



STATE COUNCIL OF EDUCATIONAL RESEARCH AND TRAINING

TELANGANA, HYDERABAD.

ACADEMIC YEAR 2020-21

LEVEL - 2

CLASS: 9th Class

Medium: English

SUBJECT: Biology

CHAPTER NAME: Plant Tissues

WORK SHEET NUMBER: 16

CONCEPT: 1.Dermal tissues

LEARNING OUT COMES:

The Learner.....

1. Explains about Dermal tissues.
2. Classifies Dermal tissues on the basis of their location and function.
3. Draws the diagrams of Dermal tissue.
4. Appreciates the Dermal Tissue for their protective function in plants.

We can find the dermal tissue over the entire surface of the plant body. This tissue develops from the cells of the Meristematic tissue.

- Write about the different types of Dermal tissue.
- Write about the functions of Dermal tissue. What is meant by bark?

Dermal tissues are divided into three types on the basis of their location and Functions. They are

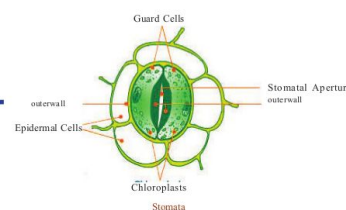
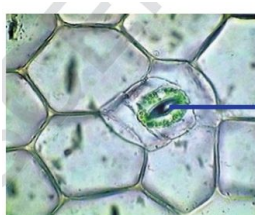
1. Epidermis (outermost layer),
2. Mesodermis (The middle layer) and
3. Endodermis (the innermost layer).

The dermal tissue protects the plants from loss of water, mechanical damage, and invasion by parasitic and disease causing organisms. In big trees the dermal tissue forms several layers above the epidermis. It is called bark. Gum is secreted from the dermal layer of gum tree.

- If dermal tissue covers the entire plant, then what about the gaseous exchange for inner tissues of plants?
- Write about the structure and arrangement of cells in the leaf epidermis.
- Write the differences between the cells of leaf epidermis and the cells of root epidermis?

Small pores are seen in the epidermis of the leaf, called stomata. They are enclosed by two kidney shaped cells, called guard cells. Gaseous exchange takes place through stomata. Cells of the roots have long-hair like parts, called root hair.

Let us do the following activity to observe the Dermal tissue more closely. Take a fresh leaf of Rheo or Betel plant. Tear it in a single stroke, so that a thin whitish edge can be seen at the torn end. Slowly remove it and observe that peel under the microscope (by preparing a temporary mount). You can see the compactly arranged cells with stomata. Draw and label the diagram and compare with the given diagram.



SELF EVALUATION:

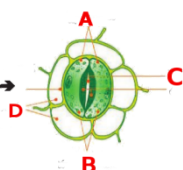
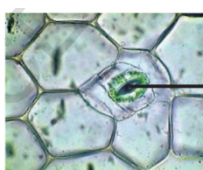
1. **This is not the character of Dermal tissue ()**

- A) Tissue with stomata B) Secrets Gum
C) Cells with thick cell wall D) Dividing tissue

2. **Match the following**

- I Epidermis () a. Inner layer
II Mesodermis () b. Outer layer
III Endodermis () c. Middle layer

3. **Identify the given diagram, and write the labelled parts. (A, B, C and D)**



Name of the diagram: -----
A: -----
B: -----
C: -----
D: -----

4. **Write about the different types of dermal tissues.**

5. **Draw the labelled diagram of Dermal tissue.**

6. **Write about the functions of dermal tissues.**

7. **Write the procedure you followed in observing the Rheo leaf peel.**



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LEVEL - 2

CLASS: 9th Class

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SUBJECT: Biology

CHAPTER NAME: Plant Tissues

WORK SHEET NUMBER: 17

CONCEPT:

1. Ground tissues

LEARNING OUT COMES:

The Learner.....

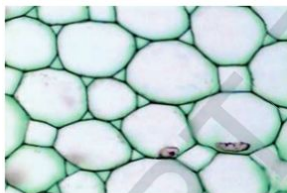
1. Explains about Ground tissues.
2. Classifies Ground tissues on the basis of their function.
3. Draws the diagrams of Ground tissue.

CONCEPT PRESENTATION:

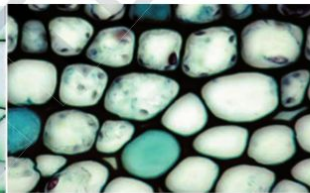
Ground tissue forms the bulk of the plant body. It is also develops from Meristematic tissue.

- Write about the different types of Ground tissue.

There are mainly three types of ground tissues. They are parenchyma, Collenchyma and Sclerenchyma.



Parenchyma



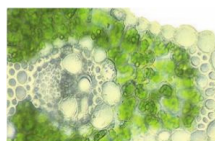
Collenchyma



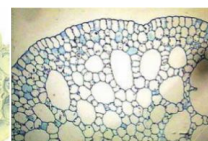
Sclerenchyma

- Write about the characters of cells in Parenchyma.
- Write about the different types of parenchyma and their functions.

The cells of the parenchyma are soft, thin walled and loosely packed.



Chlorenchyma



Aerenchyma



Storage Tissue

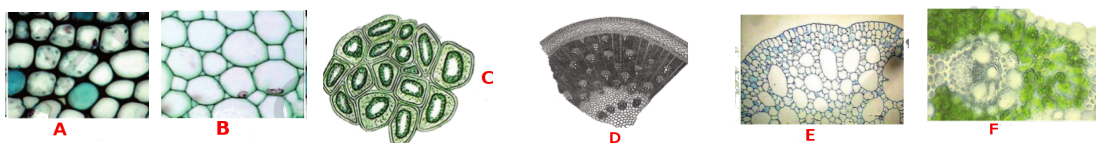
The Parenchyma which contains chloroplasts is called “Chlorenchyma”. This participates in photosynthesis. The Parenchyma which contains large air cavities or spaces is called “Aerenchyma”. This participates in exchange of gasses in plants. The Parenchyma which stores water or food or waste products is called “Storage Tissue”.

- Compare the cells of Parenchyma, with the cells of Collenchyma and Sclerenchyma.

Collenchyma tissues have thick walled, longer cells when compared with parenchyma. In the sclerenchyma the cells are thick walled and tightly packed without spaces. So when compared with the ground tissue is of various types.

SELF EVALUATION:

- Character of the cells of Parenchyma. ()
 A) soft, thin walled and loosely packed B) Thick walled cells
 C) Cell with dividing nature D) Tightly packed without spaces
- Match the following
 I Parenchyma () a. thick walled, longer cells
 II Collenchyma () b. thick walled and tightly packed without spaces
 III Sclerenchyma () c. soft, thin walled and loosely packed
- Choose the WRONG one . ()
 A) Collenchyma tissues have thick walled, longer cells when compared with parenchyma.
 B) Cells in Sclerenchyma have soft, thin walled and loosely packed.
 C) Chlorenchyma performs photosynthesis.
 D) Aerenchyma contains large air cavities or spaces.
- Identify the tissue given in the diagrams and fill the table.



A	
B	
C	
D	
E	
F	

- Draw the diagrams of Ground tissue. .

- Write the functions of Parenchyma.



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SUBJECT: Biology

CHAPTER NAME: Plant Tissues

WORK SHEET NUMBER: 18

CONCEPT: 1.Vascular tissues

LEARNING OUT COMES:

The Learner.....

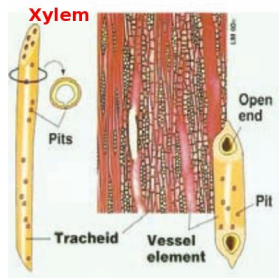
1. Explains about Vascular tissues.
2. Classifies Vascular tissues on the basis of their transporting material.
3. Draws the diagrams of Vascular tissue.

CONCEPT PRESENTATION:

The tissues involved in transportation are vascular tissues. They are composed of different types of cells which show specific arrangements.

Mention the different types of Vascular tissue.

Vascular tissue is mainly of two types. They are 1. Xylem 2. Phloem.

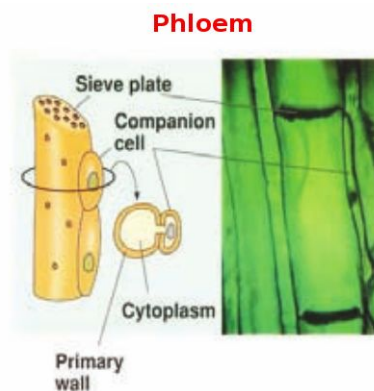


- Write about the cells present in Xylem. Which materials are transported by Xylem?

Xylem is responsible for the transportation of materials like water and salts from the root. Xylem contains elongated tracheid cells, tubular vessels, fibres and parenchyma.

- Write about the cells present in Phloem.
- Which materials are transported by Phloem?

Phloem contains long sieve cells and sieve tubes, companion cells, fibres and parenchyma. Phloem helps in the transportation of the food material prepared by photosynthesis to the other parts of the plants.



- What are the functions of Vascular tissue?

Xylem is responsible for the transportation of materials like water and salts from the root.

Phloem helps in the transportation of the food material prepared by photosynthesis. Hence they are known as conducting or vascular tissues.

- Which Tissue forms Vascular Bundles?

Xylem and Phloem together form the vascular bundles. The vascular tissue gives mechanical support to the plant as well.

SELF EVALUATION:

- This is not the Character of the Xylem. ()

A) Presence of elongated tracheid cells	B) Presence of Xylem vessels
C) Presence of companion cells	D) Presence of parenchyma
- Match the following

I Xylem	()	a. transportation of the food material
II Phloem	()	b. Xylem and Phloem together form Vascular bundles
III Vascular bundles	()	c. transportation of materials like water and salts
- Choose the WRONG one .()

A) Xylem and Phloem together form Vascular bundles	B) Parenchyma is present in Xylem and Phloem.
C) Xylem is responsible for the transportation of water.	D) Phloem helps in the transportation of mineral salts.
- Draw the diagrams of Xylem.
- Draw the diagrams of Phloem.
- What will happen if Xylem is removed from the plant.

Resources: 1. <https://www.youtube.com/watch?v=gvKpJORpIKo>
 2. <https://www.youtube.com/watch?v=ffT-rLntdcA>



STATE COUNCIL OF EDUCATIONAL RESEARCH AND TRAINING

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ACADEMIC YEAR 2020-21

LEVEL - 2

Class: IX

Medium: English

Subject: Bioscience

Name of the lesson: Animal Tissues

WORKSHEET: 19

Concepts:

1. Organ systems
2. Animal tissues

Learning Outcomes :

The learner.....

1. Explains about the organ systems and their functions.
2. Identifies the role of tissues in the formation of an organ / organ systems.

CONCEPT PRESENTATION:

There are different kinds of organ systems carrying out different functions in animals.

What are different types of organ systems and their functions? Enlist them in the following table.

List of Organ systems	Functions in animal body
Nervous system	Transmission of information

In animals there are different types of tissues to carry out different functions.

All organ systems form an organism to perform different functions for example body protection. muscle system for movement, skeletal system for body support, digestive system for digestion, respiratory system for respiration, blood circulatory system for transportation, Excretory system for waste disposing, Nervous system for coordination, Endocrine system for chemical coordination and Reproductive system for reproduction.

- How many types of tissues are there? what are they?

These organ systems have mainly four types of tissues. They are

1. Epithelial Tissue
 2. Connective Tissue
 3. Muscle Tissue and
 4. Nervous Tissue .
- How does Epithelial Tissue help the organisms ?

Epithelial tissue covers the body surface, lines the internal organs, body cavities and protects them.

- What are the functions of Connective tissue?

Connective tissue: These tissues help in the transport of materials, body defence, binding the other tissues and organs together and provide a framework and support to various organs in the body. These tissues transport the material, body defence, body repair and storage of fat.

- What is the function of muscle tissue?

The tissue which is responsible for movement in our body is known as muscle tissue.

- What is the function of nervous tissue?

A specialised tissue, that responds to internal and external stimuli is called nervous tissue.

SELF EVALUATION:

1. Match the following

- | | | |
|-----------------------|---------|--------------------------------|
| i. Nervous tissue | () | a. Helps in movement |
| ii. Epithelial tissue | () | b. Gives framework and support |
| iii. Muscle tissue | () | c. Control and coordination |
| iv. Connective tissue | () | d. Covers body parts |

2. Which organ systems help in control and coordination of the body?

3. Write different organ systems and their functions?

4. If the reproductive system is absent in animals, what will happen ?

5. Find the INCORRECT one based on connective tissue.

- A) Connective tissues help in binding the other tissues.
- B) Connective tissues provide a framework and support various organs in the body.
- C) Connective tissues show a major role in control and coordination.
- D) Connective tissues transport the material.



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LEVEL - 2

Class: IX

Medium: English

Subject: Bioscience

Name of the lesson: Animal Tissues

WORKSHEET: 20

Concepts:

1. Squamous Epithelial Tissue
2. Stratified Epithelial Tissue

Learning Outcomes:

The learner.....

1. Explains the structure and functions of squamous and stratified epithelial tissues.
2. Identifies the location of squamous and stratified epithelial tissues.
3. Draws the diagrams of squamous and stratified epithelial tissues.

CONCEPT PRESENTATION:

Epithelial tissue covers and protects the animal's body outside and inside.

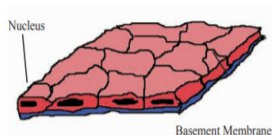
- How many types of epithelial tissues? What are they?
- Where do epithelial tissues present?

Epithelial tissues are mainly four types. They are

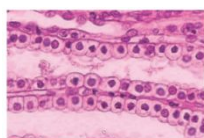
1. squamous epithelium
2. stratified epithelium
3. cuboidal and
4. columnar epithelial tissues .

Epithelial tissue is present in the skin, lining of mouth, lining of blood vessels, alveoli of lungs and kidney tubules.

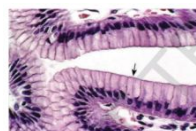
Observe the different types of epithelium.



Squamous epithelium



Stratified epithelium



Cuboidal epithelium

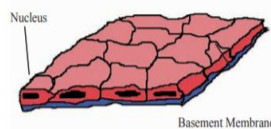


Columnar

- Where does squamous epithelium present ?

- How do we observe the squamous epithelium?

Squamous epithelium is found in the lining of mouth, oesophagus, blood vessels, alveoli of lungs. To know the structure of squamous epithelium, scrape the lining of the mouth by using wooden spoon and observe this under the microscope. Draw the diagram of your observation.



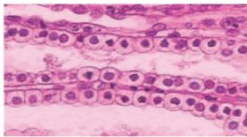
- How are the cells arranged?
- Are intercellular spaces present between the cells?

Squamous epithelial cells are compactly arranged without intercellular space.

Squamous epithelium, extremely thin and flat, forms a delicate lining. This tissue is responsible for the transportation of substances, because the plasma membranes of this tissue is selectively permeable.

- Why the epithelial cells of the skin are arranged in the form of layers?

The epithelial cells in skin are arranged in the form of layers. This is called as stratified squamous epithelium. If skin burns or wounded it helps in regeneration of affected area.



SELF EVALUATION:

1. Draw the diagram of squamous epithelium.
2. How does stratified squamous epithelium protect our body?
3. How many types of epithelial tissues are there? What are they?
4. where is squamous epithelium present in our body?
5. Which of the following is not a characteristic of squamous epithelium?
 A) Flattened cell B) single layer of cells
 C) Adopted to facilitate the diffusion of substances D) Contain microvilli
6. Assertion : Only squamous epithelium takes part in transport of substances .

Reasoning : Squamous epithelial tissue forms a permeable membrane, so it selectively transports substances.

- A) Assertion is correct but reasoning is incorrect.
- B) Assertion is incorrect but reasoning is correct.
- C) Both are correct.
- D) Both are incorrect.



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LEVEL - 2

Class: IX

Medium: English

Subject: Bioscience

Name of the lesson: Animal Tissues

WORKSHEET: 21

Concepts :

1. Cuboidal Epithelium
2. Columnar Epithelium

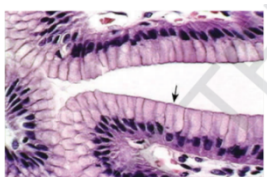
Learning Outcomes:

The learner.....

1. Explains the functions and location of cuboidal and columnar epithelium.
2. Differentiates the cuboidal epithelium and columnar epithelium
3. Draws the diagrams of cuboidal and columnar epithelium.

CONCEPT PRESENTATION : Observe the following figure.

- Where does cuboidal epithelium present?
- What is the function of it?



This is cuboidal epithelium, which forms the lining of organs or tubules like ureters and other parts. It mainly provides mechanical support to salivary glands. Each cell of Cuboidal epithelium is square or cuboidal in shape and arranged in single layer.

Observe the following figure.

- How are the cells arranged?
- Where are they present?



This is Columnar epithelium. This epithelium is present wherever absorption and secretion occurs. Cells of columnar epithelium are column or pillar like arranged in a long row with the nuclei.

- What is modified epithelium?

The epithelial tissue that is modified into different forms is called modified epithelium. They are the scales of fish, reptiles and feathers of birds.

SELF EVALUATION:

1. Draw the diagrams of cuboidal epithelial tissues.
2. Draw the diagrams of Columnar epithelial tissues. What is its function?
3. Where does cuboidal epithelium present? What is its function?
4. Where does Columnar epithelium present?
5. Intestine absorbs the digestive food materials. What type of epithelial tissues are responsible for that?
 A) Squamous epithelium B) cuboidal epithelium
 C) Columnar epithelium D) Stratified squamous epithelium
6. The tissue present in ureters.
 A) Squamous epithelium B) cuboidal epithelium
 C) Columnar epithelium D) Stratified squamous epithelium
7. Find out the odd one based on modified epithelial tissue.
 A) Scales of fish B) feathers of birds C) Lining of mouth D) Scale of reptile



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LEVEL - 2

Class: IX

Medium: English

Subject: Bioscience

Name of the lesson: Animal Tissues

WORKSHEET: 22

Concept :

1. Connective tissue
2. Areolar Tissue

Learning Outcomes :

The learner.....

1. Classifies the connective tissues.
2. Explains the functions of areolar tissue.
3. Draws the diagram of areolar tissue.

CONCEPT PRESENTATION:

The internal organs are located at specific places without any displacement due to connective tissue.

- What are the major functions of connective tissues?

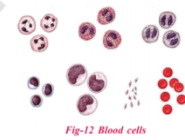
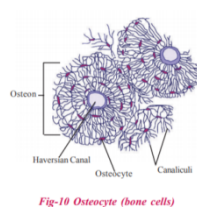
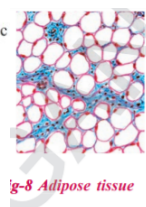
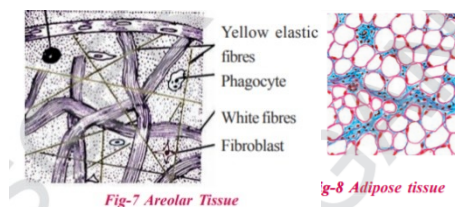
Connective tissues help in binding other tissues and organs, transport of materials from one tissue to another, body defence, body repair, and storage of fat.

