UNIT-2

WINDOWS OF KNOWLEDGE

1.Sense organs and receptors

Sense organs	Receptor	Stimulus
Eye	Photoreceptors	Light
Ear	Auditary receptors	Sound
Tongue	Chemoreceptors/Tastebuds	Different tastes
Skin	Various receptors	Touch,pain,temperature,pressure etc.....
Nose	Olfactory receptors	Smell

2.How eyes are protected?

- **Eye socket** :depressions in the skull
- **External eye muscles** : fix the eye balls in the orbit
- **Eyebrow** :
- **Eyelashes** : prevents from entry of germs and dust particles.
- **Eyelids** :
- **Conjunctiva** : secretes mucus which protects the anterior portion of the eye ball from being dry.
- **Tears** : clean and lubricate the anterior part of the eye ball.

  Lysozyme, the enzyme present in tears, destroys germs that enter the eyes.

3.Which are the three layers of eyes?

- **Sclera :** The white outer layerwhich gives firmness to the eye.
- **Choroid :** The middle layer which contains a large number of blood vessels.

- **Retina :** The inner layer which has photoreceptors.
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4.Which are the parts of sclera?

Cornea : The projected transparent anterior part of the sclera which refracts light rays to focus on the retina.

Conjunctiva : The layer which covers and protects the front part of sclera except the cornea.

5.Which are the parts of choroid?

Iris : The part of the choroid seen behind the cornea. Presence of the pigment melanin gives the iris a dark colour.

Pupil : The aperture seen at the centre of the iris. The size of this aperture increases and decreases depending on the intensity of light.

6.Which are the parts of retina?

Yellow spot : The part of the retina where plenty of photoreceptors are present. It is the point of maximum visual clarity.

Blind spot : The part of the retina from where the optic nerve begins. Here there is no vision as photoreceptors are absent.

7.Which is the lens in our eyes?

Elastic transparent **convex lens**, connected to ciliary muscles by thread like ligaments.

8.What is the function of ciliary muscle in our eyes?

The contraction and relaxation of these muscles alter the curvature of lens.

9.What is the function of optic nerve?

Transmits impulses from photoreceptors to the visual centre in the brain.

10.Compare aqueous humor and vitreous humor

Features	Aqueous humor	Vitreous humor
Chamber	aqueous chamber	vitreous chamber
Position	between the lens and the cornea.	between the retina and the lens.
Nature	water like	jelly like
Function	Provides oxygen and nourishment to the tissues of the eye.	Helps in maintaining the shape of the eye.

11.What are the changes in pupil during dim light and intense light

Dim light	Intense light
radial muscles contract	circular muscles contract
size of the pupil increases.	size of the pupil decreases

12.What are the peculiarities of the image formed by the lens of the eye?

- Small
- Real
- Inverted

13.What are the changes taking place inside the eye while viewing near object and distant object?

While viewing nearby objects	While viewing distant objects

Focal length decreses	Focal length increases
Curvature of lens increases.	Curvature of lens decreases
Ciliary muscles contract	Ciliary muscles relax
Ligaments relax.	Ligaments stretch

14.Define power of accomodation of eye?

The ability of the eye to adjust the focal length of the lens by changing its curvature in accordance to the distance of the object from the eye and form the image on the retina is called the power of accommodation of the eye.

15.Compare rod cell and cone cell

Feature	Rod cell	Cone cell
Shape	Rod shape	Cone shape
Pigment	rhodopsin	photopsin(iodopsin)
Component of pigment	opsin+retinal	opsin+retinal
Function	Able to see objects in dim light.	cone cells provide us with colour vision

16.Make short note on formation of impulses in photoreceptors

In the presence of light, the pigments present in photoreceptors, dissociate. This chemical change leads to the formation of impulses

Light

Rhodopsin ⇌ Retinal + Opsin

Photopsin ⇌ Retinal + Opsin

17.Complete the flowchart related to the sense of sight

Light ➡ cornea ➡ aqueous chamber ➡ pupil ➡ lens ➡ vitreous chamber ➡ retina ➡ photoreceptor ➡ impulse ➡ optic nerve ➡ cerebrum ➡ sense of vision

18.What is binocular vision?

The images from two sides of the same object combine as a result of the activities of the brain and a three dimensional image of the object is formed. This is called

binocular vision.

19.Tabulate eye dieseses/defects

Dieseses/defects	Cause	Effect
Night blindness	The deficiency of Vitamin A results in the low production of retinal.	cannot be seen clearly in dim light
Xerophthalmia	prolonged deficiency of Vitamin A	conjunctiva and cornea become dry and opaque. Leads ultimately to blindness.
Colour Blindness	due to the defect of cone cells.	persons cannot distinguish green and red colours
Glaucoma	If the reabsorption of aqueous humor does not occur, it causes an increase in the pressure inside the eyes.	causes damage to the retina and the photoreceptor cells and ultimately leads to blindness
Cataract	lens of the eyes become opaque	leads to blindness
Conjunctivitis	infection of the conjunctiva by bacteria, virus etc..	reddening of eyes

20.What are the things to be taken care of to ensure the health of the eyes?

