Chapter 35 Study Guide

Study Tip

Suggest that students review the chapter contents by using each of the Vocabulary terms correctly in a sentence. Check their sentences for errors. Then, have them rewrite their sentences as fill-in-the-blank questions by leaving out the Vocabulary terms. They can use the questions to quiz a classmate.

Thinking Visually

Graphic organizers should show that the nervous system consists of the central nervous system (brain and spinal cord) and the peripheral nervous system, which has sensory and motor divisions. The nervous system can also be divided into the somatic nervous system and the autonomic nervous system, the latter with its sympathetic and parasympathetic divisions.

Chapter 35 Assessment

Reviewing Content

1. c **2.** b **3.** a **4.** d **5.** a **6.** c **7.** b **8.** d **9.** b **10.** a

Understanding Concepts

11. Cell, tissue, organ, organ system, organism

12. Unless cells of the body are kept at a temperature within a certain range, supplied with energy, bathed in fluid, and cleansed of waste—in short, unless homeostasis is maintained—permanent injury or death can occur.

13. The largest part of a typical neuron is the cell body, which contains the cell nucleus and much of the cytoplasm. The cell body is where most of the cell's metabolic activity occurs. Short, branched extensions called dendrites carry impulses from the environment or other neurons toward the cell body. The long fiber that carries impulses away from the cell body is called the axon, which ends in small swellings called axon terminals.

14. During a resting potential, potassium ions (K^+) diffuse across a neuron's cell membrane more easily than do sodium ions (Na^+), resulting in a negative charge inside the cell membrane. During an action potential, the cell membrane becomes more permeable to Na^+ ions, resulting in a reversal of charges.

Chapter 35 Study Guide

35–1 Human Body Systems

Key Concepts

- The levels of organization in a multicellular organism include cells, tissues, organs, and organ systems.
- Homeostasis is the process by which organisms keep internal conditions relatively constant despite changes in external environments.

Vocabulary

specialized cell, p. 894
epithelial tissue, p. 894
connective tissue, p. 894
nervous tissue, p. 894
muscle tissue, p. 894
homeostasis, p. 895
feedback inhibition, p. 895

35–2 The Nervous System

Key Concepts

- The nervous system controls and coordinates functions throughout the body and responds to internal and external stimuli.
- The basic structural units of the nervous system are neurons.
- A nerve impulse begins when a neuron is stimulated by another neuron or by its environment.

Vocabulary

neuron, p. 897 • cell body, p. 897
dendrite, p. 898 • axon, p. 898
myelin sheath, p. 898
resting potential, p. 898
action potential, p. 899
threshold, p. 899 • synapse, p. 900
neurotransmitter, p. 900

35–3 Divisions of the Nervous System

Key Concepts

- The central nervous system relays messages, processes information, and analyzes information. The central nervous system consists of the brain and the spinal cord.
- The peripheral nervous system can be divided into the sensory division and the motor division. The sensory division transmits impulses from sense organs to the central nervous system. The motor division transmits impulses from the central nervous system to the muscles or glands.

Vocabulary

meninges, p. 901 • cerebrospinal fluid, p. 901
cerebrum, p. 902 • cerebellum, p. 902
brain stem, p. 902 • thalamus, p. 903
hypothalamus, p. 903 • reflex, p. 903
reflex arc, p. 904

35–4 The Senses

Key Concept

- There are five general categories of sensory receptors: pain receptors, thermoreceptors, mechanoreceptors, chemoreceptors, and photoreceptors.

Vocabulary

sensory receptor, p. 906 • pupil, p. 906
lens, p. 907 • retina, p. 907 • rod, p. 907
cone, p. 907 • cochlea, p. 908
semicircular canal, p. 908 • taste bud, p. 909

35–5 Drugs and the Nervous System

Key Concepts

- Stimulants increase heart rate, blood pressure, and breathing rate. In addition, stimulants increase the release of neurotransmitters at some synapses in the brain.
- Depressants slow down heart rate and breathing rate, lower blood pressure, relax muscles, and relieve tension.
- Cocaine causes the sudden release of a neurotransmitter in the brain called dopamine.
- Opiates mimic natural chemicals in the brain known as endorphins, which normally help to overcome sensations of pain.
- Alcohol is a depressant that slows down the rate at which the central nervous system functions.

Vocabulary

drug, p. 910
stimulant, p. 910
depressant, p. 911
fetal alcohol syndrome, p. 913
drug abuse, p. 914
addiction, p. 914

Thinking Visually

Develop a graphic organizer to show the relationship between the different divisions of the nervous system.

TIME SAVER

CHAPTER RESOURCES

Print:

- ***Teaching Resources,*** Chapter Vocabulary Review, Graphic Organizer
- ***Chapter Tests: Levels A and B,*** Chapter 35 Test

Technology:

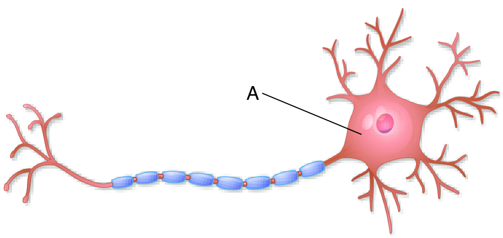
- ***Computer Test Bank,*** Chapter 35 Test
- ***iText,*** Chapter 35 Assessment

Chapter 35 Assessment

Reviewing Content

Choose the letter that best answers the question or completes the statement.

