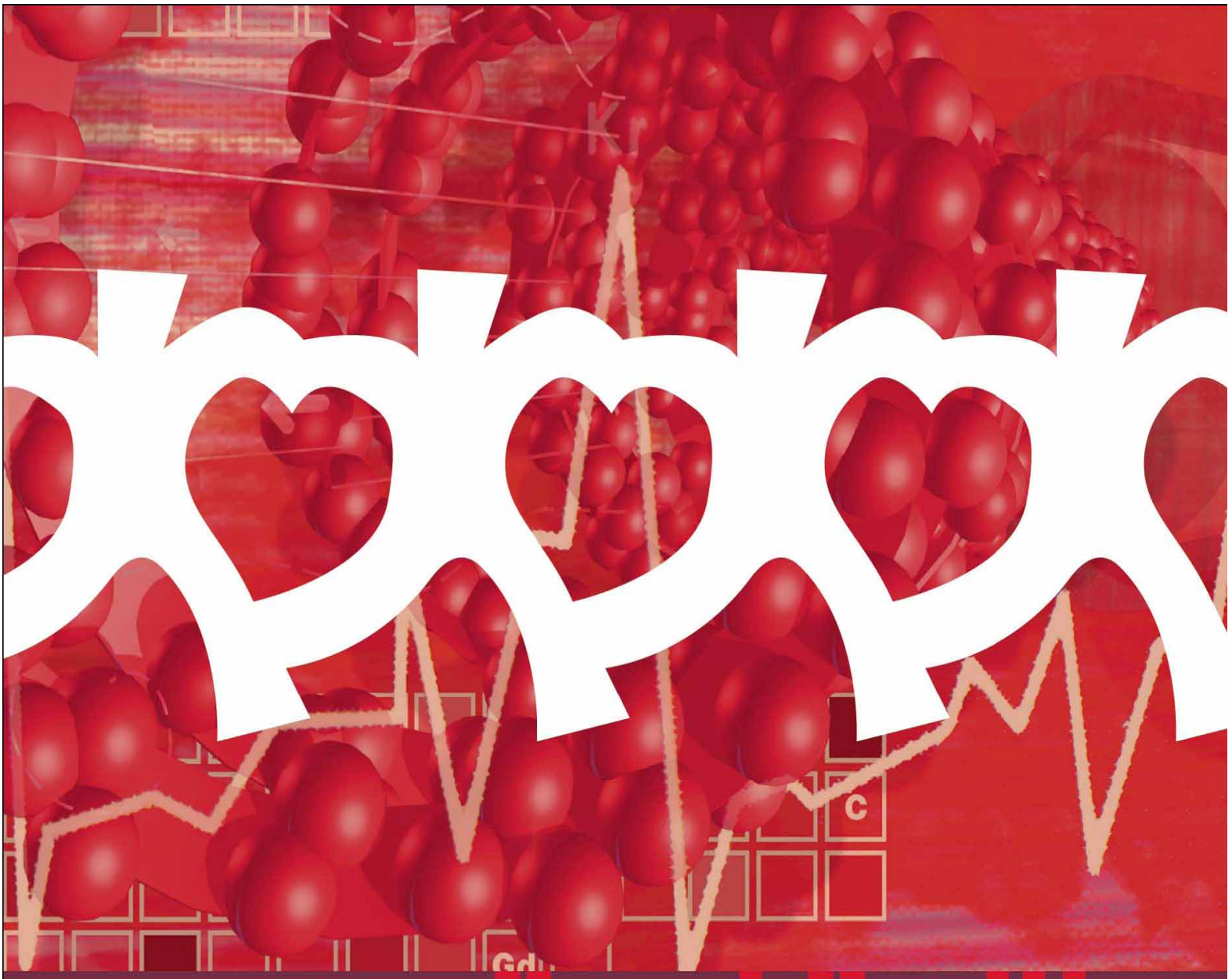

Heart Health

A Resource for Senior High School Physical Education

Alberta
EDUCATION

Heart Health

A Resource for Senior High School Physical Education

2006

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Note: All Web site addresses were confirmed as accurate at the time of publication but are subject to change.

The primary intended audience for this document is:

Administrators	
Counsellors	
General Audience	
Parents	
Students	
Teachers	✓

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USING THIS RESOURCE

> *"The Kindergarten to Grade 12 Physical Education Program contributes to the development of life skills for the personal management of health, for the use of physical activity as a strategy for managing life challenges, and for a setting within which to practise the ability to work with others."*
>
> – Alberta Learning, 2000a, p. 1

Activities in this resource are designed to facilitate student learning of the prescribed outcomes of the *K–12 Physical Education Program of Studies* and is intended for use in Physical Education 10–20–30. The aim of the physical education program is to enable individuals to develop the knowledge, skills and attitudes necessary to lead healthy, active lifestyles. This resource includes inquiry-based learning activities to address the outcomes of the physical education program and specifically focuses on:

 General Outcome B: Benefits Health

 General Outcome D: Do It Daily … for Life.

Activities may also be adapted for use in the senior high school Career and Life Management (CALM) course. See page 6 for the physical education program of studies overview, and Appendix A, page 71, for CALM's general outcomes.

Rationale for heart health learning

Research suggests that lifestyle habits adopted during youth generally extend into adulthood. Students have the opportunity to become healthy adults and reverse current physical inactivity trends.

Current data indicates the following.

- Canadians are at high risk of developing heart disease. Eight out of 10 individuals have at least one of these risk factors: physical inactivity, being overweight, smoking, high blood pressure, diabetes (Heart and Stroke Foundation of Canada, 2003).

- In 2000, 57 percent of Canadians aged 5 to 17 were not sufficiently active to meet international guidelines for optimal growth and development. For adolescents, this number grew from 64 percent in 2000 to 82 percent in 2002 (Craig and Cameron 2004).

- Canadian youth face risks for a number of chronic diseases due to increasingly sedentary lifestyles. Over the past two decades, the number of overweight and obese children nearly tripled in Canada. Obese youth have a greater occurrence of hypertension, high cholesterol and Type 2 diabetes (Canadian Institute for Health Information, 2004).

- In 1998, Canadians 15 years and older spent an average of 15 hours per week watching television compared to only 7 hours per week in active leisure pursuits. Research indicates that they also spent more time playing video games than children in most other countries. In 1998, less than 37 percent of 5- to 18-year-olds walked to school (Canadian Institute for Health Information, 2004).

Physical education and CALM provide opportunities for students to be actively engaged in seeking answers to real-world questions about their own health and fitness.

Teachers may choose to deliver the lessons in conjunction with activities associated with CPR training—a mandatory component of the Grade 10 Physical Education Program. This will encourage students to connect heart health messages to the outcomes associated with emergency care: General Outcomes B: Benefits Health and D: Do It Daily … for Life.

The activities and lessons provided in this resource will help students understand and experience the health benefits that result from physical activity.

For a Glossary of terms related to *Heart Health*, see pages 161–162.

Inquiry-based Learning

> *"Inquiry strategies help [students] answer questions, solve problems and make decisions, using process, communication and participation skills."*
>
> – Alberta Learning, 2000b, p. 4

Inquiry-based learning is a process of learning that involves students in their learning. Students formulate questions, investigate widely, and build new understandings, meanings and knowledge. Students may use this new knowledge to answer questions, develop solutions, or support positions or points of view. This knowledge is usually presented to others and may result in some type of action.

Using an inquiry model helps students internalize a process for inquiry that is transferable to everyday situations. Thinking about inquiry as a puzzle can help students relate inquiry-based learning to their lives outside school. Students gather information from many sources and piece them together to create the whole picture or puzzle. Students will find that many of their original questions are answered through the inquiry process; however, many more may arise as well.

Inquiry-based learning provides opportunities for students to:

- develop skills they will use all their lives
- learn to cope with problems that may not have clear solutions
- deal with changes and challenges to understandings
- shape their search for solutions, now and in the future.

During inquiry-based learning, the learner becomes a human laboratory in the quest for health and fitness. Physical education teachers provide the initial framework for the quest. For questions to frame this inquiry, see Appendix B, page 72.

The sign of a successful inquiry project is that students finish the project with more questions than when they started, so the inquiries go on and lead to further learning. Physical education provides opportunities for students to pursue personal inquiries related to health and fitness. The outcome of these inquiries instills a lifelong desire to perpetuate healthy, active lifestyles.

Inquiry-based Learning in Physical Education

Heart Health is grounded in the skill of learning to listen to the language of the heart … the heart beat. *Heart Health* connects students to their heart-rate data, and offers insights into what these numbers mean using the framework of Heart Zones Training.™ Students may listen to their hearts by manually taking their pulse (carotid or radial palpation), by learning to perceive their own exertion levels or by using heart-rate monitors to collect heart-rate numbers. For more information related to Heart Zones Training,™ see http://www.heartzones.com.

The suggested technologies to be integrated in physical education to enhance learning of General Outcomes B and D may include pedometers, heart-rate monitors, Web sites and online training journals. Educators can also capture student performance via digital and video cameras.

Pedometers
See Appendix C, page 73, for more on pedometers.

There are eight learning opportunities in this resource that originate from the following questions.

1. How does heart health information apply to my life?
   - Students make personal connections to active-living concepts through written logs. They demonstrate goal setting and personal progress over time.
2. What are my heart-rate numbers?
   - Students determine personal heart-rate numbers in order to monitor heart health and fitness.
3. What do my heart-rate numbers mean?
   - Students use various activities to interpret heart-rate numbers that contribute to setting fitness and performance goals.
4. How does my body feel at various levels of intensity?
   - Students describe their bodies' responses during times of exertion, connecting them to heart-rate data in order to better gauge the health, fitness and performance benefits of physical activity.
5. Am I getting cardiovascular benefits in physical education class?
   - Students suggest and implement strategies to ensure cardiovascular benefits are achieved in physical education class.

6. Am I active enough each day to receive health/fitness benefits?
    - Students assess the frequency and intensity of current physical activity profiles to determine if cardiovascular benefits are provided.
7. How do I create my own physical activity program?
    - Students evaluate personal fitness levels to better understand and maintain all components of fitness as part of an active lifestyle.

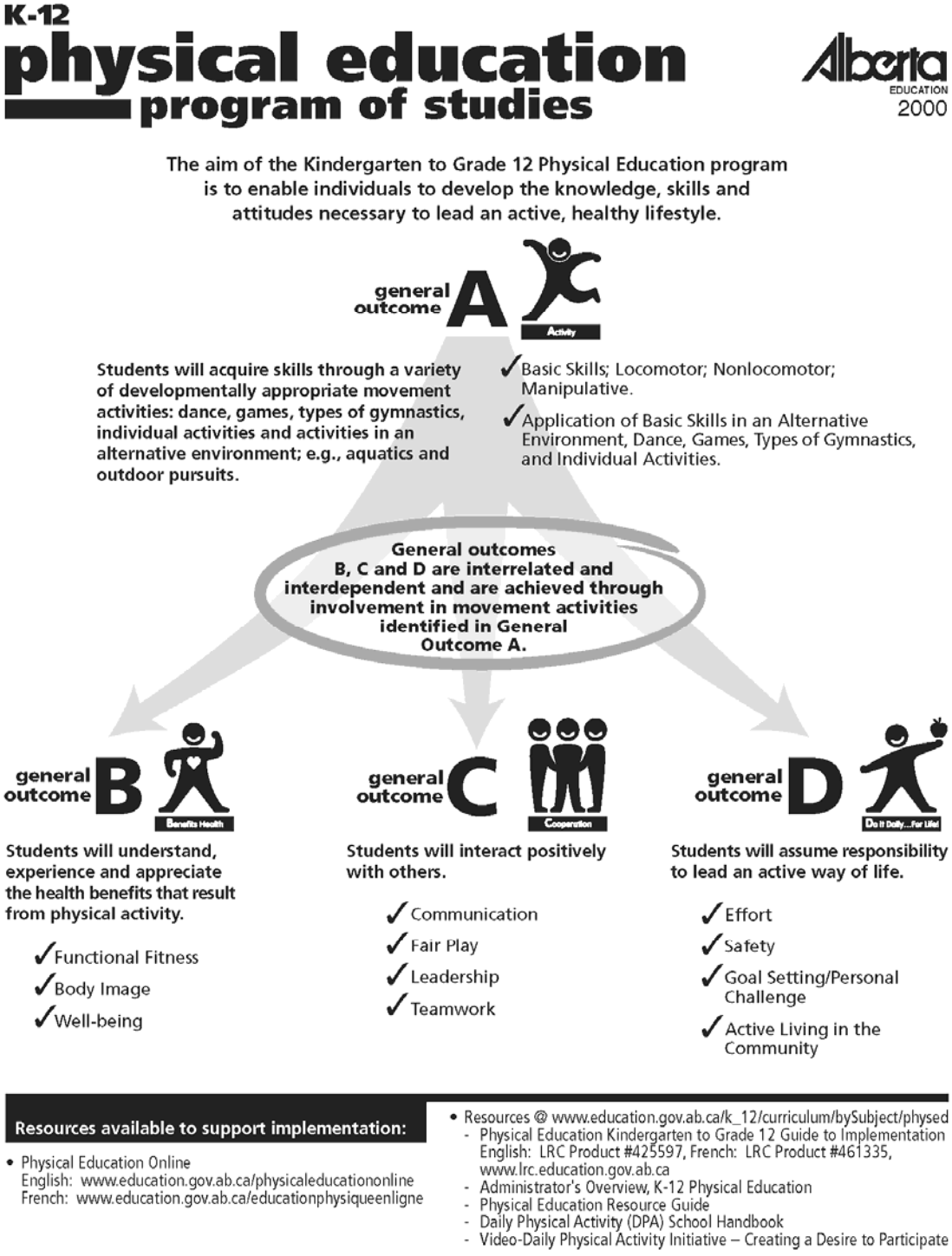
8. How can we share our understanding of heart health with the community?
    - Students share knowledge of personal lifestyle practices to make a societal change in health behaviours.

The learning opportunities in this resource provide inquiry-based activities that can be used in a variety of ways to increase student knowledge about healthy hearts.

Each learning opportunity contains:

- physical education learning outcomes—links to Physical Education 10 outcomes (although activities can be modified to reach similar outcomes in Physical Education 20 or 30)
- learning activity—an overview of activity expectations
- key understanding—a statement of the concept addressed through the activity
- background information—information that supports the learning activity
- equipment/materials—equipment needed for the activities, as well as related worksheets and handout materials
- procedures—steps to follow to achieve the stated outcome
- heart healthy tips—suggestions on how to improve effectiveness of the learning activity
- student inquiries—sample student questions that may arise as a result of the learning activity.

K–12 Physical Education Program of Studies



The learning opportunities in this resource connect to the K–12 physical education program. Achievable outcomes for each learning opportunity are identified by the icons above.

Heart Zones Training™

Heart Zones Training™ (Edwards 1993) is a methodology for calculating and using heart-rate data. Heart Zones™ involves:

- an individualized, personalized approach to health and fitness training
- multiple zones that provide multiple benefits
- a wellness continuum from health to fitness to performance.

To calculate heart-rate numbers for each of the five training zones, students must first determine their maximum heart rates—the highest number the heart can contract in one minute. See Learning Opportunity 3, pages 22–31, for more on maximum heart rates.

Planning for Inquiry-based Learning Experiences

Time spent being physically active during physical education classes should be maximized in order to provide opportunities for heart-healthy physical challenges.

Teachers may ask:

- how can my physical education classes be organized to increase the health/fitness benefits to my students
- how can I integrate activities that help students inquire into and challenge their personal heart health and fitness?

For strategies to promote cardiovascular benefits in physical education classes, see Appendix D, page 74.

Students can become part of a solutions-orientated team approach in physical education. Teachers are encouraged to communicate the desired learning outcome, and encourage students to share their ideas and solutions.

In a solutions-oriented classroom, students are actively engaged in exploring inquiries related to their own heart health. Physical education log books allow students to compile information and data to assist student learning. It is reasonable to assign activity time beyond the class as well as appropriate investigations that involve links to the home and community.

Note: Some inquiries may take several classes to complete.

LEARNING OPPORTUNITIES

1. How does heart health information apply to my life?

Physical Education Learning Outcomes

Benefits Health:
Functional Fitness B
(10–20–30)–2

Do It Daily … for Life:
Effort D
(10–20–30)–1

Active Living in the Community D
(10–20–30)–9

Learning Activity
Students gather data and record findings related to their heart health. There are a variety of written logs that can be incorporated into physical education. Logs provide students with a record of their knowledge, skills and attitudes in relation to the outcomes of the physical education program. Students make personal connections to active living concepts and record personal experiences. They also learn goal-setting techniques and demonstrate progress over time.

Key Understanding
Learning to analyze and reflect upon daily routines and how physical activity contributes to health and fitness allows students to be engaged in the learning process. These reflections help students make healthy lifestyle choices as they become adult members of the community.

Background Information
Allowing students the opportunity to reflect upon their experiences, skills, feelings and participation helps them discover the benefits of being active on a daily basis. Student feedback also helps teachers evaluate different teaching strategies.

Equipment/Materials
- Student Worksheet 1: Log Book, page 12
- Student Worksheet 2: Activity Assessment: Log Book Reflection Ideas, page 13
- Student Worksheet 3: Values Assessment: Log Book Reflection Ideas, page 14
- Duo tang and lined paper
- Pencils/pens

Procedures
1. Log Book Assignment
   Have students use log books on a daily, weekly or unit-based time frame. Copy and distribute Student Worksheet 1: Log Book, page 12, for sample entry starters for a weekly response.

   Students can use their log books to:
   - record personal physical activity levels outside class; e.g., at home, in a fitness centre, with family or friends
   - describe how they feel when participating in physical activity

1. How does heart health information apply to my life?

- describe situations where they encourage other classmates while participating in physical activity and what impact the support had?
- track and record their steps on a daily basis, using pedometers. See Appendix C, page 73, for details on pedometer use.

2. Copy and distribute Student Worksheet 2: Activity Assessment, page 13, and Student Worksheet 3: Values Assessment, page 14, to encourage students to reflect on their feelings and experiences.

Heart Healthy Tips

- Encourage students to be active every day, progressing toward 60 minutes of activity most days of the week. See Canada's *Guidelines for Health Physical Activity* provided by the Health Agency of Canada at http://www.paguide.com.
- Create a bulletin board that promotes physical activity opportunities at school and in the community. Use the bulletin board to announce upcoming activities in physical education class.
- Encourage students to volunteer at community events that promote physical activity, such as a family day run or swim meet.
- Role-model a healthy active lifestyle.

Student Inquiries

Questions like the ones below may arise as a result of the learning activity.

- When I am finished my senior high school physical education program, how can I stay active?
- How do I continue a lifestyle that values active living and healthy lifestyle choices?
- What should I expect when I no longer have a regular fitness routine?
- Is joining a gym the best way to maintain my fitness level?
- What kind of physical activities do I enjoy?
- What can I do to help my family members take that first step to becoming more active?
- Is it expensive to participate in organized physical activity outside of school? What else can I do?
- What opportunities are there for physical activity close to my home?

Student Worksheet 1

Log Book

1. Consider the following daily entries.

   - Generally comment on the class activity.
   - What were the positive aspects?
   - What aspects could be changed?
   - How do you feel about your activity level and heart health?

2. Complete sentence stems like the following.

   - Today we did _____ and it increased my _____; e.g., strength, cardiovascular fitness.
   - I enjoyed _____.
   - I'd like to do more _____.
   - I discovered that _____.
   - Next time I would _____.
   - I have now set a goal to _____.
   - Now that I can _____ I will be able to _____.
   - I found _____ worthwhile.
   - I found it tough to _____ but _____.
   - I surprised myself by _____.
   - I'm looking forward to _____.
   - I'm proud that I _____.
   - It was awesome/funny when _____.
   - The impact physical education is having on my heart is _____.
   - I know I am benefiting because _____.
   - I am seeing improvement in _____ because _____.
   - I like working in the _____ Heart Zone best.
   - The activity that benefits my heart most is _____.

Activity Assessment: Log Book Reflection Ideas[1]

Answering these questions will help you understand your skills, exertion levels and unique abilities.

1. Do you consider yourself physically fit? Explain why or why not.

2. What physical activities are you good at; e.g., those requiring endurance, strength, flexibility?

3. What are your favourite physical activities?

4. What physical activities do you dislike?

5. Do you prefer team activities or individual activities? Why?

6. What physical skills have you learned over the past six months?

7. What sports would you like to be better at?

8. What is your assessment of your level of physical activity? Circle one descriptor below.
   - Fit? Ha! Where's the remote control?
   - I have some work to do!
   - Fair
   - Average
   - Good
   - Very good!
   - Outstanding!!

---

1. Adapted from Alberta Education, "Activity Assessment," *Physical Education Online*, http://www.education.gov.ab.ca/physicaleducationonline/HomeEducation/student/assess/assess1.htm (Accessed June 2005).

Values Assessment: Log Book Reflection Ideas[2]

Answering these questions will help you understand your interests, needs and feelings about physical activity and health.

1. Is physical activity important to you? Why or why not?

2. Do you live a physically active lifestyle? Explain.

3. Is there an athlete you admire? Why?

4. List the benefits you would like to receive from being active.

5. Over the next several months, what can you do to develop a physically active lifestyle?

6. Do you believe that what you put into your body affects your energy level and performance? List ways to improve your ingestion habits to ensure a healthier body.

7. How can you improve your attitude toward active living?

8. How can you be more open to activities you haven't tried?

9. If you could change one habit or attitude over the next several months to develop an active lifestyle, what would that be? Explain.

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2. Adapted from Alberta Education, "Value Assessment," *Physical Education Online*, http://www.education.gov.ab.ca/physicaleducationonline/HomeEducation/student/assess/assess1.htm (Accessed June 2005).

2. What are my heart-rate numbers?

Physical Education Learning Outcomes

Benefits Health:
Functional Fitness B (10–20–30)–3

Do It Daily … for Life:
Goal Setting
Personal Challenge D (10–20–30)–6

Learning Activity
Prerequisite—Students gather personal heart-rate numbers from a variety of body positions and physical activities.

Key Understanding
Heart-rate numbers are unique to individual physiology. No two people have the same set of numbers.

Background Information
Heart-rate data provides an excellent window into a person's physiology. For a short introduction of how the heart functions, see Appendix E, page 75. Students who know their heart-rate numbers are better prepared to monitor their heart health and fitness. By becoming aware of heart-rate data, students learn about their hearts and the various factors that affect heart health; e.g., activity, stress, food, smoking, humidity, sleep, illness, medication and altitude. Heart-rate data can be collected:

- by palpation (carotid or radial pulse), see Appendix F, page 76
- using a heart-rate monitor, see Appendix G, pages 77–78
- a combination of both.

Equipment/Materials
- Student Worksheet 4: True Resting Heart Rate, page 18
- Student Worksheet 5: Heart Rate Homework, page 19
- Student Worksheet 6: What Are My Heart-rate Numbers? pages 20–21
- Pencils, clipboards
- Heart-rate monitors, if available

Procedures
1. Copy and distribute Student Worksheet 4: True Resting Heart Rate, page 18. Teach students how to collect their resting heart rates accurately.
2. Copy and distribute Student Worksheet 5: Heart Rate Homework, page 19. Have students complete this worksheet for homework.
3. Help students measure and record their heart-rate numbers after participating in a variety of activities.
   - Copy and distribute Student Worksheet 6: What Are My Heart-rate Numbers? pages 20–21. Explain that students will be measuring their heart rates after a variety of activities with different intensity levels.

They will then create a graph that shows a linear increase in heart-rate measurements as their activity levels increase.

- If using heart-rate monitors, teach students how to use them. See Appendix G, pages 77–78. If using the palpation method, explain, demonstrate and practise this technique. See Appendix F: Tips on Taking Your Heart Rate while Exercising, page 76.
- Have students complete the activities listed under the graph on page 20. As the intensity of the exercise increases, the heart rate should increase until students reach their anaerobic thresholds—an intensity that is hard but can be maintained for 15–60 seconds. Discuss individual differences and how different graph numbers are appropriate.
- Discuss the inquiry questions on pages 20 and 21 and assign them for homework.
- Encourage students to take multiple readings over a period of classes for a variety of physical activities and body positions to establish base-line data.
- If available, have students wear pedometers during the activities and record both their heart rates and pedometer readings.

4. Have students use the information gathered to determine their maximum heart-rate (Max HR) numbers by completing the "Calculations for Determining Maximum Heart Rate" section on page 21. It is a good idea for students to choose three of the five methods provided to arrive at a personal average.

Heart Healthy Tips

- When using a pulse to obtain a heart rate, provide more than a one-count session. For example, provide a six or 10-second count and immediately after, provide a second six or 10-second count for students who may have been a little late in palpating their pulse.
- Heart-rate Monitors
  - Demonstrate how to use a heart-rate monitor.
  - Familiarize yourself with the basic care and maintenance of heart-rate monitors. See Appendix G, pages 77–78.

2. What are my heart-rate numbers?

  - Establish a system for distributing heart-rate monitors. See Appendix H, page 79, for a sample heart-rate monitor check-in/check-out sheet.
  - Be prepared to troubleshoot heart-rate monitoring activities during class.
  - Provide a spray bottle with a mild cleaning solution or a bucket of warm water and a towel to clean the transmitters.
- Encourage students to ask questions.
- Be prepared, initially, to have students collect heart-rate data over two or three classes. A large gym provides many opportunities to raise the heart rate. In subsequent classes, alternate venues can be used. An activity with a lot of running is ideal.
- Encourage students to take their resting heart rates and their heart rates after exercising on a regular basis outside of class.
- For further activity ideas, see the physical education online Web site at http://www.education.gov.ab.ca/physicaleducationonline/teacherresources.

Student Inquiries

Questions like the ones below may arise as a result of the learning activity.

- Is this a good heart-rate number?
- Does a higher heart rate mean better fitness?
- Does a lower resting heart rate mean better fitness?
- Am I missing some of the beats in my count because my heart is beating so hard?
- How do my heart-rate numbers compare to my parents/ guardians, siblings and friends?
- What is my heart rate during an examination or thinking about an examination?
- How much does my heart rate fluctuate throughout the day?
- Why does my heart rate fluctuate so much while I'm sitting?
- What is the lowest heart rate I can have?

Student Worksheet 4

True Resting Heart Rate

Collect your true resting heart rate for three to five mornings. The easiest method of obtaining your resting heart rate is to use the palpation method in the morning before getting out of bed.

Radial or carotid pulse

- Use your index and middle fingers to take your pulse, not your thumb. (Your thumb has a pulse too which can make counting inaccurate.)[3]
- Use a stopwatch, watch or clock that displays time in seconds.
- Practise the procedure below a few times.
- Count the number of pulses you feel in 15 seconds and multiply by four, or count for a total of one minute.
- Record your results.

Where to find your pulse[3]

- **Wrist:** Find the tendon running down the centre of the inside of your arm. Take your pulse on the thumb side of that tendon.
- **Neck:** Take your pulse on the carotid artery next to your Adam's apple.

Your carotid artery is pressure sensitive so do not press too hard.
Caution: Do not take a pulse rate on both sides of the neck at once.

Use the chart below to record your resting heart rate and calculate the average.

Date	**15-second count**	**1-minute count**
_____	_____ × 4 =	_____
_____	_____ × 4 =	_____
_____	_____ × 4 =	_____
_____	_____ × 4 =	_____
_____	_____ × 4 =	_____
	Total	_____

Calculate the average by dividing the **Total** by the number of times you took your resting heart rate. **My resting heart rate** =_____.

Note: Another method of obtaining information about your resting heart rate is to wear a heart-rate monitor while you sleep. Set the watch to record every 30 minutes and download the information from the watch to determine the average resting heart rate. This should be repeated several nights to get a true average.

3. Adapted with permission from Kaleida Health Cardiovascular Services, "Target Heart Rate," *Kaleida Health Cardiovascular Services*, 2003–2005, www.cardiovascularservices.org/HeartRate.html (Accessed July 2005).

Rate Homework

Name: _____

Week of: _____

♥ heart-rate numbers ♥

Monday Resting Heart Rate: _____	**activity** _____ _____ _____	**heart rate** _____ _____ _____
Tuesday Resting Heart Rate: _____	**activity** _____ _____ _____	**heart rate** _____ _____ _____
Wednesday Resting Heart Rate: _____	**activity** _____ _____ _____	**heart rate** _____ _____ _____
Thursday Resting Heart Rate: _____	**activity** _____ _____ _____	**heart rate** _____ _____ _____
Friday Resting Heart Rate: _____	**activity** _____ _____ _____	**heart rate** _____ _____ _____

★This week's goal

Take my resting heart rate at least three mornings before I get up.

