

9 – Matter


Class – 4

E.V.S

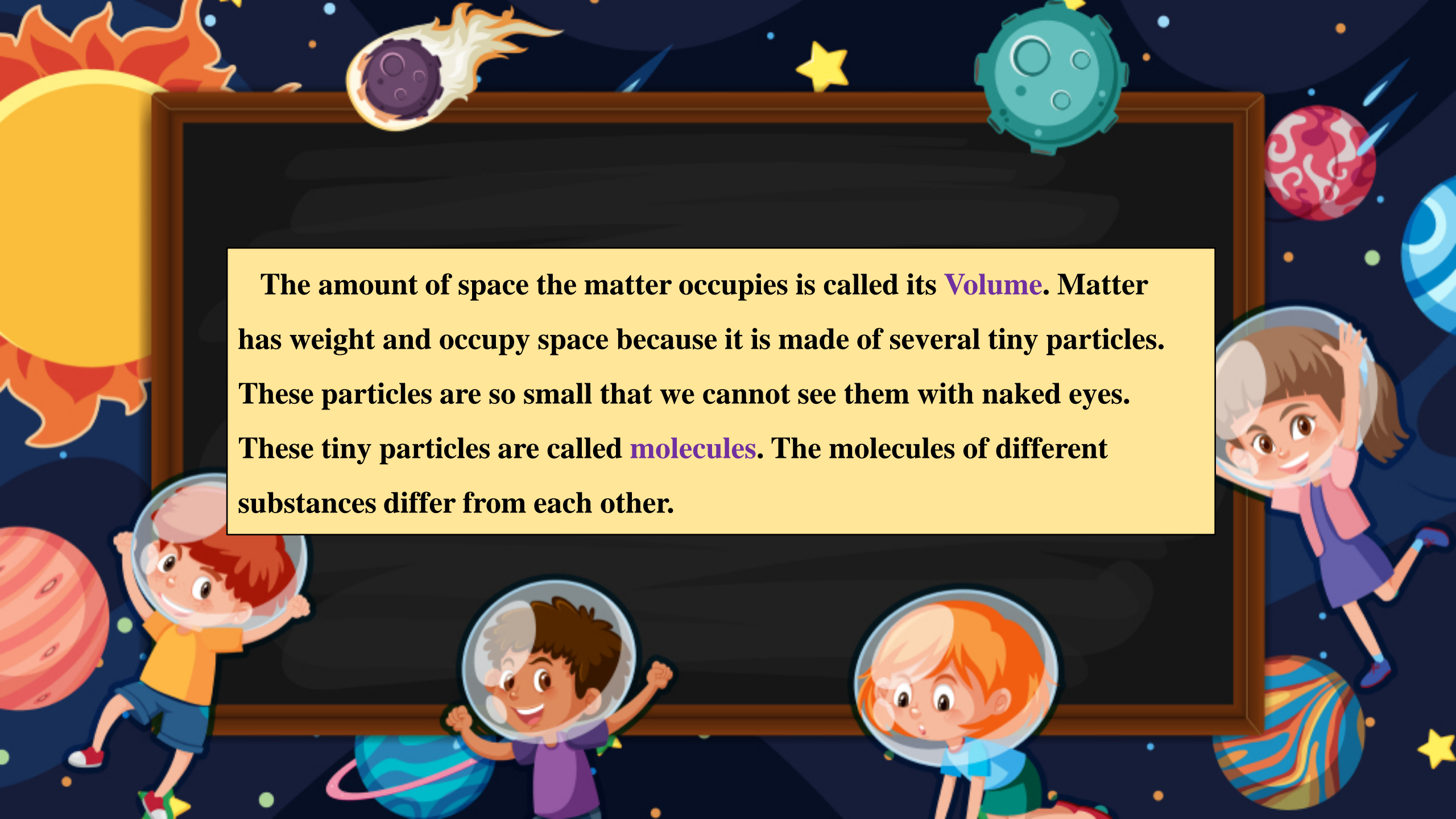


WHAT IS MATTER?

When you look around, you find many things. All these things differ from each other in shape, colour and size. They are also made of different materials. These things possess different properties. But when you observe them closely you find that all of them have some common qualities.



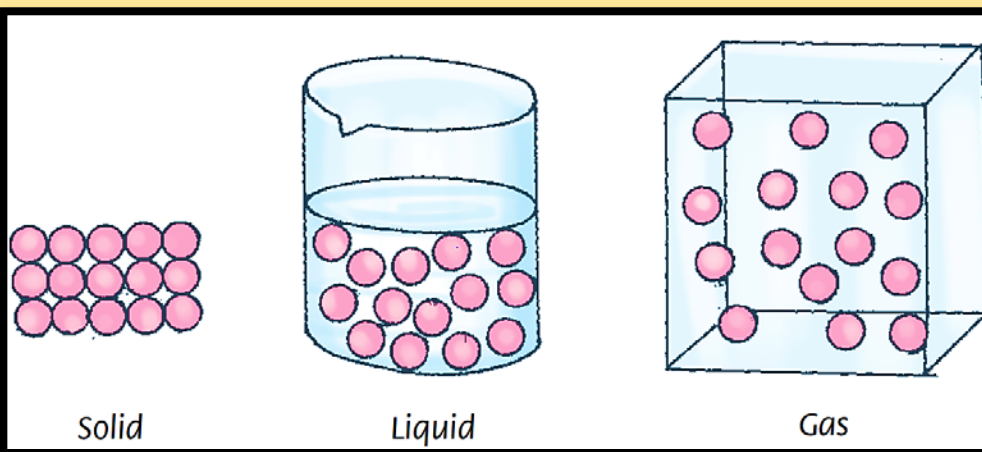
You see, all things occupy space. The things which have weight and occupy space are called the **matter** . All living things like animals and plants and the non-living things like chair, bus, etc. are matter. Feelings and emotions of the living things are not the matter.



