



Unit: The Characteristics of Life

Lesson Plan 6: Characteristic 3: Organisms Must Maintain Homeostasis

Objective(s):

Students will be able to:

- Define key terms (homeostasis, metabolism)
- Give examples of how organisms maintain homeostasis

Materials:

- Video from Discovery Education: (Subscription Required) Metabolism and Homeostasis. Distribution Access. 1998. Discovery Education. 15 December 2009. <<http://streaming.discoveryeducation.com/>>.

Anticipatory Set:

The third characteristic of all living organisms is that all organisms must be able to maintain homeostasis. Have you ever wondered why it is you sweat after exercising or your body shivers when you're standing in the cold?

Lesson:

- I. PowerPoint presentation
Have students take notes.
- II. Video

Lab Activity:

Homeostasis Lab: The effects of exercise on homeostasis

Evaluation:

- Lab observations
- Quiz on vocabulary



Characteristics and Classification of Organisms Part 5

Characteristic 3: Organisms must maintain homeostasis

•**Homeostasis:**

- the ability for organisms to maintain an internal balance needed for survival

•**Metabolism--:**

- the conversion of potential energy to chemical/usable energy
 - Based on the organism's need, homeostasis regulates how much energy is used or stored.



Homeostasis Lab

The Effects of Exercise on Homeostasis

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
- perspiration level
- external body temperature
- breathing rate
- heart rate
- blood pressure (optional)

Pre-Lab Notes

1. Working in groups of 3 or 4, 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 obtain readings from the blood pressure kit or machine if you are doing this part of the lab. Follow directions for the specific kit your school will be using.
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 subject's 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.)
- blood pressure (Use the blood pressure monitor to get a reading.)

