



INDIAN SCHOOL MUSCAT

CLASS : XII
SUBJECT: BIOLOGY
LABSHEET : 1



TOPIC: **POLLEN GERMINATION**

AIM

To study pollen germination on a slide.

REQUIREMENTS

Freshly plucked seasonal flowers, boric acid, sucrose, microscope, beaker and slide.

PROCEDURE

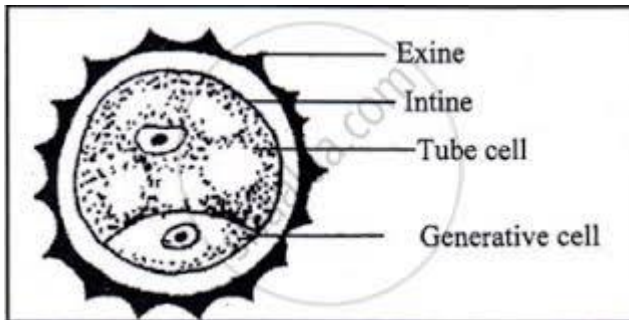
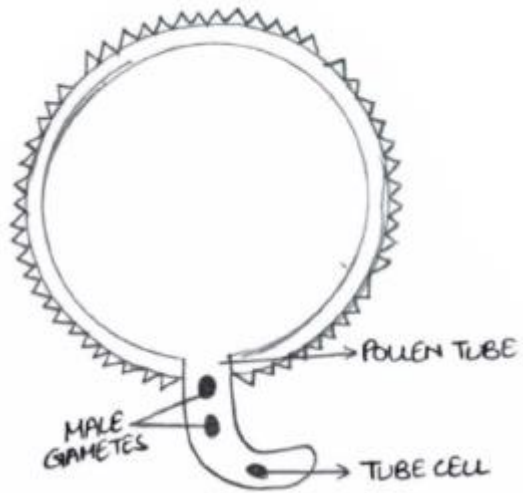
- Dissolve 10g of sucrose and 10mg of boric acid in 100ml of water.
- Pour a few drops of this solution onto the slide.
- Place mature anther from a fresh flower and crush them on a slide.
- Remove the debris using a needle leaving only pollen grains on the slide.
- Let the slide set for 5 minutes.
- Use the microscope to view the slide in 30-minute intervals.



OBSERVATION

The pollen grains will germinate when submerged in the nutrient-rich medium. This is characterized by the enlargement of the vegetative/tube cell. It emerges through one of the germ pores, eventually forming a pollen tube. The generative cell nucleus grows into the pollen tube and makes two male gametes (sperm nuclei). The male gamete is either spherical or lenticular in outline.

PRECAUTIONS

- Ensure that the flowers are freshly picked
- The observation slide should be a cavity slide, meaning that it has a depression in the centre



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TOPIC: EXTRACTION OF DNA

AIM

Isolate DNA from available plant material such as Strawberry, Kiwi etc.

Requirements:

Plant material (Strawberry or Kiwi), Water, zipper bag, Chilled Ethanol (Refrigerate it overnight), NaCl, Liquid detergent, Muslin cloth for filtration, tooth pick, Beaker, Petri dish, Boiling tube

Procedure:

1. Take the available plant material and squish it in the zipper bag manually to make paste,
2. Fill a clean beaker with 25 ml of water, slowly add two teaspoons of liquid detergent and half teaspoon of NaCl. Gently mix them without making bubbles till the salt dissolves.
3. Add this mixture to mashed plant material.
4. Place a fine/muslin cloth on a small beaker/boiling tube and carefully pour the mixture here and filter it. Gently squeeze the mixture to get more liquid out. This liquid filtrate contains DNA.
5. Since the DNA is soluble in water so to isolate DNA from this filtrate pour chilled ethanol by side of slightly (45°) tilted boiling tube.
6. After few minutes DNA will isolate as white precipitates/ fine threads from the watery filtrate at the boundary layer between water and ethanol.
7. Separate DNA by spooling i.e. the winding of the fine threads of DNA on toothpick.



Observation:

DNA appears as white precipitate of very fine threads on the spool.

Precautions:

1. All the glass wares must be thoroughly cleaned and dried.
2. The chemicals used for the experiments must be of standard quality.