- How many types of connective tissues are there? What are they?

Observe the following pictures.

- What are they?

These are connective tissues. Several types of connective tissues are present. They are Areolar tissue, Adipose tissue, Bone, Cartilage, Ligament, Tendon, and blood.



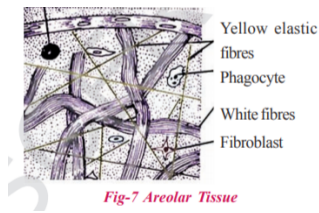


Fig-7 Areolar Tissue

Observe the above picture of areolar tissue, it has lot of fibrous structures.

- What is the structure and function of it

Areolar tissue is a type of connective tissue which joins different tissues. It helps in packing and helps to keep the organs in place. Areolar Connective tissue has fibroblasts which secrete fibrous material which helps the other tissue to be in position. These cells also help in repair of the tissues when they are injured.

The muscles in our body are attached to the skin and bone by areolar tissue. We can see this type of tissue around the blood vessels and nerves.

SELF EVALUATION :

1. Draw the diagram of areolar tissue .
2. What are the major functions of connective tissue? Name the cells which help connecting the organs?
3. Write about the connective tissues.
4. Write the location of Areolar tissue.
5. Identify the INCORRECT one . ()
 - A) Muscles are attached to skin by areolar tissue.
 - B) Muscles are attached to bone by areolar tissue.
 - C) Areolar tissue transports the material from one part to the other.
 - D) Areolar tissue holds other tissue in position.



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ACADEMIC YEAR 2020-21

LEVEL - 2

Class: IX

Medium: English

Subject: Bioscience

Name of the lesson: Animal Tissues

WORKSHEET: 23

Concepts: 1. Adipose Tissue

2. Bone

3. Cartilage

4. Ligament

5. Tendon

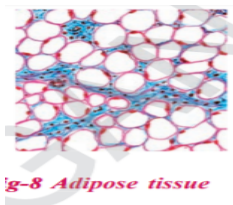
Learning Outcomes :

The learner.....

1. Identifies the location of adipose tissue, bone, cartilage, ligament and tendon.
2. Explains the functions of adipose tissue, bone, cartilage, ligament and tendon.

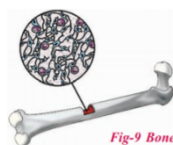
CONCEPT PRESENTATION:

- Is there any special arrangement to prevent the heat escape from our body?

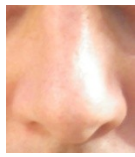


Above shown figure is fat storing adipose tissue. It is found below the skin and internal organs. The cells of these tissues are filled with fat globules. Storage of fat acts as insulator.

- Which tissue gives a definite shape to the body of vertebrate?



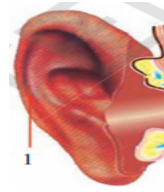
Bone is another type of connective tissue. Bone forms the frame work that supports the body. It is a major component of skeletal system of several vertebrates.



Nose



Trachea



Ear

- Which tissue gives support to these organs?

Cartilage is a type of connective tissue found in the joints of bones, tip of ribs, tip of the nose, external ears and in trachea. Endo skeleton of Shark is made up of cartilage. Cartilage is hard but not as hard as bone.

- How are two the bones connected at joints?

Ligament is another type of connective tissue that connect bones at the joints and hold them in position. It is made up of large number of fibres. These fibres are made of a protein called collagen. This is elastic in nature.

The body movement is because of muscles attached to bones.

- How are muscles are attached to bones?

Tendon is a type of connective tissue it joins the muscle to the bone. Tendon's fibre is made up of collagen. It is elastic in nature.

SELF EVALUATION:

1. Write the differences between cartilage and bone.

2. Which factors help the ligament and tendons to do their work efficiently?

3. Match the following.

- | | |
|-----------------------------|--|
| i. Adipose tissue | a. Joins muscle to the bone. |
| ii. Ligament | b. Forms framework and gives support to body |
| iii. Bone | c. Fat storing tissue |
| iv. Tendon | d. Connect bones at joints |
| A) i-c, ii- a, iii-d, iv- b | B) i-d, ii- c, iii-a, iv- b |
| C) i-c, ii- d, iii-b, iv- a | D) i-a, ii- c, iii-d, iv-b |

4. Identify the INCORRECT one.

- A) Cartilage present in tip of nose.
- B) Cartilage present in trachea.
- C) Cartilage present in fingers.
- D) Cartilage present in external ear .



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LEVEL - 2

Class: IX

Medium: English

Subject: Bioscience

Name of the lesson: Animal Tissues

WORKSHEET: 24

Concepts:

1. Plasma
2. Red Blood Cells
3. Blood composition

Learning Outcomes:

The learner.....

1. Identifies the components of blood.
2. Explains the structure and functions of RBC.
3. Draws the flow chart of blood.

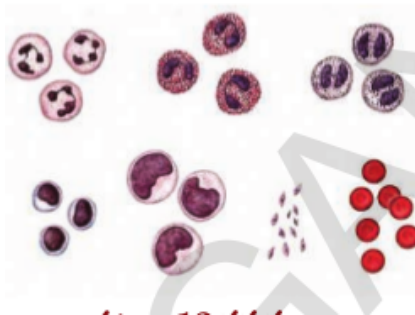
CONCEPT PRESENTATION:

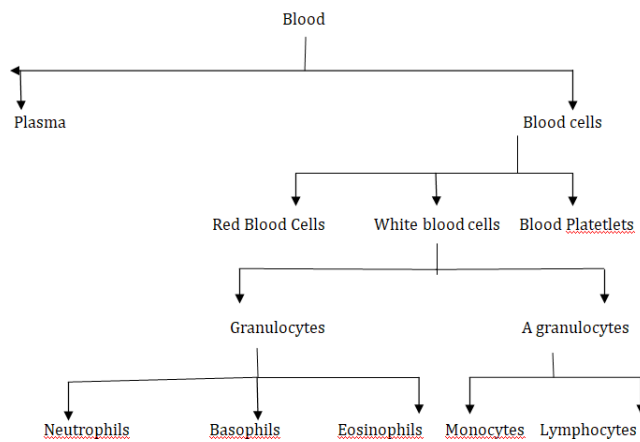
The red stream that flows in closed tubes in our body is blood. It is also a type of connective tissue. Normal adult human beings have about 5 litres of blood. There are no fibres in blood. Blood has mainly two components. They are Plasma and Blood cells.

- Which components are present in plasma?

There are different types of cells in blood. They float freely in plasma. Extracellular space is filled with fluid called plasma. A chief component in plasma is water. Besides water it also has several nutrients such as glucose, amino acids, proteins, vitamins, hormones required for the body and also excretory products such as lactic acid, urea, salts etc. plasma also has heparin which helps to prevent blood clotting.

- How many types of cells are present in blood?
What are they?
- There are different types of cells in blood. They have specific function. Blood cells are 3 types.
 1. RBC, 2. WBC, 3. Blood platelets.





Observe the flow chart to know the components of Blood.

- Where do red blood cells formed? What is their function?

Red blood cells are also known as erythrocytes. They have red colour protein called haemoglobin which helps in the transport of oxygen and carbon dioxide. One ml of human blood has about five millions of RBCs which live for 120 days in blood.

- Which organ forms RBC?

In mothers womb foetus RBCs are formed in the liver and spleen. After child birth these RBCs are generated from the bone marrow of long bones.

SELF EVALUATION:

1. What is plasma? Name the components present in it?
2. What is the role of RBC?
3. Draw the flow chart of components of blood.
4. Collect the blood reports of some patients and analyse them. (Project work)

5. Choose the right one.

Statement1: In foetus RBC are formed by the Liver and Spleen.

Statement2 : After the child birth RBCs are generated from the bone marrow of long bones .

- A) Statement 2 is correct B) Statement 1 is correct
C) Both the statements are correct D) Both the statements are incorrect

6. Which one of the following is INCORRECT.

- A) RBC lifespan is 120 days .
B) Healthy human being have approximately five liters of blood .
C) Thin fibres are present in blood
D) RBCs also known as Erythrocytes .



STATE COUNCIL OF EDUCATIONAL RESEARCH AND TRAINING TELANGANA, HYDERABAD.

ACADEMIC YEAR 2020-21

LEVEL - 2

Class: IX

Medium: English

Subject: Bioscience

Name of the lesson: Animal Tissues

WORKSHEET: 25

Concepts:

1. White Blood Cells
2. Blood Platelets

Learning Outcomes :

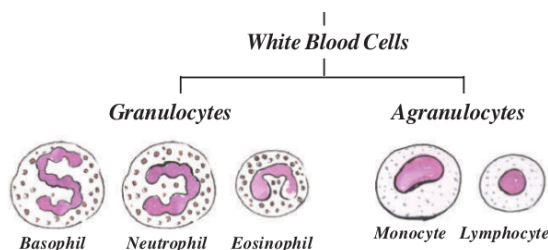
The learner.....

1. Classifies the White blood cells on the basis of their functions.
2. Explains the role of WBCs in protection of our body.
3. Draws diagrams of white blood cells.

CONCEPT PRESENTATION:

- How many types of WBC are there? What are they?

Observe the following pictures to know the types of WBC.



- Why do we call these blood cells as white blood cells?
- Write about the types of White blood cells?

The second type of blood cells are called white blood cells which are also called as leucocytes. These cells do not have haemoglobin, hence they are colourless. WBCs are less in number when compared to RBC.

WBC are two types 1. Granulocytes. 2. Agranulocytes.

There are three types of cells in granulocytes – Neutrophils, Basophils, Eosinophils

- How do granulocytes help us?

Granulocytes attack and destroy the micro organisms that enter the body. Neutrophils are the first line of defence against bacteria. So they are called microscopic policemen .

- What is the role of agranulocytes in maintaining our immunity?

Agranulocytes are two types – Lymphocytes and Monocytes. Lymphocytes secrete antibodies to guard against foreign material that enter into blood.

Monocytes are more like amoeba and attack the foreign materials and engulf them. They are called Microscopic scavengers. Some white blood cells sacrifice their life to fight against micro organisms .

- How do Platelets prevent the blood loss from wounds?

Blood platelets are a separate group of cells which do not have a nucleus. They are disc like projections . Whenever a blood vessel is injured, platelets accumulate at the site of injury and help in the formation of blood clot.

SELF EVALUATION :

1. Draw the flow chart of WBCs.
2. Draw different types of white blood cells and name them.
3. What is the role of Blood platelets in Blood clotting?
- 4 How do white blood cells protect our body from pathogens?
5. Match the following

i.	Platelets	()	a. Engulf foreign material
ii.	Neutrophils	()	b. Secrete antibodies.
iii.	Monocytes	()	c. First line of defence against bacteria
iv.	Lymphocytes	()	d. Help in the formation of blood clot.
6. Which of the following is the function of white blood cells?

A) Transport oxygen	B) Produce haemoglobin
C) Defence against Infection	D) Blood clotting

Image source: <https://images.app.goo.gl/z5Z86srAWUJjop5M6>



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TELANGANA, HYDERABAD.

ACADEMIC YEAR 2020-21

LEVEL - 2

Class: IX

Medium: English

Subject: Bioscience

Name of the lesson: Animal Tissues

WORKSHEET: 26

Concept :

1. Blood groups

Learning Outcomes :

The learner

1. Classifies blood groups.
2. Identifies the blood groups with the help of blood grouping kit .
3. Appreciates the process of blood donation.

Concept Presentation :

“ Your sisters and brothers are not your relatives” This shocks you. But it is true, if you take into consideration the blood groups, because they may not have the same blood groups as yours.

- Who discovered blood groups ? What are the main blood groups?
- What is the significance of blood groups AB and O?

Land steiner, a German doctor divided human beings into four major groups. They are A, B, AB and O. AB blood group human beings can receive the blood from any other groups, hence they are called as universal blood recipients. O group people can donate the blood to any other group. So these people are known as universal blood donors.

- When do people need blood transfusion?
- What is the importance of blood grouping?

People need blood transfusion if they have a severe blood loss by an accident, in some operations or liver diseases etc. The accurate grouping of blood is very important . when it comes to having a blood transfusion. Otherwise it can cause intravenous clamping in the patient's blood which can be fatal.

- How do we identify the blood groups?

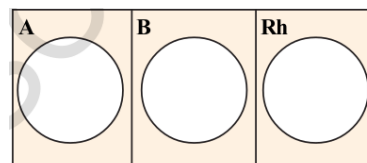
For this we need a blood grouping kit .

We use the above material to find out the blood groups .

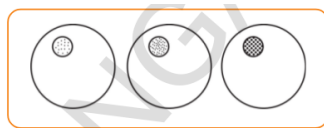
- What is the procedure of blood grouping?

Procedure :

With a wax pencil draw three circles on the porcelain white slate . Place one drop of corresponding anti- serum near the edge. Clean the left ring

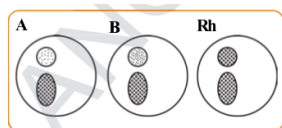


finger tip with alcohol in cotton ball, let it dry. Press on the bottom of the finger tip and quickly prick the finger tip with the needle.



Note : Needle is sterile , so do not touch the tip with anything before using it.

Quickly, let one drop of blood into each circle. Apply gentle pressure to the wound with cotton ball. Properly dispose the used needle.



agglutination.

Use a tooth pick to mix the blood and antiserum and stir it gently. Do it for each of the circle using fresh toothpick every time. Watch to see if any of the blood samples show agglutination. Rh is slower to

Result and Inference : Following table can be used to determine the blood type .

Anti-A	Anti-B	Type
Yes	No	A
No	Yes	B
Yes	Yes	AB
No	No	O

(It is better to conduct the blood grouping test with the help of a Health Inspector)

- How can we identify Rh⁺ and Rh⁻ .

If agglutination occurs in anti Rh D serum, The Rh factor is positive and if does not Rh factor is Negative. Example A⁺ Blood group : If agglutination occurs in anti- A serum and Anti-RhD serum blood group is A⁺ .

Result should be given in the below table.

S. No.	Name	Blood Group

SELF EVALUATION:

- Write the procedure of identification of blood groups.
- Which blood group is indicated as universal donor and universal recipient? why?
- Collect the blood reports of your neighbours and analyse them? (Project work)
- Match the following

a. A ⁺ blood group	i. Agglutination occurs with all serums
b. O ⁻ Blood group	ii. Agglutination occurs with anti A and Anti D serum
c. AB ⁺ Blood Group	iii. Agglutination do not occurs with any serum
d. B ⁺ Blood Group	iv. Agglutination occurs in anti Rh D serum
e. O ⁺ Blood Group	v. Agglutination occurs with Anti B and Anti D serum

A) a-v, b-ii, c-i ,d-iv, e-iii B) a-i, b-iii, c-v, d-ii, e-iv
 B) C) a-ii, b-iii, c-i, d-v, e-iv D) a-iii ,b-v, c-ii, d-i, e-iv



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ACADEMIC YEAR 2020-21

LEVEL - 2

Class: IX

Medium: English

Subject: Bioscience

Name of the lesson: Animal Tissues

WORKSHEET: 27

Concept :

1. Striated muscle

Learning Outcomes:

The learner

1. Identifies the types of muscles.
2. Explains the structure and functions of striated muscles.
3. Draws the diagram of striated muscle.

CONCEPT PRESENTATION:

- Which tissue is responsible for body movements?

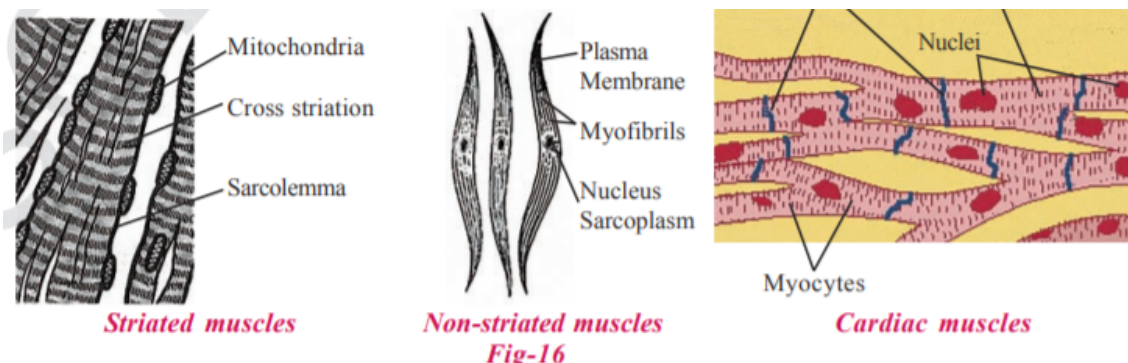
Muscles are responsible for the movement of hands and legs and also for the movement of several internal organs. The muscles which are attached to bones and move according to our will and wish are known as Voluntary muscles.

- What is the structure of muscle tissues?

Muscular tissue consists of elongated cells and muscle fibres. This tissue is responsible for movement in our body. Muscles contain a special protein called Myosin which is responsible for contraction and relaxation to cause movements.

- How many types of muscle tissues are there ? What are they?

Muscles are three types. They are striated muscle, Non –striated muscle and cardiac muscle.



Let us know about striated or skeletal muscle.

- Observe the given diagram. Why it is called striated muscle?

The muscles present in inner limbs move according to our wish and will such muscles are called voluntary muscles. These muscles are also called as skeletal muscles as they are mostly attached to bones and help in our body movement. These muscles show alternate light and dark bands or striations. As a result, they are also called as striated muscles.



The cells of striated muscle are long , cylindrical, unbranched and have many nuclei in the cytoplasm.

SELF EVALUATION:

1. Draw a neat labelled diagram of striated muscle.
2. Where is striated muscle located?
3. Why do we call skeletal muscle as striated muscle or voluntary muscle?
4. If striated muscles are involuntary, What will happen?
5. Which is a contractile protein of a muscle.
A) Tubulin B) Myosin C) Tropomyosin D) Fibrin
6. Which of the following statement is wrong according to striated muscle.
A) Long cells
B) Cylindrical cells
C) Multi nucliated
D) Branched cells



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ACADEMIC YEAR 2020-21

LEVEL - 2

Class: IX

Medium: English

Subject: Bioscience

Name of the lesson: Animal Tissues

WORKSHEET: 28

Concepts:

1. Smooth Muscles
2. Cardiac Muscles

Learning Outcomes :

The learner.....

1. Explains the characteristics of smooth and cardiac muscles.
2. Differentiates the smooth and cardiac muscles.
3. Draws the diagrams of smooth muscles and cardiac muscles.

