X CLASS (EM)

BIOLOGY

EXPERIMENTS & OBSERVATIONS

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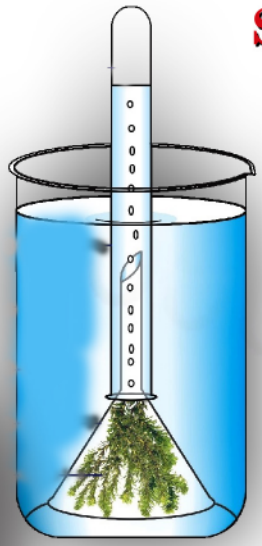

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EXPERIMENT-I

PRESENCE OF STARCH IN LEAVES (NUTRITION)

AIM:

To test the presence of starch in leaves.

Materials required:

Leaf, Beaker, Test tube, Water, Methylated spirit, Iodine solution, Petri dish, Burner and stand.

Precautions:

We should be careful wile boiling.

Procedure:

1. Take a leaf in a test tube with Methylated spirit.
2. Boil the leaf in methylated spirit over the water in the beaker.
3. Boil the leaf until it becomes pale white due to the removal of chlorophyll.
4. Take the leaf carefully from the test tube using a brush.
5. Spread the leaf in a petridish and add a few drops of Iodine solution on it.

Observation:

The leaf turns Blue-Black in colour.

Inference:

In general Iodine turns the Starch into Blue-Black colour. In this experiment, the Blue-Black colour of the Leaf indicates the presence of Starch. This Starch is prepared by the process of Photosynthesis.

EXPERIMENT-2

MOHL'S HALF LEAF EXPERIMENT (NUTRITION)

Aim :

To prove that carbon di oxide is necessary for photosynthe sis.

Materials required:

Wide mouthed bottle, KOH solution, Potted plant, Split cork, and Iodine solution.

Precautions:

1. The splitted cork should be tightly fit to the mouth of the bottle that ensures the lack of carbon di oxide inside the bottle.
2. The plant has to be destarched before the experiment.

Procedure:

1. Destarch the plant by keeping it in dark room for nearly a week.
2. Take wide mouthed transparent bottle.
3. Put potassium hydroxide solution in the bottle. It absorbs carbon di oxide.
4. Insert splitted cork in the mouth of the bottle.
5. Insert one of the leaf of destarched plant through the split cork into transparent bottle .
6. Leave the plant in sun light for few hours and test this leaf with iodine solution.

Observation:

The leaf which is exposed to atmospheric air becomes bluish-black and the one inside the flask containing potassium hydroxide which absorbs carbon di oxide in the bottle becomes brown instead of blue-black.

Inference:

With this experiment it is proved that carbon di oxide is necessary for photosynthesis. It is the major component in the process of photosynthesis.

EXPERIMENT-3

HYDRILLA EXPERIMENT (NUTRITION)

Aim:

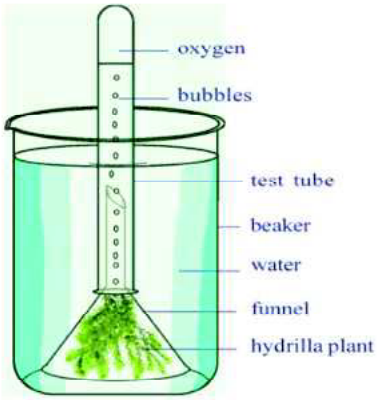
To prove that oxygen is produced during photosysthesis in the presence of light.

Materials required:

Beaker, Hydrilla plant, Water, Test tube, Funnel, Insence stick.

precautions:

we should be careful while inverting the test tube on to the funnel.



Procedure:

1. Place Hydrilla plant in a short stemmed funnel and keep it in a beaker containing water.
2. invert a test tube full of water over the stem of the funnel.
3. Ensure that the level of water in the beaker is above the level of stem of inverted funnel.
4. place this apparatus under the sunlight for 2-3 hours.

