

4. Water Safe for Drinking



Try this.

- Take a glass half full of water. Add a spoonful of sugar to it and stir it with a spoon.

See what change takes place.

- Repeat this experiment with each of the substances mentioned below.

(Wash the glass clean every time you take the next substance.)

Common salt, honey, washing soda, powdered alum, sand, wheat flour, sawdust, turmeric powder and some oil.

What do you see?

Sugar, salt, washing soda, alum disappear in the water. They dissolve completely in the water. But sand, sawdust, turmeric powder, oil do not disappear even on stirring. They do not dissolve.

What does this tell us?

Some substances dissolve in water, while some substances do not.

The substance that dissolves in water spreads throughout the water.
When salt dissolves in water, the water in the container tastes salty.
When sugar dissolves, the water tastes sweet.

A new term !

solution : When a substance dissolves in water, a mixture of that substance and water is formed. This mixture is called the solution of that substance.



If someone gets loose motions, we give them a solution of salt and sugar to drink. This solution is called ORS or oral rehydration solution.

A patient in a hospital is sometimes put on 'saline', that is, on a solution of salt in water. Sometimes, other medicines may also be given through saline.

These are examples of useful solutions.



Do you know ?

- Seawater is salty to taste because it is nothing but a solution of salt that occurs naturally. We cannot use seawater for drinking.
- Water of different wells may have different tastes. Why is that so? Some substances from the ground dissolve in the water. They give a taste to the well water. But if there is nothing dissolved in water, water has no taste.
- When we remove the lid of a soda-water bottle, bubbles fizz out of it. To make soda-water, a gas called carbon dioxide is dissolved in water under pressure. When the lid is removed, the pressure reduces and the gas bubbles out.



Try this.

- Fill a large container with water.
- Collect the following articles.

From your compass box : a plastic ruler, an eraser, a pencil, a sharpener, a rubber band, the compass.

From your house : a steel spoon, a plastic spoon, some groundnut shells, an iron nail, a screw, a coin.

From outdoors : stones, little twigs, leaves, soil.

- Put these things in the water and see whether each of them sinks or floats.

What do you see?

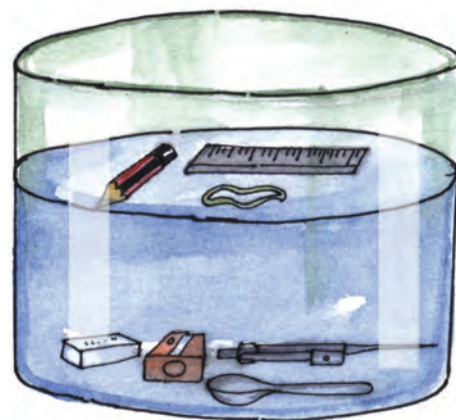
The eraser, sharpener, steel spoon, nail, screw, stones, coin, the compass and the soil sink in the water while the other things float.

What does this tell us?

Some things float on water while some things sink in it.



The things that float are lighter than water. The things that sink are heavier than water.





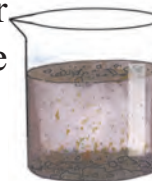
Try this.

- Take some muddy water in a big beaker. (If you do not find muddy water, then make some by adding some soil, pieces of dry twigs, straw, leaves, etc. to water.)
- Now allow this beaker to stand still for four or five hours.



What do you see?

- The particles of soil sink in the water and form a layer or sediment at the bottom. But twigs and other rubbish float on the water. It takes a long time for the sediment to form.



What does this tell us?

- Particles of soil are heavier than water. But because they are very small, they take a long time to settle to the bottom of the water. Leaves, twigs, etc. are lighter than water.
- Now the water appears much cleaner and transparent than it was.



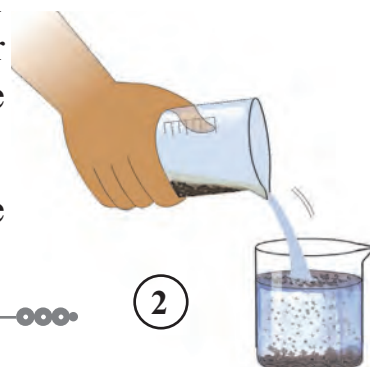
The process of allowing heavier particles to settle to the bottom of still water is called 'settling'.

Without disturbing the sediment, pour the water above it into two smaller beakers. Even though this water appears much cleaner than before, there are still some fine particles of soil and some rubbish floating in it.

Now carry out the following experiments using these two beakers. Label them 1 and 2.



1



2



Try this.

- Take a piece of alum and swirl it once in the water in the first beaker.
- Leave this beaker undisturbed for two or three hours.

What do you see?

- The particles floating in water slowly settle to the bottom. And the water in the upper part becomes transparent. The twigs and straw still keep floating on the water.

What does this tell us?

- Swirling alum in water helps the soil particles in muddy water to settle down.



