

The Senses



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تاريخ إضافة الملف على موقع المناهج: 11:45:26 2026-06-12

ملفات اكتب للمعلم اكتب للطالب | اختبارات الكترونية | اختبارات | حلول | عروض بوربوينت | أوراق عمل
منهج انجليزي | ملخصات وتقارير | مذكرات وبنوك | الامتحان النهائي | للمدرس

المزيد من مادة
علوم:

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التواصل الاجتماعي بحسب الصف التاسع المتقدم



صفحة المناهج
الإماراتية على
فيسبوك

الرياضيات

اللغة الانجليزية

اللغة العربية

التربية الاسلامية

المواد على تلغرام

المزيد من الملفات بحسب الصف التاسع المتقدم والمادة علوم في الفصل الثالث

Structure of The Nervous System

1

L1 and 2 Review - Nervous System

2

مراحل نمو الإنسان قبل الولادة

3

الجهاز الإخراجي

4

درس العقاقير

5

● Sensory receptors:

- The senses help us perceive the changes that occur in the environmental environment by receiving influences from the external environment and interpreting them every second.
- **Sensory receptors: These are nerve cells that help sense:**

Taste

smelling

Hearing

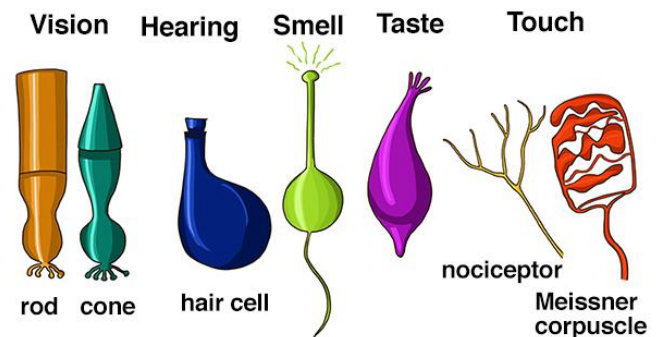
Sight

Touch

Temperatures

Sensation of movement

Sensory Receptor Cells



1- Smell:

Alarm type:

Chemicals (smell molecules in the air)

Path:

Specialized receptors at the top of the nose....to...the olfactory bulb....to.....the brain.

2- Taste:

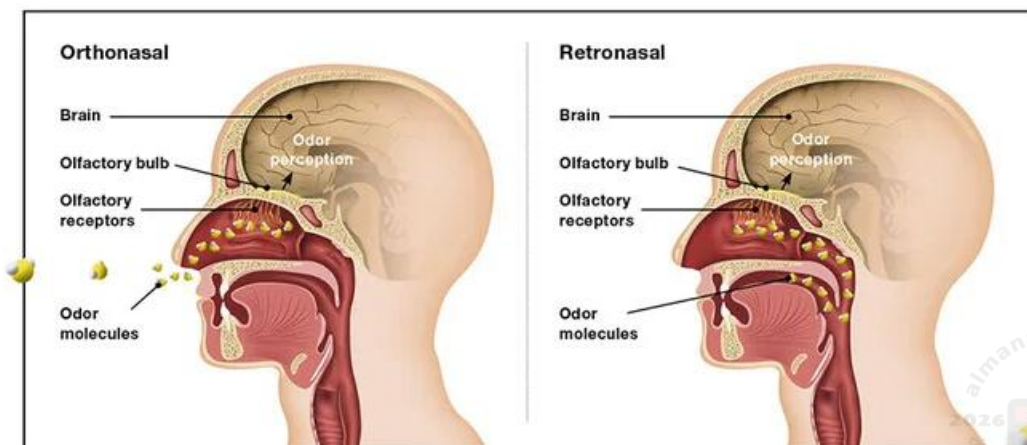
Alarm type:

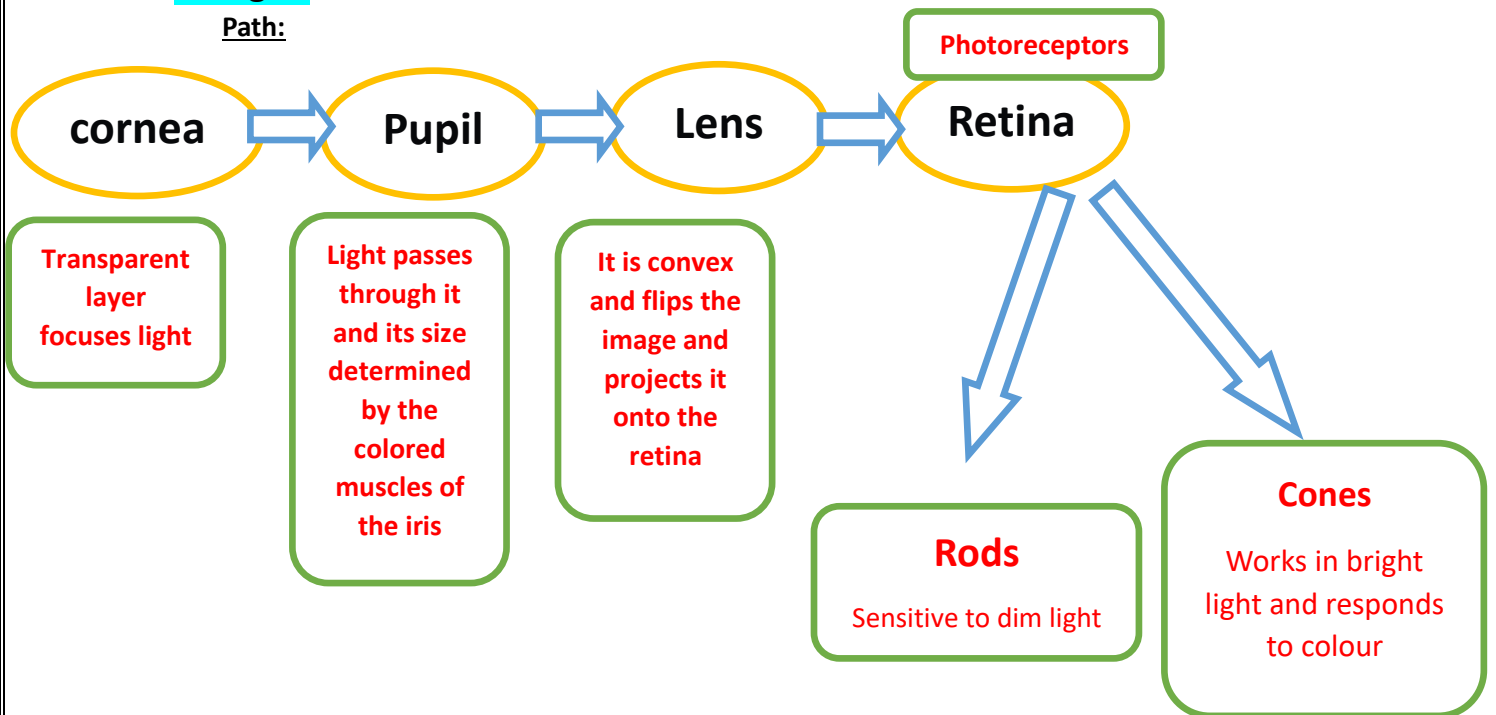
Chemicals in food.

Path:

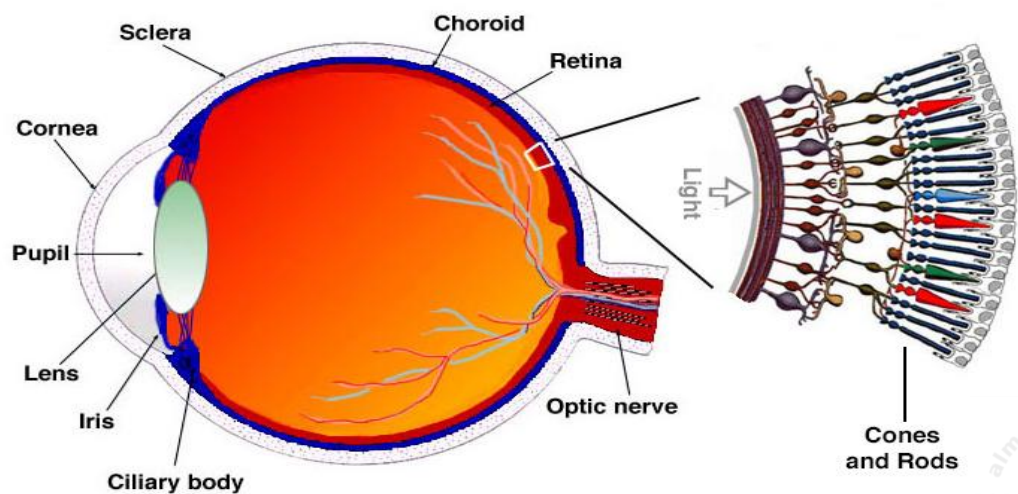
Specialized receptors in the tongue pick up tastes (sweet, sour, salty, and bitter) and send them to another part of the brain.

