are critical at this stage of development: speed, stamina and strength, as per each athlete individual growth.
- The Train to Train program consists of two phases for this age group:
 - Phase 1 is for females aged 11-12 years of age and males 12-13 years of age
 - \circ $\,$ $\,$ Phase 2 is for females aged 13-15 years of age and males 14-16 years of age $\,$
- Coaches must implement in their daily training environments, the capacity to identify the individual growth spurts of each athlete and train the physical (stamina and strength), psychological and life skills appropriately. Coaches should implement three training groups based on each athlete's individual needs; either as an early, average or late maturer.
- With respect to the technical, tactical and choreographic training, coaches can train these abilities in the team environment.

- Athletes in the program may participate in provincial, national and international competitions. Eligibility into the national competitions is based on accomplished competencies at the provincial championship.
- Talent identification and an athlete's ambitions will largely determine whether the athlete pursues the national and international stream of training and competition.

Training aspects covered:

Athletic Capacities:

- Speed
- Stamina
- Strength
- Ancillary skills

Mental Training Introduces:

- Pre-competition routine
- Mental preparation
- Goal setting
- Coping with success and failure
- ☑ Tracking growth spurt of each athlete is <u>critical</u> in T2T stage
- ☑ Introduce taper and peak during T2T stage

Artistic Swimming Specific Capacities:

- Advanced body positions, sculls and transitions (FINA Figures)
- Routine skills taught within a more complex environment
- Suppleness
- Rhythm & Musicality
- Patterns & Shapes

Tactical Instruction:

- Emphasis on teamwork
- Develop routines around team strengths
- Suppleness

Lifestyle Instruction:

- Educate athletes and parents on performance nutrition
- Introduce recovery and regeneration techniques
- Introduce injury prevention

Land to Water Ratio: 1:2 (land training : water training)-> example) 60 min on land and 120 min in the water

Partners Involved: NS0 / PS0 / Clubs

Coach Training: Online training, Competition Introduction, Competition Development Trained or Certified

Resources: Train to Train Technical Package & Train to Train Coaches Manual (In development, see Implementation Plan on p.62), Competition Introduction & Development Manuals/Courses/Evaluation, Canada Artistic Swimming – A Parent's Guide to Artistic Swimming

Developing Competitor:

It is critical that **reactive periodization** is implemented at this stage so coaches can monitor the growth spurt of each athlete. Training must react to the tempo of the athletes' growth to ensure accommodation of the developmental implications for each individual athlete as per their growth spurt. Further, the Train to Train stage must be longitudinal in its planning, i.e.: a coach evaluates the team of athletes over a period of time (years) to study the changes in their athletic abilities.

Other aspects to consider in the Train to Train program will be the skills/competencies evaluated at competition. The recommendation is to develop a competition structure independent of the FINA structure for Phase 1 of Train to Train (F11-12/M12-14) based on skills mastery and proper progressions. For example, evaluations of the athletic abilities critical for this stage would be included. Another example would be to evaluate basic transitions at the start of the competitive season (Late Fall/Early Winter), then progressing to performing the entire FINA figure at the end of season Championships (Late Spring). In the routine component, weighting of competencies critical for development and mastery at this stage would be integrated into the final score. In addition, recommendations regarding skills encouraged in routines for each level would be included.

For athletes in Phase 2 of Train to Train (F13-15/M14-16), the concept of a modified FINA judging scale, where weighting for certain aspects would be integrated, is being considered and analyzed as the potential evaluation system implemented. Swimmers would be assessed in the categories of figures, solo, duet and team, according to a modified and expanded marking scale in the FINA Judges and Coaching Manual. In addition, in-season evaluations and monitoring of physical competencies would be compulsory.

Details of the Train to Train program will be explained in the **Train to Train Technical Package** and **Train to Train Coaches Manual** (In development, see Implementation Plan on p.62). This includes the breakdown of skills with respect to each athletic ability: suppleness, strength/core strength, speed, swimming/stamina, ballet/dance, rhythm & musicality and artistic swimming skills; the competencies for each level; the NCCP requirements; and a recommended competition structure.

Snapshot of Train to Train (T2T) Training:

- * Train aerobic endurance at start of growth spurt
- * Train suppleness (vital during growth spurt)
- * Train speed (vital during age 11:13)
- * Introduce free weights for strength training (based on PHV)

Promote physical care (injury prevention and treatment) Introduce team tactics/strategies Teach progressively higher-level skills and transitions throughout stage Develop breath holding training and strategies Develop ancillary skills Stress mental preparation and tenacity Introduce sport psychology Build team dynamics and communication Emphasize work ethic, dedication, and responsibility Introduce and develop leadership Introduce taper

*Periodization will provide the principle of sequencing of all of the above activities to avoid interference between them

*Athletes will move toward year-round involvement at the END of Stage 4. Specifically, in individual routines, solo or duet, is being introduced.

About Train to Train:					
Swimmers per Team	Special Rules				
6-8 swimmers per team	Refer to the T2T Technical Package				
Competition Format	Equipment Required				
Speed events (land & water) Flexibility events (land & water) Propulsion events Set routine with elements FINA 11-12 or 13-15 Figures, Solo, Duet and Team at: Provincial Championships, National Qualifier (T2T P2 only), National Championships, Canada Winter Games (T2T P2 only), FINA Youth Worlds, UANA 13-15 Championships or Mediterranean Cup (T2T P2 only)	Training suits, nose clips, goggles, swim caps, competition suit(s), club outfit, running shoes, shorts, tubing, yoga mat, water bottle, flutter boards				
Specialization	Evaluators				
Solo & Duet	Judges, Nationally Trained Evaluators				



T2T TRAINING METRICS:

- ➔ LAND:WATER = 1:2
- TRAINING LOAD MIN-MAX:
 2-3 hours (6x week) in water including warm-up, plus complementary disciplines per week, e.g.:
 ballet, strength training/fundamental strength & Pilates
- TRAINING TO COMPETITION RATIO: 60% Training to 40% Competition Specific Training and actual Competition

Influence of growth and maturation factors on training, competition, and recovery:

TRAINING	COMPETITION	RECOVERY
 Growth and maturation is prevalent for athletes in Train to Train. Coaches must adapt training based on INDIVIDUAL athlete growth development. Coaches must develop individual training programs for Aerobic Power and Strength as per each athlete's developmental age. Artistic swimming specific training for figures and routines can combine athletes of different developmental ages. It is recommended to investigate the possibility of supporting each athlete's developmental age by grouping athletes of similar developmental age together for both figures and routine training. Provide support and encouragement for the late maturing athlete to continue training. 	 Competitive athletes may vary greatly in physical stature during Train to Train as we can have early, average, and late maturing athletes. Developmentally appropriate competition system with appropriate judging criteria and competitive events. 	 Coaches, parents, and athletes need to be educated on the various rest and recovery tools required for Train to Train athletes. The importance of sleep quality, sleep phases and common sleep disturbances are critical in coach, parent and athlete education. Nutrition education Other recovery techniques, such as hydration and regeneration techniques are integral to introduce during Train to Train Athletes' in their growth spurt need more sleep and recovery to promote ultimate growth.

• By taking and tracking athlete measurements every three months, coaches understand the process of change in centre of gravity, leg length and arm span and its effect on loss of balance coordination due to rapid growth.

Supporting data for Train to Train strategies:

- Developing Competitors account for approximately 50% or half of the national competitive athlete membership, therefore a high-priority stage to develop for advancement and retention in the artistic swimming athlete development pathway.
- 2014 National testing on 16 general athletic skills reflected a 72% overall score from all athletes aged 11-12.
- 2014 National testing on 16 general athletic skills reflected an 81% overall score from all athletes aged 13-15.
- Specifically highlighting suppleness, critical to maintain at this stage, athletes aged 11-12 tested in 2014 scored an average of 66% on split testing, and athletes ages 13-15 scored an average of 75%.
- Specifically highlighting strength, a key skill to continue to develop during the Train to Train stage, athletes aged 11-12 tested in 2014 scored an average of 82% on plank, and 70% on push-ups, and athletes ages 13-15 scored an average of 89% on plank, and 82% on push-ups.

Best in Class...

- Canada Artistic Swimming has implemented Land Skills Events at the National Championships for 11-12 since 2011.
- ✓ Ukraine trains all flexibility skills on land: <u>https://www.youtube.com/watch</u> <u>?v=FxkXq7TW420</u>
- Canada Artistic Swimming implemented a national monitoring system to identify strength and weaknesses in the athletes' podium performance benchmarks.



Program Specifics:				
LTAD sta	LTAD stage:		in to Train	
Competitive Program:		Developing Competitors		
Chronological A	Chronological Age:		Phase 2 F13-15/M14-16	
Competitive Progr Evaluati	am on:	SuperSTAR 1-5 (In implementatio	development, see n plan on p.62)	
Rewa	ard:	TE	3D	
Training Frequency/we	ek:	6 days/week	6-9 trainings/week	
Total training hrs/we	ek:	12-14 hrs/week	16-18 hrs/week	
Overview	of th	e breakdown of T2T trainin	g times.	
Time to task	(will	vary depending on the train	ing phase.	
Athletic Capaciti	es:	2-3 days/ week	2-4 trainings/ week	
Physical Literacy		Maintain (ABC, R	JT, KGBs, CPKs)	TΑ
Swimming Fundamentals		up to 60	up to 60	RG
Suppleness (Flexibility)	ay	30 (to maintain)	30 (to maintain)	E
Strength/Core	s/ d	Up to 45	Up to 90	Ü
Segmental Speed	tes	10 min daily at	10 min daily at	
	inu	high intensity	high intensity	Ë
Speed of locomotion	Σ	I rained in swimming (60)	I rained in swimming (60)	Ë
Ballet		45	45	Ē
Musicality & Rhythm		Integrated into trai	ning above abilities	Ê
Artistic Swimm Specific Capaciti	ing ies:	3-4 days/ week	4-5 trainings/ week	- POE
Figures:		75	75	
Basic Sculling	ay	(15)	(15)	M P
Basic Positions	p /:	(30)	(20)	TO
Basic Transitions	tes	(30)	(40)	E
Routines:	inu	45	60	ΓΙΑ
Free routine techniques	Σ	(30)	(45)	
Creative routine skills		(15)	(15)	8
Practice other spor	rts:	Winter/Spring/Fall/ Summe such as swimming, gyr	r: Complementary activities nnastics, ballet, dance	DEVE
Volume of traini	ng:	Medium-High	High (progressively increasing)	LOPY
Intensity of Traini	ng:	Medium-High	High	IEN
Delivery:		Membe	r Clubs	-
Evaluations:		Specific competenci	es achieved for each	
		SuperSTAR (in	development)+	
		Targeted Excellence	- Podium Potential ID	
		Skilla Evant	Skills Event	
			♥ Provincial	
Competitions:		Provincial	K Y	
		Notional Factive	National Festival	
		inational restival	↓ International	
		Compatition		
Coach Certificati	on:	NCCP Fundamentals		

Performance Benchmarks:

Athletes finishing the Train to Train Developing Competitors programs, will have accomplished the following individual performance benchmarks:

- ☑ Anaerobic Lactic: 225m hypoxic swim under 3m10sec
- ☑ Pull-ups: >5 repetitions
- ☑ 30 sec Pike-ups: >20 repetitions
- ☑ Shoulder extension = minimum 45 degree angle to the floor
- ☑ Toe Flexion and Knee Extension maintained during all figures and routines
- ☑ Suppleness: 180° flat split in figures and routines
- ☑ Tripod headstand position: hold 15 sec
- ☑ Speed lower body: 25m front flutter kick on or under 20 sec
- ☑ Speed upper body: 25m propeller on or under 22 sec
- ☑ Speed total body: 25m Freestyle on or under 18 sec
- ☑ Speed total body: 50m artistic swimming specific swim (phase 1) under 2m15s; 150m artistic swimming specific swim (phase 2)
- ☑ Sculling: overhead, spin, split
- ☑ Stamina: 200m IM in 2m30s-3m

Basic skills accomplished to "Good" judgement level as per FINA:

- ☑ Eggbeater double arms = 8.0 height check
- ☑ Body boost two arms = 8.0 height
- ☑ Barracuda Rocket = 8.0 height
- ☑ Vertical hold 15 sec = 8.0 height
- ☑ Cont. spin in vertical position (min 3 spins)
- ☑ NO travel in FINA Figures
- ☑ Design & Control scores >7.1 in all FINA Figures

Accomplished Style of Performance in a team context:

- ☑ Minimal artistic swimming errors
- Covers 1 lap/1 minute or less of routine (corner to corner)
- ☑ Pattern changes above water: 10-20/lap
- ☑ Hybrids must include the following: a split position & walkout, a ballet leg, vertical sustained height (min 4 counts), vertical thrust
- ☑ Propulsion segments: 6-10 per lap
- ☑ Eggbeater double arms height-check 8.5 or higher
- ☑ Single leg height-check 9.5
- ☑ Include one cadence figure with one pattern change
- ☑ Minimum of 1 double arm eggbeater boost

TRAIN TO COMPETE - ADVANCED COMPETITOR

MAIN GOAL: Mastering the competitive foundations and preparing for challenge of performance

At the Train to Compete stage, athletes build on their competitive foundations developed in the Train to Train stage. Their demanding sport-specific physical, tactical and technical training programs are preparing them for the challenges of performance. Athletes are now proficient at performing technical artistic swimming-specific skills are working to gain more competition maturity as they train to compete these skills under a variety of competitive conditions.