Procedure

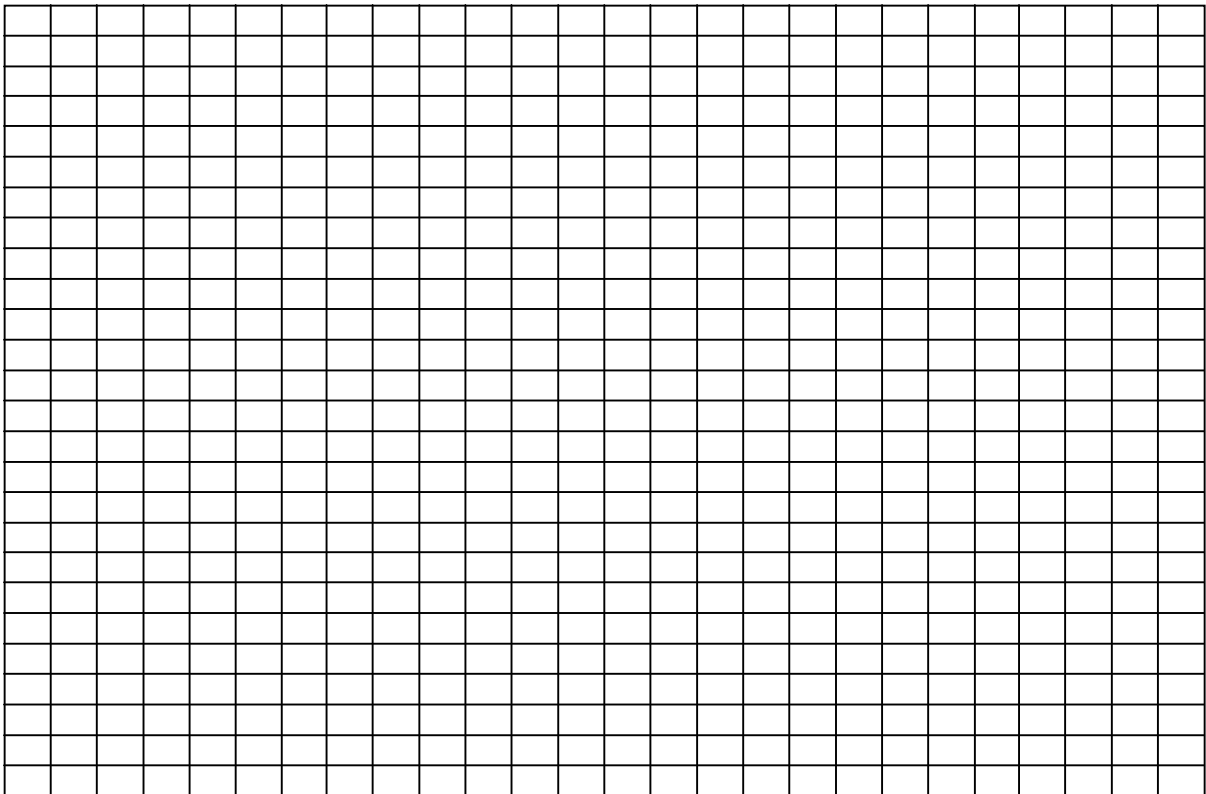
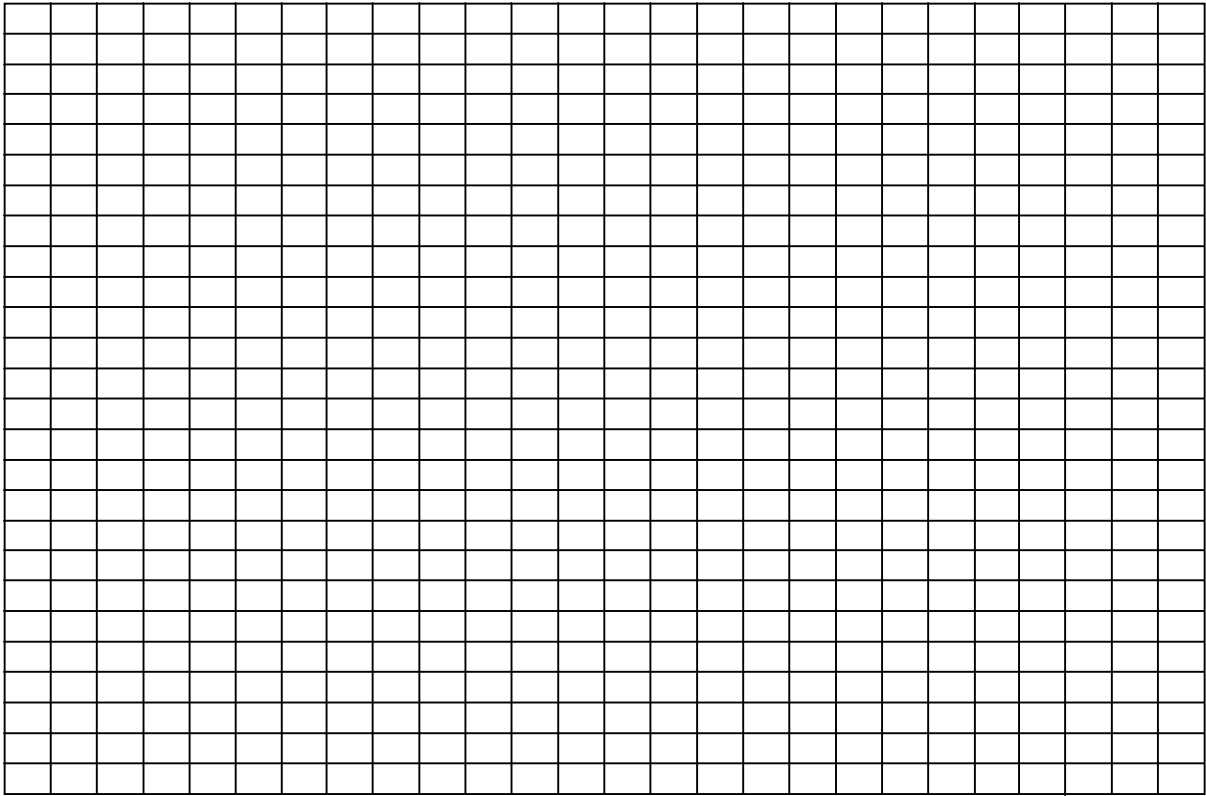
1. Make observations and measurements of the person jumping rope while he/she is sitting down and resting. Record your observations on the data table.
2. The student jumping rope should begin jumping when the person with the stopwatch gives the signal and continue jumping for 2 minutes. After 2 minutes, **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.

