ACTIVITY #1: 20,000 BREATHS A DAY

TIME 50 minutes

REQUIRED RESOURCES

Activity

- "20,000 Breaths a Day Student Worksheet," one for each student
- Gymnasium or outdoor area
- One straw for each student

Making it Real

- Internet Access for Google Maps, http://maps.google.ca/
- "The Basics of Asthma, Allergies and Anaphylaxis Fact Sheet," one for each student from

  http://education.alberta.ca/media/745566/factsheetasthmaanaphylaxisen.pdf

Objectives

1. To analyze the effects of physical activity on the respiratory system.
2. To develop an action plan to increase daily activity, monitor breathing, and progress on achieving physical fitness.
3. To understand lung diseases such as asthma and to understand the connections between allergies and asthma and the connection to air quality.
4. To simulate the effects of asthma on breathing.
5. To demonstrate the benefits of active living and clean air.

Curriculum Connections

This activity is designed for Grades 10 to 12 Physical Education. It also covers some Health topics. Curriculum connections are listed by province, grade and subject on the Air Aware website,

http://www.cleanairchampions.ca/programs/air_aware/teacher_zone/curriculum_connections.php

Activity

1. In the gymnasium or an outdoor area, begin with a discussion about active living. Ask students, "What is active living?"
2. Distribute "20,000 Breaths a Day Student Worksheet."
3. Ask students to complete the chart on the worksheet estimating the amount of time they participate in moderate-intensity (walking, skating, bike riding) and/or vigorous-intensity physical activity (running, soccer).

4. Ask students to compare their estimate to the recommendations in *Canada's Physical Activity Guidelines,* which recommend 60 minutes of moderate- to vigorous-intensity physical activity daily, as explained on the worksheet. For more information:

   http://www.csep.ca/english/view.asp?x=804

5. Share the following information about active living:

   Active living is a commitment to incorporate physical activity into one's daily lifestyle. Active living can occur in all aspects of our everyday routine, including activities at home, work, school and leisure.

   One way to have an active lifestyle is to include active transportation in our daily lives. Depending on where you live, you may be able to choose more active transportation (walking, biking). Extracurricular activities and even shopping are ways to get around and get some exercise. Other examples include shoveling snow or raking leaves instead of relying on snow or leaf blowers, using a push mower, or taking the stairs instead of the elevator.

   Making small changes, such walking or biking instead of driving, contribute to active living and in turn benefit our environment by keeping our air free of harmful pollutants. Encourage students to increase their daily activity with small steps such as increments of 5 to 10 minutes rather than one big leap.

6. Discuss ways that students can increase their amount of daily activity. Share *Tips to Get Active* from the Public Health Agency of Canada: http://www.phac-aspc.gc.ca/hp-ps/hl-mvs/pa-ap/06paap-eng.php . Ask students to complete the table for Week 1, making a commitment to increase their daily activity by 5 to 10 minutes each day.

7. Explain the Breathing Activity. Students work in pairs to monitor their breathing while they are doing various activities for one minute. While doing an activity, students are to carry on a conversation with their partner. Then they rank each activity according to their breathing.

8. Ask the students to pair up and complete the Breathing Activity along with the ranking on the worksheet.

9. Ask students which activities had the biggest impact on their breathing. Explain that as their fitness levels increase, their breathing rates also change. During exercise, they will still breathe more often and take deeper breaths, but they will gasp less and be able to carry on a conversation.

10. Once per week (Week 2 through Week 6) provide a copy of page 2 of the worksheet to each student. Ask students to record the week number on the worksheet. At the beginning of each week, students record their current activity and indicate how they will increase their activity if they are not yet achieving the recommended guidelines. During the week, students record whether they achieved increasing their activity level. Each week, have students complete the Breathing Activity again (with Steps 7 and 8 above) and encourage them to compare the current week to the previous week. Students complete the chart and the Breathing Activity for Week 2 to Week 6.

11. At the end of the six weeks, ask students to compare Week 6 to Week 1 to see their progress on increasing their activity and fitness levels.

