Heart Physiology Lab

Part 1: Pulse Rate

Measure your pulse in each of the following conditions (in each case you will count your pulse for **1 full minute**):

1. lying down

2. sitting

3. standing

4. during 1 minute of exercise

5. immediately after 2 minutes of exercise

Record the pulse data for everyone in the class. You may use Table 1 in the Heart Physiology Worksheet for this, if you wish. Once you have all the data, then do the following:

1. Calculate the average pulse rate in each condition by adding all the measurements in each column and dividing by the number of students that were measured.

2. Make a bar graph of the class averages for each measurement. You may use Graph 1 in the Heart Physiology Worksheet for this, if you wish. Be sure to write the class average above each bar!

3. Using your graph, answer questions 1a and 1b in the Heart Physiology Worksheet.

Part 2: Blood Pressure

Blood pressure is measured with a device called a sphygmomanometer. The general procedure for measuring blood pressure is as follows.

1. Place the "cuff" of the sphygmomanometer around the bicep of one arm and inflate it until there is enough pressure to cut off the flow of blood to the forearm through the brachial artery (to ensure that you have enough pressure to do this, inflate the cuff to about 180-200 mm Hg).

2. Place the stethoscope in the crook of the elbow and slowly release the pressure in the cuff by loosening the screw next to the pressure bulb of the sphygmomanometer.

3. As the pressure drops, at some point you should start to hear a faint tapping or thumping sound. The pressure at which you first hear these sounds is the **systolic** blood pressure. (Note: There are two cues that may help you in identifying when you should be hearing these sounds.

First, the person you are measuring should feel the blood beginning to pump back into his/her forearm, so they can signal you that you should be hearing something. Second, if you watch the dial of the pressure gauge closely, the needle will jump each time blood is pumped through the brachial artery. If you see the needle jumping, this is another cue that you should be hearing something through the stethoscope).

4. Continue to let the pressure drop. As you do so, the tapping/thumping sounds will get louder and then they will eventually fade away. The pressure at which you can no longer here these sounds is the **diastolic** blood pressure.

Measurements:

You will need to work in groups of two to collect the data. Obtain a sphygmomanometer and measure your partner's blood pressure in the following conditions. Once you have finished measuring your partner's blood pressure, switch roles and have your partner measure your blood pressure in the same conditions.

Posture Effects:

a. lying down

b. standing upright

Activity Effects:

a. immediately after 3 minutes of exercise

b. immediately after 6 minutes of exercise

Once you have finished, you will need to obtain the data from everyone else in the class. You may record this data in Table 2 of the Heart Physiology Worksheet, if you wish. You will then use this data to:

1. Calculate the class average for each measure by adding all the numbers in each column and dividing by the number of students measured.

2. Plot the class averages for blood pressure measurements as a line graph. You may use Graph
2 in the Heart Physiology Worksheet to do this, if you wish. Your graph should have two lines: one that connects the points for systolic pressure in each measurement condition, and the second connecting the points for diastolic pressure in each measurement condition. Be sure to write the class average above each point!

3. Using the graph you have created, answer questions 2 a, b, and c in the Heart Physiology Worksheet.