The Train to Compete is for females aged 15+/- to 18+/- years of age and males 16 to 19+/- years of age. Athletes in the program will participate in provincial, national and international competitions. Eligibility into the national competitions is based on accomplished competencies at the respective Provincial Championships. Eligibility into international competitions requires athletes to qualify for the Junior National Team or attain approval from the NSO via the official bid process. At this stage, fulfillment of each athlete's potential depends on their own efforts, the support of teammates and the unselfish guidance of the coach. Athletes must be exposed to quality competitions and training environments which extend their mental, physical, tactical and technical capabilities to their limit. Athletes must have a sound understanding of artistic swimming principles and concepts, and they should show emotional stability when confronted with pressure situations.

The key objectives of the Train to Compete program is to:

- ✓ Refine athletic abilities: stamina, strength, speed-strength, speed-endurance, suppleness
- ✓ Refine artistic swimming specific skills (basic sculling, basic positions, basic movements, patterns, propulsion, synchronization, execution)
- Provide opportunities for athletes to pursue either a national or international stream of competition based on talent predisposition and commitment level
- ✓ Optimize Taper and Peak
- Learn to compete under any circumstance, i.e.: hot/cold temperatures, too much light, acoustics, not enough warm-up time, delays (transportation, weather).

The artistic swimming focus in the Train to Compete stage is to consolidate, refine and maintain advanced sculling, advanced positions and propulsion skills; develop, consolidate and refine advanced figure transitions and routine propulsion, patterns, entries, and transitions; to develop and consolidate advanced creative routine skills and to train for competitions, and to optimize taper and peak performances.

The details of the program are explained in the **Train to Compete/Learn to Win Technical Package** and the **Train to Compete/Learn to Win Coaches Manual** (In development, see Implementation Plan on p.62). This includes the expectations required in the four components of the athlete development matrix: Technical & tactical, Physical, Mental and Life skills, the NCCP requirements and a recommended competition structure.

Training aspects covered:

Athletic Capacities:

- Conditioning specific to positions, individuals and artistic swimming skills.
- Maintain or increase segmental speed, suppleness, agility, aerobic and anaerobic endurance, core strength and scapular stability.
- Prevention and care of injuries.

- Fatigue management for optimal training and performances
- Individualization of physical training.
- Testing is crucial to monitor progress. Athletes strive to achieve NextGen and Gold Medal Profile standards.
- Optimize Taper and Peak
- Optimize ancillary capacities

TRAIN TO COMPETE – ADVANCED COMPETITOR

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Tactical Instruction:

- Emphasis on individual & team goals •
- Linkage between athletes and team
- Advanced team preparation and fatigue • management strategies
- Effective use of set strategies •

Artistic Swimming Specific Capacities:

- Consolidation of position specific training i.e.: highlight flyer, highlight pusher, highlight stack •
- Consolidation of Technical Element skills: body line, height, stability, core strength
- Consolidation of advanced physical techniques and skills •
- Athletes striving to achieve NextGEN and Gold Medal Profile standards. •

Mental Training Introduces:

- Pre-competition self-talk, imagery, thought-stopping, goal setting, mental toughness, anxiety control and relaxation.
- Technique to re-focus. •
- Maintaining mental skills under • pressure and fatigue
- Performance analysis to identify . mental weakness

Lifestyle Instruction:

- Understand periodized training plans
- Balancing training & lifestyle needs •
- Responsibility and self-discipline. •
- Planning for career/ sport options
- Scholarships and compensation • schemes.
- Integration of artistic swimming, career and life goals

Ancillary Capacities Optimized:

Stretching ٠

Ability to adapt to competition, schedule and travel environment

Artistic Swimming's National Teams and eventually representing

Canada with the Full-Time Training Group for one or more quads

Effective communication strategies individually and as a team Demonstrated dedication and intent of swimming on Canada

- Advanced diet, nutrition & • hydration
- Recovery fatigue management •
- Taper and peak

Land to Water Ratio: 1:2

Partners Involved: NSO / PSO / Clubs

Coach Training: Online training, Competition Development Trained or Certified

Resources: Advanced Competitors Technical Package, Advanced Competitors Coaches Manual (In development, see Implementation Plan on p.62), Competition Development Manuals/Courses/Evaluation, Canada Artistic Swimming - A Parent's Guide to Artistic Swimming

Snapshot of Train to Compete (T2C) Training:

Concentration Responsibility Discipline

Accountability Goal Setting Will to win

Self-Confidence Self-Motivation Mental toughness Competitive mentality in practice & competition

*Periodization will provide the principle of sequencing of all the above activities to avoid interference between them.

*The athlete should now focus on one sport, utilizing year-round training in a guality environment to reach his/her potential and move onto next stage.

* Athletes are taught the importance of being educated and a student of the sport. They are encouraged to watch international competitions through web applications and study the FINA judging manual.

- - Warm-up, Cool down

TRAIN TO COMPETE - ADVANCED COMPETITOR

T2C TRAINING METRICS:

- ➔ LAND:WATER = 1:2
- → TRAINING LOAD: High
- → TRAINING TO COMPETITION RATIO: 40% Training to 60% Competition Specific Training and actual Competition



About Train to Compete: Swimmers per Team **Special Rules** Refer to the T2C 8 swimmers per team Technical Package. **Competition Format** Equipment Required FINA Junior Figures, Technical Training suits, nose clips, and/or Free routines in Solo, goggles, swim caps, Duet, and Team at: competition suit(s), club Provincial Championships outfit, running shoes, National Qualifier shorts, tubing, yoga mat, water bottle, flutter National Championships Canada Winter Games boards Junior National Team Selections UANA Junior Championships Junior World Championships Specialization **Evaluators** Performing in figures National and International Performing in 1-3 technical and/ level Judges or free routine events

Influence of growth and maturation factors on training, competition, and recovery:

TRAINING

- By T2C most athletes are exposed to slow deceleration to cessation of growth.
- Training loads and intensities are determined gradually by diagnostics.
- All systems are now fully trainable.
- Individual testing is of high importance to implement, to identify both individual and team training priorities.
- Athletes are expected to develop ideal performance state during practices and start to perform on demand
- IST support and performance analysis

COMPETITION

- Monitor for competition stress and anxiety as performance demands are elevated.
- RECOVERY Ensure comfortable sleep environment when travelling and
- competing.Focus on reducing sleep debt.

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- Do not train if unrested and sleep deprived.
- If athletes' sleep is poor, seek help.
- Maintain reliable nutrition routines (breakfast is the important meal of the day).

TRAIN TO COMPETE – ADVANCED COMPETITOR

Supporting Data for Train to Compete Strategies:

• Advanced Competitors account for approximately 17% of the national competitive athlete membership.

- National testing of Junior FINA aged athletes (15-18) has identified main areas that need improvments as: suppleness, maxiumum strength, segmental speed, speed of movement, and core strength-endurance.
- The web graph represents the average flexibility results of Junior athletes (blue line) compared to the podium performance objectives identified (red line)
- International performance at the 2016 Junior Worlds has identified priority areas for improvement as:
 - **Figures:** Canada's team average figure results at the 2016 Junior Worlds was 75.3809. This is 3.5073 points away from the first place team average in figures.
 - **Routine:** Canada's routine score at the 2016 Junior Worlds was 86.7667. This is 5.1666 points away from the first place team routine score.





TRAIN TO COMPETE - ADVANCED COMPETITOR

	ane	Train to Compete		
		E15_18/M16_19		
Competitive Progr	am.	Advanced Competitors		
Competitive Program Evaluat	tion:	N/A		
Training Frequency/w	eek:	8-10 trainings/week	1	
Total training hrs/w	eek:	18.75-22 hrs/week	ĺ	
Overview of the bre Time to task will vary	akdov	wn of T2C training times.		
Athletic Capacities:	acpen			
Swimming		180		
Suppleness (Flexibility)		30 min daily (maintain)		TA
Strength/Core	eek	220		RG
Segmental Speed	N/s	10 min/ training		ETE
Speed of locomotion	ute:	Trained in swimming (60)		
Ballet	4inu	120		Ě
Musicality & Rhythm	1 -	Integrated into training		
		above abilities		
Figures / Technical Elements:		100-140		
Basic Sculling	sek	(20-40)		
Basic Positions	Ň,	(20-40)	GO	Ő
Basic Transitions	tes	(60)	5	
Routines:	inu		Ē	PO
Technical Team		250-290	AL	臣
Free routine techniques		250-290	PR	
Volume of train	ing:	High	1 2 1 2	
Intensity of Train	ing:	High	m	8
Deliv	ery:	Member Clubs	4	
Evaluations:		Targeted Excellence – Podium Potential ID & Tracking Gold Medal Profiling		/ELOPMEN1
Competitions:		Skills Event V Provincial V National Festival V International		F + TRACKING
Special Teams:		Junior Provincial Team Junior National Team		
Coach Certification:		Competition Development Advanced CPE's		

Performance Benchmarks:

Athletes finishing the Train to Compete Advanced Competitors programs, will have accomplished the following performance objectives:

- ☑ Anaerobic Lactic: 300m Hypoxic swim under 4m20sec
- ☑ Pull-ups >11
- ☑ 30 sec Pike-ups: >30 repetitions
- ☑ Shoulder extension = minimum 60 degree angle to the floor
- Toe Flexion and Knee Extension maintained during figures and all routines
- ☑ Suppleness: 180° flat split in figures and all routines
- ☑ Speed lower body: 25m front flutter kick on or under 18 seconds
- ☑ Speed upper body: 25m propeller on or under 20 seconds
- ☑ Speed total body: 25m Freestyle under 15 seconds

Basic skills accomplished to "Very Good" judgement level as per FINA:

- ☑ Eggbeater double arms = 8.5 height
- ☑ Body boost two arms = 8.5 height
- 🗹 🛛 Barracuda Rocket Split = 8.5 height
- ☑ Vertical hold 15 sec = 8.5 height
- ✓ Full twist in vertical position followed by a continuous spin in vertical position = 8.5
- ☑ NO travel in FINA Figures
- ☑ Design & Control scores > 8.0 in all FINA Figures

Accomplished Style of Performance in a team context:

- ☑ Minimal artistic swimming errors
- ☑ Covers 1 lap per minute of routine (corner to corner)
- ☑ Pattern changes: 15-25 per lap
- Hybrids must include the following: a split position & walkout; a double ballet leg; vertical sustained height (minimum 4 counts with minimum 180 twist); rocket split
- ☑ Propulsion segments: 8-12 per lap
- ☑ Eggbeater double arms height check 8.5 or higher
- ☑ Single leg height check 9.5
- ☑ Include one cadence figure with two pattern changes
- ☑ Minimum of 1 double arm eggbeater boost

LEARN TO WIN - ADVANCED COMPETITOR

MAIN GOAL: Learning how to perform to win

At the Learn to Win Stage athletes apply what they've learned and refine their competitive skills as they prepare to enter the world of University and Senior level or Full-Time Training Group artistic swimming. Athletes are now highly skilled and proficient at all competencies, and must now be exposed to quality competitive situations where they can further refine these skills under a variety of competitive situations. With the competitive maturity comes an increasing development of mental, emotional and cognitive skills to allow the athlete to apply advanced techniques and skills, both technical and mental (decision-making).