Observation:

It is observed that the air bubbles arise from the Hydrilla plant. These air bubbles move upwords into the test tube and replace the water. So some gas is collected in the test tube.

Testing gas in the test tube:

1. Take out the test tube by closing its mouth with the finger.
2. When an insence stick is inserted into this test tube it burst into flames.

Inference:

From the above experiment it is proved that the oxygen is released from the Hydrilla plant during the process of photosynthesis.

EXPERIMENT- 4

BLACK PAPER EXPERIMENT (NUTRITION)

Aim:

To prove that sunlight is necessary for photosynthesis.

materials required:

Potted plant, Black paper and Iodine solution.

Precautions:

1. The plant must be destarched before the experiment.
2. the black paper should be tightly clipped so as to prevent the sunlight.

Procedure:

1. Take a potted plant with destarched leaves.
2. Cover one of its leaves with black paper on which a design is cut.
3. Fix the paper on the leaf in such a manner that light does not enter the dark part.
4. Place this potted plant in the sunlight.
5. After few hours of exposure to bright sunlight, test the leaf which is covered by black paper for the presence of starch.

Observation:

It is observed that only the parts of the leaf, which could get light through the cut out design, turns blue-black showing the presence of starch.

Inference:

From the above experiment it is proved that sunlight is necessary for photosynthesis. Sunlight is trapped by the chlorophyll and converted into chemical energy. So sun is the main energy source on this earth.

EXPERIMENT-5

EXPERIMENT WITH YEAST (RESPIRATION)

Aim:

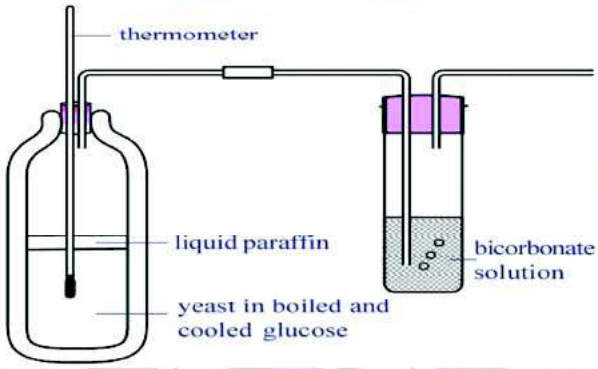
To test the production of heat and carbon di oxide under anaerobic respiration.

Materials required:

Wash bottle, Thermometer, L shaped glass tubes, Test tube, Mixture of yeast in boiled and cooled glucose, Bicarbonate solution and Liquid paraffin.

Precautions:

1. Oxygen should be removed completely from the wash bottle.
2. We should handle the thermometer carefully.



Procedure:

1. Take a wash bottle half of which filled with mixture of yeast in boiled and cooled glucose.
2. Pour liquid paraffin on to the mixture of one centimeter to avoid oxygen to mix with it.
3. Close the wash bottle tightly with two holed cork. one hole is to fix thermometer and another for L shaped glass tube.
4. The other end of glass tube is attached to another L shaped glass tube which in turn is inserted into test tube containing bicarbonate solution.
5. Note the initial temperature and leave this set up for 2-3 hours and observe.

Observation:

1. The raise in temperature is obsevedin the thermometer.

2. it is also observed that the bicarbonate solution turns into milky white.

Inference:

Since oxygen is removed from the wash bottle, aerobic respiration is prevented. But still ther is release of temperature and carbon di oxide. this proves that the heat and carbon di oxide are released during anaerobic respiration.