CONCEPT PRESENTATION:

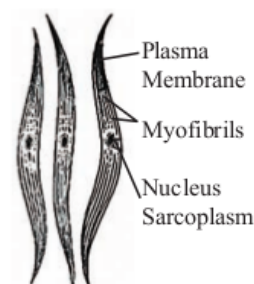
Movement of external organs like limbs can be voluntarily controlled, whereas functioning of internal organs like heart, intestine etc. are involuntary .

- What is the reason for involuntary functioning of internal organs?

The movement of food in alimentary canal and the contraction and relaxation of blood vessels are involuntary because they have smooth muscles. Smooth muscle or involuntary muscle controls such movement.

Observe the figure.

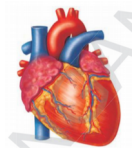
- Why do smooth muscles are called as Non striated muscles?
- Where does smooth muscles present?



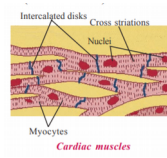
Smooth muscles are found in the iris of an eye, in uterus and in the bronchioles of lungs. Cells are long with pointed ends having single nucleus. They are also called Non- Striated muscles. These muscles do not show alternate light and dark bands or striations. So , They are called as Non-striated muscles.

Observe the figure.

- Where do the cardiac muscle present? What is the function of it?



Heart



The cardiac muscles are present in the heart and are responsible for pumping of blood. The cardiac muscles are long, branched and are multi nucleated. Cells are joined to each other at their ends. All the muscle cells in cardiac muscle have striations. It is an involuntary muscle.

SELF EVALUATION:

1. Draw a neat labelled diagram of cardiac muscle.

2. Label the parts of given smooth muscle.



3. What are the characteristics of smooth muscles?
4. Where are smooth muscles are present in opur body? What is its function?
5. Why do we call smooth muscle as Non- striated muscle ?
6. Fill the characteristics of muscles in the following table.

Striated muscle	Non striated muscle	Cardiac muscle

7. Find out the right one based on cardiac muscle.
 - A) Striated ,multi nucleated and voluntary
 - B) Striated, cross connected and voluntary
 - C) Striated, multinucleated and involuntary
 - D) Smooth, Spindle shaped and involuntary



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LEVEL - 2

Class: IX

Medium: English

Subject: Bioscience

Name of the lesson: Animal Tissues

WORKSHEET: 29

Concept :

1. Nervous Tissue

Learning Outcomes :

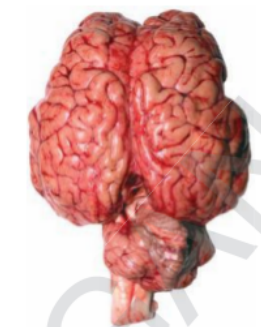
The learner.....

1. Explains the structure and functions of neuron.
2. Draws the diagram of a nerve cell.

CONCEPT PRESENTATION:

- If you put your fingers in a glass of hot water, how do you feel ?
- How would you know that the water is hot or cold?
- What mechanism do you think is responsible for the above feelings?

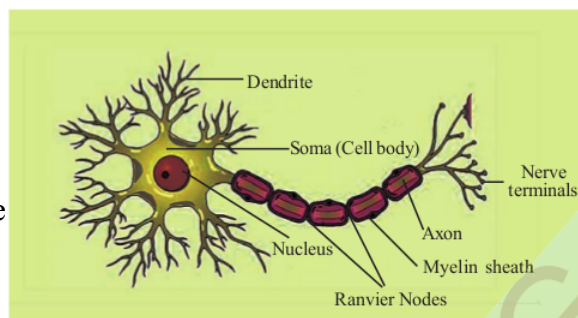
In above situations a specialized mechanism in our body works in the form of electric impulses. The brain, spinal cord and nerves play an active role in this mechanism. Neuron (Nerve cell) is a structural and functional unit of nervous system.



Observe the figure.

- What is this? What is the function of it?

This is Neuron diagram (Nerve cell). Nerve cells/Neurons do not have the ability of regeneration and no two neurons in the nervous system have same



appearance. Neurons are highly specialised for transmitting the stimulus rapidly from one place to another within the body.

- What are the parts present in a Nerve cell? Describe the structure of the Nerve cell.

Nerve cells have three distinct parts. They are 1. Cell body or Cyton 2. Axon 3. Dendrites.

Cell body/ Cyton : It has a large nucleus and cytoplasm . The cytoplasm contains nissal's granules.

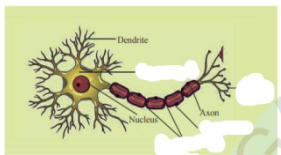
Dendrites: There are some projections from cell body these are called dendrites. They are sharp, branched, more in number.

Axon : A projection that is somewhat longer than remaining projections is called Axon. Some nerve cells have axon covered with myeline sheath. Nodes present at regular intervals on myeline sheath are known as Ranvier nodes. Axon ends with nerve terminals.

Nerve terminals of nerve cells are connected with dendrites of near by nerve cell to form a web like structure throughout the body.

Self Evaluation:

1. How does the neuron differ from other cells?
2. Label the remaining parts of the diagram given below.



3. Describe the structure of a Neuron with a neat labelled diagram.
4. Write the functions of nervous system.
5. Find out the INCORRECT one.
 - A) The cytoplasm of a cyton contains nissal's granules.
 - B) Dendrites are the projections of cyton .
 - C) All axons are covered with myelin sheath.
 - D) Axon ends with nerve terminals.



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ACADEMIC YEAR 2020-21

LEVEL - 2

Class:IX

Medium:English

Subject:Biological Science

Name of the chapter: PLASMA MEMBRANE

Worksheet No:30

CONCEPTS:

1. Substances needed for the cell.
2. Substances discarded by the cell.

LEARNING OUTCOMES:

The learner....

1. Identifies the substances which are needed and discarded by the cell.
2. Gives reasons for some substances are needed and some are discarded by the cell.
3. Appreciates the role of the cell in allowing the substances.

CONCEPT PRESENTATION:

Cell is the structural and functional unit of life. All organisms are made up of cells. Cells perform different functions.

Identify the substances needed and discarded by the cell. Fill in the given table.

Substance	Needed for the cell	Discarded by the cell
Oxygen		
Glucose		
Vitamins		
Proteins		
Wastes		
Carbon dioxide		
Minerals		

- Which substances should enter the cell? Why?
- Which substances should come out of the cell? Why?

Cells require solids like glucose, proteins, vitamins, liquids like water and gases like oxygen to perform cell functions. So they enter into the cell. Unwanted substances like wastes, ammonia, carbon dioxide etc are harmful to the cell. They should be discarded (sent out) from the cell.

Cell membrane/plasma membrane allows the passage of substances in and out of the cell.

SELF EVALUATION:

1. How do the substances move in and out of the cell?
2. The role of cell is appreciable. Comment.
3. Find out which substances are needed and which are discarded by the animal cell (draw an arrow to illustrate the direction of movement)



4. Choose the incorrect one. ()
 - A. Cell needs various substances to perform different functions.
 - B. Unwanted materials are kept inside the cell.
 - C. Waste substances should be sent out of the cell.
 - D. Ammonia is not needed for the cell.

RESOURCE: 1. https://www.youtube.com/watch?v=9WemjMabX_U



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LEVEL - 2

Class:IX

Medium: English

Subject: Biological Science

Name of the chapter: PLASMA MEMBRANE

Work sheet no: 31

CONCEPT:

1. Saturated solution

LEARNING OUTCOMES:

The learner

1. Explains the preparation of different concentrated solutions.
2. Identifies different concentrated solutions.
3. Compares different concentrated solutions.

CONCEPT PRESENTATION:

A solution contains a solute (a substance that dissolves) and a solvent (a substance that allows dissolving)

- How do you prepare a sugar solution?
- Find out the solute and solvent in the sugar solution?

We can prepare sugar solution by adding sugar to the water. In this solution solute is sugar and solvent is water. (use cold water)

- How do you prepare different concentrated solutions?

Preparation of saturated solution:

Take 100ml. of water in a beaker. Add sugar. Stir till it dissolves. Repeat it till a little amount of sugar is left at the bottom of the beaker which will not dissolve. This is the saturated solution of sugar.

Different concentrated solutions:

Take three glasses with 100ml. of water in each. Add half teaspoon of sugar to the first glass, one teaspoon to the second and one and half teaspoon sugar to the third one.

- The solution of which glass will be most sugary? What is the reason?
- How do you convert the solution of the third one into the solution of the first glass?

The solution of the third beaker will be most sugary, because more quantity of sugar is dissolved in it. We can convert the solution of the third beaker into the solution of the first beaker by adding 200 ml. of water.

We can convert the solution of the first beaker into the solution of the third one by adding one teaspoon of sugar.

Solutions with different amounts of solute dissolved in them are solutions of different concentrations. The amount of sugar present in 100ml. of water is the concentration of the sugar.

- Which glass has the most concentrated solution?

The third glass has the most concentrated solution, as it contains more sugar.

SELF EVALUATION:

1. How do you prepare a concentrated salt solution?

2. List out the materials required to prepare sugar solution

3. Find out I. solute and II. solvent from the following

A) I water, II salt

B) I sugar, II lemon water

C) I water, II sugar

D) I lemon water, II salt

RESOURCES : <https://youtu.be/CmnLujnwQ2c>



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ACADEMIC YEAR 2020-21

LEVEL - 2

CLASS: 9th Class;

MEDIUM: ENGLISH

SUBJECT: BIOLOGY

CHAPTER NAME: PLASMA MEMBRANE

WORK SHEET NO: 32

CONCEPT:

1. Plasma Membrane

LEARNING OUTCOMES:

The learner

1. Explains the functions of Plasma membrane.
2. Gives reasons for the change in size of raisins kept in different solutions.
3. Conducts experiments to know the functions of plasma membrane.
4. Applies the scientific concepts in daily life like dipping wilted vegetables in water.

CONCEPT PRESENTATION:

Cell performs different functions. Different types of substances are required by the cell to perform different functions. They are solids like glucose, liquids like water, and gases like oxygen.

- How do substances pass through the cells?

Cell membrane/plasma membrane is the covering of the cell. In plant cell there is another layer present over the cell membrane known as cell wall.

Take 100ml of water in a beaker. Keep a raisin in it and leave for 1 hour. Take it out and compare it with a dry raisin.



- What did you observe in the size of raisin taken out of the beaker?

There is an increase in size of the raisin. The size increases due to the entry of water. The cells in the outer layer permits the water to pass through. This layer is plasma membrane.

Do the same activity with different materials like bengal gram / green gram/groundnut seeds.

Record your observations.

- If wilted vegetables are dipped in water, what changes do you observe?

Take 100ml. of saturated sugar solution in a beaker. Keep the swollen raisin of previous activity in it. Leave it overnight. Observe the size of the raisin.



- What change did you observe in the size of raisin taken out of the beaker?

There is a decrease in size of the raisin. Water comes out through a layer called plasma membrane. The plasma membrane is not permeable to all substances equally. It is selectively permeable. In the same manner, when your mother dipped wilted vegetables in water, they absorb water and get somewhat fresh.

SELF EVALUATION:

1. Why do wilted vegetables are dipped in water?
2. What happens if plasma membrane loses its permeability?
3. Keep a swollen raisin in a beaker of saturated salt solution for overnight. Write your observations with reasons.
4. Observe the size of raisins in the given figures.



Fig.A. Raisin kept in water



Fig.B. Raisin kept in sugar solution

In figure A, water moves from _____ to _____

In figure B, water moves from _____ to _____

Resources: 1. https://www.youtube.com/watch?v=9WemjMabX_U
2. <https://www.youtube.com/watch?bmm1kXyewZU>



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TELANGANA, HYDERABAD.

ACADEMIC YEAR 2020-21

LEVEL - 2

CLASS:9.

MEDIUM: ENGLISH.

SUBJECT: BIOLOGY

CHAPTER NAME: PLASMA MEMBRANE.

WORK SHEET NO:33

CONCEPT:

1.OSMOSIS

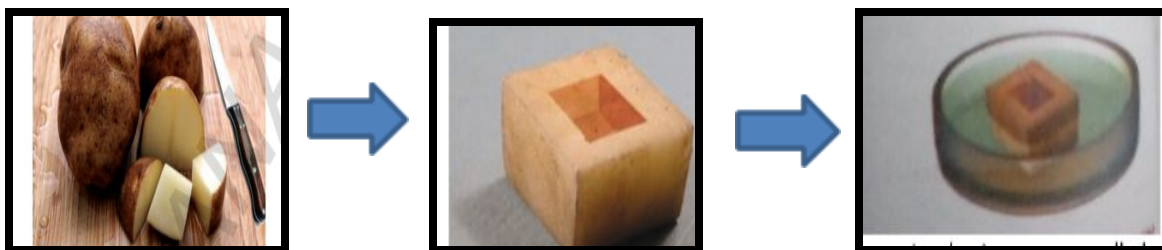
LEARNING OUTCOMES:

The learner

1. Conducts experiment of osmosis.
- 2 .Explains the process of osmosis.
3. Gives examples for osmosis .

CONCEPT PRESENTATION:

The movement of solute and solvent molecules in and out of a cell is possible due to the difference of concentration.



The materials are transported across the membrane by the process called diffusion, osmosis and other methods. Observe the given figures. We can prove the process of osmosis by this experiment.

Take a raw potato. Peel off the skin. Cut cube shaped cups as shown in the figure. Pour saturated sugar solution up to $\frac{3}{4}$ level in the potato cup and mark the level by piercing the pin. Keep the potato cup in the beaker. Pour water in the beaker to half of the height of the potato cup. Ensure that the potato cup does not float or submerge in water. Leave the arrangement for one hour.

- What is the change in the level of solution inside the potato cup?

There is a raise in the level inside the potato cup. Water move inside through plasma membrane, so the level increases.

Repeat the above experiment by taking sugar solution in the beaker and water in the potato cup.

- What did you observe? Record your observations?

Now the level of water decreases inside the cup, because water moves from inside to outside through the plasma membrane.(less concentration to more concentration)

- Compare the above two activities and write your observations

In the above two activities , water always move towards sugar solution through plasma membrane.

- What might be the reason?

The water movement in and out of the cell is due to the difference in concentration of solutions . Such process, in which water moves towards sugar solution is called osmosis(in Greek , Osmos means pushing) Water moves through plasma membrane from less solute concentrated to more solute concentration. It allows water and materials dissolved in water to pass through. It is called permeable membrane.

SELF EVALUATION:

1. Give examples of three daily life activities in which osmosis is involved?
2. What will happen to a marine fish if kept in freshwater?Give reasons.
3. If you eat chips, kurkure etc. you feel more thirsty .What is the reason?
4. Write the procedure followed to conduct osmosis experiment?

RESOURCES : <https://youtu.be/XDUJ7EoDFJA>



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TELANGANA, HYDERABAD.

ACADEMIC YEAR 2020-21

LEVEL - 2

CLASS:9.

MEDIUM : ENGLISH

SUBJECT : BIOLOGY

UNIT NAME: PLASMA MEMBRANE.

WORK SHEET NO:34

CONCEPT:

1. Filtration

LEARNING OUTCOMES:

The learner

- 1.Explains the process of filtration.
2. Conducts experiments of filtration
3. Applies the knowledge of filtration in daily life situations.

CONCEPT PRESENTATION:

Materials move from in and out of the cells through the cell membrane/plasma membrane .

- Observe the following figure.



- What is the process shown in the given figure?
- Does the cell membrane allow all substances to pass through?

The process shown in the given figure is filtration. Let us observe this by doing an activity.

Take a glass, funnel, filter paper, rice flour, water, iodine. Prepare rice powder solution (by adding 1 tea spoon of rice powder in 100 ml. of water). Add a drop of iodine solution to the rice flour solution. Arrange a filter paper in the funnel and pour the solution into the funnel by keeping a glass below.

- What did you observe?
- What did the filter paper allow to pass through?
- Which substance is not allowed by the filter paper to pass through?

Water and dissolved colour are allowed to pass through the filter paper. But, rice powder is not allowed to pass through.

- Why are certain substances not allowed to pass through the filter paper?

Some substances are not allowed to pass through because of their nature, size and solubility.

We can understand that in filtration filter paper allows water to pass through it. It allows certain materials dissolved in water to pass through. It will not allow certain materials to pass through it.

The plasma membrane /cell membrane also works in the same way. It allows only some materials to pass through. Allowing only certain materials to pass through is called selective permeability.

SELF EVALUATION:

1. The role of plasma membrane of a cell is appreciable. Comment.
2. Why the plasma membrane is called selectively permeable membrane?
3. List out the materials used in the filtration experiment.
4. Assertion : Allowing some materials to pass through is called selective permeability.
Reason: Plasma membrane is a selectively permeable membrane.
A. Assertion is correct, reason is not correct
B. Assertion is not correct, reason is correct.
C. Assertion and reason, both are not correct.
D. Assertion and reason both are correct.
5. Where do you find filtration in your daily life? Give some examples.

RESOURCES: 1. https://youtu.be/N_aqAPy8NTY



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ACADEMIC YEAR 2020-21

LEVEL - 2

CLASS:9.

MEDIUM: ENGLISH.

SUBJECT: BIOLOGY

UNIT NAME: PLASMA MEMBRANE.

WORK SHEET NO:35

CONCEPT:

1. PLASMA MEMBRANE—FUNCTIONS

LEARNING OUTCOMES:

The learner -----

- 1.Explains the functions of plasma membrane.
2. Identifies the properties of plasma membrane.
3. Appreciates the role of plasma membrane in plant and animal cells.

CONCEPT PRESENTATION:

The outermost,elastic, delicate membranous covering of the cell is called plasma membrane.It separates and protects the cell contents from the external environment, acts as a mechanical and physical barrier.Plasma membrane is a living flexible membrane.

- How does plasma membrane acts as selectively permeable membrane?
- What are the functions of plasma membrane?

Plasma membrane is selectively permeable because it allows entry of certain substances,exit of some substances while preventing passage to remaining substances. It has substances over its surface which function as recognition centres and points of attachment.They help in tissue formation, distinction of foreign substances and defence against microbes. Plasma membrane provides a definite shape to semi fluid contents of the cell. Plasma membrane provides for the flow of information amongst different cells of the same organism. It helps in cell continuity and Osmosis. Plasma membrane enables the cell to perform endocytosis (process of engulfing food and other substances from its external environment.)

- Which character of plasma membrane helps in endocytosis?

The flexibility and elasticity of plasma membrane helps in endocytosis.
Plasma membrane gets modified to perform different functions.Eg:absorption of micro villi.

- What are the properties of plasma membrane?

Plasma membrane shows following properties, impermeability, permeability, semi permeability and selectively permeability.