3. NaCl and Liquid detergent should be to dissolve slowly by stirring without formation of foam or bubbles.
4. Add chilled ethanol to enable the precipitation of the DNA

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TOPIC: WATER HOLDING CAPACITY OF SOIL

AIM

To study soil samples from two different sites and analyse their property water-holding capacity.

Requirements:

Soil samples, Beaker, Measuring cylinder, Filter Paper, Distilled water, Funnel, Weighing scale/ balance.

Procedure

Take two funnels and line them with filter paper. Label them as A and B. Now place them on two measuring cylinders. Take 20gram oven dried sample each of garden soil and roadside soil. Garden soil should be placed in funnel A and roadside soil in funnel B. Pour 100 ml of water in each funnel. Record the volume of filtered out water in the measuring cylinder when the dripping of water stops from the funnel.

Observation:

Record all the observations in the observation table and calculate the water holding capacity by given formula:

Water holding capacity of the soil in % = $\frac{\text{Vol. of water poured} - \text{Vol of water collected in measuring cylinder}}{\text{Weight of soil}} \times 100$

S. No.	Soil types	Weight of soil (X)	Volume of water poured (Y)	Volume of water collected in measuring	Volume of water retained the soil	Water holding capacity of the soil

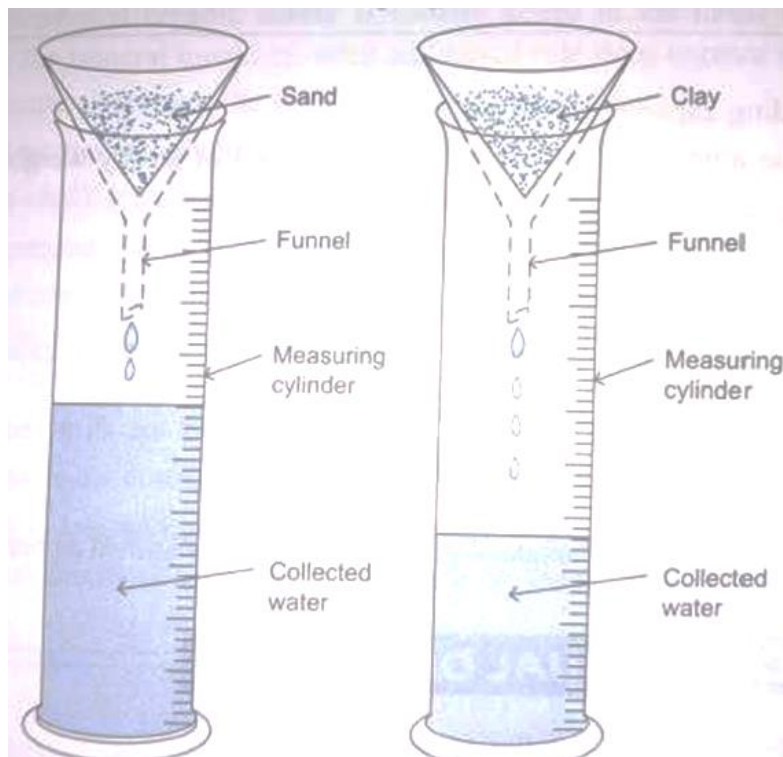
1.	Garden soil	20g	100 ml			
2.	Roadside soil	20g	100ml			



Result:

Garden soil has a higher water holding capacity than the roadside soil, because the roadside soil has larger quantities of sand and silt.

Precautions:

1. Wash the glassware thoroughly and get it oven dried before the experiment.
2. Weighing of soil samples should be done accurately.
3. Pour water slowly and gently on the soil in the funnel.
4. Record the volume of collected water in the measuring cylinders carefully.



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TOPIC: Flowers adapted to pollination by different agencies (wind, insects, birds).

1. Flowers adapted to pollination by WIND

COMMENTS:

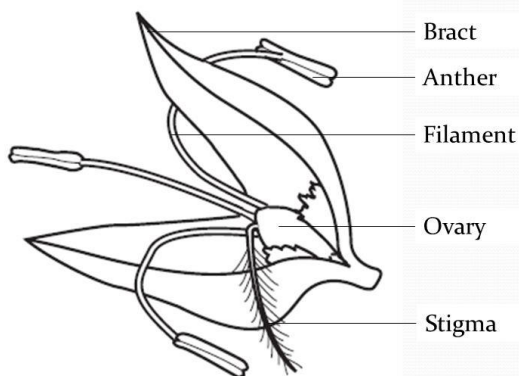
1. Pollination of flowers by the wind is called as *anemophily*.
2. Such flowers do not produce nectar and fragrance.
3. In the flowers pollinated by the wind, the microsporangia hang out of the flower. As the wind blows, the light-weight pollen blows with it. The pollen gets accumulated on the feathery stigma of the flower.



