Activity 1: observing samples under the microscope.

Objective: To observe different samples under the microscope.

Introduction: Microscope is one of the basic tools in biology which is very important to see small creatures or small organisms that cannot be seen with our naked eyes. We can make/improvise a simple microscope from simple local materials and use it in biology lesson.

Materials required:

- Microscope
- A small cup of yogurt (sample)
- Slide and cover slip
- Dropper

Procedure:

1. Place a drop of thin yogurt at the center of the microscope slide and cover it with a cover slip. Avoid trapping of air bubbles.
2. Place a slide at the center over the stage opening on the stage of the microscope and fix it with clippers.
3. Adjust the amount of light using the iris diaphragm on the condenser
4. Focus with the coarse adjustment knob using first the low power objective and then with medium power objective using the fine adjustment knob to get a clear view.
5. Observe and search for organisms by moving the slide in all directions, left to right, and back to forth.

Question:

Draw and label what you observe.

Activity 2: Observing distant objects through binocular.

Objective: To develop the skills of observing distant objects through binocular.

Introduction: Binocular or field glass telescope are instruments used to observe distant or far objects. Binocular is a pair of field glass which is made up of two small telescopes joined with a single focusing device. It is designed for simultaneous use by both eyes.

Material required:

Binocular

Procedure:

1. First look with your naked eyes at the distant object (bird or other animal).
2. Use binocular and look at the same bird or animal you see with your naked eyes.
3. Using the binocular look at sites where you were not able to see clearly with your eyes.

Question:

What is the difference between naked eye and binocular observation?

Activity 3: Measuring temperature using thermometer.

Objective: To develop the skills of measuring temperature by using thermometer.

Introduction: Thermometer is an instrument used to measure and indicate temperature. It typically consists of a graduated glass tube that contains mercury or alcohol which expands when heated.

Materials required:

- Thermometer
- 70% alcohol
- Cotton
- Stove
- Beaker
- water

Procedure:

1. Add water to a beaker.
2. Insert a thermometer and measure the temperature.
3. Heat the water on a stove for 10 minutes.

4. Insert a thermometer and read the thermometer.

Thermometer

Questions:

1. What was the temperature before and after heating?
2. What is the difference in temperature between the two?

Activity 4: Measuring heart beat and blood pressure.

Objective: To develop the skills of measuring heart beat and blood pressure.

Introduction: Blood pressure is the force of blood against the walls of arteries. Blood pressure is recorded as two numbers–the systolic pressure (as the heart beats) over the diastolic pressure (as the heart relaxes between beats). The measurement is written one above or before the other, with the **systolic** number on top and the **diastolic** number on the bottom. For example, a blood pressure measurement of 120/80 mmHg (millimeters of mercury) is expressed verbally as "120 over 80." It is measured by Sphygmomanometer.

Heartbeat may refer to:

Cardiac cycle of the heart. Contraction of the muscles of the heart, or a perceived effect of it, such as: Heart sound, Pulse Contraction visualized on echocardiography. Stethoscope is advice used to measure heartbeat.

Materials required:

- Stethoscope

- Sphygmomanometer

Procedure:

1. With your teacher go to the nearby clinic and observe how a stethoscope and sphygmomanometer are used. Or invite a health worker to your classroom and ask him/her to demonstrate the use of these instruments to you.
2. Record and compare heart beat and blood pressure of the group member.

Questions:

1. Do all group members have the same heart beat and blood pressure? If not why?

Activity 5: preparation of Incubator from local materials.

Objective:

- **To appreciate the uses of incubator.**
- **To develop the skills of preparing incubator from local materials.**

Introduction: Incubator is a device for maintaining an organism in an environment that encourages its growth. The instrument commonly maintains a constant temperature and a constant humidity level in poultry (chicken farm). Incubators are used to keep eggs warm until they hatch and to warm the young chickens after hatching.

Materials required:

- Carton/thin
- Aluminum sheet
- Bulb (40W)
- Electric wire

- Switch
- Sponge
- Glue/cola
- Egg

Procedure:

1. Collect necessary local materials to make incubator.
2. Assemble the thin (iron sheet)/carton in a rectangular manner by leaving opening in one side just like a door.
3. Cover the internal part of carton with aluminum sheet
4. Make money holes to put eggs on the sponge.
5. Put the sponge inside the carton.
6. Put the eggs on the holes of sponges.
7. Close the opening/door
8. Switch on the bulb for 23 hours per day.
9. Keep the eggs inside the prepared incubator for 21 days.
10. On the 21th day break the eggs at the pointed top properly.

Questions:

1. What is found inside the egg when you break on the 21th day?
2. What is your conclusion from this?
3. By using different local materials make incubator in your home.

Activity 6: Examining food items kept at different incubation conditions.

Objective: To examine food items kept at different incubation conditions.

Introduction: A refrigerator (often called a "fridge") is cooling instrument. It contains a thermally insulated compartments and a heat pump to transfer heat from it to the external environment. Then it cools the contents kept in to a temperature below the room temperature.

They are extensively used to store foods, and prevent bacterial spoilage. If this device maintains a temperature a few degrees above the freezing point of water. A similar device which maintains a temperature below the freezing point of water is called a "freezer".

