

THE NERVOUS SYSTEM PART 1

Keep going! Read the text below. Then, answer the questions that follow.

The brain also coordinates the body's responses. A message from the brain will travel through the spinal cord. Then it will travel through nerves in the **peripheral nervous system**. This system includes all of the nerves outside of the central nervous system. The nerves in the peripheral nervous system are the communication pathway between the brain and spinal cord and the other parts of the body.

NEURONS AND RECEPTORS

There are three different types of neurons in the human body. They work together to detect, transmit, and send impulses to coordinate your response to stimuli.

- **Sensory neurons** pick up a stimulus in the environment, convert it into a nerve impulse, and send a message to the brain.
- **Interneurons** make up the majority of the neurons in the body. As the "middle man" of the nervous system, interneurons transmit impulses to and from the central nervous system.
- **Motor neurons** send messages from the brain to the other cells in the body to initiate movement.

Sensory neurons, sometimes called sensory **receptors**, can be further classified by the type of stimuli they detect. **Mechanical** receptors found in the skin and ears detect touch and sound. These receptors detect the sound of your alarm clock ringing. **Electromagnetic** receptors in the eyes detect changes in light, helping you see the time on your alarm clock. **Chemical** receptors in the nose and mouth detect substances and allow you to smell and taste.

Now let's consider what happens when your alarm clock sounds. Sensory neurons detect the sound of your alarm, which is converted to a nerve impulse. This impulse travels from the sensory neurons to interneurons and then to the brain. The brain sends a message via the motor neurons to your eyelids and body, causing you to turn over, open your eyes, and reach out and press the snooze button on the alarm.

Show what you know! Use the reading to answer the questions below.

1. What is the primary function of the nervous system? **(Sample answer) The primary function of the nervous system is to coordinate everything happening in the body.**

2. Neurons are made up of three main parts. Describe the function of each part.

a. axon: **part of the neuron that carries impulses away from the cell body**

b. cell body: **control center of the neuron that contains the nucleus**

c. dendrite: **part of the neuron that receives impulses from other cells**

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Keep going! Use the reading to answer the questions below.

3. What is myelin, and what is its function in the neuron?

(Sample answer) Myelin is a material that coats the axon. It allows nerve impulses to travel very quickly, as fast as 120 meters per second.

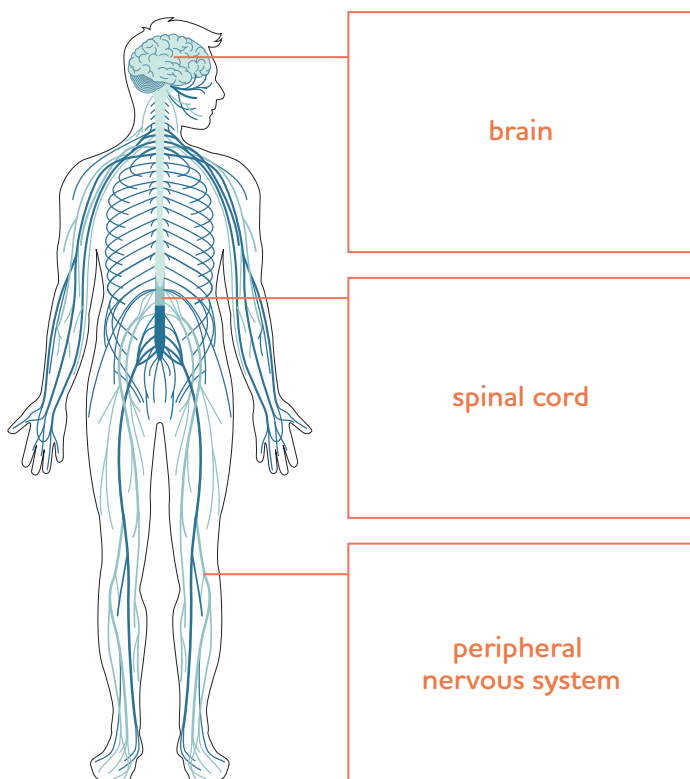
4. What is the role of a neurotransmitter in the nervous system? Use the vocabulary words axon, dendrite, and synapse in your answer.

(Sample answer) A neurotransmitter is a chemical signal that transmits a message across the synapse from the axon of one neuron to the dendrites of a neighboring neuron.

5. List the three main types of sensory receptors in the body. Describe what each receptor does, and provide an example of where the receptor is found in the body.

SENSORY RECEPTOR	FUNCTION	LOCATION IN THE BODY
Mechanical receptor	Detects touch and sound	Skin, ears
Electromagnetic receptor	Detects changes in light	Eyes
Chemical receptor	Detects substances	Nose, mouth

6. Identify the major components of the nervous system on the diagram below.



7. Breakfast smells good! You follow the smell and walk to the kitchen. Describe how a nervous impulse, or message, travels along a network of neurons from your nose to your brain and back out to your muscles, causing movement. Identify the types of receptors involved in detecting the stimulus, transmitting the nerve impulse, and generating a response.

(Sample answer) Chemical receptors in the nose detect the smell from the kitchen. A nerve impulse is generated that travels from sensory neurons in your nose via interneurons to the brain. A message from the brain is sent to the motor neurons that directs your legs to walk to the kitchen.