The Learn to Win Stage is for females aged 18+ years of age and males 19+ years of age. Athletes in the program will participate in Senior/University level provincial, national and international competitions. Eligibility into Senior national events and competitions is based on accomplished competencies at the respective Provincial Championships. Eligibility into Senior international competitions requires athletes to qualify for the Full-Time Training Group. At this stage, talent identification and an athlete's goals will largely determine whether they pursue entry into the Full-Time Training Group program or if they choose to pursue University while continuing to train as a Senior athlete.

The key objectives of the Learn to Win program is to:

- Develop & acquire "Perform to Win" level athletic abilities in the athlete including; stamina, strength, speed-strength, speed-endurance and suppleness
- Develop & acquire "Perform to Win" level of artistic swimming specific skills in the athlete including; height in positions, speed and execution of complex movements, execution of required elements, patterns, propulsion and synchronization
- Provide opportunities for athletes to gain experience in senior level international competitions
- ✓ Maximize taper and peak

The artistic swimming focus in the Learn to Win program is to consolidate and refine technical elements, learn and develop routine propulsion, patterns, entries, and transitions required at the Perform to Win level; to develop and acquire higher level creative routine skills (for both technical and free routines), train for international senior level competitions, and learn how to perform on demand at the elite level.

The details of the program are explained in the **Train to Compete/Learn to Win Technical Package** and the **Train to Compete/Learn to Win Coaches Manual**. This includes the expectations required in the four components of the athlete development matrix: Technical & Tactical, Physical, Mental and Life skills, the NCCP requirements and a recommended competition structure.

Training aspects covered:

Athletic Capacities:

- Individual fitness programs for maintenance and improvement.
- Training, rest and fatigue management are closely monitored.
- Periodization is essential.
- Quadrennial planning is implemented and athletes and team set quadrennial goals.
- Athletes are striving to achieve Gold Medal Profile standards
- Maximize ancillary capacities

Tactical Instruction:

- Tactical instruction teaches decision-making tactical awareness, routine analysis and appreciation, productivity and competitive proficiency.
- High confidence and competency in leadership and routine analysis.
- Clear understanding of team and athlete roles within the system.
- Importance and organization of set pieces for activation, fatigue management and Ideal Performance State.
- Athletes are striving to achieve "Winning Style of Performance" standards.

LEARN TO WIN - ADVANCED COMPETITOR

Artistic Swimming Specific Capacities:

- Technical training emphasizes the refinement of core skills, position specific skills and advanced techniques
- Focus on skills in technical routines to learn to automatize performances under competition.
- Athletes are striving to achieve "Winning Style of Performance" standards

Mental Training:

- Pre-practice and pre-competition routines are consolidated.
- Firm confidence in independent decision making.
- Increased sense of responsibility, accountability, discipline and leadership.
- Competitive mentality and will to win.

Lifestyle Instruction:

- Recovery and regeneration is optimized
- Diet, nutrition and hydration plans and methods are fully understood.
- Self-monitoring is firmly established.
- Balance between training, competition and life outside of sport is well managed.
- Media training and public speaking are consolidated.

Land to Water Ratio: 1:2

Partners Involved: NS0 / PS0 / Clubs / Universities

Coach Training: Online training, Competition Development Certified, Advanced Coaching Diploma

Resources: Advanced Competitors Technical Package & Competition Development Advanced Gradation (CDAG) Coaches Manual (In development, see Implementation Plan on p.62), Competition Development Advanced Gradation (CDAG) Manuals/Courses/Evaluation, Canada Artistic Swimming – A Parent's Guide to Artistic Swimming

<u>Snapshot of Learn to Win (L</u>	2W) Training:	About Learn to Win:		
Concentration	Self-Confidence	Swimmers per Team	Special Rules	
Responsibility Discipline Accountability Competitive mentality in practice & competition	Self-Motivation Will to win Mental toughness Goal Setting	8 swimmers per team	Refer to the Advanced Competitors Technical Package.	
*Periodization will provide t	he principle of sequencing of all the	Competition Format	Equipment Required	
above activities to avoid int * Athletes are taught the imp student of the sport. They ar competitions through web a manual.	portance between them. Doortance of being educated and a re encouraged to watch international pplications and study the FINA judging	FINA Senior Technical and Free events at: Provincial Championships National Qualifier National Senior Championships	Training suits, nose clips, goggles, swim caps, competition suit(s), club/national team outfit, running shoes, shorts, tubing,	
L2W TRAINING METRICS:		University National Championships International Opens	yoga mat, water bottle, advanced equipment as per coach	
→ LAND:WATER = 1:2				
→ TRAINING LOAD MIN-MA	X: Moderate to High	Specialization	Evaluators	
→ TRAINING TO COMPETIT 30% Training to 70% Co Competition	ION RATIO: mpetition Specific Training and actual	Senior Technical Routines Senior Free Routines	National and International level Judges	

LEARN TO WIN - ADVANCED COMPETITOR

Program Specifics:				
LTAD Stage:		Learn to Win		
Age:		F18+/M19+		
Competitive Program:		Advanced Competitors		
Competitive Program Evaluat	ion:	N/A		
Training Frequency/w	eek:	9-12 trainings/week		
Total training hrs/w	eek:	18.75-24 hrs/week		
Athletic Capacities:				
Swimming		180		
Suppleness (Flexibility)		30 min daily (maintain)		
Strength/Core	/ee	220		TΑ
Segmental Speed	s/v	10 min/ training		RGI
Speed of locomotion	ute	Trained in swimming (60)		
Ballet	Min	120-180		
Musicality & Rhythm		Integrated into training above abilities		XECE
Figures / Technical Elements:		100		NC N
Basic Sculling	¥			Ē
Basic Positions	Ne.		Ĭ	PO
Basic Transitions	/se		DM	Ē
Routines:	Jut		ED,	Ч Р
Technical Team	Ξ	200-300		
Free routine techniques		300-450	R	T
Volume of training:		High	Ĩ	
Intensity of Train	ing:	High		DE
Delive	ery:	Member Clubs, Universities, Full-Time Training Group		VELOPM
Evaluations:		Targeted Excellence – Podium Potential Tracking Gold Medal Profiling		IENT & TRA
Competitions:		Skills Event Frovincial K National Festival International		CKING
Special Tea	ms:	Full-Time Training Group		
Coach Certificat	ion:	Competition Development Advanced CPE's		

Performance Benchmarks:

Athletes at the Learn to Win and the Perform to Win stage (see pages 52-53) are evaluated on performance benchmarks as follows:

☑ Specific metrics and performance analyses for athletic capacities and artistic swimming specific skills are done on a regular basis ie; core strength, balance, coordination, flexibility, vertical height, eggbeater boost, etc.

Important Notes:

- Concern can be that having tests leads to focusing more on the outcomes instead of the process.
 For example, at a younger age it is not about height, it is about generating the correct propulsion technique.
- The above tests are for the L2W and P2W stages, but encourage coaches to focus on developing the skills to create the best results on the tests.

PERFORM TO WIN - PERFORMANCE COMPETITOR

MAIN GOAL: Performance excellence at the highest level of the sport

At the Perform to Win Stage, athletes have built and refined the skills and physical capacities necessary to perform to win and deliver consistent high performance and winning competitive experiences on the world competition circuit. The maintenance of their finely developed high performance technical, tactical and synchronization skills is sustained at this elite level to deliver performance excellence on demand during training and a variety of competitive situations. Double periodization with sport specific technical adjustments and refinements as required to maintain top skill proficiency. Athlete's set pinnacle individual and team goals and celebrate the fulfillment of reaching them. Preventative rest periods for fatigue management and injury prevention are very important at this stage, as athletes focus on the capabilities that refine their competitive advantages and roles within the sport.

The Perform to Win Stage is for females aged 18+ years of age and males 19+ years of age. Athletes in the program are exclusively training with the Full-Time Training Group with the highest caliber coaches and an integrated support team of experts in sport science, performance analysis, and other areas as required to achieve international podium success.

The key objectives of the Perform to Win program is to:

- Accomplished "Perform to Win" level athletic abilities in the athlete including; stamina, strength, speed-strength, speedendurance and suppleness
- Accomplished "Perform to Win" level of artistic swimming specific skills in the athlete including; height in positions, speed and execution of complex movements, execution of required elements, patterns, propulsion and synchronization
- ✓ Accomplished ability to perform on demand
- ✓ Have trained and refined all skills at a level that will deliver podium performances at the highest level of the sport
- ✓ Maximize taper and peak

The Perform to Win Program will be executed under the direction of the Full-Time Training Group coaching team and the integrated support team of experts working with the athletes. The NSO's Gold Medal Profile will act as the measurement tool and framework, which defines the highest performance levels required for success at the Perform to Win Stage.

Training aspects covered:

Diagnostics:

• Will tell coaches what to train. Physiological testing, psychological testing and skill analysis will influence the emphasis on training, will uncover athlete's strength & weaknesses so coaches can adjust program accordingly.

Trained Athletic Abilities:

- Individual fitness programs for maintenance and improvement.
- Training, rest and fatigue management are closely monitored.
- Periodization is essential.
- Quadrennial planning is implemented and athletes and team set quadrennial goals.
- Athlete routinely achieve Gold Medal Profile standard of physical testing.
- Maximize taper and peak

Tactical Instruction:

- Tactical instruction teaches decision-making tactical awareness, routine analysis and appreciation, productivity and competitive proficiency.
- High confidence and competency in leadership and routine analysis.
- Clear understanding of team and athlete roles within the system.
- Importance and organization of set pieces for activation, fatigue management and Ideal Performance State.
- Athletes understand and achieve winning style of performance

PERFORM TO WIN - PERFORMANCE COMPETITOR

Technical Instruction:

- Technical training emphasizes the refinement of core skills, position specific skills and advanced techniques and skills in technical and free routines to automatize performances under competition.
- Athletes routinely achieve excellence in "Winning Style of Performance"

Mental Instruction

- Pre-practice and pre-competition routines are automatic.
- Firm confidence in independent decision making.
- Increased sense of responsibility, accountability, discipline and leadership.
- Competitive mentality and will to win.
- Understanding the importance of representing Canada and what success means to self, their sport and the country

Lifestyle Instruction:

- Recovery and regeneration (fatigue management) is maximized
- Diet, nutrition and hydration plans and methods are fully understood.
- Self-monitoring is firmly established
- Balance between training, competition and life outside of sport is well managed
- Media and speaking engagements are mastered.