Materials required:

- Three pieces of meat (fresh)
- Three small plastic containers
- Freezer refrigerator

Procedure:

1. Smell each piece of meat and make sure it is not spoiled
2. Place one piece in each plastic container and label 1, in freezer, 2 in refrigerator 3, in one corner of the laboratory.
3. Each day, smell all of them and return to their places.
4. Continue smelling until one of them smells bad
5. Note the day and continue until the second smells bad

Questions:

1. Which sample goes bad first and after how many days?
2. Which sample was spoiled next, and after how many days?
3. Which sample stayed long- unspoiled?
4. What is your conclusion?

Activity 7: Examining different water samples and prepared slides for the presence of organisms.

Objective: To examine the presence of different organisms in different water samples.

Introduction: Many unicellular organisms such as amoeba, euglena, paramecium, bacteria and yeasts are found in water bodies like lakes, ponds, and river water. In most cases they are minute sized or microscopic and require microscopes to observe them.

Materials required:

- Hand lens

- Water samples from pond, river, lake, well or stagnant water
- Compound light microscope
- Prepared slides of amoeba, euglena, paramecium, bacteria, yeast and unicellular algae

Procedure:

I. observation using a hand lens

1. Collect water samples in open mouth container (beakers)
2. Observe the surface of each sample with a hand lens for the presence of living organisms.

Questions:

1. Can you observe anything moving?
2. Draw your observation

II. Observation of prepared slides.

1. Place a prepare slide of amoeba on the stage of the microscope.
2. With your microscope on low power, observe the slide
3. Move the slide around on the stage until you find some cells.
4. Now, using the medium or high power objective lens focus on one cell and observe and draw what you see.
5. Repeat step 1-4 for prepared slides of paramecium, euglena, yeast and bacteria.

Questions:

1. Draw and label all visible structures.
2. For each organism you view, be sure to include the name of the organism and the total magnification used.

Activity 8: Observing Micro-organisms in different water samples.

Objective: To observe Micro-organisms in different water samples.

Introduction: Aquatic environments such as lakes, rivers, ponds and stagnant water are homes to several living things. In this activity we are going to observe micro organisms that inhabit stagnant water and prepared infusion under the compound light microscope.

Materials required:

- Water samples of stagnant water
- Water samples of prepared infusion
- Compound light microscope
- Dropper
- Glass slides
- Cover slips

- Pencils
- eraser

Procedure:

1. Place a drop of the two water samples on each glass slide respectively
2. Cover with a cover slip carefully.
3. Place the specimen on the stage of the microscope.
4. Observe the slide Under the low power objective (x4)
5. Move the slide around carefully on the stage until you find some organisms
6. Focus on one organism using the medium power (x10) and then high power (x40) objective lens.

Questions:

1. Draw what you observed under the microscope in the space below.
2. Write the name of the organism and label all the visible structures if possible
3. Calculate the total magnification used for each organism.

Notes: Hay Infusion preparation

Materials required

- Water jar
- Water (1/2 of jar)
- Bread (1/2 of a round bread/dabo)
- Hay/dry grass (one handful)
- Yeast /ersho (optional for more paramecium growth) (2 Spatula/spoons)

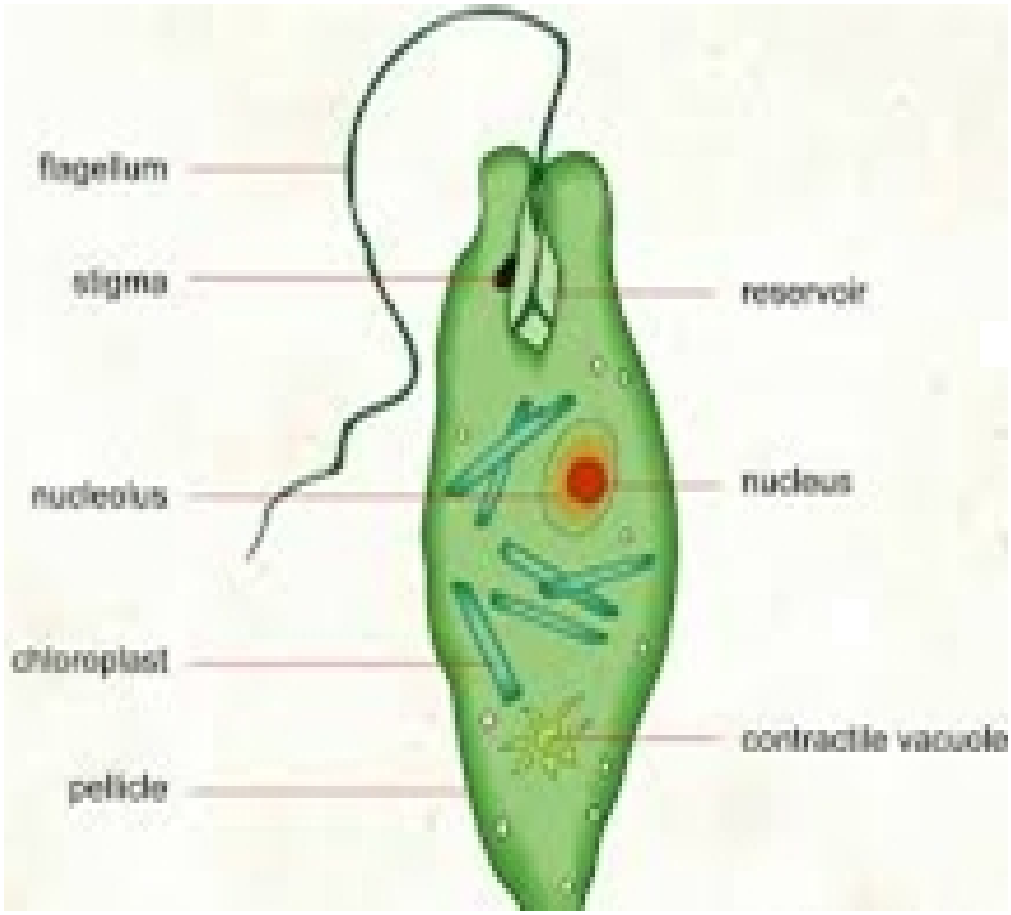
Procedure:

1. Add hay into a jar or bucket.
2. Add water to the jar or the bucket.
3. Add pieces of bread and/or yeast (ersho).
4. Keep it in a relatively darker area for about five days.
5. Observe the sample under a microscope and keep the data every day.

Activity 9: Examining the movement of Euglena under the microscope.

Objective: To observe the movement of Euglena.

Introduction: Euglena is an oval-shaped unicellular organism, which shows both plant and animal like features. The cell of euglena consists of cell membrane, nucleus, contractile vacuole, flagellum, eye spot (stigma) and chloroplast).



Materials required:

- Compound light microscope
- Slides and cover slip
- stagnant water or hay infusion
- Dropper

Procedure:

1. On a clean slide add a drop of hay infusion and cover it with a cover slip.
2. Observe your sample first under the lower power and then observe it under the medium power.

Questions:

1. Have you seen Euglena?
2. What characteristics of euglena are similar to that of plant and animal cells?
3. Draw and label the structure of euglena you observed under the microscope.
4. How do you differentiate Euglena from paramecium?

Activity 10: Growing Bacteria on Petri dishes.

Objective: To prepare media to grow bacteria on the petri dish

- To observe the colonies of bacteria grown on the petri dish

Introduction: Bacteria are unicellular microscopic organisms that have nuclear material, but without distinct nucleus. They are found in a wide variety of habitat or almost everywhere. Bacteria can exist in single, in pairs, or in colonies or in chains. A single bacterium is observed only by microscope. But we can see colonies of bacteria by our naked eyes. Colonies are groups or pile of bacteria grown together. In this activity, we will prepare a media for growing bacteria.

Materials required:

- petri dish (3 pcs)
- barely/beso flour (3 spoons)(if agar is available, you can use the same amount of agar.)
- 250 ml beaker (3)
- Bunsen burner/sprit lamp
- Dropper
- Forceps
- Compound microscope
- Cover slip
- slide
- Match
- Thermometer
- Cotton swab (9 sticks)
- Water (about 50 ml)
- Stirrer (3 pcs)
- Spoons (3 pcs)

Procedure:

1. Prepare three beakers and pour 50 ml water to each 250 ml beaker. Label them 1, 2, 3.

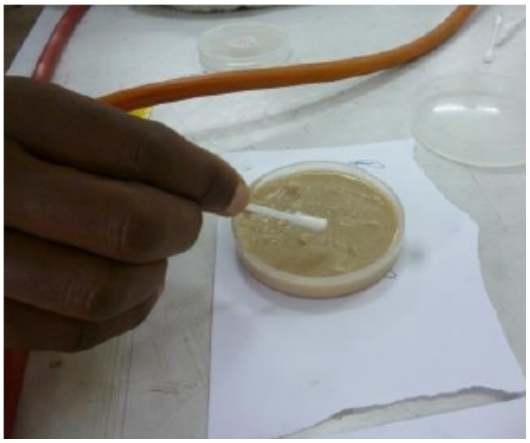
2. Take two spoons of barley flour (beso) in to beaker1, two spoons of corn flour in to beaker 2, and take one spoon corn flour and one spoon barley (beso) flour into beaker 3.

3. Boil these samples in each beaker to make a kind of syrup/porridge.

4. Pour the syrup of each sample to petri dishs 1, 2, 3 and cool them down.

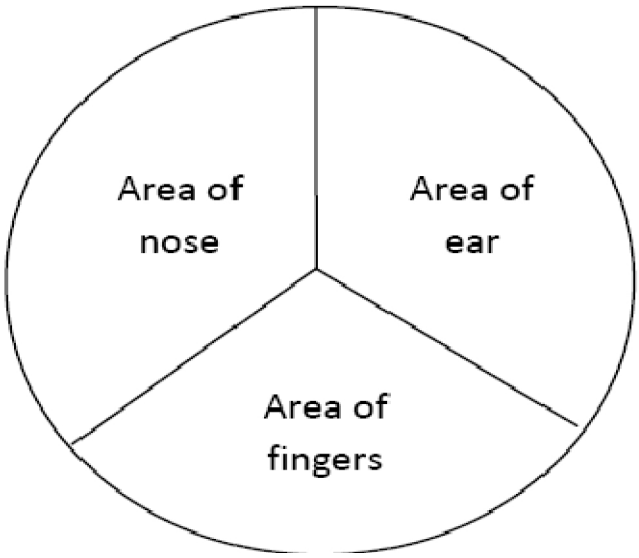
5. Touch one part of syrup of each dish with your two fingers, and close the dishes.

