

In this investigation, you will investigate the effect of exercise on the respiratory and circulatory systems.

Question

How are the respiratory and circulatory systems related?

Prediction

Predict how heart rate and breathing rate will be affected by exercise.

Safety Precautions

Students who have respiratory and/or heart problems should not be subjects in this activity.

Materials

- stopwatch

Part 1: Measuring Resting Heart Rate and Breathing Rate

1. First, measure and record the subject's resting heart rate, or the number of heartbeats per minute while the subject is sitting at rest. Find your subject's resting heart rate by taking their pulse. Locate the artery in their wrist and gently press your index finger and one or two other fingers against the artery. (Do not use your thumb, because it has its own pulse.) Use the stopwatch to count the number of pulses in 30 s. Multiply by 2 to get the number of heartbeats in 1 min. Record this as the subject's resting heart rate. **Try your best**

2. Repeat step 1 two more times. Record your results in your table. Add the three resting heart rates together. Divide this number by 3 to get the subject's average resting heart rate.

3. Next, measure and record the subject's resting breathing rate. The resting breathing rate is the number of complete breaths per minute while the subject is sitting at rest. Count the number of times the subject breathes (one inspiration and one expiration) in 30 s. Multiply that number by 2 to get the number of breaths in 1 min. Record this as the subject's resting breathing rate.

4. Repeat step 3 two more times. Record your results in your table. Add the three values for breathing rate together, and divide by 3. This will give you the subject's average resting breathing rate.

Part 2: Measuring Heart Rate and Breathing Rate after Exercise

8. Have your subject walk at a normal pace on the spot for 5 min. Then record the number of heartbeats per minute and the number of breaths per minute.

9. Have your subject walk briskly in place for 5 min. Then record the number of heartbeats per minute and the number of breaths per minute.

Analysis

1. Plot your results on graph paper. Each coordinate point should indicate breaths per minute on the horizontal axis and heartbeats per minute on the vertical axis. Create a title for your graph. Don't forget your headings.

2. What are the two dependent variables in this investigation?

Conclusions

3. What is the relationship between heart rate and breathing rate? Use evidence from your graph to support your answer.

4. An increased breathing rate increases gas exchange in the lungs. Why is this increase in breathing rate related to heart rate?

Activity	Heartbeats/min	Breaths/min
Resting 1		
Resting 2		
Resting 3		
Average		
Normal Walk		
Brisk Walk		

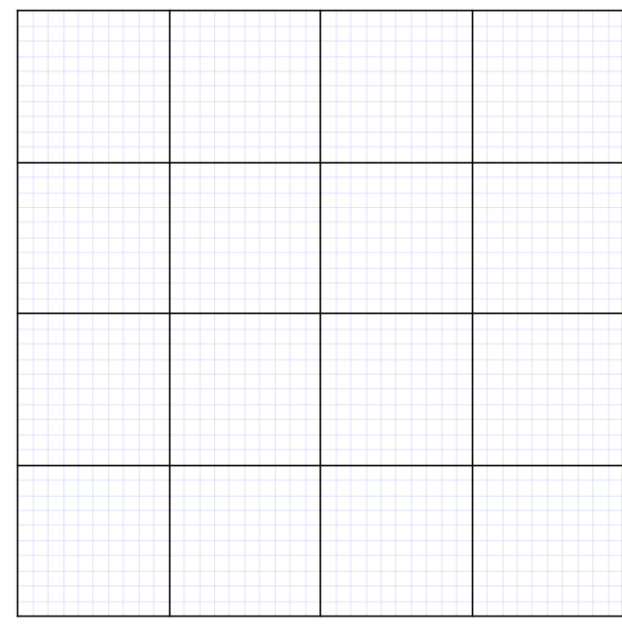


Figure 1.0 _____