★Don't forget

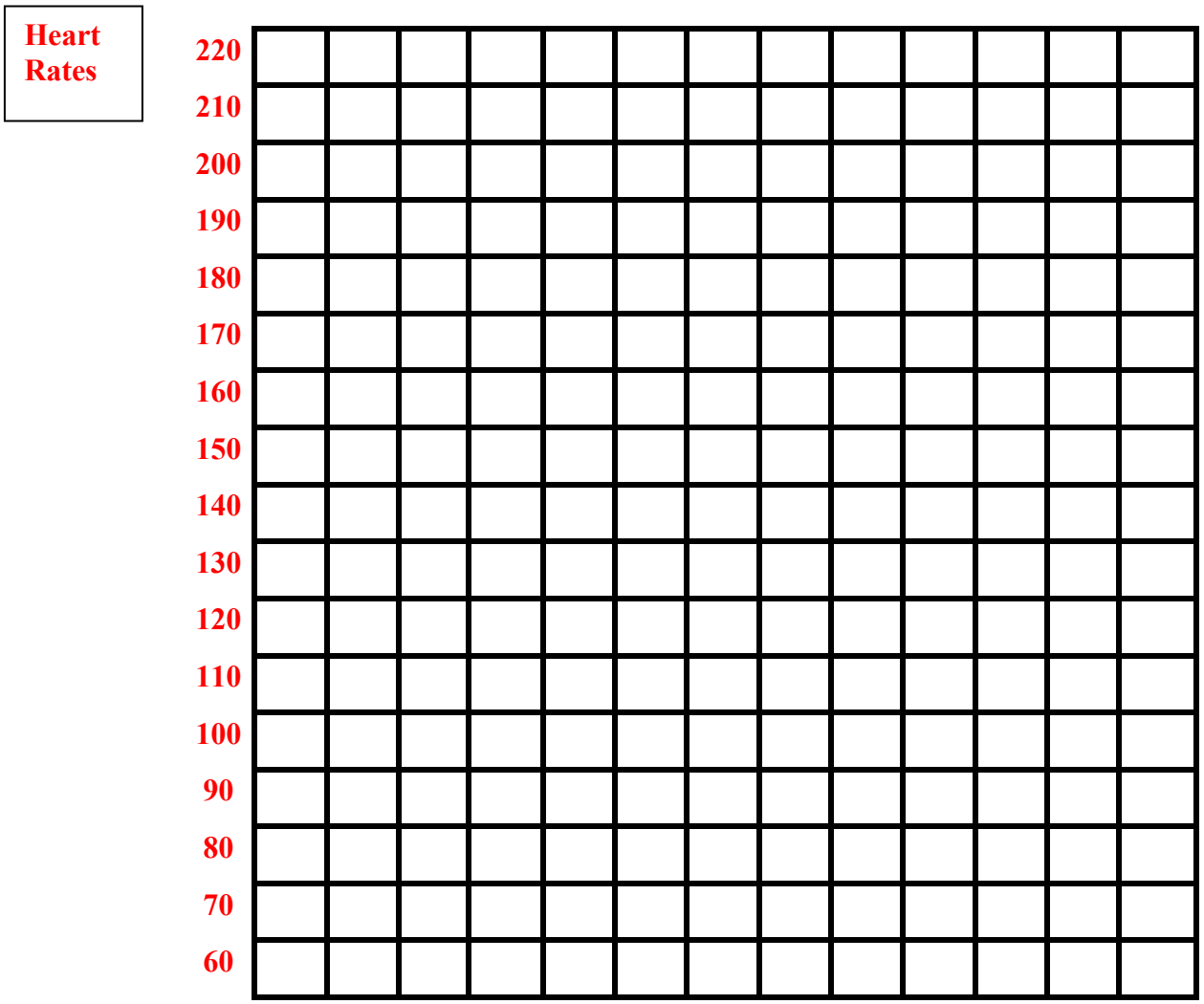
Use your index and middle fingers on the neck or wrist and count the heart rate for at least 15 seconds. Multiply by 4 to get a 1-minute count and record.

★Challenge★

1. Obtain a resting heart rate every day this week and count for a full minute.

2. Obtain heart rates during different activities; e.g., sitting, doing an examination, homework, walking to school.

What Are My Heart-rate Numbers?



Check for understanding:

1. How much higher was your peak HR than your resting HR?
   Peak _____ **− resting** _____ = _____**bpm** (beats per minute)

2. What was the difference in HR between resting and recovery after four minutes?
   Resting _____ **− recovery** _____ = _____ **bpm** (beats per minute)

3. How would you describe your fitness level based on this experiment and why?

_____

_____

_____

4. How did the pedometer readings relate to your heart-rate readings?

_____

_____

_____

5. What could you do to alter your results next time?

_____

_____

_____

↑ Intensity = ↑ Heart Rate

Increasing intensity equals an increase in heart rate

Your graph should show a linear increase until you reach your anaerobic threshold. (Notify your teacher if after several repeats, you are not getting a linear increase.)

Calculations for determining Maximum Heart Rate

- Heart rate after 2 km run _____ bpm × 1.15 = _____ bpm
- Heart rate during 1 km power walk _____ bpm × 1.30 = _____ bpm
- Heart rate after 3 minutes of step up/down _____ bpm × 1.55 = _____ bpm
- Warm-up and sprint against a classmate _____ bpm + 10 beats = _____ bpm
- Highest number recorded _____ bpm Activity: _____

3. What do my heart-rate numbers mean?

Physical Education Learning Outcomes

Benefits Health:
Functional Fitness B (10–30)–2

Do It Daily … for Life:
Effort D (10–20–30)–1
D (10–20–30)–2

Learning Activity
Students discover how heart-rate numbers are useful in setting fitness and performance goals. Students use a variety of activities to discover their maximum heart rates and develop the ability to understand their heart rates.

Key Understanding
By interpreting and understanding what heart-rate numbers mean and the benefits of exercising in various heart-rate zones, students are better able to plan and implement activities to improve their heart health.

The Zones Chart, pages 27–29, provides information about the characteristics and benefits of working the heart to various levels of intensity.

Background Information
Heart-rate data provides an excellent window into a person's physiology. A student who knows his or her heart-rate numbers is better prepared to monitor heart health and fitness. By becoming aware of heart-rate data, students will learn about their hearts, and also about the various factors that affect heart health; e.g., activity, stress, food, smoking, humidity, sleep, illness, medication and altitude. Heart-rate data can be collected in a variety of ways:

- by palpation (carotid or radial pulse), see Appendix F, page 76
- using a heart rate monitor, see Appendix G, page 77
- or, both methods indicated above.

Using heart-rate data can be simplified into three basics steps:

1. What are my heart-rate numbers?
2. What do those numbers mean?
3. How can I act upon those numbers?

Equipment/Materials

- Maximum Heart Rate™ Chart, page 26
- The Zones Chart,™ pages 27–29
- Student Worksheet 7: Heart Zones Training™ Plan, pages 30–31
- Computer lab and Internet access

The following activities can be used to determine maximum heart rate (MHR). These assessments are easy to complete and do not push students to their maximum heart rates, which should only be tested under the supervision of qualified professionals.

3. What do my heart-rate numbers mean?

The results, when averaged, provide students with their maximum heart rates. This information is key in determining students' optimal heart-rate zones.

If you are implementing learning opportunity 3 after learning opportunity 2, using the data from page 21 would be appropriate. For most healthy, active students a MHR is determined by measuring the heart rate after warm-up followed by strenuous activity for two to four minutes. Adding 10 beats to the heart rate taken at the end of the strenuous activity provides a valid MHR.

Procedures

1. Have students choose three of the following five methods to arrive at a personal average MHR.

   - Heart rate after a 2 km run
     _____ bpm × 1.15 = _____ bpm (beats per minute)
   - Heart rate during a 1 km power walk
     _____ bpm × 1.30 = _____bpm
   - Heart rate after 3 minutes of step up/down
     _____ bpm × 1.55 = _____bpm
   - Warm-up and sprint against a classmate
     _____ bpm + 10 beats = _____bpm
   - Highest number recorded _____ bpm
     Activity: _____

   Ask students to visit http://www.heartzones.com during class or as homework.

2. Introduce The Zones Chart on pages 27–29 and discuss the concepts and information included. Guide student understanding of heart-rate numbers using the five training zones on the chart.

3. Copy and distribute Student Worksheet 7: Heart Zones Training ™ Plan, pages 30–31. Once students have determined their maximum heart rates, they can use the chart to calculate their five training zones using the following steps.

3. What do my heart-rate numbers mean?

- Ask students to find their MHR along the top row of the chart on page 26.
- Examine the five training zones in the chart. For example, an individual with a MHR of 200 would have the following training numbers:

	a range of
Zone 5 (90–100% of individual MHR)	180–200
Zone 4 (80–90% of individual MHR)	160–180
Zone 3 (70–80% of individual MHR)	140–160
Zone 2 (60–70% of individual MHR)	120–140
Zone 1 (50–60% of individual MHR)	100–120

4. Students can use this chart to plan their own training or workout programs, or determine fitness goals.

5. Ask students to take their heart rates while participating in activities during and after class. Discuss in which zones they were participating.

Heart Healthy Tips

Heart Zones Training™ is based on the number of times the heart beats during an activity. The number of heart beats identifies a zone. A zone is simply a range of heart beats, called a cardiac training range. The range reached during an activity defines what the individual training program would look like depending on the desired goal. Heart Zones Training ™ is a method of training more efficiently and effectively.

- Heart Zones™ Maximum Heart Rate chart and The Zones chart are available for purchase from the Learning Resources Centre in large chart format (18" by 24") at http://www.lrc.education.gov.ab.ca. Charts can be posted in various activity areas; e.g., gymnasium, fitness centre, dance studio.
- For further understanding of Heart Zones Training™ and other heart healthy materials, see http://www.heartzones.com.
- Integrate this learning opportunity into regular physical education classes with a short reference to various zones. For example, during the warm-up of a lesson, briefly discuss the benefits of being physically active, how the body utilizes food for fuel and the type of energy expended in Zone 1. Discuss activities with Zone 1 intensity; e.g., walking the dog, participating in warm-ups and cool-downs.

3. What do my heart-rate numbers mean?

Student Inquiries

Questions like the ones below may arise as a result of the learning activity.

- In which zone is it best to work out?
- Do my zones change as I become more fit?
- What is a threshold?
- The charts in my fitness club indicate that the target heart rate should be between 70–85 percent of MHR. Do zones 1, 2 and 5 really matter?
- Should I work out in all five zones if I have no athletic aspirations?
- Can I always just work out in Zone 3?
- What is the best intensity for someone just starting an exercise program?
- In which zone do I burn the most fat?
- Is it beneficial to do interval training using different zones?

MAXIMUM HEART RATE [4]

Training Zone (% maximum heart rate)	Fuel Burning	HEART ZONES TRAINING														
		Max HR 150	Max HR 155	Max HR 160	Max HR 165	Max HR 170	Max HR 175	Max HR 180	Max HR 185	Max HR 190	Max HR 195	Max HR 200	Max HR 205	Max HR 210	Max HR 215	Max HR 220
Z5 RED LINE 90%-100%	GLYCOGEN BURNING	135	140	144	149	153	158	162	167	171	176	180	185	189	194	198
Z4 THRESHOLD 80%-90%	GLYCOGEN BURNING	135 – 120	140 – 124	144 – 128	149 – 132	153 – 136	158 – 140	162 – 144	167 – 148	171 – 152	176 – 156	180 – 160	185 – 164	189 – 168	194 – 172	198 – 176
Z3 AEROBIC 70%-80%	GLYCOGEN BURNING	120 – 105	124 – 109	128 – 112	132 – 116	136 – 119	140 – 123	144 – 126	148 – 130	152 – 133	156 – 137	160 – 140	164 – 144	168 – 147	172 – 151	176 – 154
Z2 TEMPERATE 60%-70%	FAT BURNING	105 – 90	109 – 93	112 – 96	116 – 99	119 – 102	123 – 105	126 – 108	130 – 111	133 – 114	137 – 117	140 – 120	144 – 123	147 – 126	151 – 129	154 – 132
Z1 HEALTHY HEART 50%-60%	FAT BURNING	90 – 75	93 – 78	96 – 80	99 – 83	102 – 85	105 – 88	108 – 90	111 – 93	114 – 95	117 – 98	120 – 100	123 – 103	126 – 105	129 – 108	132 – 110

Five Steps to Better Fitness and Performance

1. Heart Zone: Ask students to select one of the five different training zones based on their exercise goals for the workout. Students should understand that they do not have to stay in one zone for an entire workout, nor are they expected to utilize Zone 5 for extended periods.
2. Maximum Heart Rate: Students find their maximum heart rates along the top horizontal row of numbers.
3. Determine the Training Zone: The box where the selected training zone and MHR column intersect is the heart-rate training zone.
4. Set the Zone: The lower heart-rate number in this box is the floor of the training zone and the upper number is the ceiling.
5. Stay in Zone: During each workout, students maintain their heart rates between their zone floors and ceilings (excluding warm-up and cool-down).

A Student's Maximum Heart Rate:

- is the anchor point for determining the five training zones
- can vary from 185–240 beats per minute (bpm)
- is skill specific (greater muscle mass usage = higher MHR; e.g., a national level badminton player is able to raise the heart rate higher than a recreational player during a badminton game)
- does not indicate better or worse athletic performance or fitness
- is a fixed number, unless a person becomes unfit
- does not decline with age, providing a person remains active
- is affected by drugs and other medications
- is altitude sensitive (drops approximately 1bpm/1000 feet elevation gain)
- is not accurately determined with a formula (Robergs and Landwehr 2002).

4. Chart reprinted with permission of Heart Zones Training™, "Maximum Heart Rate" chart (Sacramento, CA: Heart Zones Training™, 2003).

THE ZONES CHART©

ZONE	MAXIMUM HEART RATE	FUEL BURNED**	CALORIES BURNED (Cal/min)* (Cal/30min)	WORKOUT TYPE	BENEFITS	HZT POINTS°	WELLNESS ZONES	INTENSITY MEASUREMENTS: LACTATE* CONCENTRATION	INTENSITY MEASUREMENTS: VO_2§	INTENSITY MEASUREMENTS: RATING OF PERCEIVED EXERTION	INTENSITY MEASUREMENTS: VERBAL DESCRIPTION
5 REDLINE  RED ZONE	100% ↕ 90%	← greater CARBOHYDRATES	~17 Cal/min ~510	Max effort, sprinting, high speed intervals	Improved lactate tolerance GET FASTEST	x5		>8mm	100% ↕ 86%	10 ↕ 7	maximal effort to very, very hard
4 THRESHOLD  ORANGE ZONE	90% ↕ 80%		~13 Cal/min ~390	Time trials, intervals, tempo, hill work	Improved anaerobic capacity, lactate clearance GET FASTER	x4	PERFORMANCE ZONES	4-8mm	86% ↕ 73%	7 ↕ 5	very, very hard to hard
3 AEROBIC  YELLOW ZONE	80% ↕ 70%		~10 Cal/min ~300	Endurance and steady-state	Improved aerobic capacity, optimal cardiovascular training GET FITTER	x3	FITNESS ZONES	3-4mm	73% ↕ 60%	5 ↕ 4	hard to somewhat hard
2 TEMPERATE  GREEN ZONE	70% ↕ 60%		~7 Cal/min ~210	LSD (long slow distance), recovery and regeneration	Improved fat mobilization basic cardio training STAY FIT	x2		<2.5mm	60% ↕ 48%	4 ↕ 2.5	somewhat hard to easy
1 HEALTHY HEART  BLUE ZONE	60% ↕ 50%	FAT	~4 Cal/min ~120	Warm-up and cool-down rehabilitation	Improved self-esteem, stress reduction, blood chemistry GET FIT	x1	HEALTH ZONES	<2mm	48% ↕ 35%	2.5 ↕ 1	easy to very easy

The Zones Chart, ©2003 Heart Zones, USA

5. Chart reprinted with permission of Heart Zones Training™, "The Zones Chart" (Sacramento, CA: Heart Zones Training™, 2003).

The Five Training Zones

Zone 5: Redline (90–100% of MHR) Red

- Zone 5 is used primarily for high-performance training and for participants wanting to increase performance.
- This zone is used mostly during interval style training of short to intermediate durations.
- Intensity is high and the body will feel very warm.
- Too much time in this zone can lead to injury.
- Usually no more than 10 percent of total training time would be done at this level of intensity.
- Forty-eight hours of recovery is recommended after training in Zone 5.
- Many calories are expended in Zone 5, with the major source of fuel being carbohydrates.
- Activities include sprints and high-speed intervals.
- Performance benefits include improved lactate tolerance and improved performance.
- Rating of perceived exertion: effort is described as seven to 10 out of 10 and "very, very hard to maximal effort."

Zone 4: Threshold (80–90% of MHR) Orange

- In Zone 4, the anaerobic threshold or maximum fat burning takes place.
- Many calories are expended in Zone 4, with the major source of fuel being carbohydrates.
- Activities at this level include various high intensity sports; e.g., basketball, soccer, hockey, running, climbing stairs, wrestling, gymnastics.
- A beginner can maintain this level up to 15 minutes; a trained athlete for up to 60 minutes.
- Performance benefits include improved $V0_2$ Max (volume of oxygen consumed while exercising) speed and lactate tolerance.
- Rating of perceived exertion: Effort is described as five to seven out of 10 and "hard to very, very hard."

Zone 3: Aerobic (70–80% of MHR) Yellow

- Zone 3 is the prime zone for physical training.
- Fuel source is balanced between carbohydrates and fat, and gradually shifts toward increased carbohydrates at the upper end.
- Activities at this level can be sustained for long periods of time; e.g., swimming, cycling, tennis, soccer, running, basketball, power walking, dancing, cross-country skiing.
- Fitness benefits include increased stroke volume, increase in size and number of blood vessels, improved oxygen utilization and overall increased fitness.
- Rating of perceived exertion: Effort is described as four to five out of 10 and "somewhat hard to hard."

Zone 2: Temperate (60–70% of MHR) Green

- Zone 2 is often called the cruise zone. This level can be sustained for extended periods of time.
- Other names include comfort zone, recovery zone or fat burning zone.
- For the fit individual, this zone is used primarily for recovery workouts and for warm-up and cool-down.
- For the individual just getting back into action, this is an excellent zone to work out in before moving into zone 3.
- Source of fuel is primarily fat but intensity is low so overall total calories expended are low in comparison to higher zones.
- Activities include long slow cycling, walking, hiking, volleyball, table tennis, recreational sports, canoeing.
- Benefits include improved fat utilization and mobilization, increased muscle mass and strengthened heart muscle.
- Rating of perceived exertion: Effort is described as 2.5 to four out of 10 and "easy to somewhat hard."

Zone 1: Healthy Heart (50–60% of MHR) Blue

- Zone 1 is the easiest and most comfortable zone.
- Combine this zone with Zone 2 for someone just starting out or someone looking for health benefits more than performance benefits.
- Activities include walking, light yard or housework, golf, yoga, tai chi, softball, doubles badminton, archery, fishing.
- This zone burns few calories, causes minimal sweating and no change in oxygen utilization.
- There are many health benefits attained in this zone; e.g., stabilized blood pressure, increased lean body tissue, improved blood cholesterol profiles, strengthened tendons and ligaments, and lower risk of degenerative diseases.
- Rating of perceived exertion: Effort is described as one to 1.5 out of 10 and "very easy to easy."

Heart Zones Training™ Plan

Name: _____

1. My highest number/maximum heart rate (youth MHR range from 185–240 bpm) is _____ beats per minute (bpm) doing _____ activity.

2. Calculate your five training zones using the Heart Zones Maximum Heart Rate chart.* Round your highest number to the nearest multiple of five.

Five Steps to Better Fitness and Performance

1. Heart Zone: Select one of the five different training zones based on your exercise goals for the workout.
2. Maximum Heart Rate: Find your maximum heart rate along the top horizontal row of numbers.
3. Determine your Training Zone: The box where your selected training zone and MHR column intersect is your heart-rate training zone.
4. Set the Zone: The lower heart-rate number in this box is the floor of your training zone and the upper number is the ceiling.
5. Stay in Zone: During each workout, maintain your heart rate between your zone floor and ceiling (excluding warm-up and cool-down).

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6. Chart reprinted with permission of Heart Zones Training™, "Maximum Heart Rate" chart (Sacramento, CA: Heart Zones Training ™, 2003).

My Cardiovascular Training Numbers[7]

Zone 5 Red Line	90–100% of MHR _____ to _____	bpm
Zone 4 Threshold	80–90% of MHR _____ to _____	bpm
Zone 3 Aerobic	70–80% of MHR _____ to _____	bpm
Zone 2 Temperate	60–70% of MHR _____ to _____	bpm
Zone 1 Healthy Heart	50–60% of MHR _____ to _____	bpm

My Personal Physical Activities and Activity Frequency

1. Activities in which I participate on a regular basis:

   _____

2. My activities that are seasonal:

   _____

3. I am active weekdays for _____ minutes _____ days/week. (Do not include physical education.)

4. I am usually active on weekend days for _____ minutes.

5. I will achieve the following training goal in the next six weeks.

   _____

   _____

6. I will record this goal in my physical education log book.

_____

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4. How does my body feel at various levels of intensity?

Physical Education Learning Outcomes

Benefits Health:
Functional Fitness
B (10–20–30)–3

Do It Daily … for Life:
Effort D (10–20–30)–1

Goal Setting
Personal Challenge
D (10–20–30)–6

Learning Activity
Students create personal intensity scales that describe how the body feels at each intensity level.

Key Understanding
Describing how the body feels during various forms of exertion is known as the rate of perceived exertion (RPE). Connecting these descriptions to heart-rate data at different levels of intensity helps individuals better gauge the health, fitness or performance benefits they receive from physical activity.

Background Information
Connecting heart-rate data to a measure of perceived exertion helps students identify the zones in which they are working. This information also helps them maintain a predetermined pace or intensity level for an activity or event, even when they are not making regular note of their heart rates.

The Public Health Agency of Canada indicates that Canadians aged 15 years to adulthood should accumulate 30–60 minutes of physical activity every day to stay healthy or improve health.

Physical activity does not have to be hard to improve health. A goal of 30–60 minutes of activity can be reached by building physical activities into daily routines. Activity periods of 10 minutes throughout the day can improve health.

The following table[8] provides examples of effort and intensity with suggested time allocations.

Very Light Effort	Light Effort 60 minutes	Moderate Effort 30–60 minutes	Vigorous Effort	Maximum Effort
Strolling Dusting	Light walking Volleyball Easy gardening Stretching	Brisk walking Biking Raking leaves Swimming Dancing Water aerobics	Aerobics Jogging Hockey Basketball Fast swimming Fast dancing	Sprinting Racing

For more information, see: http://www.paguide.com.

8. Source: *Canada's Physical Activity Guide to Healthy Active Living*, Public Health Agency of Canada, 1998, p. 2. Adapted and reproduced with the permission of the Minister of Public Works and Government Services Canada, 2006.

4. How does my body feel at various levels of intensity?

Students can learn to recognize their activity levels by examining their perceived levels of exertion. To facilitate understanding of perceived levels of exertion, students can ask themselves these questions at each intensity level.

- How does the activity make me feel?
- How is my breathing?
- Am I sweating?
- How long can I maintain intensity?
- Does this level of exertion allow me to focus on the activity?
- What am I feeling in other parts of my body, such as my head, stomach, arms and legs?
- Am I able to differentiate between intensity levels by listening to the rest of my body as well as my heart?

With practice, students can fairly accurately predict the intensity at which they are working. By creating their own scale or framework, students will be able to add detailed descriptions of how each level of intensity feels.

Equipment/Materials

- Heart-rate monitors
- The Zones Chart™, pages 27–29
- Student Worksheet 8: Perceived Intensity Scales, page 37
- Student Worksheet 9: Personal Intensity Scale, page 38
- Student Worksheet 10: Student Sample Personal Intensity Scale, page 39
- Student Worksheet 11: Activity Circuit Station: Heart Zone Identification, page 40
- Student Worksheet 12: Personal Monthly Activity Log, page 41
- Appendix I: Activity Circuit Station Cards, pages 80–116
- Appendix J: Core Body Exercise Circuit Cards pages 117–142
- Pencils, clipboards

Procedures

1. Prerequisite: Prior to this activity, ensure all students have participated in activities in each zone.
    - At the beginning of the class, divide students into five groups and assign one of the 5 Heart Zones (page 27) to each group. Have each group brainstorm

4. How does my body feel at various levels of intensity?

descriptors for how they feel at each intensity level and record this information with coloured markers on chart paper. Groups rotate through all five zones and add ideas to their lists. As a class, discuss and revise descriptors as necessary. Create a list of activities that relate directly to the various zones. Facilitate discussion on the differences of intensity for each individual. For example, badminton may be a Zone 5 activity for a nationally ranked player but for the average physical education student, it may be a Zone 1 or Zone 2 activity. Students should refer to The Zones Chart™, page 27, for descriptions.

- Copy and distribute Student Worksheet 8: Perceived Intensity Scales, page 37. Have students work individually or in pairs to develop their own custom-made perceived intensity scales. Begin this activity by asking students, "If you could use only one or two words at each intensity level, what would your words be?"
- Have students create their perceived intensity scales in chart format. Students may enjoy sharing their personal intensity scales. These charts can be included in their log books.

Copy and distribute Student Worksheet 9: Personal Intensity Scale, page 38. Encourage students to record and recognize their own intensity levels during activities, using their own intensity descriptors. For this activity, students work individually. Activities may include:
Zone 1—Brisk walking
Zone 2—Jogging
Zone 3—Refereeing a soccer game
Zone 4—Completing circuits
Zone 5—Sprinting.

Students submit their charts and compare this scale with their perceived exertion scales created initially. How do different students describe vigorous activities? Copy and distribute Student Worksheet 10: Student Sample Personal Intensity Scale, page 39. Students can examine it for ideas.

4. How does my body feel at various levels of intensity?

2. Create activity stations designed to provide a variety of intensity levels. Copy and distribute Student Worksheet 11: Activity Circuit Station: Heart Zone Identification, page 40. Have students select activities from the circuit station cards. See Appendix I, pages 80–116, for circuit station cards and Appendix J, pages 117–142, for core body exercise cards. Have students list the activity stations they choose for their circuits on Student Worksheet 11. Ask students to take their heart rates after completing each station and enter the required information on the worksheet. Students should relate their feelings to a particular heart zone. Encourage students to achieve an improved time or increased repetitions for a personal best. Following the circuit, have students complete the Check for Understanding questions on the bottom of page 38. Encourage students to share their answers with the class.

3. Copy and distribute Student Worksheet 12: Personal Monthly Activity Log, page 41. Students list activities they have participated in on a monthly basis. For each activity, they record their heart rates and comments. Have students complete the Check for Understanding questions at the bottom of page 41.

Heart Healthy Tips

- Personal intensity scales can be integrated into physical education to enhance learning about heart health. Have students work in individual and group settings; e.g., personal training unit, track and field, dance, individual and team games. Ideally, integration of personal intensity scales works best in classes that provide a wide range of intensity levels.
- Integrate perceived intensity activities over the course of two to three weeks or within a variety of activities in your regular physical education classes.
- Heart-rate monitors provide an accurate means of comparing how students feel with actual heart rates. Heart-rate monitors can be rented from local Be Fit for Life Network locations. See http://www.provincialfitnessunit.ca.
- If heart-rate monitors are unavailable, teach students the palpation method of collecting heart rates using the pulse or carotid artery.

4. How does my body feel at various levels of intensity?

- Encourage students to listen to their bodies. The more descriptive they are, the easier it is for them to predict their intensity levels when they are not using heart-rate monitors or taking their pulse. Have them describe their breathing, feelings in their muscles, perspiration, ability to talk and emotional feelings. As students become fit they need to make adjustments. For example, students who have been sedentary may find it difficult to talk in Zone 3. As their fitness levels improve, they will soon be able to carry on a conversation at the Zone 3 intensity level.
- If students are going into their upper zones they should be supervised at all times to ensure safety.

Student Inquiries

Questions like the ones below may arise as a result of the learning activity.

- Is there a heart zone that is best for fat burning?
- Is there a heart zone that is best for endurance training?
- Is it okay to train in the red zone repeatedly?
- What can I do to increase my heart zone in physical education class?
- In what zone should my parents be working?
- Am I getting health benefits if I work in Zone 1 on a regular basis?
- How long do I have to work in a zone to get health benefits?
- What zone do I need to work in to improve fitness?
- Which zone will help me lose weight?
- Are my intensity ratings the same as my classmates, parents/guardians or friends?
- Is it best to be active with someone who works at similar intensity levels?
- Will my personal intensity scale change as my fitness level improves?
- Will I feel comfortable working at the same intensity level every day?

Perceived Intensity Scales

Gunnar Borg (1982) designed the original 6–20 point Rating of Perceived Exertion scale to help individuals rate how easy or hard a particular intensity felt like. The original scale was correlated to exercise heart rate. For example, a rating of 16 correlated to a heart rate of 160 bpm, a rating of 17 correlated to 170 bpm. This was a crude measure of intensity and didn't take into consideration the huge variance in heart rates in the general population. Numerous modifications and scales have evolved since the original creation.

Using verbal descriptions or feelings, describe various exercise sensations. Assign a rating scale to each level of intensity from 1–10. Maximum exertion will rank as 10 and the lowest level will be 1.

Using the scale below as a model, create descriptors for your personal intensity scale on the right.

Sample Scale

Modified Borg Scale 0–10 points	
0	Rest
1	Really really easy
2	Easy
3	Moderate
4	Somewhat hard
5	Hard
6	Getting harder
7	Very hard
8	Very very hard
9	Ultra hard
10	Maximal

My Intensity Scale

Perceived Intensity Scale 0–10 points	
0	
1	
2	
3	
4	
5	
6	
7	
8	
9	
10	

Personal Intensity Scale
(perceived level of exertion)

This is **how** I feel and the **activities** that get me into the zones.

