03 Water as a Natural Resource

Water is the most important natural resource given to us by nature. As soon as you hear the word "water", you will think of rivers, streams, ponds, wells, etc. Water is commonly in liquid state.Does water exist only in the state of liquid ? Let's do the follwing activity to find it.

Activity 3.1

Identifying the states of water

You will need :- some ice cubes
a test tube
a burner

Method :-

- Put the ice cubes into the test tube.
- Then heat the test tube as shown in the figure.
- Record your observations.
- What are your conclusions?

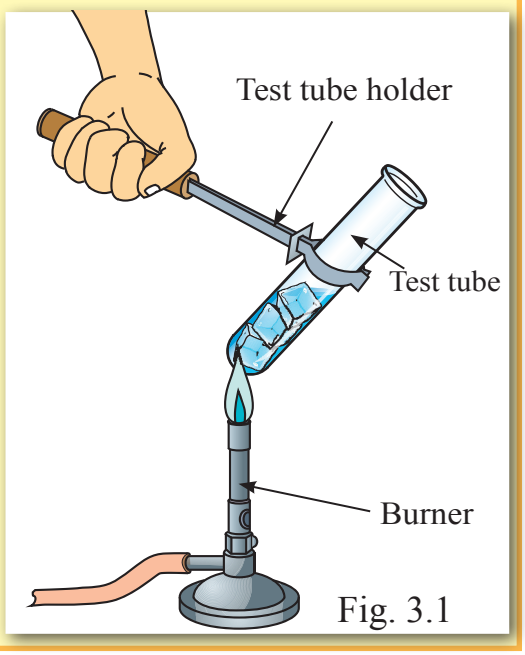


Fig. 3.1

It can be observed that when ice cubes are heated, they turn into liquid water. When further heated, water turns into vapour. Hence water exists in three physical states as ice, liquid water and water vapour.

Ice (solid) → liquid water (liquid) → water vapour (gas)

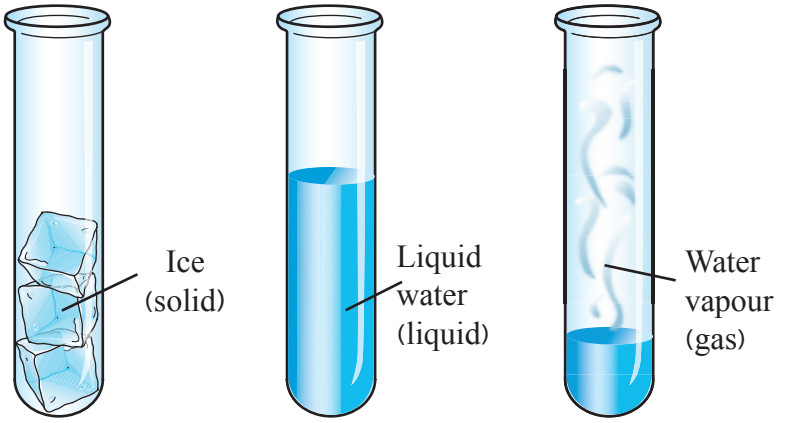


Fig. 3.2 ▲ Physical states of water

3.1 States of Water

Water exists in the states of solid and liquid in physical forms and gas in the natural environment.

Water in Solid State

Ice, snow, glaziers are some examples for the solid state of water. Glaziers can be seen in the Southern and Northern poles of the world. In some countries, snow can be seen in the winter season. Snow is also a solid state of water.

Glaziers Ice Snow

Fig. 3.3 ▲ Water in solid state

Water in Liquid State

The liquid state of water can be seen in lakes, streams, rivers, tanks, ponds, wells and seas. The word "water" in our language normally refers to water in liquid state.

River

Well

Sea

Tank

Fig. 3.4 ▲ Water in liquid state

Water in Gaseous State (water vapour)

Steam and water vapour are examples for the gaseous state of water. Water exists in the atmosphere as water vapour. Let's do the following activity to find out whether there is water vapour in the atmosphere.

Activity 3.2

Testing whether there is water vapour in the atmosphere

You will need :- a glass, some ice cubes, water, a piece of cardboard

Method :-

- Fill half of the glass with water.
- Observe the outer surface of the glass after some time.
- Put some ice cubes into the same glass and close it with the piece of cardboard.
- Observe the outer surface of the glass after some time.
- Record your observations.
- What are your conclusions?

