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Chapter 35

Nervous System

Section 35–1 Human Body Systems (pages 891–896)

This section describes human organ systems and explains how the body maintains homeostasis.

Organization of the Body (pages 891–894)

1. List the levels of organization in a multicellular organism, from smallest to largest.

a. _____

b. _____

c. _____

d. _____

Match the organ system with its function.

Organ System	Function
_____ **2.** Nervous system	**a.** Stores mineral reserves and provides a site for blood cell formation
_____ **3.** Skeletal system	**b.** Provides oxygen and removes carbon dioxide
_____ **4.** Integumentary system	**c.** Coordinates the body's response to changes in its internal and external environments
_____ **5.** Endocrine system	**d.** Helps produce voluntary movement, circulate blood, and move food
_____ **6.** Lymphatic system	**e.** Controls growth, development, metabolism, and reproduction
_____ **7.** Muscular system	**f.** Eliminates wastes and maintains homeostasis
_____ **8.** Reproductive system	**g.** Serves as a barrier against infection and injury
_____ **9.** Respiratory system	**h.** Converts food so it can be used by cells
_____ **10.** Excretory system	**i.** Helps protect the body from disease
_____ **11.** Circulatory system	**j.** Produces reproductive cells
_____ **12.** Digestive system	**k.** Brings materials to cells, fights infection, and regulates body temperature

13. What are four types of tissues found in the human body? _____

_____

_____

14. The most abundant tissue in most animals is _____ tissue.

15. Circle the letter of the type of tissue that covers the surface of the body and lines internal organs.

a. nervous **c.** epithelial

b. connective **d.** muscle

16. What is a gland? _____

_____

17. Circle the letter of the type of tissue that connects bones to muscles.

a. nervous **c.** epithelial

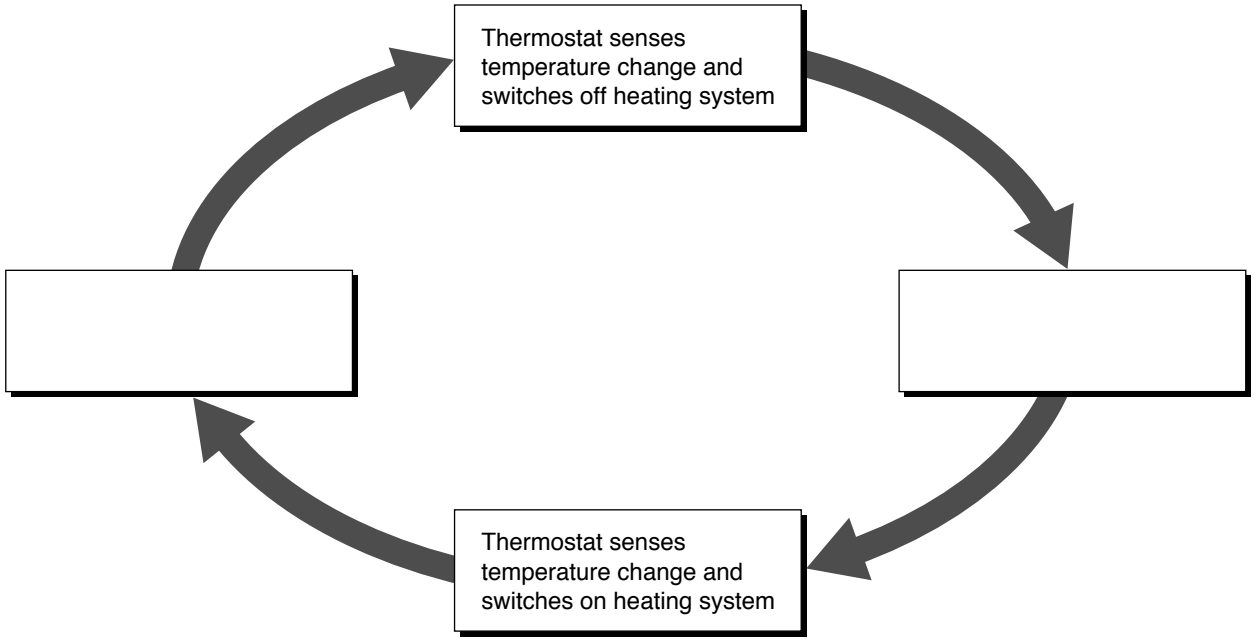
b. connective **d.** integumentary

Maintaining Homeostasis **(pages 895–896)**

18. The process of maintaining a controlled, stable internal environment is called _____.

19. The process by which the product of a system shuts down the system or limits its operation is referred to as _____.

20. Fill in the missing labels in the diagram to show how a thermostat uses feedback inhibition to maintain a stable temperature in a house.