ZONE	My Feelings **DESCRIPTORS:** Breathing, body heat/sweating, ability to talk, muscle feeling, concentration, focus	Activities that get me in the zone	
5 **RED** **90–100%** **of MHR**		**HEART RATE:**	**HEART RATE:**
4 **THRESHOLD** **80–90%** **of MHR**		**HEART RATE:**	**HEART RATE:**
3 **AEROBIC** **70–80%** **of MHR**		**HEART RATE:**	**HEART RATE:**
2 **TEMPERATE** **60–70%** **of MHR**		**HEART RATE:**	**HEART RATE:**
1 **HEALTHY HEART** **50–60%** **of MHR**		**HEART RATE:**	**HEART RATE:**

CHECK FOR UNDERSTANDING

- Am I getting cardiovascular benefits from this zone?
- How did my personal intensity scale differ with various sports? Why?
- How does the activity make me feel?
- How is my breathing?
- Am I sweating?
- How long can I maintain this intensity?
- Does this level of exertion allow me to focus?
- What am I feeling in other parts of my body; e.g., head, stomach, arms, legs?
- Am I able to differentiate between the different intensities by listening to the rest of my body as well as to my heart?

Student Sample Personal Intensity Scale[9]

Personal Intensity Scale

This is HOW I Feel in my Heart Zones and activities that get me into the zones

Zone	My Feelings	Activities that get me in the zone
211 BPM = Lightings 203 BPM = running 5 **Red** **90-100% of maxHR**	- chest pains - muscles ache - head throbbing - unwillingness of muscles to move much longer - need for slow decrease of activity, opposed to studden stoppage - breathing difficulties	- 15 minutes of lightning drill in hockey
194BPM = Hockey **4** **Threshold** **80-90% of maxHR**	- shortness of breath causing for panting like breathing - leg muscles very sore - need for quick break before wanting to continue activity - very hot feeling	- Playing hockey games - sprinting - constant running during a rugby game
174BPM - Refereeing **3** **Aerobic** **70-80% of maxHR**	- Body feels nice and warm - feel ability to continue on for long periods of time - breathing speeds up - cold fingers - loose muscles - Substantial sweating	- Refereeing a hockey game - light hockey practice - swimming lengths in the pool
148 BPM - Marching Parade **2** **Temperate** **60-70% of maxHR**	- Knee paing - tightening muscles - feeling like my body wants needs to do more work to feel better - slightly accelerated breathing - sweating increases	- marching and playing in a parade - being a linesman for a hockey game - jogging lightly
1 **Healthy Heart** **50-60% of maxHR** 119 BPM = Brisk walk	- feeling as though little to no work being done - little to no sweating - breathing similar to resting - feels as though I am warming up to something more intense	- Briskly walking the dog - swimming in the pool for leisure - playing ping pong

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Student Worksheet 11

Activity Circuit Station: Heart Zone Identification

Learning Outcome: Plan, assess and maintain personal fitness

✓ List the circuit stations you will complete, along with today's date.
✓ Enter the required information on your worksheet after completing each station.
✓ Go for a personal best (PB) by trying to improve times or the number of repetitions completed.
✓ Indicate the zone in which you worked and the health fitness factors for each activity.

Health Fitness Factors: C = Cardio, **S** = Strength, **F** = flexibility

Date:		**Date:**	**Date:**	**Date:**
Circuit Station Activity	**Health Fitness Factors**	**Intensity Descriptors**	**Intensity Descriptors**	**Intensity Descriptors**
1.	HR / ZONE			
2.	HR / ZONE			
3.	HR / ZONE			
4.	HR / ZONE			
5.	HR / ZONE			
6.	HR / ZONE			
7.	HR / ZONE			
8.	HR / ZONE			
9.	HR / ZONE			
10.	HR / ZONE			

CHECKING FOR UNDERSTANDING

- Looking at your intensity descriptor list from your circuit results, in which zone did you spend the majority of time during this particular circuit?
- Looking at your zone list from your circuit results, in which zone did you spend the least time during this particular circuit?
- Was there any particular zone in which you felt you did not work today? Why? Modify two of the activities to reach a different heart zone, one to increase and one to decrease the level of intensity.
- If you could create three new stations that you would enjoy, what would they be? What heart zone do you think you would achieve for each activity?

Month:

Personal Monthly Activity Log

List activities you participated in during the past month along with your heart rate and any comments.	Activities/HR	1	Activities/HR	2	Activities/HR	3	Activities/HR	4	Activities/HR	5	Activities/HR	6
	Comments:		Comments:		Comments:		Comments:		Comments:		Comments:	
Activities/ HR	7	Activities/HR	8	Activities/HR	9	Activities/HR	10	Activities/HR	11	Activities/HR	12	Activities/HR	13
Comments:		Comments:		Comments:		Comments:		Comments:		Comments:		Comments:	
Activities/ HR	14	Activities/HR	15	Activities/HR	16	Activities/HR	17	Activities/HR	18	Activities/HR	19	Activities/HR	20
Comments:		Comments:		Comments:		Comments:		Comments:		Comments:		Comments:	
Activities/ HR	21	Activities/HR	22	Activities/HR	23	Activities/HR	24	Activities/HR	25	Activities/HR	26	Activities/HR	27
Comments:		Comments:		Comments:		Comments:		Comments:		Comments:		Comments:	
Activities/ HR	28	Activities/HR	29	Activities/HR	30	Activities/HR	31	**CHECK FOR UNDERSTANDING** • During which activity did you have the highest heart rate? Why do you think this is? • During which activity did you have the lowest heart rate? Why do you think this is? • Describe ways you could increase your heart rate during the activity that provided your lowest heart rate.					
Comments:		Comments:		Comments:		Comments:							

5. Am I getting cardiovascular benefits in physical education class?

Physical Education Learning Outcomes

Benefits Health:
Functional Fitness B (10–20–30)–2,
B (10–20–30)–3

Do It Daily … for Life:
Effort D (10–20–30)–1

Learning Activity
Students suggest and implement strategies to ensure cardiovascular health benefits in physical education class.

Key Understanding
Any movement that elevates the heart rate benefits the heart. Participating in activities that allow the heart rate to reach Zone 1 and Zone 2 improves the health of the heart. In order to improve heart health further, a higher level of intensity is required.

Background Information
There is often sustained activity in a physical education class and students' understanding of intensity, individual heart-rate numbers and how they can personally improve heart health during class are key understandings for this lesson.

Not all physical education classes are expected to provide a high intensity experience; e.g., yoga, tai chi. However, many students value the opportunity to be engaged in motivating and energizing activity during class. Students can be challenged to attain those outcomes related to cardiovascular fitness (Outcome B) as well as effort outcomes (Outcome D) through daily activity experiences, including physical education class.

Equipment/Materials
- Two or three heart-rate monitors or pedometers, if possible
- Watches or clocks that measure seconds
- Maximum Heart Rate™ Chart, page 26
- Student Worksheet 13: Heart-rate Responses, page 45
- Student Worksheet 14: Are You Getting Cardiovascular Benefits in Physical Education Class?, page 46

Procedures
1. Provide a variety of activities designed to increase heart rates. See Appendix K, pages 143–147, for sample activities. Explain the procedures for each activity.

5. Am I getting cardiovascular benefits in physical education class?

2. Copy and distribute Student Worksheet 13: Heart-rate Responses, page 45. Students will analyze and record their heart rates at the end of each activity using heart-rate monitors or palpation readings and record their data on the worksheet. Heart rates can be recorded as a number or plotted on the graph.

3. If students are using pedometers, they can record the readings after recording their heart-rate readings.

4. Have students work in pairs to answer the questions at the bottom of the worksheet. Allow time for class discussion afterward.

5. Have students place the completed worksheets in their log books.

6. After gathering data from several physical education classes, students can compute an average heart rate for physical education class by dividing the total heart-rate number by the number of activities for which a heart rate was recorded. Students then compute an average heart rate and determine in which zone their average heart rate is located.

Example of an average heart rate calculation

Activity	**Heart Rate**
1	**125 bpm**
2	**135 bpm**
3	**127 bpm**
4	**187 bpm**
Total	**574 bpm**
÷ 4 activities =	**143.5 bpm (Zone 3)**

5. Am I getting cardiovascular benefits in physical education class?

7. Copy and distribute Student Worksheet 14: Are You Getting Cardiovascular Benefits in Physical Education Class?, page 46. After determining their average heart rates for physical education class, students can use it to determine if they are active enough in physical education to get cardiovascular benefits. Students can use this worksheet to set goals for improving their cardiovascular health. Have students consider what type of cardiovascular benefits they obtained, and reflect on what they could do in future classes to enhance their heart health and fitness.

Heart Healthy Tips

- Some heart-rate monitors are downloadable onto computers and can be used to create heart-rate profiles for students' log books.
- Refer students to their Student Worksheet 9: Personal Intensity Scale, page 38. Encourage continual review and revision of these scales.
- See Appendix D, page 74, for strategies to promote cardiovascular benefits in physical education class.
- During physical education class, have students come together to stretch, discuss heart rates or pedometer readings, fitness benefits and other related information (Outcome B). This discussion time is also valuable for engaging students in goal-setting activities (Outcome D).
- For more activity ideas for physical education, see http:///www.education.gov.ab.ca/physicaleducationonline/teacherresources.

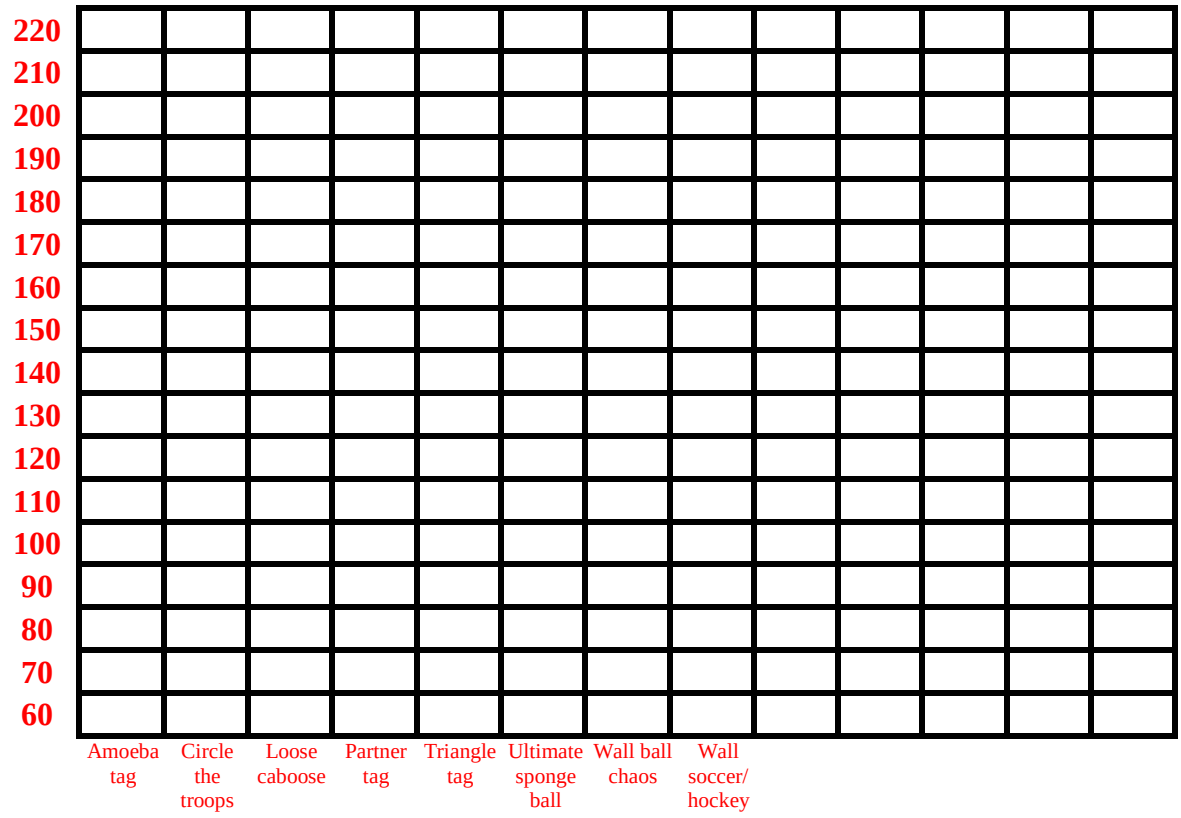
Student Inquiries

Questions like the ones below may arise as a result of the learning activity.

- What activities outside of class will provide good cardiovascular benefits?
- What types of activities could I suggest to my friends, siblings, family members that would provide cardiovascular benefits?
- Is there such a thing as too much cardiovascular training? (Discuss overtraining.)
- How can I determine if I am training too hard? (Discuss importance of monitoring resting heart rate, amount of sleep and overall training plan.)
- How much recovery time is required after a really vigorous training session?

Heart-rate Responses

Note: Ensure the activities listed on the horizontal axis of the graph reflect the activity choices in the physical education lessons.



Pedometer reading

HR monitor reading
HR manual reading

1. Which activity raised your heart rate most? Why?

   _____

2. Which activity produced your lowest heart rate? Why?

   _____

3. Suggest a modification for the activity with your lowest heart rate to provide improved heart-rate training.

   _____

4. How did the pedometer readings relate to your heart-rate readings?

   _____

5. What could you do to improve your results next time?

   _____

Are You Getting Cardiovascular Benefits in Physical Education Class?

Achieving Optimal Cardiovascular Fitness 4	**Improving Cardiovascular Fitness 3**	**Maintaining Cardiovascular Fitness 2**	**Basic Health Benefit 1**
Achieves an average heart rate in upper Zones (4–5) and shows some time spent in Zone 5.	Achieves an average heart rate within Zone 3.	Achieves an average heart rate in upper Zone 2.	Achieves an average heart rate in lower Zone 2 or Zone 1.

1. In physical education class, which level of cardiovascular fitness are you currently operating?

   Reflect on your cardiovascular fitness and provide comments:

   _____

2. Which level of cardiovascular fitness do you want to achieve in physical education class?

   _____

3. How can you increase cardiovascular opportunities in physical education class?

   _____

   _____

   _____

6. Am I active enough each day to receive health/fitness

Physical Education Learning Outcomes

Benefits Health:
Functional Fitness B (10–20–30)–3

Do It Daily … for Life:
Effort D (10–20–30)–1

Goal Setting
Personal Challenge D (10–20–30)–6

Learning Activity
Students assess the frequency and intensity of their current daily physical activity habits and determine whether their physical activity levels provide cardiovascular benefits that improve and/or maintain physical fitness.

Key Understanding
Individuals aged 15 and older are encouraged to increase their physical activity time to 60 minutes per day, of which 30 minutes, should be vigorous.[10]

Background Information
Vigorous activity occurs when heart rates are in Zone 3 or higher. Flexibility and strength activities often take place in less-vigorous Zones 1 or 2.

Students should be encouraged to accumulate 60 minutes of activity a day in periods of at least 10 minutes each. Students should also be encouraged to make a conscious effort to decrease nonactive time. Small increases in activity levels and small decreases in nonactive time often result in significant changes in physical and psychological health over the course of several months and/or years.

Research suggests that people who track their activity on a daily basis are better able to adhere to exercise or training programs.

Recording physical activity provides:
- a daily dose of motivation
- assistance in achieving personal goals
- evidence of progress; e.g., five weeks ago it was tiring to walk 45 minutes at a brisk pace, now it is easier
- confirmation of the effectiveness of personal training programs.

10. Adapted from Health Canada, *Canada's Physical Activity Guide to Healthy Active Living* (Ottawa, ON: Health Canada, 1998), p.2.

6. Am I active enough each day to receive health/fitness benefits?

Equipment/Materials

- Student Worksheet 15: Physical Activity Record, page 51
- Various online physical activity tracking tools; e.g., Student Assessment Form at http://www.education.gov.ab.ca/physicaleducationonline/HomeEducation/student/intro/intro.htm
- Student Worksheet 16: Assessment Rubric: Do It Daily, page 52
- Student Worksheet 17: Goal Setting Organizer, page 53
- Canada's Physical Activity Guide, available online at http://www.healthcanada.ca/paguide or call 1–888–334–9769
- Pedometers

Procedures

1. Copy and distribute Student Worksheet 15: Physical Activity Record, page 51. Have students track their physical activity for a predetermined period; e.g., a term, the school year, two weeks. Recording physical activity can be a prime tool to motivate further action. Students should submit the completed Physical Activity Records or include them in their log books.

2. Copy and distribute Student Worksheet 16: Assessment Rubric: Do It Daily, page 52. Have students analyze their personal data. This analysis could include the following questions.
   - Do you meet, exceed or fall below the recommended 30–60 minutes of daily activity?
   - Are you more or less active on weekends?
   - What activities do you enjoy most?
   - What influences do others have on your activity level?
   - What are the barriers that keep you from being more active?
   - Is it possible to remove some of the barriers and if so, how?
   - What strategies can you adopt to increase your level of activity?

3. Copy and distribute Student Worksheet 17: Goal Setting Organizer, page 53. Have students write personal goals based on the analysis of data from the Physical Activity Records.

6. Am I active enough each day to receive health/fitness benefits?

Have students put their completed Goal Setting Organizer worksheets in their log books. Use the assessment rubric to help students understand how to set and achieve goals to increase time spent daily in physical activity.

4. If pedometers are available, students can measure physical activity by recording their daily steps. A goal of 10,000–12,000 steps a day provides health benefits. Measuring time and intensity or perceived intensity of activity using heart-rate monitors along with the number of steps provides a broader picture of students' activity levels.
   - For more information on how to use and care for pedometers, see Appendix C, page 73.
   - Students can record interesting data from their pedometer readings; e.g., How many steps do I take in various physical education classes? How many steps do my teachers take each day? What activity requires the most steps?

Heart Healthy Tips

- Invite students to provide input on the Do It Daily rubric, page 52, to customize the rubric to meet their personal needs.
- Create a bulletin board that promotes physical activity opportunities within the community. Encourage students to post opportunities as well.
- Encourage students to modify the Physical Activity Record, page 51, to reflect their personal preferences on the types of goals they wish to set.
- Encourage students to use the electronic tracking database provided online at http://www.education.gov.ab.ca/physicaleducationonline/HomeEducation/student/intro/intro.htm.
- If students are using pedometers, they can donate their steps to research by logging onto http://www.canadaonthemove.ca.
- Basic pedometers are available at department, electronic and sports stores. To reduce losses, select pedometers with safety straps. Pedometers are available for purchase from the Learning Resources Centre at http://www.lrc.education.gov.ab.ca.

6. Am I active enough each day to receive health/fitness benefits?

Student Inquiries
Questions like the ones below may arise as a result of the learning activity.

- What type of record keeping works best for me; e.g., paper and pencil, spreadsheet or online tracking system?
- What activities outside of physical education classes are accessible and popular for my age group, culture, gender?
- How could I get more people involved in these activities?
- What are the barriers to participation in recreation centres, sport facilities and school athletic facilities?
- What suggestions could I make to overcome these barriers?
- What could the school do to help increase my physical activity; e.g., daily physical education classes, intramurals, walk-to-school program, physical activity fair, activity-based clubs?

Student Worksheet 15

Physical Activity Record

Name: ________________________

Do It Daily … The Health Agency of Canada recommends 60 minutes of physical activity most days of the week, with 20–30 minutes of vigorous activity four to seven times per week.
Vigorous = Zones 3, 4 and 5
FITT formula**: Frequency** = daily; **Intensity** = endurance, Zones 3, 4 and 5; **Time** = 30–60 minutes;
Type = endurance, flexibility, strength

DATE	**RESTING HEART RATE** RHR in the a.m. while lying down	**PHYSICAL ACTIVITY**	**TIME**	**BENEFIT: HEALTH FITNESS**	**ZONE 1, 2, 3, 4, 5, N/A**	**STRENGTH TIME**	**FLEXIBILITY TIME**	**COMMENTS** Examples: who participated, weather, feelings, accomplishment of goals, location, reflection on performance

Assessment Rubric: Do It Daily

Name: _____

CRITERIA	4	3	2	1
Frequency Intensity Time (Outcome B)	Log entries indicate I am physically active 4–7 times per week for at least 60 minutes, of which 30 are vigorous (Zones 3, 4, 5). Activities include flexibility and strength activities at least 2–4 times per week.	Log entries indicate I am active for at least 60 minutes every day, with 30 minutes being vigorous (Zones 3, 4, 5). I participate in strength and flexibility activities one or two days per week.	Log entries indicate I am active for at least 60 minutes 2–4 days per week, with less than 10 minutes per session spent in vigorous activities. I do minimal flexibility or strength activities.	Log entries indicate I am active for 30 minutes 3–5 times per week. I do not participate in strength or flexibility activities.
Goal Setting (Outcome D)	Records indicate that physical activity levels and goals to increase fitness have been met.	Records indicate that physical activity patterns have been tracked and comments indicate goals have been set/met.	Records indicate that physical activity patterns have been recorded but reflection is minimal.	Records indicate that physical activity patterns have been entered separately and goals have not been established.
Active Living in the Community	Activity choices are varied and demonstrate commitment to physical activity within the school and community.	Activity choices indicate some variety of activities that include community involvement outside of school.	Activity choices are few and there is sporadic use of community opportunities.	Activity choices indicate minimal involvement outside of physical education class.

My activity assessment indicates I am at _____ (indicate level).

- Do you meet, exceed or fall below the recommended 30–60 minutes of daily activity?
- Are you more or less active on weekends?
- What activities do you enjoy most?
- What influences do others have on your activity level?
- What are the barriers that keep you from being more active?
- Is it possible to remove some of the barriers and if so, how?
- What strategies can you adopt to increase your level of activity?

Goal Setting Organizer

Name: _____ **Date:** _____

When creating a goal for physical activity, ask yourself: **Is your goal**

- ☐ Specific?
- ☐ Measurable?
- ☐ Achievable?
- ☐ Rational?
- ☐ Targeted?

Complete the following sentences.

My fitness goal is to _____

_____

The potential obstacles or barriers to achieve my goals are _____

_____

I will overcome these barriers by _____

_____

I will know if I am successful when _____

_____

To reach my goal, I will _____

_____

I chose this goal because _____

_____

If I were going to do something different, it would be _____

_____

7. How do I create my own physical activity program?

Physical Education Learning Outcomes

Benefits Health:
Functional Fitness B (10–20–30)–2,
B (10–20–30)–3

Do It Daily … for Life:
Effort D (10–20–30)–2

Goal Setting
Personal Challenge D (10–20–30)–6

Learning Activity
Students create personal physical activity programs based on their current fitness levels. Students' fitness levels will be compared with levels achieved after creating and following a regular physical activity program.

Key Understanding
Students who can evaluate their own levels of fitness are better able to maintain their own fitness profiles. Fitness results are most beneficial when used to meet personal health and fitness goals rather than for comparison with a standardized assessment measure. The basic principles of training include frequency of activity, intensity of activity, and time and type of activities. This is referred to as the FITT formula. The FITT formula provides a framework to assist in the design of personal fitness programs.

Background Information
Functional fitness as it is used in this resource includes the three dimensions of fitness identified by the Public Health Agency of Canada in the *Physical Activity Guide*: cardiovascular endurance, flexibility and strength. These components are necessary for the basic health of all individuals.

Endurance is a measure of how well the heart, blood, blood vessels, lungs and respiratory system are able to transport oxygen and necessary fuels to muscles during continuous exercise. Cardiovascular training also makes the heart muscle stronger, which means everyday activities are not as demanding. The suggested frequency for endurance activities is four to seven times a week; e.g., walking, participating in physical education, organized exercise programs, recreational sports.

Flexibility refers to the range of motion possible for various joints of the body. Flexibility is important for injury prevention. The suggested frequency for flexibility activity is four to seven times a week; e.g., gentle reaching, yoga, bending and stretching of all muscle groups.

Strength activities are those that work muscles against resistance; e.g., pushing or pulling open a heavy door. Strength activities help muscles and bones stay strong, improve posture and help prevent diseases like osteoporosis. The suggested

frequency of strength activities is two to four times a week; e.g., heavy yard work, resistance training. Strength can be broken down further to include both muscular endurance and muscular strength activities. Both activities are important as muscular strength assists with the maximal pulling force of a muscle or muscle group, and muscle endurance allows muscles to contract repeatedly or sustain a contraction.

Equipment/Materials

- Measuring tapes, three or four stop watches, clock with a second hand, heart-rate monitors (if available), grip-strength dynamometer (if available), meter stick, music, blocks/bean bags for agility run, variety of sports/game equipment, skipping ropes
- Student Worksheet 18: How Fit Am I? pages 58–59
- Student Worksheet 19: Personal Activity Program, page 60
- Student Worksheet 20: Heart Health Circuit Station, page 61
- Student Worksheet 21: Fitness/Skill Challenge, page 62.

Procedures

1. Discuss the principles of training and the FITT formula. See Appendix L, page 148, for more on the principles. Provide opportunities for students to experience a variety of fitness assessment activities; e.g., a two-kilometre run/walk to measure endurance, a sit-and-reach test to measure flexibility. See Appendix M, page 149, for sample assessment tests. Assist students in understanding the actual purpose of each fitness assessment. Connect student learning to the fitness principles of frequency, intensity, time and type.

2. Copy and distribute Student Worksheet 18: How Fit Am I?, pages 58–59. Help students select and record fitness assessment activities for each category of the worksheet. Students can complete the remainder of their worksheets at home. Encourage creativity.
   - Working in pairs or small groups, students demonstrate their personalized functional fitness appraisal tests to each other and record their current levels of fitness for each test.
   - At regular intervals during the physical education program, require students to record their levels of fitness according to their How Fit Am I? worksheets.

7. How do I create my own physical activity program?

- Encourage students to select activities that are enjoyable and set individual goals to improve each component of fitness. Caution students to be realistic when setting goals but encourage them to challenge their current fitness levels.

3. Copy and distribute Student Worksheet 19: Personal Activity Program, page 60, during a class scheduled in a fitness facility. The strength component of the program is primarily dependent on the use of body weights, elastic resistant bands, strength and fit balls.

4. Copy and distribute Student Worksheet 20: Heart Health Circuit Station, page 61. Have students create a Heart Health Circuit as a homework assignment, individually or in groups. Students will post and set up their circuits on the designated day for physical education.

   Student-created cardiovascular circuits can also be used for warm-up during physical education class. Have students rotate to three stations for approximately two minutes each, or use one student-created circuit in each class.

   Establish a theme for the circuit stations; e.g., survival, boot camp or kids' play. If going outdoors, put the circuit cards in plastic sleeves and tape them to pylons.

5. Incorporate Student Worksheet 21: Fitness/Skill Challenge, page 62, on days that work with your existing physical education schedule.

6. Assign students the task of creating a fun circuit in an outdoor environment near their homes.

7. Explore other aspects related to students' functional fitness; e.g., power, balance, agility, coordination, speed and reaction time. What other aspects of fitness are necessary to perform well in specific sports or activities; e.g., high-performance tennis, shovelling snow, snowboarding? How could these aspects of fitness be measured?

7. How do I create my own physical activity program?

Heart Healthy Tips

- Integrate fitness assessment activities with regular learning activities in physical education classes. For example:
  - integrate strength activities; e.g., push-ups, dips, plank, position holds, wall sit, crunches, into warm-up activities
  - create a 2- to 3-km school running course for a cardiovascular endurance workout
  - use stretches for the cool-down portion of the class.
- Avoid comparing fitness scores. There are many significant hereditary and environmental factors involved in a person's personal fitness level. It is best to help students strive toward a personal best rather than encouraging them to reach the 100^{th} percentile on a normative chart or compete with other students in fitness activities.
- Encourage students to use fitness assessments that can be done at home and in the community.
- A self-produced training program can help students develop the confidence to manage their own health and fitness when they leave school.

Student Inquiries

Questions like the ones below may arise as a result of the learning activity.

- How can I do my own assessments if I am not comfortable doing assessment tests in front of others?
- How do I carry on with physical activity when I no longer have physical education?
- Why don't I look like a body builder?
- Will I build muscle mass and look like I have big muscles?
- How long does it take to get fit?
- How do I know if I'm fit?
- What happens if I miss participating in physical activity for a week or two?
- Do I need to do a fitness test to know if I am fit?
- Is it important to compare myself to others in class?
- What is the best physical activity program to increase my heart health, overall activity level and strength?

Student Worksheet 18

How Fit Am I?

Evaluate your own level of fitness

This activity allows you to create your own assessments to measure your functional fitness. You can use assessments done in class, existing assessments or be creative and create your own tests. Include a brief description or diagram of how each test is performed. During physical education classes, you will administer and record these self-tests to determine your current level of fitness. You will follow up with the same assessment post-program to check for improvements. Avoid any type of movement that puts you at risk of injury.

There are many genetic and personal factors that affect fitness levels. Avoid comparing your scores with others or with an outside standard. Fitness results are most beneficial when used to meet your health needs and improve your own personal fitness. Strive for your own personal best.

My Fitness Assessment

Tests to determine fitness level	Date:	Date:
Endurance Assessment:	Pre-program Results	Post-program Results
•		
•		
•		
•		
•		
Flexibility Assessment:		
•		
•		
•		
•		
•		
Strength Assessment:		
•		
•		
•		
•		
•		

- The components of functional or health fitness are: endurance, flexibility and strength.
- Basic principles of training – frequency, intensity, time and type of activity (FITT).

The FITT formula outlines four essential ingredients in the development of each area of fitness. Consider the FITT formula when planning your physical activity routine. Your FITT formula should be based on your own personal physical activity goals.

