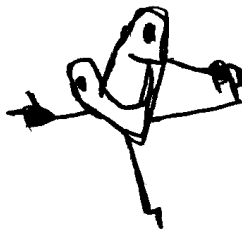


# Assessment

## Fitness Testing – An Inquiry Approach



HPEC  
Calgary, AB  
May 2011

Presented by  
Bev Robinson [barobinson@cbe.ab.ca](mailto:barobinson@cbe.ab.ca)  
Shelagh McCracken [smmccracken@cbe.ab.ca](mailto:smmccracken@cbe.ab.ca)



Calgary Board of Education

# Assessment

## Fitness Testing-An Inquiry Approach

**Session Description:** Sharing of ideas, research, strategies, fitness assessments, and how to involve students in fitness testing to personalize learning. Why test? How good is a test – reliability and validity? Types of tests? Creating fitness assessments. What's worth doing?

### Agenda

- Welcome & Introductions
- What is inquiry learning? What does it look like in PE? Fitness Assessment?
- What's currently happening? Personal & at School
- The How and Why of fitness assessment? What's worth doing?
- Curricular Connections?
- How good is a test? Reliability and Validity?
- Research
- Types of tests?
- Assessment of Student Learning
- Fitness Tasks - designing learning with kids
- References/Resources
- Feedback

## What is Inquiry-based Learning?



**Inquiry:** “dynamic process of being open to wonder and puzzlements and coming to know and understand the world.” (Galileo Educational Network, 2004) An inquiry needs to be authentic.

### What does inquiry-based learning look like within Physical Education?

In physical education one could ask...is this what a coach, athlete, exercise physiologist, sport psychologist, or personal trainer would be exploring?

Human body becomes the human laboratory and the Physical Education Program of Studies provides the framework for the learner and from there the fitness queries are endless.

Personal and class inquiries might be fuelled by questions such as...

- How fit am I? How active am I? How much fitness or activity do I really need?
- How can I measure my fitness? How can I measure my level of activity?
- How do I currently measure my fitness level/activity level?
- How does my fitness or activity change over the course of a year and throughout my life?
- Am I receiving a health/fitness benefit from participating in P.E.?
- How can my PE class be organized to increase health/fitness benefit? What can I do to increase my cardio fitness benefit within the PE class?
- What tools can I use to help me measure my fitness or activity level?
- What are the barriers that prevent me from being more active? How can these barriers be overcome?
- What "take action" projects can students initiate to increase the physical activity of their peers, family, and society?
- What is the correlation between students and their parent's levels of physical activity?
- How does nutrition/sleep/stress effect fitness?
- Is there a correlation between student screen time and physical activity time/fitness?

A true sign of a good inquiry project is that you always end up with more questions than you started with and the inquiry could go on forever!!! Physical education should empower students on a lifetime inquiry into their health and fitness. This is an exciting way to teach, as teachers become learners too.

## Why and How of Fitness Testing in Youth?

(from OASPHE – Ontario Assoc. School Physical Health Education)



1. Fitness assessment helps students identify physical abilities and areas of physical fitness that need improvement. **Establish baseline to help set individual goals.**
2. **Success for all** students, avoid student comparisons
3. Use fitness assessments to **encourage lifelong participation** in physical activity, generate **critical thinking, self-awareness, and discussion** about healthy lifestyles.
4. Fitness assessments should **NOT be used as a grade**. E.g. 10% for 10 push-ups and 100% for 100 push-ups is not acceptable practice. We do not grade genetics.
5. **Focus on health-related components of fitness:** cardiovascular, muscular endurance, muscular strength and flexibility to set goals to maintain/improve personal health-related fitness. BMI is not the role of the educator.
6. **Inclusive, student-centred, personalized, and consistent** throughout the year through: **focus on process**, allow some student choice, focus on the purpose of testing – do with the students and not TO the students. Avoid springing a fitness test on students. Focus on self-assess and self-monitor personal fitness levels.