The amount of space the matter occupies is called its **Volume**. Matter has weight and occupy space because it is made of several tiny particles. These particles are so small that we cannot see them with naked eyes. These tiny particles are called **molecules**. The molecules of different substances differ from each other.

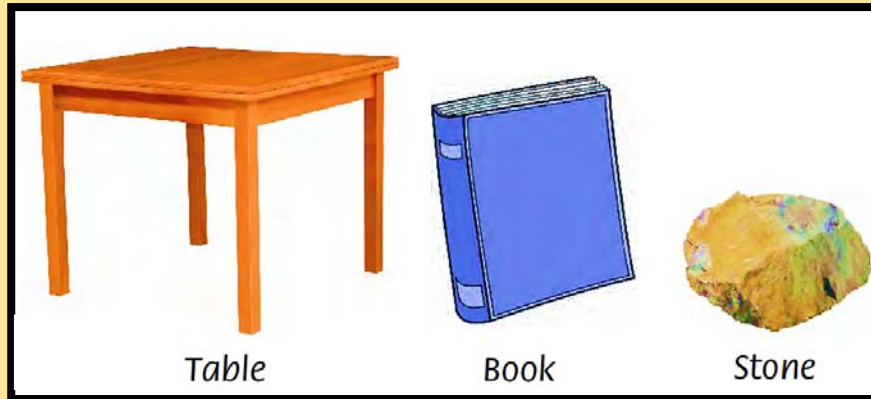
STATES OF MATTER

Matter exists in three states — **solid**, **liquid** and **gaseous**.



Solid

A stone, a table or a book are solids. They are hard and do not change their shape or size with the change in place. Solids therefore have a definite shape and volume. In solids, molecules are closely packed.