6. Rub your nose gently with cotton swab and make strike on another part of the syrup of each dish and close the dishes.



7. Rub your ear gently with cotton swab and make strike on another part of the syrup of each dish and close the dishes.

NB: After you inoculate in the three different parts of the medium in the petri dishes, you need to label/mark the outside of the petri dish in order not to mix the three sources of bacteria (finger, ear, and nose)



8. Keep the three dishes (dish 1, 2, 3) in the same temperature.
9. Take samples from the three Petri-dishes and observe under the microscope.

Questions:

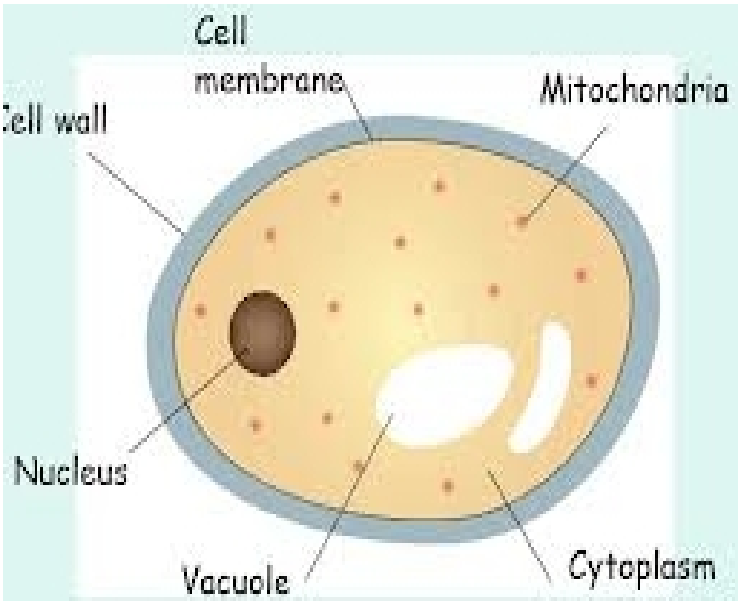
1. Observe the progression (colonies of bacteria) after 24, 48, and 72 hours with your naked eyes and by using a microscope.
2. Record what you see and report your result to the class.

Activity 11: Looking at yeast cells under the microscope.

Objective: To observe yeast cells and how it reproduces.

Introduction:

Yeast is an oval unicellular microscopic fungus. It is composed of cell membrane, nucleus and cytoplasm. Yeast cells are found normally on the skin surface of fruits such as grapes and also in fermented dough (enjerra dough) and other local fermented products like tella and tej). They are also found on the skin surfaces and in the intestinal tracts of warm-blooded animals. They commonly feed on sugary materials present in fruits and grains. When they feed on sugar or glucose, in the absence of oxygen they convert it into alcohol (ethanol) and carbon dioxide. This process is known as fermentation.



Materials required:

- Compound light microscope
- Slides and cover slip
- Overnight grown yeast culture
- Dropper

Procedure:

1. Add a drop of yeast to a clean slide and cover it with a cover slip.
2. Observe your sample first under the low power and then observe it under the medium power.

Question:

Draw what you observe and compare it with picture of budding yeast in Figure 2.14 in your text book.

Activity 12: observing prepared slides under the microscope.

Objective: To observe different animal cells under the microscope.

Introduction: Animals including humans are made up of many cells, and are known as multi-cellular organisms. There are different types of cells in human body. The cells that form our body include skin cells, nerve cells, muscle cells, blood cells, sperm cells, ova (egg cells) and others. These cells vary in their shapes and sizes and in their function)

Materials required:

- Prepared slides of different animal cells(skin cells, nerve cells, blood cells, muscle cells and others)
- Compound light microscope

Procedure:

1. Observe each prepared slide first under low and then under medium power.
2. Draw what you have observed and compare it with pictures in Figure 2.16 in your textbook

Questions:

1. Have you observed differences among the cells?
2. What type of variations have you observed?
3. What do you think is the reason for these variations among cells of multi-cellular organisms?

Activity 13: Comparing starch production of the parts of leaves exposed and not exposed to light.

Objective: To identify the importance of light for photosynthesis.

Introduction: Plants make their own food using different materials by the process of photosynthesis. In this laboratory activity you are going to investigate the importance of one of these materials for photosynthesis.

Materials required:

- Manila paper/aluminum foil/carbon paper
- Paper Clips/staples
- Iodine solution
- Ethanol (100ml)
- Forceps
- Petri dishes
- 400ml beaker
- 250ml beaker
- Thin and soft leaves outside the laboratory

Procedure:

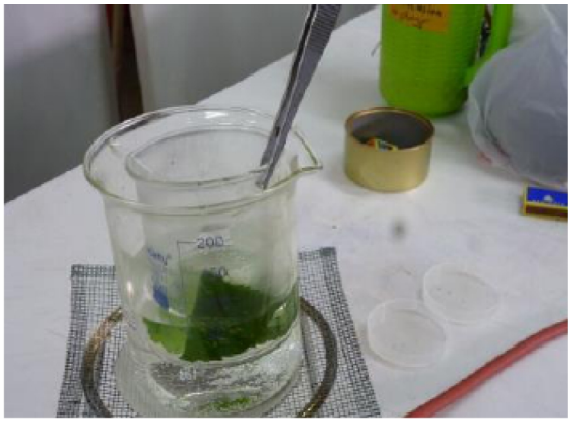
1. 24 hours before the experiment select a plant with and soft leaves outside the laboratory.
2. Cover some parts of a few leaves with a strip of Manila paper or aluminum foil or carbon paper to prevent any light getting in to the leaf part.