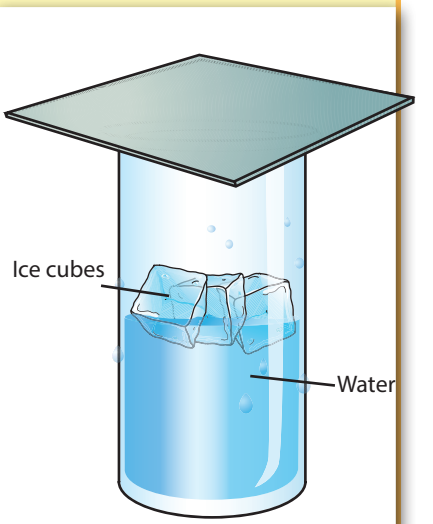


Fig. 3.5

Water vapour in the atmosphere condenses and can be seen on the outer surface of the glass. Hence, there is water vapour in the atmosphere.

3.2 Types of Water Based on Availability

What happens to the rain drops when they fall on to earth? Sometimes they flow, sometimes they are absorbed by the soil and sometimes they gather in muddy puddles. Let's do the following activity to find out what happens to the rain drops when they fall on to earth.

Activity 3.3

Find out the behaviour of rain drops when they fall down

You will need :- a glass tank, clay, sand, stones, gravel in soil, a tin with small holes

Method :-

- Put the components of soil into the glass tank as shown in the figure.
- Then pour some water on to the components using the tin with holes.
- Observe the flow of water.
- What are your conclusions?

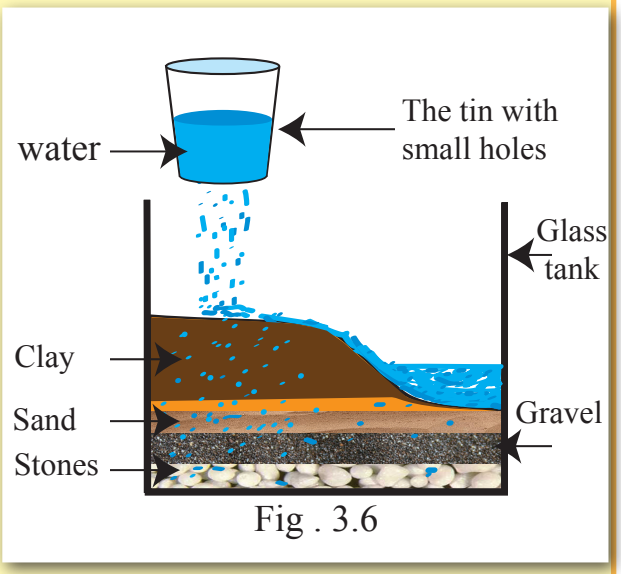


Fig . 3.6

The water comes through the tin and falls on soil is called precipitation/ rain. The water which flows through the components of soil is called ground water and the water remaining on soil is called surface water.

Accordingly, precipitation / rain, ground water and surface water are the ways in which water exists.

Precipitation

The types of precipitation are rain, snow, hail, sleet etc.

Surface water

The types of surface water are oceans, seas, rivers, streams, tanks, ponds, lakes, waterfalls.

Ground water

The water in wells and springs are the types of ground water.

3.3 Types of Water Based on Salinity

Why does sea water taste salty ? Dissolution of different things in water is a special property of water. Many things are dissolved in sea water. Sodium chloride is a one type of salt dissolved in sea water. This is the reason for sea water to taste salty. Based on salinity, water can be further categorized as **fresh water, marine water and brackish water.**

Salt (Sodium chloride) is produced in salterns by vapourzing sea water.

Freshwater

The water in wells, ponds, rivers, streams, waterfalls is known as **fresh water.** The amount of saline/salt dissolved in fresh water is very low.

Marine water

The water in seas and oceans is known as **marine water.** The amount of saline dissolved in marine water is very high.

Brackish water

The water in lagoons is known as **brackish water.** The amount of saline dissolved in brackish water is less than marine water but higher than fresh water .