- **Frequency** – How often are you active? Find a routine that will fit with your schedule and stick with it.
- **Intensity** – How hard is your activity? Use a variety of intensities as well as your perceived level of exertion scale to exercise at a comfortable but challenging level. Each person's correct level of intensity is individual. Incorporate moderate to vigorous activities into your routine four-to-seven times a week.
- **Time** – How long are you active? Time is dependent on effort and intensity. See the Physical Activity Guide recommendations at http://www.paguide.com.
- **Type** – What type of activity will you choose? Combine a variety of activities in your routine depending on your goals, paying attention to strengths and weaknesses.

The Physical Activity Guidelines recommend:

- endurance four to seven days per week
- flexibility four to seven days per week
- strength two to four days per week.

Accumulate 30–60 minutes of activity of varying intensities every day. A minimum of 30 minutes should be moderate to vigorous activity most days of the week.

Personal Activity Program

Name:_____ Class: _____

This worksheet is recommended for use in a fitness facility.

rep = repetitions, e.g., 10; **set** = number of sets of repetitions, e.g., three sets of 10 repetitions; **res** = resistance, e.g., 10 kg; **ave** = average heart rate; **int** = intensity, e.g., Heart Zone 1–5 or verbal description, e.g., vigorous

Date:																					
Strength 2–4 days/week:	rep	set	res	rep	set	res	rep	set	res	rep	set	res	rep	set	res	rep	set	res	rep	set	res
1.																					
2.																					
3.																					
Flexibility 4–7 days/week:	rep	set	res	rep	set	res	rep	set	res	rep	set	res	rep	set	res	rep	set	res	rep	set	res
1.																					
2.																					
3.																					
Endurance 4–7 days/week:	time	ave	int	time	ave	int	time	ave	int	time	ave	int	time	ave	int	time	ave	int	time	ave	int
1.																					
2.																					
3.																					

Student Worksheet 20

Heart Health Circuit Station

Name: _____

Learning Outcome: Plan, assess and maintain personal fitness activity

You and members of your physical education class are the top fitness professionals in the country. With a partner, design a cardiovascular circuit station. The station can be designed for individual or partner participation. The circuit needs to be fun, safe, challenging and raise participants' heart rates. Work the big muscles in an activity that can be maintained for a few minutes. The circuit card should include the name of the activity, a diagram/illustration and concise instructions.

Background: Heart disease is the number one killer in North America. One of the main risk factors for many chronic diseases, such as diabetes, cancer and heart diseases, is inactivity. The health of two-thirds of Canadians is at serious risk due to dangerously inactive lifestyles [Canadian Fitness and Lifestyle Research Institute (CFLRI), 2000].

Date:										
Name of Circuit Station	**Reps**	**HR**	**Reps**	**HR**	**Reps**	**HR**	**Reps**	**HR**	**Reps**	**HR**

Reps = number of repetitions of a specific activity to be performed at each station, e.g., bicep curls – 10 reps of lifting 4.5 kg.
HR = heart rate (taken with HR monitor or manually by counting the pulse for 6 seconds × 10)

Student Worksheet 21

Fitness/Skill Challenge

Partner **1**: _____ Partner **2**: _____

Learning Outcome: Plan, assess and maintain personal fitness

- ✓ List the circuit stations in which you will participate, along with today's date.
- ✓ Work with a partner to enter the required information on your worksheet after completing each station.
- ✓ Go for a personal best by trying to improve times or the number of repetitions completed.
- ✓ Measure each other's progress over time. Add your own activities for 8–15; e.g., 2-km run, dips, continuous juggle with soccer ball, number of basketball shots in one minute, wall sit, plank, arm wrestle, chin-ups, chest press.
- ✓ Include challenge for endurance, flexibility and strength components.

Date:_____	**Date:_____**		**Date:_____**		**Date:_____**	
Circuit Station Activity	**1**	**2**	**1**	**2**	**1**	**2**
1.						
2.						
3.						
4.						
5.						
6.						
7.						
8.						
9.						
10.						
11.						
12.						
13.						
14.						
15.						

8. How can we share our understanding of heart health with the community?

Physical Education Learning Outcomes

Benefits Health:
Functional Fitness B (10–20–30)–2

Do It Daily … for Life:
Active Living in the Community D (10–20–30)–8,
D (10–20–30)–9

Learning Activity
Students share their understanding of heart health with the community. Student activities could include a Heart Health Fair or written assignment on health benefits related to heart health.

Key Understanding
Education is a key component in helping reverse increasing rates of chronic heart disease. Helping students improve their personal lifestyle practices is one way schools can make a societal change in health behaviours. Student learning can be enhanced through active, hands-on engagement in activities that communicate heart-health messages to others.

Background Information
Strong evidence exists that physical activity contributes to the overall well-being of individuals. People of all ages can substantially improve their health and quality of life by including a moderate amount of physical activity into their daily routines.

> *"Participation in physical activity contributes to physical, mental and social well-being providing benefits to the individual and community."*
>
> – Alberta Education 2000a, p. 2.

Equipment/Materials
- Student Worksheet 22: Heart Health Fair Draft Submission, page 68

Procedures

Heart Health Fair
1. Have students work in groups of three or four to create interactive displays for a Heart Health Fair. This could be an interdisciplinary health fair including displays by students in physical education, locally developed activity courses; e.g., sports medicine, science, mathematics, and Career and Life Management.

   Interactive display suggestions are listed on pages 64–66.

   When hosting a Heart Health Fair for the public, consider participants' health, especially at stations requiring vigorous activity. To avoid potential risk, all community

members should complete a PAR-Q, Physical Activity Readiness Questionnaire. See Appendix N, page 150, for the PAR-Q & You form. Participants who answer YES to any of the questions should see a doctor before proceeding with vigorous activity.

2. Once students have chosen their stations, have them publicize the event with posters. These could be posted on vending machines and other areas frequented by students and staff.

3. Discuss the assignment in a physical education class and have students begin thinking of displays they could present in an interactive format. Provide a week for students to organize their teams and discuss possible projects, begin the initial draft of their project proposal and delegate who is going to take responsibility for various aspects of the project. Students can summarize their plan using Student Worksheet 22: Heart Health Fair Draft Submission, page 68.

Interactive Display

1. Invite community fitness professionals to mentor students as they create their cardiovascular stations. Topics could include the following.
   - Show how the heart responds to physical activity.
   - Show how the heart rate responds to different stimuli, such as stress, caffeine or a cold.
   - Create a survey that includes physical activity questions, such as:
     - how often are you active
     - in what activities do you like to participate
     - how often you participate in vigorous activity?

     After completing the survey, students can compare participants' answers to *Canada's Physical Activity Guide to Healthy Active Living* and provide feedback on the guidelines.

2. Have students invite participants to engage in a variety of cardiovascular activities organized by students. A fitness professional should be present to assist students with any fitness assessment activities. Using heart-rate monitors increases the accuracy of results.

8. How can we share our understanding of heart health with the community?

- One-minute Heart-rate Recovery
  Participants do moderate activity for approximately two minutes and note their exercise heart rates with heart-rate monitors or pulse palpitation. Have participants rest for one minute and take their heart rates again. The difference between these two measurements is one-minute recovery.
  Results can be recorded and students can interpret results with participants.
- Resting Heart Rate
  Participants have their heart rates taken in a horizontal position, while sitting and while standing. In each case, encourage participants to relax and bring their heart rates as low as possible. Record findings. This activity works best using heart-rate monitors.
  Students can interpret results with participants.
- Heart IQ
  Students make up quizzes or go online to locate samples. See Resources, pages 163–165. Participants then take in a mini-quiz to test their heart IQ.
- Stress and Your Heart
  Students obtain participants' heart rates prior to exercise and post-exercise for the following activities. Identify which activities help lower participants' heart rates:
  - yoga
  - breathing exercises
  - listening to soothing music
  - alternate muscle contraction for relaxation effect.
- Talk Test
  Participants note the highest heart rate they can sustain during physical activity while carrying on a conversation without any problem. Students then interpret results with participants.
- Eating for Your Heart
  Students promote the importance of proper nutrition for the health of the heart. Topics could include:
  - reading food labels
  - types of fat
  - salt
  - carbohydrates: simple versus complex
  - fibre
  - five a day – fruit and vegetable servings

- fast food
- beverages; e.g., caffeine, sport drinks, protein shakes, water
- vending machine attack
- food serving size: nutrition label serving versus food guide serving
- fad diets
- development of a school nutrition policy.

Record ideas for inclusion on the school policy for cafeteria food, pop and vending machines. For input from a local dietician, contact the local health authority.

Classroom Written Assignments

1. Students complete written assignments on the health benefits related to heart health and display them at a parent–teacher night or open house. See Appendix O, pages 154–163, for ideas for written assignments.

Heart Healthy Tips

- Heart Health Fairs could be scheduled during school hours, open house, lunch hour, during heart month or in conjunction with a major event at the school. Involve other members of the staff and organizations or professionals within the community; e.g., Heart and Stroke Foundation, local fitness centre, regional health unit, cardiologist, physiologist and dietician.
- Brainstorm ways to share project information within the school and community.
- Ask students to consider heart health assessments that are less invasive than cardio-endurance testing. This could include:
  - participating in physical activity of any kind, including simple games
  - quitting smoking
  - eating healthy foods
  - reducing stress
  - contacting volunteers from local emergency medical services to do blood pressure/heart-rate testing.
- This may provide an opportunity to collaborate with the school nurse or other community resources to develop station ideas.
- Brainstorm how students might be able to share their project information within the school and community.

8. How can we share our understanding of heart health with the community?

Student Inquiries

Questions like the ones below may arise as a result of the learning activity.

- How can I share my understanding of heart health and fitness with my family members?
- What type of sharing will have the greatest impact?
- Does increased knowledge really change behaviour? How will I know?
- What other agencies are involved in heart health in my community?
- What message can community partners share to support my understanding of heart health and fitness?
- What careers involve working in the area of heart health and fitness?
- What community partners can we invite to participate in the fair?
- What groups in our area could benefit from attending our fair; e.g., junior high, senior group, community pool members?

Heart Health Fair Draft Submission

Name of Interactive Display: _____

TEAM MEMBERS	RESPONSIBILITIES
1.	
2.	
3.	
4.	

Key understanding and relationship to heart health:

Explanation of the activity display: What will participants be doing?

Equipment required:

Location requirements: plug-ins, space, access to stairs, Internet access

Diagram of display set-up:

Expert consultation: do you need to contact experts in the area for more information?

Other:

(use reverse side of page if required)

APPENDICES

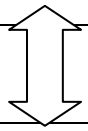
Appendix A

CAREER AND LIFE MANAGEMENT (CALM)

Program of Studies

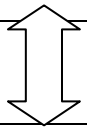
Aim

The aim of senior high school Career and Life Management (CALM) is to enable students to make well-informed, considered decisions and choices in all aspects of their lives and to develop behaviours and attitudes that contribute to the well-being and respect of self and others, now and in the future.



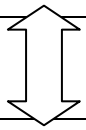
General Outcome 1 – Personal Choices

Students will apply an understanding of the emotional/psychological, intellectual, social, spiritual and physical dimensions of health, and the dynamic interplay of these factors, in managing personal well-being.



General Outcome 2 – Resource Choices

Students will make responsible decisions in the use of finances and other resources that reflect personal values and goals and demonstrate commitment to self and others.



General Outcome 3 – Career and Life Choices

Students will develop and apply processes for managing personal, lifelong career development.

Learning Opportunity 8: How can we share our understanding of heart health with the community? is connected to the CALM program. These activities identify the achievable outcomes in a chart form.

Appendix B

Questions to Guide Inquiry-based Learning

Inquiry possibilities for students in physical education classes could include the following.

- What is my resting heart rate and what does it mean to my fitness?
- What is my maximum heart rate for various activities? What is the maximum heart rate of others my age?
- What is the range of maximum heart rates in my class, school, city or the world?
- Is there any formula that can accurately predict maximum heart rate? Can we create our own maximum heart-rate formula?
- What methods appear to be best for determining maximum heart rates in youth and children?
- Am I receiving health/fitness benefits from participating in physical education?
- What are the barriers that prevent me from being more active? How can these barriers be overcome?
- What action projects could I initiate to increase the physical activity of my peers, family and society? Could we make them reality?
- What are the correlations between my own and my parents/guardians' levels of physical activity?
- How does nutrition, sleep, stress, smoking and caffeine impact my heart health?
- What methods or strategies are most beneficial for me in managing life's stresses; e.g., breathing exercises, visualization, music, yoga, exercise, positive self-talk?
- What does it feel like to be working in each of the five training zones? What words can I use to describe how I feel in each zone? How soon do I notice a change in my physical and mental feelings in each of the five training zones?
- How can I measure my own cardiovascular fitness? How does my cardiovascular fitness change over the years? What types of cardiovascular assessments do I enjoy most?
- What types of activities will I include in a personal fitness test that addresses the aspects of functional fitness (cardiovascular, flexibility, muscular endurance, muscular strength)?
- Am I active enough for optimal growth and development?
- How much do I really move in the course of a day? How can I measure this?

Appendix C

Pedometers

A pedometer is a motion sensor that detects vertical movement of the body which is then expressed as steps taken during walking or running. With the added input of stride length, it can calculate distance walked and approximate calories burned. Students can learn how much movement they complete in a day as a result of all their activities by keeping track of their steps. Students can set and achieve goals through the use of pedometers. They are simple, inexpensive, lightweight and easy for students to use and interpret.

Pedometers are available for purchase from the Learning Resources Centre at 780–427–2767 (http://www.lrc.education.gov.ab.ca) and equipment suppliers. Purchase a class set to share within the school and promote different types of student activities from walking programs to physical education classes in order for students to track their results.

Most pedometers are designed to be worn on the waistband aligned directly above the knee. The pedometer should be positioned as straight as possible, not leaning forward, backward or sideways as that will affect the accuracy of the mechanism that counts the steps. Pedometers are equipped with belt clips, however, adding a safety strap prevents loss and damage due to dropping. Pedometers are durable but a fall on a hard surface can cause damage.

How to Use a Pedometer

- Recording the number of steps students take during an average day allows them to track their progress or establish a daily average.
- Most pedometers are electronic and are activated when the foot hits the ground, producing an impulse that transfers to the pedometer case recording a step. Just like a clock, there is a pendulum arm that must be in an upright position to work properly.
- To see if a pedometer is working properly:
  - open the face of the pedometer and reset the reading to 0
  - take 20 normal walking steps
  - open the face and read how many steps were recorded
  - if the reading is 20 (or close to it), it is working fine
  - if not, test again.
- Instruct students to put pedometers on in the morning, wearing them while going to school, playing with friends or walking the dog, and take them off at night before going to bed.
- Pedometers should not be worn during extracurricular sport activities.
- Pedometers should be kept dry.

Average Steps

- Eight–10-year-olds: 12 000–16 000 steps per day
- Young adults: 7000–13 000 steps each day

Resources

For more information on pedometer use, see "WellSpring" by the Alberta Centre for Active Living at http://www.centre4activeliving.ca/Publications/WellSpring/index.html#03Spring. The Spring 2003 edition is dedicated to pedometer use with articles such as:

- Watch Your Steps: Pedometers and Physical Activity
- How Do Pedometers Work?
- The 10,000 Steps Rockhampton Physical Activity Project
- Buyer Beware: The Pros and Cons of Pedometers.

Appendix D

Strategies to Promote Cardiovascular Benefits

Below are some strategies for increasing cardiovascular endurance activities in physical education classes.

- For beginning classes, students should move as soon as they enter the activity area. Provide a variety of equipment to assist them. Stress the importance of safety, and awareness of and respect for other students' physical spaces.

- Have sufficient equipment available for every student to minimize wait time and line-ups.

- Create small teams to increase the opportunity for movement; e.g., three-team volleyball creates more opportunities than six-team volleyball.

- Create a work-to-rest ratio of 2:1 when it is not conducive for the entire class to move at the same time. A relay team with two people will create twice as much movement opportunity as a relay team of four.

- Modify the rules or equipment so students increase the intensity of their activities, and can measure progress and achievement.

- Be solutions orientated with students so they can identify ways to create more movement time, and less management and transition time.

Appendix E

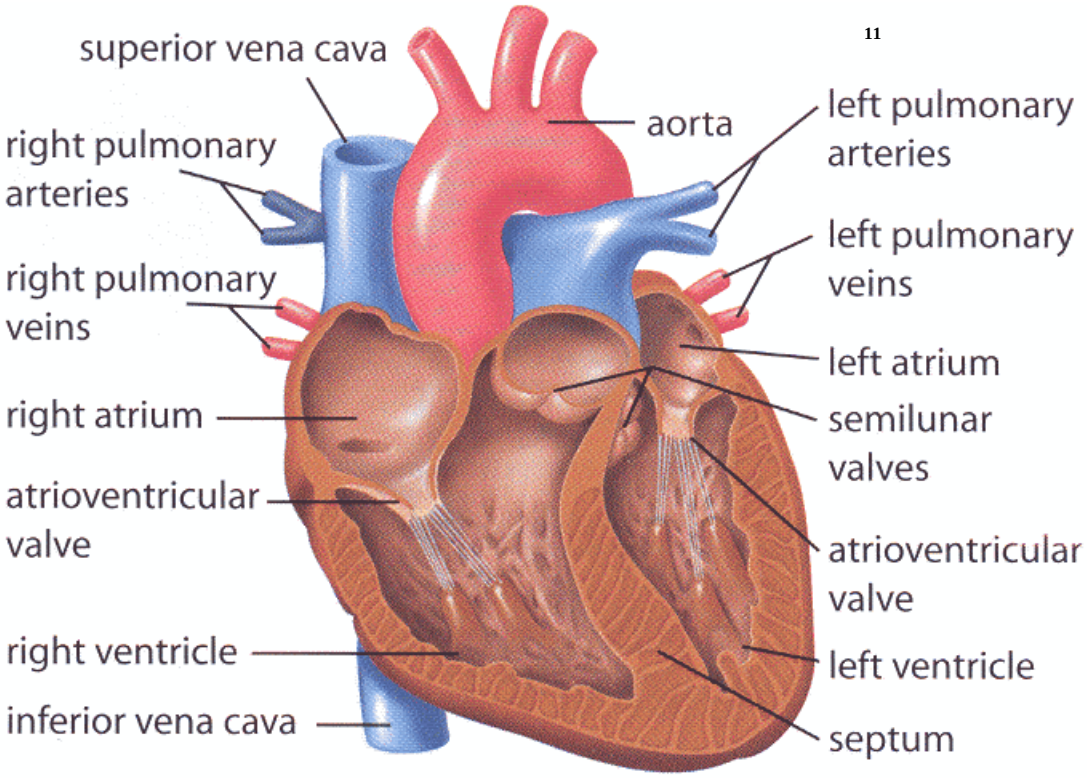
The Heart Muscle

The heart is the most important muscle in the body. It is an efficient, resilient pump making blood flow through the body for an entire lifetime.

The heart muscle itself is made up of four chambers, two valves and two separate pumps. There are two sides to the heart allowing it to function as a dual action pump. The heart's job is to contract and force blood into the chambers, through the valves, to send blood to the lungs for oxygen, and then back to the heart through valves and chambers, to be pumped out to all the cells of the body.

The rhythm of a complete heartbeat is driven by electrical activities originating from the pacemaker, a bundle of specialized nerve tissue that receives messages. It independently creates its own electrical signals beating away until there is a need to make a change in the heart rate, measured in beats per minute (bpm). For example, if cells need more oxygen, the brain automatically speeds up the contraction rate of the heart, which in turn increases blood flow.

Exercise induces such a need for more oxygen, increasing the heart rate in order to supply the harder working cells in the muscles and lungs. Improving your fitness level allows your heart to work at high levels longer and more efficiently.



11. Illustration reproduced with permission from McGraw-Hill Ryerson, *Inquiry into Biology* (Toronto, ON: McGraw-Hill Ryerson, 2006).

Appendix F

Tips on Taking Your Heart Rate while Exercising

Keep moving while taking your heart rate. Your heart rate will drop within 15 seconds if you stop moving.[12]

Where to find your pulse[12]

Wrist: Find the tendon running down the centre of the inside of your arm. Take your pulse on the thumb side of that tendon. Use your index and middle fingers to take your pulse, not your thumb as there is also a pulse in your thumb.

Neck: Take your pulse on the carotid artery on either side of your Adam's apple. Your carotid artery is pressure sensitive so do not press too hard and do not try to take your pulse on both sides at once.

Determining Your Heart Rate

Using radial or carotid pulse (palpation method)

You will need a stopwatch, watch or wall clock that displays time in seconds. Encourage students who are using the palpation method to use their own watches.

Have students practise taking their resting pulse first. If they are familiar with finding their pulse while sitting or lying quietly, it will be much easier to find during exercise when the heart is beating more vigorously: six-second count × 10 = bpm, 10-second count × six = bpm, 15-second count × four = bpm (bpm = beats per minute).

If students have a hard time finding their pulse while exercising, have them find it before they begin exercising and draw an **x** on the pulse spot.[12]

When gathering heart-rate data via palpation during exercise, use the six-second count instead of the 15-second count. During exercise, students will need to stop briefly to locate their carotid or radial pulse. Then they should be provided with a six-second count. Upon stopping physical activity, the heart starts to relax and the heart rate quickly slows down. If students count for 15 seconds, the heart rate will not be as accurate because of the recovery factor.

Alternative methods for determining heart health information

Use Student Worksheet 8: Perceived Intensity Scales on page 37 and/or the description of various intensities identified in the chart on pages 28–29 to help guide students in listening to their hearts.

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12. Adapted with permission from Kaleida Health Cardiovascular Services, "Target Heart Rate," *Kaleida Health Cardiovascular Services*, 2003–2005, www.cardiovascularservices.org/HeartRate.html (Accessed July 2005).

Appendix G

Heart-rate Monitor Parts and their Functions

Heart-rate monitors pick up the electrical signals given off by the heart and report the average number of times the heart contracts in a minute. Heart-rate monitors typically consist of three parts:

- chest belt—an elastic belt worn across the chest that holds the transmitter comfortably, yet firmly, in the correct position
- transmitter—attached to the chest belt, worn in front of the body with the label centred on chest; picks up the signal of the heart rate and transmits it to the receiver
- wrist receiver—similar to a wrist watch; receives the transmitter signals.

Wearing Your Heart-rate Monitor[13]

- Attach the transmitter to the elastic strap.
- Adjust the chest belt strap length to fit snugly. Comfortably secure the strap around your chest just below the chest muscles and buckle it.
- Lift the transmitter off your chest and moisten the grooved electrode areas on the back.
- Check that the wet electrode areas are firmly against your skin and that the logo is in a central, upright position.

Tip

Men – chest strap and transmitter should sit across the nipple line.
Women – chest strap and transmitter should sit just below the bra line.

See your heart-rate manual for specific instructions.

Care and Maintenance of Heart-rate Monitors[13]

- Wash the transmitter regularly after use with mild soap and water. Dry it carefully after washing.
- Never store the transmitter wet. Sweat and moisture can keep electrodes wet and the transmitter activated, which shortens the battery life.
- Store the heart-rate monitor in a cool, dry place. If it is wet, do not store it in any kind of non-breathing material, such as a plastic bag or sports bag.
- Do not bend or stretch the transmitter. This may damage the electrodes.
- Keep the heart-rate monitor out of extreme cold (below –10°C/14°F) and heat (above 50°C/ 122°F).
- Do not expose the heart-rate monitor to direct sunlight for extended periods; e.g., leaving it in a car exposed to sunlight.
- Dry the transmitter with a towel or soft fabric. Hard handling may damage the electrodes.
- If the heart-rate monitor is water resistant, do not operate the buttons under water, as water pressure can cause the receiver to leak.

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13. Adapted with permission from Polar Electro Oy, *Polar F5™ Fitness Heart Rate Monitor: User Manual (ENG)* (Kempele, Finland: Polar Electro Oy, 2004), Sections 1, 11 and 12.

- Avoid dropping the receiver as this may break the crystal and buttons. Always put the receiver on first so it doesn't hit the floor. If already wearing a watch, place the receiver on the other wrist to reduce the possibility of interference.
- For some models, battery changes need to be performed by an authorized dealer to maintain the warranty.
- Elastic straps can be washed by machine on the gentle cycle provided they are placed inside a lingerie mesh bag. Hang to dry. With high usage, this would be the protocol once a week.

Transmitter and elastic strap

Receiver

How to Use Heart-rate Monitors

The heart rate provides an objective gauge of exertion. Heart-rate monitors are designed for wear during strenuous exercise. They measure and record the heart rate, giving instant feedback about the work level of the heart. Using a heart monitor helps prevent stressing the body too much and maximizes the efficiency of training while minimizing the opportunity for injury.

A strap, usually attached to the chest, continuously measures the heart rate during activity. This strap must have solid uninterrupted contact with the skin to operate correctly. Data is relayed to a receiver and provides feedback when the body is working outside the targeted heart-rate zone. Some monitors do not require chest straps, instead a finger touches the sensor to collect heart-rate data.

Heart-monitor training can be effective when the information collected is used to design and implement a personal workout regimen. To do this, an initial calculation of the various heart-rate zones for the heart is made. These zones are used to guide the exertion rate during workouts.

Troubleshooting Heart Monitors

Remember:

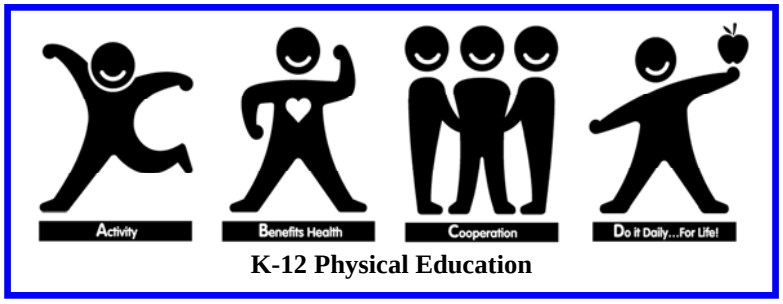
- moisten the electrodes
- adjust the chest straps to fit correctly
- place the receiver at least three feet away from another receiver to avoid cross-talk
- interference can also result from other electronic equipment, such as cell phones, wireless Internet, power lines and electronic consoles on cardio equipment
- position the wrist receiver and chest transmitter within one meter of each other
- the placement of the chest transmitter across the chest is important.

Heart-rate Monitor Check-in/Check-out System

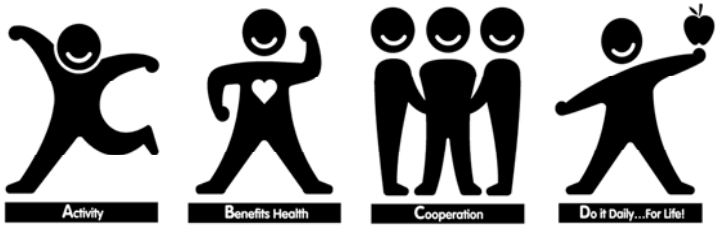
HRM Number	Name of user

Students should use the same monitor for each session.

Leapfrog around the gym with a partner.

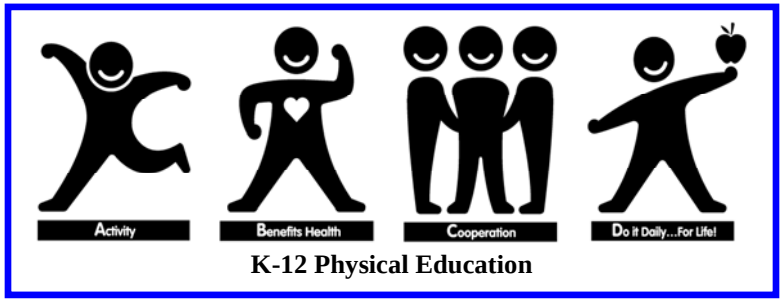


Log roll the width of the gym with a tennis ball between your legs.

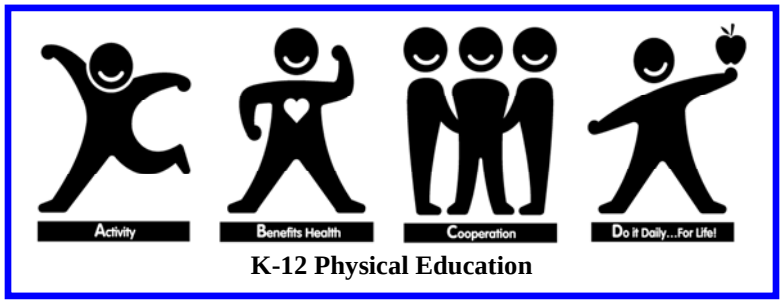


K-12 Physical Education

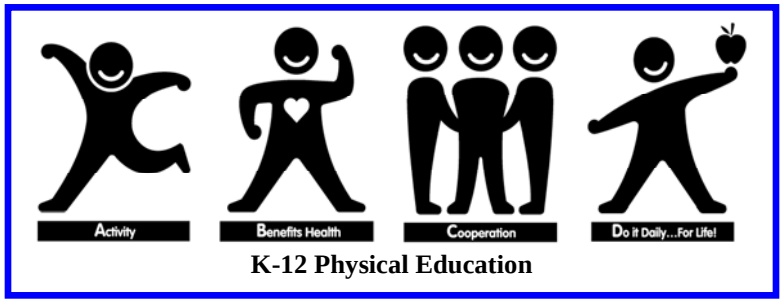
Jump rope 25 consecutive times in place.



