A Split-Second Response

Trace how the brain and spinal cord work together.

HAP.6.3 "Discuss the structure and function of the brain and spinal cord."

NAME _____ DATE _____

1 READ AND MARK

Read it twice

YOUR JOB Circle one mention each of the cerebrum, cerebellum, brainstem, and spinal cord. Underline a phrase that tells what each one does, then give each structure and its matching phrase the same number.

The Tipping Tray

1. During a crowded school lunch, Maya brushes her hand against a hot serving tray. Heat and pain receptors in her skin send signals along sensory neurons toward her spinal cord. Inside the cord, connecting neurons help route a rapid response to motor neurons. Those neurons activate muscles that pull her hand away before she has consciously decided to move it. This withdrawal is a spinal reflex. Signals also travel upward to her brain, where she becomes aware of the pain. Her spinal cord, protected inside the backbone, is both a pathway for messages and a center for some quick responses.

2. Maya then sees the tray begin to tip and decides to steady it with her other hand. Visual signals reach her brain, and the cerebrum uses that information to choose an action and start voluntary movement. The cerebellum helps adjust the timing and force of her reaching hand so it does not knock the tray farther over. Meanwhile, her brainstem continues to control automatic functions such as breathing and heart rate, even while she focuses on the tray. These regions are not isolated workers. They exchange information to turn a sudden problem into a controlled response.

3. To steady the tray, commands from Maya's brain travel down the spinal cord and out through motor neurons to muscles in her arm. Touch signals from her fingers travel back toward her brain, helping her judge whether her grip is secure. Her brain is protected by the skull, while the spinal cord extends from the brainstem down through the backbone. Both are parts of the central nervous system, but they do different jobs. The spinal cord carries signals and coordinates certain reflexes; brain regions interpret information, plan actions, refine movements, and regulate vital processes.

2 ANSWER WITH EVIDENCE

Use the passage

1. How does the spinal cord help Maya pull her hand away before she consciously decides to move?

2. How do the cerebrum and cerebellum contribute differently when Maya steadies the tray?

3. What does the brainstem keep doing while Maya focuses on the tray, and how is that job different from choosing to move her hand?

4. Why could an injury to the spinal cord disrupt both Maya's grip and her ability to feel the tray?

3 YOUR TURN

Your own words

Choose an everyday action other than handling a tray. In four or five sentences, explain how the cerebrum, cerebellum, brainstem, and spinal cord each contribute, including a signal traveling to or from the spinal cord.

A Split-Second Response

PART 1 · READ AND MARK

Circle one mention each of the cerebrum, cerebellum, brainstem, and spinal cord. Underline a phrase that tells what each one does, then give each structure and its matching phrase the same number. Accept any marking that follows this job and points at the right text.

PART 2 · ANSWERS

#	QUESTION	ANSWER
1	How does the spinal cord help Maya pull her hand away before she consciously decides to move?	**Connecting neurons in the spinal cord route signals from sensory neurons to motor neurons, which activate the muscles that pull her hand away.**
2	How do the cerebrum and cerebellum contribute differently when Maya steadies the tray?	**The cerebrum uses visual information to choose and start the movement. The cerebellum adjusts its timing and force.**
3	What does the brainstem keep doing while Maya focuses on the tray, and how is that job different from choosing to move her hand?	**The brainstem controls automatic functions such as breathing and heart rate. Choosing to move her hand is a voluntary action started by the cerebrum.**
4	Why could an injury to the spinal cord disrupt both Maya's grip and her ability to feel the tray?	**The spinal cord carries motor commands toward her arm and touch signals back toward her brain. An injury could disrupt either pathway.**

PART 3 · YOUR TURN (SAMPLE ANSWER)

As I step off a curb, touch signals from my foot travel up my spinal cord toward my brain. My cerebrum uses information about the street to decide when to take the next step and sends movement commands down the spinal cord to my legs. My cerebellum adjusts my balance and the timing of my steps. My brainstem keeps my breathing and heart rate going while I cross.

Accept other accurate everyday actions that assign distinct functions to all four structures and correctly describe a signal traveling through the spinal cord. For the marking job, accept any passage phrase that accurately matches a circled structure to its function.