

Consider this scene for a moment. You are walking along a beautiful beach watching the sunset. You notice the various hues and are amazed at the multitude of shades that cover the sky. The waves are indeed melodious as they splash along the shore, and you wiggle your feet with delight as you sense the warm, soft sand trickling between your toes. You sip on a soda and then inhale the fresh salt air as you continue your stroll along the shore. It is a memorable scene, but one that would not be possible without the assistance of your sense organs. The sense organs pick up messages that are sent over nerve pathways to specialized areas in the brain for interpretation. They make communication with and enjoyment of the environment possible. The visual, auditory, tactile, olfactory, and gustatory sense organs not only protect us from danger but also add an important dimension to our daily pleasures of life.

Your study of this chapter will give you an understanding of another one of the systems necessary for homeostasis and survival.

## **TOPICS FOR REVIEW**

Before progressing to Chapter 9, you should review the classification of sense organs and the process for converting a stimulus into a sensation. Your study should also include an understanding of the special sense organs and the general sense organs.

# CLASSIFICATION OF SENSE ORGANS

## CONVERTING A STIMULUS INTO A SENSATION

### GENERAL SENSE ORGANS

Match the term on the left with the proper selection on the right.

- |       |                        |                          |
|-------|------------------------|--------------------------|
| _____ | 1. Special sense organ | A. Olfactory cells       |
| _____ | 2. General sense organ | B. Meissner's corpuscles |
| _____ | 3. Nose                | C. Chemoreceptor         |
| _____ | 4. Krause's end-bulbs  | D. Eye                   |
| _____ | 5. Taste buds          | E. Touch                 |



If you have had difficulty with this section, review pages 204-206.

## SPECIAL SENSE ORGANS

### Eye

Circle the correct answer.

- The "white" of the eye is more commonly called the:
  - Choroid
  - Cornea
  - Sclera
  - Retina
  - None of the above
- The "colored" part of the eye is known as the:
  - Retina
  - Cornea
  - Pupil
  - Sclera
  - Iris
- The transparent portion of the sclera, referred to as the "window" of the eye, is the:
  - Retina
  - Cornea
  - Pupil
  - Iris
- The mucous membrane that covers the front of the eye is called the:
  - Cornea
  - Choroid
  - Conjunctiva
  - Ciliary body
  - None of the above

10. The structure that can contract or dilate to allow more or less light to enter the eye is the:
- A. Lens
  - B. Choroid
  - C. Retina
  - D. Cornea
  - E. Iris
11. When the eye is looking at objects far in the distance, the lens is \_\_\_\_\_ and the ciliary muscle is \_\_\_\_\_.
- A. Rounded, contracted
  - B. Rounded, relaxed
  - C. Slightly rounded, contracted
  - D. Slightly curved, relaxed
  - E. None of the above
12. The lens of the eye is held in place by the:
- A. Ciliary muscle
  - B. Aqueous humor
  - C. Vitreous humor
  - D. Cornea
13. When the lens loses its elasticity and can no longer bring near objects into focus, the condition is known as:
- A. Glaucoma
  - B. Presbyopia
  - C. Astigmatism
  - D. Strabismus
14. The fluid in front of the lens that is constantly being formed, drained, and replaced in the anterior chamber is the:
- A. Vitreous humor
  - B. Protoplasm
  - C. Aqueous humor
  - D. Conjunctiva
15. If drainage of the aqueous humor is blocked, the internal pressure within the eye will increase and a condition known as \_\_\_\_\_ could occur.
- A. Presbyopia
  - B. Glaucoma
  - C. Color blindness
  - D. Cataracts
16. The rods and cones are the photoreceptor cells and are located on the:
- A. Sclera
  - B. Cornea
  - C. Choroid
  - D. Retina
17. The area that contains the greatest concentration of cones on the retina is the:
- A. Fovea centralis
  - B. Retinal artery
  - C. Ciliary body
  - D. Optic disc

18. If our eyes are abnormally elongated, the image focuses in front of the retina and a condition known as \_\_\_\_\_ occurs.
- A. Hyperopia
  - B. Cataracts
  - C. Night blindness
  - D. Myopia



If you have had difficulty with this section, review pages 204-211.

## Ear

Select the correct term from the choices given and write its letter in the answer blank.

