

# Getting 4th Graders Excited about the Cardiovascular System

This activity series focuses on contributors to a healthy lifestyle; exercise and eating right, while learning human physiology. Students will use the scientific method to test the effects of exercise on heart rate, respiration rate and blood pressure.

Activity courtesy of HOPES 2011 Recipients Dr. Patricia Halpin, Scientist & Heather Cantagallo, Teacher

~ 3 hours

### **Quick Guide and Materials:**

- Age Range: Elementary School
- Preparation Time: ~ 30 minutes
- In Class Time:
- Duration:
- Materials List:

### 3 weeks Wrist Blood Pressure and Heart Rate Monitors, Stop Watch

## www.asbmb.org/k5activity/hc





#### **Activity Outline**

Class.Sequence	Activity	Timing
Vctivity Breakdown Below 1.1 2.1 2.2 2.3 3.1 3.2	Pretest Introduction & Practice Using Equipment Lecture- Scientific Method Design Experiment Experiment Data Analysis Posttest	5 min 55 min 10 min 20 min 30 min 55 min 5 min

#### **Preparation**

- I. Review teaching points
- 2. Print pretest and posttest, which can be found at www.asbmb.org/k5activity/
- 3. Obtain supplies- wrist blood pressure and heart rate monitors and stopwatch can be purchased easily from Amazon or other retailers. Will need one per group.

## Week One

### Give students pre-test before starting

### Introductory Teaching Points with Hands-On Activities

Discuss what a physiologist is and what they do. Describe the study of physiology.

Introduce heart function- it pumps blood, it is a muscle. Definition of heart rate- number of beats per minute bpm Have student take their heart rate

Introduce blood pressure by mentioning pressure in a bike tire in psi.

What is the pressure doing? Putting force on the walls of the tire to keep it inflated.
Definition of blood pressure- the force pushing the blood through the body.
What causes blood vessels to get clogged or narrowed (decrease in diameter)? Unhealthy eating, saturated fats. Smaller diameter increases blood pressure.
What effect does exercise have on heart rate and blood pressure? Both go down and less work is done to pump same amount of blood to tissues.

### SASBMB-2

Blood pressure is measured in mm Hg.

Systolic pressure- pressure when heart is contracting Diastolic pressure- pressure when heart is relaxing Systolic/diastolic = BP mm Hg

Demonstrate how to use BP monitors.

Get in small groups. Take resting blood pressure and heart rate with monitors and record numbers.

Introduce breathing rate- number of breaths per minute

Have student take their respiration rate.

How do the heart and lungs work together? To deliver oxygen to your cells via the blood vessels. Cells need oxygen to make energy to do work.

If junk food and too much meat is consumed, it can create plaques on the inside of blood vessels. This makes blood pressure go up and the heart works harder.

### Introduce Importance of Exercise on Heart Health

The heart is a muscle. Exercise and good food keep it healthy.

To measure the healthiness of the heart, doctors can measure blood pressure. Higher resting blood pressure indicates the heart is working harder, and this is not good over time. Regular exercise lowers heart rate, respiration rate and blood pressure. The heart stays healthy and does not have to work as hard.

## Week Two

### Learn about the Scientific Method and Design Experiment

Provide a brief overview of the scientific method.

Experimental questions to address- After exercise, \_\_\_\_\_(heart rate, breathing rate, blood pressure) should go \_\_\_\_\_ (up, down).

With the class as a whole, devise an experimental plan that answers this question and can be executed in 5 minutes or less.

An example would be to go to the playground. Take resting measurements. One member exercises for 5 minutes, then measurements are taken again. Record data, then switch to a different group member and repeat.

### SASBMB-3

### **Execute Experiment**

Go to area where students will conduct their experiment and begin. Make sure students have lab notebook to record measurements and some way of monitoring time.

Tip: When student stops exercising, the student will put on the wrist monitor and measure BP and HR. At the same time, have another student within their group count breaths.

Tip: To incorporate math, can have students count number of breaths for 30 seconds and then multiply by two to get breaths per minute.

## Week Three

### Data Analysis

Before class, create six histograms of class data.

Resting heart rate

Resting blood pressure

Resting respiration rate

Active heart rate

Active blood pressure

Acrive respiration rate

Analze the data as a group.

Calculate mean, median, and mode.

Determine whether hypothesis was supported by the experiment. Draw conclusions.

Give students post-test at the end of the class