Taste and smell receptors are linked together, and the signals sent contribute to creating a unified effect in the brain. This is why we do not feel the taste of food when the nose is closed.



3- Sight:Path:

- The nerve impulse is transmitted from the retina to the optic nerve, then to the brain, and is then interpreted in the form of an image.
- Vitreous fluid is a colorless gelatinous fluid found between the lens and the retina through which images are transmitted.
- When a type of cone cell is lost, a person will suffer from color blindness.
- When the rod cells are lost or their number is reduced, the person suffers from poor night vision.



4- Ear:

- The ear performs two functions: hearing and balance.
- The ear is divided into three main parts:

Outer ear**middle ear****Inner ear****Hearing process:**

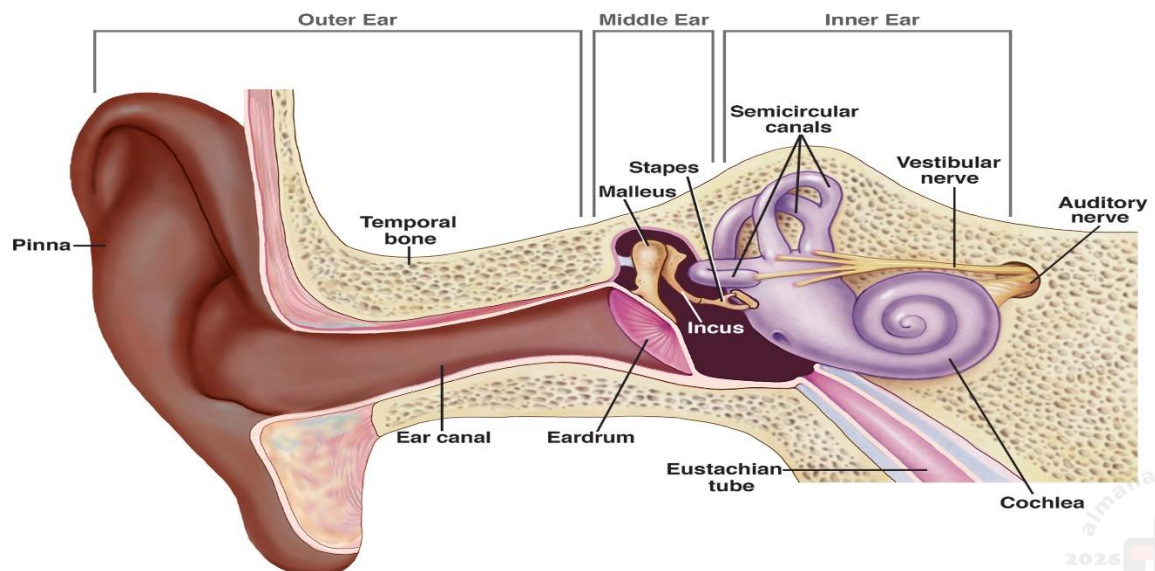
- Hearing waves enter the ear
- The tympanic membrane vibrates
- The three bones shake
- The oval window (membrane separating the middle and inner ear) vibrates.
- The fluid vibrates in the cochlea
- Hair cells vibrate
- Sending a nerve signal to the auditory nerve
- To the brain to translate it into sound

Semicircular canals

- They transmit information about the body's position and balance to the brain and form a right angle to each other. They are filled with fluid and lined with hair cells.