- |  |                 |               |              |
|--|-----------------|---------------|--------------|
|  | A. External ear | B. Middle ear | C. Inner ear |
|--|-----------------|---------------|--------------|
- \_\_\_\_\_ 19. Malleus
  - \_\_\_\_\_ 20. Perilymph
  - \_\_\_\_\_ 21. Incus
  - \_\_\_\_\_ 22. Ceruminous glands
  - \_\_\_\_\_ 23. Cochlea
  - \_\_\_\_\_ 24. Auditory canal
  - \_\_\_\_\_ 25. Semicircular canals
  - \_\_\_\_\_ 26. Stapes
  - \_\_\_\_\_ 27. Eustachian tube
  - \_\_\_\_\_ 28. Organ of Corti

Fill in the blanks.

29. The external ear has two parts: the \_\_\_\_\_ and the \_\_\_\_\_.
30. Another name for the tympanic membrane is the \_\_\_\_\_.
31. The bones of the middle ear are collectively referred to as the \_\_\_\_\_.
32. The stapes presses against a membrane that covers a small opening called the \_\_\_\_\_.
33. A middle ear infection is called \_\_\_\_\_.
34. The \_\_\_\_\_ is located adjacent to the oval window between the semicircular canals and the cochlea.
35. Located within the semicircular canals and the vestibule are \_\_\_\_\_ for balance and equilibrium.
36. The sensory cells in the \_\_\_\_\_ are stimulated when movement of the head causes the endolymph to move.



If you have had difficulty with this section, review pages 213-214.

# TASTE RECEPTORS SMELL RECEPTORS

Circle the correct answer.

37. Structures known as (papillae or olfactory) cells are found on the tongue.
38. Nerve impulses generated by stimulation of taste buds travel primarily through two (cranial or spinal) nerves.
39. To be detected by olfactory receptors, chemicals must be dissolved in the watery (mucus or plasma) that lines the nasal cavity.
40. The pathways taken by olfactory nerve impulses and the areas where these impulses are interpreted are closely associated with areas of the brain important in (hearing or memory).
41. (Chemoreceptor or mechanoreceptor) is the term used to describe the type of receptors that generate nervous impulses resulting in the sense of taste or smell.



If you have had difficulty with this section, review pages 214-218.

## UNSCRAMBLE THE WORDS

42. CALRIEU

--	--	--	--	--	--	--	--	--	--

43. RAECLS

--	--	--	--	--	--

44. LAPILAE P

--	--	--	--	--	--	--	--	--	--

45. CTVNUCNOIAJ

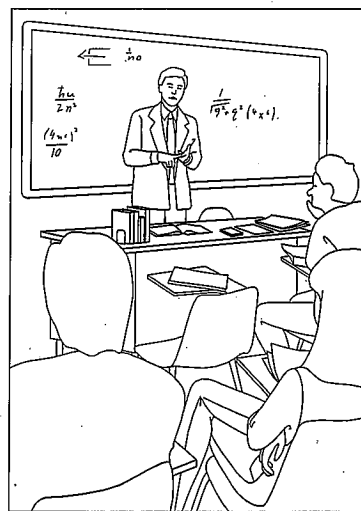
--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

Take the circled letters, unscramble them, and fill in the statement.

What Mr. Tuttle liked best about his classroom.

46.

--	--	--	--	--	--



## APPLYING WHAT YOU KNOW

47. Mr. Nay was an avid swimmer and competed regularly in his age group. He had to withdraw from the last competition due to an infection of his ear. Antibiotics and analgesics were prescribed by the doctor. What is the medical term for his condition?

48. Mrs. Metheny loved the outdoors and spent a great deal of her spare time basking in the sun on the beach. Her physician suggested that she begin wearing sunglasses regularly when he noticed milky spots beginning to appear on Mrs. Metheny's lenses. What condition was Mrs. Metheny's physician trying to prevent?

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49. Amanda repeatedly became ill with throat infections during her first few years of school. Lately, however, she has noticed that whenever she has a throat infection, her ears become very sore also. What might be the cause of this additional problem?

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50. Julius was hit in the nose with a baseball during practice. His sense of smell was temporarily gone. What nerve receptors were damaged during the injury?