21. Is the following sentence true or false? The part of the brain that monitors and controls body temperature is the hypothalamus.

_____

22. What happens if nerve cells sense that the core body temperature has dropped below 37°C? _____

_____

_____

23. What happens if the body temperature rises too far above 37°C? _____

_____

_____

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Section 35–2 The Nervous System (pages 897–900)

This section describes the nervous system and explains how a nerve impulse is transmitted.

Introduction (page 897)

1. What is the function of the nervous system? _____

_____

_____

2. What are three types of neurons?

a. _____

b. _____

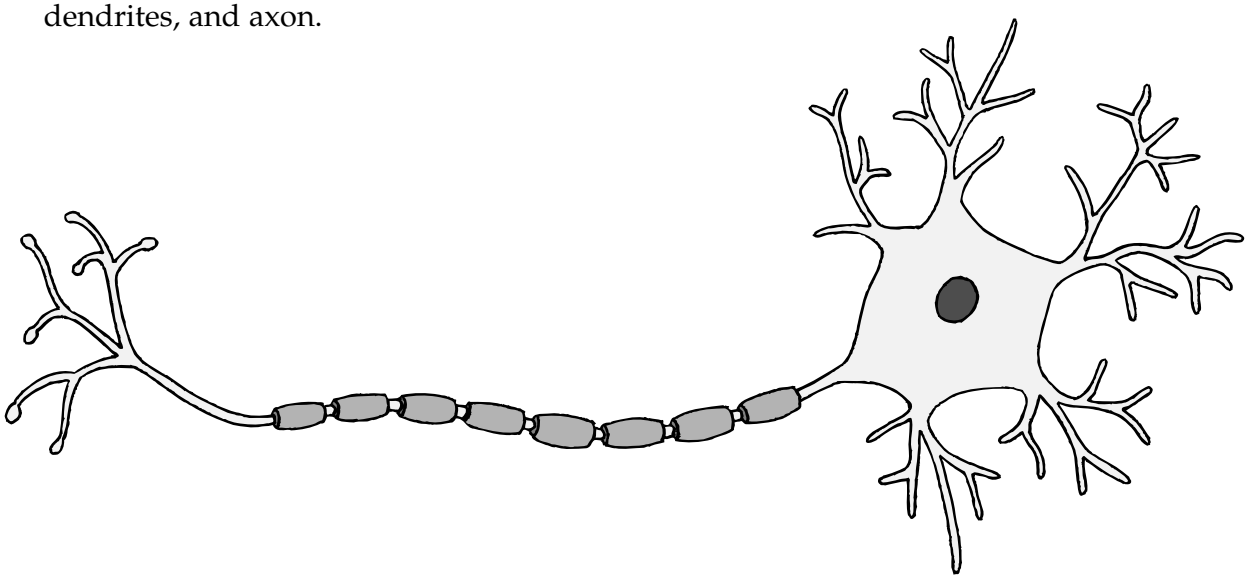
c. _____

Neurons (pages 897–898)

3. Is the following sentence true or false? Sensory neurons carry impulses from the brain and the spinal cord to muscles and glands.

_____

4. Label the following features in the drawing of a neuron: cell body, dendrites, and axon.



5. What is the function of the myelin sheath? _____

_____

The Nerve Impulse (pages 898–899)

6. Is the following sentence true or false? There are more sodium ions in the cytoplasm than in the fluid outside the cell.