Hair cells

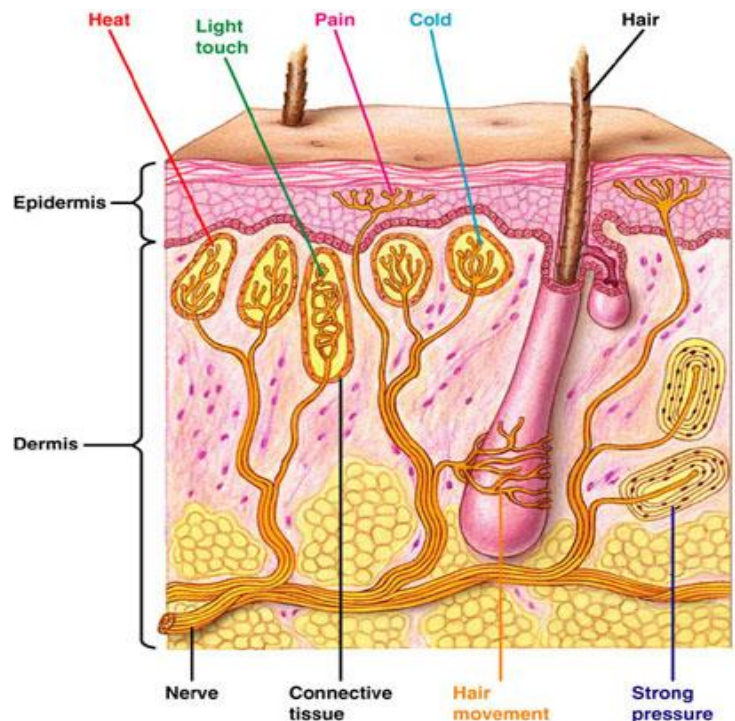
- It monitors the movement of the head and changes its location. When the location of the head changes, the fluid in the channels moves, and the hair cells bend and send a nerve impulse to the brain, through which the brain determines the position of the body whether it is fixed or moving.



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5- Touch:

- The skin contains the following sensory receptors:
- the heat
- the pressure
- the pain
- Light touch
- Coldness
- These receptors are found in the epidermis and dermis.
- Light touch receptors are concentrated in the fingertips.
- The sole of the foot contains pressure receptors.
- Pain receptors consist of free ends located at the ends of nerves and are found in all tissues of the body except the brain.
- The brain constantly receives signals from these receptors and each respond in an appropriate manner.



- ***A sensory receptor is a nerve cell that recognizes stimuli.***

Receptor	Stimulus	Organs
Auto	Movement, pressure and tension	Skin, Ear, Muscles
Lighting	Photochromic changes	Eyes
Chemicals	Chemicals Substance	Tongue, Nose
Heating	Temperature changes	Skin
Pain	Tissue damage	All Part of the body

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1- It is a colorless gelatinous liquid located between the lens and the retina through which images are transmitted.

Vital fluid tears vitreous fluid bloody fluid

2- When a type of is lost, a person will become color blind.

Cone cells Neurons Rod cells Motor cells

3- When there is a loss or decrease in the number of..... the person suffers from poor night vision.

Cone cells Neurons Rod cells Motor cells

4- Are cells sensitive to dim light?

Retinal cells Sensory cells Saccular cells Cone cells

5- Light passes through it and its size is determined by the colored muscles.

cornea pupil retina lens

6- It works in bright light and responds to colours.

Retinal cells Sensory cells Saccular cells Cone cells

7- It transmits information about body position and balance to the brain.

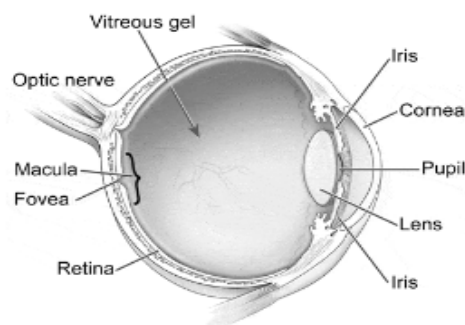
Semicircular canals hair cells cone cells sensory cells

8- Receptors.....they consist of the free ends of the nerve endings and are found in all tissues of the body except the brain.

Heat pressure pain light

1. The part of ear that provides equilibrium

- | | |
|------------------------|-----------------|
| a) labyrinth | b) round window |
| c) semicircular canals | d) cochlea |



2.

The first part of the eye that light hits.

