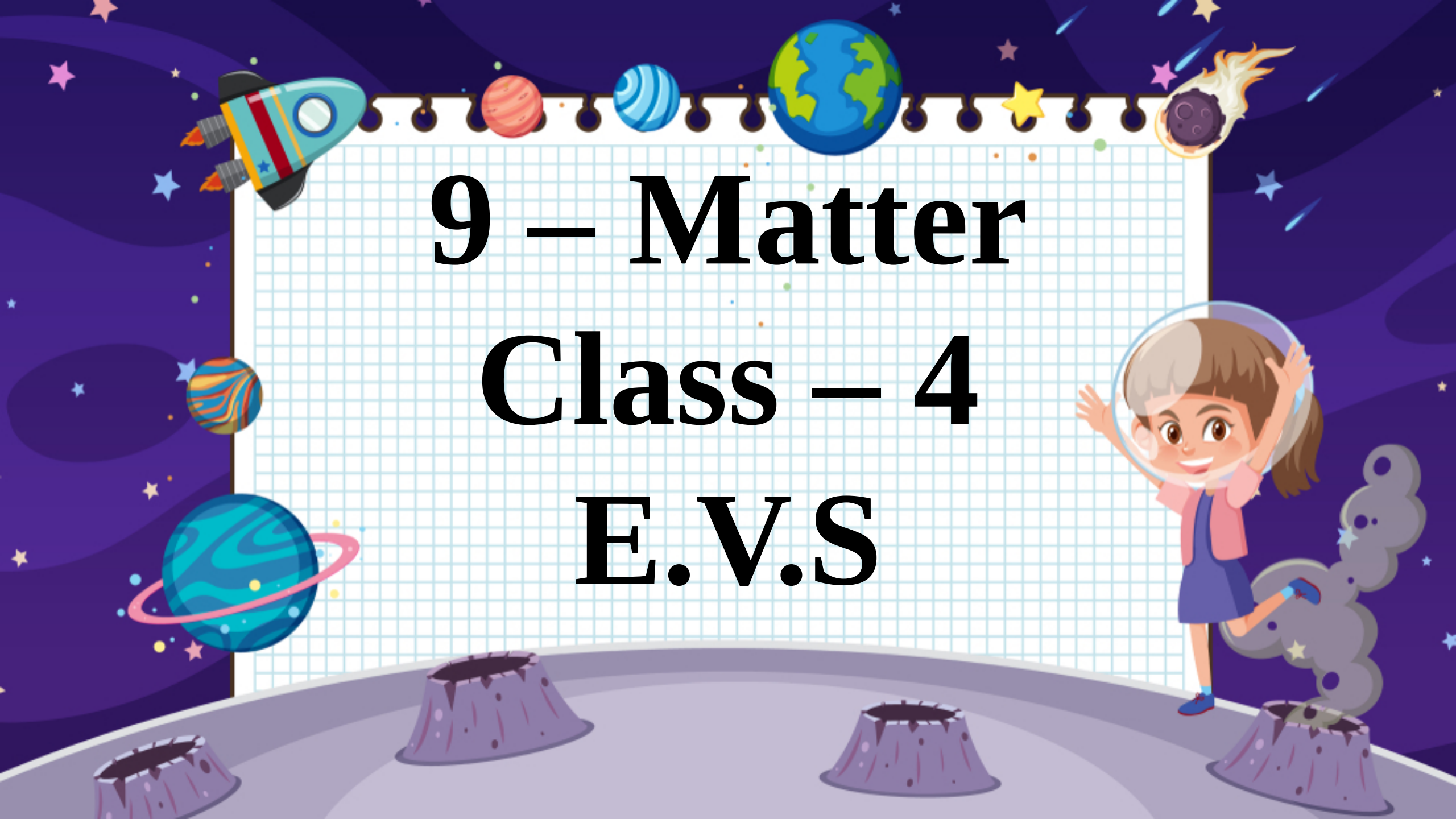
9 – Matter
Class – 4
E.V.S



WHAT IS MATTER?

