

Homeostasis Lab

The Effects of Exercise on Homeostasis

Student Page

Objectives

Students will

- ∞ **identify conditions that need to stay constant to keep the body in equilibrium.**
- ∞ **describe how organisms maintain stable internal conditions while living in changing external environments.**

Materials

jump rope/skipping rope	thermometer
stopwatch	alcohol
cotton balls	blood pressure/heart rate kit (optional)

Background

Exercise causes many factors of **homeostasis** to kick in to maintain internal equilibrium. How exercise affects some of these factors can be determined by measuring and observing certain conditions of the human body. Some of these conditions are:

- | | |
|---|-----------------------------|
| ∞ change in skin color on arms and face | ∞ breathing rate |
| ∞ perspiration level | ∞ heart rate |
| ∞ external body temperature | ∞ blood pressure (optional) |

Prelab Notes

1. Working in groups of 2 or 3, select a student that will be able to jump rope well and will be able to maintain jumping for 8 minutes.
 - ∞ The group member jumping will stop just long enough for the needed measurements and observations to be collected.
2. Before beginning the lab make sure someone in your group will be able to measure a heart rate by taking a pulse at the wrist. (Ask Schy if you need help with this)
3. Record the resting observations and values of the person jumping rope using the following:
 - ∞ **skin color of hands and face (pale, pink, red)**
 - ∞ **perspiration level (none, mild, medium, high)**
 - ∞ **external body temperature (place the thermometer under the subjects arm pit for 1 minute; the thermometer should be directly against the skin)**
 - ∞ **breathing rate (count the number of breaths in 1 minute)**
 - ∞ **heart rate (find the pulse at the wrist and count the number of beats in 1 minute)**