_____

7. The difference in electrical charge across the cell membrane of a resting neuron is called its _____.

8. How does a nerve impulse begin? _____

9. Circle the letter of the choice that describes an action potential.

- **a.** Reversal of charges due to the flow of positive ions into a neuron
- **b.** Increase in negative ions in a neuron due to the flow of potassium out of the cell
- **c.** Change to a negative charge due to the flow of sodium ions out of a neuron
- **d.** Reversal of charges due to the flow of negative ions into a neuron

10. The minimum level of a stimulus that is required to activate a neuron is called the _____.

11. How does a nerve impulse follow the all-or-nothing principle? _____

The Synapse **(page 900)**

12. Circle the letter of the term that refers to the location at which a neuron can transfer an impulse to another cell.

a. axon **b.** dendrite **c.** synapse **d.** node

13. What are neurotransmitters? _____

14. Describe what happens when an action potential arrives at an axon terminal. _____

Reading Skill Practice

When you read about a complex process, representing the process with a diagram can help you understand it better. Make a diagram to show how a nerve impulse is transmitted from one cell to another. Do your work on a separate sheet of paper.

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Section 35–3 Divisions of the Nervous System (pages 901–905)

This section describes the major divisions of the nervous system and explains their functions.

Introduction (page 901)

1. What is the function of the central nervous system? _____

_____

_____

The Central Nervous System (page 901)

2. The central nervous system consists of the _____ and the _____.

3. Is the following sentence true or false? Three layers of connective tissue known as meninges protect the brain and spinal cord.

_____

4. The brain and spinal cord are bathed and protected by _____.

The Brain (pages 902–903)

Match the part of the brain with its function.

	Part of Brain	Function
_____	**5.** Cerebrum	**a.** Coordinates and balances the actions of the muscles
_____	**6.** Cerebellum	**b.** Regulates the flow of information between the brain and the rest of the body
_____	**7.** Brain stem	**c.** Controls voluntary activities of the body
_____	**8.** Thalamus	**d.** Controls hunger, thirst, fatigue, anger, and body temperature
_____	**9.** Hypothalamus	**e.** Receives and relays messages from the sense organs

10. The two hemispheres of the brain are connected by a band of tissue called the _____.

11. Identify the four lobes of the brain.

a. _____ **c.** _____

b. _____ **d.** _____

12. Is the following sentence true or false? The left hemisphere of the cerebrum controls the body's left side. _____

13. Is the following sentence true or false? The outer surface of the cerebrum is called the cerebral cortex. _____

14. What is gray matter, and where is it found? _____

_____

15. The two regions of the brain stem are the _____ and the _____.

The Spinal Cord (page 903)