Impermeable	If the substances do not pass through the membrane
Permeable	If the substances can pass readily through the membrane
Semi permeable	If the membrane is permeable to solvent but prevents the passage of solutes.
Selectively permeable	If the membrane allows the passage of solvent and some selected solutes.

SELF EVALUATION:

1. What do you mean by permeability of membrane ?
2. Write the functions of plasma membrane.
3. The role of plasma membrane is appreciable. Why?
4. Choose the wrong one. ()
 - A) Plasma membrane is flexible.
 - B) Selectively permeable membrane allows both solute and solvent.
 - C) Plasma membrane is selectively permeable membrane.
 - D) Plasma membrane helps in osmosis.
5. Match the following .

I) Permeable.	()	a. allows the passage of solvent and some selected solutes.
II) Impermeable.	()	b. allows the passage of both solute and solvent.
III) Selectively permeable	()	c. allows the movement of solvent and prevents solute.
IV) Semi permeable.	()	d. Does not allow the passage of solute and solvent
6. **Statement-1:** Plasma membrane is flexible.
Statement-2 : Plasma membrane performs endocytosis.
 A. Statement 1 and 2 both are correct B. Statement 1 is correct, statement 2 is wrong
 C. statement 1 is wrong, statement 2 is correct. D. Both statements are wrong.

RESOURCE : <https://youtu.be/ifnfqSDrZQg>



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LEVEL - 2

CLASS:9.

MEDIUM: ENGLISH

SUBJECT: BIOLOGY

CHAPTER NAME: PLASMA MEMBRANE.

WORK SHEET NO:36

CONCEPT:

1.Exosmosis

2.Endosmosis

LEARNING OUTCOMES:

The learner

- 1.Explains about the transport of substances across the plasma membrane.
2. Conducts experiments to observe the movement of substances through plasma membrane.
- 3.Compares exosmosis with endosmosis.

CONCEPT PRESENTATION:

Plasma membrane helps in the transport of substances. It is selectively permeable because it allows entry of certain substances, exit of some substances while preventing passage to remaining substances.

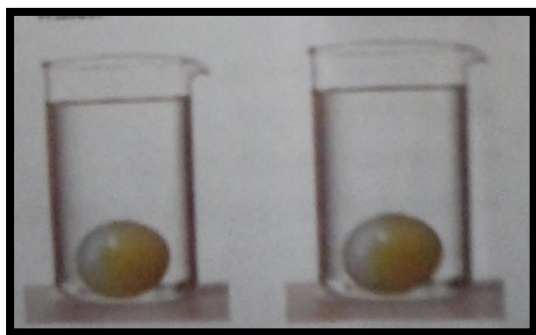
- How do you observe the movement of water through plasma membrane?

Let us do the following activity to know about this.

Materials required: two equal sized eggs, dil. HCl, two beakers, salt water, cloth to wipe, a strip of paper for measurement

Procedure: Take two eggs. Keep them separately in beakers containing dil.HCl for 4 or 5 hours. Remove carefully with a spoon, wash them with tap water and wipe them. Measure the circumference of each egg with a long strip of paper and mark on paper. Measure it with a scale and record your observations in the table. Now prepare concentrated salt solution.

Place one egg in the beaker with tap water and the other in salt water. Leave for 2 to 4 hours. Take the eggs out wipe them and measure the circumference with the same strip of paper, mark it, measure it. Record in the given table.



Eggs taken for experiment	Circumference before experiment(cm)	circumference after experiment(cm)
Egg in tap water		
Egg in salt water		

- What change did you notice in the circumference of the eggs? Give reasons.

There is a decrease in size of egg kept in salt water, because water moves out of the egg through the cell membrane. The process in which water molecules leave the cell is called **Exosmosis**. There is an increase in size of the egg kept in tap water, because water moves into the egg through the cell membrane. The process in which water molecules enter the cell is called **Endosmosis**.

SELF EVALUATION:

- 1.How the substances are transported through the plasma membrane of a cell?
- 2.Write the procedure to show that water transports through the plasma membrane.
- 3.Differentiate between exosmosis and endosmosis.
- 4.Which is not a function of plasma membrane?()
 - A.to facilitate cell to cell coordination
 - B. to generate energy to perform cell activities
 - C. acts as a physical and mechanical barrier
 - D.performs osmosis
- 5.The egg placed in salt water shrinks due to ()
 - A.exosmosis.
 - B.endosmosis.
 - C.filtration.
 - D .A and B
- 6.The egg placed in water swells due to ()
 - A. endosmosis.
 - B. exosmosis.
 - C .endocytosis
 - D .A and B

RESOURCE: .<https://youtu.be/Zx7OpxQR1YY>



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LEVEL - 2

CLASS:9.

MEDIUM: ENGLISH.

SUBJECT: BIOLOGY

UNIT NAME: PLASMA MEMBRANE.

WORK SHEET NO:37

CONCEPT:

SEMI PERMEABLE MEMBRANE

LEARNING OUTCOMES:

The learner

- 1.Explains the preparation of semi permeable membrane from an egg.
- 2.Conducts experiments for preparation of semi permeable membrane.
- 3.Gives reasons for the movement of water in osmosis.

CONCEPT PRESENTATION:

Plasma membrane is a semi permeable membrane. It is present in both plant and animal cells. We can separate this membrane from egg .It works as a semi permeable membrane.

- How to prepare a semi permeable membrane?

Materials required: raw egg, dilute HCl, glass, tap water, safety pin



Procedure: Take one raw egg. Keep it in a glass. Pour dil .HCl carefully, until it submerges. Keep for 4 to 5 hours. Remove the eggs and wash with tap water. Carefully pierce with a safety pin in the egg membrane and drain the contents. It looks like an egg pouch. Wash the membrane with fresh water. This egg membrane works as a semi permeable membrane. It also acts as selectively permeable membrane.

- How does it works as a semi permeable membrane?

Let us know by performing the following activity using the above prepared egg membrane.

Materials required: Two egg membranes ,two beakers, sugar ,water,thread,measuring jar, disposable syringe.

Procedure: Take one egg membrane and fill it with 10ml.of saturated sugar solution with a syringe .Tie its mouth with a thread. Measure 100 ml. tap water in a beaker. Keep the prepared egg membrane in fresh water beaker.Leave it for overnight . Arrange the second egg membrane with 10ml. of tap water ,tie it, keep it in 100ml. of saturated sugar solution.Leave this also for overnight.



- What are your observations?

In the first arrangement ,water moves from beaker into the egg membrane ,whereas in the second arrangement water movement is from egg membrane to outside.

- Give reasons for your observations.

Egg membrane acts as a semipermeable membrane. The water moves from less solute concentration to more solute concentration .This process is known as osmosis.

SELF EVALUATION:

1. Write the precautions to be taken while preparing the semi permeable membrane.
2. Why do you keep raw eggs in acid while preparing semi permeable membrane in the above activities?
3. Draw a flow chart showing the preparation of semi permeable membrane.

RESOURCE: <https://youtu.be/g82maPrAka8>



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ACADEMIC YEAR 2020-21

LEVEL - 2

CLASS: 9th Class;

Medium: ENGLISH

SUBJECT: Biology

CHAPTER NAME: PLASMA MEMBRANE

WORK SHEET NO: 38

CONCEPT:

1. Osmosis in living organisms
2. Reverse osmosis

LEARNING OUTCOMES:

The learner

1. Explains the importance of osmosis and reverse osmosis.
2. Identifies the process of osmosis in living organisms
3. Identifies the utilization of reverse osmosis in desalination of water.

CONCEPT PRESENTATION:

Water moves across plasma membranes from solutions of lower concentrations to higher concentration. This process is called osmosis. It is an important process in living organisms.

- What are the two types of osmosis?

Exosmosis and Endosmosis are the two types of osmosis.

What is the importance of osmosis in living organisms?

Water enters the roots through osmosis.

Water moves between the cells through osmosis.

It brings about movement of water and minerals in certain plants.

It helps in opening and closing the stomata.

In our body waste materials are filtered from the blood.

In our body useful materials are absorbed along with water through osmosis.

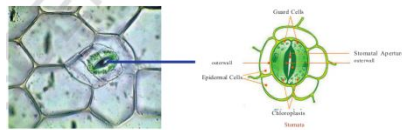
- What is the process of preparing fresh water from salt water?

We can convert salt water into fresh water by a process called reverse osmosis.

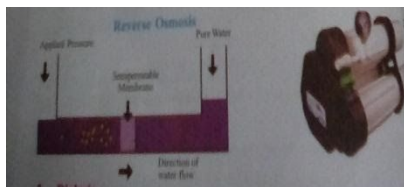
Removing salts from seawater by using a semipermeable membrane is known as reverse osmosis. R.O. machines are used at many places like hotels, railway stations, schools, colleges and in our houses etc.

SELF EVALUATION:

1. Name the process by which waste materials in our body are filtered from the blood?
2. What is the mechanism behind opening and closing of stomata?



3. How is osmosis useful for living organisms?
4. What do you understand from these pictures? They indicate the process of reverse osmosis. Collect information about reverse osmosis(project work)



5. Choose the wrong one. ()
 - A.Desalination of water is also called reverse osmosis.
 - B.Plants absorb water through osmosis.
 - C. Salts are added to water in reverse osmosis.
 - D.Water moves between the cells through reverse osmosis

RESOURCE: 1. https://youtu.be/4RDA_B_dRQ0.



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ACADEMIC YEAR 2020-21

LEVEL - 2

CLASS: 9

MEDIUM: ENGLISH.

SUBJECT: BIOLOGY

CHAPTER NAME: PLASMA MEMBRANE.

WORK SHEET: 39

CONCEPT:

1. Diffusion

LEARNING OUTCOMES:

The learner -----

1. Explains the process of diffusion
2. Conducts experiments of diffusion.
3. Applies knowledge of diffusion in daily life situations.

CONCEPT PRESENTATION:

Materials move in a medium by osmosis and other ways. Let us study one such process by the following activity.

Open a bottle of scent in one corner of the room. You might have observed that the smell spreads equally in the room. It happens by a process known as diffusion.

- How do you observe the process of diffusion?

The materials required to observe the process of diffusion are,; coffee powder ,water ,glass

Procedure: Take half glass of water. Prepare small ball of coffee powder using water. Slowly put it in water.

- Observe .What happens to the ball of coffee powder?

Coffee powder diffuses slowly throughout the water.The process by which some materials are kept in a medium like air and water spread equally throughout is called **diffusion**.

- Does the process of diffusion is same in the three situations given below?

1. Make a small ball of coffee powder and drop slowly in half glass of water.
2. Putting the pinch of coffee powder first and adding water slowly.
3. Pouring hot water on the pinch of coffee powder.

Diffusion is faster in second situation when compared with first situation and in third situation when compared to the other two situations.

- Where does diffusion can be observed in our daily life?

We can observe diffusion while using air freshners, agarbathis and mosquito repellents.

SELF EVALUATION:

1. What is diffusion?
2. Write the list of incidents where diffusion occurs in daily life?
3. Write the procedure for conducting diffusion experiments and your observations
4. Pick up the wrong one. ()
 - A) Mosquito repellents are examples of diffusion
 - B) Diffusion occurs in liquid medium only.
 - C) Role of the plasma membrane is important in osmosis.
 - D) Plants absorb water through filtration
5. Prepare a report of Vizag LG Polymers incident. (gas leakage (,may 2020)).
 - a) What are the preventive measures to be taken to avoid such incidents?
 - b) Write the precautions to be taken at the time of such incidents.
6. Following processes are examples of **osmosis/diffusion**. Put a tick in the relevant box

Hotel chimney	Air pollution	osmosis	diffusion
Cigarette	Smoke		
lungs	Breathing		
stomata	opening , closing		
plants	water absorption		
flowers	fragrance		

7. In which process the MIC gas was spread throughout the city of Bhopal tragedy?
8. Match the following
 - I. Osmosis () a. substances spread equally throughout the medium
 - II. Diffusion () b. changing salt water into fresh water
 - III. Filtration () c. lower concentration to higher concentration
 - IV. Reverse osmosis () d. allowing only some substances

Reference: <https://youtu.be/LUPHohqIPTU>



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ACADEMIC YEAR 2020-21

LEVEL - 2

Class: 9

Medium: English

Subject: Biology

Unit: DIVERSITY IN LIVING ORGANISMS & CLASSIFICATION

Worksheet No.40

CONCEPTS:

1. Diversity in plants

LEARNING OUTCOMES:

The Learner...

1. Explains about diversity in plants.
2. Compares the characteristics of leaves in different plants.
3. Identifies the characteristics of flowers in different plants.

CONCEPT PRESENTATION:

There are many plants and animals around us. Some of the organisms not visible to the naked eye. These are all existing from mountain peaks to deserts and plateaus to the deep oceans, from extreme cold conditions to extreme hot ones and many more, such diversity is the symbol of nature. Different types of organisms in nature have to make groups and classify them on the basis of diversity present in them.

- Observe the following picture.



- Observe the leaves of different plants in your surroundings.

On the basis of above two observations record the details in the following table.

S.No.	Name of the plant (the leaf of which is taken)	Length of the leaf	Width of the leaf	Colour of the leaf	Shape/Size of the leaf	Margin of the leaf	Venation of the leaf

- Could you find any two leaves which are similar with respect to any of the characteristics?

If we compare the characteristics like leaf length, width, colour, shape, size, margin and venation with other leaves it shows diversity.. Some of the characteristics shows more differences and some less. This is the diversity present in the leaves of the plants

- What type of diversity present in the external characters of the plants ?

Observe any five different plants (grass plants and crop plants like paddy, jowar) with flowers and roots from your surroundings and fill the table on the basis of your observations.

S. No.	Name of the plant	Length of the Stem	Length between nodes	Leaf venation	Flower Single/ born in group	No. of petals	No. of sepals	Tap root/ fibrous root

If we compare the characteristics like length of the stem, length between nodes, venation, flowers in single or in group, number of sepals and petals and root system with other plants it shows diversity. Some of the characteristics show more differences and some less. There is a relation in between some of the characteristics. The plants having fibrous root system contains flowers in clusters.

There are several characters that we can choose to make group of plants, some groups would have many plants, while some would have just a few.

So diversity is present in the characteristics of the plants and the structure of the leaves

SELF EVALUATION:

1. Compare the characteristics of the leaves of any two plants. (Leaf width, leaf margin, shape etc.)
2. Compare the external characteristics of any two plants. (distance between nodes, flowers in single or cluster, root system etc)
3. What type of root system is present in plants which have flowers in clusters?
4. Draw the pictures of any two leaves and compare the characteristics of the both leaves.



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LEVEL - 2

Class: 9

Medium: English

Subject: Biology

Unit: DIVERSITY IN LIVING ORGANISMS & CLASSIFICATION

Worksheet No.41

CONCEPTS:

1. Diversity in seeds

LEARNING OUTCOMES:

The Learner...

1. Identifies the variations in different types of seeds.
2. Explains the correlation between venation, cotyledons and root systems.

CONCEPT PRESENTATION:

The plants present in surroundings have variations in flowers, root systems and in the structure of the leaves. In the same way different types of seeds have different types of shapes and sizes. They also have variations.

- Collect and observe different types of seeds from your surroundings. On the basis of your observations record the details in the given table.

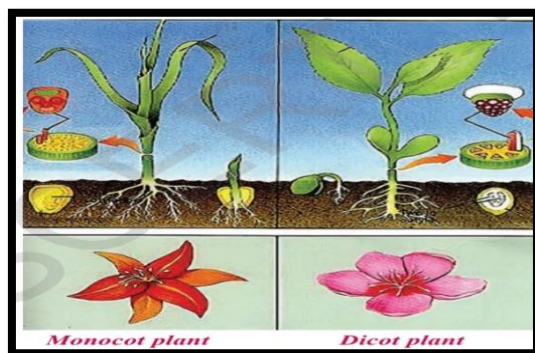
S. No.	Name of the Seed	Colour	Shape/size	No. of cotyledons (seed leaves)	Others
1.					
2.					
3.					
4.					
5.					

Different types of seeds have variations in colour, size and shape. This is the variations in the seeds. If we observe the seeds of groundnut, two thick portions come out which are called cotyledons. Groundnut, Pea, Red gram contains two cotyledons. Jowar, Paddy, Maize contains only one cotyledon. So seeds also have variations in the structure and the number of cotyledons.

Plant seeds which having two seed leaves are called dicotyledons, while those having single seed leaf are called monocotyledons.

- What type of relationship present in the root system and venation in mono and dicotyledon plants ?

- Observe the venation and root system present in the plants of collected seeds.
- Observe the following pictures.



On the basis of above two observations record the details in the given table.

S. No.	Name of the plant	Leaf venation	No.of cotyledons / seed leaves	Tap root system or fibrous root system
1.	Maize			
2.	Paddy			
3.	Grass			
4.	Beans			
5.	Green gram			
6.	Ground nut			

Monocotyledon plants have only one seed leaf i.e., cotyledon. These plants contains parallel venation and fibrous root system. Dicotyledon plants have two seed leaves i.e., cotyledons. These plants contains reticulate venation and tap root system. With this we know that different types of organisms have similarities and differences in their characteristics.

SELF EVALUATION:

1. Compare the seeds of ground nut with paddy. Write the differences.
2. What are monocotyledons and dicotyledons ? give examples.
3. Compare the characteristics of monocotyledons and dicotyledons.
4. Draw the pictures of monocotyledon and dicotyledon plants.



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LEVEL - 2

Class: 9

Medium: English

Subject: Biology

Unit: DIVERSITY IN LIVING ORGANISMS & CLASSIFICATION

Worksheet No.42

CONCEPTS:

1. Diversity in insects
2. Diversity in human beings

LEARNING OUTCOMES:

The Learner...

1. Identifies the diversity in insects.
2. Explains about the diversity present in human beings.

CONCEPT PRESENTATION:

In our surroundings different types of animals are present along with plants. In these insects are also present. Animals also have variations like plants.

- Collect and observe the external characteristics of house fly, mosquito, ant, dung beetle, butterfly and cockroach from your surroundings. (Wash your hands after completion of this activity. Don't harm the insects. Leave them carefully)
- Record your observations in given table.

S. No.	Name of the Insect	No. of Legs	No. of Wings	Colour	Shape/Size	body parts (Segmentation)	Other characters

Even though all these are insects they show several differences in the number of legs and wings, size of the wing, colour, shape and segmentation. Generally some characters like the structure of the legs are common in all insects. In some insects number of legs and wings are same in number but differs in other insects. In the same way insects shows different types of colours or same colour in some of the insects.

- Observe the following picture.



- Observe the students from your school or surroundings and record the details in the given table.

S. No.	Name of the Student	Height	Weight	Lenth of fore finger	Thumb Impression	Palm	
						Length	Width

On the basis of above observations we conclude that persons contains same height and weight or with different height and weights. You might observe that no two thumb impressions are alike. It is a very specific character of an individual.

