



Teacher's Pre- and Post-Program Visit Guide

Program	Circulation, Respiration and Bodies in Motion
Grade Level	4-8
Time	50 minutes
Location	Science Classroom

Program Objectives

- Students will calculate their resting and target heart rates, and understand the importance of daily exercise for heart health.
- Students will calculate their vital lung capacity, and understand the importance of not smoking for optimal lung health.
- Students will study how the circulatory and respiratory systems work together.
- Students will identify some major muscle groups in the human body and learn exercise techniques for these muscle groups.
- Students will test their own muscle fatigue and understand how the musculature system relates to the respiratory system (oxygen consumption by muscles).

Program Description

Students classify organ systems in the human body, identify their specialized functions and investigate how these systems work together. After a fun physical fitness test, students will calculate their own lung capacity, heart rate and muscular endurance, record their data and compare results. Combine this program with a visit to *BODIES: The Exhibition* opening February 1, 2008.

Major Vocabulary and Concepts

Circulation	Maximum Oxygen Consumption	Lung Capacity	Pulse
Respiration	Muscle Fatigue	Triceps	Alveoli
Resting Heart Rate	Maximum Heart Rate	Biceps	Lungs

Activities

Activity # 1: The Beat Goes On: Measuring Your Resting and Maximum Heart Rate

Students will measure their own pulse and listen to their own heartbeats with stethoscopes. They will calculate and graph their resting and target heart rates.

Activity # 2: The Air in There: Measuring Lung Capacity

Students will measure the amount of oxygen their lungs can hold with balloons and calculate their own vital lung capacity.

Activity # 3: Muscles in Motion

Students will break a sweat with some light weightlifting and exercise to test their own muscle fatigue and understand the importance of how healthy exercise routines can keep not only muscles in shape, but other organ systems.

Suggested things to do in your classroom before the program

- Identify the different parts of the human heart in a diagram. Learn how blood flows through the body and how it is pumped through the heart.
- Draw a diagram of a human body with at least 3 different organ systems, for example, the circulatory, respiratory, and skeletal systems.
- Research a lung or heart disease and list ways you can help prevent them. For example, you can reduce the chance of developing lung cancer by not smoking.

Suggested things to do after the program

- Find other healthy physical activities that can raise your heart rate, for example, jumping rope, running, playing basketball. How can you slow your heart rate down after doing these activities?
- Breathe through a clean drinking straw for 1 minute. How do you feel? How much air is making it to your lungs? Explain to students that people with lung diseases such as emphysema, lung cancer and COPD have as difficult a time breathing normally like students do when breathing through straws.

Curriculum and Standards Addressed

Ohio - Scientific Inquiry, Scientific Ways of Knowing, Life Sciences, Physical Sciences, Science and Technology

Kentucky - Biological Science, Biological Change, Practical Living/Vocational Studies

Indiana - The Nature of Science and Technology, Scientific Thinking, The Living Environment, Health and Wellness, Physical Education

Related Exhibits and Features

- *BODIES: The Exhibition* special exhibit February 1 - September 1, 2008.
- *The Human Body OMNIMAX* film February 1 - September 1, 2008.

Resources

- <http://www.bodiestheexhibition.com/bodies.html>
- http://www.pbs.org/wgbh/nova/teachers/activities/3414_marathon.html
- *Janice VanCleave's The Human Body Book for Every Kid* by Janice VanCleave. John Wiley & Sons, Inc., 1995.
- *Head to Toe Science* by Jim Wiese. John Wiley & Sons, Inc., 2000.
- *The Heart: Our Circulatory System* by Seymour Simon. Harper Collins Publishers, 1996.
- *The Busy Body Book: A Kid's Guide to Fitness* by Lizzy Rockwell. Crown Publishers, 2004.
- *Our Body: Circulatory System* by Cheryl Jakab. Smart Apple Media, 2006.
- *Your Body and Health: Blood and Heart* by Jen Green. Stargazer Books, 2006.
- *BODIES: The Exhibition* exhibit guide. Premier Exhibitions, Inc., 2006.