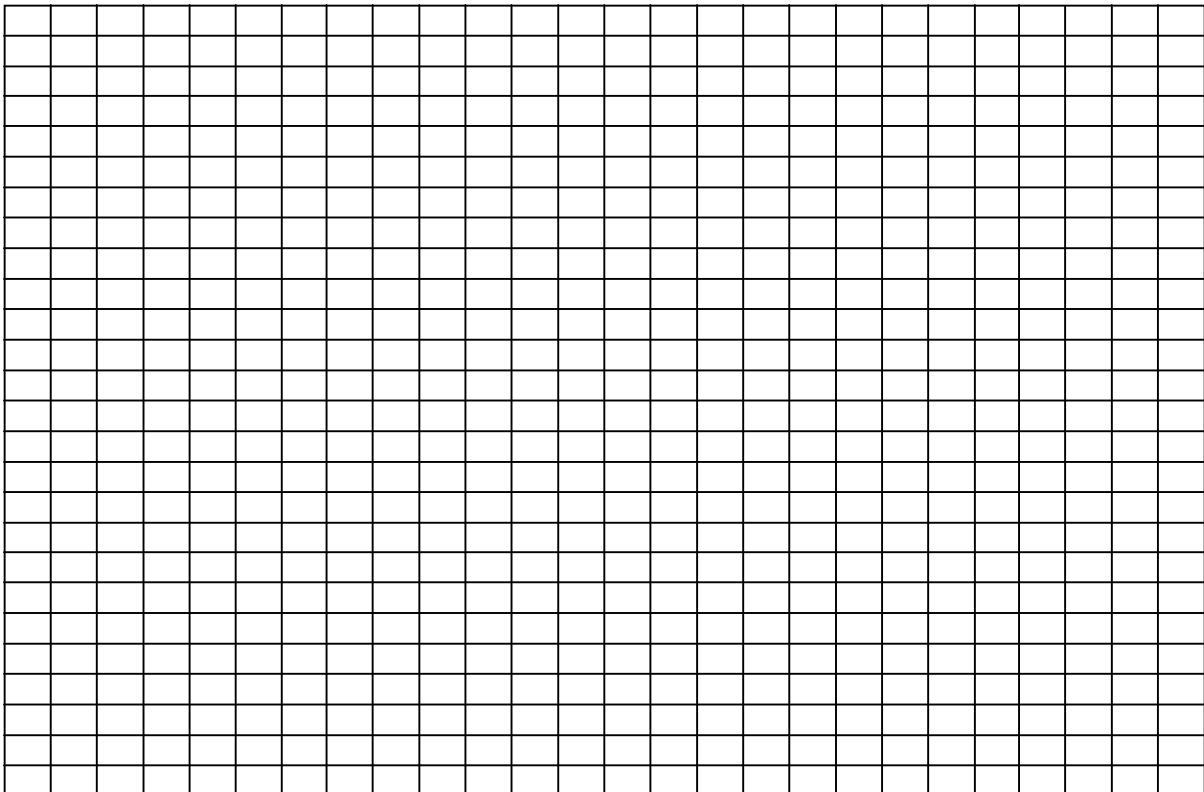
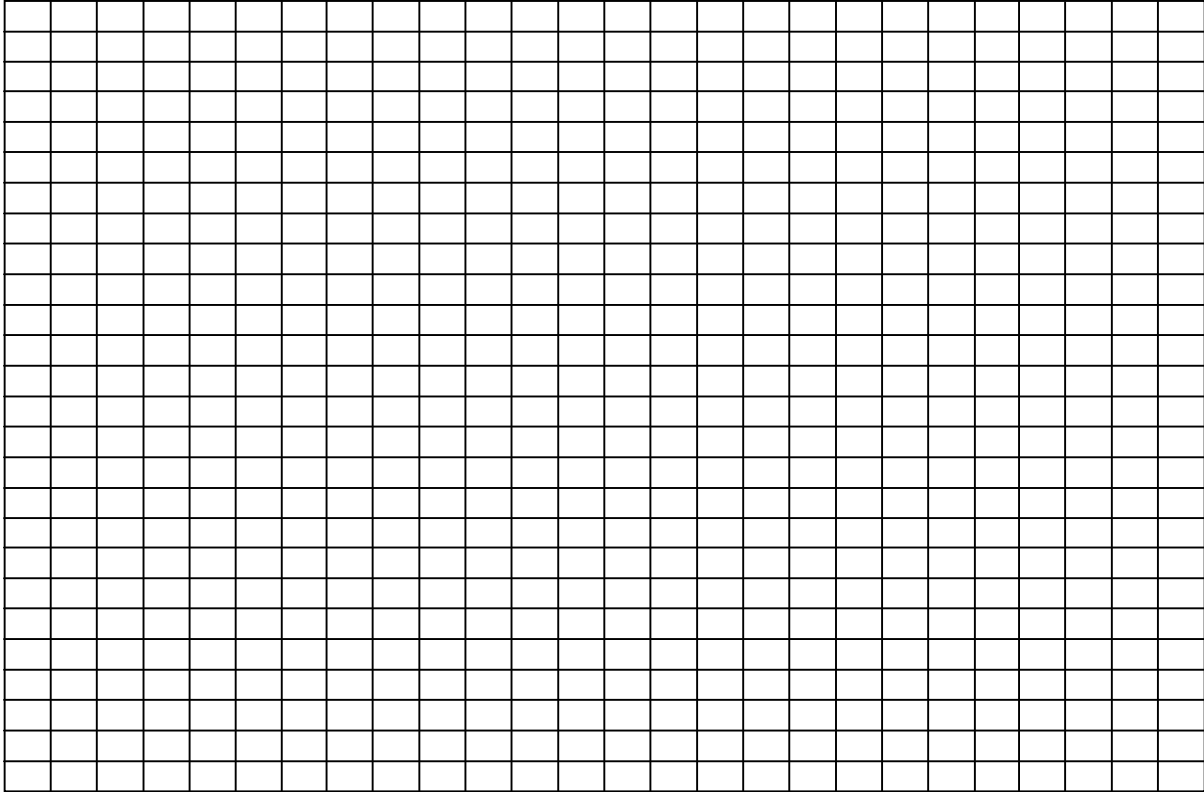