16. Name two examples of a reflex. _____

17. What is the advantage of a reflex? _____

_____

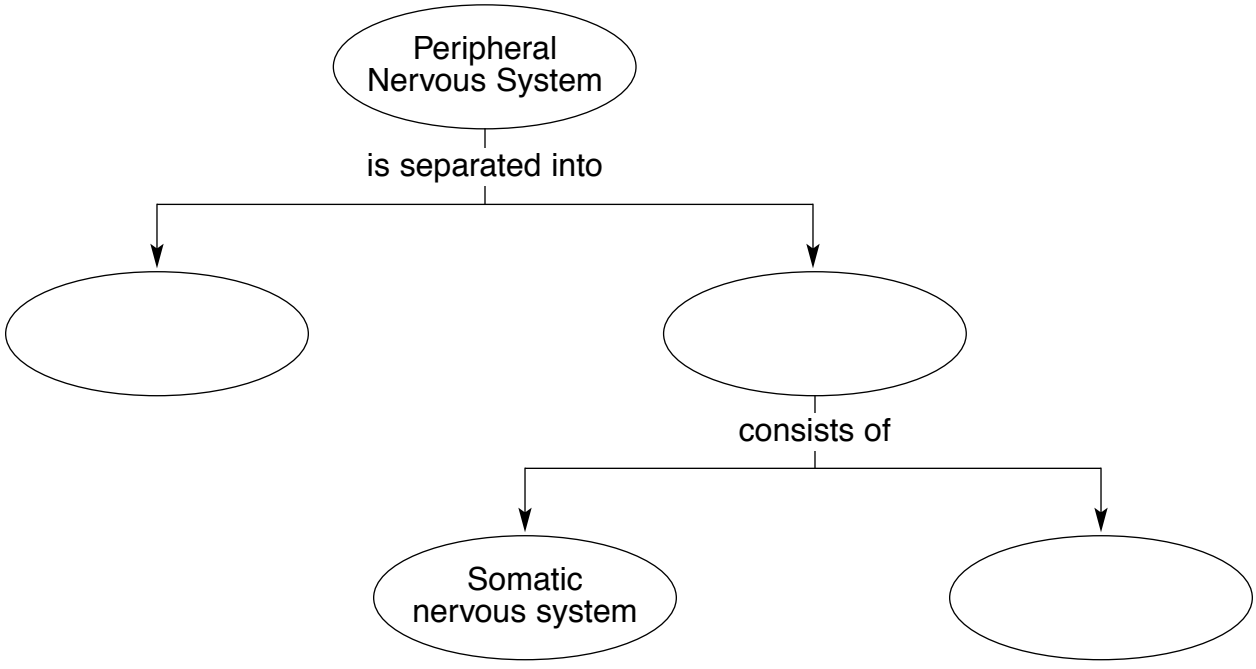
_____

The Peripheral Nervous System (pages 903–904)

18. Circle the letter of each choice that is part of the peripheral nervous system.

a. cranial nerves
b. spinal nerves
c. ganglia
d. spinal cord

19. Complete the concept map.



20. Circle the letter of each activity that is controlled by the somatic nervous system.

a. Beating of the heart
b. Lifting a finger
c. Wiggling the toes
d. Pulling foot away from tack

21. What does the autonomic nervous system regulate? _____

_____

_____

22. Why is it important to have two systems that control the same organs? _____

_____

_____

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Section 35–4 The Senses (pages 906–909)

This section explains how each of the five senses responds to stimuli from the environment.

Introduction (page 906)

1. What are sensory receptors? _____

_____

_____

2. List the five general categories of sensory receptors.
   - **a.** _____
   - **b.** _____
   - **c.** _____
   - **d.** _____
   - **e.** _____
3. Which category of sensory receptors are sensitive to touch, sound, and motion? _____

_____

Vision (pages 906–907)

4. Circle the letter of each sentence that is true about the structures of the eye.
   - **a.** Light enters the eye through the cornea.
   - **b.** The anterior chamber is filled with vitreous humor.
   - **c.** The pupil changes in size to let more or less light enter the eye.
   - **d.** The lens focuses light on the retina.
5. Is the following sentence true or false? The function of the iris is to adjust the size of the pupil. _____
6. Where are the photoreceptors located in the eye? _____

_____

7. What do photoreceptors do? _____

_____

8. Is the following sentence true or false? Cones are extremely sensitive to light, but they do not distinguish different colors.

_____

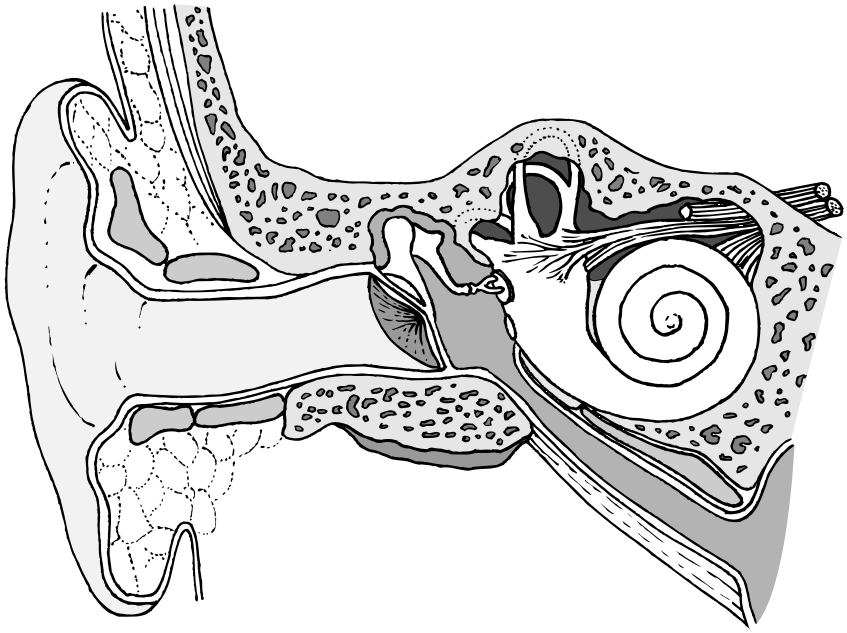
9. How do impulses travel from the eyes to the brain? _____

