

Homeostasis Lab

Introduction: Homeostasis means maintaining a relatively constant state of the body's internal environment. The term used to describe a pattern of response to restore the body to normal stable level is termed negative feedback. When a stimulus (environment change) is met by a response that reverses (negates) the trend of the stimulus, it is negative feedback. As a result the internal environment is returned to normal. Pulse rate is constantly checked by receptors (sensors) throughout your body. A stimulus such as elevated pulse rate leads to a reaction by an organ making the response. An appropriate response will return the pulse rate to normal.

Purpose: To observe an example of homeostasis working to control your body's pulse rate (heart rate).

Materials: stop watch

Procedure:

1. Start by determining which person in your group will exercise and which person in your group will watch the stopwatch and record data.
2. Have you OR your partner sit down and measure their pulse rate in their radial artery (wrist).
3. Take three separate measurements, each for thirty seconds. Calculate the beats per minute by multiplying the values obtained by 2. Record each in Data Table 1.
4. Find an average for the three values of your resting heart rate. Record this in Data Table 1.
5. You OR your partner will exercise vigorously for three minutes by jogging in place or doing jumping jacks. Start your stop watch when you start exercising. Measure the pulse rate immediately on finishing the three minutes of activity; measure the same as before (count for 30 seconds then multiply by 2). Record the value in Data Table 2.
6. Let your stop watch continue as you rest for 5 minutes. Measure your pulse rate again after you rest for 5 minutes the same way. Record your pulse rate after this 5 minute rest period in Data Table 2.
7. Repeat steps 5-6 two more times for a 2nd and 3rd trial. Record the value in Data Table 3 & 4.
8. Create a bar graph that shows the results of each trial. Remember each trial has **2** different values that need to be graphed. Make sure you include all necessary graph components!



Data:

Data Table 1: Resting Pulse Rate

Resting Pulse Rate 1	Resting Pulse Rate 2	Resting Pulse Rate 3	Average Resting Pulse Rate

Data Table 2: Pulse Rate After Exercise Trial 1

ACTIVITY	PULSE RATE
After 3 minutes vigorous activity	
After 5 minutes of rest	

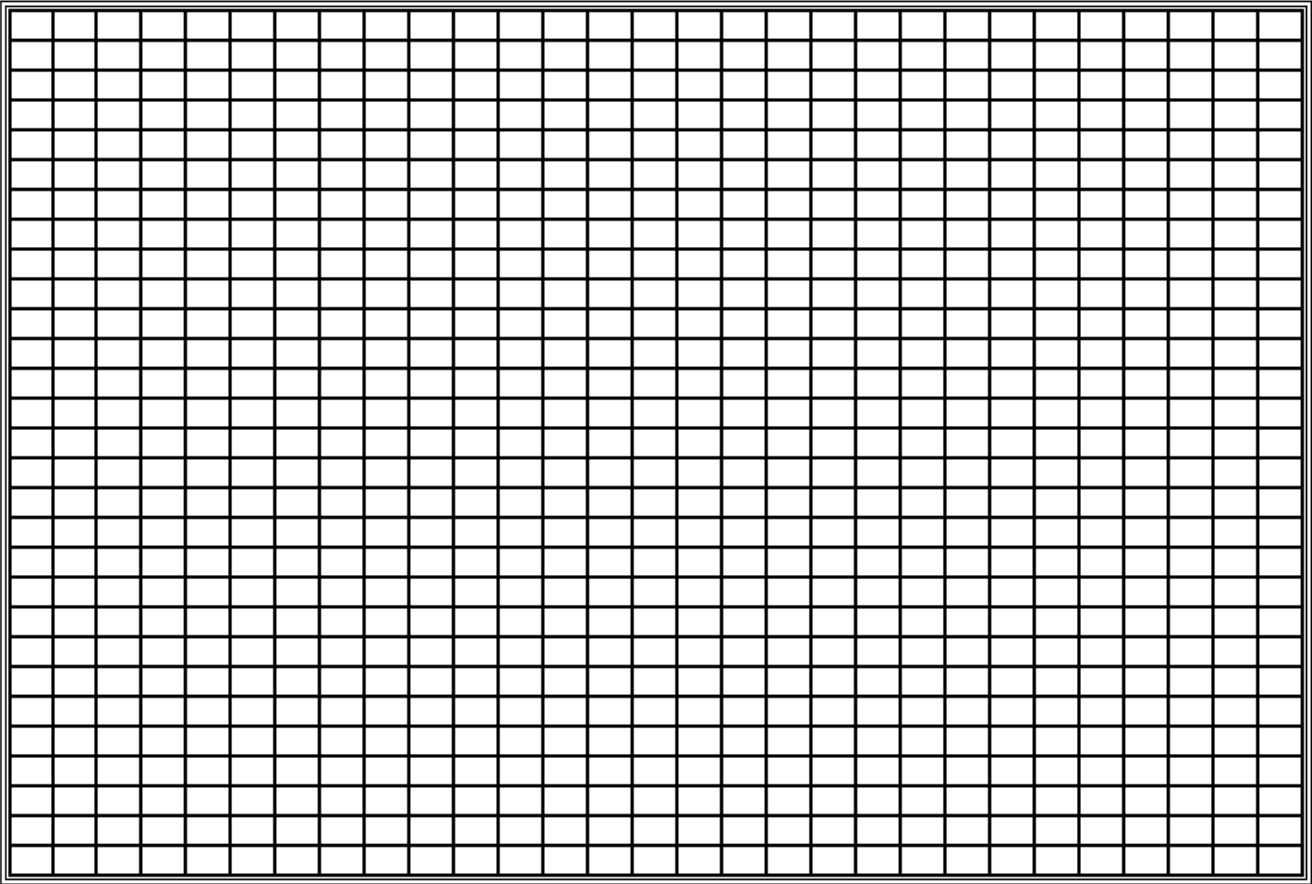
Data Table 3: Pulse Rate After Exercise Trial 2

ACTIVITY	PULSE RATE
After 3 minutes vigorous activity	
After 5 minutes of rest	

Data Table 4: Pulse Rate After Exercise Trial 3

ACTIVITY	PULSE RATE
After 3 minutes vigorous activity	
After 5 minutes of rest	

Graph:



Questions:

1. What is your average resting pulse rate? Most adults are between 60-90 beats/min. How do your values compare?
2. What happens to your pulse rate with vigorous exercise?
3. Every cell in the body requires oxygen for respiration so that sufficient energy can be produced. Carbon dioxide, a waste product, is also produced and needs to be removed. Therefore, the levels of both gases must be regulated. How does this explain the changes in your pulse rate?
4. How did your body respond during the resting period after each activity?
5. Explain why your body responded this way during the resting period after each activity?
6. How do you think the results from this lab would compare for a trained athlete and an average person? Explain.
7. What are some ways your body regulates the increase of body temperature that also occurs when exercising?
8. Explain what happened to your respiratory rate (breaths per minute) during exercise.
9. Explain what happened to your respiratory rate during the resting period after exercise.