Data:

Observations and Measurements During Various Intervals of Exercise

Time Intervals	Body Color	Perspiration Level	Body Temperature	Breathing Rate	Heart Rate	Blood Pressure
Rest						
2 Minutes						
4 Minutes						
6 Minutes						
8 Minutes						
Rest After Exercise 1 Minute						





**Conclusion:**

1. What caused the changes you observed in the body color and perspiration level?
2. How do the changes help the body adjust to maintain equilibrium (homeostasis)?
3. Why do you think a change in body temperature occurs?
4. Your body uses which mechanisms to maintain a constant body temperature?
5. Why does an increased breathing rate accompany exercise?
6. Why does an increased heart rate accompany exercise?
7. Write a paragraph about the conclusions you can draw about your body's ability to maintain equilibrium (homeostasis). Be sure to include the answers to the questions above.



Name: _____

Date: _____

Quiz: Organisms Maintain Homeostasis*Direction: Rewrite each sentence to make it true.*

1. Metabolism is an organism's way of maintaining an external balance.

2. Homeostasis is the conversion of potential energy into usable energy.

3. When a person sweats or shivers, it is their body maintaining metabolism.

4. Metabolism has no means of regulation.



Name: _____

Date: _____

Quiz Answers: Organisms Maintain Homeostasis*Direction: Rewrite each sentence to make it true..*

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Homeostasis is an organism's way of maintaining an internal balance.

2. Homeostasis is the conversion of potential energy into usable energy.

Metabolism is the conversion of potential energy into usable energy.

3. When a person sweats or shivers, it is their body maintaining metabolism.

When a person sweats or shivers, it is his/her body maintaining homeostasis.

4. Metabolism has no means of regulation.

Homeostasis regulates an organism's metabolism.