3. Wait for 24 hours or more.
4. After 24 hours take off the leaves from the plant.

5. Boil the leaves in water (500ml beaker) for five minutes.

6. Pour about 100 ml ethanol into 250 ml Beaker.

7. Transfer leaves into Ethanol and heat them in a water bath for a few minutes (until the green color is removed).



8. Wash the leaves in cold water and stretch them on petri dishes (shallow dishes)
9. Add drops of iodine solution to the leaves (cover it completely)

10. Rinse it with cold water.

Questions:

1. Observe and record your observation.
2. Which part of the leaves turned blue-black colour?
3. What can you conclude from the result of the activity?

Activity 14: testing for starch in variegated leaves.

Objective: To test the presence of starch in variegated leaves.

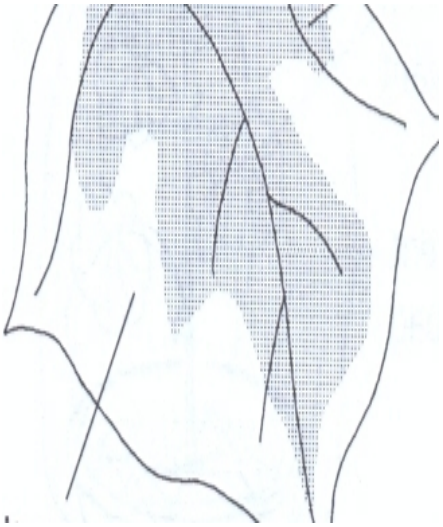
Introduction: A variegated leaf is a leaf with partial green and some non-green parts. Thus in variegated leaf the green pigment is reduced or lacking altogether in certain parts of the leaf.

Materials required:

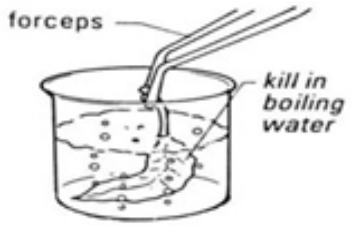
- variegated leaves
- Iodine solution
- Ethanol (100ml)
- Water
- Bunsen burner/spirit lamp/heat source
- Forceps
- Petri dishes

Procedure:

1. In groups, obtain variegated leaves from plants of your school compound.

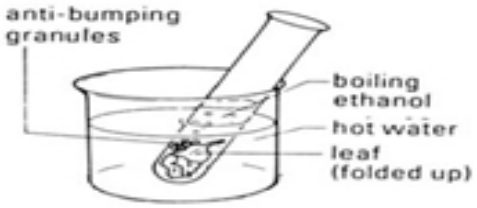


2. Place the variegated leaves in boiling water for a few (five)minutes



1. Leaf in boiling water

3. Transfer the leaves in to ethanol and heat them in a water bath for a few minutes

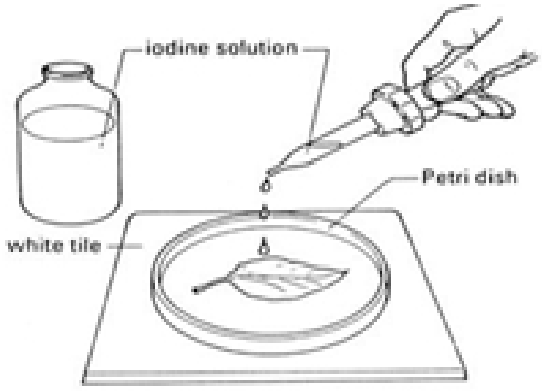


2. Leaf in boiling alcohol

4. Wash the leaves in cold water and stretch them on shallow dish

3. Washing leaf in cold water

5. Add drops of iodine solution to the leaves (cover it completely)



4. Testing leaf for starch

Questions:

1. Which part of the leaves turned blue-black?
2. What do you conclude from this experiment?

Activity 15: Testing the formation of oxygen during photosynthesis using Pondweed, Elodea (or any small water plant).

Objective: To detect that oxygen is produced during photosynthesis.

Introduction: Photosynthesis provides virtually all of the energy utilized by living organisms to survive, with the exception of the few food chains based on chemosynthetic bacteria.

The process of photosynthesis is responsible for much of the energy we use to sustain our lifestyles as well. Wood and fossil fuels are the result, directly or indirectly, of photosynthetic output, as are the less well-known fuels as gasohol, and the methane generated by biomass conversion.