1. The type of tissue that covers the body, lines internal surfaces, and forms glands is
   a. muscle tissue.
   b. connective tissue.
   c. epithelial tissue.
   d. nervous tissue.
2. The process of maintaining a relatively constant internal environment despite changes in the external environment is called
   a. regulation.
   b. homeostasis.
   c. synapse.
   d. stimulation.
3. The basic units of structure and function of the nervous system are
   a. neurons.
   b. axons.
   c. dendrites.
   d. neurotransmitters.
4. In the diagram below, letter *A* is pointing to the
   a. myelin sheath.
   b. axon.
   c. dendrite.
   d. cell body.



5. The place where a neuron transfers an impulse to another cell is the
   a. synapse.
   b. dendrite.
   c. myelin sheath.
   d. receptor.
6. The central nervous system consists of the
   a. sense organs.
   b. reflexes.
   c. brain and spinal cord.
   d. sensory and motor neurons.

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7. Voluntary or conscious activities of the body are controlled by the
   a. medulla oblongata. **c.** cerebellum.
   b. cerebrum. **d.** brain stem.
8. The sympathetic nervous system and the parasympathetic nervous system are divisions of the
   a. peripheral nervous system.
   b. central nervous system.
   c. somatic nervous system.
   d. autonomic nervous system.
9. The semicircular canals and the two tiny sacs located behind them help maintain
   a. night vision. **c.** respiratory rate.
   b. equilibrium. **d.** temperature.
10. Drugs that increase heart rate, blood pressure, and breathing rate are
    a. stimulants. **c.** opiates.
    b. depressants. **d.** barbiturates.

Understanding Concepts

11. Sequence the following terms from simplest to most complex: organ system, tissue, organ, organism, cell.
12. Why is it important for an organism to maintain homeostasis?
13. Describe the structure and function of a neuron.
14. What changes occur in the neuron during the resting potential? During an action potential?
15. How does the all-or-none principle relate to the transmission of a nerve impulse?
16. Describe the structure and function of the cerebrum.
17. Describe the advantage of a reflex response in the survival of an organism.
18. List the divisions of the autonomic nervous system and give the function of each.
19. Trace the path of light through the eye.
20. What are the functions of rods and cones?
21. Trace the path of sound through the ear.
22. Explain why a pregnant woman should avoid drinking alcohol.
23. Define drug abuse in your own words.
24. It has been said that no one can be cured of a drug dependence. Explain why.

TIME SAVER

HOMEWORK GUIDE

Section:	Questions:
Section 35–1	1, 2, 11, 12, 35
Section 35–2	3–5, 13–15, 25, 27, 30, 32, 36
Section 35–3	6–8, 16–18, 28
Section 35–4	9, 19–21, 26, 29, 31, 34
Section 35–5	10, 22–24, 33

iText

If your class subscribes to the iText, your students can go online to access an interactive version of the Student Edition and a self-test.

(Continued from page 916)

15. According to the all-or-none principle, any stimulus that is stronger than the threshold will produce an impulse and any stimulus below the threshold will not produce an impulse.

16. The cerebrum consists of two hemispheres, each divided into regions called lobes. A band of tissue known as the corpus callosum connects the two hemispheres. The cerebrum is responsible for the voluntary, or conscious, activities of the body. It is the site of intelligence, learning, and judgment.

17. A reflex allows an organism to respond to danger quickly, which is an advantage for survival.

18. The autonomic nervous system is divided into the sympathetic and parasympathetic nervous systems. The sympathetic and parasympathetic nervous systems have opposite effects on the same organ system.

19. Light enters the eye through the cornea and passes through the anterior chamber, which is filled with aqueous humor. The light then goes through the pupil, which is an opening in the iris, and through the lens into a large chamber filled with vitreous humor. The lens focuses the light on the retina, where photoreceptors convert light into impulses that are sent via the optic nerve to the brain.

20. Rods, which are extremely sensitive to light, and cones, which are less sensitive to light but can distinguish different colors, are photoreceptors in the retina. Their function is to convert light into impulses that are carried through the optic nerve to the central nervous system.

21. Sound waves, which are vibrating air molecules, enter the auditory canal and cause the tympanum to vibrate. Three tiny bones, the hammer, anvil, and stirrup, pick up the vibrations, and the stirrup transmits them to the oval window. The oval window vibrates and creates pressure waves in the fluid-filled cochlea. The pressure waves push back and forth against tiny hair cells, which respond by producing nerve impulses that are sent to the brain through the cochlear nerve.

22. She risks having a child with fetal alcohol syndrome—a set of birth defects. A child with FAS can have heart defects, a malformed face, delayed growth, and poor motor development.