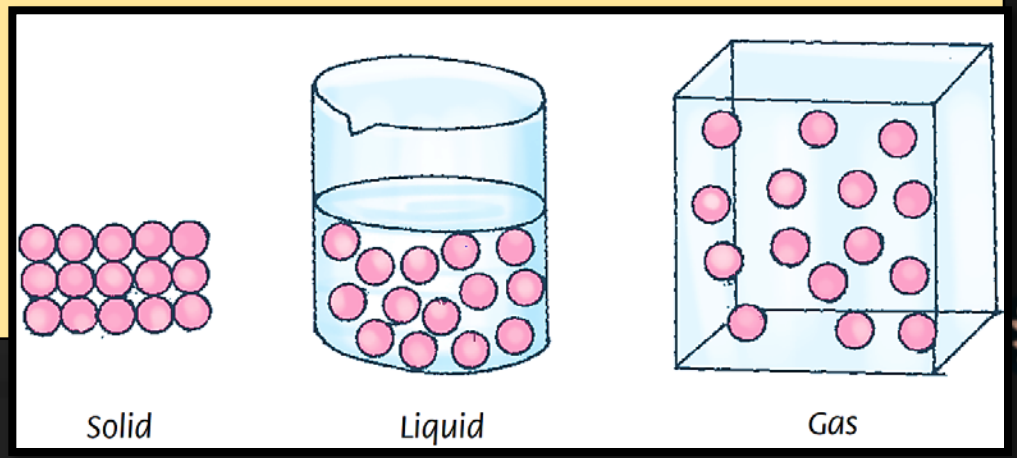
When you look around, you find many things. All these things differ from each other in shape, colour and size. They are also made of different materials. These things possess different properties. But when you observe them closely you find that all of them have some common qualities.


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.