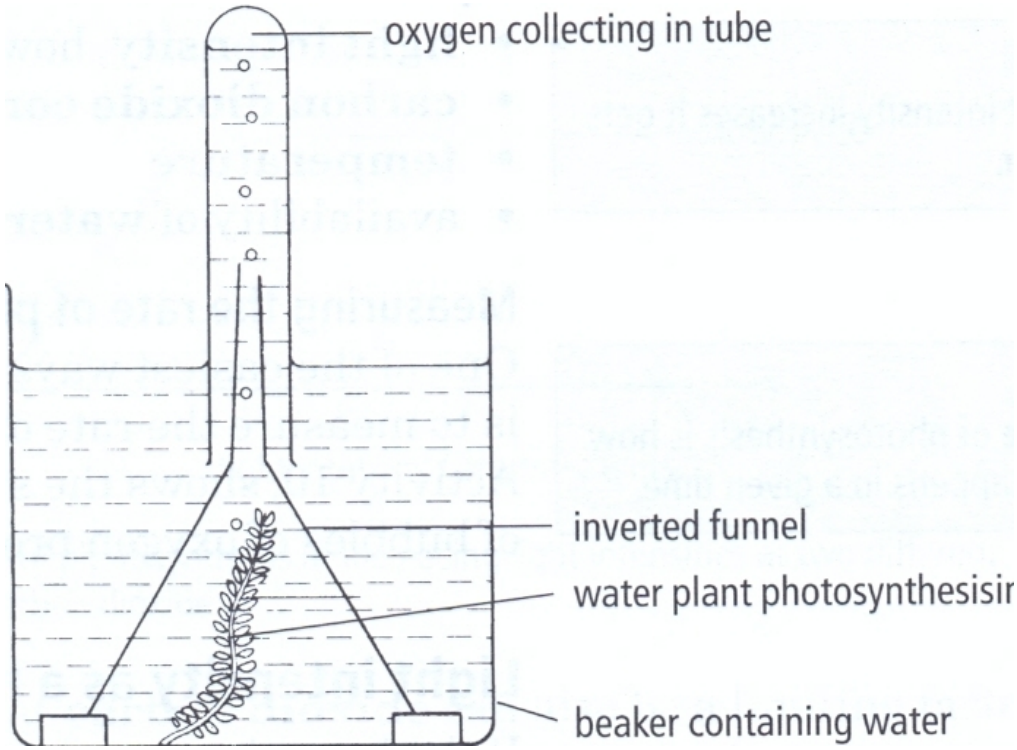
Materials required:

- Water plant or pond weed
- Funnel
- Beaker
- test tube
- Water

Procedure:

1. Add water into a beaker
2. Place small amount of Sodium bicarbonate, which serves as a source of carbon dioxide into water in a beaker.
3. Put the Pondweed in the beaker.
4. Cover the weed with an inverted funnel, which is rested on a support (two small rectangular plastic rods can be used) to keep the funnel away from the bottom of the beaker.
5. Fill a test tube to the brim with water, place your thumb over the mouth of the test tube and invert the tube, place the mouth of the test tube under the water surface in the beaker and then remove your thumb, make sure that little or no air enters the tube during this operation.
6. Move the test tube over the funnel stem and lower it gently to rest on the funnel as shown below.
7. Place the apparatus in a position where it can receive maximum sunlight.
8. Leave the apparatus until the test tube is half full with gas.

9. Carefully lift the test tube from the funnel and place your thumb over the open end before taking it out of the water.
10. Remove the test tube from the water and invert it keeping the thumb in place so that no gas escapes.
11. Remove your thumb from the test tube and quickly insert a glowing splint into the gas in the tube



Questions:

1. Observe what happens? What gas causes this?
2. What do the bubbles indicate?
3. Why did you insert a glowing splint into the gas collected in the test tube?

Activity 16: Analyzing the effect of light intensity on the rate of photosynthesis.

Objective: To analyze the effect of light intensity on the rate of photosynthesis.

Introduction: Photosynthesis is a cellular process during which light energy is absorbed by green pigments, chlorophyll and used for making organic compounds (sugar molecules). The rate of photosynthesis can be affected by different factors like the raw materials (water, carbon dioxide, light, temperature,

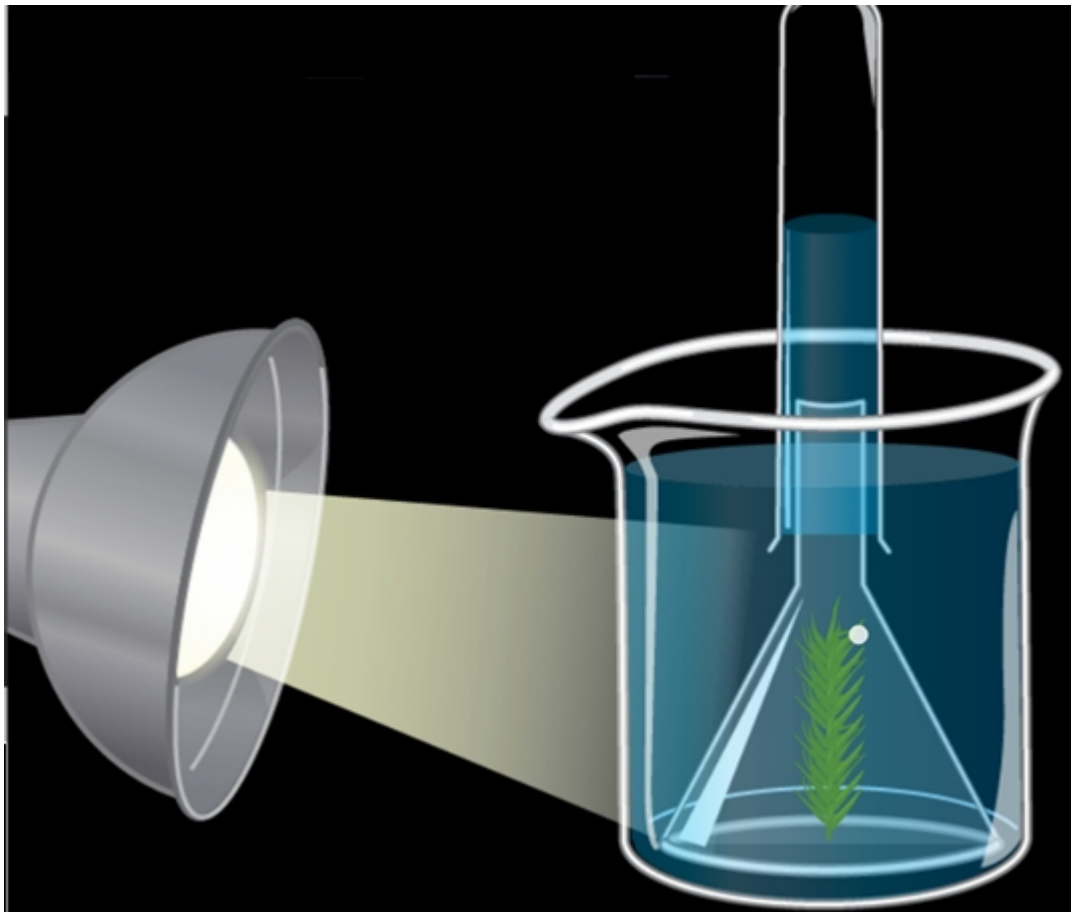
minerals, and photosynthetic pigments. Generally light is an important source of energy for photosynthesis. Regarding light, not only its presence or absence but also the amount of light (intensity) that falls on the leaves affects the rate of photosynthesis