Land to Water Ratio: 1:2

Partners Involved: NSO, Sport Canada, INS & Canadian Sport Institutes

Coach Training: Online training, Advanced Coaching Diploma (ACD), National/International Clinics

Resources: Canada Artistic Swimming - A Parent's Guide to Artistic Swimming

Snapshot of P2W Train	ing:	About Perform to Win:		
Concentration	Self-Confidence	Swimmers per Team	Special Rules	
Responsibility Discipline Accountability Goal Setting	Self-Motivation Will to win Mental toughness Competitive mentality in practice &	8 swimmers per team	n/a	
	competition	Competition Format	Equipment Required	
*Periodization will provide the principle of sequencing of all the above activities to avoid interference between them. * Athletes are taught the importance of being educated and a student of the sport. They are encouraged to watch international competitions through web applications and study the FINA judging manual.		FINA Senior Technical and Free events at: National Senior Championships FINA World Series FINA World Championships Olympic Games	Training suits, nose clips, goggles, bathing caps, competition suit(s), club/national team outfit, running shoes, shorts, tubing, yoga mat, water bottle, advanced equipment as per coach	
→ LAND:WATER = 1:2		Specialization	Evaluators	
 → TRAINING LOAD: Hi → TRAINING TO COMP 20% Training to 80% Competition 	gh; 9-12 trainings/ week ETITION RATIO: % Competition Specific Training and actual	Senior Technical Routines Senior Free Routines	National and International level Judges	

SYNC FOR LIFE - MASTERS COMPETITOR

MAIN GOAL: Have fun maintaining an active and healthy lifestyle

At the Sync for Life stage, the goal is to have athletes lead an all-round active and healthy life. The Sync for Life program focuses on enabling athletes to make a smooth transition from their competitive careers to lifelong physical activity and participation in sport. Whether athletes choose to continue in the sport of artistic swimming as Masters competitors, professional artistic swimmers, coaches, officials or volunteers, change to a different sport, transition to a career in performance arts or sport administration, or participate in new recreational activities, the skills they learn in artistic swimming will help them succeed in whatever path they choose.

The key objectives of the Sync for Life program is to:

- ✓ Make a smooth transition from competing to living an active life
- ✓ Enjoy sport participation individually or with peers for recreation or competitive pursuits
- \checkmark Share knowledge and lessons learned from experience
- ✓ Be a role model for artistic swimming swimmers

The artistic swimming focus in the Sync for Life program is to maintain the athlete's basic skills, stamina, strength, speed and flexibility, as well as to introduce artistic swimming skills to newcomers to the sport. For retiring athletes, skills both artistic and technical can be transferred to professional performance opportunities and coaching.

Training aspects covered for the Sync for Life athlete:

Trained Athletic Abilities:

- Maintain Stamina
- Maintain Strength
- Maintain Speed
- Maintain Suppleness

Technical Instruction:

- Basic sculling & positions
- Specific Masters routine requirements
- Musicality and patterns

Psychological Skills:

- ✓ Maintain stress-management and time management skills
- ✓ Develop a personal approach to setbacks in sport and life
- ✓ Opportunities for engagement in range of sports for health, wellness and social inclusion

Lifestyle Instruction:

- Promote life balance
- Promote volunteering opportunities
- Aging and injury prevention

Recommended Sync for Life Training & Competition Framework:

- 2-3 training sessions per week at 45-90 minutes per session
- Unlimited activity outside of structured programs
- No periodization, but well-structured programs with appropriate skill progressions, level of activity and learning opportunities in a well-planned positive environment that fosters fun, socializing and the maintenance of fitness
- AquaGO! Masters
- Enter Regional, Provincial, Nationals and International Masters Competitions as desired

ATHLETES WITH A DISABILITY

Athletes with a disability are first and foremost athletes, and for this reason, virtually everything in Canada Artistic Swimming's LTAD Framework is applicable. However, a few additional factors need to be considered when working with athletes with a disability. Athletes with a disability pass through the same stages as able-bodied athletes, although the ages and rate of progress may differ.

- Specific disabilities may advance or slow development for any given chronological age
- The physical literacy skills needed by children with a disability vary greatly depending on the nature and extent of their disability
- Regardless of their previous physical skill, individuals who acquire a disability often have to learn new physical literacy skills such as wheeling, using a prosthetic limb, or accommodating a restricted range of movement.
- All individuals, regardless of their age, must effectively learn the fundamentals of new movement and sport skills so that those skills can be applied to a wide range of sports and recreational activities.
- Sport can play an important role in helping individuals with a physical or intellectual disability to develop a positive self-image and enhance their self-concept.
- Consideration of mental, social and emotional development is particularly important when working with athletes with intellectual disability.
- Many athletes with a disability require adapted equipment or facilities in order to take full advantage of their athletic ability and to minimize the sport-performance impact of their disability.
- Because there may be only a few other athletes with a disability with the same type and/or level of disability, access to appropriate competitive experience may be difficult.

Canada Artistic Swimming Athletes with a Disability Participation Model

Athletes with a disability can participate in the AquaGO! Program progressing through levels 1–12 at a pace that best fits their development. If competing, athletes with a disability can participate in the STAR Program progressing through levels 1–6 at their own pace. Athletes with a disability choosing to compete, can enter as an athlete with a disability "Physical" or an athlete with a disability "Cognitive" competitor with a selection of 5 levels of figures for each discipline, as well as the opportunity to compete in solo, duet or team events. Full athletes with a disability rules are found in the Canada Artistic Swimming Rulebook.

LTAD STA	GE	AGE	RECOMMENDED PROGRAMS	COMPETITION OPTIONS
Stage 8	Active for Life	Any age (18+)	AquaGO! Levels 1-12 STAR 1-6	Skills events, Festivals, Regional and Provincial Competitions + Nationals and AWAD Intl.
Stage 5	Train to Compete	F15-18/M16-19	STAR 1-6	Skills events, Festivals, Regional and Provincial Competitions + Nationals and AWAD Intl.
Stage 4	Train to Train	F11-15/M12-16	STAR 1-6 AquaGO! Levels 10-12	Skills events, Festivals, Regional and Provincial Competitions + Nationals
Stage 3	Learn to Train	F8-11/M9-12	STAR 1-6 AquaGO! Levels 7-9	Skills events, Festivals, Regional and Provincial Competitions
Stage 2	FUNdamentals	F8-11/M9-12	AquaGO! Levels 3-6	No Competition
Stage 1	Active Start	F/M5-6	AquaGO! Levels 1-2	No Competition

CANADA ARTISTIC SWIMMING COMPETITION STRUCTURE

	Competition Style	Age Categories	Competitions
Sync for Life	Masters	19+	Regional Events Provincial Events National Championships International Invitationals Masters Worlds
International	FINA Style (International Rules)	12&Under, 13-15, 16-18, Junior (15-18) Senior (15+)	Olympic Games (Sr) World Championships (Sr) FINA World Series (Sr) Junior Worlds (Jr) World Youth Champs (13-15) Mediterranean Cup (13-15) UANA Championships (12U/13-15/Jr/Sr)
National	FINA Style (International Rules)	11–12, 13–15, Junior (15–18), Senior (15+), Masters (19+)	Canadian Championships (13-15/Jr/Sr) National Qualifier (13-15, Jr, Sr) SYNC Invitational (11-12/13-15/Jr)
Provincial	Skills Events and Competitions	Please verify with your provincial sport organization	Provincial Championships Provincial Qualifying Competitions Provincial Invitationals
Regional	Skills Events & Festivals	Please verify with your provincial sport organization	Regional Skills Events Regional Festivals

- Recommended minimum age of 9 years of age on or before December 31st of the competition calendar year
- Athletes may enter festival and fun competitive events prior to the Learn to Train stage
- Athletes can progress through a competition structure that will offer competition opportunities at the regional, provincial, national and international levels.
- Athletes may attend national and international competitions only if minimum skill level/Canadian standards required has been achieved.
- National level competitions are open to athletes in Train to Train Phase 1 (11–12), Train to Train Phase 2 (13–15), Train to Compete (15–18) and Learn to Win (18+).
- International competitions are available to podium potential athletes as of the Train to Train stage.
- For those athletes participating in Sync for Life, they may select competitive events at the Regional, Provincial, National and International level, allowing them to continue to enjoy competing in the sport at a level of their choosing.
- Athletes with a disability, may also select events available at the Regional, Provincial, National and International level, allowing them to enjoy a competitive experience that best fits their goals.

INSTRUCTOR / COACH DEVELOPMENT

The sport of artistic swimming has adopted an LTAD-aligned/staged approach to its instructor and coach development in order to best serve the participants in each stage of the LTAD Framework. This approach ensures that the instructors or coaches working with participants or athletes in a particular LTAD stage are trained specifically in the areas where these participants require expertise.

Stage 8	Active for Life	Any age	Masters	Competition Introduction Competition Development
Stage 7	Perform to Win	F18+/M19+	Performance Competitors	Competition Development Advanced Graduation (CDAG)
Stage 6	Learn to Win	F18+/M19+		Competition Development
Stage 5	Train to Compete	F15-18/M16-19	Advanced Competitors	Competition Development
Stage 4	Train to Train	Phase 1 F11-12/M12-14 Phase 2 F13-15/M14-16	Developing Competitors	Competition Development Competition Introduction
Stage 3				Competition Introduction AquaGO! Instructor
Stage 2	FUNdamentals	F6-8/M6-9	Learning the FUNdamentals	AquaGO! Instructor
Stage 1	Active Start	F/M 5-6	Learn to Swim	AquaGO! Instructor

AquaGO! Instructor: Instructors trained to deliver the AquaGO! program at a member club, or licensed aquatic facility, municipality, school, or community centre (previously Synchro Instructor).

Competition Introduction Coach: Coaches trained to deliver New Competitor programs (Stages 3-4) and prepare athletes for skills events, festivals and provincial level competitions.

Competition Development Coach: Coaches trained to provide athletes with Train to Train and Train to Compete level training programs and prepare athletes for skills events, provincial and national level competitions.

Competition Development Advanced Gradation (CDAG) Coach: Coaches trained in advanced coaching via the Advanced Coaching Diploma (ACD), which is the pinnacle of a coaches' education in the National Coaching Certification Program. Coaches learn to prepare athletes in the Train to Compete, Learn to Win and Perform to Win stages for national and international competitions at the highest level of each stage.

Though delivery of these coach education programs and ongoing regular support, Canada Artistic Swimming will endeavor to provide instructors/coaches with:

- The opportunity to be involved as leaders in ongoing LTAD program development and improvement.
- Educational and learning opportunities to enhance professional and leadership development.
- Facilitation of communication between coaches in order to build a strong support network and encourage peer to peer learning and mentorship and encourage continual growth and development.
- Facilitation of communication between coaches and officials to ensure a seamless program and continuous improvement.
- Services and support to ensure a smooth transition from club-level coaching to national team-level coaching.
- Delivery of the higher levels of the NCCP in partnership with the National Coaching Institutes.
- Up-to-date coaching resources and tools.
- The opportunity to provide input into the organization's strategic decisions at all levels of participation.
- Competitive salaries and benefit packages for coaches working with national teams.

OFFICIALS DEVELOPMENT

In order to provide athletes with optimal feedback and evaluation the national judging and evaluation system must be aligned with the new Canada Artistic Swimming LTAD Framework. This approach ensures that the officials assessing participants in a particular LTAD stage are trained specifically regarding the skills where these participants require evaluation. Canada Artistic Swimming is undertaking a Judging System Review and Implementation project to align the Canada Artistic Swimming Athlete Development Matrix with the judging system. This will be outlined within the Technical Packages for stages 3-4. Athletes competing in National and International competitions (stages 4-7) will follow FINA (international) rules and guidelines.