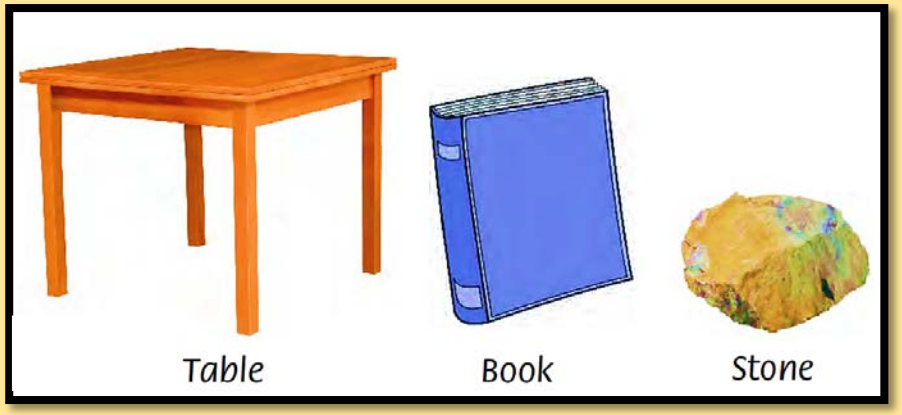
STATES OF MATTER

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



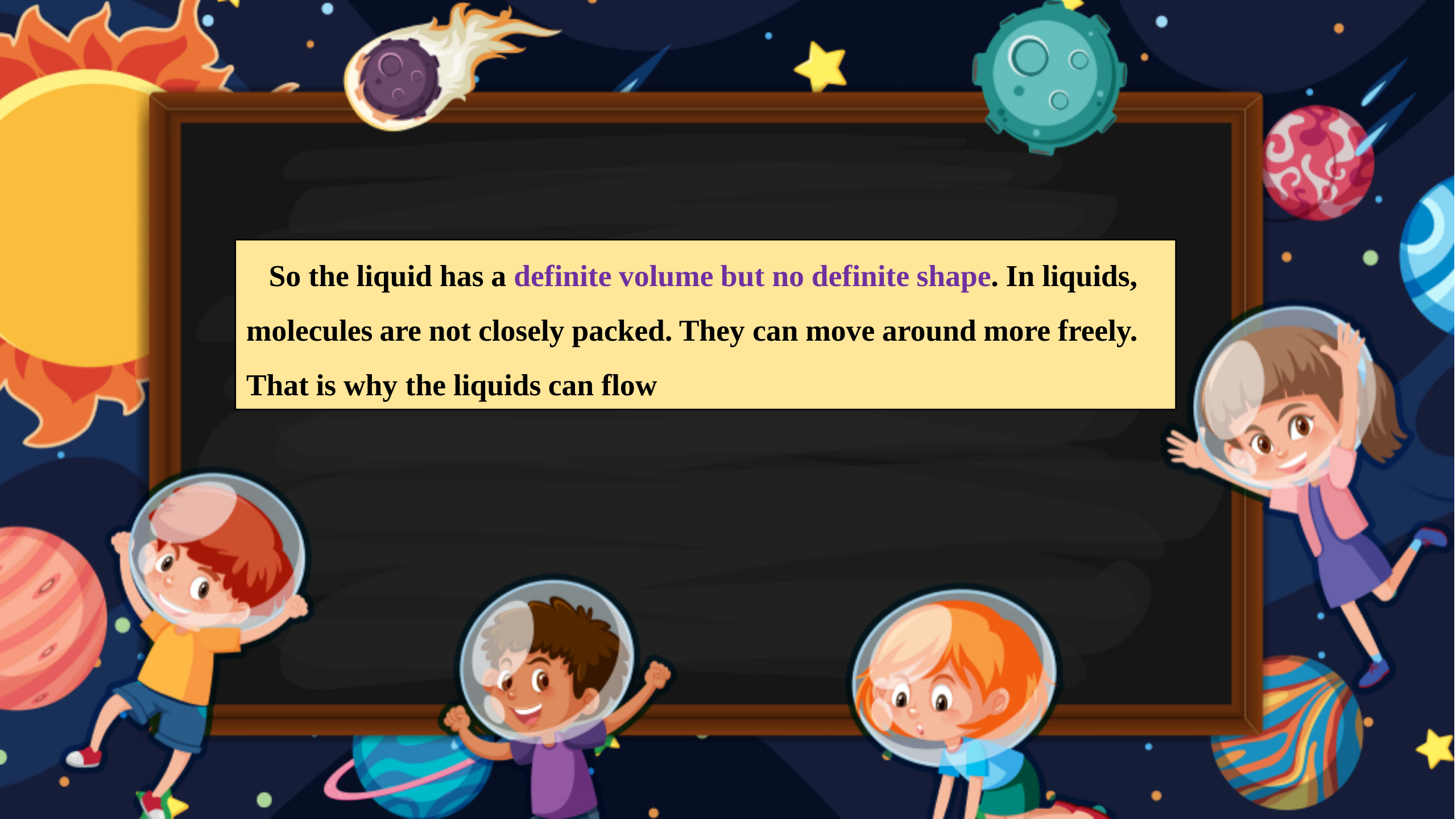
Solid

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

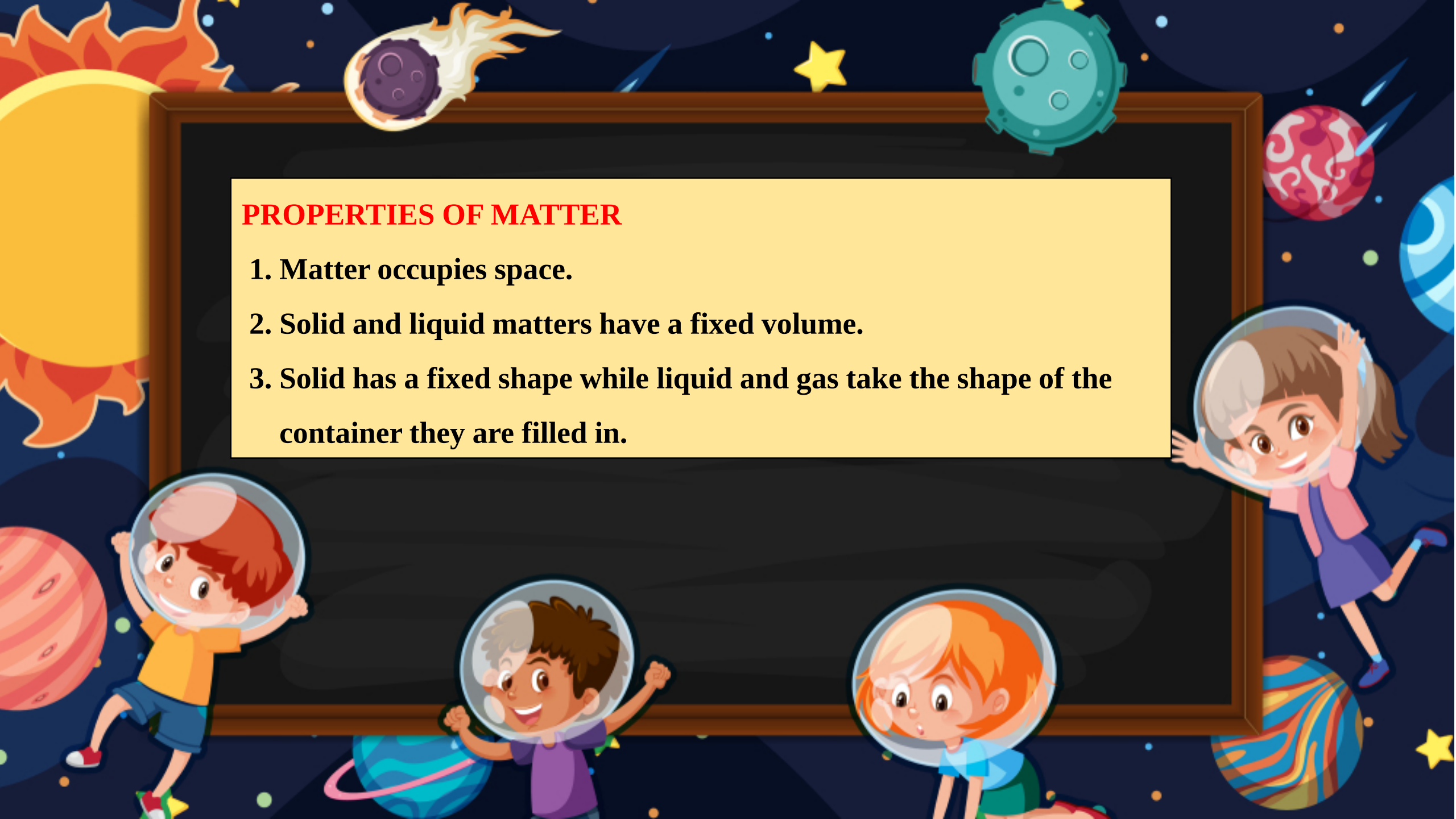
Water and milk are the liquids. We cannot pick them up with our hands. They flow if we pour them on the floor. What is the shape of the liquid? Pour a liquid in a container. It is the same as that of the container. Now pour it in a bowl. It will take the shape of the bowl. But the volume of liquid does not change as per the container.

