



# Factors Affecting Blood Pressure and Heart Rate

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## **Research Host:**

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**1996**

## **Grade Level:**

Middle-High School

## **Factors Affecting Blood Pressure and Heart Rate**

### **Purpose:**

To analyze the factors that may affect heart rate and blood pressure.

### **Objectives:**

Students will be able to:

- identify the difference between blood pressure and heart rate.
- explain the role of blood pressure and heart rate.
- understand the function of the baroreceptor on blood pressure and heart rate.

### **Materials:**

- sphygmomanometer and stethoscope
- clock or stopwatch
- student handout

### **Preparation:**

Students should already be familiar with procedures for taking blood pressure and heart rate, and should have a basic understanding of the cardiovascular system.

### **Procedure:**

Students will be divided into groups of four. In these groups the students will need to choose two people to measure heart rate and two people to measure blood pressure. The heart rate people will then need to take their resting heart rate and record it. The blood pressure people will need to take their resting heart rate and record it. Then as a group the students will choose two factors that they believe will cause a change in heart rate and blood pressure. They will test these factors and collect the data using time as an independent variable. Graphs will then be made and analyzed. The groups will then present and compare results.

### **Safety:**

Students should be reminded of laboratory safety rules when deciding what factors they will be using to affect the heart rate and blood pressure.

### **Questions to Ask:**

1. What kind of effects did you see in blood pressure and heart rate?
2. What are different factors that could affect blood pressure and heart rate? (e.g. running, reading a scary book, and/or taking blood pressure and heart rate lying down)
3. Would there be a difference in blood pressure and heart rate if you stood on top of a table or sat down on the floor?
4. What if you lay down on the table?
5. Compare the blood pressure and heart rate. Are there any similarities or differences in the changes?

6. What would be the variable and control in the experiment?

**Where to Go From Here:**

This lab should be used when you are discussing the circulatory system. A good follow up activity might be to talk about athletics and the heart. You may even want to talk about the Olympics and how some athletes travel to high elevations to practice. This would also be a good time to invite a physiologist to talk to your classroom about the circulatory system.

**References and Resources:**

1. Monitoring the heart / Vital Statistics
2. A good source for equipment is: Cynmar Corp., 131 North Broad Street, P.O. Box 530, Carlinville, IL 62626, 1-800-223-3517.

**Suggestions for Assessment:**

Students should complete a joint laboratory report for their group. Their results should then be presented and compared as a class.

## **Resting Heart Rate**

### **Student Activity: Sheet #1**

**Purpose:** To learn how to measure your pulse or heart rate.

#### **Materials:**

- stopwatch
- lab sheet
- pencil

#### **Procedure:**

1. Divide students into pairs. (As one student takes their pulse one student will time.)
2. Students must then choose a pulse point on their body, which they will use to detect their heart rate.

#### **Pulse Points:**

### **Finding Your Heart Rate:**

1. Feel with the fingertips of your index and middle finger for your pulse point until you detect pulsations.
2. Keep yourself as still as possible while you are taking your heart rate.
3. Count the number of heartbeats you feel in one minute. Record the results.
4. Now repeat steps 1-3 measuring your heart rate at a different pulse point.
5. Repeat the procedure for your partner.
6. Graph and compare results.

**Data:**

Names	Pulse Point #1 _____	Pulse Point #2 _____

**Graph**

Heart Rate				
	Student Name			

## Cuff 'Em

### Student Activity: Sheet #2

#### Purpose:

To learn how to measure your blood pressure.

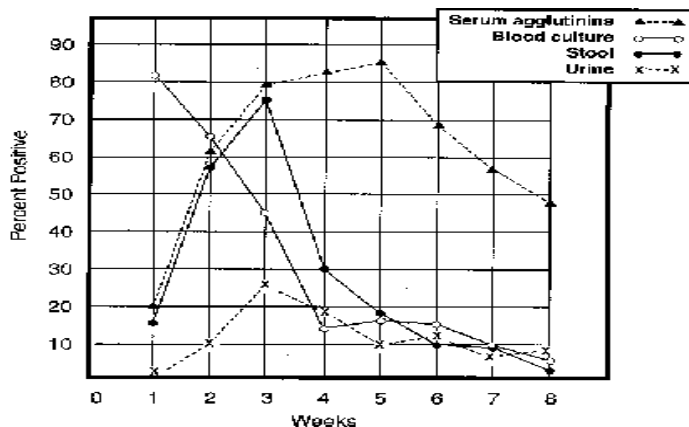
#### Materials:

- sphygmomanometer (blood pressure cuff)
- stethoscope
- lab sheet
- a pen or pencil

#### Procedure:

1. Divide students into pairs.
2. Jobs: One student will be the patient having his/her blood pressure measured. The other student will be the student doctor who measures the blood pressure.
3. Switch jobs.

#### How to measure blood pressure:



1. Student patient should extend arm on table with palm up.
2. Place blood pressure cuff above the bend in the arm. The cuff should be snug yet have enough room to insert two fingers.
3. Check to see if valve is open or closed.
4. Place stethoscope ear tips into ear.
5. Position stethoscope on arm to hear pulse.
6. Pump pressure up to 180 mm.
7. Release valve slowly.
8. The first pulse sound you hear as you release the valve is the systolic pressure. Have the student patient place their finger on the number of the first sound to mark the spot.

9. Continue to release the valve. Approximately 40 mm down from the first sound you will hear is called the diastolic pressure.
10. Record the systolic and the diastolic pressure on the chart.
11. Jog in place for two minutes.
12. Repeat steps 1-10.
13. Record results.
14. Make a bar graph of results.
15. Present, analyze, and compare results in class.

**Data:**

<i>Names</i>	<i>Resting Blood Pressure</i>		<i>Blood Pressure After Jogging for two Minutes</i>	
	<i>Systolic Pressure</i>	<i>Diastolic Pressure</i>	<i>Systolic Pressure</i>	<i>Diastolic Pressure</i>

# Factors Affecting Blood Pressure and Heart Rate

## Student Activity: Sheet #3

**Purpose:** To analyze the factors that may affect heart rate.

**Materials (per group):**

- sphygmomanometer
- stethoscope
- clock or stopwatch
- student handout
- graph paper
- pen or pencil

**Procedure:**

1. Assign students to lab groups of four.
2. In your group choose two students to measure the heart rate and two students to measure the blood pressure.
3. Heart rate pair: Take resting heart rate and record. Blood pressure pair: Take resting blood pressure and record.
4. The group will then choose two factors that they believe will cause a change in heart rate and blood pressure.
5. Test these factors and collect the data using time as an independent variable.
6. Graph and analyze results.
7. Present and compare results with class.

**Data:**

	Heart Rate		
Names of Heart Rate Pair	Resting	Factor #1 _____	Factor #2 _____
Names of Blood Pressure Pair	Blood Pressure		
	Resting	Factor #1 _____	Factor #2 _____