7. Study of water samples collected from different water bodies for their pH, clarity and presence of living organisms (microscopic/ planktonic).

Date : / /

Aim : To study water samples for measuring pH, clarity (turbidity) and pre ence of li ing organi ms.

1. pH te t of water sample with Litmus paper

Introduction :

pH is a measure of the acidity or alkalinity of water. The pH of water is primarily decided by the salts present in soil from where the water sample is collected. But pH also changes due to organic matter, fertilizers, sewage and other pollutants.

Requirement :

Different water samples, sample bottle with cap, pH papers of different ranges etc.

Procedure :

Collection and preparation of sample

1. Collect water samples in a clean, dry plastic jar.
2. Cap the jar tightly and shake vigorously a few times.
3. Allow the sample to stand for 5 - 10 minutes.
4. Remove the cap of the jar.
5. Dip the litmus paper in it for a second, holding it with a clean dry foreceps (avoid touching with your fingers.)

Observation :

1. Observe the colour change.
2. Match the resultant colour with colour code on the pH colour strip. Identify the pH and note it.

Sr. No.	Water Sample	pH
1.	Tap water	7
2.	pond water	8

Result :

1. pH value of Tap water is 7, is referred as 'neutral'.
2. pH value of pond water is 8, is referred as 'alkaline'.

2. Clarity of Water :

Test of water for clarity (Turbidity) :

Measuring water clarity is an important part of environmental science. Often lakes or streams contain pollutants or sediments that make water cloudy. This often has bad effect on the organisms that live in such waters. Typical sources of turbidity in drinking water include the waste discharges, algae or aquatic weeds, humic acids and other organic compounds resulting from decay of plants, leaf litter, small animals, etc. in water sources and high iron and phosphorus concentrations which give water a rust-red coloration.

Units of Measuring Turbidity :

In late 1800's Tyndall and Rayleigh started the scientific study of light scattering. This phenomenon is used to understand the clarity of water. Most of the early study considered the absorption and transmittance. Many units such as JTU (Jackson "Candle" Turbidity Units), TE/F (of formazin) European units, Kieselguhr (SiO_2) units, Nephelometric Turbidity Units (NTU), were and are being used.

Requirments :

Four 1000ml beakers, distilled water, Cardboard box or some other suitable box, torch/lamp or bulb and different water samples.

Procedure :

Collection and preparation of sample

1. Collect water sample in a clean, dry plastic jar.
2. Avoid touching to prevent contaminating the sample.
3. Prepare Tyndall set up from a cardboard box as shown in the diagram. This set-up can be made by making a hole in card board box and fixing a bulb or torch on the other side of the box.
4. Pour distilled water in a clean beaker and use this as standard.
5. Pour different water samples in clean dry beakers and place the samples one by one and compare the turbidity.
6. Place each beaker in the Tyndall set up and observe the beaker through hole for clarity/ turbidity.

Observation :

1. Observe the clarity of distilled water.
2. Compare and note the turbidity of the samples.
3. Record your observation as clear, less turbid, moderately turbid and highly turbid.

Sr. No.	Water Sample	Clear/ Tirbid
1.	Tap water	Clear
2.	pond water	Turbid

Result :

1. The light is scattered because of the particles present in water.
2. More particles make water more turbid and reduce the clarity.

Conclusion :

The pond water is turbid hence not suitable for consumption without treatment.