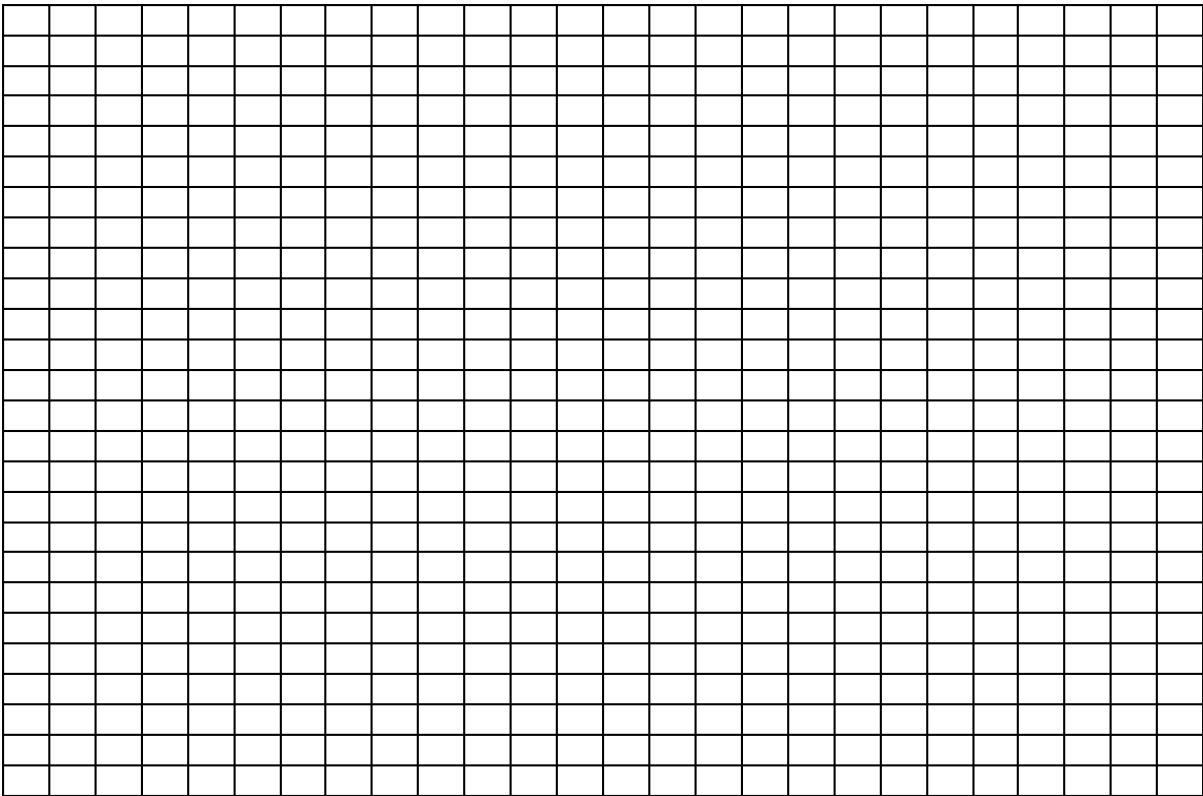
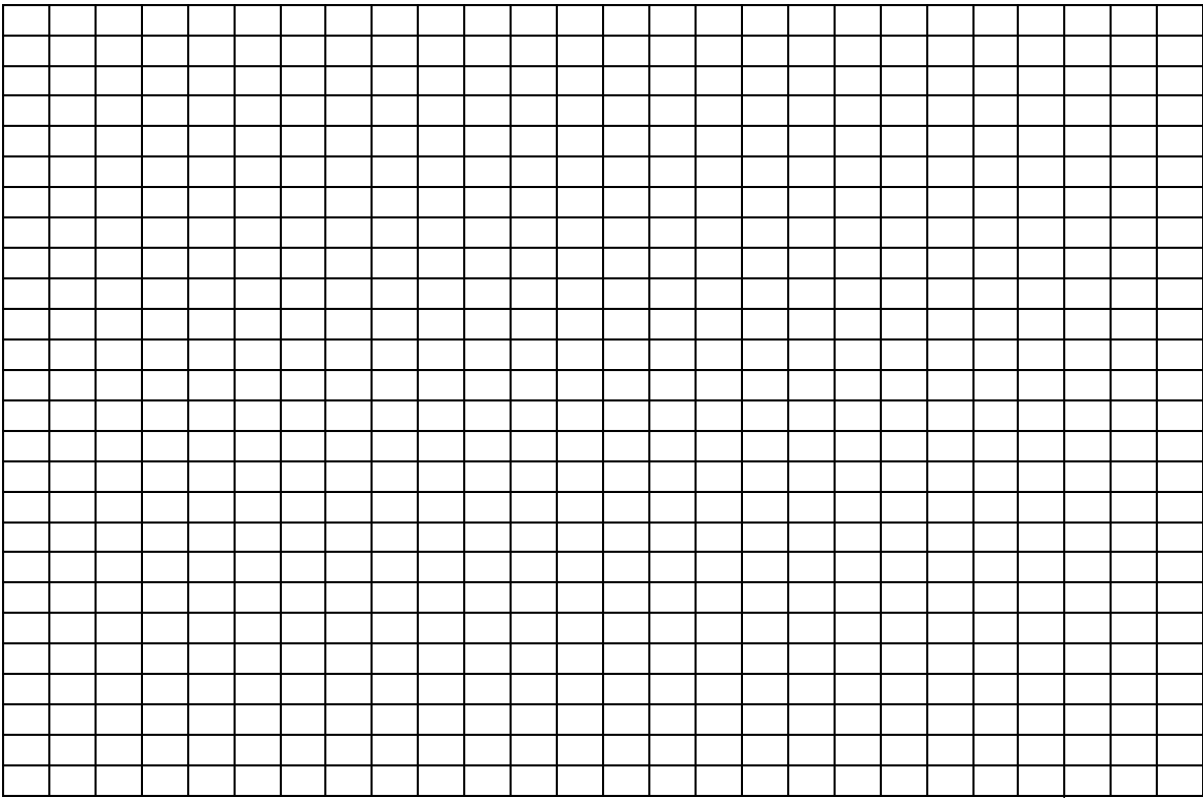
Procedure