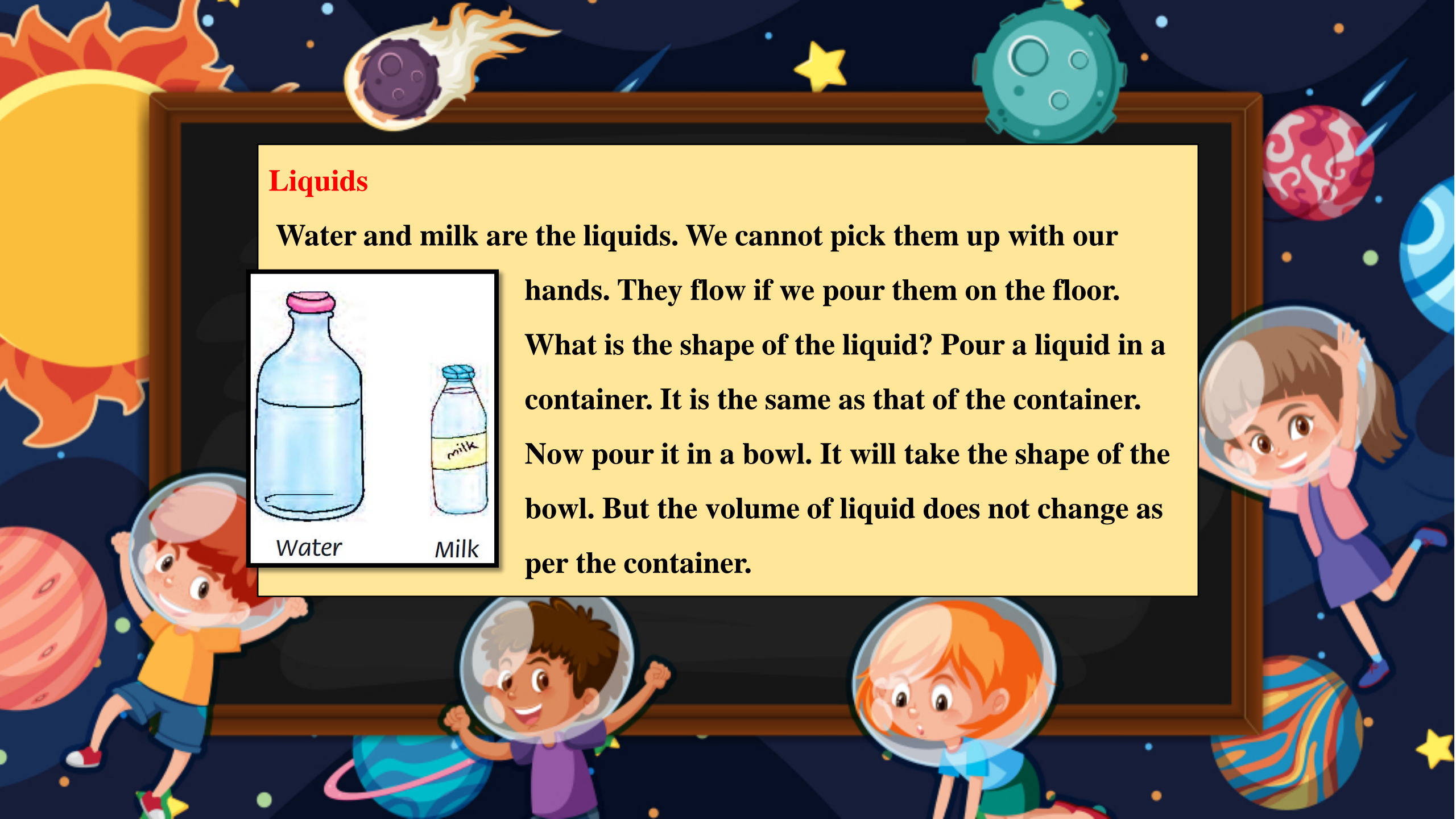
Liquids

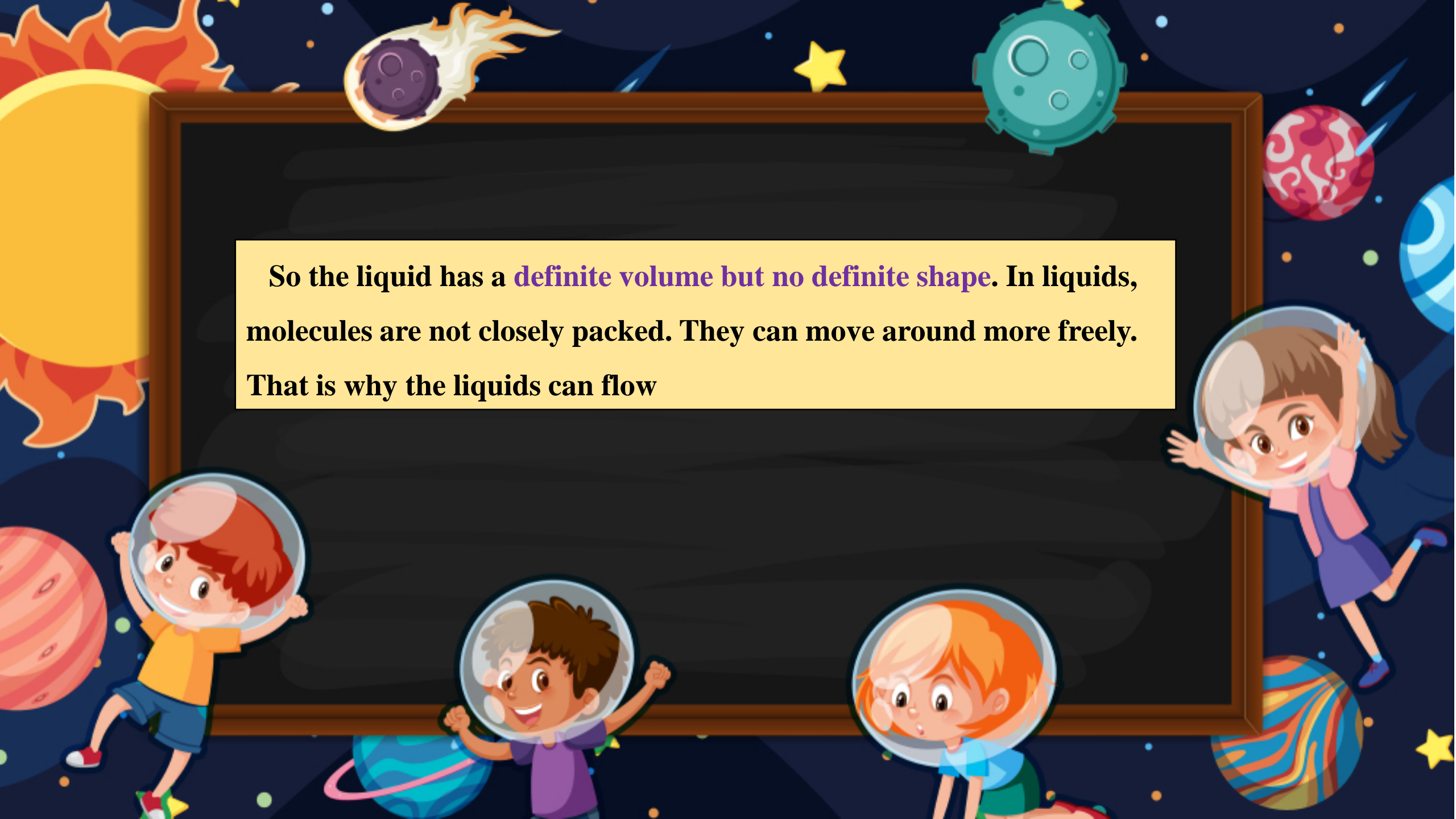
Water and milk are the liquids. We cannot pick them up with our

hands. They flow if we pour them on the floor.

What is the shape of the liquid? Pour a liquid in a container. It is the same as that of the container.

Now pour it in a bowl. It will take the shape of the bowl. But the volume of liquid does not change as per the container.