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### 51. WORD FIND

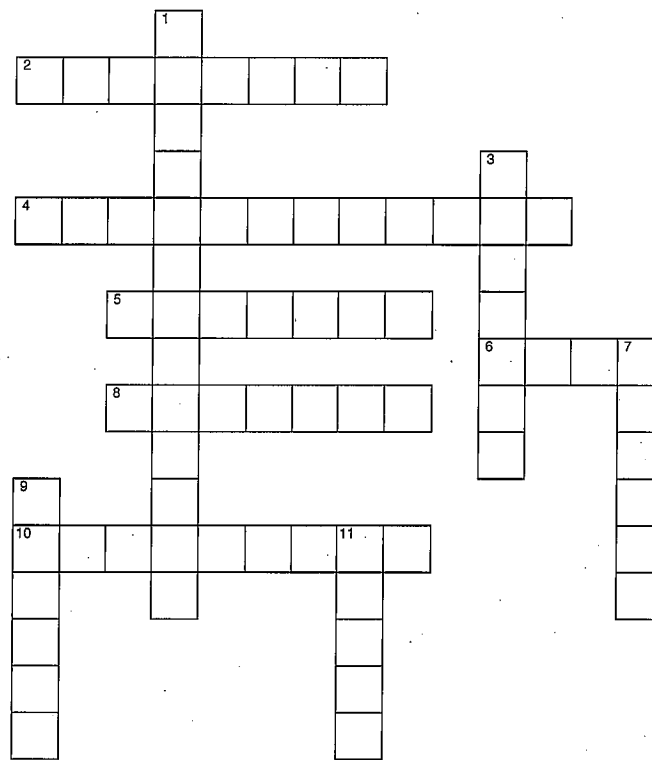
Can you find 19 terms from this chapter? Words may be spelled top to bottom, bottom to top, right to left, left to right, or diagonally.

M E C H A N O R E C E P T O R  
H R A T B Q I R T B N H M A E  
P F T Y R O T C A F L O X R C  
G U A Y I N A I H C A T S U E  
G P R A C E R U M E N O P X P  
I E A I P O Y B S E R P K D T  
W L C P L Y N E Y K E I T O O  
C Q T O I B R J B S F G L M R  
Z U S R C L E O U J R M N N S  
F D M E O H L Q T N A E Y I S  
H I D P N D L A M A C N X S Z  
A M L Y E S S E E D T T M Z H  
D D M H S F E X A Y I S I I A  
J C G N J T I S L P O G U V J  
P H G Y A K H S U C N I S G A

Cataracts	Gustatory	Presbyopia
Cerumen	Hyperopia	Receptors
Cochlea	Incus	Refraction
Cones	Mechanoreceptor	Rods
Conjunctiva	Olfactory	Senses
Eustachian	Papillae	
Eye	Photopigment	

# THE SENSES

Fill in the crossword puzzle.



## Across

2. Bones of the middle ear
4. Located in anterior cavity in front of lens  
(two words)
5. External ear
6. Transparent body behind pupil
8. Front part of this coat is the ciliary muscle and iris
10. Membranous labyrinth is filled with this fluid

## Down

1. Located in posterior cavity  
(two words)
3. Organ of Corti located here
7. White of the eye
9. Innermost layer of the eye
11. Hole in the center of the iris

# CHECK YOUR KNOWLEDGE

## Multiple Choice

Circle the correct answer.

1. Where are the specialized mechanoreceptors of hearing and balance located?
  - A. Inner ear
  - B. Malleus
  - C. Helix
  - D. All of the above
2. The organ of Corti is the sense organ of what sense?
  - A. Sight
  - B. Hearing
  - C. Pressure
  - D. Taste
3. Where are taste sensations interpreted?
  - A. Cerebral cortex
  - B. Area of stimulation
  - C. Nasal cavity
  - D. None of the above
4. A surgical technique to treat myopia without the use of glasses or contacts is called:
  - A. Presbyopia
  - B. Removal of cataracts
  - C. Radial keratotomy
  - D. None of the above
5. Which of the following statements about the cornea is *true*?
  - A. It is a mucous membrane.
  - B. It is called the "window of the eye."
  - C. It lies behind the iris.
  - D. All of the above
6. Which of the following are general sense organs?
  - A. Gustatory receptors
  - B. Pacinian corpuscles
  - C. Olfactory receptors
  - D. All of the above
7. The retina contains microscopic receptor cells called:
  - A. Mechanoreceptors
  - B. Chemoreceptors
  - C. Olfactory receptors
  - D. Rods and cones
8. Which two involuntary muscles make up the front part of the eye?
  - A. Malleus and incus
  - B. Iris and ciliary muscle
  - C. Retina and pacinian muscle
  - D. Sclera and iris

