

**Rest and Exercise Lab: Connecting the Respiratory and Cardiovascular Systems**

**DO NOW**

What vital role does the respiratory system play in the cardiovascular system?

What is the name of the type of muscle that contracts every time you heart beats?

The alveoli are the specific spot where the respiratory system begins to interact with the cardiovascular system. What does the alveoli look like and what is its function?

Predict the effect that exercise (running, weight lifting, etc.) will have on both your cardiovascular system and respiratory system. What is the effect that we observe after exercise?

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**INTRODUCTION**

As discussed in class, the human body is composed of eleven different body systems that work together to enable the body to perform all of the functions necessary for life. As we continue to explore the organ systems that make up our body, I would like you to keep in mind that each system interacts with one another in order to effectively perform its function (physiology). A reoccurring example seen in class is how the respiratory system is connected to the cardiovascular system. Now take two (2) minutes to discuss with your group members the way in which the respiratory system and cardiovascular (circulatory) system connect. Write your answer below:

Today we are going to prove how these two systems are closely connected and how both would be unable to perform their functions without the other. And we will do so through exercise!!!!!!

**PROCEDURE:**

**Checking your own heart rate**

1. Place stethoscope on the inside of your partner's wrist.
2. You should hear their heartbeat. It is necessary to be very quiet as it may be not be very loud.
3. Count the amount of heartbeats you hear in 10 seconds. Then multiply that number by 6, and that will give you the heart rate in beats per minute.

**If a stethoscope is not available you will need to check your pulse manually**

1. Place your index and middle finger together and rest them gently on the underside of your partner's wrist.
2. You should feel your partner's pulse.
3. Count the amount of beats you feel in 10 seconds. Then multiply that number by 6 and that will give you your partner's heart rate in beats per minute.

In this laboratory, you will be taking your heart rate and breathing rate under the following conditions: at rest, after jogging in place, after jumping jacks and after walking around the classroom. In this activity, your heart rate expresses activity from your \_\_\_\_\_ system. Your breathing rate represents activity from your \_\_\_\_\_ system.

**Control: Taking Resting Heart Rate and Breath Rate**

1. Count your pulse rate for 10 seconds. Multiple that number by 6 to get your heart rate in beats per minute.
2. Count the amount of breaths you take at rest. (**\*Remember to breathe at a normal rate in order to ensure the validity of your control\***)
3. Record this data in your laboratory data sheet.
4. Repeat Steps 1-3 for trial #2

**Activity #1: Walking around the classroom**

1. Continuously walk around the classroom for 1 minute and 30 seconds.
2. When the time goes off, go back to your seat.
3. While your partner calculate your heart rate (beats/minute), you should count the amount of your breaths per minute (one breath=inhale/exhale)
4. Switch roles with your partner.
5. All data should be recorded in your laboratory data sheet.

Name: \_\_\_\_\_

### **Activity #2: Jogging in Place**

1. Continuously jog in place for 1 minute and 30 seconds.
2. When the time goes off, go back to your seat.
3. While your partner calculate your heart rate (beats/minute), you should count the amount of your breaths per minute (one breath=inhale/exhale)
4. Switch roles with your partner.
5. All data should be recorded in your laboratory data sheet.

### **Activity #3: Jumping Jacks**

1. Continuously do jumping jacks for 1 minute and 30 seconds.
2. When the time goes off, go back to your seat.
3. While your partner calculate your heart rate (beats/minute), you should count the amount of your breaths per minute (one breath=inhale/exhale)
4. Switch roles with your partner.

### **POST LAB QUESTION**

Based on the data you have just collected, how does exercise affect both the respiratory rate and the heart rate of the test subjects?

What does this tell you about the connection between the two systems?

Why do we feel tired after exercise (in relation to cellular respiration)?

Why do we have less energy when we don't eat (in relation to cellular respiration)?

Name: \_\_\_\_\_

# Scientific Method

Problem/Question

Hypothesis

Data Analysis

**Respiration Rate (# of breaths per minute)**

<b>Participant Name</b>	<b><u>Type of Exercise</u></b>	<b><u>Trial 1</u></b>	<b><u>Trial 2</u></b>	<b><u>Average</u></b>

**Heart Rate (# of heart beats per minute)**

<b>Participant Name</b>	<b><u>Type of Exercise</u></b>	<b><u>Trial 1</u></b>	<b><u>Trial 2</u></b>	<b><u>Average</u></b>