6th Grade Activity 7: “Under Pressure”

Learning goals:
After completing this exercise students should be able to:

- Explain what blood pressure is.
- Explain how exercise affects blood pressure.
- Form a simple hypothesis.
- Make a conclusion based on data.

Introduction:
Blood pressure is the force created by the heart as it pushes blood into the arteries of the circulatory system. It is measured in units of mm Hg (millimeters of mercury). It is usually written as a ratio of two numbers, such as 120/75 mm Hg, which represent systolic and diastolic pressure.

**Systolic blood pressure** describes the surge of pressure in the arteries as the heart beats and pumps blood out of the left ventricle. It is the upper number in the measurement of a person's blood pressure. For example, in the measurement 120/75, 120 is the systolic blood pressure.

**Diastolic blood pressure** is the pressure in the arteries when the heart relaxes between beats. It is the lower number in the measurement of a person's blood pressure. For example, in the measurement 120/75, 75 is the diastolic blood pressure.

Normal resting blood pressure is variable based on gender, age, and physical condition. In general, however, systolic blood pressure higher than 140 mm Hg and/or diastolic blood pressure higher than 90 mm Hg is considered above normal. Systolic blood pressure below 100 mm Hg is generally considered below normal.

**Question:** What is the effect of exercise on blood pressure?

**Hypothesis:**
State your hypothesis (educated guess) about how you think exercise will affect blood pressure. Explain the reasoning behind your hypothesis. Write your hypothesis and explanation on the Student Worksheet.

An important part of designing an experiment is identifying variables. The **independent variable** is the thing, which we will change in our experiment. The **dependent variable** is the thing, which we measure in our experiment too see if there was a change. What do you think are the independent and dependent variables in this experiment? Write your answer on the Student Worksheet.
**Procedure:**
In order to answer this question, you will need to measure blood pressure before and after exercise.

1.) You will need a *control* for your experiment. Choose one person to do the control trial. This person will sit quietly for two minutes. Choose a different person to do the experimental trial. This person will exercise for two minutes.

2.) Practice taking the resting blood pressure of the experimental trial volunteer and the control trial volunteer.
   - Place the cuff around the upper arm, just above the elbow. Position the cuff so that the rubber hose is pointing down toward the hand and on the inside of the arm.
   - Tighten the cuff with the Velcro, but not too tight. There should still be enough room to fit one finger between the cuff and the arm.
   - The person whose blood pressure is being measured should sit and remain as still as possible with their arm held at chest level. It might be helpful for someone else to support their arm or to have them rest their arm on a support.
   - Follow the instructions that come with the monitor.
   - Remain still until the blood pressure is displayed in the window.

3.) Take the resting systolic blood pressure (*top number*) of both volunteers and record in Table 1 on the **Student Worksheet**.

4.) Have the volunteer for the experimental trial do jumping jacks for two minutes. Meanwhile, have the volunteer for the control trial sit quietly for two minutes.

5.) Take the resting blood pressure of both volunteers again and record the systolic blood pressure in the table on the **Student Worksheet**. Switch roles and do the experiment again. Record the data in Table 2.

6.) Gather together the data from the whole class and record the data in Table 3 on the **Student Worksheet**.

7.) Compute the average systolic blood pressure in both the experimental and control trial. Record on the **Student Worksheet**.