- | | |
|-----------|-----------|
| a) retina | b) cornea |
| c) pupil | d) lens |

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3. The receptors that sense chemicals
- a) chemoreceptors
 - b) thermoreceptors
 - c) photoreceptors
 - d) mechanoreceptors
4. The receptors that sense light
- a) thermoreceptor
 - b) mechanoreceptor
 - c) photoreceptor
 - d) chemoreceptor
5. Receptors stimulated by physical forces that cause movement of fluid or vibration within the body are:
- a) chemoreceptors
 - b) mechanoreceptors
 - c) thermoreceptors
 - d) proprioceptors
6. Receptors for taste and smell are classified as:
- a) proprioceptors
 - b) chemoreceptors
 - c) thermoreceptors
 - d) mechanoreceptors
7. The _____ is the area for hearing.
- a) cochlea
 - b) incus
 - c) malleus
 - d) stapes
8. Special structures that detect stimuli
- a) Receptors
 - b) medulla
 - c) nerve cells
 - d) brain
9. Photoreceptors are found in your
- a) ears
 - b) nose
 - c) mouth
 - d) skin
 - e) eyes

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10. Receptors found in your mouth are
- a) photoreceptors
 - b) sound receptors
 - c) chemical receptors
 - d) mechanical receptors
11. Which type of receptor is NOT found in your skin?
- a) pressure
 - b) pain
 - c) light
 - d) temperature
12. Nerve impulses are carried from the eye to the brain by the
- a) cornea
 - b) optic nerve
 - c) rod and cone cells
 - d) transducens nerve
13. Which of the following statements about sense organs is INCORRECT?
- a) They contain sensory cells.
 - b) They are responsible for detecting stimuli.
 - c) There are five sense organs in humans.
 - d) They are responsible for producing senses.
14. The cells responsible for color vision in vertebrates are called
- a) rod cells
 - b) cone cells
 - c) bipolar cells
 - d) cupula cells
15. The ear functions for _____.
- a) both balance and hearing
 - b) hearing
 - c) balance

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1. Rod cells and cone cells are located in the
 - a) cornea
 - b) retina
 - c) organ of Corti
 - d) iris
2. OUR EARS HAVE THREE PARTS: OUTER EAR, MIDDLE EAR AND OUTER EAR. WHERE CAN YOU FIND THE EARDRUM AND THE THREE SMALL BONES?
 - a) IN THE NOSE
 - b) INNER EAR
 - c) MIDDLE EAR
 - d) OUTER EAR



3. WHERE CAN YOU FIND THE COCHLEA?
 - a) IN THE EYE
 - b) IN THE OUTER EAR
 - c) IN THE INNER EAR
 - d) IN THE MIDDLE EAR
4. The receptors that sense light
 - a) thermoreceptor
 - b) photoreceptor
 - c) chemoreceptor
 - d) mechanoreceptor

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5. Photoreceptors are found in your
- a) mouth
 - b) nose
 - c) ears
 - d) eyes
 - e) skin
6. The cells responsible for color vision in vertebrates are called
- a) cone cells
 - b) bipolar cells
 - c) rod cells
 - d) cupula cells
7. Your ear drum is also known as the:
- a) Tompanic Membrane
 - b) Timpanic Membrane
 - c) Tempanic Membrane
 - d) Tympanic Membrane
8. The ear has 2 main functions. They are hearing and:
- a) Balance
 - b) Creating cerumen
 - c) Draining excess fluid
 - d) Managing pressure when in elevated areas
9. The small projections on the surface of the tongue are called
- a) otoliths
 - b) taste buds
 - c) gustatory hairs
 - d) papillae
10. How can we smell different scents?
- a) a magic bus travels into our nose
 - b) our brain tells us what we are smelling
 - c) we sniff the air
 - d) scent molecules travels unto our noses

11. What other sense works closely with your sense of taste?

a) Sense of hearing

b) Sense of smell

c) Sense of sight



12.

What part of the eye can change shape to help focus the image?

a) retina

b) lens

c) cornea

d) iris

• **Short Answer Questions (Interpretation, Analysis, Comparison)**

1. **Explain the biological reason** why food tastes bland when you have a stuffy nose. How do taste and smell receptors collaborate to create the *perception* of flavor?
2. **Compare and contrast** the nature of the stimuli detected by the senses of smell and touch. How does the mechanism of reception differ (e.g., chemical vs. physical)?

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3. **Analyze the pathway of vision.** If the vitreous gel becomes cloudy, why would this directly impair sight, even if the retina and optic nerve are perfectly healthy?
4. **Describe the process of sensory adaptation** using the example of touch receptors. Why might you stop feeling your watch on your wrist after wearing it for a while, and what is the benefit of this phenomenon?
5. **Interpret the following scenario:** A person with damage to the hair cells in their semicircular canals feels dizzy and off-balance even when standing still. Explain the physiological cause of this dizziness.
6. **Compare the roles** of rod cells and cone cells in the retina. Why is night vision primarily the responsibility of rods, and what is the consequence of losing them?
7. **Analyze the statement:** "The brain interprets signals; it does not sense directly." Use the example of hearing (from vibration to sound perception) to justify this statement.
8. **Explain the protective function** of pain receptors. Why is the absence of pain receptors in the brain both an advantage and a potential danger?
9. **Deduce and explain:** If the auditory nerve is severed, a person becomes completely deaf in that ear. However, if the eardrum is ruptured, hearing loss may be partial. Why is there this difference in outcome?