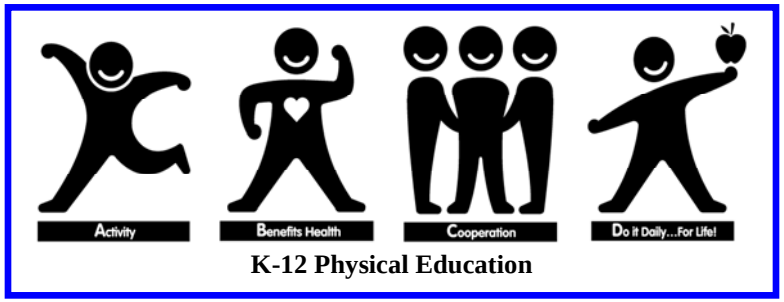
Wall volley 20 times with a volleyball.



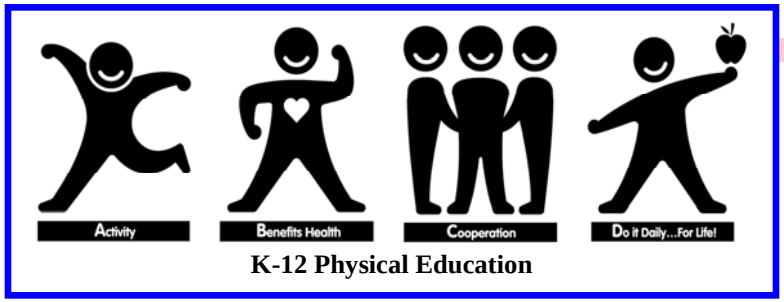
Pass a beach ball with a partner using your feet only.



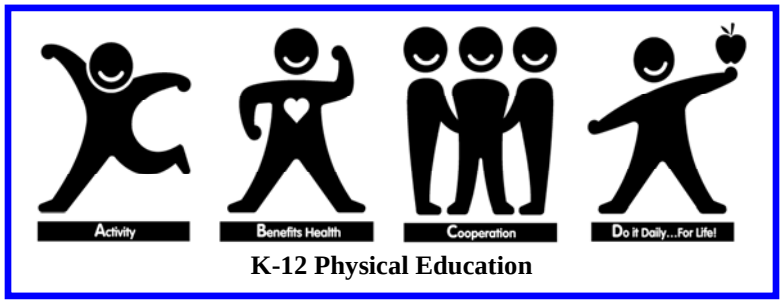
Perform 20 line touches between two lines on the floor.



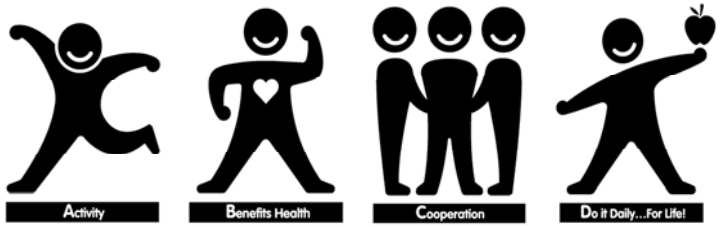
With partners, place a ball between your backs and walk around the gym.



Hopscotch with hoola hoops.

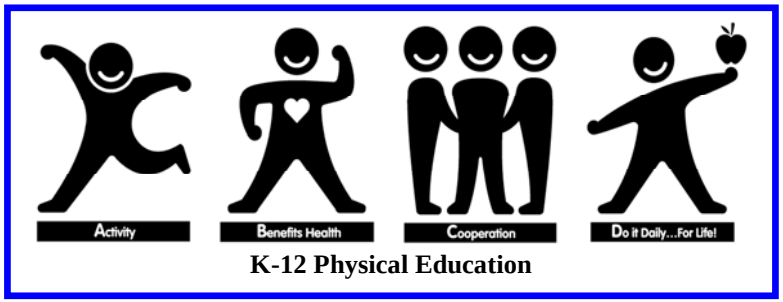


Make a push-up train by attaching as many people as you can in push-up position.

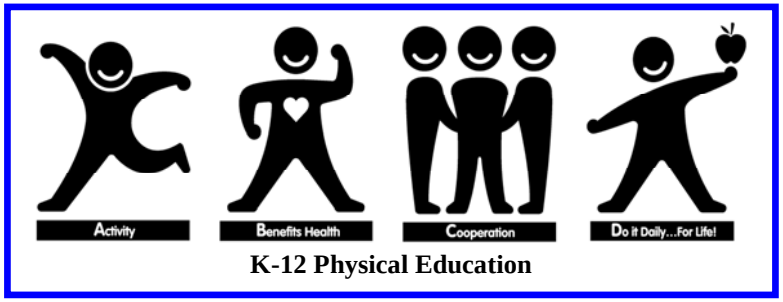


K-12 Physical Education

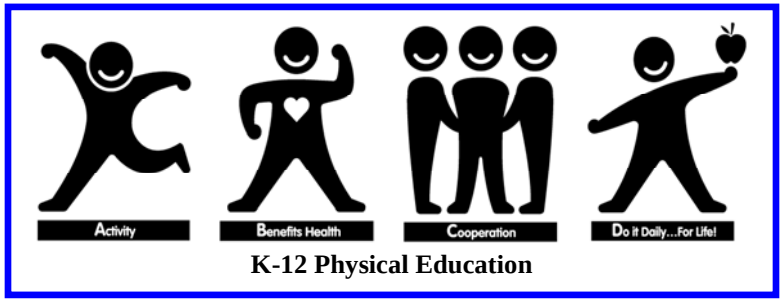
Do a 3-legged walk around the gym with a partner.



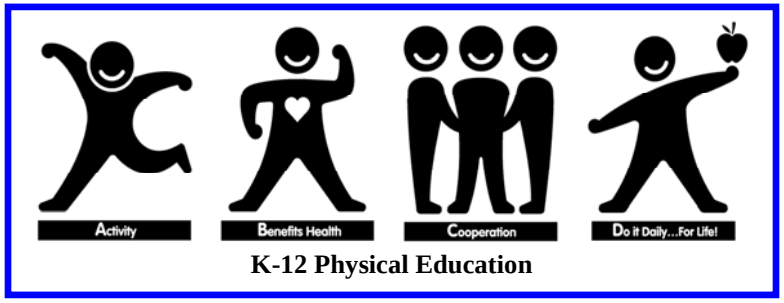
Walk or run backwards
the length of the gym
as fast as you can without falling.



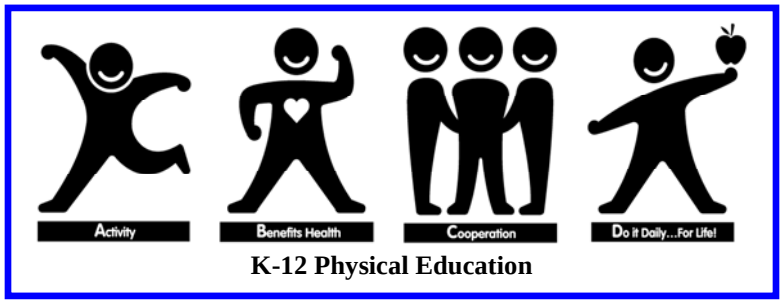
Jump rope 10 times with a ball between your knees.



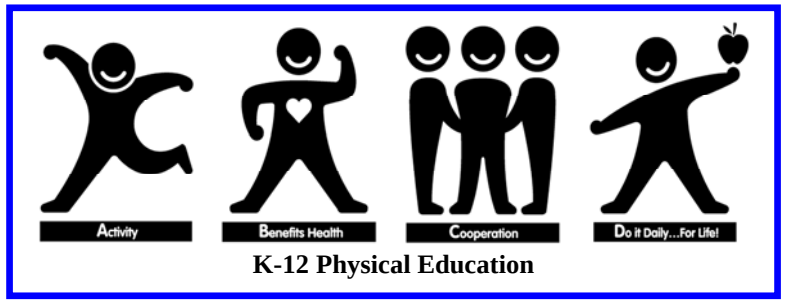
Perform 20 step-ups for each leg on a bench.



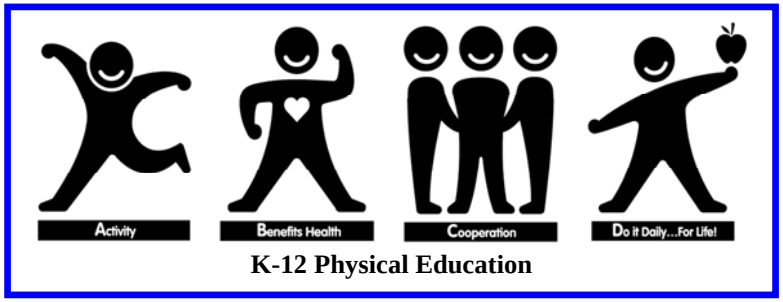
Swing a hoola-hoop around a body part 10 times in a row.



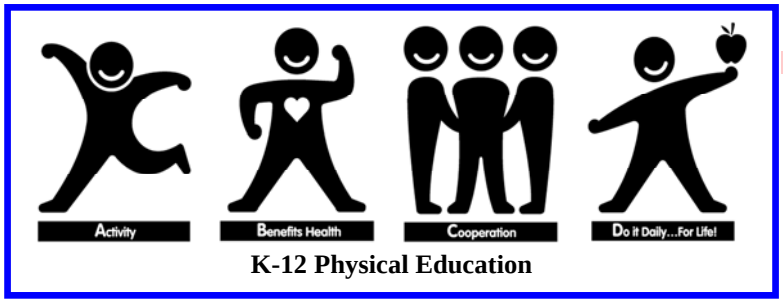
Do 10 cartwheels.



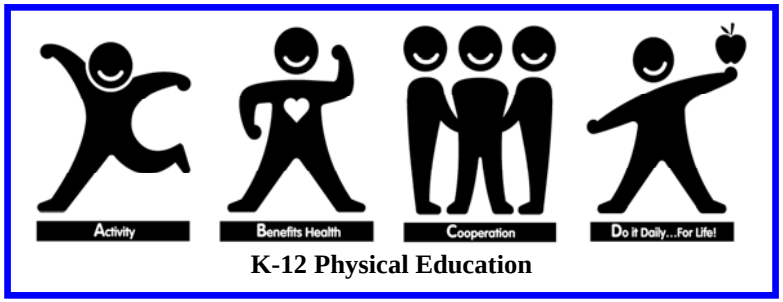
Jog around the gym three times while smiling.



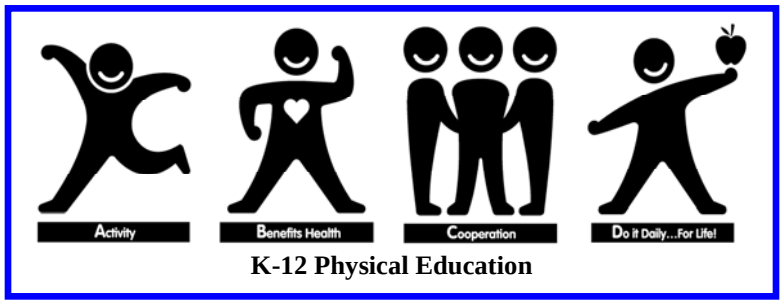
Do 25 jumping jacks while smiling.



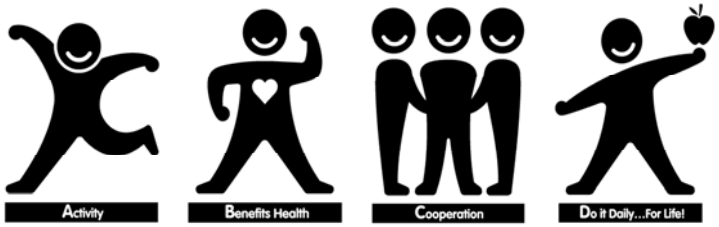
Skip around the gym swinging your arms as high as you can to get vertical lift.



Run around the room and touch every 90-degree angle.

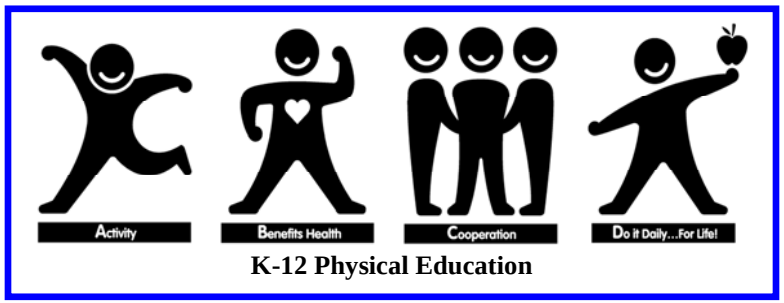


Using an elastic jump rope,
perform 20, two-foot jumps
at ankle height without touching the rope.

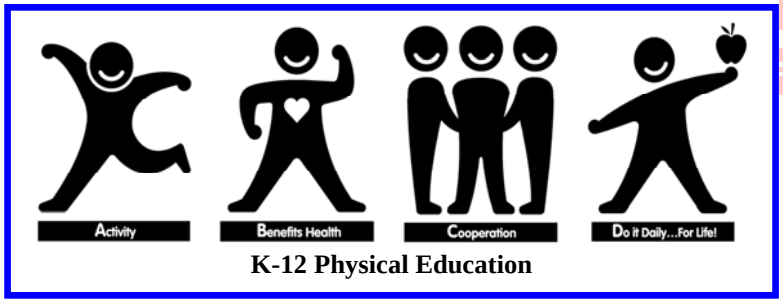


K-12 Physical Education

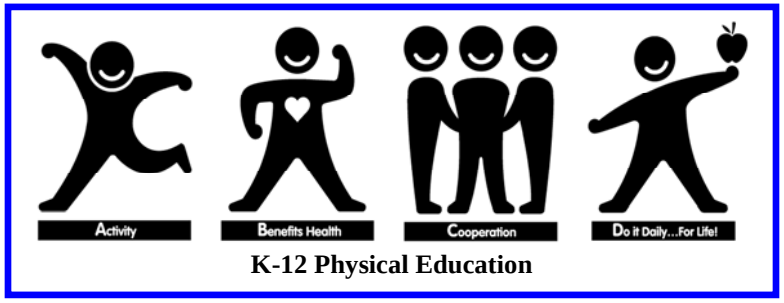
Using a basketball, football and other object, shoot each ball through 5 hoops.



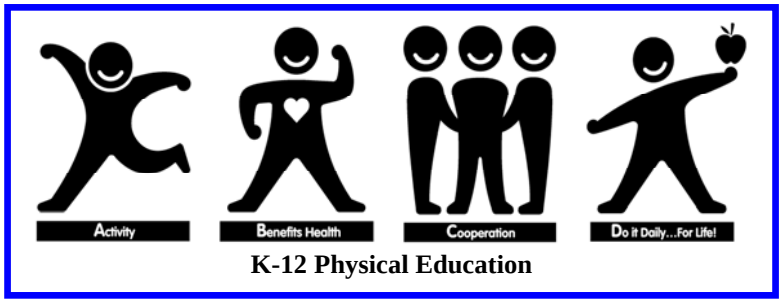
From an indicated line, pitch three objects into a bucket.



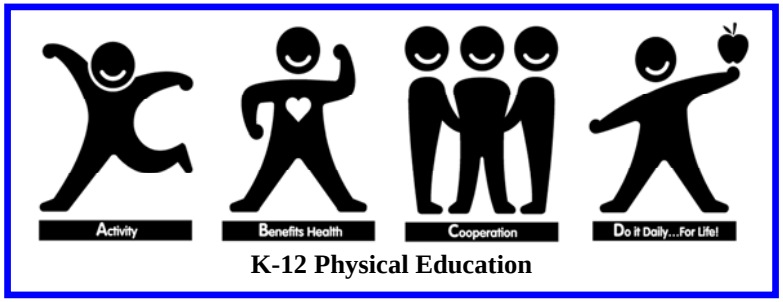
Jump rope with a partner 20 consecutive times.



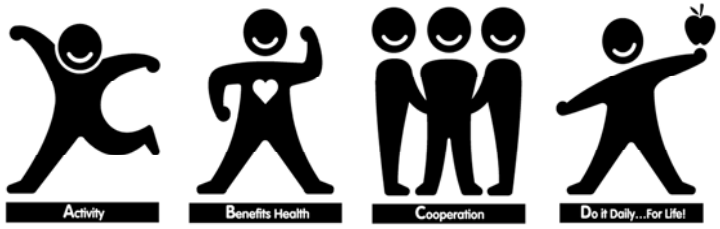
Toss an object up, turn around and catch it. Try this 10 times consecutively.



Skip on one foot,
using a rope or a hoola hoop.

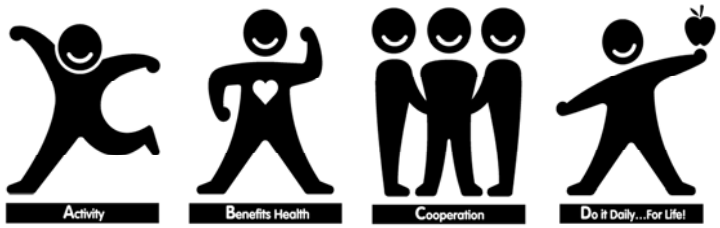


While lying on your back, toss an object up and catch it 10 times consecutively.



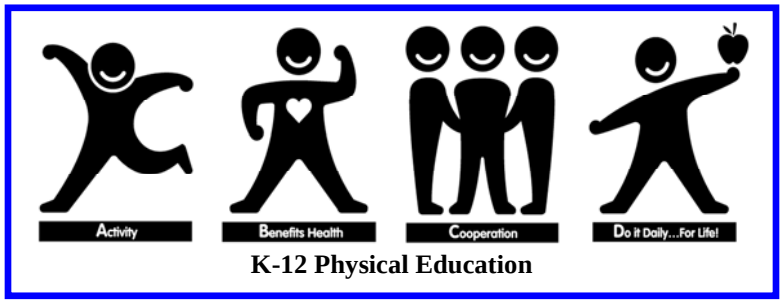
K-12 Physical Education

In a wheelbarrel position, carry your partner the width of the gym and switch places on the way back.

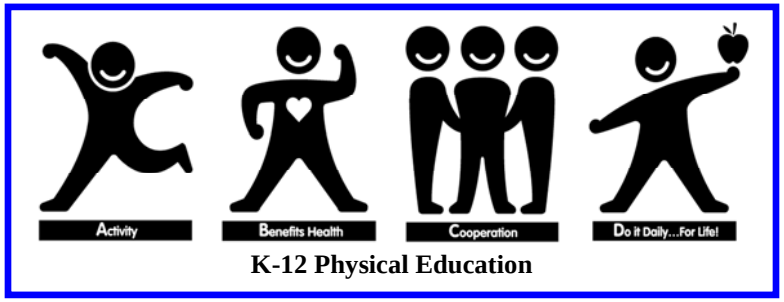


K-12 Physical Education

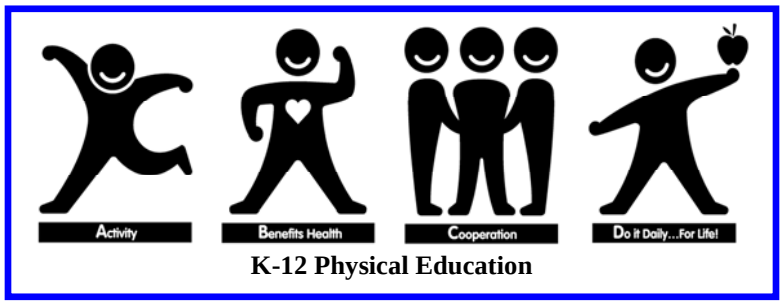
Bounce a tennis ball using a paddle while moving around the gym.



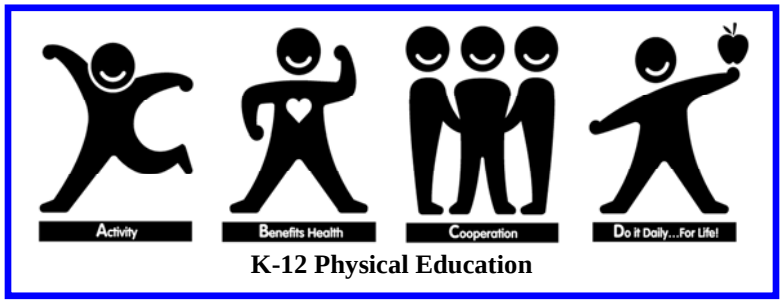
Skip around the gym using a skipping rope.



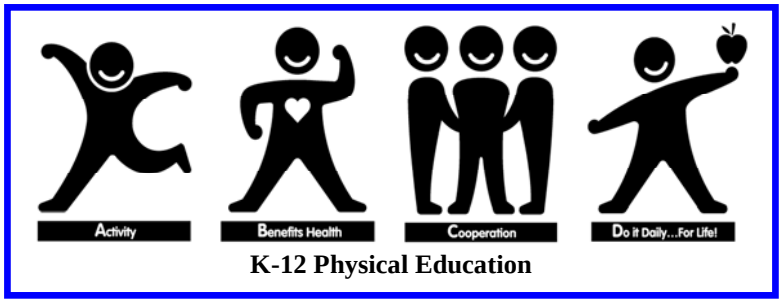
Speed walk around the gym with a ball balanced on a paddle.



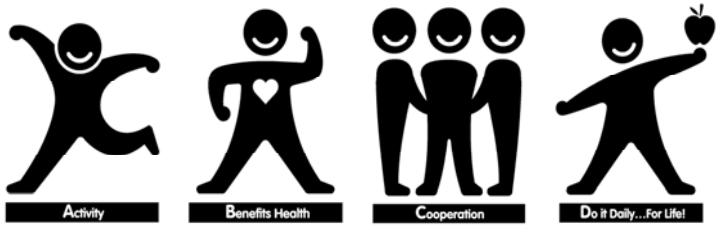
With your hands on each others' shoulders, skip once around the gym side by side with a partner.



Use paddles to rally a ball with a partner.

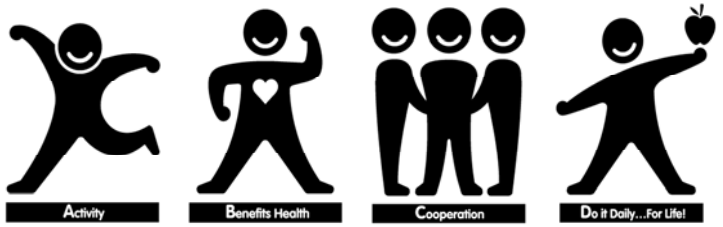


In pairs, do 10 sit-ups while passing a ball at the height of the sit up. The ball must touch the floor behind the head before each pass.



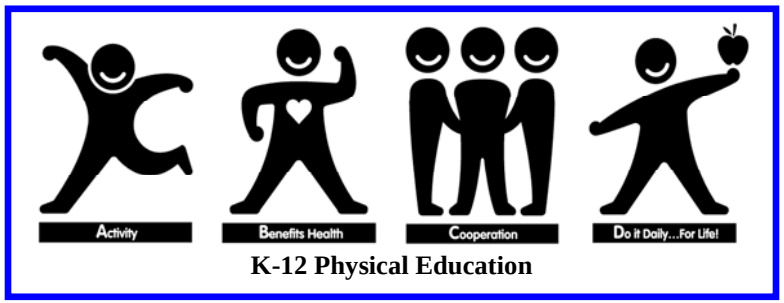
K-12 Physical Education

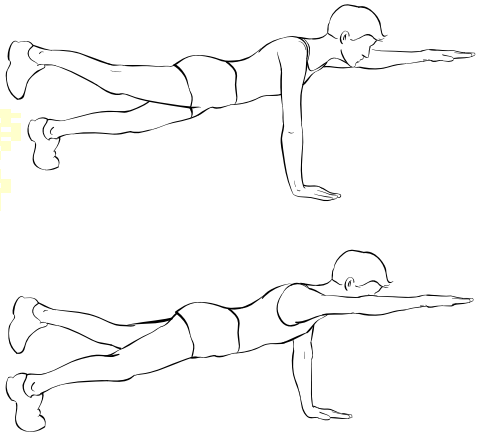
On your own, with a partner or in a group, push mat(s) between two pylons as fast as you can.



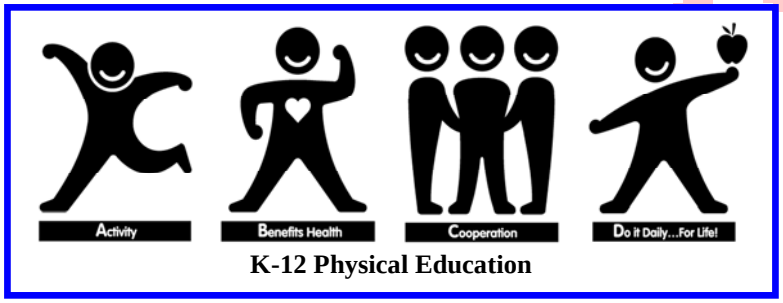
K-12 Physical Education

With a partner, run around the gym passing an object between you while discussing what you like about physical education.

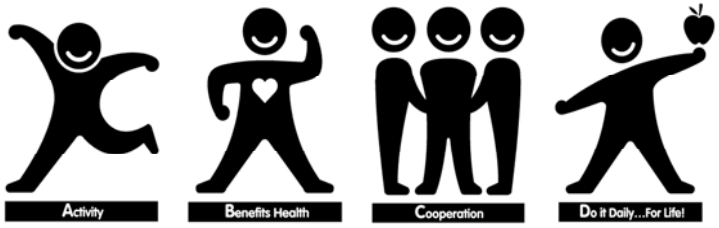




Do 10 spiders. From a push-up position lift the opposite arm and leg in the air while balancing on the remaining arm and leg. Alternate arm and leg positions.

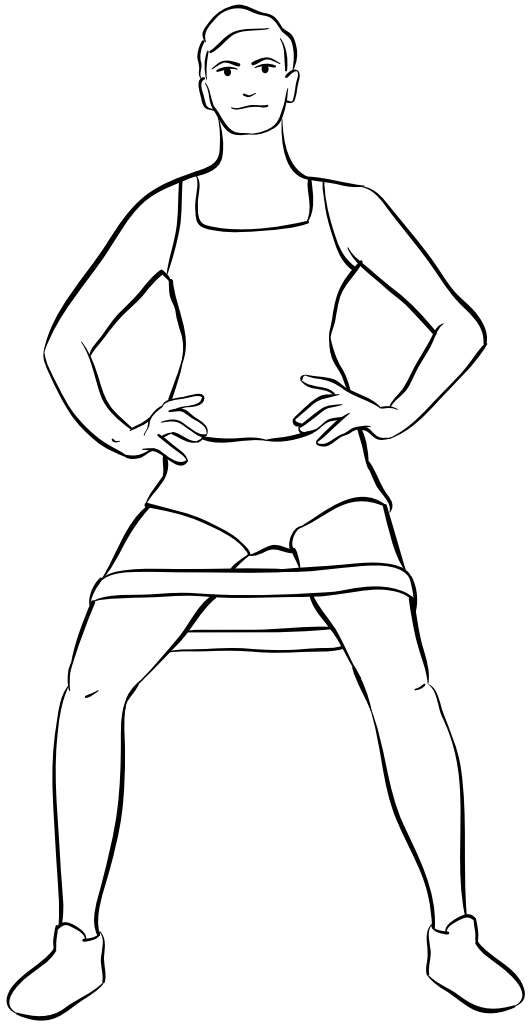


The class makes a large circle; stand behind your partner and have them sit on your knee [switch].



K-12 Physical Education

Side-step Dyna Band Walk



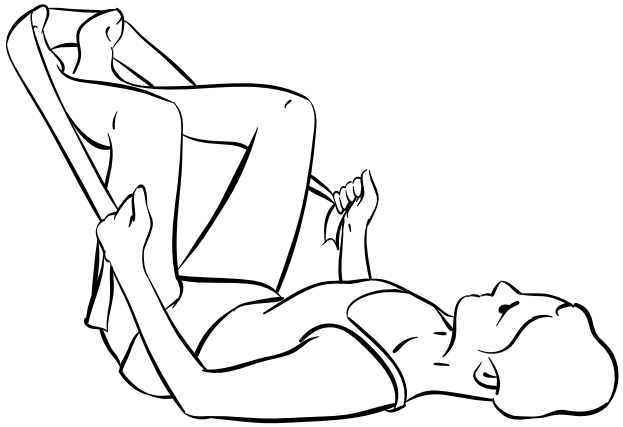
Tie a 1–1 ½ metre length of rubber tubing band around legs a few centimetres above the knees. Bend knees about 45 degrees and side-step with feet wide apart, keeping feet parallel and knees bent. Bring feet back together and continue walking to the side in a slight squat position. Keep hands on hips or, for a more advanced option, hold a weighted ball overhead or at chest height. Walk 13–15 metres in one direction, then stop and side-step back to the start, leading with the opposite leg (face the same direction). Repeat for 10–15 steps up to three times for each side.

Modification: Side step without the rubber tubing but carrying a weighted ball at chest height.