## Curricular Connections

From Alberta Education – PE Grade 8 Program of Studies, Specific Outcomes:

### General Outcome B: Benefits Health

#### B8 – Functional Fitness

**B8-2** *demonstrate and monitor ways to achieve a personal functional level of physical fitness*

**B8-3** *explain fitness components and principles of training, and formulate individual plans for personal physical fitness*



#### Body Image

**B8-4** *acknowledge the perceptions that occur as a result of media influence on body types in relation to physically active images*

#### Well-Being

**B8-7** *monitor, analyze, and assess fitness changes as a result of physical activity.*

## Current Research

(From Mark Tremblay, Meghann Lloyd and Rachel C. Colley with the Healthy Active Living and Obesity Research Group, Children's Hospital of Eastern Ontario research Institute, Ottawa, Ontario)

***“Physical literacy is the foundation of skills or tools – social/cognitive, behavioural and fitness related - that children need to possess or develop in order to receive the inherent benefits of taking part in physical activity and sport for life long enjoyment and success.” (Tremblay & Lloyd 2011)***

Tremblay et al have developed a new battery of tests called *The Canadian Assessment of Physical Literacy*. CAPL includes the following four inter-related domains: i) motor skills, ii) physical activity behaviour, iii) physical fitness, iv) awareness, knowledge and understanding. CAPL aims to be inclusive, adaptable, individualized, comprehensive, safe and user friendly.

*The Canadian Assessment of Physical Literacy* hopes to provide valid and reliable information to educators, coaches, parents and students. Pilot tests are being completed in an effort to enhance the quality and scope of physical education programming.

### Sample CAPL Tests

Physical Fitness	Motor Skills	Physical Activity Behaviour	Knowledge Questionnaire
Shuttle Run Run/PACER Test Partial Curl Ups Push Ups Sit and Reach Arm Flexibility Back Strength Hand Grip Height	Dynamic Obstacle Course:  Jumping Dodging Kicking Hopping Catching Throwing Running	Pedometers worn for seven consecutive days, records kept in logbook	Questionnaire to assess knowledge, awareness and understanding of Health, Physical Fitness, Motor Skills, and Physical Activity preferences

Battery of tests developed for 2010 Vancouver Olympic Games, online fitness assessment for children and youth,

- 8 tests to measure fitness
  - (sit & reach – extend at 20 cm
  - vertical jump
  - 30 m sprint
  - basketball throw
  - 800 m run
  - T-drill
  - Partial curl-up – 10 cm of mov't max of 90
  - Stork stand
  - and online questionnaire). Ideas on how to improve your scores.



## USA President's Physical Fitness Challenge

- Curl-ups (or partial curl-ups)
- Shuttle run
- Endurance run/walk
- Pull-ups (or right angle push-ups or flexed-arm hang)
- V-sit reach (or sit and reach)

## Maximize Test Reliability

For maximal reliability, accuracy and standardization of testing protocol the following guidelines should be followed.

- Always warm up thoroughly before performing fitness tests. Perform 5-10 minutes of light aerobic exercise followed by stretching to all the major muscle groups.
- If you are performing all the tests in one session, complete short, explosive tests first. For example a standing vertical jump should be performed before a multistage shuttle run.
- Always keep the order of fitness tests the same.

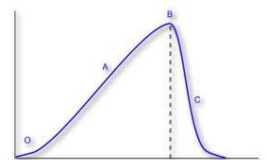
- Try to test at the same time of day.
- Use the same equipment and protocol.
- If an examiner is taking measurements, have the same person take the measurements each time.
- Familiarize yourself with the testing procedures. Do a trial test if necessary.
- Avoid eating within 2 hours of the test battery, and avoid smoking and coffee on the day of the test.
- Be well hydrated.
- Avoid vigorous training the day before the fitness tests and prior to the tests on test day.

