Overview

You will learn how the human body self-regulates to maintain a stable internal environment despite changes in the external environment -- a process called homeostasis. You will begin by looking at how the human body regulates temperature and the value of a fever in fighting infection. Then you will use an interactive Web activity to explore other ways in which the body maintains homeostasis, such as by controlling heart rate, respiration rate, blood sugar levels, and blood pressure. Another Web activity to discover how infection can upset homeostasis and how the immune system fights infection follows. Finally, you learn how exposure to extreme environment conditions -- such as high altitude -- can affect the body's ability to maintain homeostasis.

Objectives

- Understand how the human body regulates temperature and how a fever fights infection
- Explore ways in which the human body self-regulates to maintain homeostasis
- Learn how the immune system fights infection
- Explore how an extreme environment can affect the body's ability to maintain homeostasis

Suggested Time

- Two class periods

Multimedia Resources

- Fever! QuickTime Video
- Function of Fever JPEG Image
- Body Control Center Flash Interactive
- Fighting Back Shockwave Interactive
- Body Breakdowns HTML Interactive

Materials

- Temperature recording forehead strips
- Alcohol swabs (for cleaning thermometers after each use)

The Lesson

Part I

1. Answer the questions in Part 1 on your answer sheet:

2. Take the temperatures of each person at the table by putting a thermometer strip on their forehead and report it to the class chart on the board.

Plot these temperatures on a graph.
Find the average and the degrees of variation.
Part 2

Look at the Fever! video and examine the Function of Fever still image. Then discuss the questions on your answer sheet with the others at your table. Write answers to each question.

Part 3

Do the Body Control Center Web activity. Answer the questions in the answer sheet.

Part 4

Explore the Fighting Back Web activity. Answer the questions on the answer sheet.

Part 5

Discuss at the table what happens when the body's ability to self-regulate breaks down. Then explore the Body Breakdowns Web activity to find out how climbing at high altitude affects the body's homeostasis. Answer the questions on the answer sheet.

Part 6

Choose a problem you have had with body regulation behavior and explain the experience with this behavior, using what you have learned about homeostasis in this lesson. Write your answer on the answer sheet.
HOMEOSTASIS IN THE HUMAN BODY

Name ___________________________________________            Hr __________                Date ____________

Part 1

1. Answer the following questions:

What is considered to be normal body temperature? _________________

Do you think that normal body temperature is as high as the temperature on a hot summer day? _________________

How do you think an organism and its cells would be helped by a warm temperature? _________________

2. Take the temperatures of each person at the table by putting a thermometer strip on their forehead. Report them to the class by writing the temperatures on the chart on the board. Copy the temperatures on to the chart below and then onto the graph.

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<thead>
<tr>
<th>Temp</th>
<th># of People</th>
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Why do you think there is so little difference in normal human body temperature while humans vary so much in other traits?

____________________________________________________________________________________________
Part 2
Answer the questions below after viewing the Fever! video and examining Function of Fever.

1. What sets body temperature? ____________________________________________

2. What can change the set point for body temperature? ________________________

3. How does stress affect body temperature? ________________________________

4. How is fever different from a simple rise in body temperature? ______________________

5. What role might fever play in fighting infection? ____________________________

6. Why does the body sweat when a fever breaks? ___________________________

7. In what other ways does the body self-regulate? ____________________________

Part 3 - Answer after viewing the Body Control Center

1. What is homeostasis? _________________________________________________

2. What controls human heart rate? ______________________________________

3. Under what conditions does heart rate change? __________________________

4. How is respiration rate controlled? ____________________________________

5. Could you hold your breath indefinitely? ________ What would happen? __________

6. In what different ways does the body control temperature? ____________________

7. How does the body maintain a steady level of sugar in the bloodstream? __________________

8. What happens if it is unable to regulate blood sugar? _____________________

9. What factors control blood pressure? ____________________________________
Part 4

Part 4 - Answer after doing the **Fighting Back Interactive**

1. How does an invasion of bacteria affect the body's normal balance? ____________________________________________________________

2. How does the immune system fight an invasion? ____________________________________________________________

Part 5 - Answer after working with the **Body Breakdowns Interactive**

1. Choose one part of the body from the diagram. ___________________________ Explain your ideas about
   A) how high altitude results in a problem ____________________________________________________________
   B) the symptoms that the problem would produce ____________________________________________________________
   C) how a specific action would relieve the problem ____________________________________________________________

2. Consider what you know about how the human body regulates itself. What do you think might be happening in a body that results in intense cramps with diarrhea? ____________________________

3. What do you think are two significant challenges the human body faces at very high altitude? Give reasons for choosing these.
   A. ___________________________________________________________________________________________
   B. ___________________________________________________________________________________________

Part 6

Explain a regulatory problem you have had. ____________________________________________________________

_____________________________________________________________________________________

_____________________________________________________________________________________