12. Explain that the next activity will help students understand what it feels like to breathe with asthma symptoms. Invite students to complete the Breathing Through a Straw Activity. Review the safety precautions that are provided on the "20,000 Breaths a Day Student Worksheet" and demonstrate how the students should complete the activity. Ask them to indicate their experience using a thumbs up if it remains easy to breathe or a thumbs down if it gets harder to breathe. Remind students that if anyone is having difficulty breathing or feeling light-headed or dizzy, they should stop breathing through the straw, sit down, and regain normal breathing.

NOTE: Ensure you are following the safety guidelines for your school board/district and/or province to know the medical background and physical limitations of your students. For the 'Breathing Through a Straw' activity, you must be aware of which students have asthma or any other lung condition.

13. After students complete the questions on page 3 of the worksheet, invite them to share their experience with the activity. Share the following information about air quality and health:

There are many things that have a negative effect on the respiratory and cardiovascular system such as smoking, second hand smoke, inactive lifestyles and air pollution. Air pollution can have a negative and detrimental effect on the respiratory system (lungs and airways), cardiovascular system (heart function and blood circulation), and major organs (heart and lungs). Air pollution:

- *makes it harder to breathe and irritating your respiratory system*
- *triggers asthma attacks and other lung diseases*
- *makes existing heart and lung conditions worse*
- *causes premature death.*

Everyone reacts differently to air pollution depending on their personal health. It is important to know if you are especially sensitive to air pollution. Groups of people that are especially at risk include children, the elderly, and those with pre-existing cardiac (heart) or and respiratory diseases such as coronary artery disease (angina or heart attack), heart rhythm problems, heart failure, chronic obstructive pulmonary disease and asthma, to name a few.

During exercise, athletes take 10 to 20 more breaths per minute than the average person, and they also take deeper breaths. High performance athletes such as the Clean Air Champions spend countless hours training outdoors — it is their office! Air quality is very important to maintaining their good health and for allowing them to perform at their best. The same applies for anyone exercising outdoors. We all need clean air to have healthy bodies.

Negative health effects increase as air pollution worsens. Studies have shown that even small increases in air pollution can cause small but measurable increases in emergency room visits, hospitals admissions and death. In fact, it has been shown that even small increases in air pollution levels for a short period of time can worsen illness among sensitive or at-risk people.

14. Have students read the Asthma Facts on the worksheet. Share the information below from the Air Aware website,

http://www.cleanairchampions.ca/programs/air_aware/fact_sheets.php

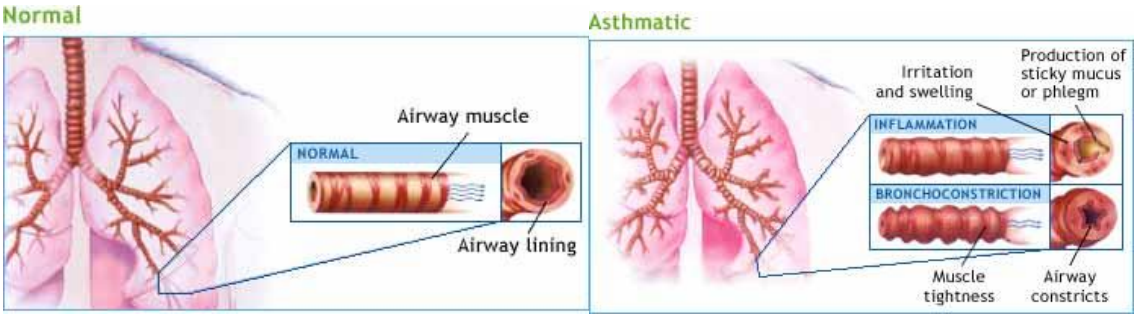
Asthma is a "chronic inflammatory disease of the airway" that causes the following symptoms: shortness of breath, tightness in the chest, coughing, and wheezing. Asthma can vary in its severity, can vary from person to person, and can flare up from time to time. The cause of asthma is not known and currently there is no cure. People with asthma often have trouble breathing when they are in the presence of what are called "triggers." When someone has asthma and their symptoms are "triggered," it means that the flow of air is obstructed as it passes in and out of the lungs. There are two types of asthma triggers:

- *allergic triggers that cause inflammation of airways — dust mites, animals, cockroaches, moulds, and pollen*
- *non-allergic triggers that can irritate airways that are already inflamed — viral infections, smoke, exercise, cold air, chemical fumes and strong-smelling substances, certain air pollutants and intense emotions.*

Many people with asthma also have allergies. People with allergies and asthma who come in contact with their allergic triggers will have a reaction in their airways as well as the usual allergy symptoms (itchy, watery eyes, etc.) An allergy is an abnormal reaction by your body to things that your body becomes sensitive to. These are called allergens. There are two types of allergens: ingested allergens (food, drink and medicines) and inhaled allergens (pollen, dust, animal dander, mould, etc.) Inhaled allergens are the most common cause of allergy problems in people with asthma.

Viral infections such as the common cold are one of the most common non-allergic triggers. Another non-allergic trigger is exercise, and this is often referred to as exercise-induced asthma. Cold, dry air is believed to be the main cause of exercise-induced asthma. When exercising, we tend to breathe quickly, shallowly and through the mouth. The air reaching the lungs misses the warming and humidifying effects of breathing through the nose. Smoke from smoking cigarettes, inhaling second-hand smoke or smoke from fires is another non-allergic trigger. Strong-smelling substances such as perfume can be another trigger. Air pollution such as ground level ozone, particulate matter and nitrogen dioxide are three pollutants that can also trigger non-allergic asthma symptoms.

Asthma can affect anyone. Most people with asthma can live full, active lives. Asthma symptoms can be managed, and the goal is to be symptom-free by avoiding asthma triggers, by taking medication, by following an asthma action plan, and by following-up regularly with your doctor.



Source: Asthma Society of Canada, *http://www.asthma.ca/adults/about/whatIsAsthma.php.*

15. Explain that breathing through a straw is similar to how people with asthma feel when their asthma is triggered. When air quality is very poor, it affects everyone, but it puts people with lung diseases and asthma at risk for their symptoms to worsen. Hospital visits increase during periods of poor air quality, and it can even lead to unexpected deaths. The level of risk from air pollution depends on the amount of pollution in the air, the amount of air being inhaled (we breathe more deeply when we are physically active), and the overall health of the individual.

16. Discuss how it would feel to be an elite athlete such as a Clean Air Champion that has asthma and has to compete in a location with poor air quality (e.g., the Beijing Summer Olympics). Remind students that the most common medical condition in the last three Olympics was asthma.

17. Divide the class in half, with one group representing the general population in North America and the other group representing athletes in North America. The following table indicates the percentage of the general population and the athletic population in North America affected by asthma, respiratory allergies, and exercise-induced asthma.

North America	**General Population**	**Athletes**
Asthma	10 – 12%	Up to 23%
Respiratory allergies	10 – 25%	Up to 45%
Exercise-induced asthma	5 – 15%	Up to 50%

Use the following table to identify how many people in the general population group would have asthma and how many in the athlete group would have asthma. Repeat this for respiratory allergies and exercise-induced asthma. If your class size is not listed below, use the percentages in the above table to identify the numbers of students for each group.

North America	**General Population**			**Athletes**		
Class Size	**24**	**28**	**30**	**25**	**28**	**30**
Asthma*	2	2	2	3	3	4
Respiratory allergies*	3	4	4	6	6	7
Exercise-induced asthma*	2	2	2	6	7	8

*For the general population, this table uses 12% for asthma, 25% for respiratory allergies and 15% for exercise-induced asthma.

18. Reinforce the importance of air quality for individuals with active lifestyles and discuss how air quality might affect those who often train outdoors, such as elite athletes or those who have lung diseases such as asthma. The benefits of exercise almost always outweigh leading an inactive lifestyle, but one should always be aware of the air quality in their location when exercising outdoors. For people with asthma, exercise helps to strengthen breathing muscles, to boost the immune system, and to maintain a healthy body weight.