23. Students may state that drug abuse is the intentional misuse of a drug, whether legal or illegal, for non-medical purposes.

24. One possible answer is: Drug dependence means that the only way a person can stop using the drug is by complete abstinence. This might be called a way to control the dependence but not a cure.

Critical Thinking

25. Students' experimental designs should include variables, controls, reasonable hypotheses, and feasible procedures. The focus should be on a simple, repetitive task.

26. The advantage relates to the thermoregulatory function of the tongue in some mammals. Mammals lose excess body heat by evaporation of water (sweating) and for many mammals, including the domestic dog, the primary organ for heat loss is the tongue.

27. If an axon is disconnected from a nerve cell body, the pathway of an outgoing nerve impulse will be disrupted.

28. The purpose of the knee-jerk reflex test is to determine whether the person's reflexes are normal. The absence of a response could indicate a disorder of one of the components of the reflex arc.

29. The slope of the graph starts to change rapidly at the age of 40 as the distance at which the person can focus clearly on nearby objects increases. Students may infer that the shape of the cornea or elasticity of the lens changes with age, affecting the focus of light entering the eyes.

30. With less myelin, nerve impulses in people with MS will travel more slowly. This will result in loss of control over motor functions, leading to paralysis, poor coordination, slurred speech, blurred vision, and tremor.

31. Constant exposure to loud noises would damage the delicate structure of the inner ear, the cochlea and the membrane covering the oval window. Hearing loss caused by damage to these structures is irreversible.

Chapter 35 Assessment

Critical Thinking

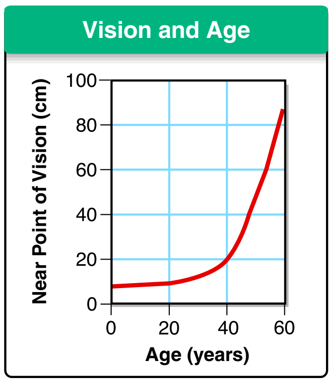
25. **Designing Experiments** Design an experiment to determine the effects of fatigue on reaction time. Formulate a hypothesis and write down your procedure. Have your teacher check your experimental plan before you begin.

26. **Applying Concepts** Heat receptors of mammals are particularly concentrated on the tongue. These receptors keep humans from burning the mouth with hot food. What advantage is it for a wild mammal that doesn't cook its food to have so many heat receptors in its tongue?

27. **Inferring** Suppose a portion of an axon is cut so that it is no longer connected to its nerve cell body. What effect would that have on the transmission of impulses?

28. **Applying 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?

29. **Using Tables and Graphs** The graph below compares age to the nearest distance in centimeters that many people can see an object clearly. Describe the general trend of the graph. At what age does the slope of the graph begin to change rapidly? What do you think might explain this change?



30. **Predicting** Multiple sclerosis (MS) is a disease characterized by the destruction of myelin. Based on your knowledge of neuron structure and the function of various cell parts, predict the symptoms this destruction of myelin might produce.

31. **Applying Concepts** Constant exposure to loud noises may cause loss of hearing. What parts of the ear may be damaged? Can the loss of hearing be reversed?

32. **Using Analogies** How are a neuron and an electrical extension cord similar? How are they different?

33. **Applying Concepts** Why are depressant drugs and alcohol a life-threatening combination?

34. **Inferring** What is the advantage of having a greater concentration of touch receptors and, therefore, greater sensitivity in the fingers, toes, and face?

35. **Classifying** Would you classify blood as a cell, a tissue, or an organ? Explain your answer.

36. **Connecting Concepts** Compare the nervous systems of nonvertebrate chordates and the human nervous system. What is the main difference between these systems? Refer to Section 30–1 and Section 33–3.

Writing in Science

At the beginning of this chapter, you read about how the systems of the body worked together toward a common goal—winning a basketball game. Imagine that you are playing soccer. Using **Figure 35–2** as a reference, pick five body systems that are most involved in the activity, and explain how the body systems are working together. Be sure to include your reasons for picking the five body systems that you chose.

Performance-Based Assessment

Making a Collage The left and right sides of the brain are responsible for different activities. Make a collage that shows examples of some right-brain activities and some left-brain activities. Attach to your collage a paragraph outlining what learning strategies would be useful for left-brain dominant individuals and for right-brain dominant individuals.

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32. Both a neuron and an extension cord carry electrical impulses. An impulse is regenerated all along a neural pathway so that it does not lose strength. Current moving along a wire meets resistance and gradually diminishes.

33. Alcohol is itself a depressant drug and in combination with other depressants can slow down breathing until breathing stops.

34. Answers may vary. Students may say that having a greater concentration of touch receptors in the fingers, toes, and face makes these parts of the body, which are often exposed, more sensitive to pain and, therefore, better able to detect sources of potential injury, such as hot or sharp objects.

35. Blood should be classified as a tissue, because it is made up of a group of cells that perform a single function.

36. Nonvertebrate chordates have a relatively simple nervous system with a mass of nerve cells forming the brain. The brain does not have distinct regions, each with a specialized function, as the human brain does.