



High School Science Virtual Learning

Biology

Homeostasis

April 13, 2020



Biology

Lesson for April 13th

Daily Objective: I can define homeostasis and describe what it is.

Bell Ringer Activity

1. If you apply an ice pack to an injury ankle, will your body temperature decrease?
2. Why or why not?



Bell Ringer Activity Answers

1. If I apply an ice pack to an injury ankle, my body temperature will continue to be maintained at about 98.6 degrees Fahrenheit.
2. When my body senses that it is cold, it takes action to keep my temperature up.



Let's Get Started!

Lesson: Homeostasis - What is it and why is it important?

All organisms need to keep their internal environment relatively stable, even when external conditions change dramatically. This condition is called homeostasis. Homeostasis is the ability to maintain constant internal conditions when outside conditions change. If balance is shifted or disrupted and homeostasis is not maintained, the results may not allow normal functioning of the organism. If homeostasis is disrupted, it must be controlled or a disease/disorder may result. For most organisms, any breakdown of homeostasis may have serious or even fatal consequences.

Lesson Continued: Homeostasis

Watch this video and answer the following questions:

1. What is homeostasis?
2. Why is homeostasis important?





Lesson continued: Feedback Mechanisms

Homeostasis depends on the ability of your body to detect and oppose changes to your internal state. Feedback mechanisms help maintain homeostasis.

Read the follow text about [Feedback Mechanisms](#).

Afterwards, fill in the following blanks:

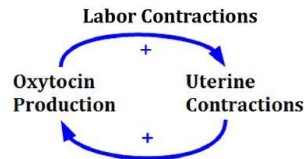
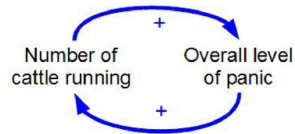
3. Negative feedback is a control system that helps the body maintain homeostasis by sending a signal to _____ a response.
4. _____ feedback is the type of control system in effect when you feel hungry and eat.
5. Positive feedback is a control system that sends a signal to _____ a response.
6. Childbirth is another example of _____ feedback.

Lesson continued: Negative and Positive Feedback

Watch this short video to see how [Positive And Negative Feedback Loops](#) work.

POSITIVE FEEDBACK MECHANISMS

- A positive feedback mechanism **ENHANCES** the original stimulus to **ACCELERATE** activity
- Integrator triggers a move in the **SAME DIRECTION** triggering an “explosive” response
- Positive feedback mechanisms are less common
 - Examples: blood clotting, childbirth (oxytocin)



NEGATIVE FEEDBACK MECHANISMS

- Most control mechanisms in the human body are negative feedback mechanisms
- A negative feedback mechanism **DECREASES** the intensity of the stimulus or eliminates it
- When a variable is above or below set point, integrator triggers a move in the **OPPOSITE DIRECTION** to reach the set value
- Ex: body temperature, blood pressure, pH & CO₂ levels, blood glucose levels

Lesson Answers:

1. Homeostasis is the ability to maintain constant internal conditions when outside conditions change.
2. Homeostasis is important because if it is disrupted, a disease or disorder may result.
3. Negative feedback is a control system that helps the body maintain homeostasis by sending a signal to stop a response.
4. Negative feedback is the type of control system in effect when you feel hungry and eat.
5. Positive feedback is a control system that sends a signal to increase a response.
6. Childbirth is another example of positive feedback.

Practice

Complete the following questions using the information you learned during the lesson activity.

Questions:

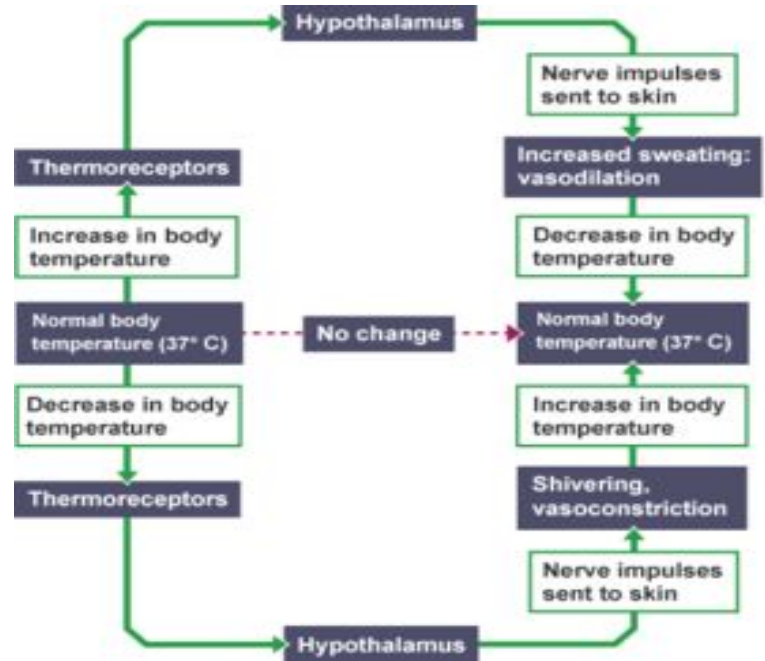
1. Which of the following is a good definition of homeostasis?
 - A. Homeostasis means that our body monitors the value of several parameters and prevents them from ever changing.
 - B. Homeostasis means that our body doesn't regulate the value of different body parameters.
 - C. Homeostasis means that our body monitors the value of several parameters and restores them to their correct value after any alteration.
 - D. Homeostasis means that we stand still all the time.



2. Which of the following variables do our bodies regulate:
- A. Salt concentration in blood
 - B. Glucose concentration in blood
 - C. Body temperature
 - D. Blood volume
 - E. All answers are correct

3. What type of feedback loop is shown?

- A. Positive
- B. Negative
- C. Neutral





4. Which of the following is an example of positive feedback to indirectly maintain homeostasis?
- A. the chemical reactions involved in blood clotting
 - B. your blood vessels dilate and you begin to sweat in response to elevated body temperature
 - C. your blood vessels constrict and you begin to shiver in response to low body temperature
 - D. your coach compliments you on your performance in practice



5. When glucose levels in the blood rise, your brain sends a signal to your pancreas. The pancreas releases insulin, which opens channels in cell membranes to allow glucose to enter the cell, lowering blood sugar levels.

- A. Positive Feedback
- B. Negative Feedback

Once you have completed the practice questions check with the **answer** key.

1. C- Homeostasis means that our body monitors the value of several parameters and restores them to their correct value after any alteration.
2. E- All answers are correct
3. B-Negative
4. A- the chemical reactions involved in blood clotting
5. B-Negative Feedback

Common Misconceptions

- “Negative feedback is detrimental for the body; positive is better for the body.” This is not true; the use of the terms “positive” and “negative” in this context does not mean good or bad.
- “Negative feedback means less.” This is not true; negative in this context is not a lesser amount.
- “Homeostasis means that the body always does what is best for itself.”- Not always. Homeostasis is the ability to *maintain constant* internal conditions. However, sometimes the constant the body is maintaining is not ideal. Such as when the body maintains a high blood pressure.

More Practice- Online homeostasis [simulation](#)

Click on the link above to do more practice!

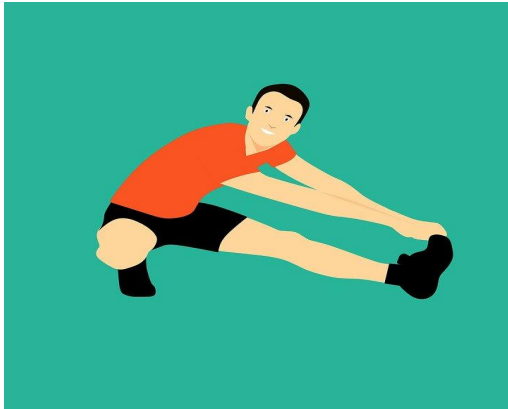
In this activity, it's up to you, not the body, to maintain homeostasis in a virtual person. Monitor the displays and use the controls to keep the indicators centered. But don't become complacent when you achieve a balance. Our subject will randomly change states—from standing, to running, to resting—and throw off your settings!



More Practice- Online Scavenger Hunt

[Worksheet](#)

1. Click on the worksheet.
2. Use the links on the worksheet to help you fill in the blanks
3. Check you work using the answer key when completed.



[Answer Key](#)



Additional Resources

[Homeostasis and Negative/Positive Feedback](#)

[Homeostasis and Feedback](#)

[Why is homeostasis important?](#)