## Measuring Functional/Health Fitness



1. **Cardiovascular Fitness:** the ability of heart, blood, blood vessels, and respiratory system to supply oxygen and necessary fuels to the muscles during exercise. Be sure to warm-up for at least 5 to 10 minutes before initiating any cardio test that requires activity at a higher intensity. Examples of cardio fitness measures include:

- 12 minute run (Record distance i.e. laps, km and average & peak heart rate if available)
- 20 meter shuttle run/beep test (Record final stage & heart rate data if available)
- 1-5 km run (Record time and average and peak heart rate if available)
- 1 mile run (Record time, average and peak heart rate if available)
- Talk test i.e. run/walk/bike for 15 minutes or set distance with a friend and maintain a conversation through out the test. Maintain the highest speed possible that keeps words flowing freely. (Record distance, time, and average heart rate)
- Threshold test i.e. what is the highest intensity that you can maintain for a designated time period ranging from 10 to 20 minutes? (Record highest heart rate that you can sustain)
- Recovery heart rate i.e. 1 min recovery from 5 minutes at a steady state of 75% of Max HR (Record number of bpm drop in 1 minute)
- Step test i.e. 3 minutes of “up-up-down-down” X 20 sets/minute. Record heart rate during final minute and 1, 2, and 3 minute heart rate recovery heart rate
- Delta or orthostatic test: heart rate difference between laying down and standing (Record bpm difference)
- Morning Heart Rate, take on a regular basis in horizontal position
- Ambient Heart Rate – sitting and relaxed
- Heart Rate Criss Cross Test i.e. Choose two levels of intensity 70% of MaxHR and 85% of MaxHR (know your numbers before starting), take your heart rate up and down as many times as you can in 10 minutes; Up and Down = 1, How many ups and downs can you get in the designated time?



Predetermine the upper and lower intensity levels. Use the same exercise modality for comparison purposes e.g. running, cycling, rowing

- Walk test i.e. 2 km (Record time and average heart rate if available)
- Jump-drop to ambient i.e. Do jumping jacks for 1.5 minutes @ pace of 60 reps/min. Record the length of time it takes to return to your normal ambient heart rate. (Also record your peak heart rate & ambient)
- Other.....

2. **Flexibility:** the ability to move joints through a full range of motion. Examples of flexibility measures include:

- Sit and reach regular or back saver (back & hamstring flexibility)
- Shoulder elevation (shoulder flexibility)
- Trunk rotation (back flexibility)
- Touch toes (back flexibility)
- Link L & R fingers over shoulder and behind back “ The Zipper” (shoulder flexibility)
- Ankle Dorsi-flexion (ankle flexibility)

3. **Muscular Endurance:** The ability of a muscle to perform multiple contractions. Examples of muscular endurance tests include:

- Push-ups (full, modified, clap, incline, decline, wide, etc.)
- Dips (full or chair)
- Curl-up or crunchie
- Wall-sit
- Plank, Bridge, and variations
- Leg Raise
- Chin-ups
- Flexed arm hang
- Burpees

4. **Muscular Strength:** the ability of the muscles to exert a force one time.

- Grip strength
- Bench press (6 RM) Use conversion scale to determine 1RM
- Leg press (6 RM) (RM = weight lifted for a max of 6 repetitions)

5. **Power:** the ability to use strength quickly (strength + speed)

- Vertical jump
- Standing broad jump
- Medicine ball 2 hand seated throw

6. **Agility:** the ability to make quick changes in direction

- T-drill
- Dot drills
- Square
- Shuttle Run (2.5 m x 4)



7. **Speed:** the ability to perform a movement or cover a distance in a short time
  - 30 m sprint
  - 50 m sprint
8. **Balance:** the ability to keep an upright posture while standing still or moving.
  - Stork stand
  - Various yoga poses
  - Stork stand on dense foam pad with eyes closed (dynamic balance)
9. **Coordination:** the ability to use the senses together with the body parts or to use two or more body parts together.
  - Tennis ball toss against wall – 1 min – alternate hands – 1 m from wall
10. **Physical Activity Behaviour/Patterns:** directly measuring daily activity
  - Using time, time X intensity = workload (e.g. Honey, how was your work out?– 30 minutes after training session on scale of 1 to 5 and then multiple intensity by # of minutes.)
  - steps (daily/weekly)
  - Nutrition data, sleep data, stress load, hydration