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10. **Synthesize a concept:** All sensory pathways ultimately lead to the brain. What is the *critical common final step* that must happen for any raw sensory data (light, vibration, chemical) to become a conscious perception like sight, sound, or taste?

*** Multiple Choice Questions (Comprehension Check)****1. What is the primary function shared by all sensory receptors?**

- a) To produce hormones
- b) To interpret environmental stimuli in the brain
- c) To convert specific environmental stimuli into nerve impulses
- d) To store memories of past experiences

2. The close relationship between taste and smell is best explained by:

- a) Both use the same type of receptor cells.
- b) Their signals converge and are integrated in the brain to create flavor.
- c) Taste buds can detect smells.
- d) The tongue is physically connected to the nasal cavity.

3. In the visual pathway, what is the role of the vitreous fluid?

- a) To focus light onto the retina
- b) To transmit nerve impulses to the optic nerve
- c) To provide a clear medium for light to pass through to the retina
- d) To interpret images as color

4. A person with color blindness most likely has a problem with:

- a) Rod cells in the retina
- b) The optic nerve
- c) The vitreous fluid
- d) One or more types of cone cells

5. Which part of the ear is directly responsible for converting fluid vibrations into nerve impulses?

- a) Tympanic membrane (eardrum)
- b) The three ossicles (bones)
- c) Hair cells in the cochlea
- d) Semicircular canals

6. The semicircular canals contribute to the sense of:

- a) Hearing only
- b) Balance and body position
- c) Pressure and touch
- d) Temperature

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7. Where would you find the highest concentration of light touch receptors?

- a) On the back
- b) On the fingertips
- c) On the sole of the foot
- d) In the epidermis layer only

8. What is unique about pain receptors compared to other skin receptors?

- a) They are only found in the dermis.
- b) They are the only type not found in the brain.
- c) They adapt very quickly, so pain never lasts long.
- d) They detect only temperature changes.

9. The correct sequence for the hearing process is:

- a) Sound waves → Oval window vibrates → Cochlear fluid moves → Hair cells bend → Nerve impulse
- b) Sound waves → Tympanic membrane vibrates → Ossicles move → Oval window vibrates → Cochlear fluid moves → Hair cells bend → Nerve impulse
- c) Sound waves → Hair cells bend → Auditory nerve → Brain
- d) Sound waves → Cochlea vibrates → Ossicles amplify → Eardrum vibrates → Brain

10. Which statement about sensory pathways is MOST accurate?

- a) All sensory information is interpreted in the same lobe of the brain.
- b) Receptors interpret the meaning of the stimulus before sending it to the brain.
- c) The brain receives raw nerve impulses and interprets them into specific sensations.
- d) The strength of the stimulus does not affect the nerve signal sent.

11. Loss of rod cells would primarily result in:

- a) Inability to see any light
- b) Poor vision in bright light
- c) Poor vision in dim light (night blindness)
- d) Loss of peripheral vision only

12. The stimulus for both smell and taste is:

- a) Mechanical pressure
- b) Electromagnetic waves
- c) Chemical molecules
- d) Temperature change

13. What is the role of the brain in the sense of touch?

- a) It acts as the primary receptor for pressure.
- b) It generates signals for heat and cold.
- c) It receives and interprets signals from skin receptors to determine the type of sensation.
- d) It contains free nerve endings for pain.

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14. The fact that the semicircular canals are oriented at right angles to each other allows them to:

- a) Amplify sounds better.
- b) Detect head movement in all three spatial planes (up/down, left/right, tilting).
- c) Prevent fluid from leaking out.
- d) Connect directly to the cochlea.

15. If the nerve connecting the olfactory bulb to the brain is damaged, what would be the most direct effect?

- a) Inability to chew food
- b) Loss of sense of smell (anosmia)
- c) Loss of sense of taste on the front of the tongue
- d) Impaired balance
