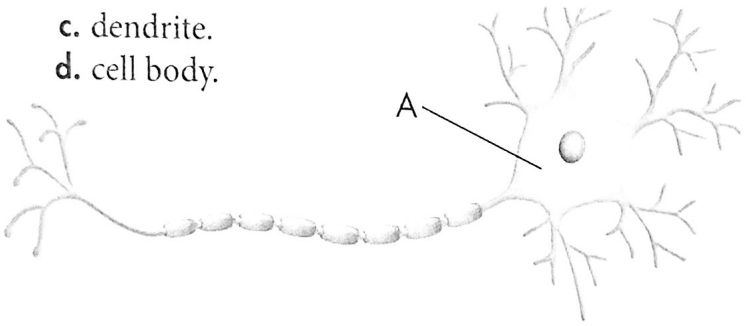
Understand Key Concepts

1. The basic units of structure and function in the nervous system are
   a. neurons.
   b. axons.
   c. dendrites.
   d. neurotransmitters.

2. In the diagram below, the letter A is pointing to the
   a. myelin sheath.
   b. axon.
   c. dendrite.
   d. cell body.



3. The place where a neuron transfers an impulse to another cell is the
   a. synapse.
   b. dendrite.
   c. myelin sheath.
   d. receptor.

4. Name the three types of neurons and describe their function in the nervous system.

5. Describe the movement of sodium and potassium ions during the resting potential.

6. **Craft and Structure** Why can an action potential be described as an all-or-none event?

Think Critically

7. **Key Ideas and Details** Suppose a portion of an axon is cut so that it is no longer connected to its cell body. What effect would that have on the transmission of impulses? Cite textual evidence to support your analysis.

8. **Production and Distribution of Writing** Develop a paragraph to clearly explain how a neuron and an electrical extension cord are similar and how they are different.

Understand Key Concepts

9. The central nervous system consists of the
   a. sense organs.
   b. reflexes.
   c. brain and spinal cord.
   d. sensory and motor neurons.

10. Voluntary, or conscious, activities of the body are controlled primarily by the
    a. medulla oblongata.
    b. cerebrum.
    c. cerebellum.
    d. brain stem.

11. Methamphetamines are a type of drug that affects the brain by
    a. causing the release of excess dopamine.
    b. blocking the production of dopamine.
    c. increasing the number of dopamine receptors.
    d. increasing the number of synapses in the brain.

12. Describe the structure and function of the cerebrum.

13. Describe the relationship between the brain stem and the spinal cord.

14. How does nicotine influence dopamine receptors in the brain?

Think Critically

15. **Infer** A stroke occurs when blood flow to part of the brain stops due to a clot or broken blood vessel. What conclusion might you make about the location of damage in a person who has difficulty speaking and cannot move many of his muscles on the right side of his body?

16. **Compare and Contrast** In what ways are the effects of methamphetamine and cocaine on the brain similar? How are they different?

31.3 The Peripheral Nervous System

Understand Key Concepts

17. The sympathetic nervous system and the parasympathetic nervous system are specific divisions of the
    a. peripheral nervous system.
    b. central nervous system.
    c. somatic nervous system.
    d. autonomic nervous system.

18. Reflexes are behaviors that
    a. involve only sensory neurons.
    b. are controlled by the autonomic nervous system.
    c. are under conscious control.
    d. occur involuntarily without conscious control.

19. Describe the advantage of a reflex response in the survival of an organism.

20. List the divisions of the autonomic nervous system and give the function of each.

Think Critically

21. **Text Types and Purposes** Design an experiment to determine how time of day may affect reaction time. Formulate a hypothesis and write your procedure. Have your teacher check your experimental plan before you begin.

22. **Apply Concepts** A routine examination by a doctor usually includes a knee-jerk reflex test. What is the purpose of this test? What could the absence of a response indicate?

31.4 The Senses

Understand Key Concepts

23. The semicircular canals and the two tiny sacs located behind them help maintain
    a. night vision.
    b. body position and balance.
    c. respiratory rate.
    d. temperature.

24. The senses of taste and smell involve sensory receptors called
    a. photoreceptors.
    b. chemoreceptors.
    c. thermoreceptors.
    d. mechanoreceptors.

25. The fluid-filled structure in the ear that sends information to the brain about sound is the
    a. tympanum.
    b. oval window.
    c. stirrup.
    d. cochlea.

26. **Key Ideas and Details** Trace the path of light through the eye.

27. What are the functions of rods and cones?

28. Trace the path of sound through the ear.

29. What are the five basic tastes?

solve the CHAPTER MYSTERY

POISONING ON THE HIGH SEAS

Because of a sketch done by the ship's naturalist, Georg Forster, it is suspected that Cook and his men most likely ate *Tetraodon lagocephalus scleratus*, also known as the Silver-stripe blaasop. Bacteria that live in the fish's liver, gonads, intestines, and skin produce a poison called tetrodotoxin. The poison can remain active even after the fish is cooked at high temperatures. Tetrodotoxin binds to and blocks voltage-gated sodium channels, especially in the peripheral nervous system.

Unlike the men on Cook's ship, today, some Japanese chefs are specially trained to prepare fish—known as pufferfish—that contain this toxin. The dish, known as fugu, is highly prized by diners in exclusive restaurants. The prepared fish have a unique taste and produce a tingling sensation in the mouth and throat when eaten. Improper preparation of fugu can lead to serious consequences for the diner, including death.

Obviously, tetrodotoxin doesn't poison the fish that produce it. Studies of the fish's genome have revealed a mutation in the gene that codes for the structure of sodium channel proteins. The mutation changes the surface shape of the channel, and prevents the toxin from binding to it.

1. **Infer** Based on the location of bacteria in *Tetraodon*, what methods are likely involved in preparing fugu?

2. **Apply Concepts** Describe in your own words why the fish are not affected by their own toxin.

3. **Connect to the Big idea** Some researchers have explored the possibility of using tetrodotoxin to treat severe pain. Assess the text for evidence that suggests why the toxin might be useful in this way. What safety concerns would you have to consider when designing a study to test this possibility?