

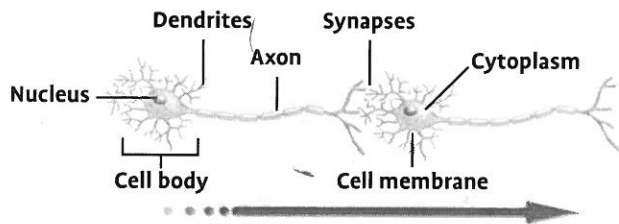
## Section 3 • Interrelationships

Student textbook, pages 144 and 145

### Neurons and Nerve Impulses

(pages 132 to 135)

1. What is the smallest living part of the nervous system? *Neuron*
2. Draw two neurons side by side.
  - a) On one neuron, show the following parts: the axon, cell body, cytoplasm, dendrites, cell membrane and nucleus.
  - b) Draw the synapses.
  - c) Use arrows to show the direction in which the nerve impulse travels in each neuron.



3. Match each of the terms below with one of the descriptions that follow:

<p><i>Axon</i>  <i>Cell body</i>  <i>Dendrite</i>  <i>Nerve ending</i></p>
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- a) Part of the neuron that contains the nucleus *Cell body*
  - b) Conductive, and longest, part of the neuron *Axon*
  - c) Excitable area of the neuron, which receives the stimulus *Dendrite*
  - d) Tip of the axon, which is filled with neurotransmitters *Nerve ending*
4. What is the name of the sheath of white matter that insulates the axon of a neuron? *Myelin sheath*

5. What is the name of the contact area between two neurons where information is transferred in the form of neurotransmitters? *Synapse*
6. Name the three properties of a neuron. *Excitable, conductive, specialized*
7. Match each type of neuron with one of the descriptions that follow:

<p><i>Motor neuron</i>  <i>Sensory neuron</i>  <i>Association neuron</i></p>
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- a) Neuron that receives and transmits a stimulus from the ears *Sensory neuron*
- b) Neuron that transmits a nerve impulse to the arm muscle to trigger a movement *Motor neuron*
- c) Neuron that sends a nerve impulse from a sensory neuron to a motor neuron *Association neuron*
- d) Neuron that propagates a nerve impulse to a gland *Motor neuron*

### The Central Nervous System and the Peripheral Nervous System (pages 135 to 140)

8. Indicate whether each of the following belongs to the central nervous system (CNS) or the peripheral nervous system (PNS):
  - a) Brain stem *CNS*
  - b) Cerebellum *CNS*
  - c) Motor nerve of the thigh *PNS*
  - d) Spinal cord *CNS*
  - e) The two cerebral hemispheres *CNS*
  - f) Auditory nerve *PNS*
  - g) Cranial nerves *PNS*

9. Who am I? Match each component of the central nervous system below with one of the following descriptions:

<i>Brain</i>	<i>Spinal cord</i>
<i>Cerebellum</i>	<i>Brain stem</i>
<i>Encephalon</i>	

- a) I am a long string of nerves that routes information from the nerves to the brain, or data from the brain to various parts of the body.  
*Spinal cord*
- b) I am an elongated part of the encephalon that connects the spinal cord to the brain. *Brain stem*
- c) I am the part of the encephalon that can produce nerve impulses so that a person can perform a movement.  
*Brain*
- d) I am the part of the central nervous system that comprises the brain, cerebellum and brain stem.  
*Encephalon*
- e) I am the part of the encephalon that processes information on balance and the body's orientation in space.  
*Cerebellum*
- f) I am the part of the encephalon that governs conscious thought, sensations, free will and memory.  
*Brain*
- g) I control vital centres such as the heart. *Brain stem*
- h) I am the source of spinal reflexes.  
*Spinal cord*

10. Which of the following elements do not protect the encephalon?

Scalp  
Myelin sheaths  
Meninges  
Bones of the skull  
Cerebrospinal fluid

*Myelin sheaths do not protect the encephalon; they insulate axons.*

### Transmission of the Nerve Impulse (pages 141 to 143)

11. Complete the following nerve impulse pathways:
- a) Pathway of a reflex arc:  
Processor ▶ *sensory nerve* ▶ *spinal cord* ▶ motor nerve ▶ muscle(s)
- b) Pathway for a voluntary movement:  
*Brain* ▶ brain stem ▶ *spinal cord* ▶ *motor nerve* ▶ muscle(s)
- c) Pathway for a sensation:  
Sensory organ ▶ *sensory nerve* ▶ spinal cord ▶ *brain stem* ▶ brain