### **Technologies that make a difference:**

- speed and distance units
- heart rate monitors
- pedometers
- electronic timing devices
- metronome or recorded timings (i.e. 20 m shuttle test, push-ups, burpees)
- the basics: stopwatch, measuring tape, yard stick

## **Assessment of Student Performance**

### **How Fit Am I?**

Complete	Incomplete
<ul style="list-style-type: none"> <li>○ Required number of tests are included for each fitness component</li> <li>○ Protocol for each test is clear, concise, and easy to follow</li> <li>○ Personal fitness tests have been completed and results recorded. (Frequency of testing &amp; recording to be determined by the class and instructor)</li> <li>○ Fitness assessments are linked to personal goal setting</li> <li>○ Consistently examines the battery of tests selected and makes adjustments due to new knowledge, fitness level, and lifestyle changes.</li> </ul>	<ul style="list-style-type: none"> <li>○ Indicate below what is still being worked on to reach “complete” stage.</li> </ul>

## How fit am I?



**Background:** It is important to learn to evaluate your own level of fitness.

- You can best manage what you can measure...are you on course?
- Motivation...you've come a long way...build in rewards
- Goal setting is much easier when you know where you are at
- Compass for further success. Life is busy and time precious...get the most out of your physical activity.

Fitness results are most beneficial when they are used to meet health standards and to improve your personal fitness. Avoid comparison of fitness scores to others due to the large hereditary and environmental factors. It is best to strive towards a "PB", Personal Best rather than trying to reach the 100<sup>th</sup> percentile on a normative chart or trying to beat your friend(s). The components of functional or health fitness are essential for optimal well-being that contributes to quality of life. Fitness scores should improve with youth, with basic growth and development, and with physical activity.

**Task:** Create your own collection of tests to measure your functional fitness. **Each test needs to actually measure what it says it is measuring (test validity) and consistently provide accurate results (reliability).** You can use tests we have done in class, existing field tests or be creative and create your own test(s). Just remember to keep the test **exactly** the same every time you do it. Avoid any type of movement that is dangerous. Include a brief description/diagram of how each test is performed on the back side of this sheet or on an attached page. During the physical education program you will administer and record these self-tests to determine your current level of fitness. Use these results to assist with your personal goal setting.

Date:						
Cardiovascular Fitness:						
•						
•						
•						
•						
Flexibility						
•						
•						
Muscular Endurance						
•						
•						
•						
Muscular Strength						
•						
•						



**Personal Fitness Assessment** Name: \_\_\_\_\_ Class: \_\_\_\_\_

Be sure to indicate units of measure (e.g. inches, kg, seconds, cm, stage, time, etc.)

Date:	Sept	Oct	Nov	Dec	Jan		
Cardiovascular Fitness:							
• 20 m shuttle							
• 5 K run							
•							
•							
Flexibility							
• sit & reach back-saver							
•							
Muscular Endurance							
• push-ups							
• burpees							
• dips							
• curl-ups							
•							
•							
Muscular Strength							
• bench press (6 RM)							
• leg press (6RM)							
•							
Power							
• vertical jump							
• Standing Broad J							
•							
Balance							
• dynamic balance R							
• dynamic balance L							
Agility							
• 4 block shuttle							
• T-test							
Speed							
•							
•							

**Protocol must be consistent**



## Fitness Assessment - S.M.A.R.T. goal setting



### Specific – Measurable – Action Plan – Realistic – Timeline

**Write 3 S.M.A.R.T. fitness goals based on your tests.** (e.g. I will improve my 20 m shuttle run from 8.2 to 9 by March 15, 2011 by consistently attending all classes and working at the silver to gold effort level.)