EXPERIMENT-6

COMBUSTION OF SUGAR (RESPIRATION)

Aim:

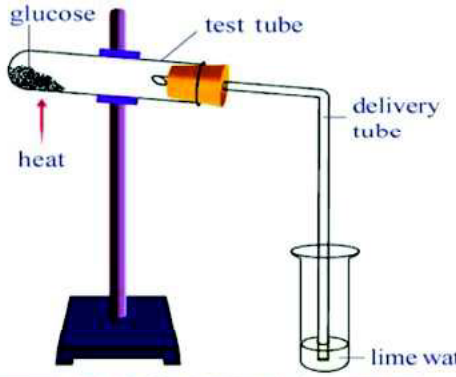
To observe the changes during combustion of sugar and comparing it with cellular respiration.

Materials required:

Test tube, glucose, One holed cork, L shaped glass tube, lime water, Stand, spirit lamp.

Precautions:

1. We should not touch the test tube while heating.
2. While heating we should make keen observations and note the changes.



Procedure:

1. Take a pinch of glucose in the test tube and close it with one holed cork tightly.
2. An L shaped glass tube is inserted into the test tube through the hole of the cork.
3. The other end of glass tube is dipped in another test tube containing lime water.
4. These are fixed to a stand as shown in the figure.
5. Heat the test tube with a burner and observe the changes in glucose and lime water.

Observation:

After heating the glucose melts and turns black. It also releases a gas which in turn passes through glass tube and turns lime water into milky white solution.

Inference:

When glucose burns carbon dioxide and water are produced and energy is released as heat. The same products are also released during cellular respiration. But combustion differs from the cellular respiration due to the following reasons.

1. During combustion glucose must be burnt at high temperature to liberate energy. if it happens in our cells, all cells would be burnt.
2. The combustion is an uncontrolled processes and releases heat at once where as cellular respiration is a controlled processes and releases heat in different stages.

Water normally stops combustion but cells contain a lot of water and respiration still goes on.

EXPERIMENT-7

RELEASE OF CARBON DIOXIDE IN RESPIRATION (RESPIRATION)

Aim:

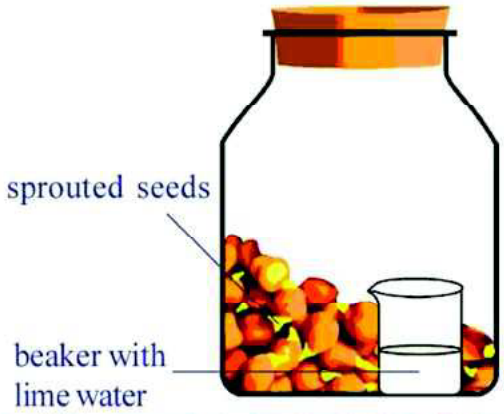
To prove that the carbon dioxide is released during respiration.

Materials required:

Glass bottle, Germinated seeds, Beaker, Lime water, Cork and Unsprouted seeds.

Precautions:

1. Close the glass bottle tightly.
2. Take the germinated and unsprouted seeds seperatly.



Procedure:

1. Take handful of germinated seeds and keep them in a glass bottle.
2. Take a small beaker filled three forth of it with lime water and keep inside the glass bottle and close the bottle tightly.
3. Make a similar set with unsprouted seeds.
4. Keep this set undisturbed for one or two days and observe the color of lime water in both the sets.

Observation:

The lime water changes into milky white solution in both the glass bottles. But in the bottle with sprouted seeds the lime water changes into milky white solution faster than in the bottle with unsproted seeds.

Inference:

In the sprouted seeds the rate of respiration is more than unsprouted seeds. So the sprouted seeds release more quantity of carbon dioxide and changes the lime water into milky white solution.

EXPERIMENT-8

RELEASE OF HEAT IN RESPIRATION (RESPIRATION)

Aim:

To prove that heat is released during respiration.

Materials required:

A flask, Sprouted seeds, Thermometer and Cork.

Precautions :

1. The flask should be tightly closed and temperature should be recorded carefully.
2. The bulb of thermometer should dip in the sprouts.

Procedure:

1. Take the sprouted seeds in a thermos flask.
2. Remove the lid and prepare a cork with thermocol or rubber or cotton.
3. Insert a thermometer through the cork and dip it in the sprouted seeds.
4. Close the flask with this tight fitting cork.
5. Record the temperature every two hours for at least 24 hours in the following table.