- Eat food rich in Vit A
- Wash eyes with clean water
- Limit the use of mobile phones,computers,laptopes etc...
- Don’t read in dim light
- Don’t read while in moving vehicle
- Don’t use excessive cosmetics for eyes
- Don’t rub the eyes.

21.Prepare a poster on 'Eye donation'

- **May your eyes see this world**

even after death...

- **Eye Donation Life Donation**

22.(a)What are the functions of ear?

The ear not only helps us in hearing, but also in maintaining the balance of the body.

(b)What are the things to be taken care of to ensure the health of the ears?

- Don’t put any sharp objects inside ear
- Don’t be exposed to loud noice
- Avoid continous use of headsets,earphones etc..
- Avoid beating around ear and face
- Avoid blowing the nose hardly.
- Avoid bathing in stagnant water

23.Which are the parts of external ear?Mention their peculiarities

- ➔ **Pinna**-Carries sound waves to the auditory canal.
- ➔ **Auditory canal**-Carries sound waves to the tympanum. Small hairs and wax present inside the canal help to prevent dust and foreign particles from entering the ear.
- ➔ **Tympanum**-A thin circular membrane that separates the middle ear from the external ear. It vibrates in resonance with sound waves.

24.Which are the parts of middle ear?Mention their peculiarities

- ➔ **Ear ossicles**-Amplify and transmit the vibrations of the tympanum to the internal ear.
- ➔ **Eustachian tube**-Connects the middle ear and the pharynx. Protects the tympanum by balancing the pressure on either side of the tympanum.

25.Which are the bones in ear ossicles?

- Malleus
- Incus
- Stapes

26.Which are the parts of internal ear?Mention their peculiarities

- ➔ **Semicircular canals and Vestibule**- help in balancing the body.

➔ **Cochlea**- helps in hearing.

➔ **Vestibular nerve**-carries impulses from semicircular canal and vestibule to cerebellum

➔ **Auditory nerve**-carries impulses from cochlea to cerebrum

27.What is difference between bony labyrinth and membraneous labyrinth?

The internal ear is situated inside a bony case in the skull called the **bony labyrinth.**

Membraneous labyrinth is present within bony labyrinth.

28.Which are the fluids present in internal ear?

The space inside the membraneous labyrinth is filled with a fluid named **endolymph.**

The space between the membraneous and bony labyrinth is filled with a fluid called **perilymph.**

29.How oval window is different from round window?

- **Oval window**-Membrane seen attached to the stapes. It spreads the vibration of ear ossicles to the inner ear.
- **Round window**-Helps in the movement of fluid inside the cochlea.

30.Make short note on cochlea

Cochlea is a coiled tube like a snail shell. It consists of three chambers. Specialized sensory hair cells which are present in the basilar membrane that separates the middle and lower chambers, function as auditory receptors.

31.What is Organ of Corti?

The basilar membrane and sensory hair cells together constitute the Organ of Corti.

32.Prepare a flowchart on sense of hearing

Sound waves → **Pinna** → **Auditary canal** → **Tympanum**

Ear ossicles → **Oval window** → **Cochlea** →

Hair cells → **Impulse** → **Auditorynerve** →

Cerebrum → **Sense of hearing**

33.Prepare a flowchart on body balancing by ear

movement of the head → movement of the endolymph → movement of the sensory hair cells → impulses → vestibular nerves → cerebellum → → equilibrium of the body is maintained

34.**(a)**What are the different types of tastes we can detect?

We have taste buds that are stimulated by tastes like sweet, salt, sour, bitter, umami etc.

(b) What are the things to be taken care of to ensure the health of the tongue?

Avoid use of extreme hot and cold food items

Ensure proper mouth hygeine

Avoid use of hard tongue cleaners

Avoid use of drugs items keeping inside mouth.

35.What are chemoreceptors?

Chemoreceptors are receptors seen inside the mouth and tongue which help us to detect taste.

36.What are papillae?

The projected structures seen on the surface of the tongue are called papillae.

37.What are tastebuds?

The parts seen on the papillae that detect taste are the taste buds.

38.Prepare a flowchart on the method of detecting taste.

Substances responsible for taste dissolve in saliva

↓

Stimulate the chemoreceptors

↓

Generate impulses.

↓

Respective nerves

↓

Cerebrum

Experience taste.

39.Prepare a flowchart on the method of detecting smell.

Aromatic particles diffuse in the air and enter the nostrils.

These aromatic particles dissolve in the mucus inside the nostrils.

Stimulate the olfactory receptors

Generate impulses.

Respective nerves

Cerebrum

Experience smell.

40.Why there a possibility of not sensing the taste of food while suffering from common cold?

During cold our noses are often blocked with mucus and we can’t smell properly.So if we are not able to smell,our brain is not able to tell us about the flavour of the dishes.

41.Which are the various receptors present in the skin to sense the different stimuli?