19. Many people check the weather before going outdoors. We can also get in the habit of checking the Air Quality and Health Index (AQHI) and Ultraviolet (UV) rating. For people with seasonal allergies, it is also important to check the pollen report. Use the Internet or Smartphone applications to access weather reports that include the current UV rating and pollen reports. The AQHI can also be accessed online and with Smartphone applications. These resources can help everyone to lead healthier lives.

AQHI: http://www.cleanairchampions.ca/programs/air_aware/the_aqhi.php

Weather Network: http://www.theweathernetwork.com/

Extension — Making it Relevant

- Transportation is one of the biggest contributors to climate change and ground level ozone (a component of smog). Close to 30% of the total energy consumed in Canada is for transportation. More than 50% of all of the energy we use for transportation is used for personal vehicles. Choosing more active types of transportation is a great way to increase activity levels while also reducing air pollution and the greenhouse gas emissions that contribute to climate change. Have students use Google Maps — http://maps.google.ca — to get directions for different ways of getting to school. Students enter their home address, and then click on "Get Directions" and enter the school address. Google Maps will create a map indicating the driving route from their home to school. Click on the icons on the left to get directions for taking the bus, walking, or biking. Google Maps also provides the distance and estimated travel time.

  Walk Score — http://www.walkscore.com — can help students compare the walkability of different neighbourhoods. Have students enter their home addresses and compare the walk scores of different communities. The map lists local restaurants, shops, schools, and parks, and the distance to each.

  Another useful website: http://www.cyclevancouver.ubc.ca/cv.aspx

- Download *The Basics of Asthma, Allergies, and Anaphylaxis Fact Sheet* at http://www.asthma.ca/allergies/resources.html

  Print one copy for each student to take home. Ensure you know which students in your classroom that have allergies, asthma and anaphylaxis. Take steps to *Allergy Proof* your classroom.

Extension — Being Active

1. Making activity fun is a great way to get started on increasing activity levels. Play the "Stair Game." In small groups or in partners, have students count all the stairs in the school. See which group can complete the activity the fastest and most accurately. Caution students to safely conduct the exercise. After completing the activity, discuss the benefits of taking the stairs — for health and the environment.

2. Knowing your heart rate helps you measure your exercise level and progress in a fitness program. Ask each student to develop a personal physical fitness goal. Ask them to pick one moderate- to vigorous-intensity physical activity to focus on over a period of weeks. Over time, students measure and record their breathing and heart rate during this activity and then analyze the impact of regular physical activity on their breathing and heart rate. With the class, discuss the principles of fitness training — FITT — frequency, intensity, time and type. Share information about target heart rates during exercise using the *Target Heart Rate Calculator*. You can enter the age level of students in the class for each of the levels of fitness to provide a target heart rate zone:

   http://exercise.about.com/cs/fitnesstools/l/bl_THR.htm

   To monitor their heart rate, students count their heart rate for 10 seconds and then multiply by 6 to record their heart rate per minute. To find their pulse:

   - Radial Pulse: Place the tips of your middle and index finger of the right hand on your other wrist (palm facing up) just below the base of the thumb.
   - Carotid Pulse: Use the middle and index finger of the right hand, and find the carotid artery. This artery is found on the neck between the windpipe and neck muscle, just under the lower jawbone.
   - Students will feel a pulse once they have found the artery. Have them hold the two fingers in place while counting the pulse for 10 seconds.

3. Refer to the Clean Air Champions website for other active games:

   http://www.cleanairchampions.ca/programs/air_aware/quizzes_activities_and_games.php

ACTIVITY #1: 20,000 BREATHS A DAY

STUDENT WORKSHEET

Did you know? *Canada's Physical Activity Guidelines (2011)* for youth ages 12 to 17 recommends 60 minutes of moderate- to vigorous- intensity physical activity each and every day. The *Guidelines* also recommends that of those seven days:

- vigorous-intensity activities should be at least three days per week
- activities that strengthen bones and muscle should be at least three days per week.