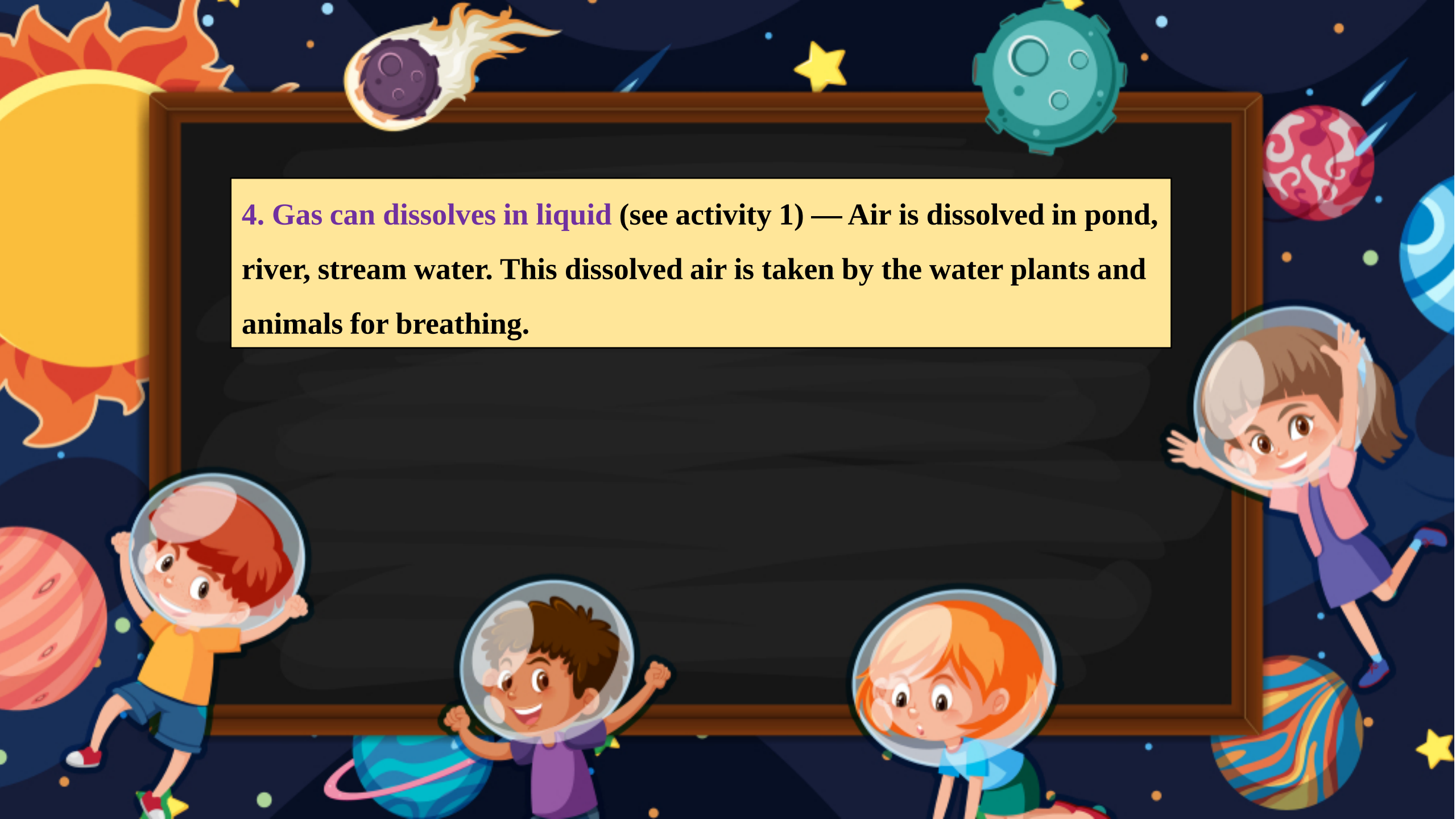

So the liquid has a definite volume but no definite shape. In liquids, molecules are not closely packed. They can move around more freely. That is why the liquids can flow