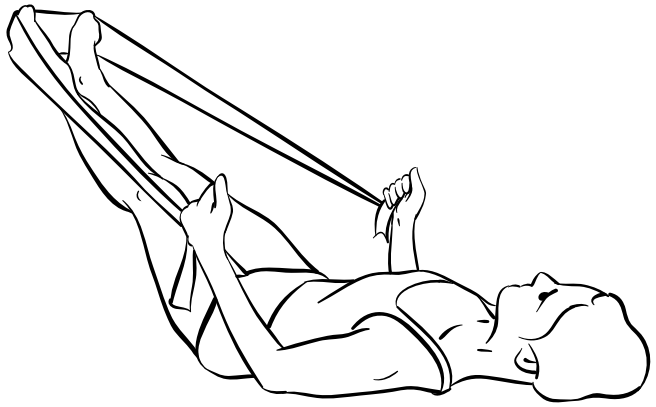
Quadriceps Strength

Lie face up, placing rubber tubing or a rubberized band around the balls of the feet. Bend knees so they align with hips, heels together, feet separated and toes turned out. Hold the band with each hand so it is tight, with arms slightly bent. Contract the abdominal muscles, drawing hips and tailbone down toward the mat (A). Maintaining heel connection, inhale to prepare, then exhale and press legs out until they are straight (do not lock knees) and at a 45-degree angle to the ground (B). Inhale while bending legs back to the start position. Do for 10–15 repetitions.

A



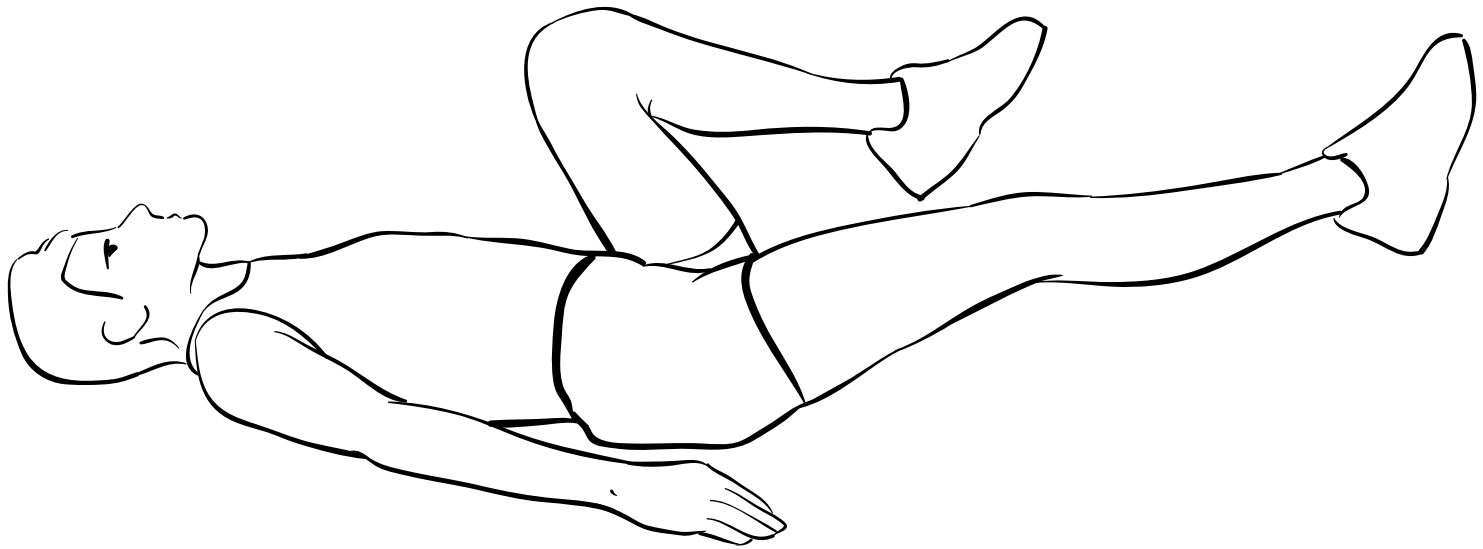
B



Dead Bug/Abdominal Strength Walk

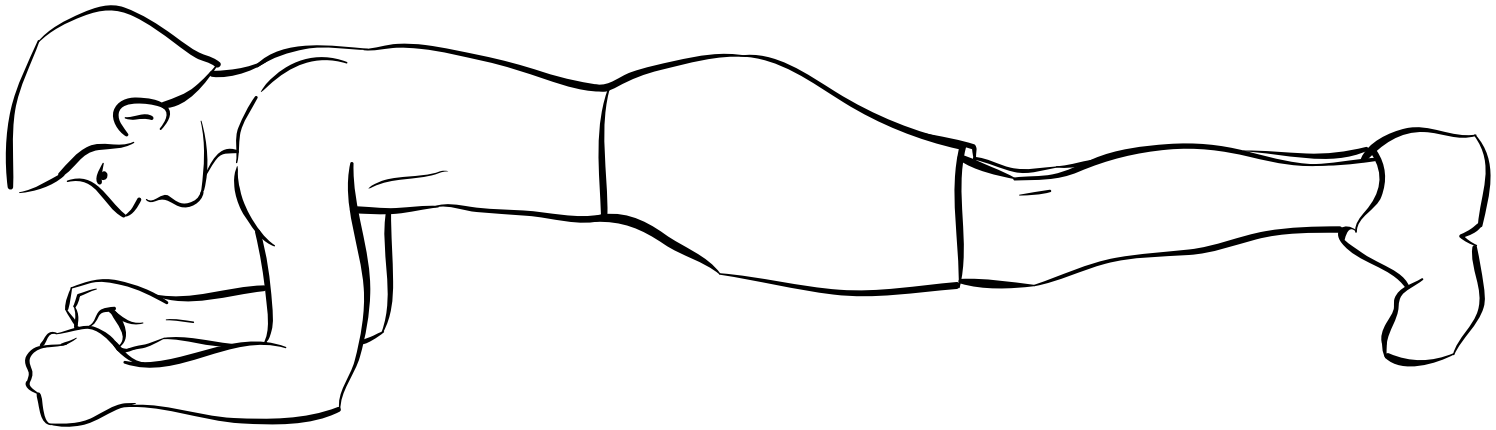
Lie on the ground with arms at sides. Contract abdominal muscles and slowly bring left leg in toward chest as right leg is lifted 15–20 cm off the ground. Switch legs, bringing right knee in and straightening left leg (keep it off the ground). Do three or four sets of 12 slow, controlled repetitions.

For an easier modification, use one leg at a time.



Plank

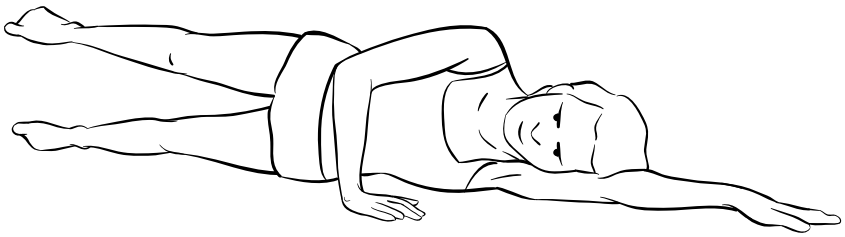
Get into a modified push-up position, resting weight on forearms. Elbows should be positioned directly under shoulders. Body should form a straight line from shoulders to ankles. Simultaneously pull belly button toward spine and squeeze gluteal muscles tightly. Keep back flat, taking shallow breaths for 30–45 seconds. Rest 30 seconds and repeat twice.



Staggered Leg Lift

Lie on left side, legs together in line with torso, shoulders and hips aligned. Rest head on left arm and place right hand in front of chest on mat for balance. Contract abdominals, then inhale and lift right leg to hip height (A). Exhale, lifting left leg to meet right, toes pointed (B). Continue to exhale as you lower both legs to mat. Do for 5–10 repetitions, then switch sides and repeat. To finish, stretch by lying on side, hug top knee in toward chest, holding stretch. Release and repeat on the other side.

A



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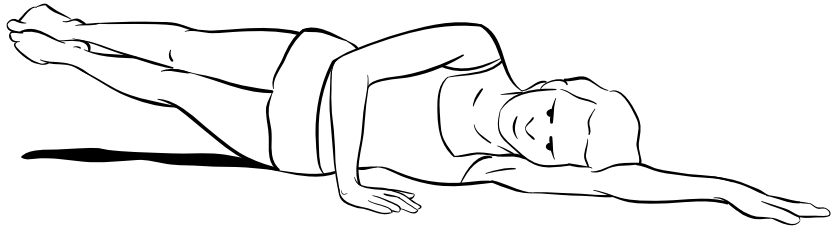


Rollback with Obliques

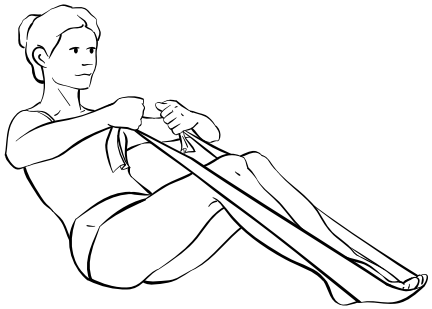
Sit with knees bent, knees and ankles together, feet flat on mat. Place rubber tubing or dynaband around balls of the feet, feet flat. Hold ends of the band, elbows bent, forearms in front of chest, palms facing in (A).

Inhale to lengthen spine, exhale to roll hips away from thighs and send lower back toward mat. Inhale at bottom of movement and exhale as you rotate to one side, including arms. Inhale back to centre and repeat exhale up to starting position (B).

Do for 5–8 repetitions, alternating sides. (1 rep = rotation to each side)

Modification: If not using rubber tubing, extend arms straight in front.

A



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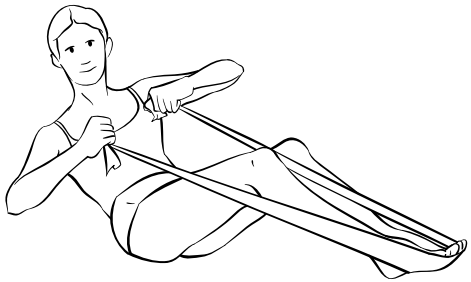
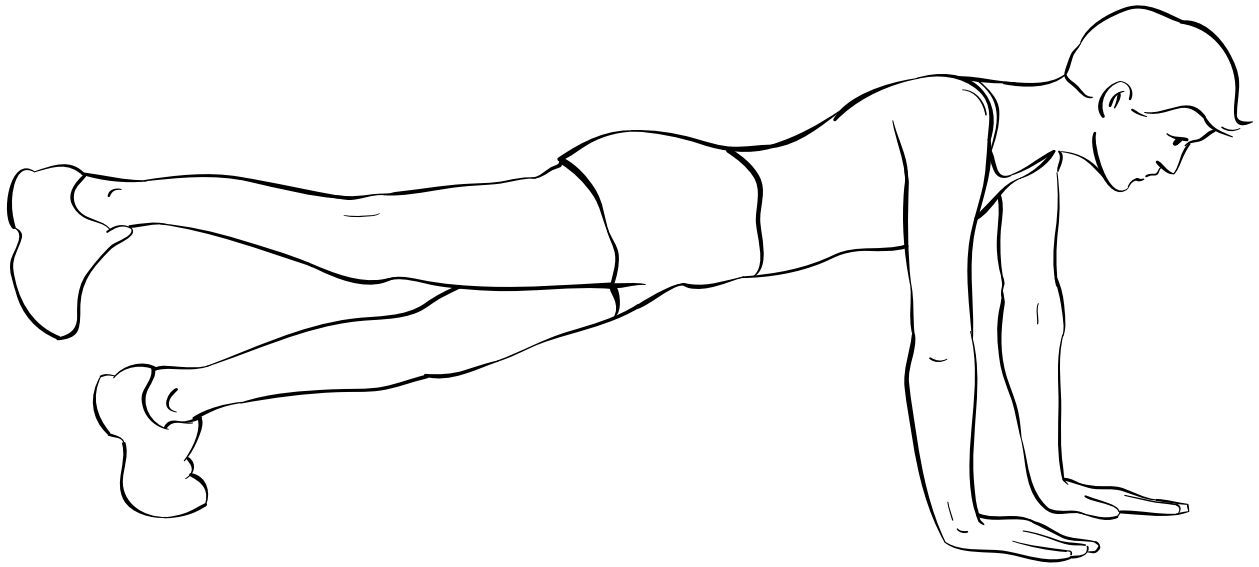


Knee to Nose Plank

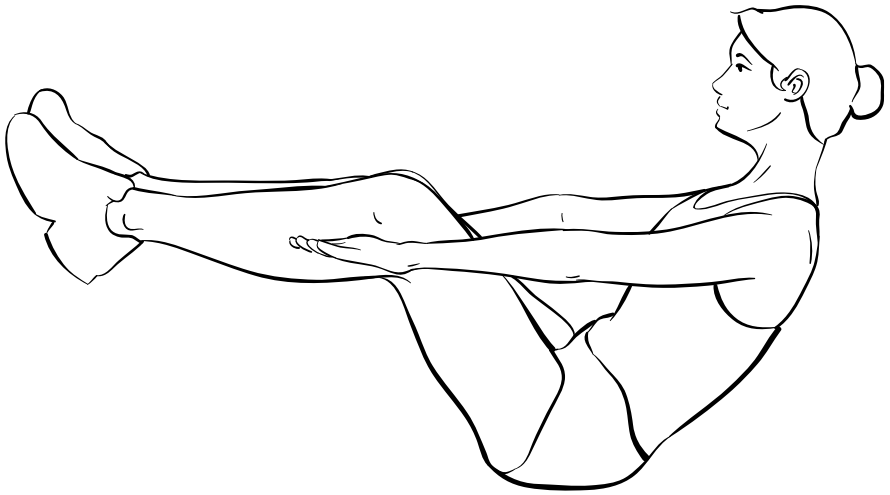
Balance on hands and toes, palms aligned under shoulders and body in a straight line. Lift right leg 8 cm and bring right knee in toward chest (not shown). Extend leg back out, lower it and repeat with left leg. Keep head in line with spine throughout. Simultaneously pull belly button toward spine and squeeze gluteal muscles tightly. Keep back flat, taking shallow breaths for 30–45 seconds. Rest 30 seconds and repeat twice.



Yoga Boat Pose

Sit with knees bent, feet on floor. Lift legs until they are at a 45-degree angle to the floor, arms extended, balancing on the tailbone and gluteal muscles. Hold for three-to-five breaths.

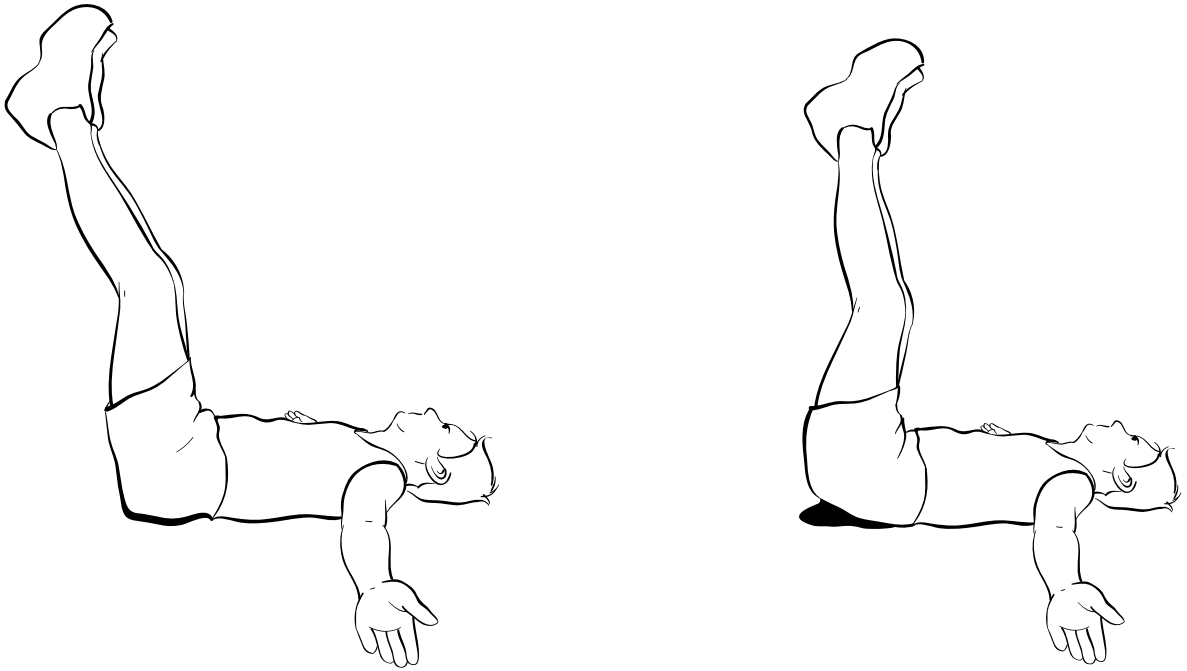
Modification: If unable to keep the back straight while in this position, bend knees. If this hurts the back, allow hands to be placed on floor behind hips.



Toes to Sky Advanced Abdominal Workout

Lie on back with hips bent at a 90-degree angle and legs straight, pointing to the ceiling. Place arms perpendicular to body, palms facing up. Lift pelvis off floor while keeping legs perpendicular. Hold for five seconds (one repetition). Do 10–15 repetitions.

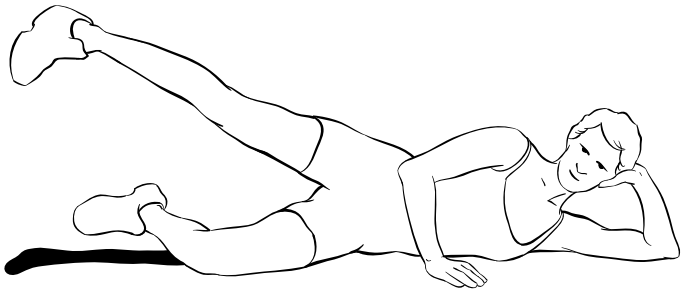
Note: This activity is an advanced movement and requires appropriate supervision.

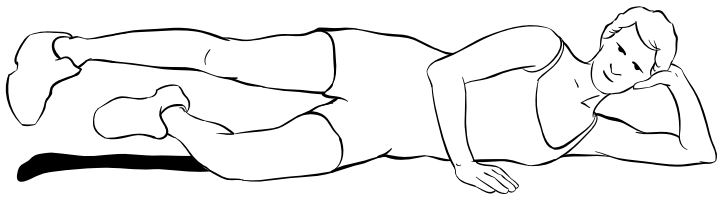


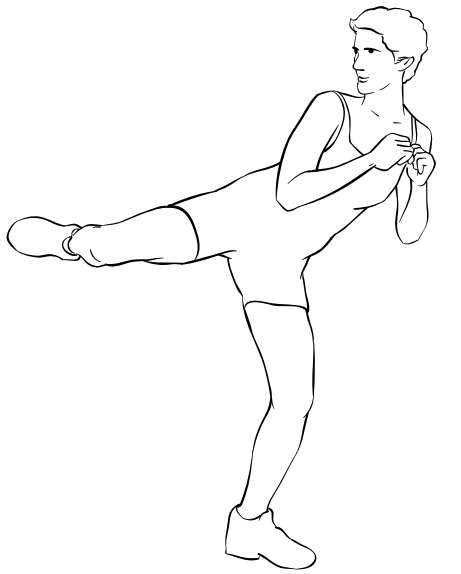
Lying Leg Lift

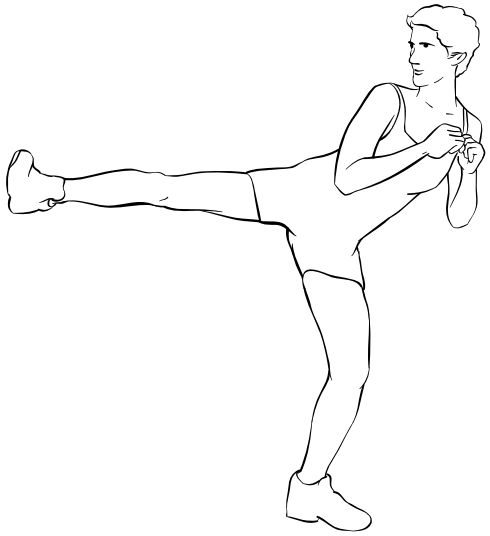
Lie on left side, head propped on left arm, bottom leg bent for balance, right hip slightly forward and right hand on floor in front of body. Flex right foot and point toe down slightly toward floor. Raise right leg (knee should be straight and facing front) until there is a contraction in the buttocks, leg and hip. Be careful not to rotate the leg inward or let hips fall back. Don't worry if the leg does not lift very high. The goal is to feel the contraction. Lower leg, without touching floor and repeat.

Variation: Working from the same starting position as above, slowly pulse top leg for three counts and then squeeze up on the fourth count. Do eight sets, and then switch legs.









Martial Arts Kick

Slide right leg to the side, toe lightly touching ground. Slightly turn left heel to face right foot and shift weight to left leg. Keeping left knee unlocked, lift right leg almost to hip level or as high as comfortable, with knee bent and foot flexed. Don't arch back. Contract buttocks while kicking right leg out to the side, leading with heel, stopping just before leg is fully extended. Keep eyes on extended foot while performing this move. Tap right leg back down to floor keeping weight on left leg and kick again to the right. Do 10 repetitions, and then switch legs. Work up to 20 kicks per leg. Hold chair or wall for balance if necessary.

Hip Flexor Stretch

Kneel on floor and place left foot in front, knee above ankle. Contract the abdominal muscles. Place left hand on leg and right hand on right gluteal muscle while pressing right hip forward. The stretch should be felt in front of the right thigh. Hold for 20–30 seconds, and then switch legs.

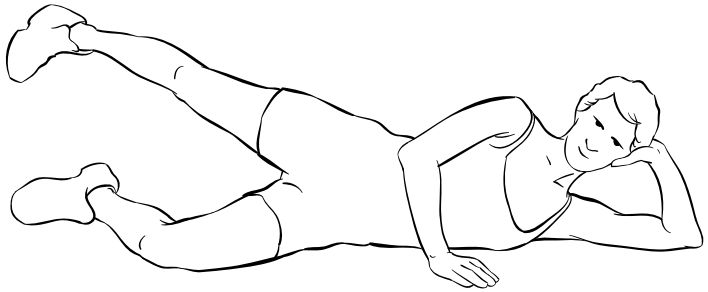
Triple Abdominal Attack

Lie on back bringing knees and feet in toward chest. Clasp hands together at the base of neck for support. On exhale, curl upper body off floor, bringing elbows to knees (pictured). Keeping knees lifted and still, slowly lower upper body to floor while inhaling. On the next exhale, curl upper body off floor, bringing elbows to knees again. Keeping upper body lifted this time, lower toes toward floor while inhaling, keeping knees bent. Lower back remains on floor. On the next exhale, raise knees to elbows to begin the next repetition. Do 15–30 repetitions.

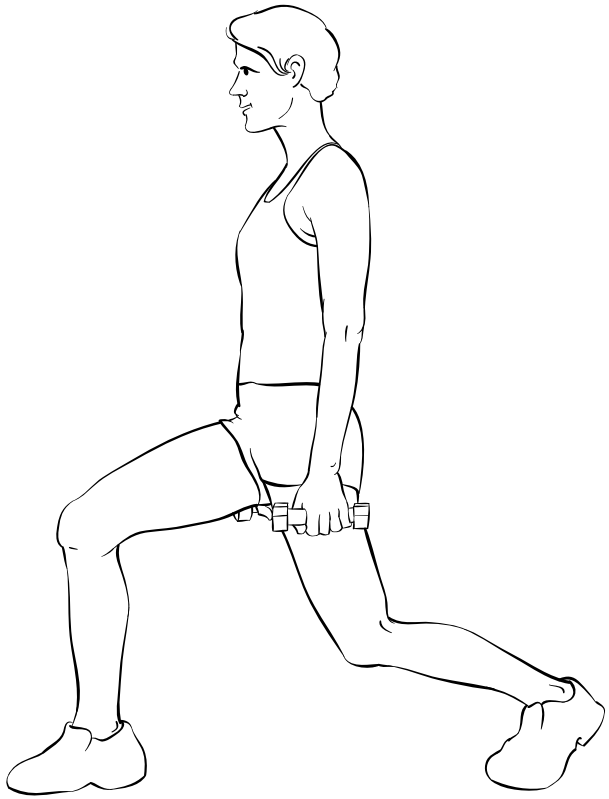
Note: This activity is an advanced movement and requires appropriate supervision.

The Pendulum

Lie on left side with left elbow bent, hand supporting head and right hand in front for support. Bend bottom leg slightly. Straighten top leg and tighten abdominals. Keeping leg straight, bring top leg in front and flex foot. Slowly swing leg back behind, contracting gluteal muscles and pointing toe, being careful not to arch the back. Swing back and forth 10–15 times using slow, controlled movements. Switch sides and repeat.



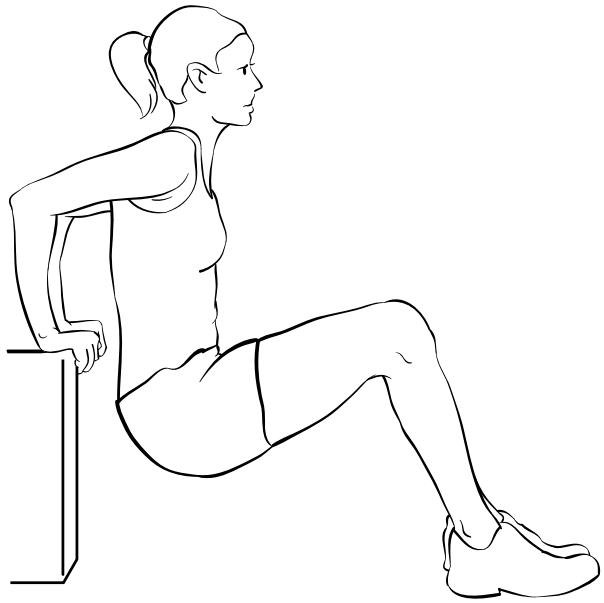
Walking Mini Lunge



Step forward with right leg and bend right knee about 45 degrees, thigh not quite parallel to floor. Rise up and lunge forward with left leg. Make sure knee is in a straight line over big toe. Walk 10–15 metres in one direction, then turn around and lunge-walk back to the start. Repeat once more in each direction. Hold dumbbells for added challenge.

Triceps Dip

Sit tall on the edge of a sturdy chair or bench and wrap fingertips over front edge. Make sure chair/bench is secured against a wall to avoid slippage. Place feet on floor in front with knees bent. Lift hips and butt slightly forward. Bend elbows about 90 degrees and lower hips toward floor in two counts. (If it is painful in shoulders, elbows are bent too much or you may need to discontinue exercise.) Press up in two counts until elbows are straight. Do 10–15 repetitions.



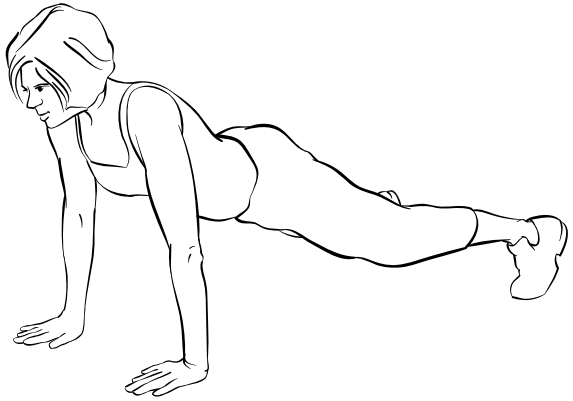
Squat Jump

Stand tall, knees slightly bent and feet shoulder-width apart. Tuck into a squat position, thighs parallel to floor, palms face down about 15–20 cm in front of toes and slightly wider than shoulder-width apart (A). Exhale kicking both legs out behind, landing on toes with legs fully extended (B). Simultaneously pull belly button toward spine and squeeze gluteal muscles tightly. Jump back into the tuck position, return to standing position, or add a two-foot jump then land to standing position.

Caution: Do not let back sway downward. Tighten buttocks to maintain alignment.