Daily Activity Estimate

Record the amount of time you spend doing moderate (walking, skating, bike riding, chores) and vigorous activity (running, rollerblading, soccer) each day, and calculate your daily total.

	Mon	**Tue**	**Wed**	**Thu**	**Fri**	**Sat**	**Sun**
Moderate							
Vigorous							
Total							

Did you know? Only 7% of Canadian youth (6 to 19) meet the recommended 60 minutes of moderate to vigorous physical activity (MVPA) 6 days per week with less than 50% meeting the 60 minutes of MPVA 3 days per week. Source: Canadian Health Measures Survey, 2007 to 2009.

1. How does your daily total compare to the "Did you know?" recommendations above?

2. Indicate what you could do to increase your daily activity.

Did you know?
In the 2006, 2008 and 2010 Olympic Games, approximately 7% of athletes had asthma, making asthma the most common medical condition experienced by Olympic athletes.
Source: Australian Association for Exercise and Sport Science, *Position Statement on Exercise and Asthma*, 2011.

3. a) Using the charts below, develop an action plan to increase your activity level over the next five weeks. For Week 1, use the information you recorded on the previous page to complete the chart. Once you have completed the new activities, mark the table with a . Total the minutes in the last row. For Weeks 2 to 6, use the information from the previous week to complete the first two rows. Compare your progress at the end of Week 6 by referring back to the table on the previous page.

Activity Monitoring Week _____

WEEK _____	Type of Activity	Mon	Tue	Wed	Thu	Fri	Sat	Sun
Current activity – moderate								
Current activity – vigorous								
New activity, 5 to 10 min								
Completed new activity								
Total Minutes								

b) Work with a partner to complete each of the activities below for one minute. As you are doing the activity, continue talking with your partner. On the table below, rank your breathing during each activity. Complete this each week to see your progress. If you have to stop talking while doing the activity before you complete one minute, you can stop doing the activity.

WEEK _____ **Activity**	**Ranking – circle 1 if your breathing remains normal, 2 if it is easy to talk while doing the activity, 3 if it is difficult to talk, and 4 if you have to stop talking**			
	NORMAL BREATHING	**EASY TO TALK**	**DIFFICULT TO TALK**	**HAVE TO STOP TALKING**
Walk normally	1	2	3	4
Walk quickly	1	2	3	4
Hacky Sack/Bean Bag*	1	2	3	4
Jog	1	2	3	4
Run quickly	1	2	3	4

*Hacky Sack/Bean Bag: with your partner, try to keep the hacky sack/bean bag off the ground using only your feet for the one minute.

- If you circled 1 or 2, this would be considered light activity.
- If you circled 3, this would be considered moderate activity.
- If you circled 4, this would be considered vigorous activity.

Breathing Through a Straw

- Take turns walking quickly for one minute while breathing through a straw.
- Use a thumbs-up to indicate if your breathing remains easy. Use a thumbs-down to indicate if your breathing becomes more difficult.

Safety First!

- If at any time you are feeling light-headed or dizzy, stop breathing through the straw, and sit down until your breathing returns to normal.
- Let your teacher know if you have health concerns that would prevent you from participating in this activity.

1. How did you feel during the breathing through a straw activity?

2. Has there ever been a time that your breathing felt similar to when you were breathing through the straw? If yes, how often has this occurred and when?

3. Have you ever been diagnosed or tested for asthma?

4. How are allergies connected to asthma?

Asthma Facts

- Three million Canadians suffer from asthma. Asthma is the most common chronic respiratory disease of children and young adults.
- In 2001, a total of 299 Canadian deaths were attributed to asthma. 60% of people with asthma do not have their asthma under control.
- The cause of asthma is not known, and currently there is no cure.

Sources: Asthma Society of Canada; Statistics Canada, *Health Reports*, Vol 16. No. 2, March 2005.