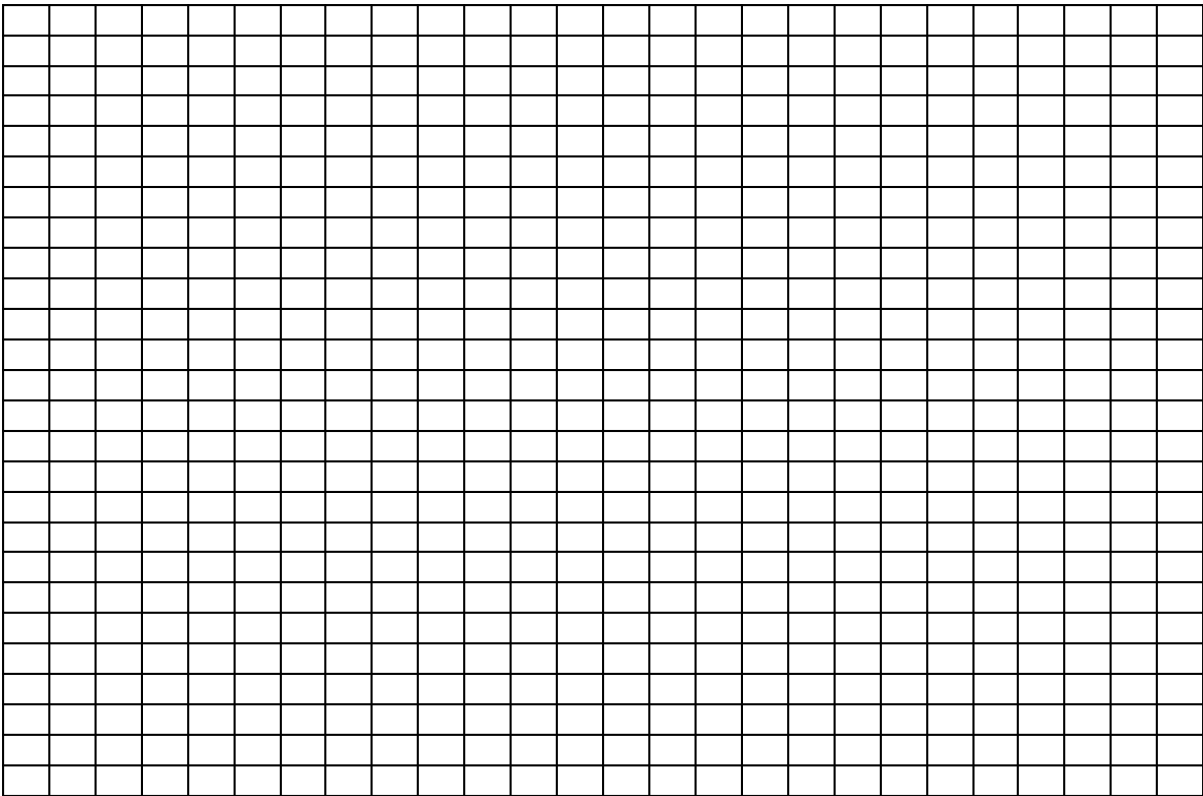
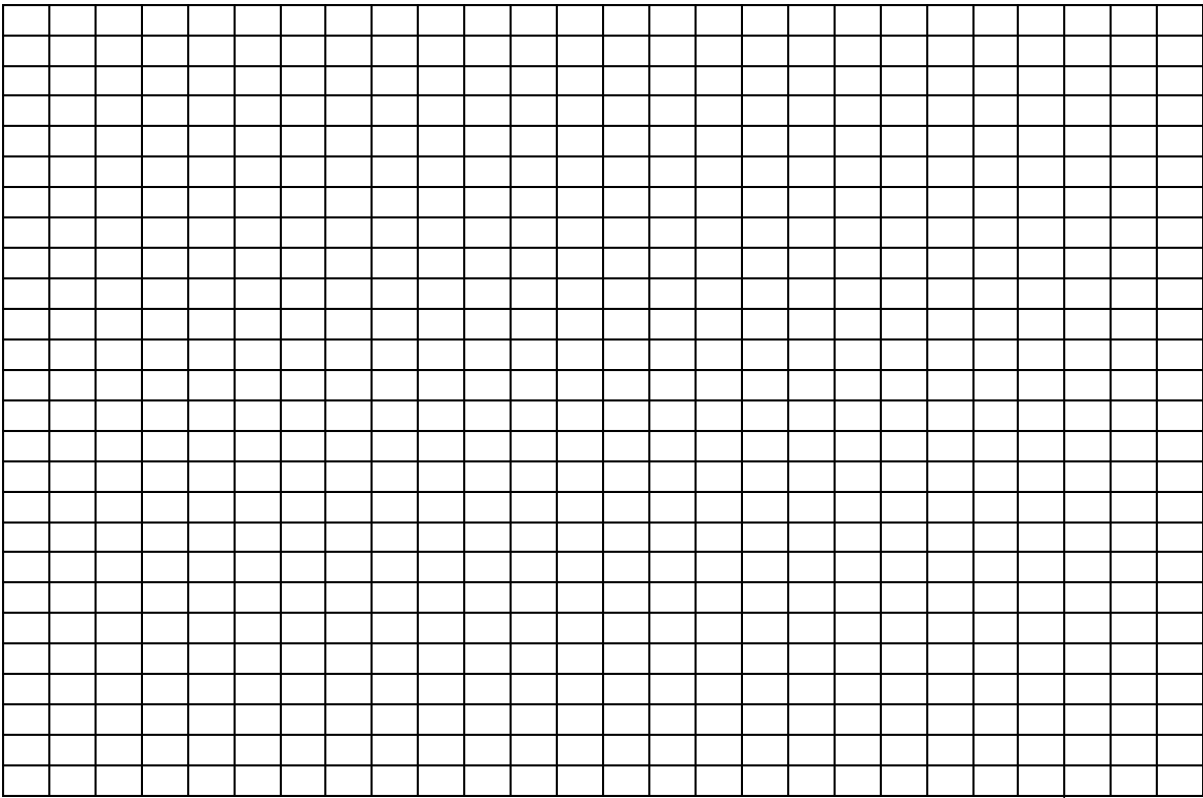
1. Make observations and measurements of the person jumping rope while they are sitting down and resting. Record your observations on the data table.
2. The student jumping rope should begin jumping when the person with the stopwatch gives the signal and continue jumping for 2 minutes . After 2 minutes **quickly** make observations and measurements and record them on the data table.
3. The student will continue jumping rope at 2 minute intervals until the 8 minute time period has been completed. After each 2 minute interval observations and measurements should be made.
4. When the 8 minutes is up, the student jumping rope will rest for 1 minute. After 1 minute, observations and measurements will be taken for the final time. Don't forget to record the data on the data table.
5. Clean the thermometer with alcohol and return it and all other lab materials to the designated area.
6. Make a separate graph for each of the following:
 - ∞ **External Body Temperature at Various Intervals of Exercise**
 - ∞ **Breathing Rate at Various Intervals of Exercise**
 - ∞ **Heart Rate at Various Intervals of Exercise**
 - ∞ **Blood Pressure at Various Intervals of Exercise (optional)**
7. Answer the questions in the conclusion section to describe and explain the results of the lab.

Data:

Observations and Measurements During Various Intervals of Exercise

Time Intervals	Body Color (pale, pink, red)	Perspiration Level (none, mild, medium, high)	Body Temperature (degrees F)	Breathing Rate (#breaths/1 min)	Heart Rate (#beats/min)
Rest					
2 Minutes					
4 Minutes					
6 Minutes					
8 Minutes					
Rest After Exercise 1 Minute					





Conclusion:

- 1. There were many changes you recorded in this lab. In response to what stimuli did the body make these changes?**
- 2. What part of your body is your “thermostat”? What does your body do to air-condition/cool itself off? (Though we did not observe this in the lab...) What do you think your body does when it “turn on the furnace?”**
- 3. What specific changes did the body go through in order to maintain homeostasis of body temperature?**
- 4. Homeostasis means “keeping a stable internal environment,” so why do you think a change in body temperature occurred?**
- 5. Why do you think an increased breathing rate accompany exercise?**
- 6. Why do you think an increased heart rate accompany exercise?**
- 7. If we conducted the opposite experiment, and instead made a person stand in the freezing cold for 8 minutes, what type of results do you think we would see?**