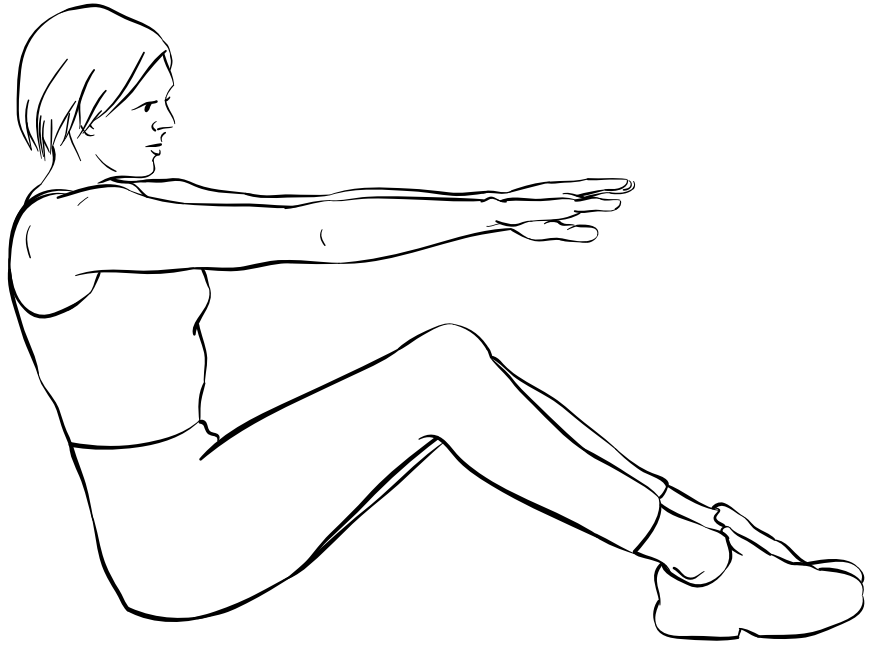
A

B



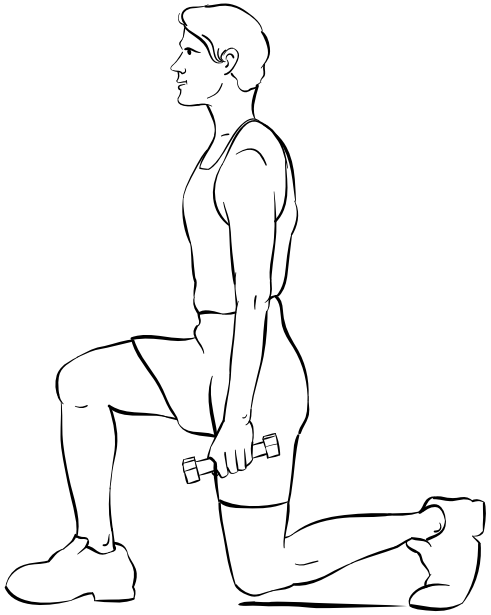
Power Sit-up

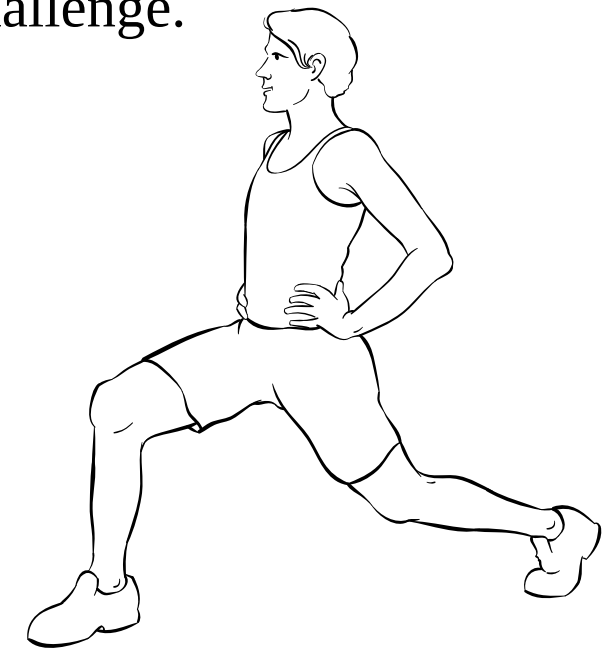
Lie back with knees bent, feet flat on floor and arms extended over head. On exhale, use abdominal strength, not momentum, to slowly raise head, shoulders and torso off floor until seated upright with arms extended forward (pictured). Lower to start position on inhale. Do 10–30 repetitions.



Thigh-sculpting Lunge

Stand with feet hip-width apart, shoulders back, arms on waist (unless using weights). Contract abdominals and step right leg forward about one metre. Lift left heel. Bend both knees until right thigh is parallel to the floor and, if comfortable, left knee almost touches floor. Press right heel down to push up and stand. Switch legs. Continue as a stationary exercise for 20 repetitions or walk a set distance of at least 20 steps. Hold dumbells for added challenge.



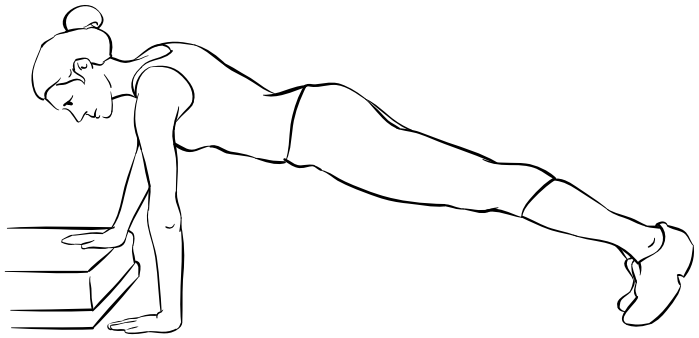


Staggered Push-up

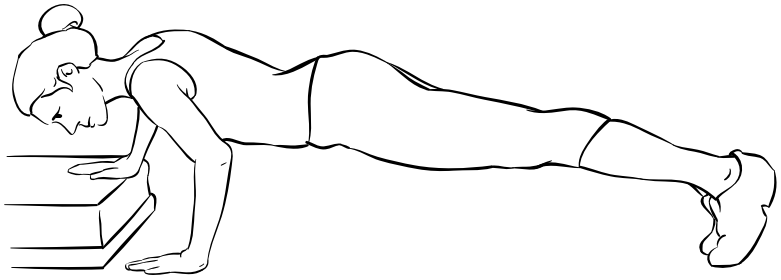
Begin in a push-up position, with hands and toes on floor, shoulder-width apart. Place one hand on a step or stair, fingers facing forward (A). Keeping abdominal muscles tight, lower upper body and hips until face is about three cm from step (B). Push back to starting position. Do 5–10 repetitions. Rest 30 seconds, switch hands and repeat.

Modification: Change the push-up position using knees as the contact position.

Staggered Push-up A



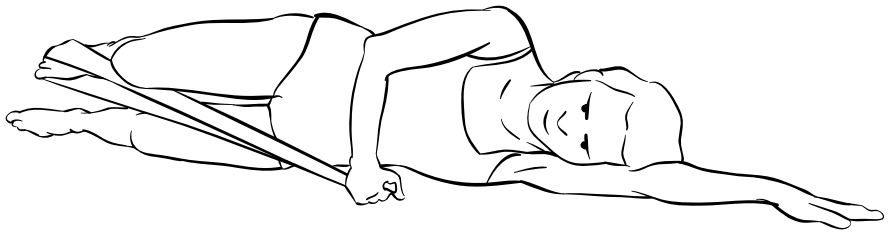
Staggered Push-up B



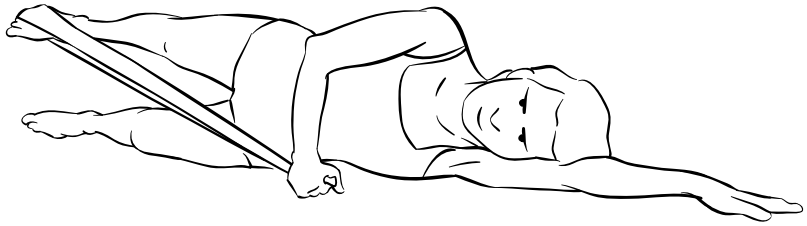
Side-lying Bend

Lie on left side and place a dyna band around ball of right foot, knee bent at hip height. Relax left leg on mat, bending knees slightly for balance if necessary. Hold band with right hand and rest head on left arm. Contract abdominal muscles to align spine, shoulders and hips (A). Inhale to prepare; exhale and straighten right leg, still parallel to mat and then behind as far as possible without rolling (B). Return to start position on inhale. Do 10–15 repetitions, then switch sides. Lie on back and hug knees to chest to stretch at end of exercise.

A



B

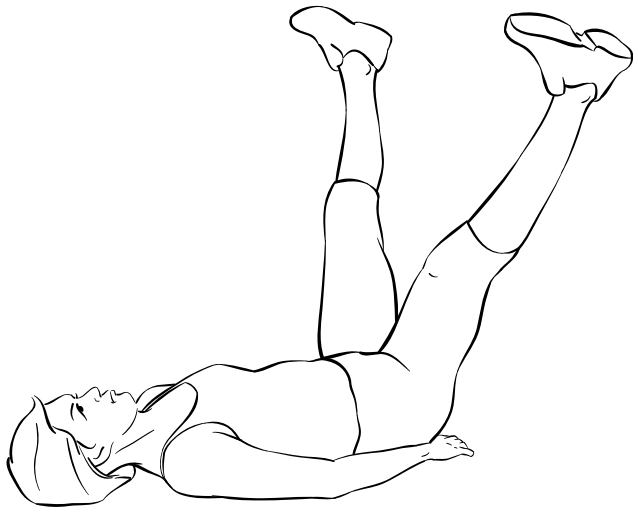


Inner Thigh Scissors

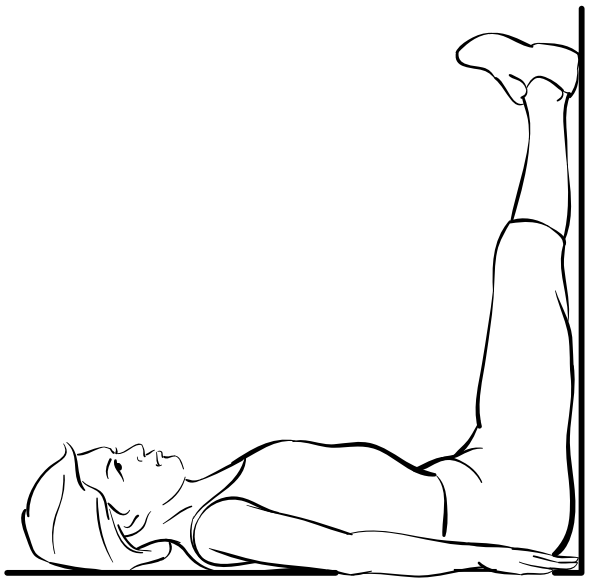
Lie back, hands at sides, palms down. Raise both legs to a 90-degree angle. Simultaneously pull belly button toward spine and squeeze gluteal muscles tightly. Press lower back into floor, flex feet and slowly open legs as wide as possible while inhaling (A). On exhale, bring legs back together, keeping feet flexed. Do 20 repetitions.

Modification: Extend legs up wall to avoid strain to back (B).

A



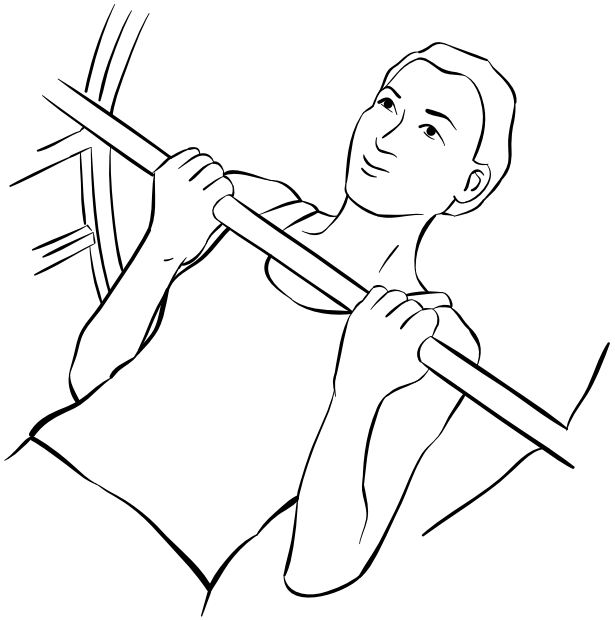
B



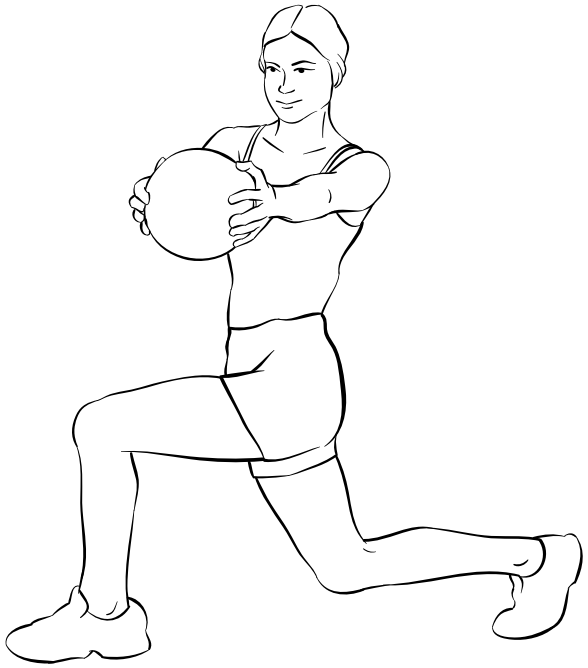
Chair Chin-up

Put a stick handle across two chairs placed about a metre apart. Lie back between chairs and grasp stick handle with palms facing down about shoulder-width apart. Lift chest up to bar, bringing elbows close to rib cage keeping legs straight. Lower almost to floor. Repeat five times. Rest 30 seconds and repeat.

Safety: Ensure stick handle is secure.



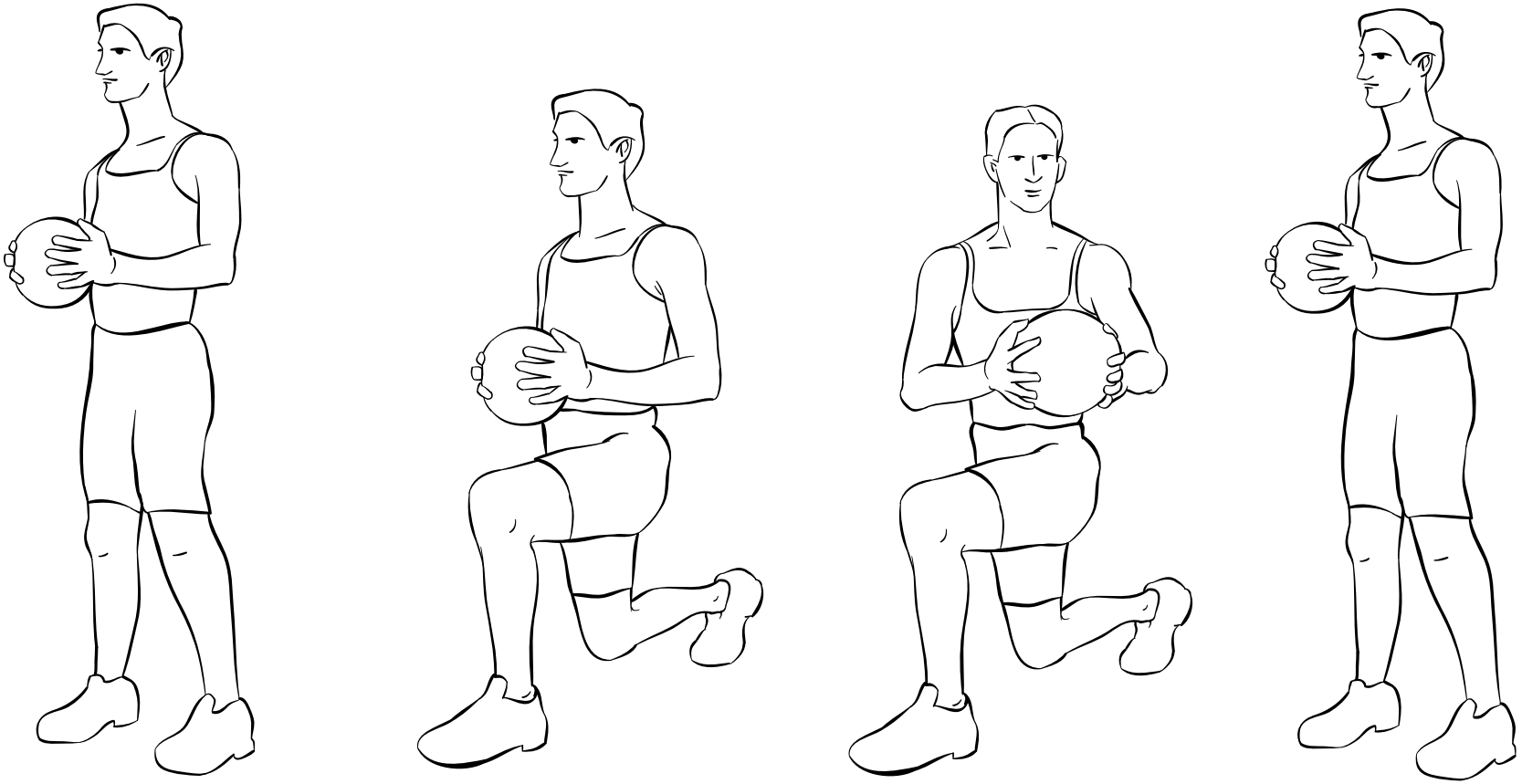
Front Lunge with Twist



Stand with feet hip-width apart. Hold a medicine ball, or lighter ball, arms extended at chest height. Contract abdominal muscles and draw shoulder blades down and together. Take a large step forward with left foot, bending knees so left knee aligns with ankle and right knee approaches floor, heel lifted. Hold the lunge and rotate torso with arms still extended, as far as possible to the left without altering alignment. Rotate back to front, return to starting position and repeat. Do 10–15 repetitions, then switch legs.

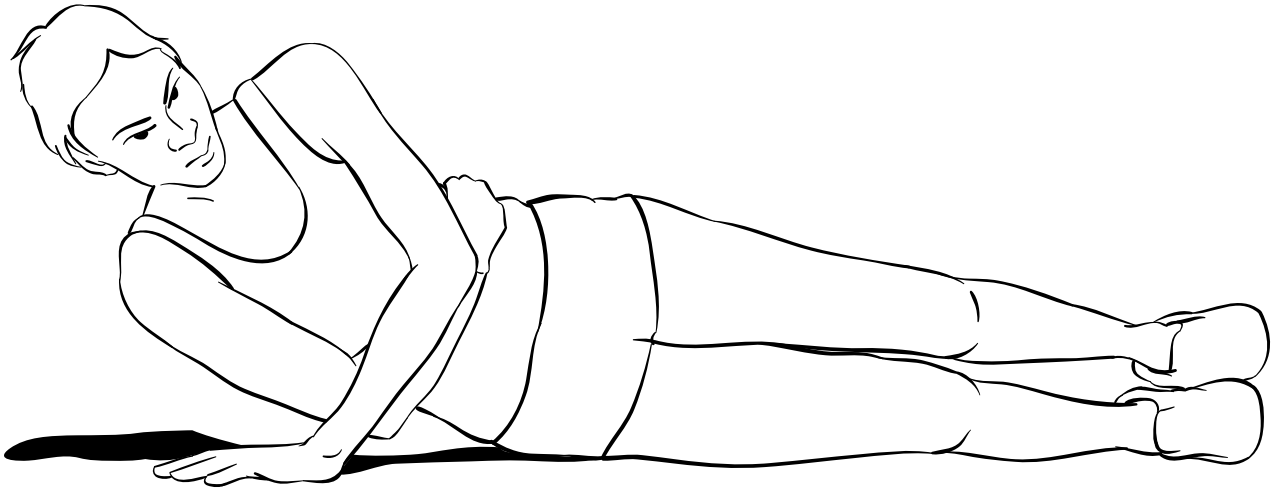
Medicine Ball Walking Lunge Twist

Keep front of lower leg perpendicular to floor. Twist to one side then return to face forward. Return to standing position.
Do 10 repetitions of each leg in a one-minute duration. Repeat three times.



One-arm Side Push-up

Lie on right side with left palm flat on floor in front of shoulder, elbow bent. Wrap right arm around rib cage and bend knees slightly. Using left arm, push torso up until arm is straight. Lower upper body until shoulder is about 10 cm off floor. Keep hips and feet planted on floor and shoulders away from ears.
Do 10–15 repetitions. Rest 20–30 seconds. Switch sides.



Sample Tag Games/Activities

Benefits Health
Functional Fitness ✓
Body Image
Well-being

The following activities can be performed in physical education classes. Although other student outcomes may be achieved through these activities, the focus is on Outcome B.

Safety Considerations for All Activities

- Keep activities away from walls/nets/poles.
- Remind students to be aware of space and others moving into their space.

Amoeba Tag

Ask two students to find partners. Ask each pair to link arms or join hands, whichever they prefer. These two pairs of students start as IT.

Establish boundaries for the activity.

Students who are IT must try to tag another single student. Once tagged, the third student links arms or joins hands to make a group of three. This group tries to tag another single student. Once they become a four-person amoeba, the amoeba splits into two. This continues until there is one student left or all have been caught.

At the end of the game, do a 10-second heart-rate count and discuss students' heart rates. Have students walk slowly around the gym until heart rates are lowered to below 120 beats per minute. Once all students have lowered their heart rates, provide a variety of stretching activities. If using pedometers, record the number of steps each student uses during this activity.

Circle the Troops

Ask students to find partners and stand behind each other. Students form two circles.

Appoint one set of partners to stand in the middle of the circle as they pass or volley a ball to each other. Upon the command UP, the ball is tossed to the middle of the circle and all the partners on the outside jump into a piggyback format with their partners. They stay there until the teacher gives the command DOWN. At this point, the partner jumps off. Continue to give these commands until you decide to CIRCLE THE TROOPS.

Once this command is given, all the partners on the outside must run around the outside of the circle in a counter-clockwise direction. Once they return to their partner, they crawl between their partners' legs to the centre of the circle.

Once inside, they try to steal the ball being tossed or volleyed that has been left in the centre of the circle. The first pair to get the ball stays in the middle for the next game.

At the end of the game, all students come to the centre of the gym to check heart rates and stretch. Discuss individual differences in heart rates and possible reasons for different heart rates. If using pedometers, note the number of steps taken to record at the end of the class.

Loose Caboose

Ask students to form groups of four or five to create a train with a locomotive and three or four cars made of students with their hands on the hips of the person in front of them. Two additional people are needed to be the "loose caboose" and "switcher."

The object of the game is for the switcher, armed with a soft vinyl-covered ball, to tag the loose caboose with the ball before the caboose can hook onto the back of a train. If the caboose manages to link up, the locomotive at the front breaks away to become the new loose caboose.

If the switcher tags the caboose, the caboose becomes the new switcher and the old switcher gets a free trip to hook onto the back of any train and release the locomotive as the new caboose. At the end of the game, have students come to the centre of the gym to stretch.

One variation is to play with more than one caboose and switcher.

Partner Tag

Ask students to find partners and lock elbows or hold hands. Each pair stands facing another pair. Label them pair A and pair B. If the numbers of students are uneven, make teams of three (or have three groups of two where A, B and C chase one another).

Establish boundaries for the activity. If a pair runs out of bounds while being chased they are automatically IT.

All the A pairs start as IT and remain standing. All the B pairs scatter. Each A pair can only chase their B pair by staying connected with their A partner while power walking … no running! Once the B pair is tagged, they must stay connected and spin a complete circle before chasing their A team. This continues for a set time in order to increase heart rates and warm up muscles.

At the end of the game, have students sit in the centre of the gym. This allows for a time to stretch. Check heart-rate monitors or pedometers for fitness benefits and discuss heart-rate zones and intensity.

Triangle Tag

Ask students to form groups of four.

Three students hold hands in a triangle facing each other. One person in the triangle volunteers to be the target. The fourth person stands outside the triangle as the chaser.

The object of the game is for the chaser to tag the target person who is part of the triangle. The three team members all cooperate to protect the target person by moving and shifting away from the chaser as necessary. The target cannot be tagged on the hands or arms or from a reach across the triangle. They must be tagged on any other part of the body. Change target person and chasers regularly so all have a chance to play each position.

At the end of the game, have students come to the centre of the gym to stretch. Discuss heart rates, pedometer results and how these relate to fitness. Ask students to enter suggestions for modifying this tag game in their log books. Have them set goals for increasing their heart rates the next time they play this warm-up game.

Ultimate Sponge Ball[14]

Divide the class into equal teams of four to eight players. Each field/court has two sidelines and two goal lines. When the whistle is blown, each team moves into the court. Each team begins at their own goal line with one of the teams in control of a sponge ball. The object is to move the ball all the way down the playing area and make a successful pass to a teammate behind the opponent's goal line. When this occurs, a point is scored and the ball is dropped. The opposite team can pick up the ball and try to score a point. The game never stops and is played continuously unless the teacher stops the game to rotate teams or take heart rates.

The team in control of the ball must move the ball down field by passing it to each other. The student who catches or has control of the ball cannot run with it, but may pivot. Allow for two steps before a travel violation is called and a change of possession occurs. All other offensive players should be trying to move into an open space. They can move anywhere in the playing area as long as they stay in bounds.

The defensive team must stay at least two arms lengths away from the player with the ball and may NOT grab the ball from the offensive player when in control of the ball. The offensive team loses possession of the ball through an incomplete pass or a pass knocked down by a defensive player. If the ball lands on the ground or outside the sidelines, the ball is automatically turned over to the other team. The defensive team must play person-to-person defense. Have students check their heart rates two or three times throughout the game.

14. Adapted with permission from Abby (Galcik) Gorsline, "# 2653. Ultimate Sponge Ball," *Teachers.Net*, posted August 7, 2002, www.teachers.net/lessons/posts/2653.html (Accessed July 2005).

Wall Ball Chaos Activity

Divide the students into two teams. Ask one team to wear pinnies. One team aligns along the wall as the batting team (team A). The other team is the fielding team (team B). Designate two safe lines at either end of the gym.

Choose one kicker from team A and one pitcher from team B. The pitcher rolls the ball to the kicker who stands at the pre-determined home plate area. When the pitcher rolls the ball, the kicker kicks the ball anywhere in the gym. The ball is played off the roof, walls, basketball hoops or other permanent object in the gym. Team B attempts to catch the ball before it hits the floor, or collects the ball after it hits the floor and throws the ball at a runner from team A.

The kicker MUST run to the opposite safe line/zone along with anyone else on the batting team who thinks they can get to the safe zone. One batter must remain behind to be the next kicker. If the runners make it to the opposite safe zone, they can wait for another kicker to send them home or run back to the batting end safe zone. Any player who runs out of the safe zone on either side of the court must continue to run. They cannot run back to the safe zone. It does not matter how many players stay at the safe zone as long as the batting team does not run out of kickers. A run is counted each time a runner comes back to the batting end safe zone.

A ball caught in the air must be set directly down on the floor and is an automatic out and an exchange of teams occurs. If any of the team A players are hit by the ball as they run to a safe zone or the fielder catches the kicked ball before it hits the floor, team B exchange places with team A. As team B runs into the batting safe zone, team A runs into the field, picks up the ball and attempts to hit one of the team B players before he or she cross the safe line. If this happens, team A must run to the batting safe zone before team B hits one of them with the ball.

This sequence continues until one team is successful at getting all their players in the batting safe zone before getting hit with the ball. The teacher can blow the whistle to indicate the exchange to help with learning the game.

Variations:

- Eliminate throwing balls at the runner and instead designate a number of passes; e.g., two needed to be made by the fielding team before the ball is passed to a fielder standing in the end zone. If the fielding team player in the end zone catches the ball before the runner arrives back, it is an out and the exchange occurs.
- Allow the fielding team to run with the ball and stipulate an underhand throw from a set distance or a tag to eliminate the runner.

Wall Soccer/Hockey Activity

Divide the class into two equal teams with each team wearing different coloured pinnies.

The objective of the game is to kick the ball against the opposing team's goal/wall and have the entire team run back to tag the defending wall in order to collect one point.

The goal area is the entire width of the wall below waist height. Each team is allowed as many goalies as they want. There is no goal crease and only goalies may use their hands to block the ball.

Teams play an indoor-soccer-type game, using soccer rules to try and get close enough to kick the ball (below waist height or lower) against the opponent's wall/goal. When the ball hits the wall, the entire offensive team must run back to their defending wall and tag it. No point is scored until all offensive team members have a hand on their wall at the same time. The game is continuous so the opposing team can score at any time during this transition.

Variations:

- Use floor hockey rules with sticks and a ball.
- Use basketball rules and throw the ball at the wall below waist height.

Appendix L

Principles of Training

Certain types and amounts of activity are most effective in developing the various components of physical fitness; e.g., cardiovascular endurance, flexibility and strength.

Changing the capacity of a system in the body requires changing the amount of work it does. This work done by the body is the basis of physical conditioning and is dependent upon the four variables in the FITT formula.

The FITT formula Applied to Components of Fitness

Component of Fitness	Cardiovascular	Flexibility	Muscular Strength
Frequency	4–7 x week	4–7 x week	2–4 x week
Intensity	moderate to vigorous	stretch to feel mild-moderate tension (no pain)	sets to failure high resistance
Time	20 minutes +	hold 30–60 seconds	to fatigue
Type	continuous	static stretch	type of contraction

The **FITT formula** outlines the four essential ingredients in the development of each area of fitness. Consider the FITT formula when planning your physical activity routine. Your FITT formula should be based on your own personal physical activity goals.

- **Frequency –** How often you are active. Find a routine that will fit with your schedule and stick with it.
- **Intensity** – How hard the activity is. Use a variety of intensities, as well as your perceived level of exertion scale to exercise at a comfortable but challenging level.
- **Time** – How long you are active. Time is dependent on effort/intensity. See Canada's Physical Activity Guide (PAG) recommendations.
- **Type** – The type of activities you choose. Combine a variety of activities in your routine depending on your goals.

The Physical Activity Guidelines recommend:
Endurance: 4–7 days/week
Flexibility: 4–7 days/week
Strength: 2–4 days/week
Accumulate 30–60 minutes of activity every day of varying intensities.

Target Heart-rate Zone
It is important to exercise within the appropriate intensity range to improve cardiovascular fitness and reduce the likelihood of injury. To calculate this zone, see the Heart Zones Training™ Plan on page 30. After determining a personal target zone, monitor exercise heart rates at intervals throughout each exercise period to maintain this intensity.

Assessment Tests: Sample for Initial Fitness Level Assessment

Endurance Assessment

Be sure that students warm up for at least 5 to 10 minutes before initiating any cardiovascular test that requires activity at a higher intensity.

