

## Applying Concepts

### Multiple Choice

Choose the letter of the best answer.

- Which sentence best describes integration in the nervous system?
  - Sensory receptors convey signals to sensory neurons.
  - Motor neurons convey signals to muscle cells.
  - Sensory neurons convey signals to the CNS.
  - Interneurons in the CNS formulate a response.
- A nerve signal travels in what order?
  - stimulation, resting potential, action potential
  - action potential, threshold, stimulation
  - stimulation, depolarization, action potential
  - threshold, stimulation, depolarization
- Which of the following are controlled by the somatic nervous system?
  - blood pressure, body temperature, heart rate
  - emotions, sensations of pain, sense of touch
  - salivation, glucose release, relaxed airways
  - walking, standing up, throwing a ball
- Which region of the brain creates sensory perceptions?
  - thalamus
  - cerebral cortex
  - cerebellum
  - corpus callosum
- Which of the following is a perception?
  - feeling cold
  - deciding that a new food is tasty
  - pulling your finger away from a sharp object
  - all of the above
- Which part of the eye controls how much light enters through the pupil?
  - cornea
  - sclera
  - retina
  - iris
- A substance that stimulates your CNS is
  - marijuana.
  - heroin.
  - cocaine.
  - LSD.

### Short Answer

- Describe the three types of neurons and their functions.
- Summarize the knee-jerk reflex arc.
- After an action potential has passed through a section of an axon, how is the resting potential restored?
- Describe the concepts of *threshold* and "all-or-none" events in relation to action potentials.
- Choose three organs of the human body. Describe the effects of the parasympathetic and sympathetic nervous systems on each of the organs.
- Describe the difference between how your brain creates a skill memory, such as using a yo-yo, and how it creates the memory of a fact, such as an address.
- Identify three types of sensory receptors found in the skin. What is the function of each type of receptor?
- Explain why your night vision is mostly in black-and-white rather than color.
- What are three ways that drugs interfere with neuron or neurotransmitter activities at synapses?

### Visualizing Concepts

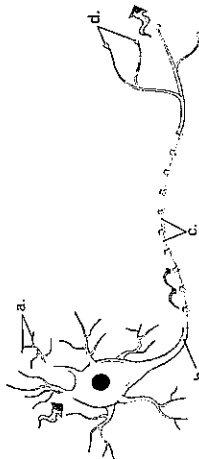
- A signal has been initiated in this axon, which has a myelin sheath. Draw the steps that will occur as this nerve signal travels along the axon. Provide a short explanation of each step.



## Applying Concepts

### Analyzing Information

- Analyzing Diagrams Review the diagram below and answer the following questions.



- Identify the parts labeled *a* and *b* and describe their functions.
- What is *c*? How would a signal travel through this neuron differently if *c* were not present?
- What is *d*? Explain what happens when an action potential reaches *d*.

- Analyzing Data Sound level is measured in decibels (dB). Many experts agree that exposure to sounds of more than 85 dB for 8 hours or more can damage hearing. Sounds of 110 dB can damage hearing in less than 15 minutes. Sounds of 140 dB can cause immediate damage.

### Decibel Levels (dB) of Various Sounds

dB	Sound
10	Normal breathing
60	Normal conversation
90	Noisy restaurant
112	Headphones (high volume)
120	Nearby ambulance siren
150	Jet engine at takeoff
162	Fireworks at about 1 meter

- Create a bar graph that depicts the data in the table above. In your graph, indicate the different ranges of sound danger.
- Explain why prolonged exposure to loud sounds can lead to hearing loss.
- Write a short public service announcement to explain threats to hearing loss and how to prevent hearing loss.

### Critical Thinking

- Comparing and Contrasting Compare and contrast your nervous system to a computer.
- Relating Cause and Effect How would a drug that inhibits the parasympathetic nervous system affect a person's pulse?
- Making Generalizations Walking home from a friend's house, Raoul is confronted by a large puddle. He decides to leap across it. Which regions of his brain will be involved in this action? How will they work together?
- Developing Hypotheses Drawing on what you have learned about the different senses, develop a hypothesis that explains why some people experience motion sickness. What two senses are probably involved with this unpleasant reaction to movement?
- What's Wrong With These Statements? Briefly explain why each statement is incorrect or misleading.
  - The parasympathetic division of the autonomic nervous system slows digestion.
  - Nerve signals travel quickly through a neuron's myelin sheath.
  - The auditory tube passes on vibrations.

### Performance Assessment

**Design an Experiment** Most sensory organs come in pairs. You have two eyes and two ears. Similarly, a rattlesnake has two infrared receptors, and a butterfly has two antennae. Propose a hypothesis that could explain the advantage of having pairs of sense organs. Devise an experiment to test your hypothesis.

### Online Assessment/Test Preparation



- Chapter 28 Assessment  
Check your understanding of the chapter concepts.
- Standardized Test Preparation  
Practice test-taking skills you need to succeed.