Stage 8	Active for Life	Any age	Masters	Level 3-4 Official
Stage 7	Perform to Win	F18+/M19+	Performance Competitors	Level 5 Official
Stage 6	Learn to Win	F18+/M19+	Advanced Competitors	
Stage 5	Train to Compete	F15-18/M16-19	Advanced Competitors	Level 4 Utticial
Stage 4	Train to Train	Phase 1 F11-12/M12-14 Phase 2 F13-15/M14-16	Developing Competitors	Level 2-3 Official
Stage 3				Level 1–2 Official
Stage 2	FUNdamentals	F6-8/M6-9	Learning the FUNdamentals	AquaGO! Instructors
Stage 1	Active Start	F/M 5-6	Learn to Swim	AquaGO! Instructors

AquaGO! Instructor: Trained to evaluate AquaGO! levels 1-12 (Stages 1-3)

Level 1 Official: Trained to evaluate and judge New Competitors (Stage 3) at festivals, regional, and provincial competitions.

Level 2 Official: Trained to evaluate and judge New Competitors (Stage 3) and Developing Competitors (Stage 4) at festivals, regional and provincial competitions.

Level 3 Official: Trained to evaluate Developing Competitors at the Espoir Championships (Stage 4) and Masters and University competitions (Stage 8)

Level 4 Official: Trained to evaluate Advanced Competitors at the Canadian Open Championships and International Competitions (Stage 5), as well as Masters and University competitions (Stage 8).

Level 5 Official: Trained to evaluate Advanced and Performance Competitors for FINA sponsored International competitions (Staged 6-7).

Skills Evaluator: Trained to evaluate general athletic and artistic swimming specific skills at provincial skills events.

Though delivery of these education programs for officials and ongoing regular support, Canada Artistic Swimming will endeavor to provide officials with:

- The opportunity to be involved in LTAD program development and improvement.
- An officials' Education Program that provides the opportunity for advancement.
- Additional training and learning opportunities that facilitates growth and development.
- The facilitation of communication between officials across the country.
- The facilitation of communication between officials and coaches.
- Mentorship opportunities.
- Funding for travel to national and international competitions.
- Services and education to ensure a smooth transition from provincial-level judging to national-level judging.
- Services and education to ensure a smooth transition from national-level judging to international-level judging.

SUPPORTING PARENTS & VOLUNTEERS

Parents and volunteers are a key stakeholder in the artistic swimming community. Not only are parents the main support system for the athlete, they are also the key-decision makers regarding their children, and often also participate and actively engage in the sport as club administrators, meet managers/volunteers, or officials. Without their tremendous support and contribution to the sport, whether as supporters of their children and club, or taking on the role as a Meet Manager for a major competition, the sport could not be adequately delivered to the athletes.

In order to effectively implement the LTAD Framework, communication and support needs to reach these key stakeholders. Through NSO-driven LTAD resources and outreach initiatives, Canada Artistic Swimming will ensure PSOs across the country have the necessary tools to educate their member clubs and volunteers regarding the new framework, the new programs, and the ongoing changes and enhancements to the Canadian artistic swimming competition structure.

The following are key resources for Parents & Volunteers:

- ✓ Canada Artistic Swimming website: www.artisticswimming.ca
- ✓ Canada Artistic Swimming A Parent's Guide to Artistic Swimming
- ✓ Canada Artistic Swimming How to build & run an artistic swimming program or club
- ✓ S4L Sleep, Recovery and Human Performance
- ✓ Mental Fitness, S4L
- ✓ Recovery and Regeneration, S4L
- ✓ The Role of Monitoring Growth in Long-Term Athlete Development, S4L
- ✓ AquaGO! Program Guide
- Learn to Train Technical Package
- ✓ Train to Train Technical Package
- Train to Compete Technical Package
- ✓ Canada Artistic Swimming Rulebook
- ✓ Provincial Rulebook for your province
- ✓ Provincial handbooks/manuals (such as a Meet Manager's Guide) available from the PSO
- ✓ Club handbooks/manuals available from your club
- ✓ PSO and Club websites

*Please also refer to page 63 for a complete list of Canada Artistic Swimming Stakeholder Resources, and planned delivery dates of new resources.

BUILDING FOR THE FUTURE

Building Clubs

There are over 165 artistic swimming clubs across Canada, many of which wish to expand and improve their programming. Canada Artistic Swimming realizes that healthy clubs are the foundation of our past and future success. A key Canada Artistic Swimming objective will be to communicate a development pathway that provides strong direction and clarity in terms of the types of programs and services that should be incorporated in order for clubs to fulfill the LTAD Framework objectives at each of the 8 stages. The success of this pathway will be demonstrated by the increased ability of clubs to sustain quality Artistic swimming programs that cater to community registrants, including very young children, mature adults, and athletes with a disability. A clear LTAD pathway will enable clubs to evaluate the current level of programs and services they offer. It will aid clubs interested in expanding their programming to include more of the stages as well as clubs that choose to focus on specializing in specific stages. The growth of existing clubs and development of new clubs will be crucial to the expansion of artistic swimming. Canada Artistic Swimming aims to support club development by:

- Developing and communicating a clear and concise athlete development pathway through the 8 stages of LTAD, providing an overview of the training requirements at each stage.
- Maintaining committees/working groups that examine existing club structures and make recommendations that foster quality community club development.
- ✓ Maintaining up-to-date resources for all stakeholders on the Canada Artistic Swimming website
- Maintaining a communication structure that will service the needs of the clubs, PSOs, and Canada Artistic Swimming.
- \checkmark Rewarding best practices at the club and provincial levels.

Building a Competitive Structure

Artistic Swimming's LTAD Framework 2.1 recognizes that the competition structure for each stage must meet the needs of athletes in that stage. A competition structure designed to address the objectives of each of the 8 stages will allow children to discover the fun and joy of competition and encourage coaches and clubs to implement NSO-led developmentally appropriate programming. Further national LTAD groups have been formed to address the national competition structure in Canada. These groups, comprised of technical leaders, officials and administrators representing all provinces have contributed to creating a revised structure based on LTAD key factors and the sport-specific needs of artistic swimming.

Stage 8	Active for Life	Any age	Masters	Masters & University Level Competitions
Stage 7	Perform to Win	F18+/M19+	Performance Competitors	Elite FINA-style competitions for Solo, Duet, Mixed Duet, Team, Combo & Highlight
Stage 6	Learn to Win	F18+/M19+	Advanced	Junior & Senior FINA-style competitions
Stage 5	Train to Compete	F15-18/M16-19	Competitors	Highlight
Stage 4	Train to Train	Phase 1 F11-12/M12-14 Phase 2 F13-15/M14-16	Developing Competitors	Speed & Flexibility events (land & water), Propulsion events, Set routine with elements FINA Figures, Solo, Duet, Mixed Duet, and Team events
Stage 3				Speed & Flexibility events (land & water), Basic Sculling, Basic Positions, Propulsion events, Set routine with elements
Stage 2	FUNdamentals	F6-8/M6-9	Learning the FUNdamentals	Participation in end of class demonstrations and
Stage 1	Active Start	F/M 5-6	Learn to Swim	Club Water shows

Building strength through the support of the Provincial Sport Organizations (PSOs)

Provincial Sport Organizations (PSOs) will play the greatest role in the support, delivery and execution of programs for most of LTAD's 8 stages. While the Podium ID & Development, Podium Potential, Podium Results Track and Gold Medal Profile (T2T, T2C, L2W, and P2W) programs will be the responsibility of Canada Artistic Swimming, the PSOs will manage the programs, services, and competitive opportunities for each of the other stages. Canada Artistic Swimming will work in partnership with the provinces for the continued development and implementation of the LTAD Framework by:

- ✓ Ensuring effective communication and delivery of required resources to the provinces.
- ✓ Facilitating communication and information-sharing between the provinces.
- ✓ Providing opportunities and resources for ongoing coach and official education regarding the LTAD Framework
- ✓ Supporting PSOs in the development of provincial funding submissions related to LTAD.
- Liaising with the PSOs to identify strong technical leaders and innovators in each province to be involved with LTAD implementation and future initiatives.

Building National Team Performance

Canada Artistic Swimming is continually striving to build the performance level of national team programming and fostering the development of elite athletes. In order to build a repeatable Podium Pathway, Canada Artistic Swimming is dedicated to implementing the new systems of programming and meaningful competition in the LTAD Framework 2.1 from grassroots to podium success, improving the athletic foundation of our athlete pool and bring Canada to podium success by 2024 and beyond.

Canada Artistic Swimming is working towards finalizing the Podium Results Tracking and Gold Medal Profile for artistic swimming as per Sport for Life and Own the Podium's standards, framework, and objectives. The Gold Medal Profile is a collection of skills and attributes that underpin the performances of athletes capable of stepping onto the World Championships and Olympic Podiums and the metrics by which those skills and attributes are tracked over time. The Gold Medal Profile is an extension of the Athlete Development Matrix, impacting all stages of development within Canada Artistic Swimming's LTAD Framework.

System Objectives (by 2020):

- Fully implemented LTAD program with one stream of comprehensive development that is the same across Canada.
- Provincial competition opportunities align with LTAD principles of meaningful competition and skill development.
- "Train to Compete" Regional Training Centres will be fully functional and aligned with the Podium Pathway.
- Coaches and officials benefit from nationally led education and development opportunities available to them, and can move seamlessly through their respective development pathways.
- Athletes and their parents are educated on the athlete development opportunities available, and can move seamlessly through the competitive pathway.

Performance Objectives (by 2024):

- Canadian Senior National Team is comprised of a pool of athletes who specifically fit the mold outlined in the Gold Medal Profile and consistently achieve Podium Results Track benchmarks.
- Canadian Junior National Team athletes consistently achieve the Junior National Team Podium Results Track Benchmarks and Gold Medal Profile indicators, and deliver top 3 Junior Worlds results in all events.
- Canadian 13-15 National Team athletes consistently achieve the 13-15 National Team Podium Results Track Benchmarks and Gold Medal Profile indicators, and deliver Top 3 figure results for international 13-15 teams.

IMPLEMENTATION

This new LTAD Framework, is the next step in enhancing the system of long-term athlete development for Artistic Swimming in Canada. The document provides an overview of LTAD and a vision for where we want to go. It outlines the gaps in the current system and provides a recommended training emphasis and competition framework for each of the 8 stages. Canada Artistic Swimming recognizes that continuing to implement LTAD will require adjustments at all levels, including organizational staffing, allocation of existing resources, competition structure, programming, and coach and official education. Successful implementation will require strong partnerships between Canada Artistic Swimming and the provinces founded on a common vision, strong leadership, and effective communication. In turn, provinces will need to develop similar partnerships with their clubs and other stakeholders.

LTAD is a "work in progress" that will constantly be reviewed and modified to reflect new research and innovations. Through this phase of implementation, Canada Artistic Swimming will implement the new programs as outlined in this document to support each of the 8 stages. These programs will reflect the information and recommendations detailed in our Athlete Development Matrix. Canada Artistic Swimming is committed to continuing to build effective and strategic partnerships with the PSOs, fellow sports, and other organizations that will help us to continue to implement a successful LTAD strategy for artistic swimming in Canada.