SN	TIME	TEMPERATURE

Observation:

A Raise in temperature is observed in a steadily manner.

Inference:

The respiration process release energy along with carbon dioxide. Some amount of energy is released in the form of heat. Hence we could observe the steady increase in temperature.

EXPERIMENT-9

ROOT PRESSURE (TRANSPORTATION)

Aim:

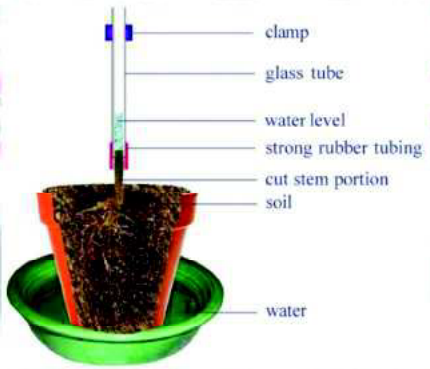
To prove that there is a push from roots due to root pressure on the column of water in the xylem vessels.

Materials required:

A potted plant, Glass tube, and Rubber tubing.

Precautions:

1. The size of the glass tube should be equal t the size of the stem.
2. We should be careful while joining tube and stem being bound tightly, so that water cannot escape from the tube.



Procedure:

1. Take a regularly watered potted plant and cut the stem portion 1 cm above the ground level
2. Then connect a glass tube by means of strong rubber tubing as shown in the figure.
3. Now pour some water in the glass tube until water level can be seen above the rubber tube.
4. Mark the level of water(M1) in the tube and keep this arrangement aside for 2 to 3 hours.
5. Then observe and mark the water level(M2) in the tube.

Observation:

It is observed that there is an increase in water level. The difference between M2 and M1 indicates that the level of water is raised in the stem.

Inference:

When the roots absorb the water it enters in to xylem vessels of the root. Due to the cohesive and adhesive forces the water a continuous water column is built in the xylem vessels of the stem. Due to the continuous water absorption pressure is exerted on the water column upwards. This pressure pushes the water column upwards. This is called root pressure.

EXPERIMENT-10

TROPIC MOVEMENTS (COORDINATION)

Aim:

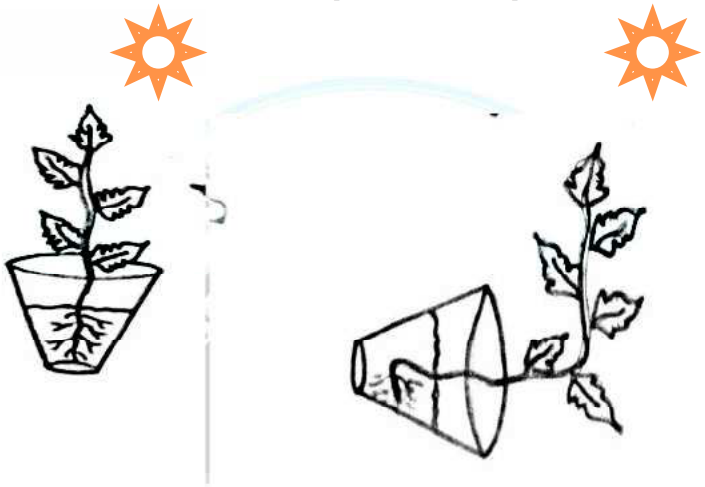
To show the phototropism and geotropism in a plant.

Materials required :

A glass jar with soil, Fenugreek seeds and water.

Precautions:

1. The apparatus should be kept under sunlight and be provided with sufficient water.
2. The seeds should be sown near the margin so that the growth of the roots can be se



Procedure:

1. Take a glass jar filled with soil.
2. Soak some fenugreek seeds in the soil and water it.
3. With in a week the seeds germinate and produce roots and stem.
4. The stem grows vertically upwards and the roots grow vertically downwards.
5. Now this jar is placed horizontally as shown in the figure and observe for a week.