So variations are present in plants, animals and human beings.

SELF EVALUATION:

1. Compare the characteristics like wings, legs, shape and colour of any two insects.
2. Compare the physical characteristics of your two friends. (height, weight, palm,fingers)
3. What is the similar character present in all insects ?
4. Draw the pictures of any two insects and compare the characteristics of both insects.



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LEVEL - 2

Class: 9

Medium: English

Subject: Biology

Unit: DIVERSITY IN LIVING ORGANISMS & CLASSIFICATION

Worksheet No.43

CONCEPTS:

1. Diversity in plants
2. Diversity in animals

LEARNING OUTCOMES:

The Learner...

1. Identifies variations in two plants belongs to same species.
2. Explains variations in two animals or insects belongs to same species.

CONCEPT PRESENTATION:

All plants, animals and human beings present in our surroundings have variations. Variation between different species is always greater than the variation within a species.

- Collect two plants of the same species (Eg: neem, rose) from your surroundings. Observe them carefully and fill the table.

S. No.	Name of the Plant	Hight of the Plant	No. of Leaves	Size / Shape of the Leaves	Colour of the Flowers	Leaf	Venation
1.	Plant -1						
2.	Plant -2						

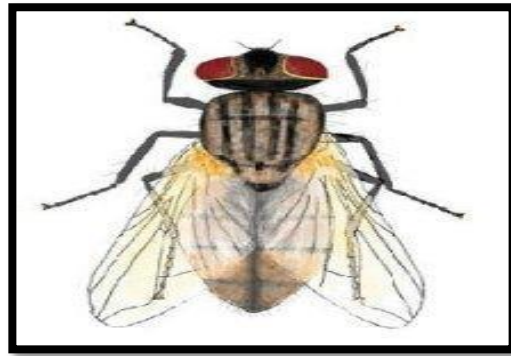
- Observe the following pictures.



- What differences and similarities do you find in the above plants ?

The two plants belong to same species also have variations. Two plants have same characteristics but with variations. Both plants have same parts like leaves, flowers and branches but these are present with variations.

- Observe the following pictures.
- What differences and similarities do you find in the same kind of insects (house fly)?



The two insects (house fly) belong to same species also have variations. Two insects have same characteristics but with variations. Both insects have same parts like legs, wings and eyes but these are present with variations.

Living organisms on the basis of the diversity and variations present in nature. No two organisms are alike. Variation between different species is always greater than the variation within a species. Variation forms a basis for selection of characters to group organisms. Selects characters to group organisms on the basis of similarities and differences between them.

SELF EVALUATION:

1. Compare any two plants belong to the same species. (fruits, leaves, branches)
2. Compare any two animals belong to the same species present in your surroundings. (eyes, legs, ears)
3. Explain the variations in organisms giving examples.



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LEVEL - 2

Class: 9

Medium: English

Subject: Biology

Unit: DIVERSITY IN LIVING ORGANISMS & CLASSIFICATION

Worksheet No.44

CONCEPTS:

1. Classification
2. Evolution
3. Species

LEARNING OUTCOMES:

The Learner...

1. Identifies the need of classification.
2. Explains the classification of Linnaeus and other scientists.
3. Explains correlation between classification and evolution.

CONCEPT PRESENTATION:

Variation forms a basis for selection of characters to group organisms. Classification is the systematic study of organisms present in nature.

- What is classification? What is the need of the classification?

Grouping of organisms on the basis of certain characters which vary over populations indicating some common lineage of each varied group or the way in which the organism may have evolved is 'classification'. Classification of organisms present with respect to their evolution.

Need of classification:

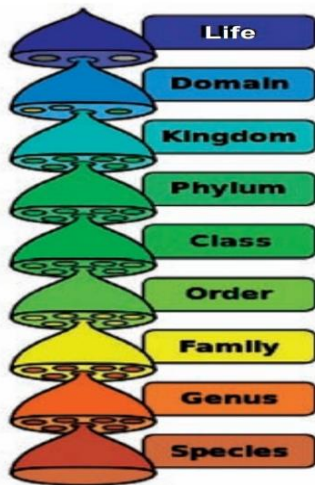
- ❖ To give better knowledge and understanding of organisms
 - ❖ To study the organisms in a proper and systematic manner
 - ❖ To explain the evolved procedure of organisms from their ancestors
 - ❖ To make comparison in an easier way
 - ❖ To understand the relationship among the organisms and their interdependence
 - ❖ To study and handle huge population of different types of organisms
 - ❖ To understand evolution of organisms in nature
- What is the relationship between classification and evolution?

The classification of life forms are closely related to their evolution. Evolution is the process of acquiring change. Most life forms that we see today had variations that accumulated over years to allow the organism processing them to survive better.

When we connect the evolution to classification we find in some groups of organisms, the body designs have not changed over the years while several organisms have acquired body designs relatively recently. Since complexity of design has increased over the years and is yet to increase, we

may say that older organisms are simpler when compared to the younger. Charles Darwin in his book “origin of species” explained about evolution.

- Observe the following flow chart showing hierarchy of classification.



- Who proposed this hierarchy of classification? Explain it.

The above mentioned hierarchy of classification proposed by Carolus Linnaeus. Classification is done starting from grouping living organisms into domains. A ‘species’ includes all organisms all organisms that are similar enough to interbreed and perpetuate or individually reproduce.

Some Species grouped as Genus, several Genus into Families, Families into Orders, Orders into Classes, Classes into Phyla, and Phyla into Kingdoms. Linnaeus identified all organisms into two kingdoms. They are Animalia (animals) and Vegetabilia (plants).

All the terms like species, genus, family, order, class, phyla etc were defined by Linnaeus on the basis of the similarities and differences studied by him in groups of organisms.

SELF EVALUATION:

1. What is classification?
2. What is the need of classification?
3. What is the relation between classification and evolution?
4. Who first proposed hierarchy of classification? Explain it.
5. What is species?
6. Identify the INCORRECT one from the following
 - A. Hierarchy of classification of organisms starts with phyla.
 - B. Charles Darwin explained about evolution in his book ‘ origin of species ‘
 - C. Classification helps in understanding the evolution.
 - D. Linnaeus divided organisms into 9 kingdoms.



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ACADEMIC YEAR 2020-21

LEVEL - 2

Class: 9

Medium: English

Subject: Biology

Unit: DIVERSITY IN LIVING ORGANISMS & CLASSIFICATION

Worksheet No.45

CONCEPTS:

1. Different types of classifications

LEARNING OUTCOMES:

The Learner...

1. Explains about Whittaker five kingdoms classification of organisms
2. Identifies the special characters taken by the Whittaker for classification.

CONCEPT PRESENTATION:

Linnaeus proposed two kingdoms in his classification of organisms in 1758. In 1969 Whittaker proposed advanced classification than Linnaeus. In between Linnaeus and Whittaker and after Whittaker also classification refined with so many changes.

- Observe the following table

Linnaeus 1735	Haeckel 1866	Chatton 1925	Copeland 1938	Whittaker 1969	Woese et al 1990	Cavalier-Smith 1998
2 kingdoms	3 kingdoms	2 empires	4 kingdoms	5 kingdoms	3 kingdoms	6 kingdoms
(not treated)	Protista	Prokaryota	Monera	Monera	Bacteria Archaea	Bacteria
		Eukaryota	Protoctista	Protista	Eukarya	Protozoa Chromista
			Plantae	Plantae		Plantae
Vegetabilia	Plantae		Plantae	Fungi		Fungi
Animalia	Animalia		Animalia	Animalia		Animalia

Whittaker proposed a five kingdom system in which three kingdoms were added to the two kingdoms (plants and animals) proposed by Linnaeus. Whittaker proposed five kingdoms are Monera (Bacteria), Protista, Fungi, Plantae and Animalia.

- What are the special characters taken by Whittaker for the classification?

Whittaker defined the kingdoms by a number of special characters. First, he specified whether the organisms possessed a true nucleus (eukaryotic) or not (prokaryotic). The eukaryotic unicellular organisms were placed into the kingdom Protista. The rest were three multicellular eukaryotic kingdoms that distinguish themselves by the general manner in which they acquire food. Plants are generally autotrophs and animals are heterotrophs. Fungi are also heterotrophs but they generally breakdown large organic molecules and live on them.

Three groups of organisms i.e., Monera, Fungi and Protista did not fit well into either the animal or plant category. Moreover, each of these three groups appeared to possess diversity comparable to that of animals and plants. Thus, the designation of each as a kingdom seemed fitting.

In the years since Whittaker's system was developed, however, new evidence and new methods have shown that the five kingdom system also fails to adequately capture what we now know about the diversity of life. Thus other modifications in the classification scheme came into existence.

SELF EVALUATION:

1. What are the five kingdoms proposed by Whittaker in his classification?
2. Compare both classifications of Linnaeus and Whittaker.
3. What are the special characters taken by Whittaker for the classification?
4. Who proposed new classifications after Whittaker? Name the kingdoms proposed by them?



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Worksheet No.46

CONCEPTS:

1. Monera
2. Protista

LEARNING OUTCOMES:

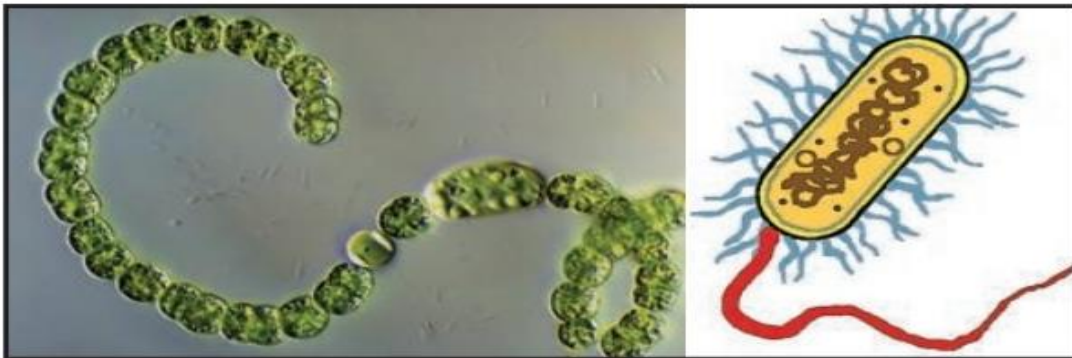
The Learner...

1. Explains the characteristics of Monera.
2. Identifies the characteristics of Protista.
3. Compares the characteristics of Monera with Protista.

CONCEPT PRESENTATION:

Monera is the first and primary one in the classification of Whittaker's five kingdoms.

- Observe the following pictures.



- Are there any cell organelles found in the pictures?
- What are the characteristics of Monera organisms?

The organisms in the above pictures are Nostoc and Bacteria. They belong to kingdom Monera.

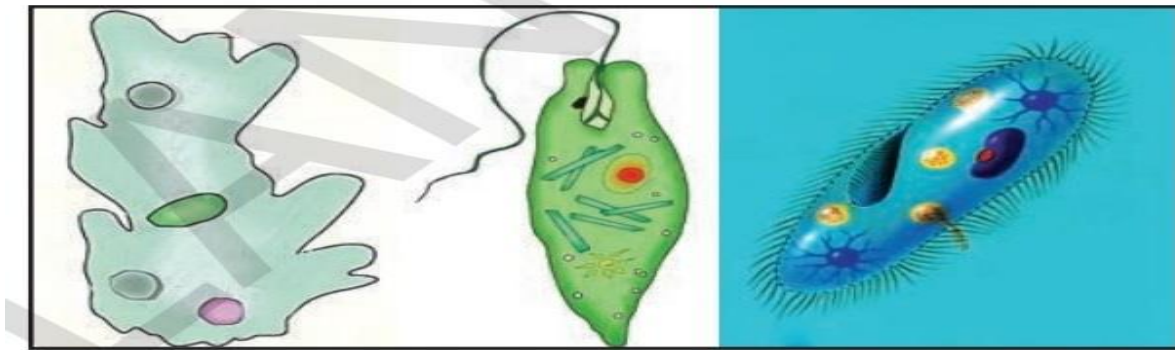
Characteristics of kingdom Monera organisms:

- ❖ Single celled organisms.
- ❖ Cells have no membrane bound nucleus.
- ❖ Reproduce by splitting into two (binary fission).
- ❖ Absorb nutrients from outside their bodies.
- ❖ They move with the help of locomotory organs like flagella, cilia or hair like structures present on them.

- ❖ Some monerans cause diseases, but others are helpful to people
- How many groups present in kingdom Monera? What are they?

Three major groups of organisms come under Monera group. They are:

1. **Archaeobacteria** : ancient bacteria, some species found in hot springs
 2. **Eubacteria** : Eg. Streptococcus, rhizobium, e.coli etc
 3. **Cyanobacteria (blue green algae)** : Appear similar to algae externally but internally are more like bacteria (but they are not bacteria)
- Observe the following pictures.



- Are there any cell organelles and locomotory organs found in the organisms?
- Identify and compare the characteristics of these organisms with Monera.

The above pictures are amoeba, euglena and paramecium. They belong to kingdom Protista.

Characteristics of kingdom Protista organisms:

- ❖ Most are unicellular, but some are multicellular.
- ❖ Cells have a membrane around the nucleus.
- ❖ Some get nutrients and energy by eating other organisms.
- ❖ Some get energy from the sun and some get nutrients from the water around them.
- ❖ They live either solitary or in a colony.
- ❖ Some of the cell organelles are present inside the cell.
- ❖ Mostly reproduce by splitting into two (binary fission).

SELF EVALUATION:

1. Write the characteristics of the kingdom Monera.
2. Write the characteristics of the kingdom Protista.
3. Compare the characteristics of the Monera with Protista.
4. Explain the groups of kingdom Monera.
5. Draw the picture of any organism belongs to kingdom Monera.
6. Draw the picture of Euglena.



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Worksheet No.47

CONCEPTS:

1. Fungi

LEARNING OUTCOMES:

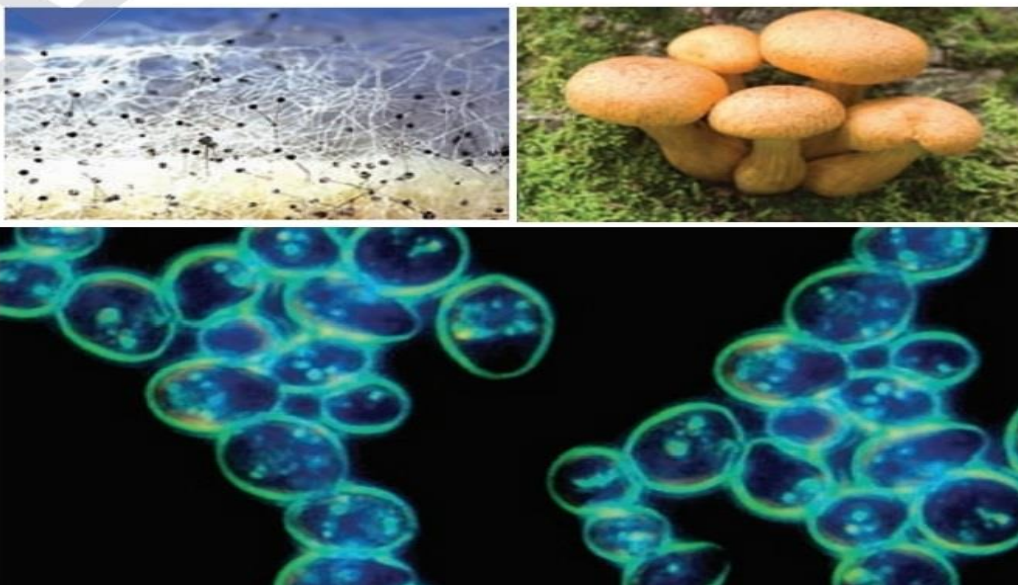
The Learner...

1. Explains the characteristics of the fungi
2. Gives examples to fungi.

CONCEPT PRESENTATION:

Fungi is one of the kingdoms proposed by Whittaker. This is separated by other kingdoms on the basis of acquiring food.

- Observe the following pictures.



Bread mould, Mushroom, Yeast

These are Rhizopus (bread mould), mushroom and yeast belong to fungi.

- What are the characteristics of fungi?

Characteristics of fungi:

- ❖ some are unicellular and most are multicellular
- ❖ Propping out from the ground/on bark of trees during rainy season.
- ❖ Well defined prominent head, some with umbrella type structures
- ❖ Get nutrients and energy by absorbing from the surface they live on through root like structures which are fine thread like parts of their body
- ❖ Most of these reproduce by spores

SELF EVALUATION:

1. Write the characteristics of fungi.
2. Draw the picture of Rhizopus.
3. What are the reproductive parts in fungi.
4. In what way fungi get their food?
5. Combine the following.

A. Monera	()	i. externally algae, internally bacteria
B. Protista	()	ii. eukaryotes
C. Fungi	()	iii. prokaryotes
D. Cyanobacteria	()	iv. Reproduces by spores



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Worksheet No.48

CONCEPTS:

1. Plant kingdom
2. Cryptogams – Phanerogams
3. Gymnosperms – Angiosperms
4. Monocot - Dicot

LEARNING OUTCOMES:

The Learner...

1. Explains the characters taken for the classification of plant kingdom.
2. Identifies the differences between the cryptogams and phanerogams, gymnosperms and angiosperms, monocot and dicot.
3. Compares the seeds with spores.

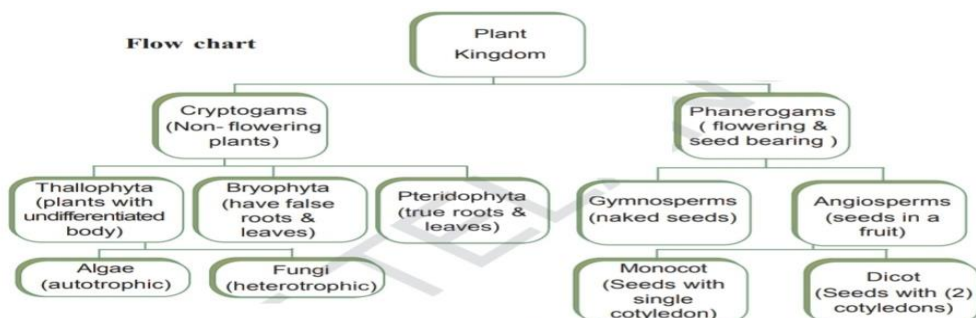
CONCEPT PRESENTATION:

Linnaeus, Whittaker and other scientists classified plants as a separate big kingdom. Plants are diverse in nature. The basis of classifying them is the way they acquire their food, the type of reproductive structures they have and the way they reproduce. They are multicellular, eukaryotic with cell walls. They are usually autotrophs and use mainly chlorophyll for photosynthesis.

- What are the main features taken into consideration for the classification of plants?

