7. Experiments with Water

What floats – what sinks?

Ayesha was waiting for dinner. Today *Ammi* was making her favourite food – *puri* and spicy potatoes.

Ayesha watched as her mother rolled out the *puri* and put it in the hot oil. She saw that at first the *puri* sank to the bottom of the pan. As it puffed up, the *puri* came up and started floating on the oil. One *puri* did not puff up and did not float like the others. On seeing this, Ayesha took some dough and rolled it into a ball. She flattened it and put it in a bowl of water. Alas! it sank to the bottom and stayed there.

Think what would happen if

- Ayesha put a puffed *puri* in a bowl of water. Would it sink or float?
- You put a steel plate on water. Would it sink or float? What would happen to a spoon?
- Would the cap of a plastic bottle sink or float on water?

In the evening Ayesha went for a bath. She had just come out when her mother called, "Ayesha, you have dropped the soap in the water again. Take it out and put it in the soap case." Ayesha was in a hurry and the soap case fell out of

her hands. It started floating on water. Ayesha gently put the soap in the soap case. She saw that the case continued to float, even with the soap in it.

Have you seen that some thing float on water while others sink? Think how this happens! The poem here raises such questions.

Why, Oh Why?

A wooden boat
in water will float.
But a needle will sink!
Why does this happen?
Let me think...

An iron ship
will also float,
though its' much heavier
than my boat!

But a needle,
light as a leaf,
thin as a pin,
will sink right in!

Why does this happen?
Let me think...

– *Shishir Shobhan Ashthana*
Chakmak, December 1985
(Translated by Anupa Lal)

Do this and find out

Do this experiment in groups of four friends. Each group will need a big pot filled with water and the things listed in the table. Put each thing one-by-one in water and observe. Write your observations in the table given on the next page.

Mark [✓] for the things that float. Mark [×] for those that sink.

Things to be put in water	I guessed, before I did it	I saw, when I did it
(a) Empty bowl (*katori*) (b) After putting in 6-7 small pebbles, one-by-one		
Iron nail or pin		
Matchstick		
(a) Empty plastic bottle with its lid closed (b) bottle half-filled with water (c) Bottle full of water		
Aluminium foil (from medicine packing) (a) open and spread out (b) pressed tightly into a ball (c) in a cup-like shape		
(a) Soap cake (b) Soap cake on a small plastic plate		
A piece of ice		

Find out from the other groups which things floated and which sank in the water?

After doing the experiment, fill in the blanks.

1. The iron nail _____ in water but the *katori* _____. I think this happened because _____
2. The empty plastic bottle _____ on water. The bottle filled with water _____ because _____
3. The aluminium foil _____ when it was spread out. When pressed tightly into a ball it _____. This may have happened because _____

Is it magic?

When Ayesha woke up in the morning, *Ammi* had fever. *Abbu* made some tea and went to give medicines to *Ammi*. He told Ayesha, "You boil eggs. Also put some salt in the water." Ayesha took water in a pot. By mistake she put too much salt in the water. She saw the eggs at the bottom of the pot come up a little and start to float in water!

- Take some water in a glass. Put a lemon in it. Now keep putting salt in the water, half-a-spoon at a time. Were you able to float your lemon in water?
- What do you think, the lemon floated in salty water, because.....

Dead Sea

All oceans and seas have salty water. The saltiest of all is the Dead Sea. How salty? Imagine 300 grams of salt in one litre of water! Would you be able to even taste such salty water? It would be very bitter. Interestingly, even if a person does not know how to swim, she would not drown in this sea. She will float in water, as if lying down on it!

Remember the lemon you floated in salty water?

What dissolved, what did not?

On Sunday Ayesha's cousin brother Hamid came to her house to play. As soon as he came he asked his aunt to make his favourite *shakkarpara* (a sweet dish). *Ammi* said, "Let me come back from the market, then I will make some for you. Why don't you help me? Take two glasses of water and put a bowl of sugar in it. Mix it till it dissolves." Hamid thought, "Let me finish this work fast. Then I will watch TV".

- Suggest some ways to Hamid for quickly dissolving sugar.

Teacher's Note : It is not expected that children should be told about density. We should accept different answers that children may give, such as water is 'heavy' or 'thick'.

