Turning Toward Sound

Trace how neuron signals connect attention to action.

PS.2.3 "Identify the parts of a neuron and explain how the process of neural transmission affects behavior and mental processes."

NAME _____ DATE _____

1 READ AND MARK

Read it twice

YOUR JOB Underline the named parts of a neuron, circle the description of how a signal passes between neurons, and number the events from hearing your name to turning your head.

A Voice in the Cafeteria

1. At lunch, you hear your name through the clatter of trays. Sound waves reach your ears, where specialized receptor cells help start signals in sensory neurons. These neurons carry information toward the brain. Your brain processes many sounds, but the sound of your name can capture your attention. Other neurons help you recognize the voice and decide whether to respond. Motor neurons then send signals toward neck muscles, and you turn your head. This everyday sequence depends on many neurons working in networks, not on one cell performing the whole task.

2. A neuron has dendrites, a cell body, an axon, and axon terminals. Dendrites receive signals from other neurons. The cell body integrates incoming signals, and if conditions reach a threshold, an electrical impulse begins near the start of the axon. The impulse travels along the axon toward its terminals. On many axons, a fatty covering called myelin helps the impulse travel more quickly and reliably. A delay or disruption in signals to motor neurons could slow your turn toward the voice. The parts work together to move information through a network, from incoming messages toward an action.

3. An electrical impulse does not simply leap from one neuron into the next. At an axon terminal, it can trigger the release of neurotransmitters into a tiny gap at a synapse. These chemical messengers bind to receptors on the next cell and can make that cell more or less likely to send its own impulse. In the brain, patterns of activity across many connected neurons help you focus on the familiar voice rather than nearby conversations. Connected pathways can link that moment of attention to a choice and, eventually, to the muscle movement of turning.

2 ANSWER WITH EVIDENCE

Use the passage

1. If the dendrites of a brain neuron did not receive signals about the sound, how might that affect your ability to notice your name?

2. If myelin on an axon in the pathway to your neck muscles were damaged, what might change about your response, and why?

3. How do axon terminals and neurotransmitters help a signal continue through neurons involved in turning your head?

4. How does focusing on your name instead of nearby conversations show that neural transmission affects a mental process?

3 YOUR TURN

Your own words

Choose an everyday event other than hearing your name and turning your head. In four or five sentences, explain how signals move through at least three named neuron parts and across a synapse, then connect that transmission to a thought or feeling and a visible action.

Turning Toward Sound

PART 1 · READ AND MARK

Underline the named parts of a neuron, circle the description of how a signal passes between neurons, and number the events from hearing your name to turning your head. Accept any marking that follows this job and points at the right text.

PART 2 · ANSWERS

#	QUESTION	ANSWER
1	If the dendrites of a brain neuron did not receive signals about the sound, how might that affect your ability to notice your name?	**The neuron would receive less information about the sound, which could make it harder for the brain network to notice the name.**
2	If myelin on an axon in the pathway to your neck muscles were damaged, what might change about your response, and why?	**You might turn your head more slowly because myelin helps impulses travel quickly and reliably along axons.**
3	How do axon terminals and neurotransmitters help a signal continue through neurons involved in turning your head?	**An impulse reaches an axon terminal and can trigger neurotransmitter release at a synapse. The neurotransmitters affect whether the next cell sends an impulse.**
4	How does focusing on your name instead of nearby conversations show that neural transmission affects a mental process?	**Patterns of activity across connected brain neurons help direct attention to the familiar voice.**

PART 3 · YOUR TURN (SAMPLE ANSWER)

When I see a bike roll toward me, sensory neurons send information from my eyes toward my brain. Dendrites on brain neurons receive signals, and cell bodies integrate them before impulses travel along axons. At axon terminals, neurotransmitters cross synapses and affect the next neurons. Activity across brain networks helps me realize the bike is close and feel alarmed. Signals through motor neurons reach my leg muscles, and I step aside.

Accept other accurate effects of disrupted signaling if the student connects the named neuron part to attention or movement. For Part 3, look for at least three correctly used neuron parts, chemical signaling across a synapse, a mental process, and a visible action.