_____

Hearing and Balance (pages 908–909)

10. List the two sensory functions of the ear.
    - **a.** _____
    - **b.** _____

11. Label each of the following structures in the drawing of the ear: auditory canal, tympanum, semicircular canals, and cochlea.



12. Is the following sentence true or false? The tympanum sends nerve impulses to the brain. _____

13. Complete the flowchart.

Vibrations enter the ear through the _____.

↓

The vibrations cause the _____ to vibrate.

↓

These vibrations are picked up by three tiny bones, called the _____, _____, and _____.

↓

The last bone transmits the vibrations to the _____, creating pressure waves in the _____.

↓

Tiny hair cells inside the _____ produce nerve impulses that are sent to the brain through the _____ nerve.

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14. What is the role of hair cells in the cochlea? _____

_____

_____

15. How do the semicircular canals help maintain balance? _____

_____

_____

Smell and Taste (page 909)

16. Is the following sentence true or false? Your sense of smell is actually an ability to detect pressure. _____

17. How does the body detect smell? _____

_____

_____

_____

18. Is the following sentence true or false? Much of what we commonly call the "taste" of food and drink is actually smell.

_____

19. The sense organs that detect taste are the _____.

20. List the four different categories of tastes.

a. _____

b. _____

c. _____

d. _____

Touch and Related Senses (page 909)

21. What is the largest sense organ? _____

_____

22. Is the following sentence true or false? The skin contains sensory receptors that respond to temperature, touch, and pain.

_____

23. Circle the letter of each choice that is true about the sense of touch.

a. Unlike the other senses, the sense of touch is not found in one particular place.

b. All parts of the body are equally sensitive to touch.

c. The greatest density of touch receptors is found on the arms and legs.

d. Touch is detected by mechanoreceptors.

24. Where is the greatest density of touch receptors found on the body? _____

_____

_____

Section 35–5 Drugs and the Nervous System (pages 910–914)

This section describes how different types of drugs affect the nervous system.

Introduction (page 910)

1. Is the following sentence true or false? A drug is any illegal substance that changes the structure or function of the body.

   _____

2. Is the following sentence true or false? Among the most powerful drugs are the ones that cause changes in the nervous system, especially to the brain and the synapses between neurons.

   _____

3. How can drugs disrupt the functioning of the nervous system? _____

   _____

   _____

Drugs That Affect the Synapse (pages 910–914)

Match the drug or type of drug with one way that it can affect the body.

Drug or Type of Drug	Effect on the Body
_____ **4.** Stimulant	**a.** Acts on pleasure centers of brain
_____ **5.** Depressant	**b.** Destroys liver cells
_____ **6.** Cocaine	**c.** Reduces pain
_____ **7.** Opiate	**d.** Decreases heart rate
_____ **8.** Marijuana	**e.** Increases blood pressure
_____ **9.** Alcohol	**f.** Causes lung damage