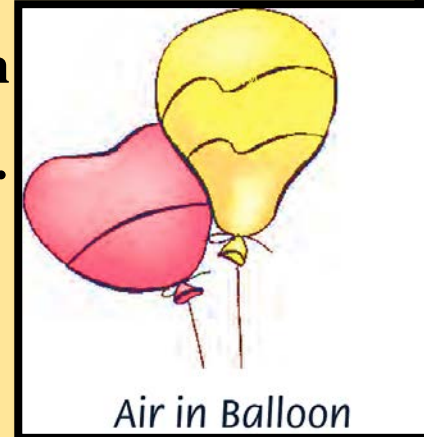




So the liquid has a **definite volume but no definite shape**. In liquids, molecules are not closely packed. They can move around more freely. That is why the liquids can flow

Gas

Air is a gas. Molecules in gas are far apart from each other. They are free and move all around in the available space. When you blow air in a balloon, it is squeezed in the balloon. When you let the air out of the balloon, it spreads all over the room. It now occupies a larger space. So the gas does not have any shape or volume.

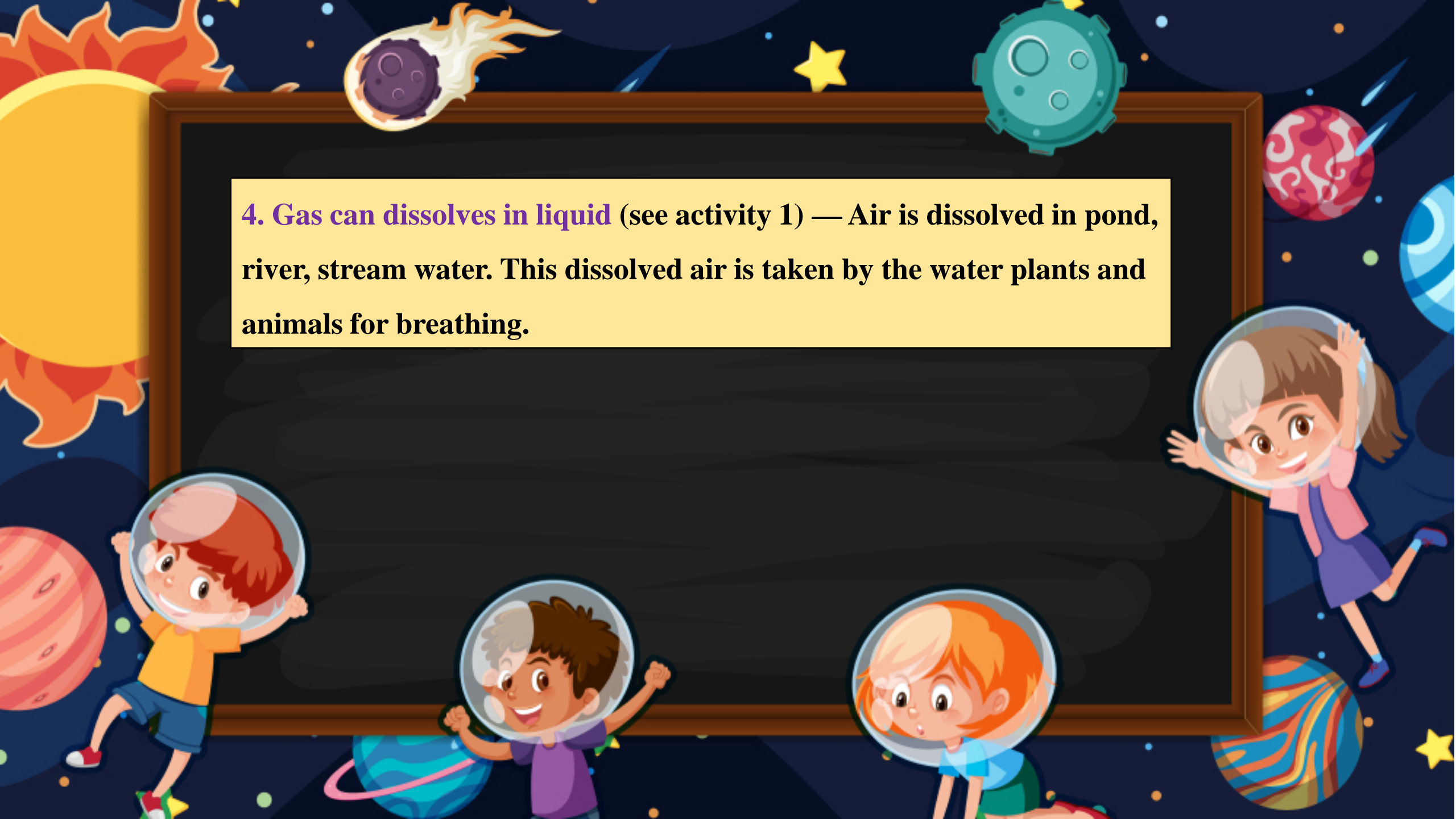


Air in Balloon

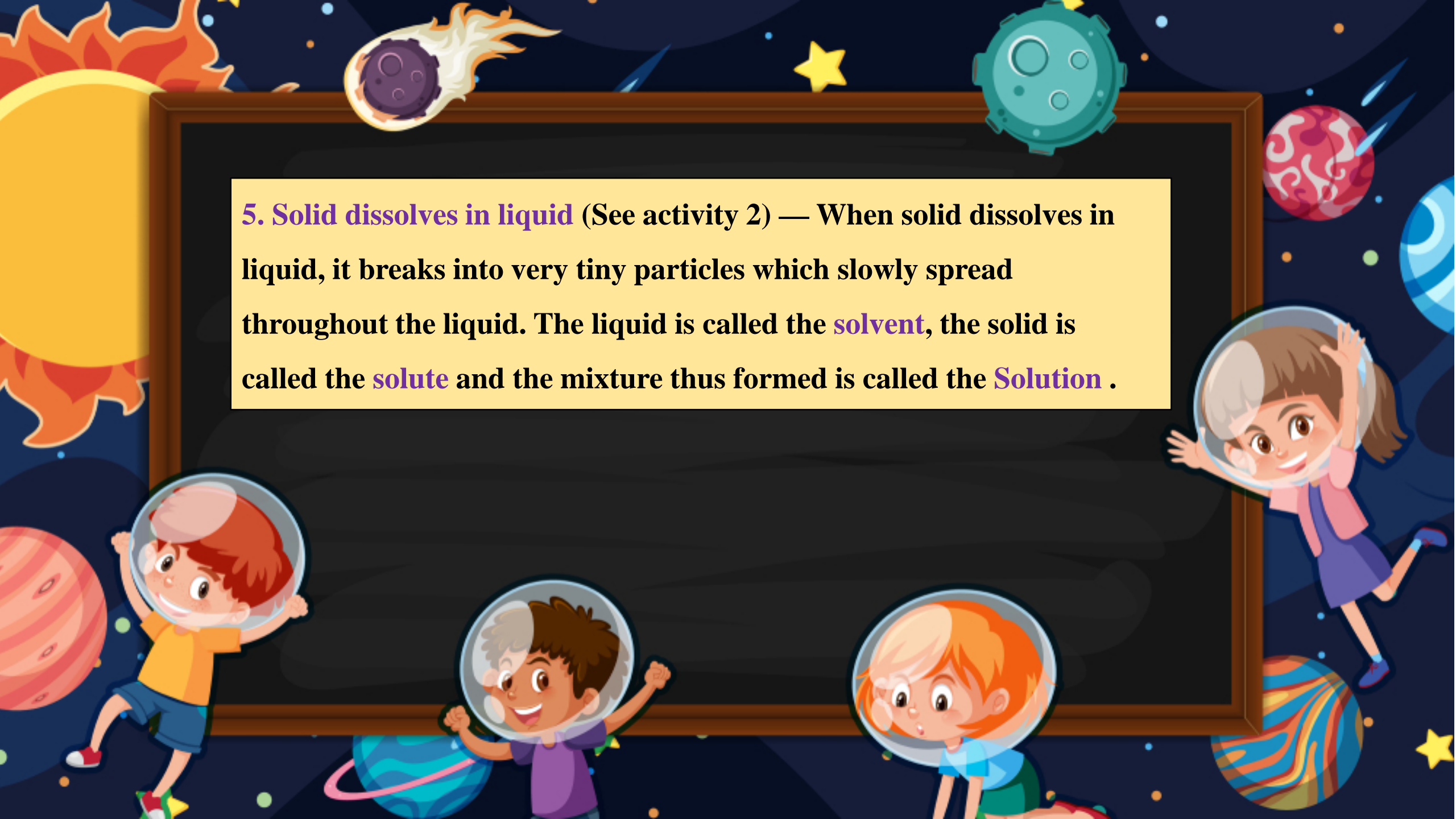
The background is a vibrant space scene. On the left, a large, bright yellow sun with orange flames is partially visible. In the top center, a purple planet with white rings is surrounded by a white comet-like trail. To the right, a green planet with white rings is shown. Further right, a pink planet with white swirls and a blue planet with white stripes are visible. At the bottom, four children wearing clear space helmets are depicted. On the left, a boy with red hair in an orange shirt and blue shorts is floating. In the center, a boy with brown hair in a purple shirt is floating. On the right, a girl with brown hair in a pink shirt and purple dress is floating. At the bottom right, a girl with orange hair in a blue shirt and green pants is floating. The entire scene is set against a dark blue space background with white stars and a large, dark, rectangular frame in the center.

PROPERTIES OF MATTER

1. Matter occupies space.
2. Solid and liquid matters have a fixed volume.
3. Solid has a fixed shape while liquid and gas take the shape of the container they are filled in.



4. Gas can dissolve in liquid (see activity 1) — Air is dissolved in pond, river, stream water. This dissolved air is taken by the water plants and animals for breathing.



5. Solid dissolves in liquid (See activity 2) — When solid dissolves in liquid, it breaks into very tiny particles which slowly spread throughout the liquid. The liquid is called the **solvent**, the solid is called the **solute** and the mixture thus formed is called the **Solution** .

To show that air dissolves in the liquid

Material required: Bottle of a coke

Method: Take a coke bottle. Shake it well. Now remove the cap.

What happens? Bubbles come rapidly out of the bottle. Actually coke is a drink with carbon dioxide dissolved under pressure, in it. When the cap of the bottle opens, the carbon dioxide escapes rapidly in the form of bubbles. It shows that air dissolves in the liquid.