The first level of classification among plants depends on whether the plant body has well differentiated distinct parts. The next level of classification is based on whether the differentiated plant body has special tissues (vascular tissues) for the transport of water and other substances within it. Further classification looks at the ability to bear seeds and whether the seeds are enclosed with fruits.

- Observe the following flow chart.



- As per above flowchart what are the primary characters taken in to consideration for the classification of plants?

Plant kingdom firstly divided into two on the basis of flowers and seeds. Plants which do not produce flowers and have sporangium as reproductive structures are called non-flowering plants or cryptogams, those that produce flowers are flowering plants or phanerogams.

- List out the flowering and non-flowering plants present in your surroundings.

Flowering plants	Non-flowering plants

- What is the basis for the classification of non-flowering plants? What are they?

Non-flowering plants divided in to three on the basis of differentiation of the plant body into stem, leaf and roots. They are:

Thallophyta : plants with undifferentiated body with stem, leaf and roots

Bryophyta: plants have false roots and leaves

Pteridophyte: plants have true roots and leaves

- Observe the following picture
- Collect and observe the fern plants available in your surroundings.



The above picture shows the leaves of fern plant. This is a non-flowering plant. These are sporophylls of fern. Leaves of the fern contains brownish or blackish like structures. These are the spore producing bodies called as sporangium. New plants produced by the spores.

Non-flowering plants produces spores. Flowering plants produces seeds. Spores contain very little food while the seed stores a lot of it. The structure and process of reproduction from seeds and spores is different.

- Explain the classification of flowering plants.

Flowering plants are classified as gymnosperms and angiosperms. Among flowering plants those having seeds enclosed within fruits are angiosperms (Eg. Mango) and those without it are gymnosperms (Eg. Pine). Angiosperms are classified into monocot and dicot. Plants having one cotyledon is called as monocot (Eg. Paddy), having two cotyledons are called as dicot (Eg. Redgram)

SELF EVALUATION:

1. Draw the flowchart showing the classification of plant kingdom.
2. Write the examples for angiosperms, gymnosperms, monocot and dicot plants.
3. Collect and analyse the characteristics of monocot and dicot plants present in your surroundings.
4. Draw the picture of sporophyll and write about it.
5. Write the differences between seeds and spores.
6. Combine the following
 - A. Thallophyta () i. have true roots and leaves
 - B. Bryophyta () ii. undifferentiated plant body
 - C. Pteridophyta () iii. naked seeds
 - D. gymnosperms () iv. have false roots and leaves
7. Identify the CORRECT sentence from the following. []
 - A. spores are produced by flowers.
 - B. In gymnosperms seeds are enclosed within fruits.
 - C. Pteridophyte plants reproduces by seeds.
 - D. Hibiscus belongs to non-flowering plant.



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Worksheet No.49

CONCEPTS:

1. **Porifera**
2. **Coelenterata (Cnidarians)**

LEARNING OUTCOMES:

The Learner...

1. Explains the characteristics of the Porifera.
2. Identifies the characteristics taken into consideration for the classification of animals.
3. Gives examples for Porifera and Coelenterata.

CONCEPT PRESENTATION:

Animals are organisms which are eukaryotic, multicellular and heterotrophic. Their cells do not have cell walls. Most animals are motile. They have special locomotory organs for the movement. They are further classified based on the differentiation of body structure.

Animal kingdom mainly classified on the basis of notochord. Porifera, Coelenterata, Platyhelminthes, Nematoda, Annelida, Arthropoda, Mollusca and Echinodermata groups are comes under animals without notochord.

- Observe the following pictures.
- What are the special characteristics of these organisms?



sycon

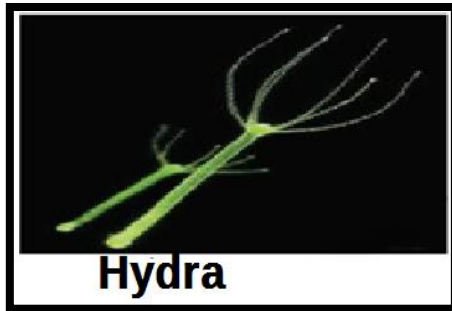


Spongilla

The above pictures are Sycon and Spongilla.

- ❖ The word porifera means organisms with pores. There are holes or pores all over the body. These lead to a canal system that helps in circulating water throughout the body to bring in food and oxygen.
- ❖ These are non-motile animals attached to some solid support.
- ❖ The body design involves very minimal differentiation and division into tissues.

- ❖ They are mainly found in marine habitats and commonly called sponges.
- ❖ Eg. Euplectella, Sycon, Spongilla etc.
 - Observe the following pictures.



The above pictures are hydra and corals. They belong to phylum Coelenterata.

Characteristics of Coelenterata:

- ❖ Body is differentiated.
- ❖ Aquatic animals
- ❖ There is gastrovascular cavity in the body.
- ❖ The body is made up of two layers of cells (diploblastic): one forming the outer layers while the other forming the inner layers.
- ❖ Some are solitary(lives singly). Eg. Hydra, Jelly fish
- ❖ Some are colonial(lives in colonies). Eg. Corals. Coral colonies are called as coral reefs.

SELF EVALUATION:

1. Compare the characteristics of Porifera with coelenterate.
2. Explain the characteristic features of Coelenterata ? Give examples and draw a neat labelled diagram of hydra.
3. Write the characteristics of Porifera.
4. Identify the INCORRECT sentence from the following
 - A. Porifera animals have pores all over the body.
 - B. Coelenterate animals have gastrovascular cavity in the body.
 - C. Porifera lives in marine water and non-motile attached to some solid support.
 - D. The body of Coelenterates is made up of three layers.



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Worksheet No.50

CONCEPTS:

1. **Platyhelminthes**
2. **Nematoda**

LEARNING OUTCOMES:

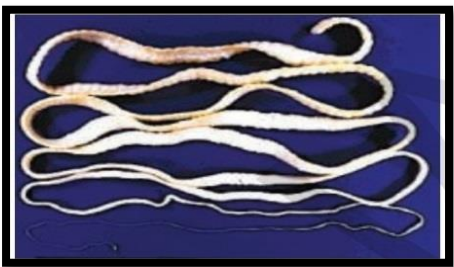
The Learner...

1. Explains the characteristics of the Platyhelminthes and Nematoda.
2. Compares the characteristics of the Platyhelminthes and Nematoda.
3. Gives examples for the Platyhelminthes and Nematoda.

CONCEPT PRESENTATION:

The body of animals in Platyhelminthes and Nematoda is far more complexly designed than Porifera and Coelenterata.

- Observe the following pictures.



The above pictures are Tape worm and Planaria. These belong to Platyhelminthes. The body is flattened dorsoventrally, from top to bottom, that is why these animals are called flatworms.

Characteristics of Platyhelminthes:

- ❖ The body is bilaterally symmetrical, meaning that the left and the right halves of the body have the same design.
- ❖ There are three layers of cells from which differentiated tissues can be formed, that is why such animals are called triploblastic. This allows outside and inside body linings as well as some organs to be formed.
- ❖ There is some degree of tissue formation.
- ❖ There is no true internal body cavity or coelom.
- ❖ They are either free living (Eg. Planaria) or parasitic (Eg. Tape worm)

- Observe the following pictures.
- How is the body structure of these organisms?



The above organisms are *Ascaris lumbricoides* and *Wuchereria bancrofti*. These belong to Nematoda.

Characteristics of Nematoda:

- ❖ The body of these organisms is round and cylindrical rather than flattened. So these are called roundworms.
- ❖ Triploblastic
- ❖ Bilaterally symmetrical
- ❖ There are tissues, but no true organs
- ❖ Pseudocoelom is present
- ❖ These are parasitic worms

Eg. *Wuchereria bancrofti* (Filarial worm), *Ascaris lumbricoides* (round worm)

- Compare and write characteristics of the following

Similarities :

Platyhelminthes	Nematoda

Differences :

Platyhelminthes	Nematoda

SELF EVALUATION:

1. Write the characteristics of Platyhelminthes.
2. Write the characteristics of Nematoda.
3. Which organisms are included under Platyhelminthes? Why?
4. Write the examples for Nematoda.



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LEVEL - 2
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Worksheet No.51

CONCEPTS:

1. Annelida
2. Arthropoda

LEARNING OUTCOMES:

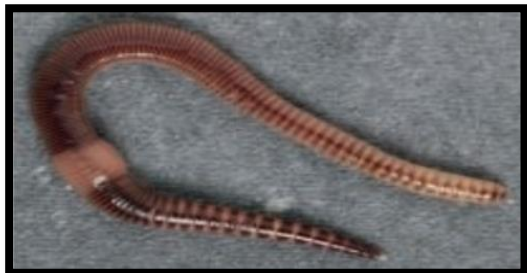
The Learner...

1. Explains the characteristics of Annelida and Arthropoda.
2. Compares the characteristics of Annelida with Arthropoda.
3. Gives examples for Annelida and Arthropoda.

CONCEPT PRESENTATION:

Annelida and Arthropoda organisms are more developed compared with other Porifera to Nematoda in animal kingdom. These animals more in numbers.

- Observe the following pictures.
- What are the specialities present in the body structure of these organisms?



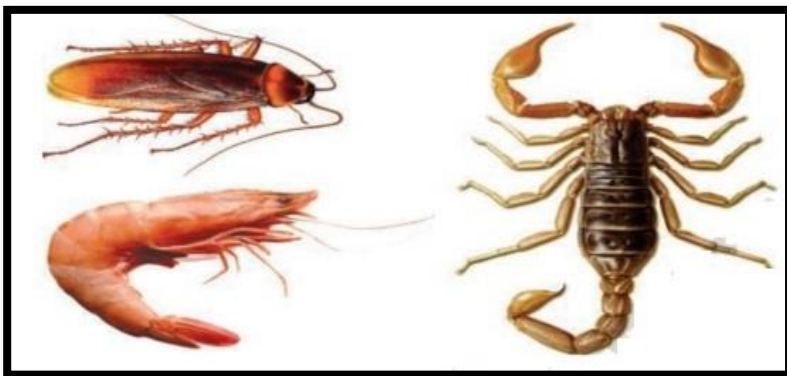
The above pictures are earthworm and leech. They belong to Annelida.

- ❖ The body of these organisms occurs in a segmental fashion, with the segments lined up one after the other from head to tail. This is the special character of the Annelida.
- ❖ Triploblastic
- ❖ Bilaterally symmetrical
- ❖ True body cavity. This allows true organs to be protected in the body.
- ❖ These animals are found in a variety of habitats – fresh water, marine water as well as on land.

- Compare the following

character	Platyhelminthes	Nematoda	Annelida
Body structure			
Body cavity			
layers			
Special characters			
others			
examples			

- Observe the following pictures.
- What are the specialities present in the body structure?



The above animals are cockroach, prawn and scorpion. They belong to Arthropoda. They have jointed legs (the word arthropod means jointed legs). This is the largest group of animals.

- ❖ These animals are bilaterally symmetrical and segmented.
 - ❖ There is an open circulatory system, and so the blood does not flow in well-defined blood vessels. The coelomic cavity is filled with blood.
- Some examples are butterflies, houseflies, spiders, crabs and other insects.

- List out the insects (Arthropoda) present in your surroundings?

SELF EVALUATION:

1. Compare the characteristics of Annelida with Arthropoda.
2. Why insects are grouped under Arthropoda?
3. What is the meaning of Annelida?
4. In which animals open circulatory system is present ?
5. Draw the pictures of earthworm and cockroach and write the characters of both.



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Worksheet No.52

CONCEPTS:

1. **Mollusca**
2. **Echinodermata**

LEARNING OUTCOMES:

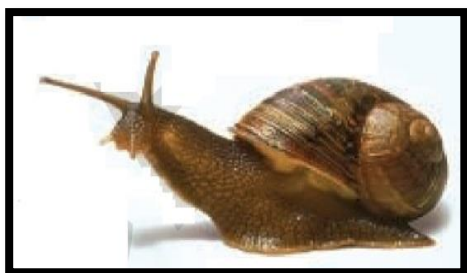
The Learner...

1. Explains the characteristics of Mollusca and Echinodermata.
2. Compares the characteristics of Mollusca with Echinodermata.
3. Draws the pictures of Mollusca and Echinodermata.

CONCEPT PRESENTATION:

In animal kingdom the last group of animals without notochord are Mollusca and Echinodermata. When compared with other animals without notochord these are well developed in the structure of the body.

- Observe the following pictures.
- What are the specialities of these animals?

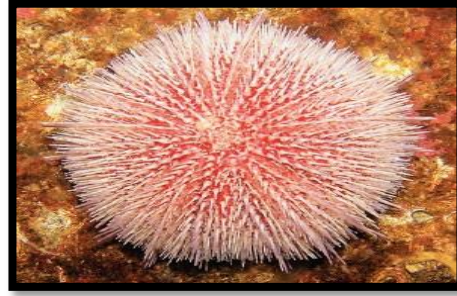


The above animals are Snail and Mussel. The animals body is soft and enclosed in a hard shell. Hence these are called as Molluscs.

Characteristics of Mollusca.

- ❖ Foot is used for moving
- ❖ Bilateral symmetry
- ❖ The coelomic cavity is reduced
- ❖ There is little segmentation. segmentation starts from these organisms
- ❖ Open circulatory system
- ❖ Present kidney like organs for excretion
- ❖ Pearls are produced from a mollusc called Oyster.

- Observe the following pictures
- What are the specialities present in the body of these animals?



The above pictures are Star fish and Sea urchin.

Characteristics of Echinodermata.

- ❖ These are spiny skinned organisms. (echinos – spines ; derma – skin)
- ❖ These have hard calcium carbonate structures that they use as a skeleton.
- ❖ Triploblastic
- ❖ Most are pentamerous, it means that they have fivefold symmetry with rays of arms
- ❖ Coelomic cavity is present
- ❖ They also have a peculiar water driven tube system that they use for moving around.
- ❖ These are exclusively free living marine animals.

Write the details in the given table

group	Special characters to name the group
Porifera	
Coelenterate	
Platyhelminthes	
Nematoda	
Annelida	
Arthropoda	
Mollusca	
Echinodermata	

SELF EVALUATION:

1. Why few organisms are named as Echinodermata?
2. Write the characteristics of Mollusca.
3. What is the use of the water driven tube system present in the star fish?
4. Draw the pictures of Snail and Star fish and write the characters of these animals.



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Worksheet No.53

CONCEPTS:

1. **Chordata**
2. **Protochordata**
3. **Vertebrata**

LEARNING OUTCOMES:

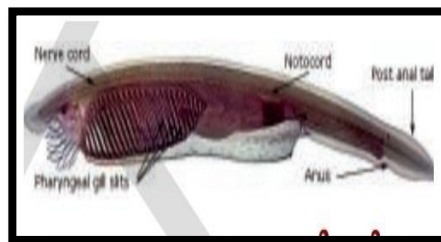
The Learner...

1. Explains the classification of protochordata.
2. Compares the characters of Urochordata and cephalochordate.
3. Explains the characteristics of vertebrata.

CONCEPT PRESENTATION:

All animals in the animal kingdom classified mainly into two groups. They are animals with notochord and animals without notochord. Animals having notochord also called as Chordata. Some of the scientists classified Chordata into protochordata and vertebrata. Protochordata also classified as Urochordata and Cephalochordata.

- Observe the following pictures.
- What are the characters of these animals?



These animals belongs to protochordata. In this herdmania belong to urochordata and amphioxus to cephalochordata.

Characteristics of protochordata.

- ❖ In urochordata animals notochord present in larva forms, but very rudimentary but in cephalochordata notochord present throughout the body and life.
- ❖ The notochord is a long rod like supporting structure that runs along the back of the animal.
- ❖ Notochord separates the nervous tissue from the gut.
- ❖ Notochord provides a place for muscles to attach for ease of movement.
- ❖ Triploblastic and bilaterally symmetrical
- ❖ Coelom is present

- Observe the following pictures.
- What are the resembled characters in these animals?



The above pictures are fish, frog, snake, bird and monkey. They all belong to vertebrates.

Characteristics of vertebrates :

- ❖ Have a true vertebral column (back bone)
- ❖ coelomates
- ❖ triploblastic
- ❖ bilaterally symmetrical
- ❖ segmented, with complex differentiation of body tissues and organs
- ❖ They have caudal fin and tail
- ❖ muscles specially attached to bones to be used for movement

vertebrates are classified into five classes. They are 1. Pisces 2. Amphibia 3. Reptilia 4. Aves 5. Mammalia

Among the above mentioned pisces, amphibians and reptiles are cold blooded animals. They can change their body temperature according to change in their surroundings. Aves and mammals are warm blooded animals. They maintain their body temperature constant without changing it according to changes in the temperature of their surroundings.

SELF EVALUATION:

1. How many groups are there in protochordata? What are they? What are the differences present in them.
2. What are the differences between protochordata and vertebrata?
3. Write the characteristics of vertebrata.
4. Write the difference between cold and warm blooded animals giving examples.
5. Vertebrata is divided into how many classes? What are they?
6. Identify the INCORRECT sentence from the following []
 - A. Herdmania belong to urochordata.
 - B. Notochord is present lifelong in cephalochordata animals.
 - C. There is no notochord in Chordata animals.
 - D. Vertebrata animals contains back bone



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Worksheet No.54

CONCEPTS:

1. Pisces
2. Amphibia
3. Reptiles
4. Aves

LEARNING OUTCOMES:

The Learner...

1. Explains the characteristics of the different classes of vertebrata.
2. Compares the characteristics of different classes of vertebrate.

CONCEPT PRESENTATION:

In animal kingdom vertebrata are well developed organisms. In these notochord is replaced by vertebral column. Vertebrata classified as five classes. They are pisces, amphibia, reptilia, aves and mammalia. Fishes are the first organisms possessing back bones. The animals present in different classes of vertebrata have similarities and differences when compared with each other.

- Observe the following pictures.



- Compare and write the characteristics of the following animals. (habitat, food, body structure etc)

fish	frog

- Observe the following pictures.



- Compare and write different characteristics of the following animals.

frog	snake

- Observe the following pictures.



- Compare and write different characteristics of the following animals.

snake	bird

- Observe the following pictures.



- Compare the special characters of the following animals.

fishes	amphibians	reptiles	birds
Cold blooded animals	Cold blooded animals	Cold blooded animals	Warm blooded animals
Heart with two chambers	Heart with three chambers	Heart with three chambers In crocodiles incompletely divided four chambers	Heart with four chambers
Lay eggs	Lay eggs	Lay eggs	Lay eggs
Lives in water	Larva lives in water, adults on land	On land	On land (on trees)
Respiratory organs are gills	Larva with gills, adults with lungs	Respiratory organs are lungs	Respiratory organs are lungs
Have fins and tail	Smooth slimy skin, Hibernate and aestivate	Have dry skin and scales	Have feathers and wings, claws

SELF EVALUATION:

- Why animals are named as vertebrata?
- Write the characteristics of the reptiles.
- Why frog is called as an amphibian?
- Explain the evolution of heart in vertebrates.
- Draw and write the characteristics of fish.
- Identify the INCORRECT sentence from the following. []
 - Claws are present in aves.
 - Frogs shows hibernation in summer.
 - Crocodiles belong to reptiles have incompletely divided three chambered heart.
 - Pisces have fins.