Fresh water (river) Marine water (ocean) Brackish water (lagoon)

Fig. 3.7 ▲ Classification of water according to salinity

Activity 3.4

Let's find the salinity in water

You will need :- 10 g of salt, drinking water, a 50 ml beaker, a balance

Method :-

- Put 25 ml of water into the beaker and measure the weight.
- Remove the water from the beaker.
- Put 2 g of salt and a little amount of water into the same beaker and dissolve well. Add water into the beaker till the volume of the salt solution becomes 25 ml.
- Measure the mass.
- Remove the solution.
- Put 6 g of salt and a little amount of water to the beaker and dissolve well. Add water into the beaker till the volume of the salt solution becomes 25 ml.
- Measure the mass.
- Record your readings in the given table.

Situation	Mass (g)
Beaker with water	.....
Beaker with 2 g of salt dissolved water	.....
Beaker with 6 g of salt dissolved water	.....

- What is your conclusion according to the readings?

Here, water without salt can be assumed as fresh water, 2 g of salt dissolved water as brackish water and 6 g of salt dissoved water as marine water. You can observe that the water with more dissolved salt has higher mass. Accordingly, when the mass of an equal volume is considered, it can be concluded that the mass of water is high with salinity. Based on this, we can separately identify fresh water, marine water and brackish water.

Assignment 3.1

Try to find a sample of brackish water/ marine water and design an experiment to compare the mass of it with a sample of fresh water.

3.4 Importance of Water

Importance of Water for Human Activities

Water is very important not only for the existence of life but also for many human activities.Think how many times you use water for different activities during the day.

Assignment 3.2

Find the uses of water and draw a picture or design a poster or prepare an album with a collection of photographs.

To drink

For agriculture

To wash clothes

To bathe

For transportation

To produce hydro electricity

Fig. 3.8 ▲ Some uses of water

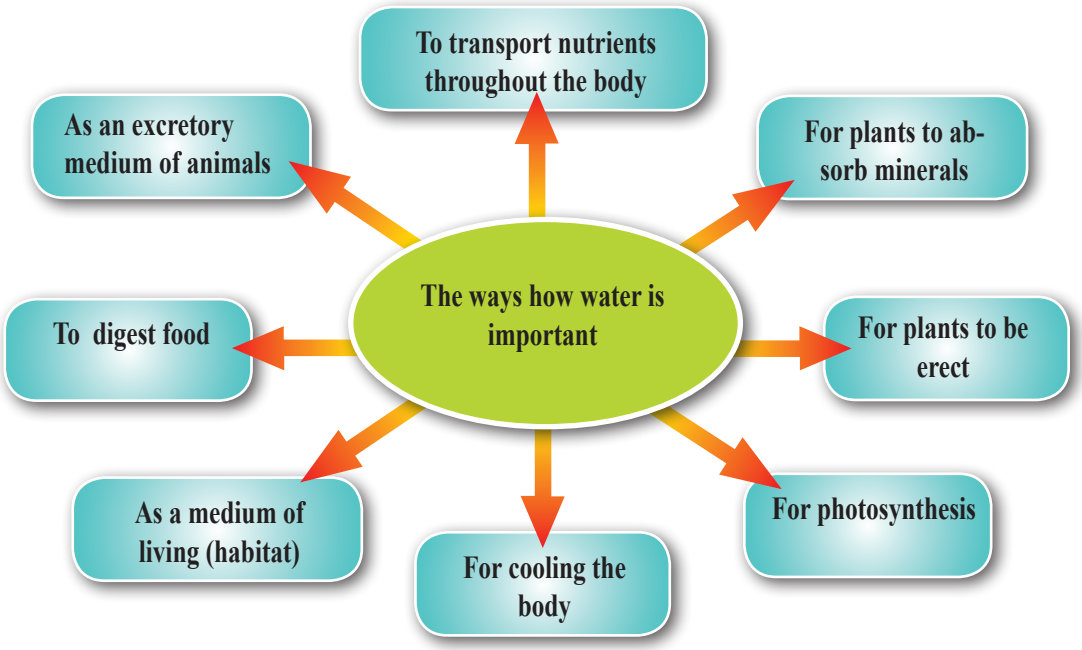
Categorize your findings in Assignment 3.2 under the following headlines.

1. For industries including agriculture
2. For sanitary purposes
3. For household activities
4. For transportation
5. For leisure
6. For water related sports
7. To produce energy

Importance of Water for the Existence of Life

A person who is suffering from diarrhea has a risk of facing dehydration, may even face death. Also, if a plant doesn't get sufficient water, it gets withered. So, you can now understand that water is a very essential factor for the existence of living beings.

The following figure shows how water is important for life.