- A 12-minute run: record the distance (laps or km) and/or the average and MHR rate, if available (aerobic measurement).
- A 20-m shuttle run: record what stage or level students reach and heart rate data, if available (anaerobic measurement).
- A 5 km run: record the time, and the average and peak heart rate, if available.
- Steady state test: students run/walk/bike for 15 minutes at an intensity level where they can comfortably talk; record the distance and average heart rate, if available.
- Recovery heart rate: one minute recovery from five minutes activity at a steady state of 75 percent of MHR; record the bpm drop in one minute.
- Morning heart rate: take on a regular basis.
- Walk test: any distance record time and average heart rate, if available.
- If students have heart-rate monitors and know their heart rates in the different zones in advance, they could try the "Heart-rate Criss-Cross Test." Choose two levels of intensity; e.g., 70 percent of MHR and 85 percent of MHR. Students work out so that they get their heart rates up to 85 percent and down to 70 percent as many times as they can in 10 minutes (up and down = 1 time). How many ups and downs can they get in the designated time?

Flexibility Assessment

Light stretches before an activity will warm up the muscles and longer stretching should occur after the workout. For a variety of stretches, see http://www.education.gov.ab.ca/PhysicalEducationOnline/TeacherResources/toolbox/files/gtstret.pdf.

- Sit and reach (hip flexibility)
- Touch toes from standing (hip flexibility)
- Touch fingers behind back (shoulder flexibility)

Strength Assessment

Warm up the muscles initially with activity before beginning assessment and stretch well after the assessment. For examples of strength activities, see Appendix J, pages 117–142.

Physical Activity Readiness Questionnaire - PAR-Q (revised 2002)

PAR-Q & YOU[15]

(A Questionnaire for People Aged 15 to 69)

Regular physical activity is fun and healthy, and increasingly more people are starting to become more active every day. Being more active is very safe for most people. However, some people should check with their doctor before they start becoming much more physically active.

If you are planning to become much more physically active than you are now, start by answering the seven questions in the box below. If you are between the ages of 15 and 69, the PAR-Q will tell you if you should check with your doctor before you start. If you are over 69 years of age, and you are not used to being very active, check with your doctor.

Common sense is your best guide when you answer these questions. Please read the questions carefully and answer each one honestly: check YES or NO.

YES	NO		
☐	☐	1.	**Has your doctor ever said that you have a heart condition and that you should only do physical activity recommended by a doctor?**
☐	☐	2.	**Do you feel pain in your chest when you do physical activity?**
☐	☐	3.	**In the past month, have you had chest pain when you were not doing physical activity?**
☐	☐	4.	**Do you lose your balance because of dizziness or do you ever lose consciousness?**
☐	☐	5.	**Do you have a bone or joint problem (for example, back, knee or hip) that could be made worse by a change in your physical activity?**
☐	☐	6.	**Is your doctor currently prescribing drugs (for example, water pills) for your blood pressure or heart condition?**
☐	☐	7.	**Do you know of any other reason why you should not do physical activity?**

If you answered YES to one or more questions

Talk with your doctor by phone or in person BEFORE you start becoming much more physically active or BEFORE you have a fitness appraisal. Tell your doctor about the PAR-Q and which questions you answered YES.

- You may be able to do any activity you want — as long as you start slowly and build up gradually. Or, you may need to restrict your activities to those which are safe for you. Talk with your doctor about the kinds of activities you wish to participate in and follow his/her advice.
- Find out which community programs are safe and helpful for you.

NO to all questions

If you answered NO honestly to all PAR-Q questions, you can be reasonably sure that you can:

- start becoming much more physically active – begin slowly and build up gradually. This is the safest and easiest way to go.
- take part in a fitness appraisal – this is an excellent way to determine your basic fitness so that you can plan the best way for you to live actively. It is also highly recommended that you have your blood pressure evaluated. If your reading is over 144/94, talk with your doctor before you start becoming much more physically active.

DELAY BECOMING MUCH MORE ACTIVE:

- if you are not feeling well because of a temporary illness such as a cold or a fever – wait until you feel better; or
- if you are or may be pregnant – talk to your doctor before you start becoming more active.

PLEASE NOTE: If your health changes so that you then answer YES to any of the above questions, tell your fitness or health professional. Ask whether you should change your physical activity plan.

Informed Use of the PAR-Q: The Canadian Society for Exercise Physiology, Health Canada, and their agents assume no liability for persons who undertake physical activity, and if in doubt after completing this questionnaire, consult your doctor prior to physical activity.

No changes permitted. You are encouraged to photocopy the PAR-Q but only if you use the entire form.

NOTE: If the PAR-Q is being given to a person before he or she participates in a physical activity program or a fitness appraisal, this section may be used for legal or administrative purposes.

"I have read, understood and completed this questionnaire. Any questions I had were answered to my full satisfaction."

NAME _____

SIGNATURE _____ DATE _____

SIGNATURE OF PARENT or GUARDIAN (for participants under the age of majority) _____ WITNESS _____

Note: This physical activity clearance is valid for a maximum of 12 months from the date it is completed and becomes invalid if your condition changes so that you would answer YES to any of the seven questions.

Supported by: Health Canada Santé Canada

15. Source: Physical Activity Readiness Questionnaire (Par-Q) © 2002. Reprinted with permission from the Canadian Society for Exercise Physiology. http://www.csep.ca/forms.asp

Appendix O

Career and Life Management (CALM)

General Outcome _____ **Specific Outcome** _____

Time Frame _____ **Date** _____

Activating learning activities	**Content/background information**
Ask students to measure their resting heart rates prior to any physical activity and have each student record the number. Then, have students do a particular set of repetitions for a set time using normal conditions, such as: • bench steps for two minutes • jumping jacks for one minute • high knee running on the spot for two minutes. Immediately after the activity, have students measure their heart rates and record them.	Ensure students are aware that tobacco has many dangerous components—cyanide, toluene, nicotine and tar to name a few. This activity focuses on the long-term effects of tobacco use that reduce the capacity of the lungs to take in air and exchange oxygen/carbon-dioxide (O_2 / CO_2) properly.
Application learning activities	**Home/school/community connections**
Cut small-to-medium diameter straws into short lengths for each participating student. Have students place a straw in their mouths and breathe through the straw only, not through their noses. This simulates the restricted airflow of most long-term smokers. Repeat the previous activity for the same time period and have students breathe through the straws only, while participating in a physical activity.	Ask students to try this activity at home with their parents/guardians. Compare students' findings to family findings. Did students find any surprising results? Seek out someone who has asthma or other conditions that affect lung capacity and discuss how vigorous exercise affects him or her.
Extension learning activities	**Assessment**
Discuss how a person's breathing capacity is one factor to consider when being active. Have students summarize why it is important to be aware of personal limitations from a health standpoint and of individual physical capabilities for activities. Measure heart rates immediately after the activity and compare the normal activity heart rate to the simulated long-term smokers' heart rate for the same activity and time. What trend, if any, did they find? Discuss how it felt to breathe through the straw while exercising. What thoughts ran through their minds as breathing became more difficult?	Students assess the effects of restricted lung capacity on health. Students analyze risk-taking behaviours, such as smoking, as contributors to physical well-being.

Resources

- Straws of small-to-medium diameters

Career and Life Management (CALM)

General Outcome_____ **Specific Outcome**_____

Time Frame_____ **Date**_____

Activating learning activities	**Content/background information**
Discuss the importance of fuelling the body before, during and after physical activity. Include a brain-storming session on what types of food to consume before, during and after competition and/or exercise to help the body work at an optimal level.	Start by discussing nutrition and how it affects a healthy, active lifestyle. Nutrition complements physical activity as students pursue a wellness lifestyle. If a student is physically active, he or she will burn more calories so it is important to eat nutritionally and rehydrate.
Application learning activities	**Home/school/community connections**
POWER SNACK ASSIGNMENT Divide the class into groups of three or four. Each group is responsible for creating a power snack. Once the snack is created, each group provides a small taste sample of their nutrition snacks for the rest of the class. The assignment includes the following requirements: • a brand name for the power snack • the recipe and a list of ingredients • the amount of fat • the amount of carbohydrates • the amount of protein • the amount of fibre • an explanation and rationale of what makes this snack fuel-efficient • the benefits to using this snack before, during or after physical activity.	Ask students to share their snacks at home with their parents/guardians and friends. Compare students' comments and feedback with family's and friends' comments. Did students find any surprising results? Seek out someone who exercises regularly and ask what they eat for fuelling and refuelling. Ask how food affects his or her performance.
Extension learning activities	**Assessment**
Have students vote on their favourite snack in the classroom.	Students describe how individuals have control over physical well-being. Students analyze nutritious choices as contributors to physical well-being.

Resources

- Snack sample for class

Career and Life Management (CALM)

General Outcome_____ **Specific Outcome**_____

Time Frame_____ **Date**_____

Activating learning activities	Content/background information
Part A: Nutrition Challenge Have students ask their family members to record their daily nutritional intake using the What did you eat today? worksheet on page 155. The worksheet can be posted on the fridge for easy access. Students will be asked to use the Daily Nutrition Log, page 156, to record nutritional intake in more detail. **Part B:** Physical Activity Challenge Have students' family members record their number of activity minutes and nonactivity minutes for each day of the week on the What did you do this week? worksheet on page 155. Ask students to use the Physical Activity Log, page 157, as it will allow them to record in more detail. Students will compare the results of each family member to formulate answers for the assignment.	In order to determine activity levels and nutritional content, students will be asked, along with their families, to keep a log of the food they consume and the physical activities they usually participate in for one week. The best ways for people to achieve personal functional levels of fitness are to: • choose activities they enjoy • choose activities that fit with their lifestyle preferences • choose activities that meet the components of fitness; e.g., strength, cardiovascular endurance, flexibility.
Application learning activities	**Home/school/community connections**
Analyze the data by completing the following. ♦ Did students feel that they and their families made appropriate food choices in relation to *Canada's Food Guide to Healthy Eating*, and for their activity levels? Have them explain their results and how they were or were not appropriate. ♦ Have them suggest improvements to food choices. Could these changes be made easily? Would they and their families be willing to make these changes? Why or why not? ♦ Have them reflect on recorded activity levels. Were they appropriate in relation to *Canada's Physical Activity Guide to Healthy Active Living* http://www.phac-aspc.gc.ca\guide? ♦ Have students record how they felt during their activities. (They can use the Personal Intensity Scale worksheet, page 38.)	After students have analyzed the collected data, discuss the results. Did students find any surprising results? Was the log helpful? Did it increase student and family awareness? Variation: Ask students to complete the following as part of a log book assignment. • This assignment was informative or not informative because … • List suggestions to make this assignment more beneficial to students or their families.

Extension learning activities

- Have students investigate Canadian Internet sites that provide nutritional information and the caloric breakdown of food. They should try to include the types of foods they and their families eat on a regular basis. They should record the Web sites used (in brackets) at the end of the assignment.
- *Canada's Guide to Healthy Eating and Physical Activity* does not replace the current *Canada's Food Guide to Healthy Eating* and *Canada's Physical Activity Guide to Healthy Active Living*. It is a combination of important points from both guides into one document, which promotes the benefits of eating well and being active and helps you make wise choices everyday. For more information, see http://www.phac-aspc.gc.ca/guide/index_e.html.
- Visit http://www.healthyalberta.com for help.

Note: *These Web sites are listed as a service only to identify potentially useful ideas for teaching and learning. The responsibility to evaluate these sites rests with the user.*

The final written report should:

- include a title page
- be neatly typed
- include the detailed daily nutrition log
- include the detailed activity log
- include the Personal Intensity Scale, with results
- include any other information discovered about lifestyle habits while doing this assignment.

Develop a plan for healthy living. Have students consider the following.

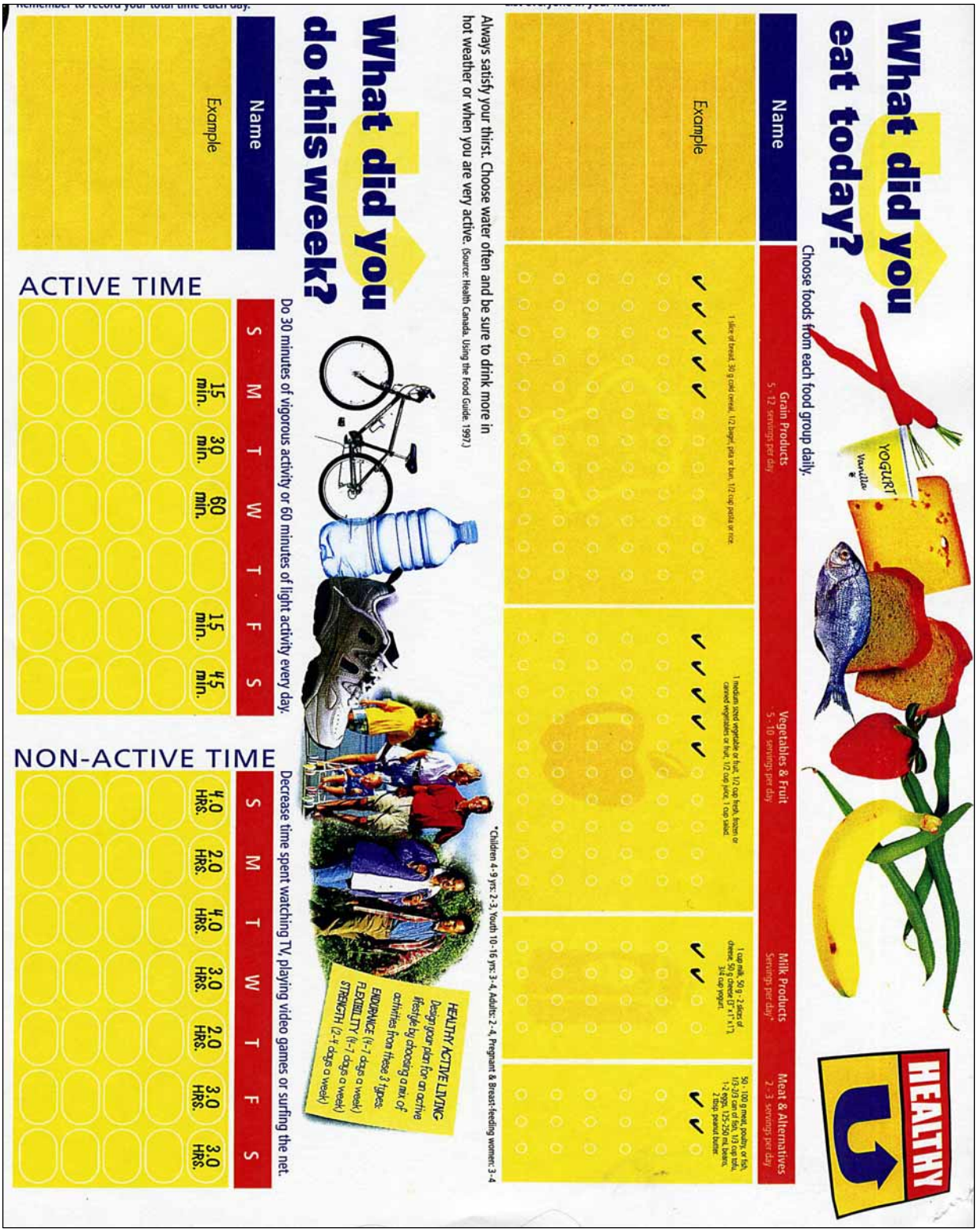
- What activities do they like to do?
- What components of fitness are important in each activity; e.g., flexibility, strength, cardiovascular, endurance, speed, agility?
- What can students do to improve performance at each activity? (Set goals.)
- Consider the information from the Personal Intensity scale worksheet when planning.
- What is the most significant change they can make to their nutrition plan?
- Are they balancing their meals with foods from all food groups?

Assessment

Students describe how individuals have control over physical well-being.
Students analyze nutritious choices as contributors to physical well-being.

Resources

- What did you eat today? and What did you do this week?, page 155.
- Daily Nutrition Log, page 156.
- Physical Activity Log, page 157.
- Personal Intensity Scale, page 38.
- Computer access to Internet.



16. This chart © 2005 Government of Alberta—Reprinted with permission from Alberta Health and Wellness.

Name: _____ Grade: _____ Class: _____

Daily Nutrition Log [17]

Date	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday
Breakfast							
Lunch							
Dinner							
Snacks							
Milk Products 3–4							
Grain Products 5–12							
Meat and Alternatives 2–3							
Vegetables and Fruits 5–10							

17. This chart © 2005 Government of Alberta—Reprinted with permission from Alberta Health and Wellness.

18. This chart © 2005 Government of Alberta—Reprinted with permission from Alberta Health and Wellness.

Career and Life Management (CALM)

General Outcome _____ **Specific Outcome** _____

Time Frame _____ **Date** _____

Activating learning activities	**Content/background information**
Students research varied fast food restaurants for the amount of fat and calories in their menu choices. Encourage students to choose some of their favourite fast food locations.	Fast Food Facts Eating at fast food chains is convenient, but there can be negative consequences to continued consumption of high-fat food choices. Most fast food chains promote overindulgence by advertising that bigger is better.
Application learning activities Have students collect the pamphlets from at least five different fast food venues and create a chart to indicate the most nutritious food choices at each restaurant. Have them list the healthiest two or three choices from each venue and indicate the number of calories and amount of fat in each. They should include the name of the fast food restaurants in their compiled lists.	**Home/school/community connections** After students have analyzed the collected data, have them share their findings with their families. Did students find any surprising results? Did it increase their own and their families' awareness? Variation: Ask students to complete the following as part of a log book assignment. • This assignment was informative or not informative because … • List suggestions to make this assignment more beneficial to students or their families.
Extension learning activities Have students analyze the nutritional information of their favourite menu options at a fast food outlet by answering these questions. • What did they learn by doing this assignment? • Is this information useful? • Will this assignment make them choose different foods when eating fast food? Why or why not? • How many times on average per week do they eat fast food? • Will they continue to eat fast foods as often? Why or why not? • Include any other relevant comments. The final written report should: • include a title page • include a bibliography of the pamphlets collected stapled to the research report • include a list of Web sites or other resources used • be neatly typed.	**Assessment** Students analyze nutritious choices as contributors to physical well-being. Students demonstrate the effects of eating fast foods. **Resources** • Pamphlets from five fast food places.

Career and Life Management (CALM)

General Outcome _____ **Specific Outcome** _____

Time Frame _____ **Date** _____

Activating learning activities	**Content/background information**
Using the Web sites listed in the Content/Background Information section and their own resources, have students answer questions 1–17 on a separate sheet of paper. They should reference their own resources with their answers.	**Note:** *These Web sites are listed as a service only to identify potentially useful ideas for teaching and learning. The responsibility to evaluate these sites rests with the user.* http://www.weightlossforall.com http://www.weightlossforall.com/metabolism.htm http://www.weightlossforgood.co.uk/basal_metabolic_rate.htm http://motionworksfitness.com/bmr.htm#BMR-F http://americanheart.org/presenter.jhtml?identifier=1200000 http://www.heartmonitors.com/heart_rate_basics.htm http://www.phac-aspc.gc.ca/pau-uap/fitness/pdf/handbook_eng.pdf

Extension learning activities

Have students ask family members to complete questions 14–17 and compare the results with their own answers.

Discuss the social aspects of life that influence healthy decisions; e.g., few friends interested in activity.

Brainstorm other questions that came to mind while completing this assignment.

Application learning activities

1. What is metabolism?
2. What is basal metabolism?
3. List four ways to boost metabolism.
4. Calculate your beats per minute (BMI).
5. What is the total number of calories that you need per day?
6. What exercise burns the most calories per day? The least?
7. Give four examples of why it is important to drink water.
8. How much water should people drink per day?
9. Why should they drink it cold?
10. What is aerobic exercise?
11. List five examples of aerobic exercise.
12. Define resting heart rate. What is your resting heart rate?
13. Define target heart rate. What is your target heart rate?

For questions 14–17, use the Public Health Agency of Canada's *Physical Activity Guide to Healthy Active Living* handbook at http://www.phac-aspc.gc.ca/pau-uap/fitness/pdf/handbook_eng.pdf.

14. Fill out the Physical Activity Readiness Questionnaire.
15. What are some things you can do to become more active every day?
16. What are the three fitness categories and briefly describe each one.
17. With the information you have gathered from doing this assignment, write a paragraph outlining whether or not you think you are physically fit. Provide reasons and examples.

Home/school/community connections	
In order to complete these questions, students and families should be familiar with the Public Health Agency of Canada's *Physical Activity Guide to Healthy Active Living* handbook at http://www.phac-aspc.gc.ca/pau-uap/fitness/pdf/handbook_eng.pdf.	
Resources • Alberta Centre for Active Living • Internet • Books or magazines • Health or fitness professionals	**Assessment** Students describe how they will control their physical well-being. Students analyze safety/risk-taking behaviours, nutritious choices and physical activities as contributors to physical well-being.

GLOSSARY

Active living: A way of life in which physical activity is valued and integrated into daily living (Government of Canada, 1992).

Anaerobic threshold: The highest intensity that can be sustained for an extended period of time (15–60 minutes).

Endurance: The ability of the heart, blood, blood vessels and respiratory system to supply oxygen and necessary fuels to muscles during exercise. Exercises for endurance range from walking and household chores to organized exercise programs and recreational sports.

Exercise: A form of leisure-time physical activity that is planned, structured and repetitive. The main objective is to improve or maintain physical fitness.

Flexibility: The ability to move easily, keeping the muscles relaxed and joints mobile. Regular flexibility activities can help maintain and improve quality of life and ensure independence as aging occurs. Flexibility activities include gentle reaching, bending and stretching of all muscle groups.

Functional fitness: The possession of the necessary fundamental components of fitness—endurance, strength and flexibility—to allow for comfortable and confident participation in a selected physical activity.

Heart-rate numbers: The number of heartbeats per minute.

Maximal heart rate: The highest number of times the heart can contract in one minute. This can be measured by using a heart-rate monitor and it is sport specific.

Muscular endurance: The ability of a muscle to contract over time.

Outcomes: Describes the knowledge, skills and attitudes achieved through student learning.

- General Outcomes—broad statements that identify what students are expected to know and be able to do upon completion of a program.
- Specific Outcome—statements that identify the component knowledge, skills and attitudes of a general outcome.

Physical activity: All leisure and nonleisure body movement produced by the skeletal muscles resulting in an increase in energy expenditure.

Physical fitness: Attributes that are either health related or performance (skill) related. Health-related fitness comprises those components of fitness that exhibit a relationship with health status. Performance/skill-related fitness involves those components of fitness that enable optimal work or sport performance.

Rate of Perceived Exertion (RPE): A way of assigning a numerical value based on the perception of effort.
Recovery heart rate: The number of beats per minute the heart drops in the first minute after exercise has stopped.

Resting heart rate: The reduction in heart rate right after exercise has stopped. The higher the fitness level, the faster the drop in heart rate.

Strength: Activities that help muscles and bones stay strong, improve posture and prevent diseases like osteoporosis. Strength activities are those that work muscles against some kind of resistance, like pushing or pulling to open a heavy door.

FURTHER SUPPORT RESOURCES

Alberta Education Authorized Resources

Allen, Lynn (ed.). *Physical Activity Ideas for Action: Secondary Level*. Champaign, IL: Human Kinetics, 1997.

Kirkpatrick, Beth and Burton Birnbaum. *Lessons from the Heart: Individualizing Physical Education with Heart Rate Monitors*. Champaign, IL: Human Kinetics, 1997.

Swaim, Deve and Sally Edwards. *Middle School Healthy Hearts in the Zone: A Heart Rate Monitoring Program for Lifelong Fitness*. Champaign, IL: Human Kinetics, 2002.

Swaim, Deve and Sally Edwards. *High School Healthy Hearts in the Zone: A Heart Rate Monitoring Program for Lifelong Fitness*. Champaign, IL: Human Kinetics, 2003.

Other Materials

Heart Zone Training chart. Available for purchase from the Learning Resources Centre, at http://www.lrc.education.gov.ab.ca. LRC# 608896, $23.60 at time of publication.

Heart Rate Monitors can be rented from local Be Fit for Life Network locations. See Web site at http://www.befitforlife.ca for locations.

Pedometers with Safety Straps and Storage Tray (sold in sets of 30). Available for purchase from the Learning Resources Centre, at http://www.lrc.education.gov.ab.ca. LRC #620634, $358.90 at time of publication.

Note: The following titles and Web sites are listed as a service only to identify potentially useful ideas for teaching and learning. The responsibility to evaluate these resources and sites prior to selection rests with the user, in accordance with any existing local policy.

Nonauthorized Resources

Burke, Edmund (ed.). *Precision Heart Rate Training*. Champaign, IL: Human Kinetics, 1998.

Edwards, Sally. *The Heart Rate Monitor Guidebook to Heart Zone Training*. Sacramento, CA: Heart Zones Training, 2002.

Kerr, Rob and Sally Edwards. *Heart Zones Handbook: Test and Measurement*. Sacramento, CA: Heart Zones Training, 2002.

Ottawa-Carleton Heart Beat Youth Committee. *Feel the Beat: Leader's Manual: Promoting Heart Health for Youth Aged 13 to 18*. Ottawa, ON: Ottawa-Carleton Heart Beat Youth Committee, 2000.

Web sites

Alberta Education. http://www.education.gov.ab.ca/physicaleducationonline/teacherresources
This site provides information to support implementation and student learning of the K–12 physical education program of studies. The site is divided into three major sections: Program of Studies, Teacher Resources and Home Education.

American Heart Association. http://www.americanheart.org. This site proves information on fighting heart disease and stroke, and offers information on the structure and function of the heart, risk factors of heart disease and tips for maintaining a healthy heart.

Canadian Fitness and Lifestyle Research Institute. http://cflri.ca/cflri/cflri.html. This site includes research on physical activity of Canadians over the past 10 years, tips for being active, resources, research projects and news releases. Also included is a Heart Health Quiz to help students assess their cardiac risk.

Canada's Physical Activity Guide. http://www.phac-aspc.gc.ca/pau-uap/paguide/. (Call 1–888–334–9769 to order the guide.) This site contains a number of guides, based on various age groups, to help people make wise choices about physical activity.

Dieticians of Canada. http://www.dietitians.ca. Includes activities to support understanding of nutrition. Includes a nutrition challenge game, a personal Nutrition Profile, a make-a-meal feature and other interactive activities.

Edmonton 2001 8th IAAF World Championships in Athletics: *Our Schools in Action.* http://www.education.gov.ab.ca/physicaleducationonline/edmonton2001/posters.asp. This site has downloadable teacher resources, including Run, Jump, Throw posters for circuits.

Gatorade Sports Science Institute. http://www.gssiweb.com/index.cfm. This is a sport science site complete with the latest research on nutrition, sport performance, injuries and hydration.

Health Canada. http://www.hc-sc.gc.ca. Resources related to heart health include a Healthy Heart Kit and *Canada's Food Guide to Healthy Eating*.

Heart and Stroke Foundation of Canada. http://ww2.heartandstroke.ca. Includes the latest research, resources on heart health, a calculator for beats per minute (BMI) and waist-to-hip ratio measurement, and various other tools.

The Heart: An Online Exploration. http://sln.fi.edu/biosci/heart.html. This is an information site on the heart, complete with images. Includes information on the development, structure and function of the heart as well as tips for heart health.

Heart Zones. http://www.heartzones.com. Includes information on Heart Zones Training™—an approach that utilizes Max heart rate and a five-zones concept to facilitate individualized training. Also includes information about training seminars, training tips, an e-newsletter and list of resources; e.g., wall charts, DVDs, CD–ROMs, books, heart-rate monitors.

Human Kinetics. http://www.humankinetics.com. Human Kinetics is a leader in the distribution and publishing of books, journals, software, videos and distance learning in physical activity.

Kids Health. "All about the Heart." http://kidshealth.org/kid/body/heart_SW.html. This information site, written for a youthful audience, includes information about how the heart works.

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Alberta Learning. *Physical Education (K–12) Program of Studies*. Edmonton, AB: Alberta Learning, 2000a.

Alberta Learning. *Social Studies 10–20–30 (Senior High) Program of Studies*. Edmonton, AB: Alberta Learning, 2000b.

Borg, Gunnar A. V. "Psychophysical Bases of Perceived Exertion." *Medicine and Science in Sport and Exercise* 14, 5 (1982), pp. 377–381.

Canadian Institute for Health Information. *Improving the Health of Canadians*. Ottawa, ON: Canadian Institute for Health Information, 2004.

Craig, Cora Lynn and Christine Cameron. *Increasing Physical Activity: Assessing Trends from 1998–2003*. Ottawa, ON: Canadian Fitness and Lifestyle Research Institute, 2004.

Craig, Cora Lynn et al. *Increasing Physical Activity: Supporting Children's Participation*. Ottawa, ON: Canadian Fitness and Lifestyle Research Institute, 2001.

Edwards, Sally. *Heart Rate Monitor Book*. Kempele, Finland: Polar Electro Oy, 1993.

Heart and Stroke Foundation of Canada. *The Growing Burden of Heart Disease and Stroke in Canada 2003*. Ottawa, ON: Heart and Stroke Foundation of Canada, 2003.

Robergs, Robert A. and Roberto Landwehr. "The Surprising History of the "HRmax=220" Equation." *Journal of Exercise PhysiologyOnline* 5, 2 (May 2002). http://faculty.css.edu/tboone2/asep/May2002JEPonline.html (Accessed December 3, 2003).