Project	2016-2017	2017-2018	2018-2019	2019-2020	2020-2021	2021-2022					
LTAD ITF	Ongoing support directed at LTAD implementation projects (pending annual review)										
Athlete Development Matrix	Implementation into new Stage 1-8 Athlete Development Programs										
National 11-12 Testing (Espoir)	Ongoing until Espoir 2017, then integrated into Meaningful Competitions for L2T and T2T P1										
NSO-PSO Skills Testing	Skills Testing is being amalgamated into Meaningful Competition for L2T, T2T, T2C *It is recommended PSOs continue Skills Testing during implementation phases										
Competition Structure Review/Meaningful Competition	FPT Plan 42 Work directed at L2T Phase 1	Work directed at L2T P2, T2T P1	Work directed at L2T P3, T2T P2, T2C P1	Work directed at T2T P3, T2C P1	Work directed at T2T P2, T2C P3						
AquaGO!	Phase 2	Phase 3	National Implementation								
Learn to Train	Phase 1 Pilot Project	Phase 2 Pilot Project	Phase 3 Pilot Project	National Implementation							
Train to Train	Periodization Project	Phase 1 Pilot Project	Phase 2 Pilot Project	Phase 3 Pilot Project	National Implementation						
Train to Compete			Phase 1 Pilot Project	Phase 2 Pilot Project	Phase 3 Pilot Project	National Implementation					
Coach/Instructor Resources	Synchro Instructor Review	Pilot AquaGO! Instructor Course	Comp Intro Review National Implementation AquaGO! Instructor Course	Pilot new Comp Intro Course	National Implementation new Comp Intro Course						
Officials Resources	Consultations, resource development & Phase 2 of Competency Based Evaluation (CBE)	Consultations, resource development, review of CBE	Implement online officials education tool								

LTAD Implementation Plan Timeline:

Supporting the implementation of the Canada Artistic Swimming LTAD Framework 2.1, will be new resources to support stakeholders in each of the 8 stages. These resources will reflect the information and recommendations detailed in the Athlete Development Matrix, and the programs that have been designed and developed for specific stages. Canada Artistic Swimming is committed to creating innovative and effective resources that will help us to continue to implement a successful LTAD program for artistic swimming in Canada.

LTAD Implementation - Summary of Stakeholder Resources:

Canada Artistic Swimming Resources	Delivery by:	Coaches/ Instructors	Officials	Athletes	Parents	Volunteers/ Clubs/Meet Managers	Facility Owners/ Operators
www.artisticswimmingcoach.ca	September 2016	Х					
Concussion Management Toolkit	Sept 2016 (Draft)	Х	Х	Х	Х	Х	
Canada Artistic Swimming LTAD Framework 2.0/2.1	June 2017 (2.0) April 2019 (2.1)	Х	Х	Х	Х	Х	Х
Canada Artistic Swimming – A Parent's Guide to Artistic Swimming	June 2017 Rev. April 2019				Х	Х	Х
Canada Artistic Swimming – How to build & run an artistic swimming program or club	June 2018	Х				Х	Х
AquaGO! Instructor Course	Pilot 2017-18 Implement 2018-19	Х					Х
AquaGO! Program Guide	2018 (Final)	Х	Х			Х	Х
Online officials education tool	2018-2019		Х				
Competition Introduction Course & Manual	Available Pilot new 2019-20 Implement 2020-21	Х					
Learn to Train Technical Package	2019 (Final)	Х	Х			Х	
Learn to Train Coaches Manual	2019 (Final)	Х					
Train to Train Technical Package	2020 (Final)	Х	Х			Х	
Train to Train Coaches Manual	2020 (Final)	Х					
Competition Development Course & Manual	Available	Х					
Train to Compete Technical Package	2021(Final)	Х	Х			Х	
Train to Compete Coaches Manual	2021(Final)	Х					
Judge Level 1 Course	Available		Х				
Judge Level 2 Course	Available		Х				
Judge Level 3 Course	Available		Х				
FINA Manual & Handbook	Available (fina.org) Updated every 4 yrs	Х	Х	Х			
Canada Artistic Swimming Rulebook	Available Updated annually	Х	Х	Х		Х	

Canada Artistic Swimming's Long-Term Athlete Development Framework 2.1 - last revised April 2019

ABC'S: Agility, Balance, Coordination, Speed

Active for Life: is a movement within the Sport for Life framework in which Canadians become active for life by developing physical literacy. Along with physical literacy and sport excellence, Active for Life is one of CS4L's three key outcomes. This stage can be entered at any age (after the onset of the growth spurt), beginning with developing physical literacy in infancy, and evolves to being Competitive for Life, Fit for Life and/or Sport and Physical Activity Leaders through all phases of adulthood.

Competitive for Life, within Active for Life, is the final LTAD stage of CS4L, where Canadians are active for life through participation in competitive sport.

Fit for Life, within Active for Life, is the final LTAD stage of CS4L, where Canadians are active for life through participation in recreational physical activity.

Sport and Physical Activity Leaders, within Active for Life, is the final LTAD stage of CS4L, where Canadians contribute to the sport and physical activity experience as professional of volunteer administrators, coaches, instructors, or officials, or through sport science and medicine.

Active suppleness (flexibility): the ability to assume and maintain extended positions using only the tension of the agonists and synergists while the antagonists are being stretched (that is, lifting the leg and keeping it high without any external support other than from your own leg muscles). Source: American Orthopaedic Association for Sports Medicine

Adaptation: a response to a stimulus or a series of stimuli that induces functional and/or morphological changes in the organism. Naturally, the level or 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 of the various adaptation processes, such as adaptation to muscular endurance or maximum strength, are clearly delineated. *Source: Sport Canada*

Adolescence: is the period during which most bodily systems become adult, both structurally and functionally. It is a difficult period to define in terms of the time of its onset and termination. 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 height growth reaches a peak (PHV), begins a slower or decelerative phase and finally terminates with the attainment of adult stature. Functionally, adolescence is usually viewed in terms of sexual maturation, which begins with changes in the neuroendocrine system prior to visible physical changes and terminates with the attainment of fully mature reproductive function. **Aerobic endurance (Stamina):** The ability to sustain a dynamic effort over an extended period of time (normally, efforts lasting several minutes, or even hours).

Agility: The ability to execute movements or change body position and direction quickly and effectively.

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, metal preparation, tapering and peaking. 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.

Within the Long-Term Athlete Development Framework, the **Athlete Development Matrix** (ADM) describes the skills and attributes of athletes progressing through the stages of the Long-Term Athlete Development Framework. The generic Sport for Life Athlete Development Matrix (ADM) guides the National Sport Organizations (NSOs) to create a focused, sport-specific matrix of skills and attributes that optimize athlete development. This establishes the background knowledge to inform NSO program design, coaching programs and materials, and effective competition reviews. In the excellence stages of Long-Term Athlete Development, the ADM skills and attributes underpin the Gold Medal Profile.

Athlete Pool: all registered athletes available to be considered by the NSO for podium ID and development For artistic swimming that would encompass all athletes registered as competitive athletes in the Train to Train phase and older (11 and up).

Balance: the ability to achieve and maintain stability. There are two types of balance: static and dynamic:

Static Balance - ability to retain the centre of mass above the base of support in a stationary position.

Dynamic Balance - ability to maintain balance with body movement.

Canadian Olympic and Paralympic Sport Institute Network (COPSIN) Supported refers to the sport science and sport

medicine support in the competitive and daily training

environment from practitioners employed in the COPSIN.

Canadian Sport for Life (S4L): is a movement to improve the quality of sport and physical activity in Canada. It links sport, education, recreation and health, and aligns community, provincial and national programming. CS4L's vision is quality programs for all Canadians based on developmentally appropriate sport and physical activity. CS4L's mission is to improve the health, wellness and sporting experiences of all Canadians by advancing physical literacy, improving performance and increasing lifelong participation in physical activity. When enacted, CS4L's values and principles link and integrate programs delivered by health, recreation, education and sport, and align programming in clubs, provincial/territorial and national sport and multi-sport organizations. CS4L addresses the overarching system and structure of sport and physical activity in Canada, including the relationship between school sport, physical education and organized sport at all levels, from policy to program delivery.

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. Childhood 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 this time framework.

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

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 shape and position to one another.

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

Sport-specific training age: refers to the number of years since an athlete decided to specialize in one particular sport.

Cognitive Development: the development of the ability to interpret and process information.

Competition: an event where there is ranking with others. Source: Canada Artistic Swimming Rule Book. **Competition-Specific Training**: training that simulates or is specific to competition requirements.

Consolidate: This is the third stage of sport skill acquisition. The skill is stabilized/automized. The athlete is able to perform a skill within a complex context (routine/figure) with moderate consistency, and the skill is performed consistently at 6.0-7.9 level. Example: A ballet leg is now performed within the athlete's figure/routine at 6.0-7.9 level. The athlete is able to perform a ballet leg at varying tempos and combined with transitions.

Coordination: The ability to perform movements in the correct order, and with the right timing.

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 et al., 2004, p. 5). For behavioural, this term "relates to the development of competence in a variety of interrelated domains (social, emotional, intellectual, and motor realms) as the child adjusts to his or her cultural milieu – the amalgam of symbols, values and behaviours that characterize a population".

Physical Development: the growth and development of the body's muscles, bones, and energy systems.

Sensitive periods of development: refer to the points in the development of a specific behaviour when experience or training has an optimal effect on development.

Develop: This is the second stage of sport skill acquisition. The athlete continues to learn the skill. The coach emphasizes repeating/drilling in a variety of ways to strengthen and improve the skill. The athlete is able to perform the skill, but not necessarily combined with other movements. *Example: The athlete is able to perform a ballet leg unassisted and in isolation, but may not be ready to do figure transitions into and out of ballet leg position.*

Dynamic suppleness (flexibility): the ability to perform dynamic (or kinetic) movements of the muscles to bring a limb through its full range of motion in the joints. *Source: American Orthopaedic Association for Sports Medicine*

Emotional Development: the development of self-concept.

Enhanced Training Environments: NSO-driven identification and development of environments for targeted athletes that include access to state-of-art training facilities and worldleading coaches, and that advance support in technology, research, sport science and sport medicine. Enhanced training environments have the required quality, daily training hours to achieve competition results and gold medal profile indicators.

GLOSSARY OF TERMS

Federation Internationale de Natation (FINA): The international governing body for Artistic Swimming.

Figures: a combination of positions and transitions performed in the water, as defined in the FINA manual.

Free Routine: presentations in the water consisting of strokes, and figures, and parts and combinations of these performed to music. These routines may have required elements.

Free Routine Combination: a routine consisting of parts of solo's, duets, trios, and teams.

Fundamental Movement (motor) skills "FMS": refers to the set of movement skills that form the basis for all sports and physical activity.

Fundamental Sport Skills: refers to the set of sport skills that form the basis for each sport.

Fundamental Tactical Skills: Finding a method for an athlete to learn something. A strategy to teach a skill.

The **Gold Medal Profile** (GMP) is the collection of skills and attributes that underpin the performance of an athlete capable of stepping onto the Olympic, Paralympic or World Championship podium. The GMP is based on validated metrics with clear benchmarks for each of the skills and attributes, scaled according to the stage the athlete is at along the Podium Pathway. The GMP is the excellence reference point for all the stage-based profiles in the Long- Term Athlete Development Framework.

Growth: refers to the "observable step-by-step, measurable changes in body size such as height, weight, and percentage of body fat." Source: Long-term athlete development plan for rowing: An Overview.

Ideal Performance State (IPS): the physical, mental, and emotional state when an athlete performs her best.

Intensity: the effort produced to successfully accomplish training tasks. Intensity can be measured as the percentage of maximal speed, difficulty/complexity coefficient, heart beats per minute, percentage of VO2 max, and perception of effort. Optimal intensity in acyclic sports requiring a repertoire of skills is characterized by the greatest strength-speed relationship exerted by the athlete to successfully accomplish the task. The drill or exercise has to be done with a high success rate and without any skill deterioration.

Introduce (acquire, learn): This is the first stage of sport skill acquisition, where a new skill is presented in stable and easy conditions. The coach emphasizes on teaching in a variety of ways. The athlete is able to visualize the skill, but may not be able to perform it. Example: the athlete is shown a ballet leg position. The athlete is now able to identify a ballet leg and understands how to do one, but may not be able to perform a ballet leg unassisted.