2. Flowers adapted to pollination by INSECTS

COMMENTS:

1. Pollination of flowers by insects is called entomophily.
2. The flowers pollinated by insects are bright-coloured and produce nectar.
3. The fragrance of the flowers attracts the insects.
4. The pollen are sticky, large, heavy and rough so that stick to the body of the insects.
5. The stigmas are also sticky so that the pollens depositing are not dispersed.

Diagram of a wind-pollinated flower



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TOPIC: Identification of stages of gamete development, i.e., T.S. of testis and T.S. of ovary through permanent slides.

1. T.S. OF TESTIS

COMMENTS:

1. The testes comprise several seminiferous tubules embedded in the interstitial tissues.
2. Thick fibrous tissues called tunica albuginea cover the testes.
3. It comprises different types of cells from the outside to the lumen in the manner given below:
Spermatogonia → Spermatocytes → Spermatids → Spermatozoa (sperms)
4. Sertoli cells are located between the germinal cells.
5. The Leydig cells that produce testosterone are present in the interstitial tissues.

2. T.S. OF OVARY

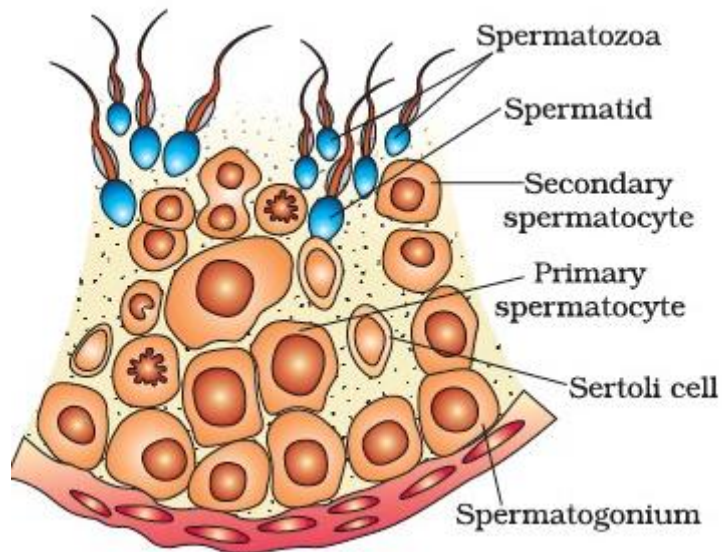
COMMENTS:

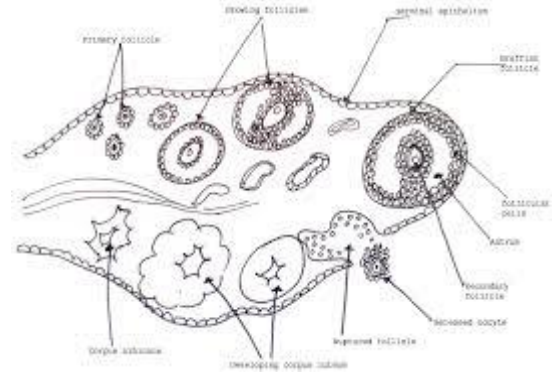
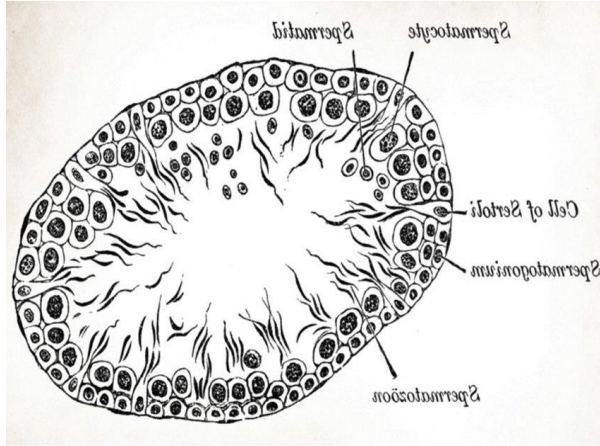
1. An ovary is a germinal epithelium bounded by a solid structure covered by a thick layer of fibrous tissue known as tunica albuginea.
2. It consists of an inner medulla and an outer cortex.
3. The medulla comprises several round or oval bodies known as ovarian follicles.