3.5 Water, a Limited Resource

There are many gifts of nature. They are called natural resources. Water is a very important gift of nature. But it is a limited natural resource. The reason is most of the sources of water are not in a condition to use directly.

Water covers more than 70% of the earth surface but the percentage of water that can be consumed is 0.01%.

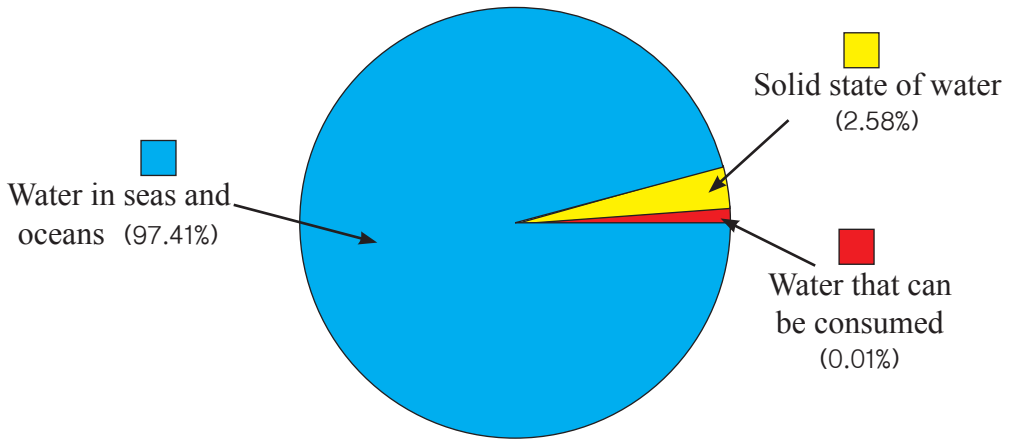


Fig. 3.9 ▲ Water on the earth surface

Even though water is a natural resource, most of the people use it in a very careless manner. Think about the amount of water you waste daily.

Assignment 3.3

Identify the occasions where water is wasted in your school and at your home. Find out the ways to minimize the wastage of water and fill in the following table.

Occasions of water waste	Ways to minimize the wastage of water

Water Pollution

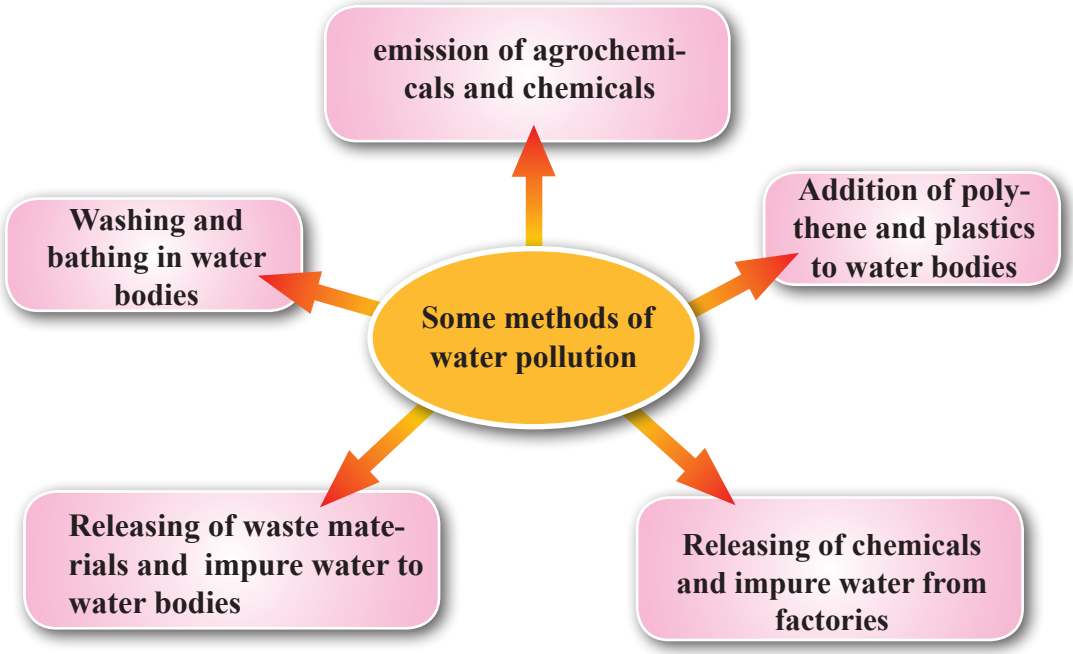
There are some water bodies with different types of waste materials, bad smell and de-colourization. Addition of waste materials to water till it becomes unsuitable for consumption is known as water pollution. Even though there is only about 0.01% of water suitable for consumption, due to unawareness and carelessness of people, this limited amount of water is getting polluted.