Materials required:

- Pondweed (Elodea) or water plants
- beaker
- Water
- Sodium bicarbonate
- Funnel
- measuring cylinders

Procedure:

1. Take the elodea plant.
2. Submerge the plant in to a test tube filled with 40ml room temperature water and 1 kg baking soda.
3. Invert the funnel and cover the water plant in the beaker with it.
4. Place the test tube over the hole of the funnel.
5. Place the light source 50cm away facing the test tube.
6. Turn on the light source and begin taking observations.
7. Count the number of bubbles generated the following intervals 10 second, 30 second, and 60 second for each trial by changing the distance of the lamp 5ocm, 30cm and 10 cm away from the beaker.



Questions:

1. What happens the number of bubbles when the lamp light placed in a short distance from the beaker (i.e first in 50cm distance, then to 30 cm distance and 10 cm

Experiment No	Distance of light bulb	Oxygen bubbles per minute
1	50cm	
2	30cm	
3	10cm	

2. What is the reason for this result?

Activity 17: Preparation of an aquarium:

Objectives:

- **To prepare aquarium from available materials in the school compound.**
- **To follow up fish feeding and reproduction in the aquarium in the school Compound.**

Introduction: An aquarium is artificial pond or tank for keeping and studying aquatic animals such as fish and aquatic plants. It is possible to rear /keep important aquatic animals such as fish for food and other incomes in an aquarium. To keep fish in an aquarium it requires providing materials that these animals need in their natural habitats.

An aquarium can be formed from wood/glass or other local materials.

Materials required:

- Washed sand
- Pebbles and fine sand
- Drinking water
- Crushed eggs hell
- Aquatic plants (planktons)
- Maize soya bean
- Ground bones
- Insect larva
- Wood/glass
- Nail
- Hammer
- Meter
- Sow
- Thick white plastic

Procedure:

1. Prepare a rectangular aquarium from wood/glass.
2. Fill the prepared aquarium with water.
3. Add washed sand, fine sand, aquatic plants, maize, soya bean, insect larvae to the aquarium.
4. When the water becomes clear after a few days introduce 2-4 fishes. Also introduce few snails to reduce the number of small aquatic animals.
5. Add food only enough to the organism little by little.

Questions:

1. In groups carefully observe the aquarium and identify the interacting biotic and abiotic factors.
2. Categorize the biotic factors in to different groups of living things. And categorize the abiotic factors into chemical and physical factors.
3. Prepare an aquarium from local materials and cultivate fishes in your home.

Activity 18: Identifying the types of soil by sedimentation and observation.

Objective: To identify the types of soil in the soil samples.

- To determine the water content of different soil samples.
- To determine the air content of different soil samples.

Introduction: The Composition of soil differs one from the other. One soil sample may contain more water, and the other one soil sample may contain less water, and the other one more air and other materials. This/ composition of soil can be observed by mixing in water. In water bigger particles settle more quickly than smaller ones. This property of soil is used to determine the amount of each component of the soil.

There are three types of soil particles.

1. Clay soil: clay soil contains more clay particles and its particle size is less than 0.002mm in diameter.
2. Sandy soil: sandy soil contains more sand particles and its particle size is between 0.002mm and 2mm in diameter.
3. Loam soil (Silt): it is a blend of sand and clay soil. It is the best soil for large number of plants. Because it is composed of dead and decayed bodies of organisms.

In this activity you are going to determine the amount of each component in different soil samples.

Materials required:

- Three different soil samples
- 500 ml beaker (3)
- 100 ml beaker (4)
- 50 ml beaker (6)
- Long drinking glass (3)
- Ruler

- Bunsen burner/sprit (alcohol) lamp.
- Tripod
- Gauze
- 20cmx20 cm aluminum foil(3)
- Spatula
- Gloves (4)
- Buckets (1)
- Triple beam balance (1)

Activity 18.1: Identifying the types of soil of the three samples by sedimentation.

Procedure:

1. Go to the surrounding and collect a sample of soil from under the tree and label it “A”
2. Take two other samples of soil from other different places and label it “B” and “C”
3. Take three drinking glasses and label them “A” “B” and “C”
4. Add equal volume of water to each glass.
5. Take soil from each sample A, B and C and put them in glass A, B and C respectively.
   (**Note:** the soil should be about 1/3 of the volume of water in the glass).