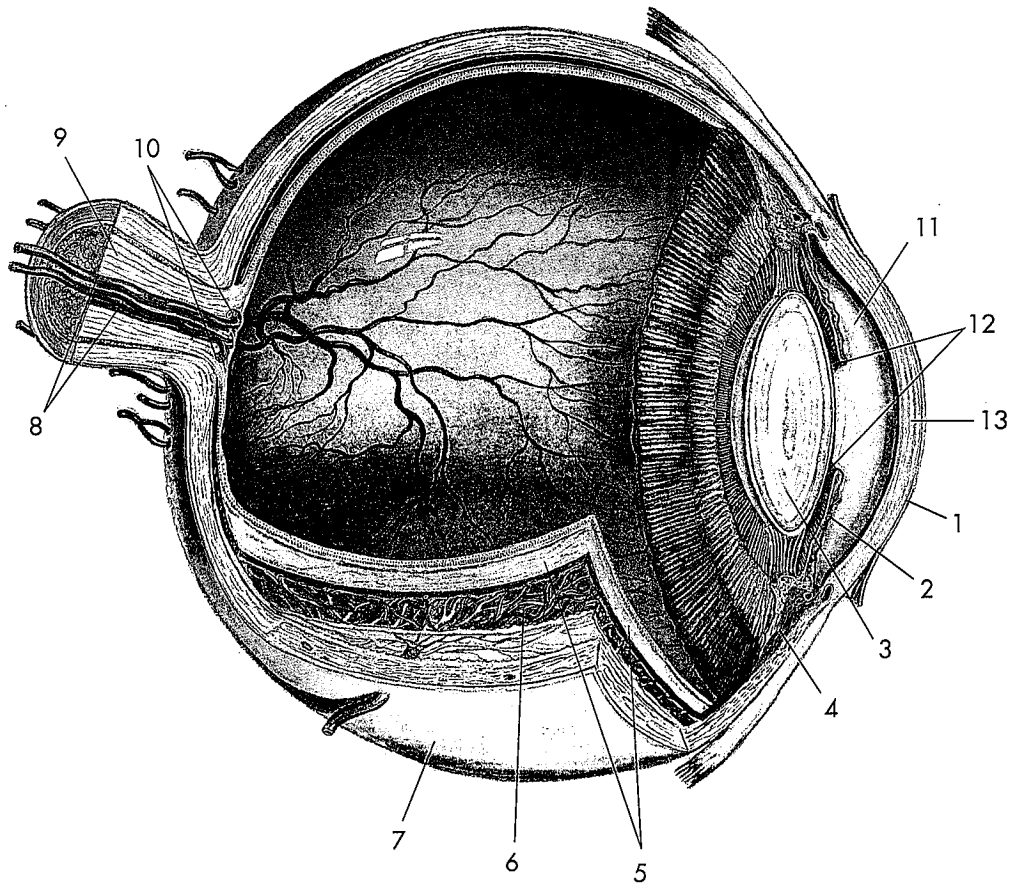
9. Which of the following statements about gustatory sense organs is *true*?
- A. They are called taste buds.
  - B. They are innervated by cranial nerves VII and IX.
  - C. They work together with the olfactory senses.
  - D. All of the above
10. The external ear consists of the:
- A. Auricle and auditory canal
  - B. Labyrinth
  - C. Corti and cochlea
  - D. None of the above

### True or False

*Indicate whether the following statements are true (T) or false (F).*

- \_\_\_\_\_ 11. The tympanic membrane separates the middle ear from the external ear.
- \_\_\_\_\_ 12. Glaucoma may result from a blockage of the flow of the vitreous humor.
- \_\_\_\_\_ 13. With the condition of presbyopia, the eye lens loses its elasticity.
- \_\_\_\_\_ 14. The crista ampullaris is located in the nasal cavity.
- \_\_\_\_\_ 15. Myopia occurs when images are focused in front of the retina rather than on it.
- \_\_\_\_\_ 16. Light enters through the pupil, and the size of the pupil is regulated by the iris.
- \_\_\_\_\_ 17. The retina is the innermost layer of the eye. It contains the structures called rods.
- \_\_\_\_\_ 18. The sclera is commonly called the "white of the eye."
- \_\_\_\_\_ 19. The olfactory receptors are chemical receptors.
- \_\_\_\_\_ 20. The organ of Corti contains mechanoreceptors.