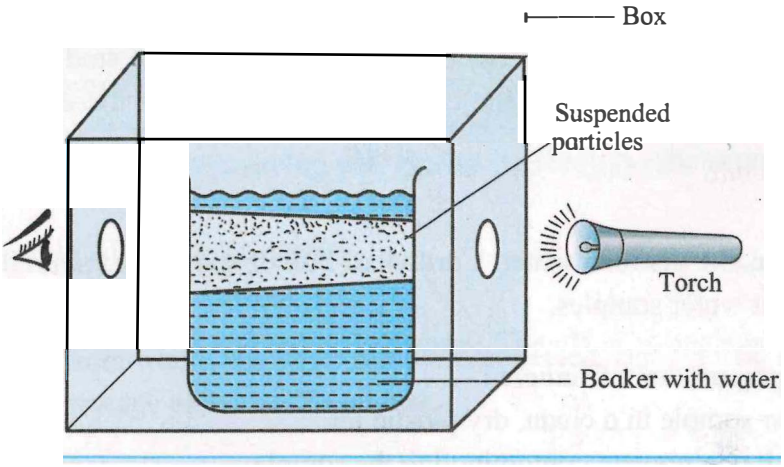


Fig. Tyndall set up

3. Briefly write on ecological role of planktons.

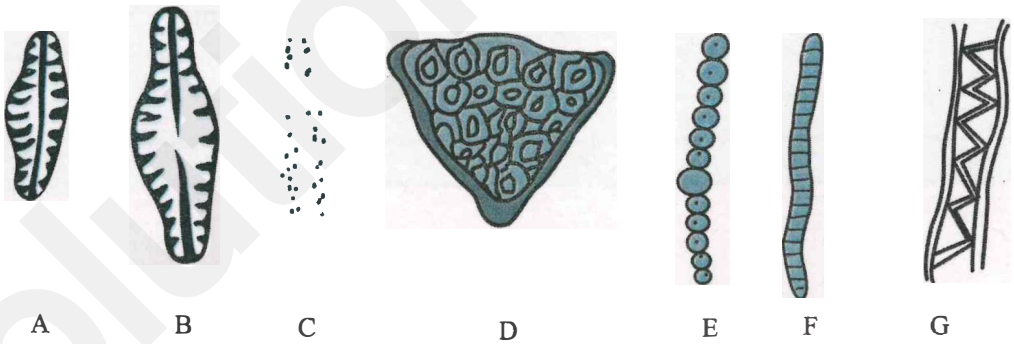
3.Presence of living organisms

Requiremets

Water samples, microscope, slides, dropper, methylene blue, spirit lamp, etc.

Proc dur

1. Put the drop of water sample on a slide and spread it evenly to make a thin film.
2. Allow it to dry and then heat it gently to fix it.
3. Put a drop of methylene blue on the smear and keep the slide for staining for 2 minutes.
4. Observe under microscope.
5. Different types of microorganisms can be observed such as Paramoecium diatoms, algae and some planktons, copepod, daphnia, rotifer, etc.
6. Make a record of the same for all the samples separately.