Observation :

After a week it is observed that the stem instead of growing horizontally take a bend towards the sun and grows upwards. At the same time the roots instead of growing horizontally they grow downwards

Inference:

1. The above experiment shows the two types of tropic movements in plants.
2. The stem grows towards the sun. this is known as phototropism.
3. The roots grow towards the ground in accordance with gravitational force. this is known as geotropism.

EXPERIMENT-11

ACTION OF SALIVA ON FLOUR (COORDINATION IN LIFE PROCESSES)

Aim:

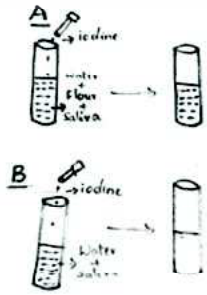
To test the role of saliva I digestion process.

Materials required:

Test tubes, water, Flour, saliva and iodine solution.

Precautions:

The two test tubes should be filled with same amount of solution.



Procedure:

1. Take a test tube half filled with water and add a pinch of flour to it.
2. Shake the test tube well till the flour gets mixed .
3. Take a few drops of this in a watch glass and test for the presence of starch by putting a drop of iodine.
4. A blue black color confirms the presence of starch.
5. Now again dissolve a pinch of flour into half filled water in a test tube.
6. Now divide the mixture into two equal halves by transferring it to another test tube.
7. Add a tea spoon of saliva to one of the test tube and mark it A
8. Do not add any thing in the other test tube and mark it B
9. After 45 min add a drop of dilute iodine solution to both the test tubes.

Observation:

When iodine is added to the test tube A, the color of the solution does not change. But when iodine is added to the test tube B, the color changes into blue black.

Conclusion:

In the test tube A the solution of water and flour is added with saliva. The saliva contains the enzyme Amalyase. This enzyme digests the carbohydrates and converts into maltose sugars. When iodine is added no change occurs. But in test tube B, the solution is not added with saliva and when iodine is added it turns into blue black in color. So it is proved that saliva acts on carbohydrates to convert into sugars.

OBSERVATION I

THE HEART (CIRCULATION)

Aim:

Observation of internal structure of the mammalian heart.

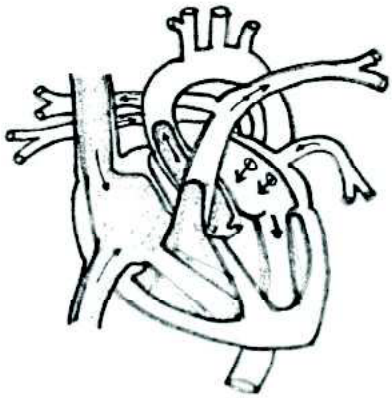
Materials required:

Heart of a sheep or a goat, straws, sharp and long blade,tray, a jug of water, dissection scissors and forceps

Procedure:

1. Collect Heart of a goat or sheep and wash it thoroughly so as to drain the blood completely from the chambers of the heart.
2. Insert the soda straws intro the major blood vessels and note the observations.
3. Keep the heart in a tray in such a way that a large arch like tube faces upwards. This is ventrical side.
4. Now take a sharp blade and open the heart in such a way that the chambers are exposed.
5. Now clearly make your observations, draw the diagram and make a note on it.

Observations:



1. It is observed that the heart is conical in shape, wider at the anterior end and narrower at the posterior end.
2. The heart is covered with two pericardial membranes. The space between these membranes are filled with pericardial fluid.
3. The heart is divided into four parts by grooves.
4. The upper parts are called atria and the lower parts are called ventricles.
5. The left atrium and ventricle are smaller when compared to that of right atrium and ventricle.
6. The blood vessels found in the walls of the heart are coronary vessels which supply blood to the muscles of the heart.
7. The walls of the ventricles are relatively thicker than the atrial walls.
8. Four major blood vessels are observed- pre &post venacava, pulmonary artery, pulmonary vein and aorta.Valves are found in between auricles and ventricles & at the beginning of pulmonary vein and aorta.