10. Circle the letter of each choice that is a stimulant drug.

a. nicotine **b.** cocaine **c.** amphetamine **d.** codeine

11. Circle the letter of each choice that is a depressant drug.

a. alcohol **c.** tranquilizer

b. morphine **d.** barbiturate

12. An uncontrollable craving for more of a drug is known as _____.

13. Cocaine causes the sudden release in the brain of a neurotransmitter called _____.

14. How does drug use increase the transmission of HIV, the virus that causes AIDS? _____

_____

_____

_____

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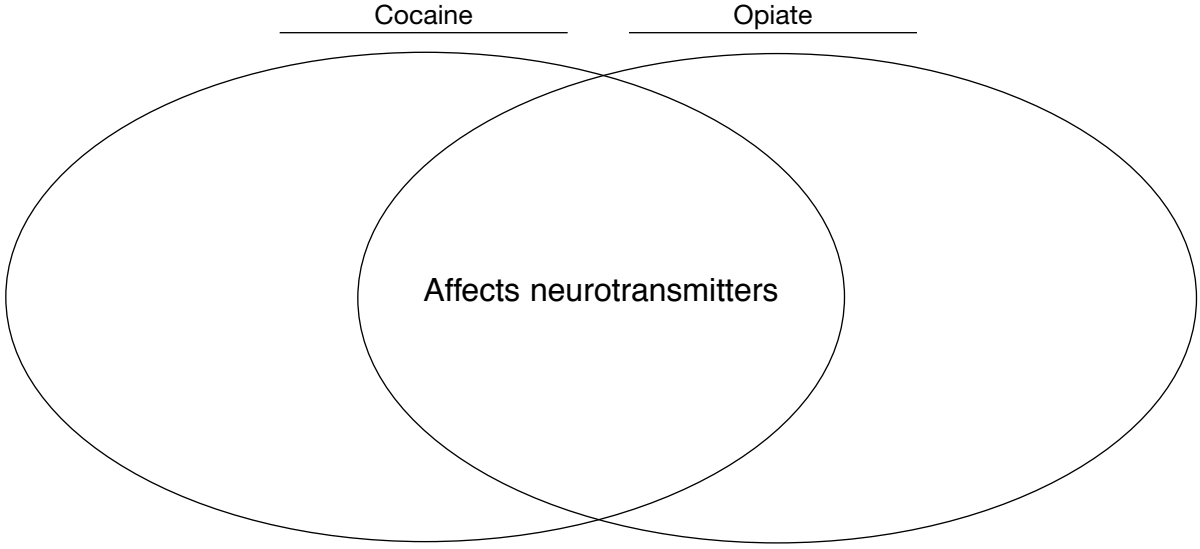
15. Complete the Venn diagram.



16. Is the following sentence true or false? The most widely abused illegal drug is marijuana. _____

17. Circle the letter of each choice that is a result of long-term use of marijuana.

a. Loss of memory
b. Inability to concentrate
c. Increase in testosterone
d. Cirrhosis of the liver

18. Is the following sentence true or false? Alcohol is the drug most commonly abused by teenagers. _____

19. What is fetal alcohol syndrome, or FAS? _____

_____

_____

20. People who have become addicted to alcohol suffer from a disease called _____.

21. How does long-term alcohol use affect the body? _____

_____

_____

Drug Abuse (page 914)

22. Using any drug in a way that most doctors could not approve is referred to as _____.

23. What is psychological dependence on a drug? _____

_____

24. When does physical dependence on a drug occur? _____

_____

_____

WordWise

Solve the clues to determine which vocabulary terms from Chapter 35 are hidden in the puzzle. Then find and circle the terms in the puzzle. The terms may occur vertically, horizontally, or diagonally.

a q u a t o d e n d r o s
h x e m h n e u r o n t o
p o o e r e n c e l l h r
u s m n e h d p b o d a h
p c t i s e r y i a r l p
i l i n h l i m w t c a y
l e s g o i t p o n d m o
f i r e l c e r e b r u m
e n g s d a b r a i u s o
c e r e b e l l u m p o t
e h r e t i n a s t e m a
b i j k f m y e s h e t g
a b s y n l e n s a p e s
c i p o t e e n t i a l t
k t n e u r o x t r a n v

Clues **Hidden Words**

Type of cell that carries messages throughout the nervous system _____
Part of a neuron that carries impulses toward the cell body _____
Part of a neuron that carries impulses away from the cell body _____
Minimum level of a stimulus required to activate a neuron _____
Three layers of tissue in which the brain and spinal cord are wrapped _____
Area of the brain responsible for voluntary activities of the body _____
Area of the brain that coordinates body movements _____
Brain structure that receives messages from the sense organs _____
Quick automatic response to a stimulus _____
Part of the eye that focuses light on the retina _____
Small opening in the iris of the eye _____
Lining inside the eye that contains photoreceptors _____