Follicle development takes place in the following stages:

1°follicle → 2°follicle → 3°follicle → Graffian follicle → Corpus luteum

4. Cortex comprises corpus luteum along with mature follicles.





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TOPIC Common disease causing organisms like Ascaris, Entamoeba, Plasmodium, any fungus causing ringworm through permanent slides or specimens. Comment on symptoms of diseases that they cause.

1. Ascaris

COMMENTS

Systematic position:

Phylum – Aschelminthes
 Class – Nematoda
 Type – Ascaris lumbricoides

External features:

1. It has a long, cylindrical and unsegmented body.
2. The male and female organisms are separate.
3. It bears a mouth at the anterior end surrounded by three lips.

4. There is an excretory pore on the ventral surface slightly behind the anterior end.
5. A pair of penial spicules are present in the male worms close to the cloacal opening.
6. The female genitals are present at about one-third distance from the anterior end.

Disease: Round worm or Ascaris is one of the common parasite found in the intestine of human beings that causes Ascariasis.

#Symptoms: (a) Irregular bowel, (b) Occasional vomiting, (c) Anaemia (d) Abdominal cramping & swelling (e) Nausea.

2. Entamoeba

COMMENTS

Systematic position:

Phylum: Protozoa

Class: Rhizopoda

Type: Entamoeba histolytica

External features:

1. It is a unicellular organism with an irregular shape.
2. It consists of a few food vacuoles. The contractile vacuole is absent.
3. Cysts with four nuclei are present.
4. It consists of a nucleus located eccentrically in the cell.

Disease: Entamoeba histolytica is an organism found in the intestines of humans that is responsible for causing amoebic dysentery.

Symptoms: Abdominal pain, Watery diarrhea with mucus, blood and pus, Fatigue, Fever, Nausea, Vomiting.

3. Plasmodium

COMMENTS:

Systematic position:

Phylum: Protozoa

Class: Sporozoa

Type: Plasmodium vivax

External Features:

1. It is a unicellular endoparasite found within the red blood cells of the diseased person.
2. The parasite is mostly diagnosed at the “signet ring” stage where the parasite appears as a round body.

3. There is a big vacuole present inside the cell. The cytoplasm is accumulated at one place and contains the nucleus.
4. Plasmodium vivax is a protozoan parasite that causes malaria in humans. The infected female anopheles bites a healthy person and transmits the sporozoite into the peripheral blood vessels of humans.

Disease: The infective stage sporozoites causes the disease Malaria. This stage undergoes several rounds of multiplication in liver and erythrocytes of Human.

Symptoms: High fever, Shaking chills, Headache, Vomiting, Nausea

4. Trychophyton (Ringworm)

COMMENTS:

Systemic position:

Kingdom: Fungi

Class: Deuteromycetes Type:

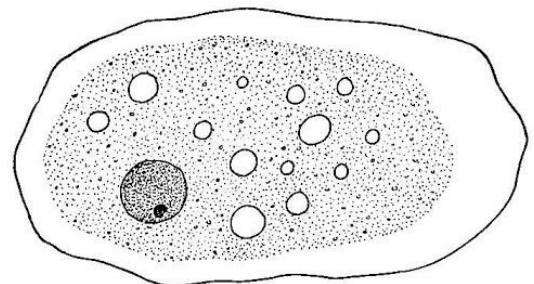
Trichophyton rubrum

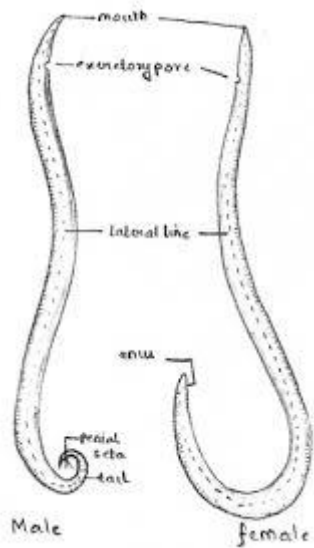
External features:



1. This fungus feeds on the keratin of the skin of human beings.
2. The hyphae are waxy and can be smooth or cotton-like.
3. Hyphae that are not stained are yellowish-brown, reddish-brown or white in colour.