Do this experiment

Make groups of four friends. For the experiment you will need 4-5 glasses or bowls, spoons, water, and the things listed in the table. Take some water in each glass. Now try to dissolve one thing in one glass. Observe what happens and note in the table.

Things	Did it dissolve or not?	What happened after keeping for 2 minutes?
1. Salt	_____	_____
2. Soil	_____	_____
3. Chalk powder	_____	_____
4. 1 spoon milk	_____	_____
5. Oil	_____	_____

Tell

- Could you see the salt after it dissolved in water? If no, why?
- Does that mean that now the water does not have salt? If it has, then where is the salt?
- What difference did you see – in the water with salt, and the water with chalk powder – after keeping for sometime?
- Which of the two would you be able to separate from the water by straining with a cloth – salt or chalk powder?

Teacher's Note : There are many things which cannot be easily labelled as soluble or insoluble. These categories are anyway not needed here. Children need to be encouraged to fill the table on the basis of their own observations.

While doing the experiment Ayesha and Hamid had an argument. Ayesha felt that after stirring it, the oil dissolved in water. Hamid did not agree. He said, "Look, the tiny yellow oil drops can still be seen in the water". Ayesha said, "Let's wait for sometime and then see."

- Do you think the oil got dissolved in the water? Why do you think so?

Racing drops

Ayesha put two drops of oil on the lid of her tiffin box. Next to that she put two drops of water and two drops of sugar solution. She tilted the lid. She saw some drops slid down quickly, while some were left behind.

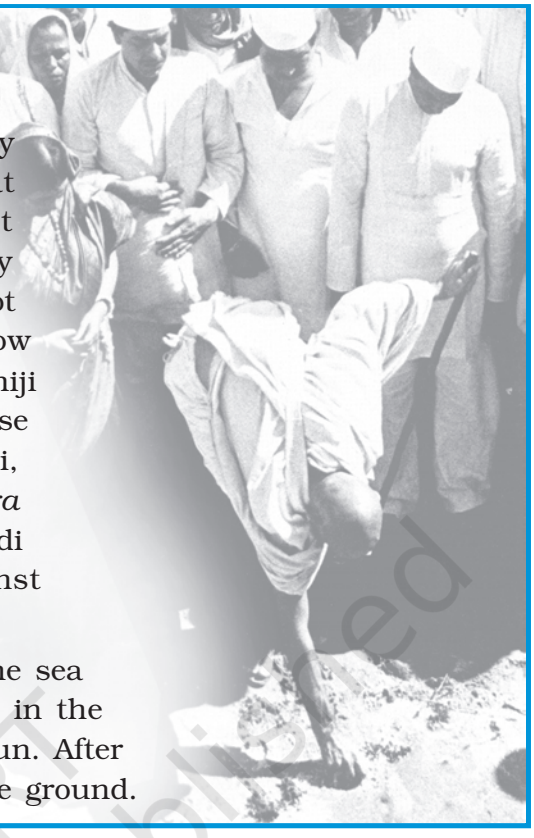
- You also try to do the same and then tell – which drop went ahead? Why did it slide faster?

Where did the water go?

One day Ayesha's mother put some water to boil on the stove for making tea. She got busy with something and forgot about it. When she remembered and came to check, she found very little water left in the pan.

- Think where did the water go?
- Why did Chittibabu and Chinnababu keep their mango jelly in the sun?
- At your house, what things are made by drying in the sun?

Dandi March



This incident took place in 1930, before India became independent. For many years the British had made a law that did not allow people to make salt themselves. They had also put a heavy tax on salt. By this law people could not make salt even for use at home. "How can anybody live without salt?" Gandhiji said, "How can a law not allow us to use freely what nature has given!" Gandhiji, with several other people, went on a *yatra* (long walk) from Ahmedabad to the Dandi seashore in Gujarat, to protest against this law.

Do you know how salt is made? The sea water is collected in shallow beds dug in the sand. Water is allowed to dry in the sun. After the water dries the salt remains on the ground.

What we have learnt

- You have washed your handkerchief and you want to dry it quickly. What all can you do?
- What things do you put in water to make tea? Which of those things dissolves in water?
- You have been given some *mishri* pieces (lumps of sugar). Suggest some ways to dissolve them quickly.

Teacher's Note : Children of this age cannot be expected to understand the concept of 'evaporation' but they can begin to think about it. 'Dandi Yatra' can provide a context to talk about the struggle for Independence.