- Take another beaker. Place a tea strainer over it. Fold a piece of fine cotton cloth into four layers. Make it moist and spread it over the strainer. Now pour the water in beaker 2 in a thin stream on the folds of the cloth.

What will you see?

- The rubbish and soil particles remain on the cloth.
- The water collects in the beaker below. It looks transparent.



What does this tell us?

- If we strain muddy water, it helps to make it clean. This process is called filtration.

After doing this experiment, throw the water into the soil and wash your hands with soap and clean water.

A new term !

potable water (water safe for drinking) : Water that does not endanger our health in any way when we drink it is called safe drinking water or potable water.

We have seen some methods of making muddy water clean and transparent. However, such water may still not be potable.



Can you tell ?

- In the rainy season, the water of rivers and streams becomes muddy. Why do we not drink that water ?
- When on an excursion, if you find that the water of a spring or well there has a bad smell, would you drink it ?

Water safe for drinking : potable water

Drinking water must be safe for our health. Pure water has no taste, smell or colour. If water has a colour or a foul smell, one must avoid drinking it. It can make us ill.

When we get muddy water during the rains, we allow it to settle before using it. If necessary, we use alum or we filter the water. Its muddiness disappears, and the water looks clean and transparent. Can we say that it is now safe for drinking?

Let us learn some more about this.

New terms !

micro : very, very small.

organism : a living thing.

micro-organism : a living thing that cannot be seen by the naked eye or even with a magnifying glass.

microscope : an instrument for looking at very very small things which we cannot see with our eyes or even through a magnifying glass.



Do you know ?

If we take a bit of yoghurt or a drop of buttermilk on a glass slide and place the slide under a microscope, we see very tiny living things in it.

They are called micro-organisms. These micro-organisms convert milk into yoghurt. They are useful for us.

But all micro-organisms are not useful. Some micro-organisms cause diseases when they enter our body. They are said to be harmful micro-organisms.



There are numerous kinds of micro-organisms around us. They are in the soil, in water, in air, on rocks, that is, anywhere and everywhere.

Even if harmful micro-organisms are present in water, we are not able to see them. Now though the water with such micro-organisms looks transparent, would it be safe for drinking?

You may know that during the rainy season, we often hear of an outbreak of diarrhoea or gastritis. At such times, we need to boil the water that has been cleaned by settling and filtration. Only then does it become safe for drinking.

Boiling the water kills the micro-organisms in it and prevents diseases.



Use your brain power !

Some substances do not dissolve in water.

What could be the advantage of this?



What's the solution ?

Mother had brought some cumin seeds (jeera) from the shop. But some sand got mixed with it. Mother wants the jeera seeds cleaned.



What we have learnt –

- Some substances dissolve in water. Some substances do not.
- Some things float on water. Some sink and settle at the bottom.
- In order to obtain clean water, muddy water is allowed to settle. After settling, the water is cleaned further by swirling alum in it or by filtration.
- Even in clean transparent water, micro-organisms can be present. It is necessary to have safe water for drinking. So water must be boiled to destroy any micro-organisms in it.



Always remember –

Even such tiny living things like micro-organisms which our eyes cannot see have great importance in our lives.



Exercises

(A) Use your brain power !

Some *rava* has got mixed with sago pearls or sabudana. What sieve should we use to separate the two – the one that allows *rava* to pass through or the one that allows sago?

(B) Answer the following questions.

1. Name the substances used to make the solution called lemon sherbet.
2. Why is the water that looks clean and transparent may not be fit for drinking?
3. When making a sherbet, what do we do to make sugar dissolve quickly?
4. Does oil float on water or sink in it?

(C) Complete the table.

1. Write the information you obtained from the floating-sinking experiment, in the table below.

Repeat the experiment with other things besides those mentioned in the lesson. Write their names, too, in the proper places in the table.

Things	These sink.	These float.
Given in the lesson		
Other things		

2. Repeat the experiment in the lesson related to dissolving using some other substances. Make a table like the one above and fill in your findings in it.

(D) Fill in the blanks.

1. Substances like salt and sugar after some time when added to water.
2. The mixture obtained on dissolving a substance in water is called a
3. ORS is an example of solutions.
4. All micro-organisms are not useful. Some can cause if they enter our body.
5. Things that float in water are than it and things that sink are.....than it.
6. A substance called is swirled in muddy water to help clean the water.

(E) True or false ?

1. Alum powder does not dissolve in water.
2. Micro-organisms cannot live in water.
3. If muddy water remains still, a sediment is formed at its bottom.
4. An eraser floats in water.
5. Tea leaves can be separated from tea by filtration.

(F) How can we tell that water has become transparent ?



Activities



- One day, as soon as you come to school, take some muddy water in a large container.
- When much of the mud has settled, pour the water near the top very carefully into two containers. Label them 1 and 2.
- In the first container, swirl a piece of alum.
- Now leave them undisturbed, and observe the two containers every 30 minutes.
- Which water becomes clean first? How long does it take ?
- How long does the water in the other container take to become equally clean ?