Disease: Ringworm is a communicable fungal infection of the skin.

Symptoms: Scaly, itchy skin, Red and raised patches, they are redder at the periphery than at the centre and forms a ring-like appearance.





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TOPIC: Two plants and two animals (models/virtual images) found in xeric conditions.

Comment upon their morphological adaptations.

OPUNTIA DILLENII (NAGPHANI)
COMMENTS:

1. It is a succulent or drought resisting xerophyte, which grows wild in arid areas.
2. The leaves are caducous. They fall down soon after their formation to reduce transpiration.
3. The stem is jointed, flattened and green phylloclade.
4. The stem becomes fleshy due to storage of water. The stored water is used throughout the unfavorable periods.

CALOTROPIS PROCERA

COMMENTS:

5. The plant has a light grey colour which makes it possible for the plant to absorb less sunlight.
6. The leaves and young branches are covered by a thick cuticle and waxy cover along with hairs for insulation.
7. The leaves are thick and partially leathery so they do not wilt easily.
8. The plant possesses milky latex which help in retaining water.

CAMEL

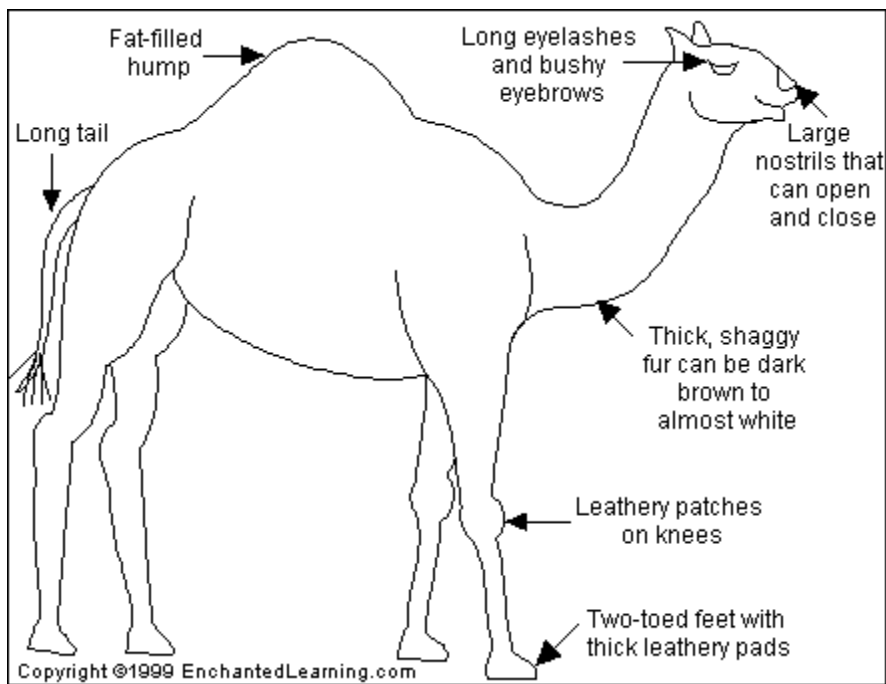
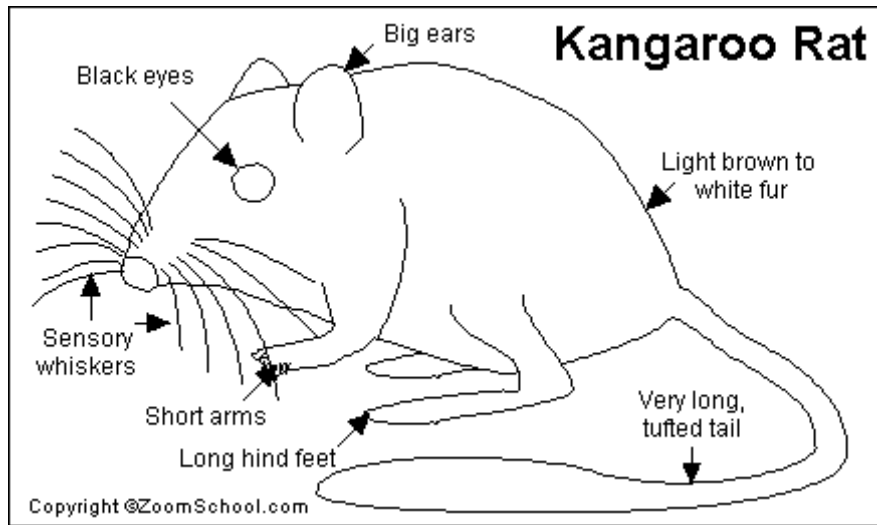
COMMENTS:

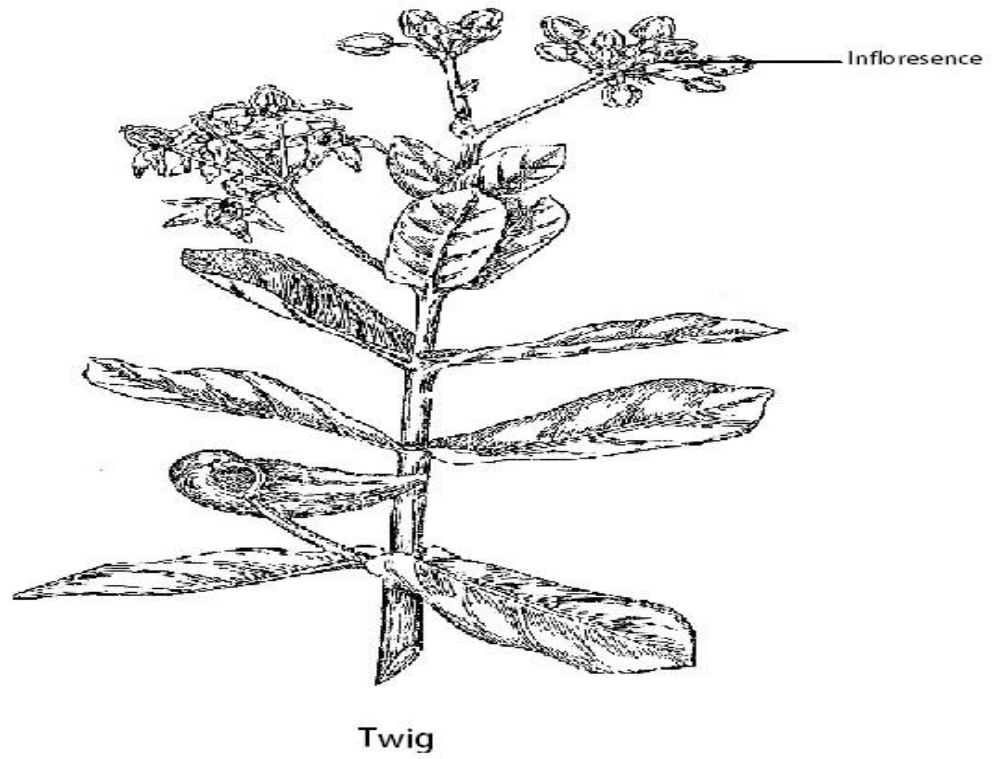
9. It excretes concentrated urine and can withstand dehydration up to 25% of its body weight.
10. It accumulates its fat in the hump rather than all the body.
11. Its feet has two toes each with fleshy pad below which spread the load on sand enable it to move on hot and slippery sand.
12. Its slender snout bears a cleft upper lip, long eye lashes and muscular nostrils which can be closed for protection from windblown sand.

KANGAROO RAT

COMMENTS:



11. The kangaroo rat can survive without ever drinking any water, getting needed moisture from their seed diet.
12. They have excellent hearing and can even detect the silent sound of an owl approaching.
13. Kangaroo rats have pouches, but not for carrying their babies. Their pouches are on the outside of their cheeks and are used for carrying seed back to their burrows.
14. Kangaroo Rats don't sweat or pant like other animals to keep cool because that would cause them to lose water from their bodies.





TOPIC:

ISM/CLASS XII/ LABSHEET NO 8/BIOLOGY/2020-21

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Two plants and two animals (models/virtual images) found in aquatic conditions. Comment upon their morphological adaptations.