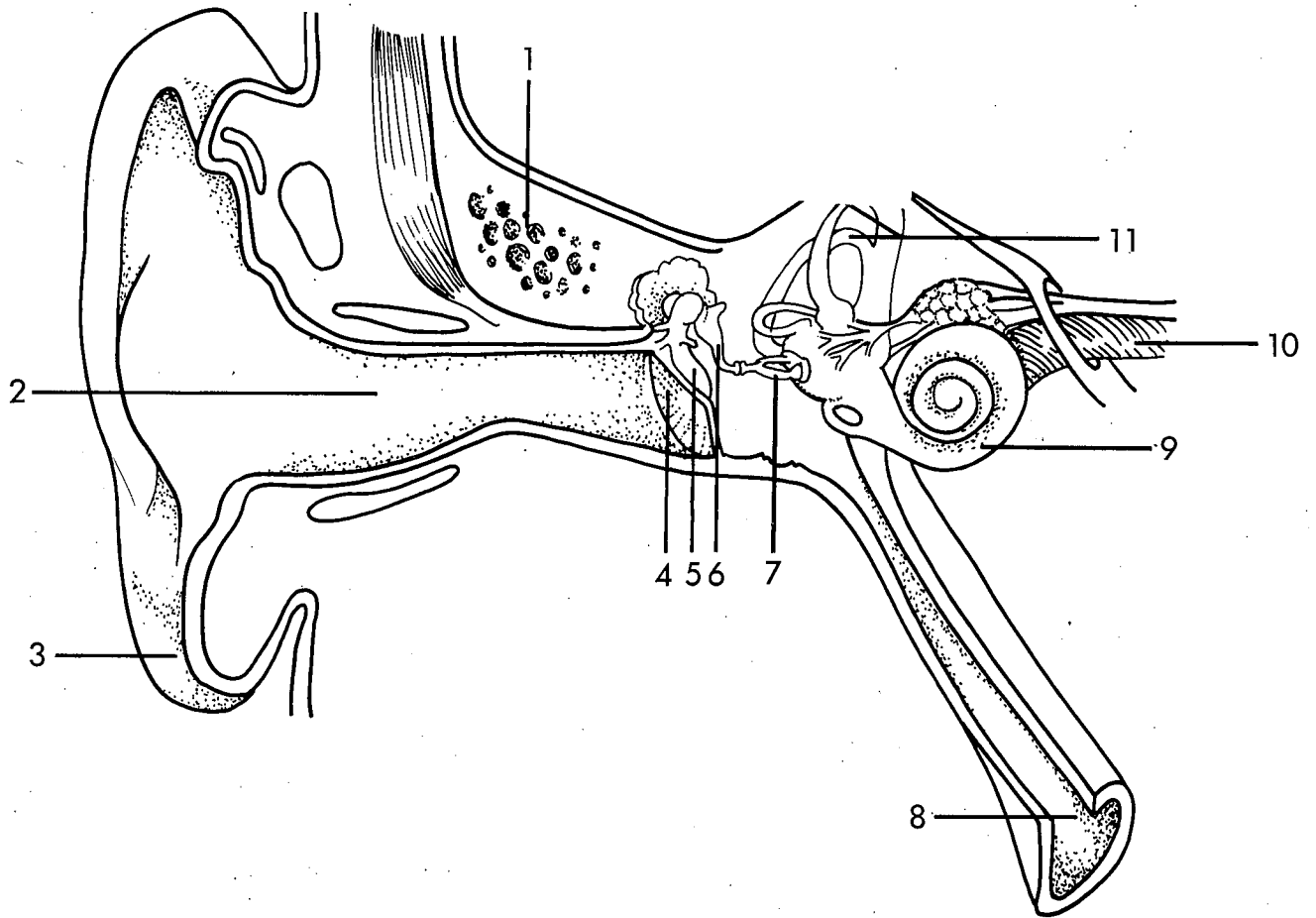
# Eye



- 1. \_\_\_\_\_
- 2. \_\_\_\_\_
- 3. \_\_\_\_\_
- 4. \_\_\_\_\_
- 5. \_\_\_\_\_
- 6. \_\_\_\_\_

- 7. \_\_\_\_\_
- 8. \_\_\_\_\_
- 9. \_\_\_\_\_
- 10. \_\_\_\_\_
- 11. \_\_\_\_\_
- 12. \_\_\_\_\_
- 13. \_\_\_\_\_

# Ear



- 1. \_\_\_\_\_
- 2. \_\_\_\_\_
- 3. \_\_\_\_\_
- 4. \_\_\_\_\_
- 5. \_\_\_\_\_
- 6. \_\_\_\_\_

- 7. \_\_\_\_\_
- 8. \_\_\_\_\_
- 9. \_\_\_\_\_
- 10. \_\_\_\_\_
- 11. \_\_\_\_\_