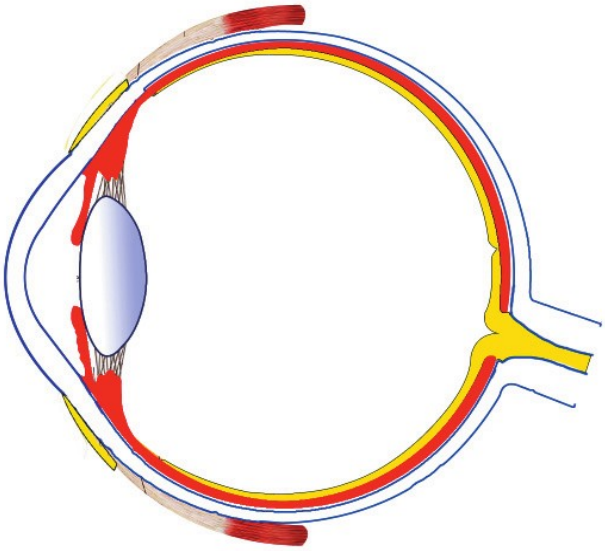
Pain receptor,Pressure receptor,Temperature receptor,Touch receptor,Cold receptoretc..

42.Tabulate different receptors in various organisms

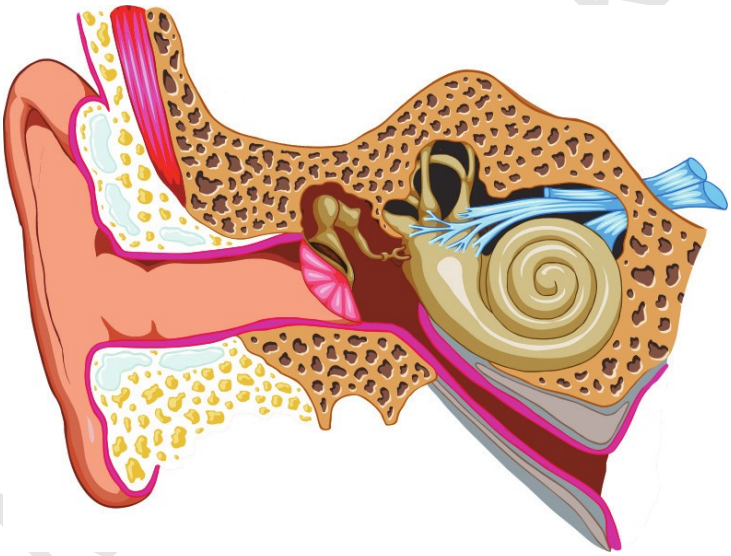
Organism	**Receptors**
Planaria	Eye spot
Shark	lateral line,olfactory receptors.
Housefly	Ommatidia
Snake	Jacobson’s organ

43.Draw and label the parts of:

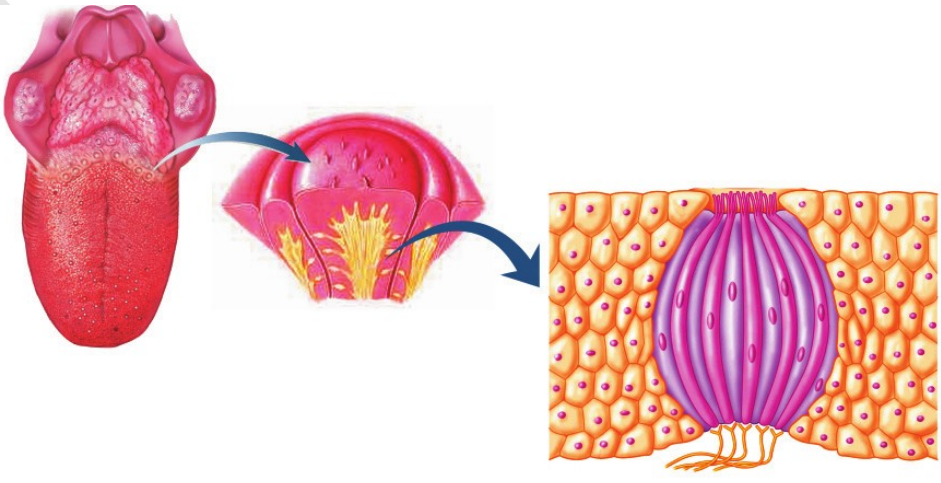
Human eye



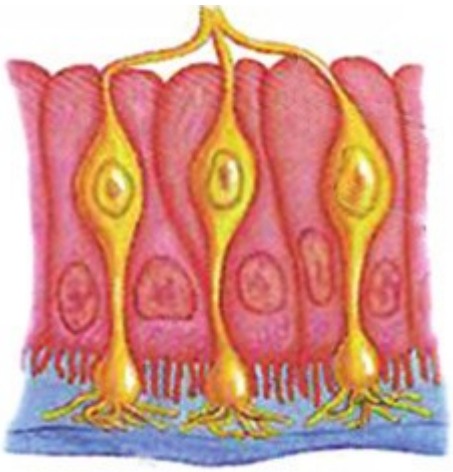
Human ear



Taste buds



Olfactory receptor



Receptor in skin