**Regulation of Human Heart Rate Lab Practicum**

**Instructions**

**Introduction**

Does your heart always beat at the same rate? When would it be important to measure a person’s heart rate? Why are astronauts’ heart rate constantly monitored? When would it be useful for the heart to beat faster during some activities or in response to stimuli? Are there any activities or stimuli that you think may decrease a person's heart rate?

Your group will design an experiment to test how a stimulus or activity affects heart rate. You will carry out your experiment, analyze your data, and write a full laboratory practicum report.

**Part 1: Measuring Heart Rate Practice**

You will be measuring heart rate by counting the number of pulses in the artery in the wrist in a 30 second interval.

1. To feel the pulse, find the artery in your partner's wrist.
2. Place the tips of the first two fingers of one hand on the palm side of your partner's wrist, over toward the thumb side of his or her wrist. **Don't use your thumb** to feel the pulse in the wrist, because your thumb has a pulse of its own.
3. To measure heart rate, count the number of pulses in 30 seconds. Multiply that number by 2, and you will have the number of heart beats per minute.

**Part 2: Measuring Heart Rate Accurately**

1. You will need to record your numbers in the *Regulation of Human Heart Rate Planning Document.*
2. Choose one person in your group to be the subject, one person to measure the pulse count in the left arm, and one person to measure the pulse count in the right arm. The fourth person in the group will use the stop watch to time a 30 second interval, and will indicate when the count of beats should begin and end.
3. Both people who are measuring pulse count should write down the number of beats for the 30 second interval before saying the number out loud.
4. Next, compare the results found by the two different people who were measuring pulse counts. Did you both count about the same number of pulses in the 30 second interval? If you got different results, can you figure out why?
5. Try to improve your technique, and repeat step 2 until both people who are measuring pulse counts get the same number of pulses in the 30 second interval (or within 1 or 2 of the same number).
6. Once you have accurate readings, use the final, accurate set of measurements to calculate the heart rate for this subject (beats per minute).
7. After this, you should switch roles. The people who were measuring pulse counts should now be the subject and the timer, and the people who were the subject and the timer should now measure pulse counts. Repeat steps 2-3 until the heart rate measurements are accurate.

**Part 3: Designing Your Experiment**

Your group will be designing an experiment to examine human heart rate in response to activity or stimulus.

1. Choose an activity that may raise or lower human heart rate. The activity **may not** harm the subject.
2. Fill in “Activity,” “Materials needed,” and “Group member…” on the *Regulation of Human Heart Rate Planning Document.*
3. Try to keep everything constant, except for the one stimulus or activity you want to test. This will allow you to measure the effect of the stimulus or activity you are testing, and minimize confounding effects due to any other factors that may influence heart rate.
4. In designing your experiment, remember that heart rate can be affected by minor physical activity such as changing seats, so you need to keep this type of factor constant in order to assess the effects of your experimental stimulus or activity.
5. Plan to have each person in the group be a subject in the experiment, in order to see whether different people have the same heart rate response to your stimulus or activity.
6. On the *Regulation of Human Heart Rate Planning Document,* write down the steps of your lab. Be specific about what you plan to do to your subjects (the stimulus) or what you want your subjects to do (the activity).
7. Specify when and how often you will measure heart rate; you will need to measure resting heart rate two or three times before your stimulus or activity, and you will need to measure heart rate during and/or after your stimulus or activity.

**Part 4: Data Chart**

Make a data sheet in your spiral notebook to collect the data during your experiment. You will need the data for your lab practicum document. The data sheet should include places to record the:

1. names of each student in the group
2. resting heart rates (pulse counts) for each subject before the stimulus or activity, as well as the heart rates during and/or after the stimulus or activity
3. anything you notice which might affect the results, for example, other things which may be happening in the room during your experiment or changes in each subject's mood during the experiment.

**Part 5: Analyzing Your Results**

Analyze the data from your chart.

For each subject, graph the resting heart rate and the heart rate during and/or after the stimulus or activity. Calculate the average resting heart rate and the average heart rate during and/or after the stimulus or activity. Graph these averages. Be sure to label both axes of any graph that you make.

Do your results support your hypothesis? What conclusions can you draw from your experiment?

**Part 6: Writing the Lab Practicum Document**

Use the Lab Practicum template as the basis for your final document. You will need information from all sections of this set of instructions in order to complete your final Lab Practicum Document.

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