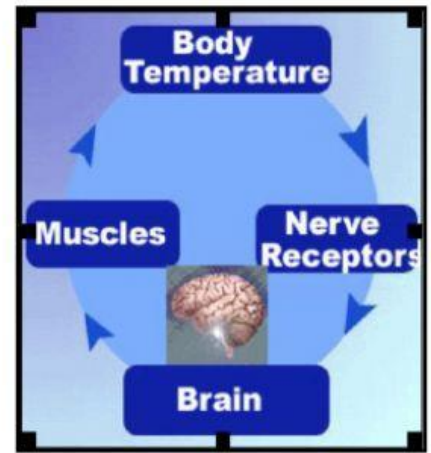




Name: \_\_\_\_\_ Date: \_\_\_\_\_

## External and Internal Stimuli

- 1 Imagine you and your family take a camping trip to Colorado. Your father is trying to build a fire. He asks you to collect some sticks for the fire. While you are searching, you meet a huge bear. What is your immediate reaction? Run! This is a result of external stimulus. An external stimulus is a stimulus that comes from outside an organism and causes a reaction. When you see the bear, your brain recognizes danger. It triggers fear and the fight or flight response. You know that you cannot fight the bear and win. Your brain triggers the “flight mode” option, so that you can flee danger immediately.



- 2 Another example of external stimulus is temperature. When it is cold outside, your response is to get warm by putting on a jacket. There are internal stimuli as well as external. An internal stimulus is a stimulus that comes from inside an organism. Have you ever been hungry after a long day at school? That was an internal stimulus. This stimulus prompts you to eat some food in order to regain needed energy.
- 3 An animal responds to stimuli based on either learned behaviors or instinct. Learned behavior is a response to a stimulus that an animal was taught. Being able to read and write are examples of learned behavior. It is not something you are born able to do. On the other hand, instinct is a natural reaction to a stimulus that is automatic instead of taught. This can be seen especially in wildlife. All animals are able to search for food and water because of instinct.
- 4 Instinct and learned behaviors are responses that allow the body to survive. Without external and internal stimuli, your body would not be able to maintain homeostasis. Homeostasis means that organisms tend to regulate their internal environment, for example temperature. Homeostasis works to keep conditions constant even though external conditions change. Basically, it keeps the body in balance with the environment. The thermostat in your home provides a good example of homeostasis. In the winter, you probably set your thermostat to about 75 degrees Fahrenheit to stay warm inside. Whenever the house temperature falls below 75 degrees, the thermostat will turn on. The heat will stay on until it is the target temperature. This is similar to how the body works.





- 5 Homeostasis works because there are receptors that monitor your body and respond to changes. While playing a game of basketball, you may become very hot. You may start to sweat. This is a response to receptors that monitor body temperature so that it does not become too hot or too cold. Without these receptors and the mechanisms of homeostasis, your body could overheat. Temperatures that are too hot can kill cells in your body. This could lead to death.
- 6 All organisms must be able to maintain homeostasis. They do not all have the same homeostatic mechanisms as humans do, however. Plants do not run away from bears. They do not have the flight or fight response that humans and animals have. Water and sunlight are the main needs of plants. This is similar to a human's need for water and food. Tropism is a special homeostatic mechanism that plants have. Tropism is a growth response of a plant to an external stimulus. What kind of stimulus could this be? Examples are weather, touch, gravity, or light. Responses can be positive or negative. A positive response means the plant grows toward the stimulus. A negative response is when it grows away from the stimulus.
- 7 Two examples of tropism are gravitropism and phototropism. Gravitropism is a plant's growth response to gravity. Ideally, roots should grow down into the ground to absorb water for a plant. Its stems and leaves should grow upward above the ground to absorb light. If a plant were to lose its upright position, it might not be able to get water and sunlight. When this occurs, a plant will begin to bend so that it is upright once again. How is this possible? Plants have a special hormone called auxin that plays an important part in gravitropism. If the plant fell over, the auxin would settle on the lower side of its stem. This would make the cells on the lower side of its stem grow longer. This makes the stem bend toward the sky. At the same time, auxin keeps root cells short so roots bend down deeper into the soil. This special homeostatic mechanism enables the plant to get water and light no matter what its position.
- 8 Phototropism is a plant's response to light stimulus. It is also regulated by the plant hormone auxin. When the Sun shines down on a plant, auxin will move to the darker side of the plant. This makes the cells on the dark side of the plant get longer. The other side of the plant remains the same. The plant will bend toward the Sun. This allows a larger amount of light to hit the leaves. The leaves are then able to use this light for photosynthesis to make food.
- 9 The human body is built to survive. However, our environment is constantly changing. Without homeostasis, the body would not be able to keep adjusting. Without homeostasis, there would be no internal stimuli to prompt you to eat when your body is lacking energy. There would be no mechanisms to keep your body temperature constant. You might get too hot or too cold. Plants would not be able to make their own food without phototropism or gravitropism. Homeostasis relies on instinct and learned behavior.



# Reading Science

- 1** Which action describes a response to internal stimuli?
  - A** catching a ball at a baseball game
  - B** drinking when you are thirsty
  - C** running at the sight of a wild lion
  - D** writing a thank you note
  
- 2** Based on the context, stimulus refers to \_\_\_\_\_.
  - A** outside reactions that monitor your bodily systems
  - B** the temperature of the body
  - C** food that gives your body energy
  - D** a thing or event that causes a reaction
  
- 3** A houseplant is placed on a window sill that gets direct, bright sunlight every afternoon. The plant starts to grow toward the window. What kind of response is described by situation?
  - A** A negative response to a stimulus
  - B** A learned behavior
  - C** Gravitropism
  - D** Phototropism



- 4** What can the reader conclude about homeostasis?
- A** Only multicellular organisms maintain homeostasis.
  - B** Without receptors, an organism cannot maintain homeostasis.
  - C** Learned behaviors are not important for an organism to maintain homeostasis.
  - D** Plants only need to respond to internal stimuli to maintain homeostasis.
- 5** What is the best summary of this passage?
- A** An external stimulus comes from outside the organism. Animals respond to stimuli through learned behaviors and instinct.
  - B** Stimuli trigger responses in organisms that allow them to maintain constant internal conditions through homeostasis.
  - C** There are internal stimuli as well as external.
  - D** Phototropism is a plant's response to turn toward light. Gravitropism is a plant's response to grow upward against gravity.