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Worksheet No.55

CONCEPTS:

1. **Mammals**
2. **Marsupials**
3. **Primates**
4. **Rodents**

LEARNING OUTCOMES:

The Learner...

1. Explains the characteristics of the mammals.
2. Compares the characteristics of the land, marine and flying mammals.
3. Identifies the types of mammals present on the land.

CONCEPT PRESENTATION:

Mammals are the highest developed organisms in animal kingdom. These animals feed babies with milk and suckle young ones, so these are called as mammals.

Characteristics of mammals :

- ❖ Skin covered by hair or fur
- ❖ Breathe air through lungs
- ❖ Warm blooded animals
- ❖ Have four chambered heart
- ❖ Lives on land, marine water and some can fly
- What are the characteristics of land mammals?
- Mammals are classified into how many groups? What are they?

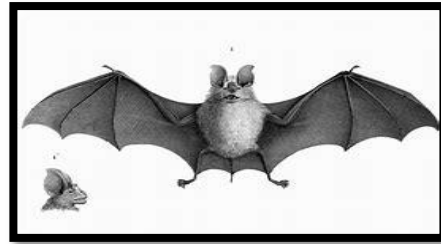
Land mammals have external ears and four limbs. (Two forelimbs and two hindlimbs). Land mammals are classified as marsupials, primates and rodents.

- Observe the following pictures.
- Compare the special characteristics of the following animals.



The above animals are kangaroo, monkey and rat. In land mammals kangaroo belongs to marsupials, monkey belongs to primates and rat belongs to rodents.

- ❖ **Marsupials** : feed their young ones in their sacks Eg. kangaroo
- ❖ **Primates** : well developed hands with fingers and legs with toes, intelligent, social animals (form bonds with family and friends) Eg. Human beings and Apes(monkeys)
- ❖ **Rodents** : large incisor teeth use like chisel to gnaw on hard foods Eg. Rabbit
- Observe the following pictures.
- Where these animals live?
- Why these animals are included in mammals?



The above animals are dolphin and bat. These are mammals. But fish shaped dolphin lives in marine water and bird shaped bat lives in dark areas.

Marine mammals:

Grow and live in marine water, some only have sparse covering hair .

Flying mammals:

Nocturnal, live in tree hollows, caves and old unused constructions, use echolocation

SELF EVALUATION:

1. Why animals are named as mammals?
2. What are the characteristics of mammals?
3. How many types of land mammals are there? Explain the characteristics of them.
4. Which mammal looks like a bird?
5. Which mammal looks like a fish?
6. What is the special character of the rodents?
7. Why kangaroos are named as marsupials?
8. Identify the INCORRECT sentence from the following []
 - A. Kangaroo is example for marsupials.
 - B. Rodents use echolocation.
 - C. Human beings belong to primates.
 - D. Dolphin is a marine animal which suckle young ones.



STATE COUNCIL OF EDUCATIONAL RESEARCH AND TRAINING

TELANGANA, HYDERABAD.

ACADEMIC YEAR 2020-21

LEVEL - 2

Class: 9

Medium: English

Subject: Biology

Unit: DIVERSITY IN LIVING ORGANISMS & CLASSIFICATION

Worksheet No.56

CONCEPTS:

1. Binomial nomenclature
2. Scientific name

LEARNING OUTCOMES:

The Learner...

1. Explains the essentiality of binomial nomenclature.
2. Identifies the scientific names of different organisms.

CONCEPT PRESENTATION:

It is surprising that naming to all organisms like human beings, but scientists working on classification felt that naming of all the organisms is essential. We see that name of one organism in various places, states and countries may create lot of confusion in studying of organisms.

- Observe the following table.

Common Name	Telugu Name	Hindi Name	Tamil Name	Marathi Name	Odia Name
Potato	Bangala Dumpa	Aloo	Urulakkiz Hangu	Batata	Bilati Aloo

Even in our Telangana state also in some areas bangala dumpa (potato) is called as alugadda.

This problem was resolved by scientists by agreeing upon a scientific name for all organisms.

- Enquire and write the different names of pea.

telugu	urdu	hindi	english	kannada	marathi
bathani					

- What is the scientific name of human being?
- Naming of organisms is called as what?

The scientific name of the human being is called *Homo sapience*. Naming of organisms with a distinct scientific name is called Nomenclature. Carolus Linnaeus introduced binomial nomenclature by which an organism is named by two words. First word indicates genus and second one indicates species. This is called binomial nomenclature.

- What are the certain norms are followed while writing scientific name?

Norms to follow to write scientific name:

1. Genus should begin with a capital letter.
2. Species should begin with a small letter.
3. When printed, the scientific name should be in italics.
4. When written by hand, the genus name and the species name have to be underlined separately.

For Eg. Observe the scientific name of the mango

Mangifera indica

- Observe the scientific names of some of the organisms in the given table. Collect and write some more.

Name of the organism	Scientific name
tamarind	<i>Tamarindus indica</i>
capsicum	<i>Capsicum frutescens</i>
.....
.....
.....
donkey	<i>Equus asinus</i>
dog	<i>Canis familiaris</i>
.....
.....
.....

SELF EVALUATION:

1. What is the need to give a scientific name to each organism?
2. What is binomial nomenclature?
3. What are the rules to be followed while writing scientific names?
4. Who introduced binomial nomenclature?
5. Identify the correct scientific name according to the rule of binomial nomenclature []
 - A. *Ficus benghalensis*
 - B. Ficus benghalensis
 - C. ficus benghalensis
 - D. Ficus Benghalensis



STATE COUNCIL OF EDUCATIONAL RESEARCH AND TRAINING

TELANGANA, HYDERABAD.

ACADEMIC YEAR 2020-21

LEVEL - 2

Class: IX

Medium: English

Subject: Biological Science

Name of the Chapter: SENSE ORGANS

Work sheet No:57

CONCEPTS:

1. Sense organs
2. Stimulation
3. Sensation

LEARNING OUTCOMES:

The learner -----

1. Explains about the sense organs
2. Differentiates the functions of sense organs.
3. Asks questions about sense organs, stimulation, sensation.

CONCEPT PRESENTATION:

- **How many sense organs are there? What are they? How are they useful to us?**

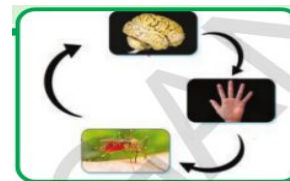
Sense organs are five. They are **eyes, ears, tongue, nose and skin**. They work together for particular sensations. Our senses have several roles to play. **Stimuli** from the environment around are received by our body through some sense organs. Our senses also help us locate mates, seek shelter and recognize our friends. They also give us the opportunity to find pleasure in music, art, athletics etc.

- **How do our senses accomplish all this?**

Our sensory impressions of the world involve **nerve signals**. They play a very important role in the way we react or respond to various stimuli or even to the same stimuli in different situations. Brain is the centre for all the sensitive activities. Sense organs send messages through sensory pathways to the brain, where they are processed and sent to required organs to function through motor pathways.

- **Observe the given picture. Write your observations?**

Stimulation to sensation is given in the picture. When a mosquito bites you on your leg(stimulus), the sensation is carried to the brain through **sensory nerves**. The brain sends the message to the hand to kill the mosquito through **motor nerves**. Then we kill it. (response). Our senses accomplish all this by working together.



- **Do all the stimuli lead to sensation?**

Dissolve 1/4 teaspoon of sugar to a glass of water. Drink a little of this. Is there any change in taste? Add sugar until you know the sweetness of solution. Find out how much sugar starts off your sensation? If we add a pinch of sugar to a glass of water, it doesn't taste sugary, because we added a very little amount of sugar.

If we add more sugar, we find that there is a change in taste. It shows that all stimuli may not lead to responses. Only a particular level of stimulus will give rise to a response. Moreover changes in stimulus also go unnoticed if they are not of a particular level.

SELF EVALUATION

1. Draw the pathway of nerve stimulation.

2. How do senses help us?

3. The sounds in a printing press may be very uncomfortable for a worker landing there for the first time. Eventually as time passes the person would not find the sounds so uncomfortable. Why?

4. What do we do when suddenly bright light falls on our eyes? Why?

REFERENCE: <https://youtu.be/Wa1alaP4qFA>



STATE COUNCIL OF EDUCATIONAL RESEARCH AND TRAINING

TELANGANA, HYDERABAD.

ACADEMIC YEAR 2020-21

LEVEL - 2

Class: IX

Medium: English

Subject: Biological Science

Name of the chapter: SENSE ORGANS

Work sheet No:58

CONCEPT:

1. Structure of eye

LEARNING OUTCOMES:

The learner -----

- 1.Explains the structure of eye .
- 2.Draws the diagram of eye.
3. Asks questions about the structure of the eye.

CONCEPT PRESENTATION:

Eyes are important sense organs. Vision helps us detect desired targets, threats and changes in our physical environment and to adapt accordingly."Sarvendriyanam Nayanam Pradhanam"

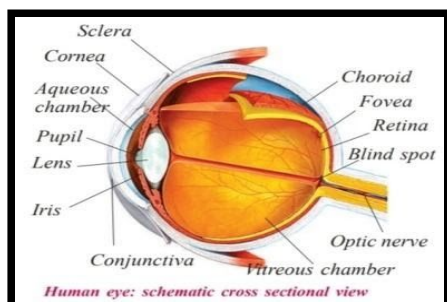
- Observe the external structure of your friend's eye. What are the parts?



Eye contains eyelids, eyelashes, eyebrows and lachrymal glands. A thin layer called conjunctiva covers the front portion of the eye. The eyeball is located in the eye socket. Only 1/6 portion of the eyeball is visible to us.

Observe the small black portion. This small black portion is called pupil.

- Observe the given diagram.



- How many layers are there in an eye? What are they?

Eye has three main layers. They are Sclerotic layer or Sclera, Choroid layer and Retina.

Sclera :

The outermost thick, tough, fibrous, non-elastic and white coloured layer. It bulges and forms cornea. The end of the Sclera connects to the optic nerve.

Choroid:

This is the second layer and black in colour and contains lot of blood vessels. It encloses the eye except the part, pupil. The part of choroid layer around the pupil is iris. Radial and circular muscles are present in the iris. Biconvex lens is present behind the pupil. It divides the inner eyeball as aqueous chamber and vitreous chamber. Aqueous chamber is filled with water like fluid substance whereas vitreous chamber is filled with Jelly like fluid.

Retina:

It contains the cells called rods and cones. The area of no vision, called blind spot and the area of best vision, called yellow spot are present in the retina. The yellow spot is also called Macula or Fovea.

SELF EVALUATION:

1. Draw the diagram of the eye and label the parts.
2. Write about the three layers of eye.
3. What is the area of no vision called? Where is it located?
4. What are the parts in the external structure of an eye?

Reference: <https://youtu.be/fYwm4Ccj4Bs>



STATE COUNCIL OF EDUCATIONAL RESEARCH AND TRAINING

TELANGANA, HYDERABAD.

ACADEMIC YEAR 2020-21

LEVEL - 2

Class: IX

Medium: English

Subject: Biological Science

Name of the Chapter: SENSE ORGANS

Work sheet No:59

CONCEPT:

1. Functioning of the eye.

LEARNING OUTCOMES:

The learner -----

- 1.Explains the functioning of the eye.
- 2.Asks questions to understand the functioning of the eye.
- 3.Appreciates the functioning of the eye.

CONCEPT PRESENTATION:

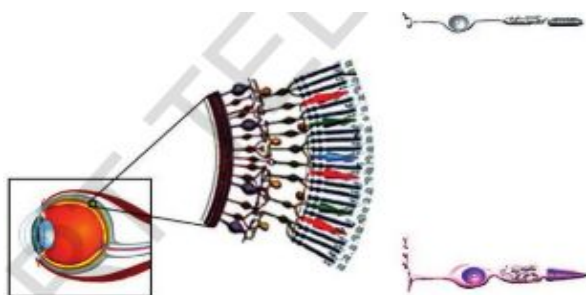
The eye is like a video camera that the brain uses to make motion pictures of the world.

- **How does the structure of the eye help us to see?**

- 1.Eye gathers light through a convex lens, focuses it, and forms an image in the retina at the back of the eye.
- 2.The lens turns the image left to right and upside down. This visual reversal may have influenced the very structure of the brain, which tends to maintain this reversal in its sensory processing regions.
- 3.Optic nerve transmits light impulses from rods and cones of retina to the brain.
- 4.This visual reversal is maintained in the sensory processing regions of the brain.
- 5.They are reversed and inverted, the eye forms an image.

Eye has the ability to take the information from light waves, transform into neural signals that the brain can process and form an image.

- **How do we see? Observe the given diagram.**



Retina is a photosensitive part. It consists of two types of photo receptors, rods and cones. They absorb light energy and respond by creating nerve impulses. Optic nerve carries no light, only patterns of nerve impulses conveying information derived from the incoming light are carried. Each of the eyes collects slightly different views of an object. The brain puts the two views together and a three dimensional picture is formed.

- **Why don't we recognize colours in dark and be able to recognize them in brighter light?**

Rods containing the pigment rhodopsin "see in the dark", but can't recognize colours. Cones containing iodopsin helps in colour vision and be able to recognize the colours in brighter light.

- **Which area is not having photo receptors?**

Part of the retina has no photo receptors. This area is called blind spot.

SELF EVALUATION:

1. Draw the diagrams of rods and cones and explain about them.
2. When we see an object, a real inverted image is formed on the retina. Why?
3. Name the area where Photo receptors are absent?
4. Choose the wrong one. ()
 - A. Biconcave lens is present in the eye.
 - B. Rods contain a pigment, rhodopsin.
 - C. Cones contain a pigment, iodopsin.
 - D. Optic nerve carries nerve impulses to the brain.

RESOURCE:

<https://youtu.be/fYwm4CcJ4B>



STATE COUNCIL OF EDUCATIONAL RESEARCH AND TRAINING

TELANGANA, HYDERABAD.

ACADEMIC YEAR 2020-21

LEVEL - 2

Class: IX

Medium: English

Subject: Biological Science

Name of the Chapter: SENSE ORGANS

Work Sheet No:61

CONCEPT:

1.EYE PROTECTION

LEARNING OUTCOMES:

The learner -----

- 1.Explains about eye protection.
- 2.Gives examples for eye diseases.
- 3.Applies knowledge of eye protection in daily life.

CONCEPT PRESENTATION:

You know the saying” Sarvendriyanam Nayanam Pradhanam.”Eyes are important sense organs. We should take proper care of our eyes.

• What are the common eye diseases?

The main diseases and defects of the eye are Night blindness, Xerophthalmia, Myopia, Hypermetropia, Glaucoma, Cataract and colour blindness. Some persons may have eye defects by birth due to various reasons.

• How do eyes are naturally protected?

Each eye is protected by eyelids, eyelashes, eyebrows and lacrimal glands. A thin membrane, called **Conjunctiva** covers the front part of the eye. Whenever unwanted substances come in contact with this layer, the lacrimal glands are stimulated to wash the substance out of the eye. The fluids that are filled in the eyeball protect the lens and other parts of the eye. Cornea protects the eye from direct exposure to light.

- **How do you take care of your eyes?Let us observe the following checklist and note the points you get.**

Wash eyes with fresh water atleast thrice or four times per day.	Yes/No
Keep the distance between the book and eyes about 25 cm while reading.	Yes/No
Don't give continuous stress and strain to the eyes. Stop the work for some time when ever your eyes feel stressed.	Yes/No
Eat food materials like green leafy vegetables, carrots etc rich in Vitamin A.	Yes/No
Work under good lighting.	Yes/No
Don't rub your eyes if anything falls in them, just wash the eyes immediately.	Yes/No
Remove dust in eye by using tongue, ring, blowing air etc.	Yes/No
Consult the eye specialist immediately whenever you face any vision related problems.	Yes/No
Avoid to see lightening, gas welding sparks, eclipse.	Yes/No

SELF EVALUATION:

- 1.How do you take care of your eyes?
- 2.How does cornea protect the eye?
- 3.What care do you take at the time of festivals and functions, to protect your eyes?
- 4.Prepare a pamphlet on the importance of eyes.
- 5.Collect details of people suffering from eye diseases in your surroundings and analyse. (project work)
- 6.Choose the wrong one. ()
 - A. We can see gas welding,lightening,eclipse etc.directly with our eyes.
 - B. Don't rub your eyes,if anything falls in them.Wash the eyes immediately.
 - C. Don't give continuous stress and strain to the eyes.
 - D. Eyes are important sense organs.

RESOURCE: <https://youtu.be/WTBxoZmAqIc>



STATE COUNCIL OF EDUCATIONAL RESEARCH AND TRAINING

TELANGANA, HYDERABAD.

ACADEMIC YEAR 2020-21

LEVEL - 2

Class: IX

Medium: English

Subject: Biological Science

Name of the Chapter: SENSE ORGANS

Work sheet No:60

CONCEPT:

1. EYE ILLUSIONS

LEARNING OUTCOMES:

The learner -----

1. Explains the reasons for eye and illusions
2. Asks questions to understand the eye and illusions.

CONCEPT PRESENTATION:

Eye has an interesting feature. It shows illusions.

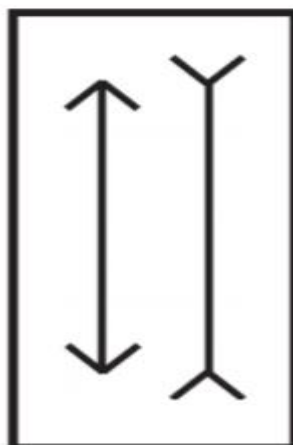
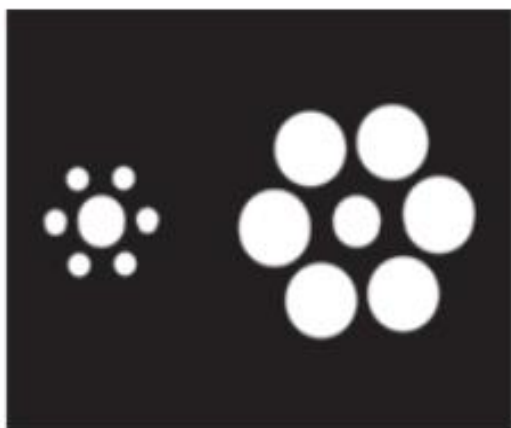
- **How do you know about eye and illusions?**

Take two pieces of white paper with the same size. Draw the picture of a cage on one paper and the parrot on the other. Insert a stick and attach the blank sides of the papers with him together. Let it dry. Then twist the stick rapidly

- **What do you notice? Guess why?**

We observed that the parrot looks to be inside the cage. It is an eye illusion.