To show that solid dissolves in the liquid

Materials required : Sugar, water

Method: Take some sugar and mix it to a glass of water. Do not disturb the glass. You will find that crystals dissolve in the water, to form a solution. This solution gives a uniform sweetness. It shows that solid dissolves in the liquid.



Sugar water solution



ALL STATES OF MATTER ARE INTERCHANGEABLE


Changes continuously take place in the matter. Matter changes from one form to another. Changes may be physical or chemical.

The background is a vibrant space scene. On the left, a large, bright yellow sun with orange flames is partially visible. In the top center, a purple comet with a long white and yellow tail is streaking across the dark blue sky. To the right of the comet is a yellow star. Further right is a green, cratered planet. On the far right, there are several other planets: one with pink and white swirls, one with blue and white stripes, and one with orange and blue stripes. At the bottom, four children wearing clear space helmets are floating. From left to right: a boy with red hair in an orange shirt and blue shorts, a boy with brown hair in a purple shirt, a girl with blonde hair in a blue shirt and green pants, and a girl with brown hair in a pink shirt and purple dress. They are all smiling and appear to be looking at the text box. The text box is a large, dark blue rectangle with a brown border, containing white text.

Physical Change

Any change in the size, shape or state of a substance is a physical change but there is no formation of any new substance in this change.

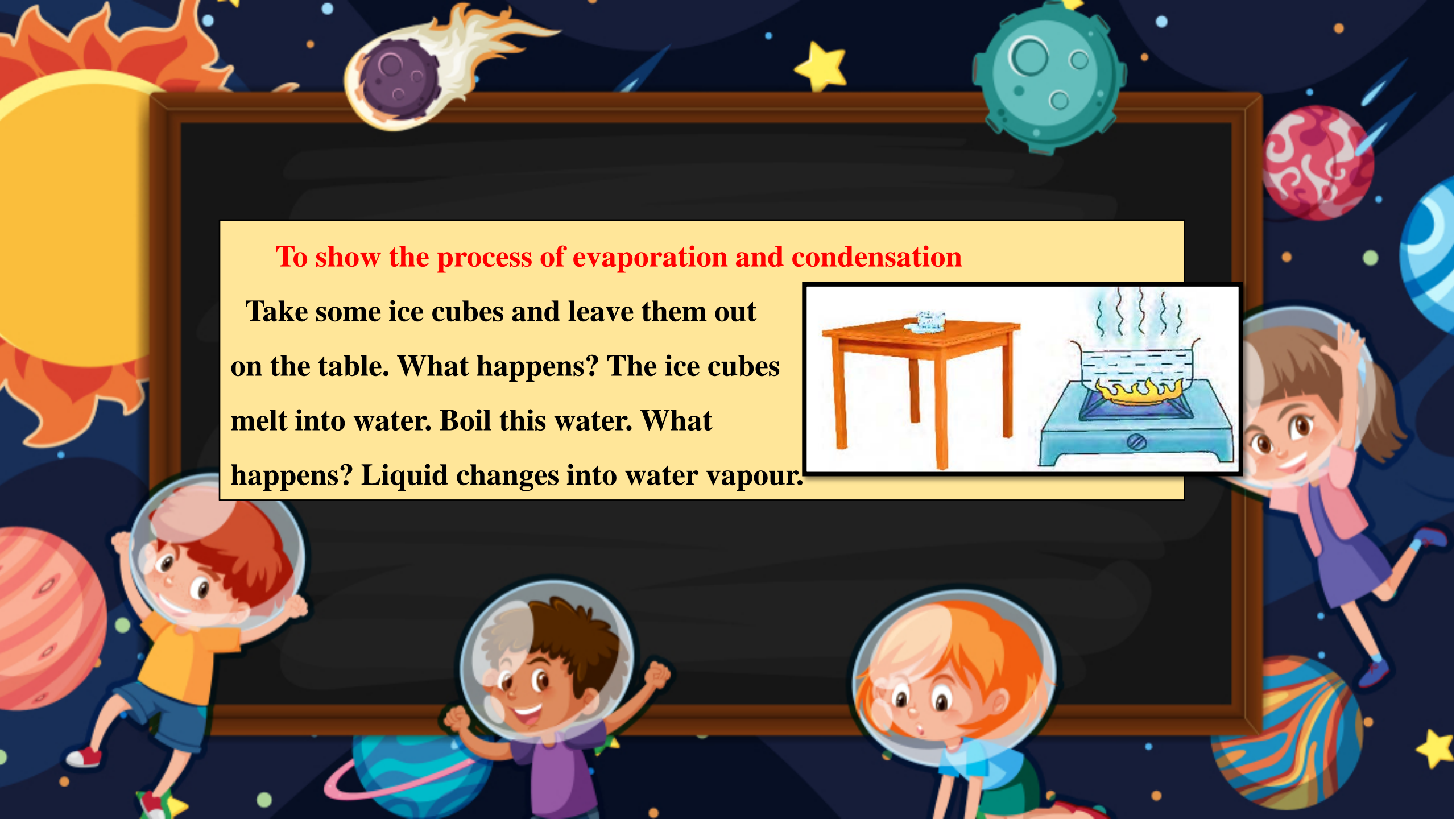
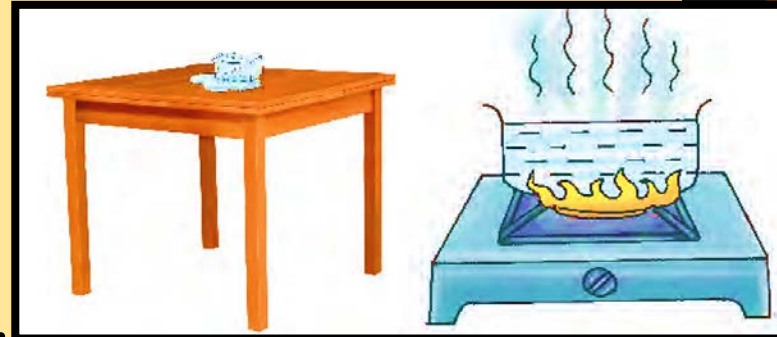
We can get back the previous form of the substance either by removing the conditions causing that change or reconstructing the conditions in



