

MiSP HUMAN PHYSIOLOGY WORKSHEET #1 HEART AND BREATHING RATES

Name _____

Date _____

Key Question: How does a person measure heart rate and breathing rates?

Introduction

Why do you need to have a heart? Why do you need to have blood circulate to all the parts of your body? How does your heart pump blood? What is a heartbeat? Does your heart always beat at the same rate? What are the functions of lungs? Why do humans have to move air in and outside of their bodies and what happens to the air once it is inside the lungs? How does air get pushed inside and outside? Do you always breathe at the same rate? These are all questions that will be addressed in your science class's study of the human circulatory and respiratory systems.

During this lesson, you will practice measuring heart rate and breathing rate accurately.

Measuring Heart Rate Accurately

Each time the heart beats, blood is pumped into the arteries. As the blood surges into the arteries during a heartbeat, each artery stretches and bulges. This brief bulge of the artery is called a pulse. You will be measuring heart rate by counting the number of pulses in the artery in the wrist in a 15 second interval.

To feel the pulse, find the artery in your or your partner's wrist. 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. You may need to press quite firmly in order to feel the pulse of blood that each heart beat sends through the artery. Don't use your thumb to feel the pulse in the wrist, because your thumb has a pulse of its own.

To measure heart rate, count the number of pulses in 15 seconds. Multiply that number by 4, and you will have the number of heart beats per minute.

Measuring Breathing Rate Accurately

One breath includes the process of moving air into and out of the lungs. A breath can be measured by watching a person's abdomen, upper body or shoulders. Each breath can be counted by seeing the abdomen or upper body expanding or the shoulder lifting. People breathe without thinking. The brain takes care of that important function. But, people can also influence their rate of breathing.

Students will work in pairs. One student will sit quietly and read or write so they don't think about their breathing. The second student will wait patiently until the student seems engaged in the activity. Then, he or she will count the number of breaths in one minute. **DO NOT TELL THE SUBJECT WHEN YOU ARE COUNTING. THAT WILL PROMPT HER OR HIM TO THINK ABOUT BREATHING AND MAY AFFECT THE BREATHING RATE.**

Procedures

Materials: calculator

Determining resting heart rate:

1. Sit at ease for two minutes.
2. Take your pulse. (Or your partner can take your pulse.) Count the number of beats for 15 seconds and multiply by 4. Do this three times. Record this data in the data chart on the next page.
3. Calculate the average of three pulse measurements. This is your resting heart rate.
4. Post your data to the class worksheet.

Determining resting breathing rate (work in pairs):

1. The subject should sit quietly and read or write.
2. The recorder should wait until the subject is engaged in their activity and then counts the number of breaths in one minute. Do this three times. Record this data in the data chart below.
3. Calculate the average of the three breath measurements. This is your resting breathing rate.
4. Reverse roles.
5. Post your data to the class worksheet.

Analyze the Data

As a class you may decide to examine just the range of heart rates and breathing rate or you may decide to group the data so you can compare the data from male and female students, or from athletes and non-athletes, or some other comparison. Your teacher will set up the class worksheet and give you further instructions about how to analyze the data.

RESTING HEART RATE

TRIAL	BEATS IN 15 SECONDS	X4 BEATS PER MINUTE
1		
2		
3		

AVERAGE/RESTING HEART RATE = _____

RESTING BREATHING RATE

TRIAL	BREATHS PER MINUTE
1	
2	
3	

AVERAGE/RESTING BREATHING RATE = _____

Discussion

1. Why is it better to use an average to determine resting heart and breathing rates?

2a. How does your heart rate compare to other students'?

2b. How does your breathing rate compare to other students'?