Fig 3.10 ▲ A river with polluted water

Assignment 3.4

Prepare a report about the human activities that cause water pollution.

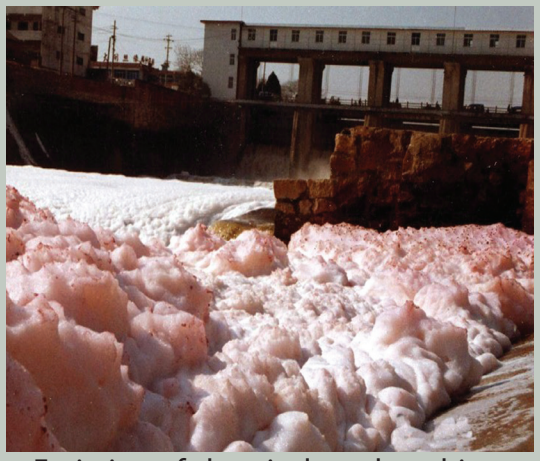
The following figure shows some methods of water pollution.



Releasing of waste materials and impure water to water bodies

Releasing of household waste materials to water

Releasing of polythene and plastics to water



Emission of chemicals and washing materials (alkali) to water

Fig. 3.11 ▲ Some methods of water pollution

Pollution of surface water affects ground water too. The poisonous chemicals in surface water are added to the ground water too. As ground water is used to drink, these poisonous chemicals enter the human body. This causes many serious illnesses such as cancers, kidney failures, etc.

Precautions should be taken as soon as possible to prevent water pollution. Otherwise, we will also lose the limited amount of water that is suitable for consumption.Taking necessary steps to stop water pollution is a timely need.

Summary

- Water exists in three physical states. They are solid, liquid and gas.
- Solid state of water -ice
  Liquid state of water -water
  Gaseous state of water -water vapour
- The ways in which water exists are precipitation/rain, surface water and ground water.
- The types of water based on salinity are fresh water, marine water and brackish water.
- Water is an essential factor for the existence of life.
- Water is important for human activities.
- The amount of consumable water has been limited due to water pollution.
- It is our duty and responsibility to minimize water pollution and conserve water.

Exercises

01). Select the correct answer.

1. Which one of the followings do not appear in the solid state of water?
   a. ice b. snow c. glaziers d. steam
2. Water with high salinity is known as
   a. marine water b. fresh water c. brackish water d. muddy water
3. Consumable percentage of water on earth is ?
   a. about 10% b. about 1% c. about 0.1% d. about 0.01%
4. Water in lagoons is known as
   a. marine water b. fresh water c. brakish water d. muddy water

02). Fill in the blanks with a suitable word/ words.

1. Water in rivers, streams, lakes, tanks is known as ……

2. Brackish water can be seen in ……..

3. Rain, hail are the …… form of water.

4. Many ……..are dissolved in sea water.

Project

- Identify the instances where water is wasted in the school and at home. Design a poster to give the message to minimize water wastage and display it in school.
- Calculate the per capita water consumption and prepare a report.
- Calculate the domestic water consumption and prepare a report.
- Prepare a report on how the water in a certain water body gets polluted.

Technical Terms

Fresh water	-	මිරිදිය	- நன்னீர்
Brackish water	-	කිවුල්දිය	- சவர்நீர்
Marine water	-	කරදිය	- உவர்நீர்
Ground water	-	භූගත ජලය	- நிலக்கீழ் நீர்
Surface water	-	මතුපිට ජලය	- மேற்பரப்பு நீர்
Water vapour	-	ජල වාෂ්ප	- நீராவி
Sleet	-	අයිස්කැට වැස්ස	- பனிக்கட்டிமழை
Snow	-	හිම	- பனி
Hail	-	හිම කැට වැස්ස	- ஆலங்கட்டி மழை
Water pollution	-	ජල දූෂණය	- நீர் மாசடைதல்
Precipitation	-	වර්ෂණය	- படிவுவீழ்ச்சி
Rain	-	වර්ෂාව	- மழை