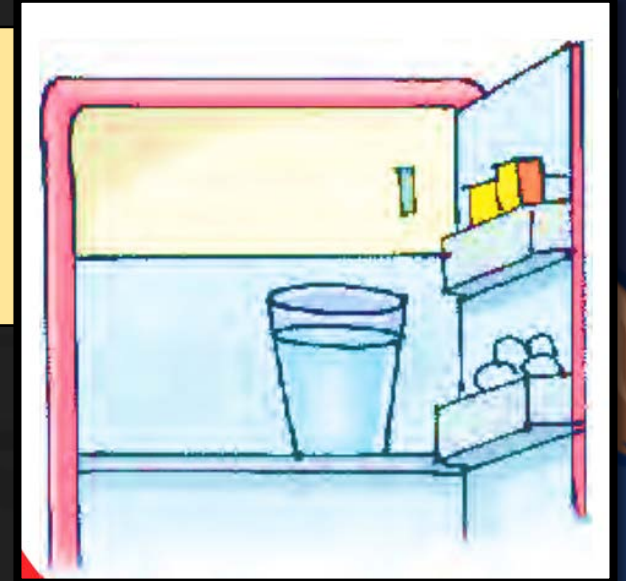
which the substance was. Thus physical changes are reversible. Activities 3, 4 and 5 are the examples of physical change.

To show the process of evaporation and condensation

Take some ice cubes and leave them out on the table. What happens? The ice cubes melt into water. Boil this water. What happens? Liquid changes into water vapour.

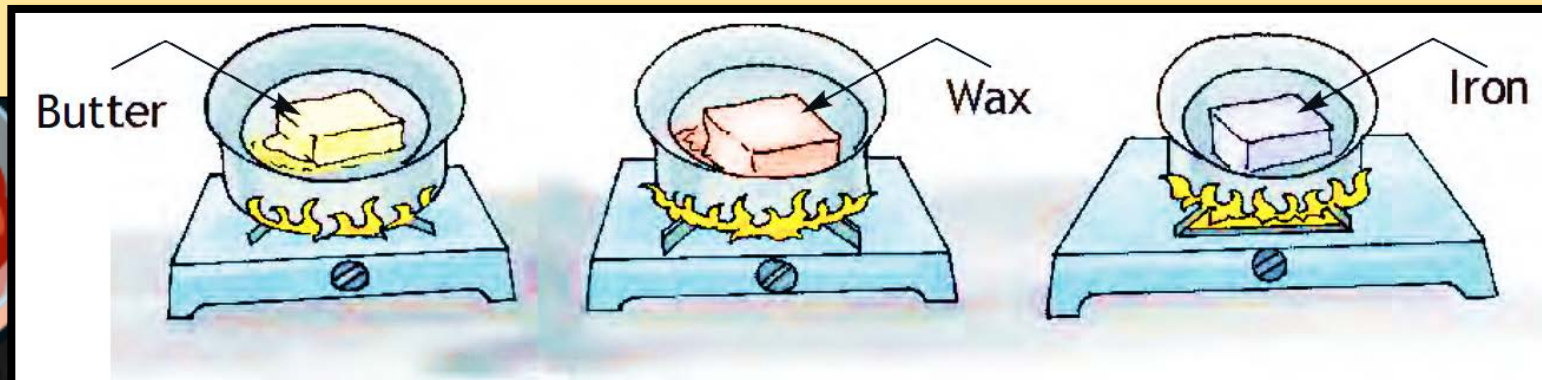


Thus a solid becomes liquid. A liquid becomes gas on heating. On cooling, the opposite changes occur. When water is cooled, it changes to ice.