6. Then stir the samples in all the glasses thoroughly and wait until they settle down.

Questions:

1. Compare the sedimentation layers of each sample and write your observation
2. Which soil sample (A, B or C) contains more clay, silt and fine sand?

Activity 18.2: To Estimate the water content of the three samples of soil (by heating)

Procedure:

1. Measure 100 gm of sample soil A, B and C with A triple beam balance.
2. Measure the mass of each sample and record it in the table below

Sample	Before heating(x)	After heating (Y)	The mass of water contained (z) (z= x-y)
A			
B			
C			

3. Put each sample in a 500ml beaker.
4. Heat each sample gently without burning, one by one with gauze, tripod and Bunsen burner or sprit lamp



5. Measure the mass of each sample after heating and record it in the table above.
6. Subtract the final mass from the initial mass and record in the same table

Questions:

1. Is there a mass difference after heating?
2. What can you say about the mass difference?

Activity 18.3: To Estimate the air content of the three samples of soil (by heating).

Procedure:

1. Put 50ml sample soils A, B and C into each 100ml beaker. Shake a little bit to make the surface flat, but don't press it.
2. Prepare exactly 50ml of water in another 100ml beaker.
3. Pour the 50ml water to the beaker, which contains soil sample A gently.
4. Measure the volume of the mixture and record in the table below.
5. Repeat the steps 3 and 4 for sample B and C. Record the result in the table below.
6. Determine the volume of air contains in sample A, B and C, using the table

Sample	The volume of soil and water before mixing (x +y)/Shaking	The volume after mixing 50ml soil and 50 ml water((a)	The volume of air in the samples (b) (b= 100-a)
A	100ml		
B	100ml		
C	100ml		

Note:

x = the volume of soil sample = 50ml.

Y = the volume of water = 50ml.

a = the volume of the mixture of x and y.

b = the volume of air in a sample of soil.

Questions:

1. What do you conclude from the result obtained?
2. Which soil sample contains more air and which sample less air?

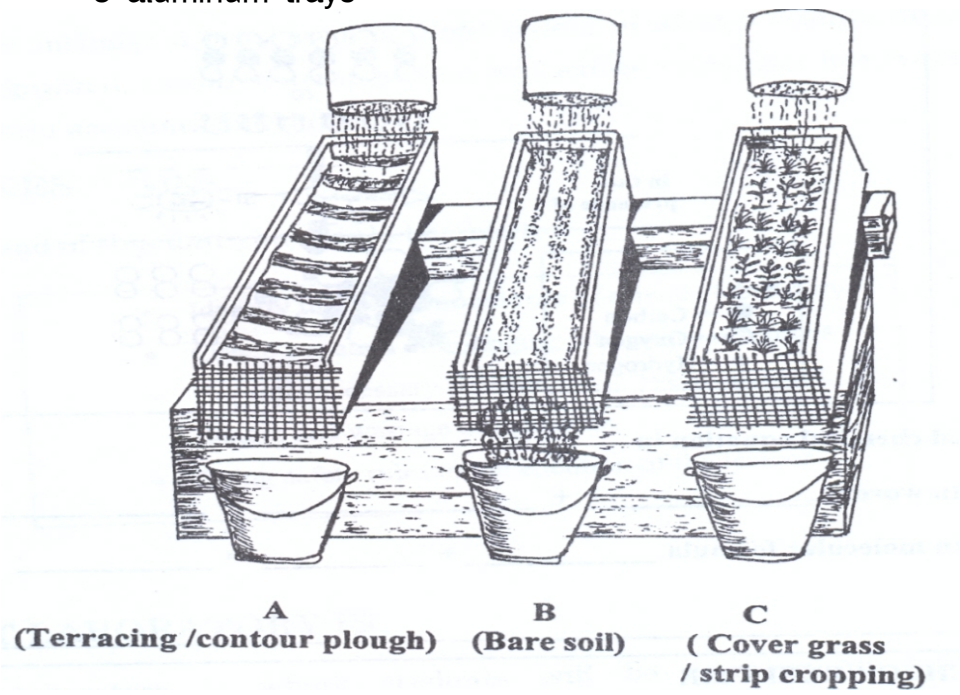
Activity 19: A project work on soil conservation.

Objective: To demonstrate the effect of running water on soil erosion.

Introduction: This project work demonstrates how running water takes away soil and how this can be checked and prevented. The project can be done by group of students that are environmentally dedicated or clubs concerned for the environment. The landscape can be constructed from locally available materials and the design may look like as shown below.

Materials required:

- Soil
- Water
- 3 aluminum trays
- 3 equal plastic bottles
- Small grasses



Model landscape to show soil conservation

Procedure:

1. Collect different materials in the school compound.
2. Fill the three aluminum trays with the same type of soil.
3. Make many horizontal rows/terracing/contour plough in tray 'A'
4. Leave tray 'B' as it is/bare
5. Plant grasses in tray 'C'
6. Make many equal small holes on the bottom of the 3 plastic bottles.
7. Place a bucket under each model to collect the water flow from each landscape model
8. Pour equal amount of water in to the 3 trays/models at the same time by using the three plastic bottles
9. Observe carefully how the water runs in the three models.

Questions:

1. Which model landscape show the highest water flow?
2. What your conclusion from this?

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