EICHHORNIA (WATER HYACINTH)

COMMENTS:

1. It is a free floating hydrophyte that grows in ponds lakes and water bodies containing freshwater.
2. When the level of water is low, the plant gets rooted in the soil.
3. The stem is offset that grows prostrate below the surface of water. It is spongy and stores air.
4. The leaves arise at the nodes in clusters. The petioles of the leaves are inflated that keep the leaves out of water.
5. The emerged leaves have waterproof, waxy and cuticular coating to prevent wetting.

NELUMBO NUCIFERA (LOTUS)

COMMENTS:

6. Leaves of Lotus plant are very wide and disc shaped. This allows them to float on water and absorb large amount of sunlight.
7. The stem and leaf surfaces of Lotus are coated with a wax which is very difficult to wet. Therefore, it keeps the surfaces free from excessive water even in water rich environment.

LABEO ROHITA (ROHU OR CARP)

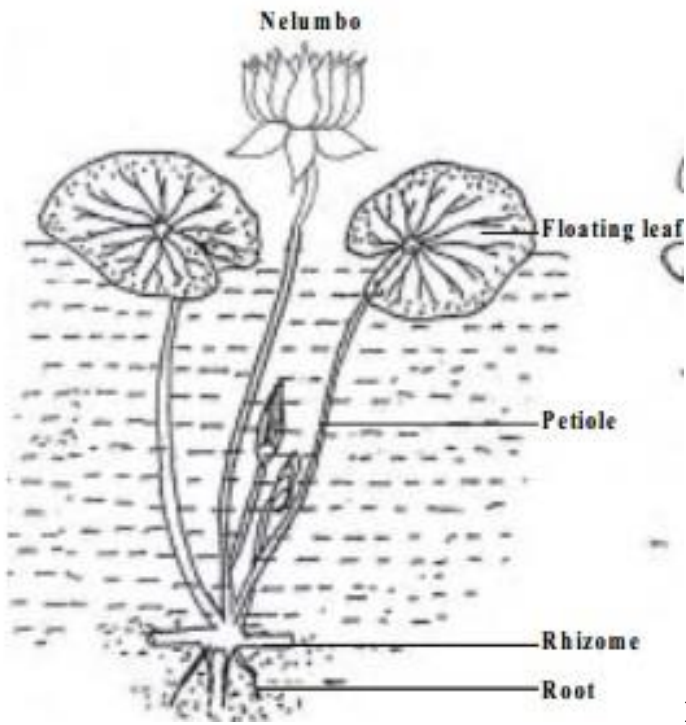
COMMENTS:

8. Its body is compressed laterally to reduce friction and to allow swift passage in water while swimming.
9. It possesses fins that helps in swimming and gills for respiration.
10. It has an air bladder or swim bladder which maintains buoyancy.
11. The body is covered with water impermeable scales to prevent osmotic entry of water in the body.