OBSERVATION 2

L.S. OF KIDNEY (EXCRETION)

Aim:

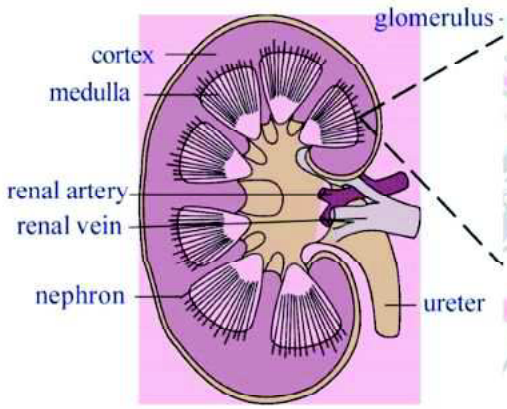
Studying the external and internal features of kidney.

Materials required:

Kidney of a sheep or goat, sharp blade, tray, and a jug of water.

Procedure:

1. Collect a kidney and wash it thoroughly so as to drain the blood from it.
2. Put the kidney in a tray, observe and make a note on it.
3. With the help of sharp blade take a longitudinal section, observe the internal structure and draw it.



Observations:

1. The kidneys are bean shaped structures.
2. Each kidney is convex on the outer side and concave on inner side.
3. The inner side of a each kidney has a fissure or hilus for the entry of renal artery, exit of renal vein and an ureter.
4. L.S. of kidney shows two two distinct regions. Dark colored outer zone is called cortex and pale inner zone is called medulla.

Details:

Each kidney is made of approximately more than one million microscopic and thin tubular functional units called nephrons or uriniferous tubules. These are the basic structures which take part in urine formation. So there are known as structural and functional unit of kidney.

OBSERVATION 3

RHIZOPUS (REPRODUCTION)

Aim:

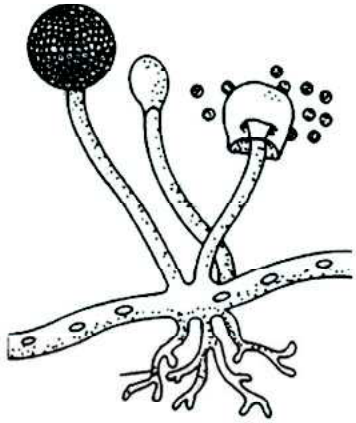
To examine Rhizopus or common mould.

Materials required:

Mould sample, plain glass slide, cover slip, water, disposal gloves.

Procedure:

1. Collect sample bread piece with mould.
2. Place a drop of water in the center of the slide.
3. Using a toothpick, scrape very little of the mould and place it on the drop of water.
4. Take the cover slip and set it at an angle to the slide so that one edge of it touches the water drop, then carefully lower it over the drop so that the coverslip covers the specimen without trapping air bubbles underneath.
5. Use the corner of a tissue paper or blotting paper to blot up any excess water at the edge of cover slip.
6. View the slide with a compound microscope, observe and draw the diagram.



Rhizopus sporongium

Observations:

1. A fine thread like structures and knob like structures are observed.
2. The threads are called hyphae and knob like structures are called sporangia.

Details:

1. Each sporangia contains hundreds of minute spores.
2. When sporangium bursts, the tiny spores are dispersed in the air.
3. The dispersed tiny spores spread over the remaining parts of the bread and develop into hyphae.