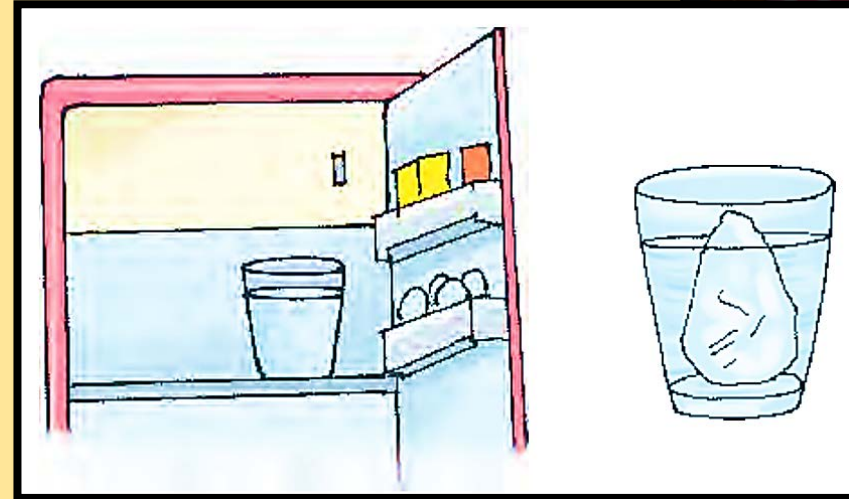


Take three pans. In one pan put a piece of butter. In the other pan put a piece of wax. In the third pan put a piece of iron. Now heat the pans. Which melts first? Now cool the pan. Which liquid change back to solids?

Iron takes more time to melt. It has to be melted in a factory. On cooling iron solidifies again.



Take some water in a glass and keep it into a refrigerator. Water changes into ice. Now keep this glass containing ice in open for sometime. The ice changes back into water. There is change only in the physical form of the substance. No new substance is formed.



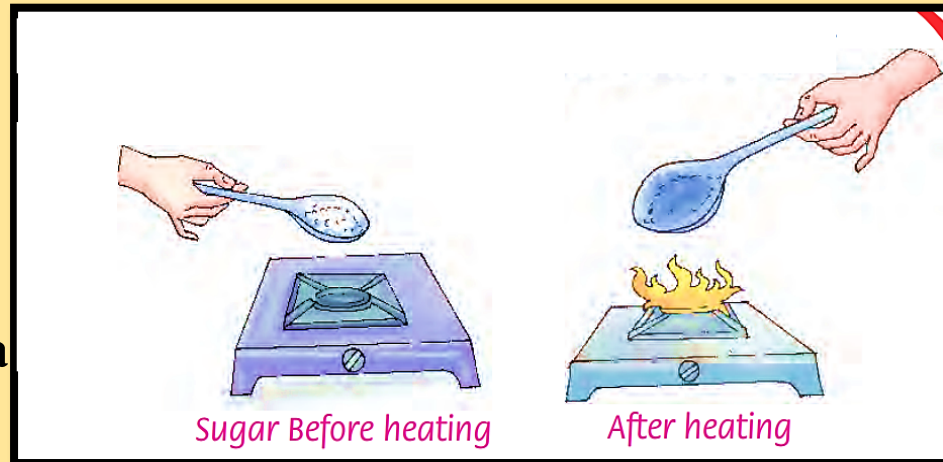
The background is a vibrant space scene. At the top left is a large, bright yellow sun with orange flames. A comet with a purple nucleus and white tail streaks across the top. A blue planet with white rings is at the top right. Various other planets in red, blue, and orange are scattered throughout. Three children in clear space helmets are floating: a boy with red hair on the left, a boy with brown hair in the center, and a girl with brown hair on the right. A large, empty rectangular frame with a brown border is in the center, containing text.

Chemical Change

Any change in which the state and composition of a substance changes permanently and does not come back to its original form is called a **chemical change**. During a chemical change new substances are formed.

Activity 6 demonstrate a chemical change.

Take some sugar in a spoon. Heat the spoon for sometime. The sugar changes its colour and after sometime turns black. Now it is not sugar any more. A new substance is formed which cannot be changed back into sugar on cooling. This is a chemical change.





Check Your Knowledge

Fill in the blanks.

1. Matter occupy _____.
2. Liquid has a definite _____.
3. The amount of space a matter occupy is called _____.

The background is a vibrant space scene. On the left, a large, bright yellow sun with orange flames is partially visible. In the top center, a purple planet with a white ring is surrounded by a white comet-like trail. To the right, a blue planet with white rings is shown. The bottom left features a red and white striped planet. The bottom center has a blue planet with a pink ring. The bottom right shows a blue and white striped planet. Four children in space suits are floating in the scene: a boy with red hair on the left, a boy with brown hair in the center, a girl with blonde hair on the right, and a girl with brown hair on the far right. They are all smiling and appear to be exploring space. A large, dark blue rectangular frame with a brown border is centered in the image, containing a yellow box with text.

Fact File

- **Liquid has more free and loose space. Solid occupy this space when it is dissolved in the liquid.**
- **When the liquid has no more free space to fill in with the solid, the solution is thus called a saturated solution.**

The background is a vibrant space scene. On the left, a large, bright yellow sun with orange flames is partially visible. In the top center, a purple comet with a long white and yellow tail is streaking across the dark blue sky. To the right of the comet is a yellow five-pointed star. Further right is a green, cratered planet. On the far right, there's a pink planet with white swirls and a blue planet with white stripes. At the bottom, three children in space suits are floating. On the left, a boy with red hair in an orange shirt and blue shorts is floating. In the center, a boy with brown hair in a purple shirt is floating. On the right, a girl with brown hair in a pink shirt and purple dress is floating. The entire scene is framed by a dark blue space with various stars and planets.

Things to Remember

- **Matter is anything that occupy up space.**
- **Matter is made of tiny particles called molecules**
- **Solid, liquid and gas are the three states of matter.**
- **Heating and cooling causes change in the state of matter**



Thank
you!