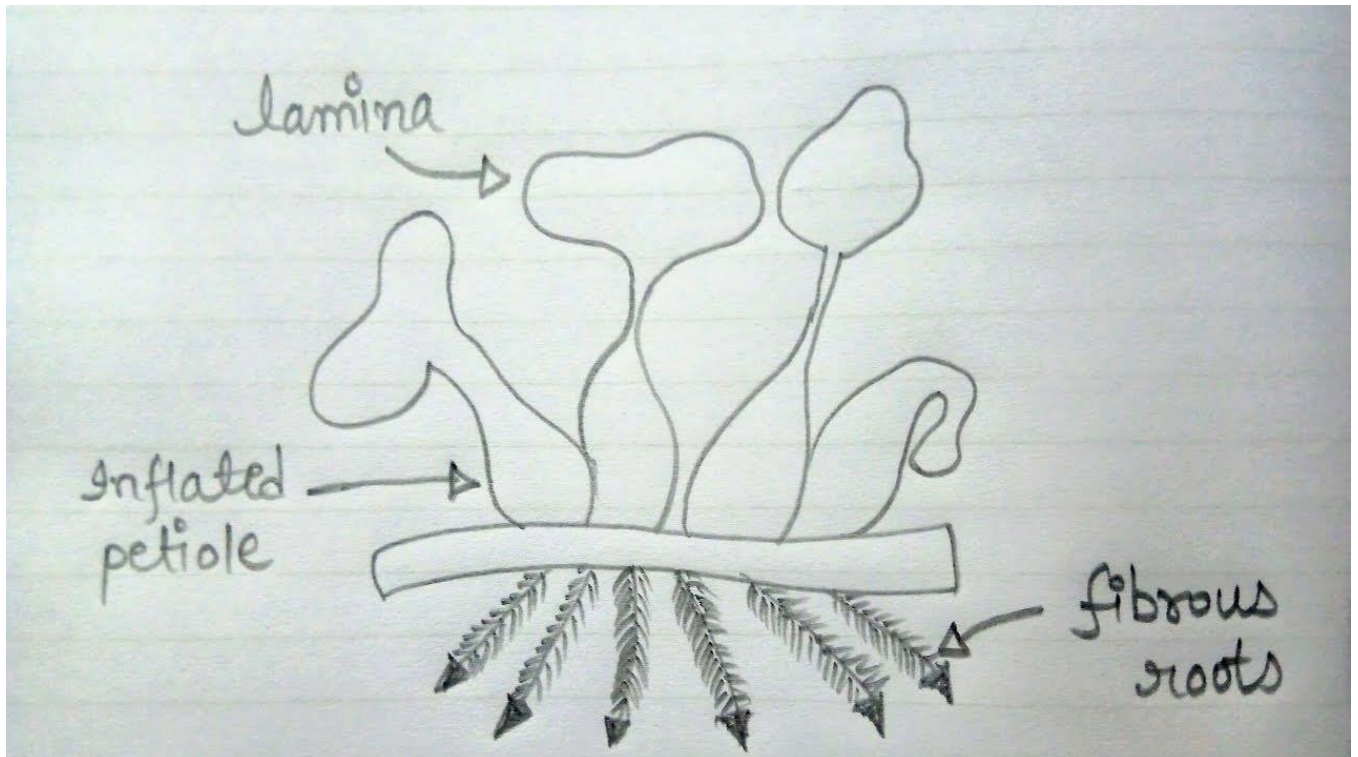
RANA TIGRINA (INDIAN BULL FROG)

COMMENTS:

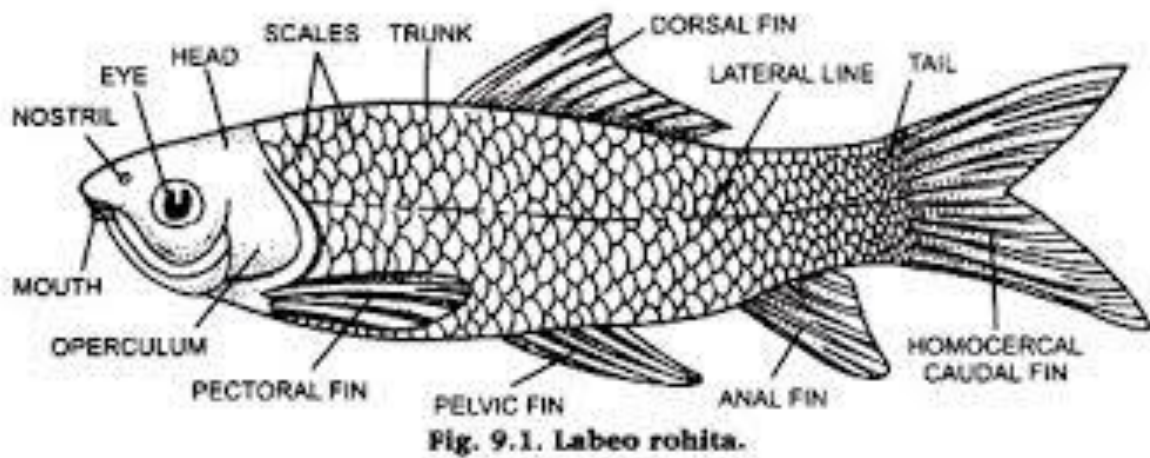
12. Frogs have long and powerful legs that allow them to jump and swim for long distances.
13. They also have webbed feet that act as fins to aid in swimming.
14. The shape of the frog's body is streamlined, with a slim body, no neck and a broad head, which allows it to propel itself through water more smoothly.
15. Frog skin is thin and allows for cutaneous respiration. It produce mucous that keeps the skin moist.



NELUMBO



EICHORNIA



ROHU