Kinesthesia: a sense mediated by receptors located in muscles, tendons, and joints and stimulated by bodily movements and tensions; also: sensory experience derived by from this sense. *Source: Long-Term Athlete Development, Human Kinetics*

Long-Term Athlete Development (LTAD): is a multistage training, competition, and recovery framework guiding an individual's pathway in sport and physical activity from infancy through all phases of adulthood. It progresses from awareness and first involvement, leads to an active start, and continues through to the pursuit for excellence and/or being active for life. LTAD is athlete centered, coach driven and administration, sport science and sponsor supported. Based on S4L principles, LTAD, in a sport-specific context, promotes system alignment and integration between sport club, provincial/ territorial and national sport organizations.

Maturation: refers to "qualitative system changes, both structural and functional in nature, in the organism's progress toward maturity." *Source: Long-term athlete development plan for rowing: An Overview*

Maximum Speed: peak speed reached by an individual.

Maximum Strength: The highest level of tension generated by a muscle or muscle group during a maximum contraction, regardless of the duration of the contraction.

Menarche: refers to the onset of the first menstrual cycle.

Motor Abilities: support the controlled execution of movements. Athletic abilities included in this category include: Agility, Balance, Coordination and Speed.

National Coaching Institutes (NCI): Canada's eight National Coaching Institutes (NCIs) offer qualified coaches the opportunity to learn from a variety of experts in the fields of coaching, sport science, leadership, business, and technology and to share experiences, strategies, and challenges with fellow coaches. They offer highly interactive, practical courses to national sport organization-approved Level 4 candidates.

Nationally-Led refers to deliberate leadership from the National Sport Organization to drive the concept of a Podium Pathway and to implement the programmatic structures and services to achieve podium success.

Passive suppleness (flexibility): the ability to assume extended positions and maintain them using only your weight, the support of your limbs or an apparatus such as a chair or a barre. Note that the ability to maintain the position does not come solely from your muscles as it does with active suppleness (flexibility). Being able to perform the splits is an example of passive suppleness (flexibility). Source: American Orthopaedic Society for Sports Medicine

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Peak Height Velocity (PHV): the maximum rate of growth in stature during the growth spurt. The age of maximum velocity of growth is called the age at PHV. The onset of the growth spurt, the fastest rate of growth, PHV and the onset of menarche are biological markers to identify the sensitive periods of accelerated adaptation to training.

Peak Strength Velocity (PSV): the maximum rate of increase in strength during the growth spurt. The age of maximum increase in height is called the age at PHV.

Periodization: refers to the structuring of short and long-term training, competition, and recovery periods to provide optimum performances at a given date.

Single Periodization: one preparatory and one competition period within the year.

Double Periodization: two preparatory and two competitive periods within the year.

Triple Periodization: three preparatory and three competitive periods within the year.

Multiple Periodization: competing all year-round while maintaining physical and technical skills.

Reactive Periodization: Reacting to the tempo of growth of each athlete and adjusting the training, competition and recovery plans according to the sensitive periods of trainability.

Physical Abilities: are determined by the rate at which energy and force can be produced by the muscles, and by the range through which the movements can be executed. Athletic abilities in this category include: Stamina (aerobic endurance), Maximum Speed, Maximum Strength, Speed-Endurance, Speed-Strength, Strength-Endurance and Suppleness (Flexibility).

Physical Literacy is the motivation, confidence, physical competence, knowledge and understanding to value and take responsibility for engagement in physical activities for life (*OTP* & S4L).

For parents: Individuals are physically literate when they have acquired the skills and confidence to enjoy a variety of sports and physical activities.

For coach and instructor: Individuals are physically literate when they demonstrate competence and confidence in fundamental movement skills and foundation sport skills combined with the ability to read their environment and make appropriate decisions. Physical literacy allows individuals to enjoy a variety of sports and physical activities. **For educators and health practitioners**: Individuals who are physically literate move with competence and confidence in a wide variety of physical activities in multiple environments that benefit the healthy development of the whole person (*PHE Canada definitions, 2007*).

Podium Pathway: describes the sport-defined excellence stages of athlete development and specifically applies to athletes on a trajectory toward podium results at the highest level of their sport. Podium Pathway encompasses both the Podium Results Track and the Gold Medal Profile.

Podium Potential: describes the targeted athlete tracking to podium success based on predictive competition results and gold medal profile indicators. Athletes with podium potential will be monitored in the enhanced training environment and tracked in competition to predict progression towards podium success.

Podium Success: is the desired performance end-state. It describes athletes achieving podium performances at World Championships and/or Olympic/Paralympic Games.

Podium Results Track/Winning Style of Play (Performance): The progression of performance benchmarks

(derived from competition results) required to move through the Podium Pathway of athlete development and successfully reach the Olympic, Paralympic or World Championship podium.

Podium ID & Development: is the entry point to the Podium Pathway characterized by deliberate athlete identification and development processes using podium results track benchmarks and gold medal profile indicators.

Puberty: refers to the point at which an individual has matured sexually and is able to reproduce.

Readiness: the child's level of growth, maturity, and development that enables him/her to perform tasks and meet demands through training and competition.

Refinement (sport skill/technique): This is the fourth and final stage of sport skill acquisition. The skill is polished and fine-tuned for a higher level of performance. Corrections become increasingly minor. The athlete is working towards perfection. The athlete is able to perform skill and variations on the skill within extremely complex contexts and in conjunction with other complex skills, and the skill is performed consistently at 8.0-10 level. Example: the athlete perform stremely complex transitions in and out of ballet leg at varying speeds with consistency

Sculling: A method of propulsion using arm actions that exert equal pressure to propel the body in the desired direction.

GLOSSARY OF TERMS

Sensitive Period of development: is a certain period of time (window) 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 development refers to the body's responsiveness to training stimuli at different stages of growth and maturation. The physiological systems of the athlete can be trained at any age, but there are sensitive periods when individuals are especially responsive to specific types of training; suppleness, speed, stamina, strength and skill.

Social Development: the development of relationships with peer groups and the adult world.

Specialization: refers to athletes limiting participation to a single sport, which they train for and compete in on a year-round basis. There are sports that require either early or late specialization in order for an athlete to succeed.

Speed: The ability to rapidly move the body or a part of the body, or to execute a series of movements, in an all-out effort of very short duration (8 seconds or less).

Speed-Endurance: The ability to sustain efforts at nearmaximum speed for as long as possible (normally, very intense efforts lasting between 8 and 60 seconds).

Speed-Strength: The ability to perform a muscle contraction or overcome a resistance as fast as possible (normally, very brief efforts of 1 or 2 seconds).

Sport form: is a state of optimal preparedness for sport achievements which athletes acquire/attain with adequate preparation on each new level of sport perfection.

Strength-Endurance: The ability to perform repeated muscle contractions at intensities below maximum strength (normally, 15 to 30 repetitions or more).

Suppleness: the ability to move a joint smoothly through its complete range of motion without sustaining injury.

Tactical Abilities: support effective decisions. The ability to analyse a situation and produce a correct response, ie: one that gives a competitive advantage and/or increases the probability of a good performance. Artistic swimming example: Athlete has a strategy for performing her routine at a competition.

Taper: a period of reduced training prior to a competitive performance. Peak performance occurs when fitness and fatigue differences are maximized.

Targeted Excellence refers to a focused strategy to achieve podium success at the Olympics, Paralympics or World Championships. skills that have been identified in a routine.

Technical Elements: Specific skills that have been identified in a routine.

Technical Routine: a routine with required elements as described in the FINA manual for junior, senior and masters competitions.

Trainability: is the responsiveness of developing individuals to the training stimulus, at various stages of growth and maturation (Malina, Bouchard, & Bar-Or, 2004).

Training: Training is the process of developing an athlete according to scientific and pedagogical principles which, through planned and systematic actions on the performance capacity and readiness, aims to take the athlete to higher and superior performances in a sport or athletic discipline. (Harre, 1982).

Transitions: Connecting movements which enable the swimmer(s) to change from one movement to another; stroke to figure, eggbeater to layout, etc...

Volume: the total quantity of work done. Volume can be translated by reps/sets, distance, time taken to successfully accomplish the task, total number of actions carried out to accomplish the training task in the drill (exercise), session, and competition.

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Long-term athlete development is an on-going study that will continue to evolve as sport scientists and coaches continue to grow our understanding of how to effectively progress athletes along the continuum from Learn to Train to Perform to Win. We are thrilled to be ahead of the curve in developing and releasing these materials and hope that you learn and benefit from the important research contained within.

We are always looking for feedback, please do not hesitate to contact Canada Artistic Swimming at any time

Yours in sport, Jackie Buckingham, CEO

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APPENDIX 1

HOW TO MEASURE GROWTH:

* For more detailed information, please refer to the Sport for Life Resource, **The Role of Monitoring Growth in Long-Term Athlete Development**.

Tools and equipment for measuring:

When considering the equipment needed for measurement, one must look at how much emphasis is going to be put on the measurement of stature. If stature data is going to be heavily incorporated into training plans, data must be very accurate, and thus, the more expensive the purchased equipment should be.

Ideal equipment:

- A free standing or wall mounted stadiometer
- This stadiometer would need to have sliding headboards and a dial or digital (or digital read outs, which would aid in the ease of use

Example of a free-standing stadiometer:



Acceptable equipment includes:

- An anthropometer or retractable steel measuring tape
- A headboard
- A smooth floor with a straight flat wall at 90 degrees

Unacceptable equipment includes:

- A cloth measuring tape
- Flexible material
- Carpeted floor
- An uneven floor
- No backboard

Why is Measurement Accuracy so Important?

As previously mentioned, proper technique when measuring an athlete is extremely important, as random and measurement errors are common. It is the responsibility of the person measuring to ensure such errors are minimized, as the more errors there are, the harder the results will be to interpret. Similarly, the more errors there are the less value the results will have. To decrease error, ensure:

- The environment is consistent and controlled
- Clothing is consistent and not bulky
- Feet are bare
- You have the cooperation of the athletes
- You follow standardized and consistent procedures

What to Measure?

Determining the rate of growth is dependent on accurate measurements; therefore, measurements need to be made to the nearest 0.1 cm. Each athlete should be measured and recorded twice, but these measurements should not differ by more than 0.4 cm. If they do not differ by more than 0.4 cm, the mean of the two measurements should be taken. If they do differ by more than 0.4 cm, a third measurement should be taken, and the median of all three measurements should be calculated (Williams, 2009a).

How Should Growth be Measured?

When measuring a child's height, it is important to pay special attention to technique, if the results are to be of use. Ideally, two measurers should be present; one to perform the positioning of the athlete, while the other records the measurement. If a second measurer is not available, it is still possible to get valid results; however, extra attention to technique should be paid.

For proper measurement of height refer to the figure below.

The orbitale (0) is located on the lower or most inferior margin of the eye socket. The tragion (T) is the notch above or superior to the tragus or flap of the ear, at the superior aspect of the zygomatic bone. This position corresponds almost exactly to the visual axis when the subject is looking directly ahead.



Figure: Orientation of the Head in the Frankfort Plane (Ross, Carr & Carter, 2000)
Protocol for Sitting Height Measurement (Simmons, 2000)

- Athlete sits on the base of the stadiometer with knees slightly bent. Hands rested on knees.
- The buttocks and shoulders rest lightly against the stadiometer, which is positioned vertically behind the athlete. Ensure there is no gap between buttocks of athlete and stadiometer.
- The tester applies gentle upwards traction to the skull behind the ears to ensure the trunk is fully stretched.
- Draw down the measuring bar to the athletes' head and record sitting height to the nearest 0.1 cm.
- Once sitting height is calculated, it can be subtracted from the stature score, in order to derive the leg length height.

Measuring Sitting Height



Protocol for Standing Height Measurement (Simmons, 2000)

- The student stands erect in bare feet with heels, buttocks and shoulders pressed against the stadiometer.
- The heels are together with arms hanging freely by the side (palms facing thighs).
- The tester applies gentle upward traction to the skull behind the ears.
- The student looks straight ahead, takes a deep breath and stands as tall as possible.
- Draw down the measuring bar to the student's head and record standing height to the nearest 0.1 cm.