OBSERVATION 4

POLLEN GRAIN (REPRODUCTION)

Aim:

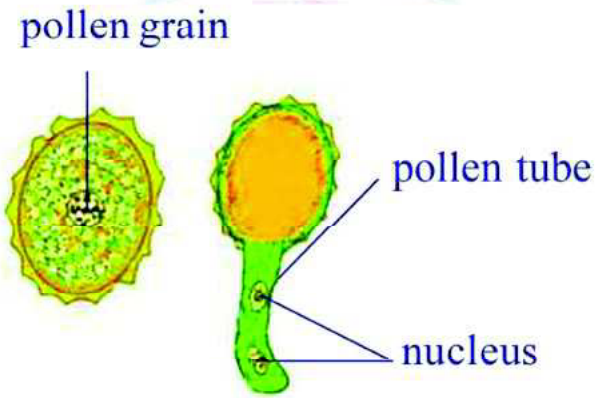
To observe the pollen grain.

Materials required:

Slide, water, Hibiscus flower, compound microscope.

Procedure

1. Take a slide and put a few drops of water on it.
2. Take a flower of Hibiscus and tap the anther over the drop of water.
3. We can see small dot like structures in water. These are called as pollen grains.
4. Observe it under microscope, draw it and describe.



Observations:

1. Pollen grain of Hibiscus is round structure with tough coating.
2. It also contains a single nucleus.

Discussion:

1. The pollen grain starts germinating on stigma.
2. When the pollen grain reaches the stigma, it secrets a sticky nutrient fluid which help in pollen germination.
3. Then it forms a pollen tube that bears two nuclei. This pollen tube enters the embryo sac for fertilization.

OBSERVATION 5

MITIOSIS IN ONION ROOT TIP (REPRODUCTION)

Aim:

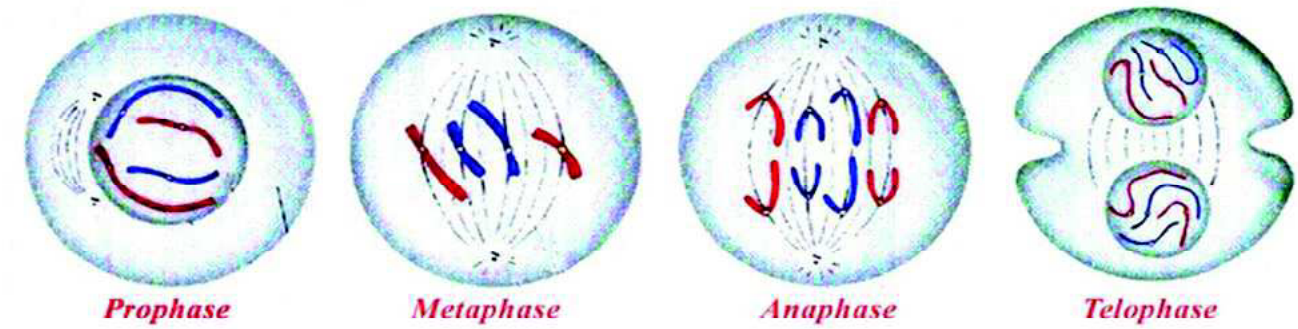
To observe the mitotic stages in onion root tip, draw and make a note on it.

Materials required:

Fresh onion root tip, slide, cover slip, stain, and water.

Procedure:

1. Take an onion with fresh roots and cut the tip 5 to 8 mm.
2. Place the cut tip on a clean microscopic slide.
3. Add 2-3 drops of stain to the slide.
4. Warm the slide gently over the alcohol lamp for about one minute.
5. Cover the slide with a cover slip.
6. Squash the slide with your thumb using a firm and even pressure.
7. Observe it under microscope for different stages of mitosis.



Observations

1. There are four stages of mitosis, Prophase, Metaphase, Anaphase and Telophase.
2. Prophase: The chromosomes contract and prominently visible and show chromatids connected by Centromere.
3. Metaphase: Chromosomes move to equator, centromer attached to centromere. Centromere split, Separating the chromatids.
4. Anaphase: The chromatids move towards the poles.
5. Telophase: Chromatids elongate and be visible. Division of cytoplasm starts.