A. *Plaurosigma*, B. *Navicula*, C. *Amphiplura*, D. *Triceretium*, E. *Nostoc*, F. *Oscilliatoria*, G. *Spirogyra*

Fig. Some micro organisms found in water sample

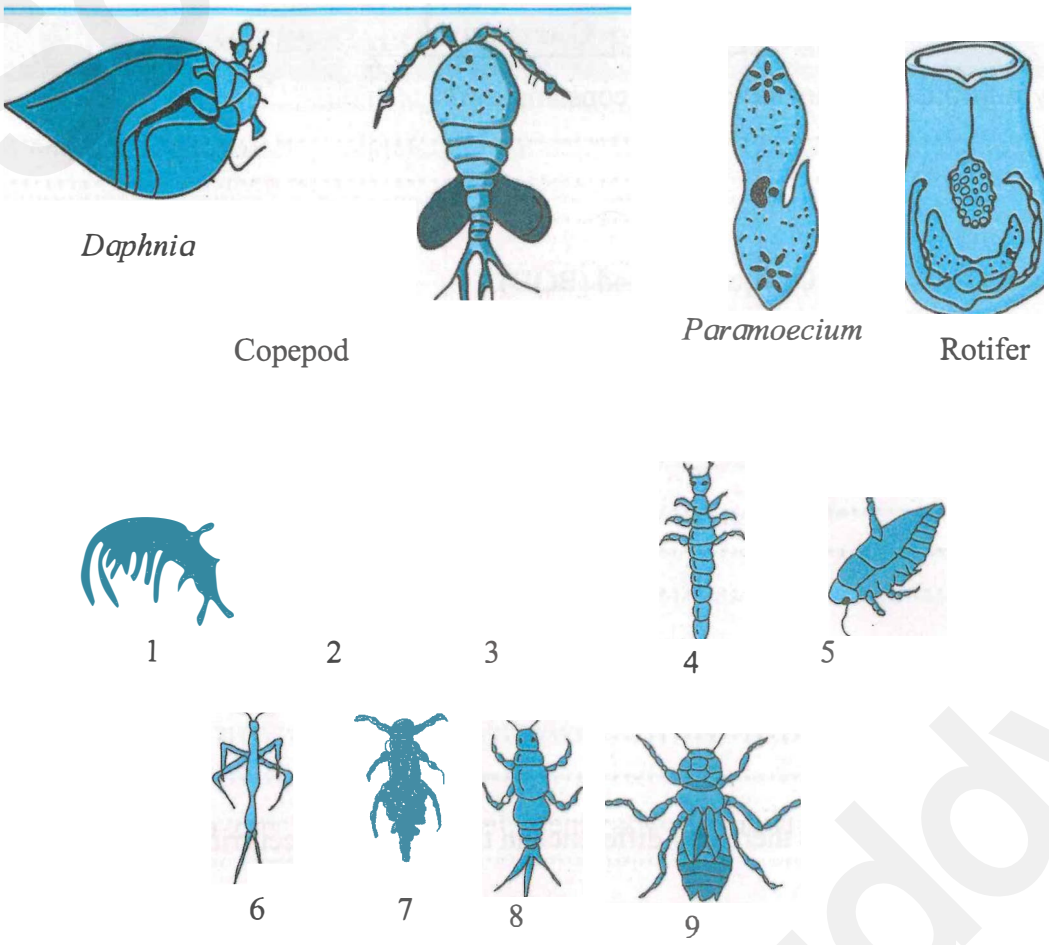


Fig. Some arthropods found in fresh water bodies

1. Amphipod 2. Mosquito larva 3. Isopods 4. *Dytiscus* larva 5. Adult *Dytiscus* 6. Water scorpion 7. First instar may fly nymph 8. Second instar may fly nymph 9. Nymph of dragon fly

Observation :

Tap water does not show any organisms hence it is suitable for consumption.
Pond water contains various type of organisms like algae like spirogyra, oscilliatoria andorganisms like Daphnia , Rotifer, Nymph of dragon fly hence it not suitable for consumption

Inference :

Tap water is suitable for consumption while pond water not suitable for consumption.

Remark and Signature of Teacher .....

Questions

1. Why is turbid water not suitable for consumption?

Turbid water may cause gastrointestinal disorders, nausea and headache.The particles of turbidity shield the microorganisms against disinfectants. Thus turbid water is difficult to clean using disinfectant.

2. What is Biochemical Oxygen Demand (BOD) ?

BOD is Biochemical Oxygen Demand. It is the amountof dissolved oxygen demanded by aerobic biological oxidation by microorganisms.

3. What is water pollution ?

Water pollution refers to addition of harmful substances, chemical or microorganisms that degrade the quality of water and make it unsuitable/toxic to living organisms.

4. What are the causes of water pollution ?

Domestic sewage, industrial effluents, excess fertilizers and pesticides are the common causes of water pollution.

5. What are planktons? Is there any difference in the planktons occurring in fresh water and sea water?

The term plankton is a collective name for all such organisms—including certain algae, bacteria, protozoans, crustaceans, mollusks, and coelenterates

Multiple Choice Questions

1. ..... arthropods found in fresh water bodies.
   a. *Daphnia* b. Hermit crab.
   c. Amphipod d. *Padina*
2. BOD of water means .....
   a. Biological oxygen demand b. Biochemical oxygen demand
   c. Biologically observed diatoms d. Biologically observed *Daphnia*
3. Methylene blue stain is used to observe .....
   a. Plankton b. Bacteria
   c. Algae d. Viruses
4. Experimental set up deviced by ..... is used to observe water clarity.
   a. Wingbarg b. Tyndall
   c. Strassburger d. Waldeyer
5. If pH is less than ..... then water is acidic
   a. 6.5 b. 10.5 c. 4.5 d. 12.5

Remark and Signature of Teacher .....