Protocol for Arm Length Measurement (Simmons, 2000)

- Mount a tape measure on the wall about shoulder height of the students being tested. Ensure the starting point of the tape measure is fixed to a corner of a wall. This is where the student's fingers must be fixed.
- The student stands erect with their stomach and toes facing the wall, feet together and head turned to the right.
- The arms are extended laterally at shoulder level (horizontal) with palms facing forwards. Fingers stretched.
- The tip of the middle finger is aligned with the beginning of the tape measure (corner of wall) and arms are out-stretched along the tape measure.
- Use a ruler held vertically to the tape measure to record total arm span to the nearest 0.1 cm.

Measuring Standing Height



Measuring Arm Span



When Should Growth be Measured?

It is important that coaches or support staff do not become consumed by the number of times the height is recorded for three reasons:

- 1. The athlete may become bored.
- 2. The athlete may become preoccupied with the measurements, particularly if they perceive they are not growing as fast as their peers.
- 3. Intervals between testing periods need to be long enough to allow for substantial growth, over and above what would be expected to occur through measurement error (Williams, 2009a).

It is recommended:

- Measurements are made once quarterly.
- Measurements are made as close as possible to the same date in the month and also at the same time of day.
- Part of a training session be set aside for measurements.
- Measurements are taken after a day of rest (this will ensure there are no confounding effects of training from the previous day).
- Measurements are taken at the beginning of the training session, as the athlete will not be prone to any effects from training session (i.e. stretching, bouncing, drop jumps etc. can all have an impact on stature) (Williams, 2009a).

Even if the coach thinks the child has already started their pubertal growth spurt, the serial measurements, taken over a year, will determine if the athlete is past the stage of PHV. The earlier the measurements can occur, prior to the growth spurt, the greater the opportunities are for the coach to adjust the training program, according to growth rate. As PHV is occurs at typically 12 years for females and 14 years for males, it would be beneficial to have as many measurement points as possible prior to this age.

Year (age)	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
Height (cm)	5.0	4.8	5.0	4.8	5.0	4.8	8.6	12.0	7.7	3.3	2.3	1.9	1.3	0.9	0.5

Table 1. Typical Growth from Year to Year Starting at Age 5

Determining a Velocity Curve

To determine the velocity curve, the increase in stature from one measurement time period to the next consecutive measurement time period is subtracted one from the other. For example, in Table 1 from 9 to 10 years the increase in stature is 5 cm. By plotting the velocity curves it will be possible to clearly distinguish the rate of growth from one point in time to another. The velocity curve will immediately show distinctive growth points (for example, the onset of the acceleration in the curve, the peak in the curve and the deceleration in the curve).

The Rate of Growth or 'Growth Velocity Curve' of a Boy Charted from 6-20 Years of Age

(Based on Table 1 on page 75)



*See Appendix 2 for **Tables for Plotting Annual and Quarterly Growth**

How to Use the Growth Information

Measuring PHV is a tool to track growth. Monitoring growth velocity curves and recognizing the timing and tempo of growth is essential for coaches when training adolescent athletes (pre-pubertal and pubertal). Monitoring growth and plotting the patterns of growth can help coaches decide how to adjust training, competition and recovery programs according to the velocity of growth. Although the trainability of skill, speed and suppleness is based on chronological age (Viru, 1995; Viru et al., 1998); Balyi & Ross, 2009a; Balyi & Ross, 2009b; Rushall, 1998), biological markers can identify the sensitive periods of trainability to exploit the adaptation to training for stamina and strength. Thus, the timing of the training emphasis can be determined to induce optimal training effects. The onset of PHV will mark the beginning of the emphasis of aerobic training in aerobic sports, the implementation of continuous training methods (LSD and Fartlek) between the onset of PHV and PHV and interval training after PHV (after growth decelerates)(Lawrence, 1999; Kobayashi et al., 1978; Rushall, 1998; Vorontsov, 2002). This emphasis will be different in speed and power sports and the extent of the emphasis should be designed by sport-specific norms and needs; i.e., "How much endurance is enough?" (See Appendix 3 for sport- specific energy system requirements).

For female athletes accelerated adaptation to strength training occurs immediately after PHV and/ or with the onset of menarche (strength training is central nervous system and motor improvements before full hormonal maturation, and no hypertrophy is expected), and 12–18 months after PHV for males (Ross & Marfell-Jones, 1991; Beunen & Thomis, 2000; Anderson & Bernhardt, 1998). Again, sport-specific norms will define the extent of the strength training emphasis, thus, "How much strength is enough" in endurance sports and speed and power sports respectively?

Both stamina and strength should be trained at all stages, but the emphasis will be defined by the objectives of the different stages and the individual tempo of growth (see CS4L and sport-specific LTAD models).

Measuring standing height, sitting height and arm span quarterly after the onset of the PHV will help to determine what part of the body is growing and at what velocity (this usually begins with the feet and hands, followed by the legs, then the arms, and finally the trunk). This way the coach will have a better understanding of the impact of growth on skill, on speed and on flexibility.

Thus, program planning (periodization) will "react" to the patterns of growth to define the training programs versus improvising decision making on these crucial issues. To summarize, when planning and designing programs for adolescent athletes, developmental age should be used at the point of reference, as opposed to chronological age.

Conclusion

Monitoring growth before, during and after the adolescent growth spurt is very important for coaches to be able to create an individualized plan to optimize athletes' development. The following is a summary to guide coaches as they monitor their athletes and develop training, competition and recovery programs for their long-term development.

- Growth measurements are needed to monitor growth.
- The onset of PHV, PHV and the onset of menarche should be determined in order to be able to adjust training, competition and recovery programs according to the tempo of growth.
- Plotting growth will help to identify the onset of the growth spurt, and the peak of the growth (after growth decelerates).
- The onset of the menarche is about a year after growth decelerates, thus the coach can estimate the time of the onset of menarche.
- Before the onset of the growth spurt, standing height should be measured on every birthday, or at the beginning of the annual training cycle in clubs.
- Standing height, sitting height and arm span should be measured quarterly after the onset of the growth spurt.
- Training skill, speed and suppleness is based on chronological age, while stamina and strength are based the adolescent growth spurt.

APPENDIX 2

Tables for Plotting Annual and Quarterly Growth:

Standing Height Example:





*Example Growth Velocity Curve for Standing Height

Standing Height tracking template for Coaches and/ or Parents:

Age	9	10	11	12	13	14		
Growthincm								
Total Growth in cm								
15	16	17	18	19	20]		
						1		



*Plot the Growth Velocity Curve for Standing Height

APPENDIX 2

Sitting Height tracking template for Coaches and/or Parents:





*Plot the Growth Velocity Curve for Sitting Height

Arm Span tracking template for Coaches and/or Parents:

Age	9	10	1		11		12			13			14					
Growthincm																		
Total Growth in cm																		

15			16				17			18			19				20				



*Plot the Growth Velocity Curve for Arm Span

Self-Assessment of Puberty: Female and Male

	*	canadian Sport fo	or Life		
	Female: Se	lf-Assessme	nt of Pube	rty	
1. How old are you?years	months 2. Hov	v tall are you?	_ft in.	3. How much do you weigh?	pounds
To make sure your sport trainin go through adolescence. By ans	ng is best suited to your in div swering the questions below	ridual needs, it is re v, your coach can te	eallyhelpful for ell if you are an	r your coach to know how your body is cha early, average or late developer.	anging as you
Please mark your answers with	an X or leave the answer B	LANK, if you do no	ot wish to answ	er.	
4. Would you say your	growth in height		5. Would	you say that your body hair has	
1 Has not yet b	begun to spurt or grow really	y fast	1	Has not yet started growing	
2 Has barely st	tarted		2	Has barely started growing	
3 Has definite	ly started		3	ls definitely underway	
4 Seems comp	pleted		4	Seems completed	
6. Have you noticed an	ny skin changes, especially p	imples?	7. Have yo	our breast begun to grow?	
1 Notyet start	ted showing changes		1	Not yet started gowing	
2 Has barely st	tarted showing changes		2	Has barely started changing	
3 Skin change	s are definitely underway		3	Breast growth is definitely underway	
4 Skin change	s seem completed		4	Breast growth seems completed	
8. Have you started yo	ur periods (begun to mensti	uate)?	9. Do you	think your development is any earlier or	
4 🔄 Yes				Much earlier	
How old wer	Vears	St period?		Somewhat earlier	
-		Monus		About the same	
1 NO				Somewhat later	
				Much later	
				mudilatei	
<i>Instructions:</i> For each of the question question. Add up your	ons numbered 4 to 8, you wi r scores for each answer you 	ll see a number be gave.	side each box.	That number is your score on the	
Your pubertal score					
Interpretinavourse	ore			This survey is based on the following references:	
5 to 7 S	itart of puberty		1	Mary A. Carskadon, and Christin e Acebo, (1993). A	
8 to 11 E	arly pubertal		Self-	Administered Kating Scale for Pubertal Developm Journal of Adolescent Health Vol.14:190-195.	ent.
12 to 14 N 15 to 17 L	Aid pubertal ate pubertal		Anne	C. Petersen , Lisa Crockett, Maryse Richards, and Ar	ndrew
18-20 P	Post pubertal		Box Relia	er. (1988). A Self-Report Measure of Pubertal Stat bility, Validity, and Initial Norms. Journal of Youth Adolescence, Vol. 17, No. 2.	20 and
			Sco	ring for CS4L - interpreting your score - has not be independently validated.	en

APPENDIX 3

Jude 🚬	rt for Life
Male: Self-Asses	sment of Puberty
I. How old are you?yearsmonths 2. How tall are you? _	ftin. 3. How much do you weigh?poun
To make sure your sport training is best suited to your individual needs, it go through adolescence. By answering the questions below, your coach c	t is really helpful for your coach to know how your body is changing as y can tell if you are an early, average or late developer.
Please mark your answers with an X or leave the answer BLANK , if you d	lo not wish to an swer.
Would you say your growth in height	5. Would you say that your body hair has
1 Has not yet begun to spurt or grow really fast	1 Has not yet started growing
2 Has barely started	2 Has barely started growing
3 🔲 Has definitely started	3 Is definitely underway
4 Seems completed	4 Seems completed
6. Have you noticed any skin changes, especially pimples?	7. Have you noticed a deepening of your voice?
1 Not yet started showing changes	1 Not yet started to change
 Has barely started showing changes 	 Has barely started showing any changes
3 Skin changes are definitely underway	3 Voice change is definitely underway
4 Skin changes seem completed	4 Voice change seems completed
8. Have you begun to grow hair on your face?	9. Do you think your development is any earlier or
1 Not vet started growing hair	later than most other boys your age?
2 Have barely started growing hair	Much earlier
3 Facial hair growth is definitely underway	Somewhat earlier
4 Eadal bair growth seems completed	About the same
	Somewhat later
	Much later
Instructions:	
For each of the questions numbered 4 to 8, you will see a number	er beside each box. That number is your score on the
question. Add up your scores for each answer you gave.	
Your puber tal score	
Intermeting your score	This survey is based on the following references:
5 to 7 Start of puberty	Mary A. Carskadon, and Christine Acebo, (1993). A
8 to 11 Early pubertal	Self-Administered Rating Scale for Pubertal Development.
12 to 14 Mid pubertal	Anne C. Petersen, J isa Crackett. Marvse Richards and Andrew
15 to 17 Late pubertal 18-20 Post pubertal	Boxer. (1988). A Self-Report Measure of Pubertal Status Reliability, Validity, and Initial Norms. Journal of Youth and Adolescence. Vol. 17. No. 2.
	Scoring for CS4L - interpreting your score - has not been independently validated.