- **Observe the following figures.**



- Which line is smaller in the first figure?
- Which one is having a big circle in the centre (second picture)?

The two lines in the first picture are equal. The circles are of the same size in the second picture. But the first line of the first picture appears smaller and the big circle of smaller flower in the second picture appears smaller.

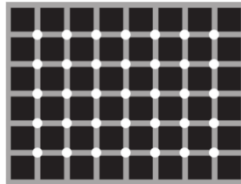
- What is the reason for eye and illusions?

The receptor cells in our visual pathways interact with each other. The functioning of certain cells that are sensitive to light - dark boundaries inhibits the activity of adjacent cells. So we experience illusions.

SELF EVALUATION:

1. What is the reason for an illusion?

2. Observe the given figure. Why do the dots, grey painted are appearing as white at the intersections of the grid? When you focus on an intersection, the spot vanishes. Why?



3. Explain the situations of eye illusions in your daily life.



STATE COUNCIL OF EDUCATIONAL RESEARCH AND TRAINING TELANGANA, HYDERABAD.

ACADEMIC YEAR 2020-21

LEVEL - 2

Class: IX

Medium: English

Subject: Biological Science

Name of the Chapter: SENSE ORGANS

Work sheet No:62

CONCEPT:

1. STRUCTURE OF EAR

LEARNING OUT COMES:

The learner

- 1.Explains the structure of the ear.
2. Draws the diagram of an ear.

CONCEPT PRESENTATION:

Ear is also an important sense organ along with the eye. It aids in hearing. Apart from hearing it helps in maintaining the equilibrium of our body.

- How many main parts are there in an ear? What are they?

Our ear has three main parts. They are external ear, middle ear and internal ear.

- Observe the given picture.

ear?

1. Outer ear (Pinna)
2. Auditory canal
3. Ear drum
- 4,5,6. Semicircular canals
7. Cochlea
8. Vestibular nerve
9. Cochlear nerve
10. Eustachian tube
11. Ear Ossicles (Utriculus)

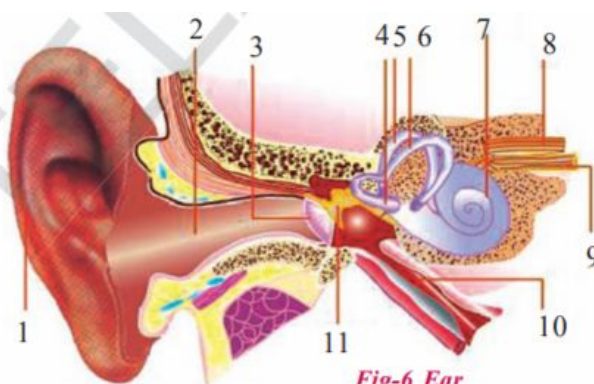


Fig-6 Ear

- What are the structures present in different parts of the ear?

External ear:

Visible part of the ear. It is a flap-like cartilaginous structure called the **Pinna**. It leads to the ear canal which is also called **auditory meatus**.

- Have you ever observed wax like substance in your ear? Where does it come from?

Pinna has ceruminous (wax producing) and sebaceous (oil producing) glands which help to keep the ear canal lubricated and prevents the dust and other particles from entering into ear canal. A thin layer called **tympanum or eardrum** (cone shape) is present at the end of the auditory meatus. It is present between the external and middle ear.

Middle ear:

The middle ear contains three bones, called **malleus, incus** and **stapes** that amplify the vibrations. The Oval window is a membrane, at the end of the middle ear. It opens into the inner ear through a round window.

- **How does the ear help in maintaining equilibrium?**

Internal ear/Inner ear:

Labyrinth consists of **vestibule, three semicircular canals and cochlea**. The anterior part of the vestibule is **sacculus** and the posterior part is **utricle**. Nerve fibers from them form the **vestibular nerve**. The semicircular canals are connected to the vestibule and filled with endolymph and form vestibular apparatus. It maintains the equilibrium of the body, pertaining to the posture and balance of the body.

Cochlea is a spiral shaped structure having three parallel tubes called **scala vestibuli, scala media and scala tympani**. Scala vestibuli and Scala tympani are filled with perilymph. Scala media is filled with endolymph. It contains **organ of corti** and tiny cells called primary sensory cells. Cochlear nerve fibres form **cochlear nerve**. The vestibular and cochlear nerves join together and form **auditory nerve**.

SELF EVALUATION:

1. Draw the diagram of ear and label the parts.
2. Write the structure of the external ear.
3. Write about the chain of bones in the middle ear.
4. Matching

- | | | | |
|------|--------------|-----|----------------------------|
| I. | tympanum | () | a. spiral shaped structure |
| II. | cochlea | () | b. semicircular canals |
| III. | inner ear | () | c. pinna |
| IV. | external ear | () | d. thin membrane |

RESOURCE: <https://youtu.be/3G5jiXl2LSM>



STATE COUNCIL OF EDUCATIONAL RESEARCH AND TRAINING

TELANGANA, HYDERABAD.

ACADEMIC YEAR 2020-21

LEVEL - 2

Class :IX

Medium: English

Subject: Biological Science

Name of the Chapter: SENSE ORGANS

Work sheet No:63

CONCEPT :

1. Auditory sensation
2. Ear protection

LEARNING OUTCOMES:

The learner -----

- 1.Explains about the auditory sensation.
- 2.Asks questions about the protection of ears.
- 3.Utilizes in day to day life situations to take care of their ears

CONCEPT PRESENTATION:

Apart from hearing, the ear helps in maintaining the equilibrium.

- **How does hearing take place?**

External ears collect the sound waves. They enter into the auditory meatus. They strike tympanum. The vibrations from tympanum reach the malleus, incus and stapes. They magnify the intensity of the sound, transmit to the oval window and to cochlea. The bacillary membrane is moved and then the vibrations reach the Organ of Corti. The impulses are sent to the brain through the auditory nerve. The hearing can be done according to the responses given by the brain.

- **What are the functions of the ear?**

- 1.To Collect and transform vibrations of sound to nerve impulses to be carried to the brain for processing.
- 2.To maintain balance or equilibrium

- **What are the common ear diseases?**

Formation of pus, infection of ear drum etc are common ear diseases caused by bacterial and fungal infections. We must consult a qualified doctor and use prescribed medicines if any infection occurs.

- **How to take care of ears?**

1. Don't insert any sharp edges in the ears to clean the ear canal.
2. If any blockage occurs due to ear infections, ear drops help to loosen it.
3. Don't pour boiled oils, leafy juices etc. in the ear. Sometimes they may cause deafness.
4. A specialist may be consulted whenever needed.

SELF EVALUATION:

1. What are the functions of the ear?
2. Why should we not pour hot oils, leafy juices in the ears?
3. What care should be taken to protect ears?
4. Write the pathway of travelling of sound through the ear.
5. Choose the correct one. ()
 - A. Listening to loud music using earphones may damage your ears.
 - B. Hydrogen peroxide helps in removing ear wax.
 - C. We should not pour leafy juices in ears.
 - D. Ear functions only to hear.

RESOURCE:

<https://youtu.be/98-6WfdumZY>



STATE COUNCIL OF EDUCATIONAL RESEARCH AND TRAINING

TELANGANA, HYDERABAD.

ACADEMIC YEAR 2020-21

LEVEL - 2

Class: IX

Medium: English

Subject: Biological Science

Name of the Chapter: SENSE ORGANS

Work sheet No:64

CONCEPTS:

1. Nose
2. Olfactory sensation

LEARNING OUTCOMES:

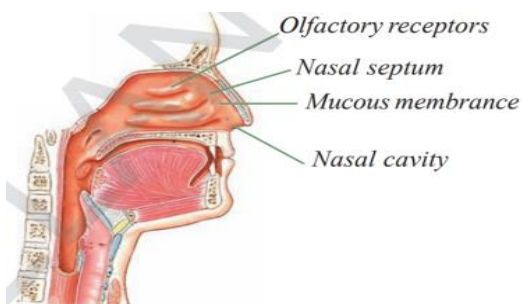
The learner....

- 1.Explains the structure and function of the nose.
- 2.Draws the diagram of the nose.
- 3.Takes care and precautions when infected with swine flu, COVID-19 etc. in daily life.

CONCEPT PRESENTATION:

Nose is an important sense organ. Smell serves a protective function by sensing the odour of possibly dangerous food or, for some animals, the scent of a predator. Human beings use the sense of smell in a much limited manner as compared to other animals, which aids in recognizing the smell.

- Observe the given picture.



- Explain the structure of the nose.

Our nose has two **nostrils** which lead to the **nasal cavity**. **Nasal septum** divides the nasal cavity into two halves. The nasal cavity is lined with **mucous membrane** and small hairs. **Olfactory receptors** are present in the mucous membrane.

- **How does the nose recognize the smell?**

Airborne chemical molecules interact with receptor proteins associated with specialized nerve cells. The olfactory receptor cells transform information about the stimulus into nerve signals and convey it to the brain. There our sensations of smell are initially processed and then passed on to many other parts of the brain. Our nose recognizes the smell.

- **How do you recognize the substance by sense of smell?**

Blindfold your friend. Ask him/her to identify different things by smell without touching. Coffee, lemon, curd, tea, tomato, pudina, cardamom, apple, carrot, brinjal etc. Some substances can be recognized by the smell.

- **How do you take care of your nose?**

We should take proper care of our nose by washing it with water. During nasal infections wash them with lukewarm salt water. Consult an ENT specialist whenever needed.

SELF ASSESSMENT:

1. Draw the diagram of the nose and label its parts.
2. What measures are to be taken to take care of the nose?
3. What precautions are taken by you to avoid Covid-19?
4. Choose the wrong one. ()
 - A. nose contains nostrils
 - B. nasal cavity is lined with mucous membrane and hairs
 - C. nostrils lead to the nasal cavity
 - D. mucous membrane does not contain olfactory receptors

RESOURCE:

1. <https://youtu.be/86ucjf4zu9Q> throat



STATE COUNCIL OF EDUCATIONAL RESEARCH AND TRAINING TELANGANA, HYDERABAD.

ACADEMIC YEAR 2020-21

LEVEL - 2

Class: IX

Medium: English

Subject: Biological Science

Name of the Chapter: SENSE ORGANS

Work sheet No:65

CONCEPTS:

1. Tongue.
2. Tongue protection

LEARNING OUTCOMES:

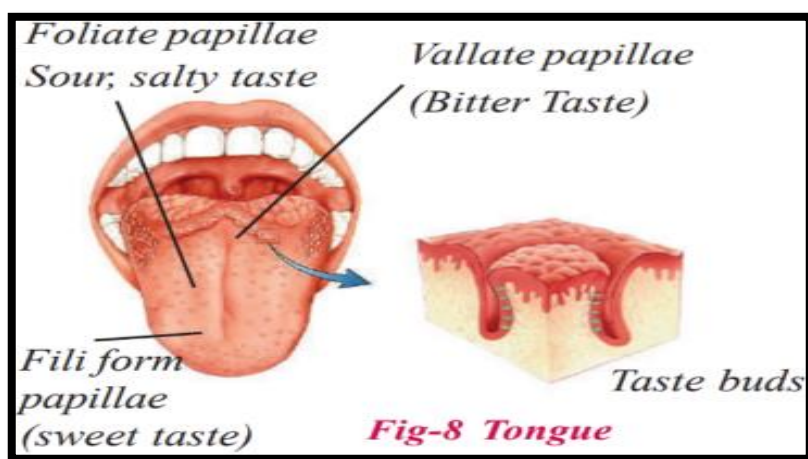
The learner

1. Explains the structure and function of the tongue.
2. Draws the diagram of the tongue.
3. Appreciates the role of tongue in enjoying the taste of different foods.

CONCEPT PRESENTATION:

Tongue helps us to know the taste. Our tongue is made up of **voluntary muscles** and about 10 thousand **taste buds**. The taste buds are present in the walls of **papillae**.

- Observe the given picture.



- Observe your tongue in the mirror. What are the different kinds of structures on the tongue?

Different kinds of structures are present on the tongue. They are flake-like **filiform papillae**, roundish structures- **fungiform papillae**, large roundish ones at the back of the tongue- **circumvallate papillae** and bump-like **foliate papillae** on the sides of the tongue.

- **What are the primary qualities of sense of taste?**

Our sense of taste involves four primary qualities, sweet, sour, bitter and salty. **Spiciness and vagaru** are also considered as tastes. **"Umami"** is another taste. Meat, seafood and cheese are in the taste of umami. **Metallic taste** is the taste of some artificial processed food material.

- **How different tastes are recognized?**

Taste receptor cells are located in the taste buds on the top and side of the tongue. They sample flavours from food and drinks as they pass by on the way to the stomach. A specialized nerve **"hotline"** carries nothing but taste messages to specialized regions of the brain along with taste receptors. The sense of taste and smell have a close and cooperative working relationship. So we cannot recognize the taste of food when we are suffering from a cold

- **How do you identify the substances by sense of taste?**

Blindfold your friend. Give him/her a piece of ginger, garlic, tamarind, banana and jaggery one by one. Ask him/her to just put each substance on the tongue to find out taste. Repeat the above experiment by taking a bite and pressing the food on the palate. What difference does he/she feels now? (precautions: your friend needs to rinse his/her mouth between each test)

He /she cannot recognize the taste immediately, by just putting on the tongue. We know the taste immediately if we bite and chew it and press it against the palate with our tongue.

- **How to take care of tongue?**

- 1.Clean and wash the tongue before going to bed and after rising up in the morning.
2. Wash the mouth cavity, after eating the food.
- 3.If any problem arises, consult a doctor immediately.

SELF ASSESSMENT:

- 1.Draw the diagram of the tongue and label the parts.
- 2.What care should be taken for the protection of the tongue?
3. Telugu people consider six types of tastes (Shadruchulu).What are they?
4. Match the following.

- | | | |
|-----------------------------|-----|--------------------------|
| I. Filiform Papillae | () | a. roundish structures |
| II. fungiform Papillae | () | b. flake like structures |
| III. circumvallate Papillae | () | c. bump like structures |
| IV. Foliate Papillae | () | d. large ones |

RESOURCE: 1. https://youtu.be/HTRq_OM18Pw



STATE COUNCIL OF EDUCATIONAL RESEARCH AND TRAINING

TELANGANA, HYDERABAD.

ACADEMIC YEAR 2020-21

LEVEL - 2

Class: IX

Medium: English

Subject: Biological Science

Name of the Chapter: SENSE ORGANS

Work sheet No:66

CONCEPTS:

1. Skin
2. Skin protection

LEARNING OUTCOMES:

The learner

1. Explains the structure and function of skin.
2. Draws the diagram of skin and label the parts.

CONCEPT PRESENTATION:

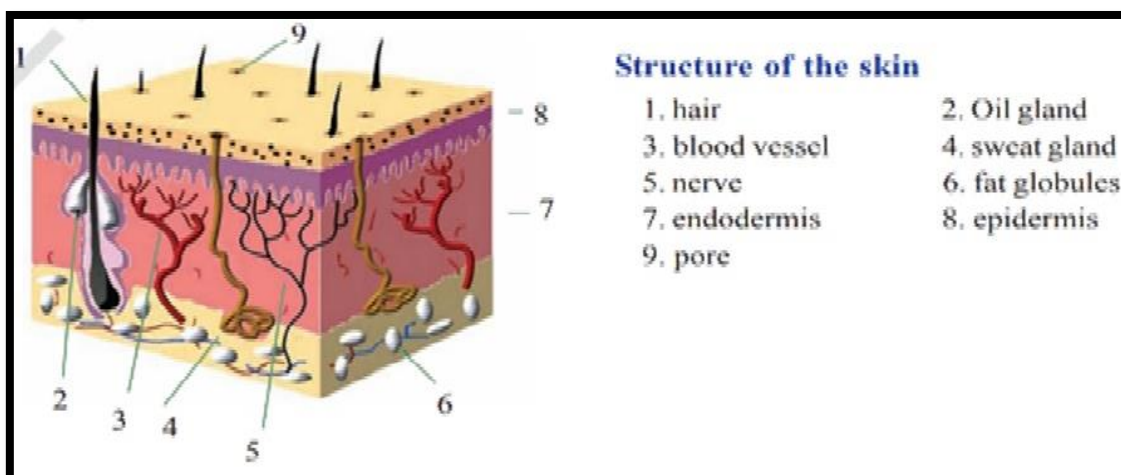
The important sense organ involved in sense of touch is skin.

- Observe the picture. Explain the structure of skin.

The skin consists of two main layers called **epidermis** and **dermis**. Epidermis is the layer for protection. It has sweat pores and small hairs. It contains three layers, **stratum corneum** or cornified layer containing dead cells, middle **granular layer** containing living cells and inner **malpighian layer** containing the cells dividing constantly. Dermis lies below the epidermis, which is made up of elastic connective tissue. It contains sweat glands, sebaceous glands, hair follicles, blood vessels and fats. Skin consists of **sensory receptors**.

- **How does the skin give sensory knowledge?**

Skin is the outermost covering of our body. It is the sense organ of touch. The sense of touch is done by **cutaneous receptors**.



- **Write the functions of skin?**

Skin is the largest organ of all. It regulates body temperature. It eliminates certain waste material through sweat. Skin provides the first level of protection to the body. Skin is sensitive to touch, temperature and pressure. It contains tactile receptors for touch, **pacinian corpuscles** for pressure, **nociceptors** for temperature etc. A pigment called "**melanin**" gets stimulated, when exposed to sunlight. Depending on the stimulation the skin colour is different in different persons.

- **What are the common skin diseases?**

Viral diseases such as measles, chicken pox; bacterial diseases like leprosy; melanin deficiency diseases such as leucoderma ; vitamin deficiency diseases such as pellagra; fungal diseases such as ringworm.

- **How do the visually impaired people read?**

In Braille script, the letters are written in the form of elevations and depressions. The visually impaired people read the script merely by touching.

- **What are the protective measures for the healthy skin?**

Take bath regularly. Use soap to clean the body. If any redness, itching, discoloration and rashes appear on the skin, immediately consult the doctor.

SELF EVALUATION:

1. Draw the diagram of skin and label the parts.
2. Explain the structure of skin?
3. What are the three main layers of epidermis?
4. Name the pigment, which gives colour to the skin.
5. Collect information regarding skin diseases and analyse (project work) .
6. Choose the wrong one. ()

A. Skin consists of two main layers. B. Skin is the largest organ of all.
C. Skin regulator body temperature. D. Dermis contains a cornified layer.

RESOURCE: 1. <https://youtu.be/THW3464E99c>

2. <https://youtu.be/OxPlCkTKhzY>