1. \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_
2. \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_
3. \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

**List all the reasons why achieving these fitness goals is important to you.** (e.g. make “.....” team, more energy, improved performance in ....., look great, etc.)

---

---

---

**Revisit and revised S.M.A.R.T. goals (March 20, 2011)**

1. \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

2. \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

3. \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

**Comments:**

**June 5, 2011 Revisit goals and write 3 more SMART goals.....where to next Summer 2011? Think and write S.M.A.R.T. (i.e. I will improve my cardio fitness during July and August by doing at least 8 hours of cardio training per week (biking, rowing, basketball, rollerblading and running) and will be able to comfortably do a workload of 600 calories per workout by the end of August 2011)**

1. \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

2. \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

3. \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

## Resources & References

Alberta Learning, “Focus on Inquiry” (2004) 122 page document available at [http://www.education.gov.ab.ca/K\\_12/curriculum/bysubject/focusoninquiry.pdf](http://www.education.gov.ab.ca/K_12/curriculum/bysubject/focusoninquiry.pdf)

Corbin, Charles & Lindsey, Ruth (2005) “Fitness for Life” 5<sup>th</sup> Edition, Human Kinetics, Champaign, IL

Fitnessgram <http://www.fitnessgram.net/overview/> Established 20 years ago by Cooper Institute, battery of tests for students grade K-12 measuring aerobic capacity, body composition, muscular strength, endurance, and flexibility. Sold through Human Kinetics.

Fitness of Canadian Children 2010 – comprehensive research and results on Canadian children by Mark Tremblay and Co.  
[http://www.cheori.org/halo/pdf/CHMS\\_FitnessofCanadianChildren2010.pdf](http://www.cheori.org/halo/pdf/CHMS_FitnessofCanadianChildren2010.pdf)

Galileo Educational Network [www.galileo.org](http://www.galileo.org) excellent examples of inquiry style projects plus numerous professional resources.

Heart Zones [www.heartzones.com](http://www.heartzones.com) Wealth of excellent fitness assessments for assessing cardio fitness utilizing heart rate.

Lloyd, Meghann, Colley, Rachel C., Tremblay, Mark S. (2010), “Advancing the Debate on ‘Fitness Testing’ for Children: Perhaps We’re Riding the Wrong Animal”, Pediatric Exercise Science, 22, pg 176-182, Human Kinetics Inc.

Lloyd, Meghann, (2010) The Canadian Assessment of Physical Literacy: Preliminary Results from Pilot and Feasibility Testing. CHEO, Research Institute, Health Active Living and Obesity Research.

OASPHE and Ophea “The Purpose of Fitness Assessment in a Quality Health and Physical Education Program – Six Key Messages developed by OASPHE  
[www.oasphe.ca/.../J\\_Walsh\\_article- OPhea.net January%5B1%5D.doc](http://www.oasphe.ca/.../J_Walsh_article-OPhea.net_January%5B1%5D.doc)

Presidents Challenge <http://www.presidentschallenge.org> American fitness challenges for youth and adults. Activity tracker - free

Rob’s Fitness Testing [www.topendsports.com](http://www.topendsports.com) Collection of over 200 fitness assessments.

SportFit Canada <http://www.sportfitcanada.com/> developed for 2010 Vancouver Olympic Games, online fitness assessment for children and youth, 8 tests to measure fitness (sit & reach, vertical jump, 30 m sprint, basketball throw, 800 m run, T-drill,

Partial curl-up, Stork stand, and online questionnaire). Ideas on how to improve your scores.

Thompson Educational, <http://thompsonbooks.com/> Great collection of fitness and health books and circuit cards written and published in Canada

Tremblay, Mark and Lloyd Meghann (2010) “Introducing the Canadian Assessment of Physical Literacy”, <http://www.cheori.org/halo/index.php?year=2010>

Tremblay, Mark and Lloyd, Meghann (Spring 2010) “Physical Literacy Measurement – the Missing Piece, HPE Canada Journal, Pg. 26-30.