Gas

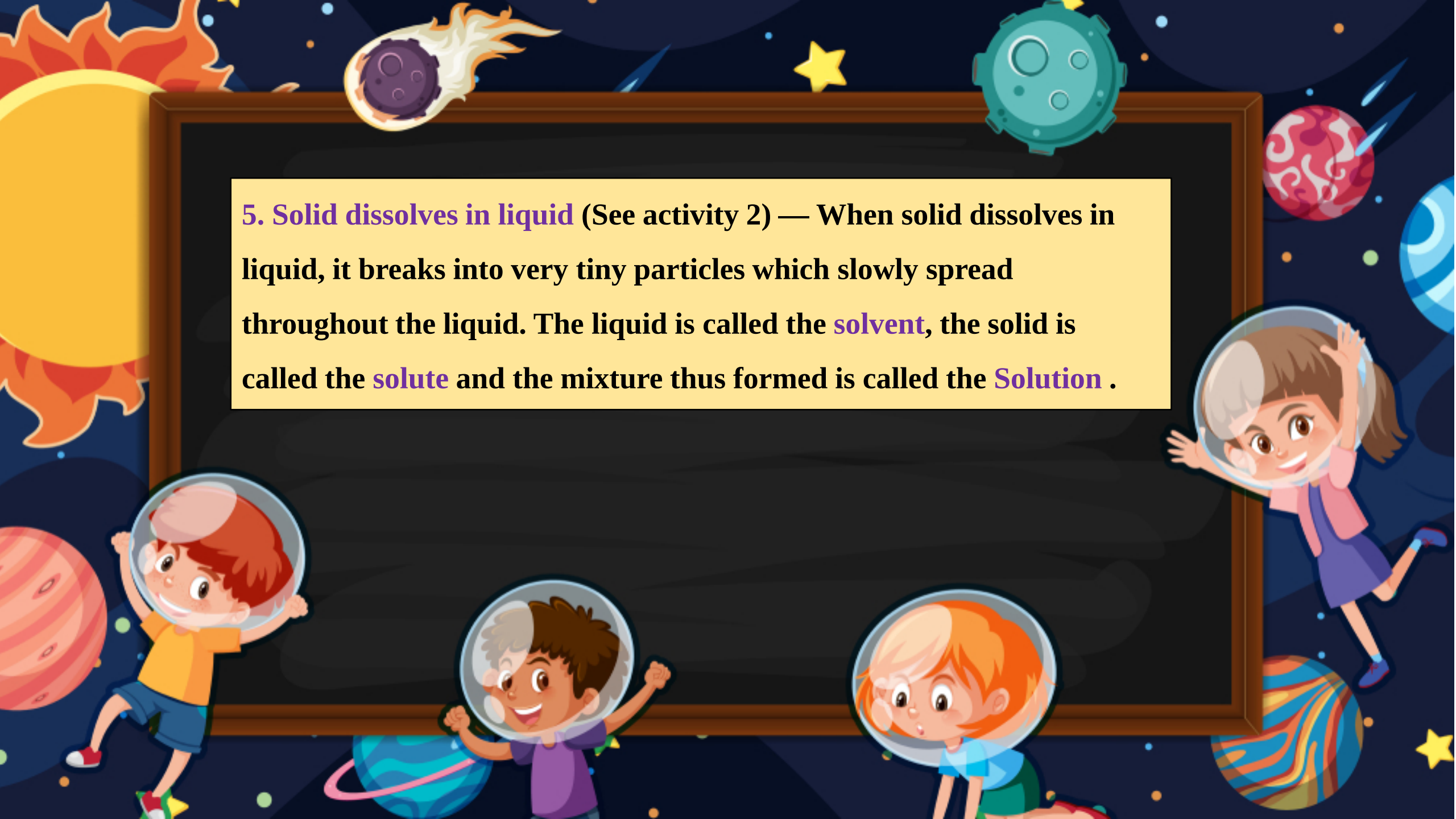
Air is a gas. Molecules in gas are far apart from each other. They are free and move all around in the available space. When you blow air in a balloon, it is squeezed in the balloon. When you let the air out of the balloon, it spreads all over the room. It now occupies a larger space. So the gas does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

Air in Balloon


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 dissolves 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

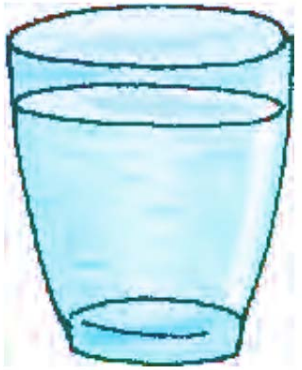
Method: Take a coke bottle. Shake it well. Now remove the cap.

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.



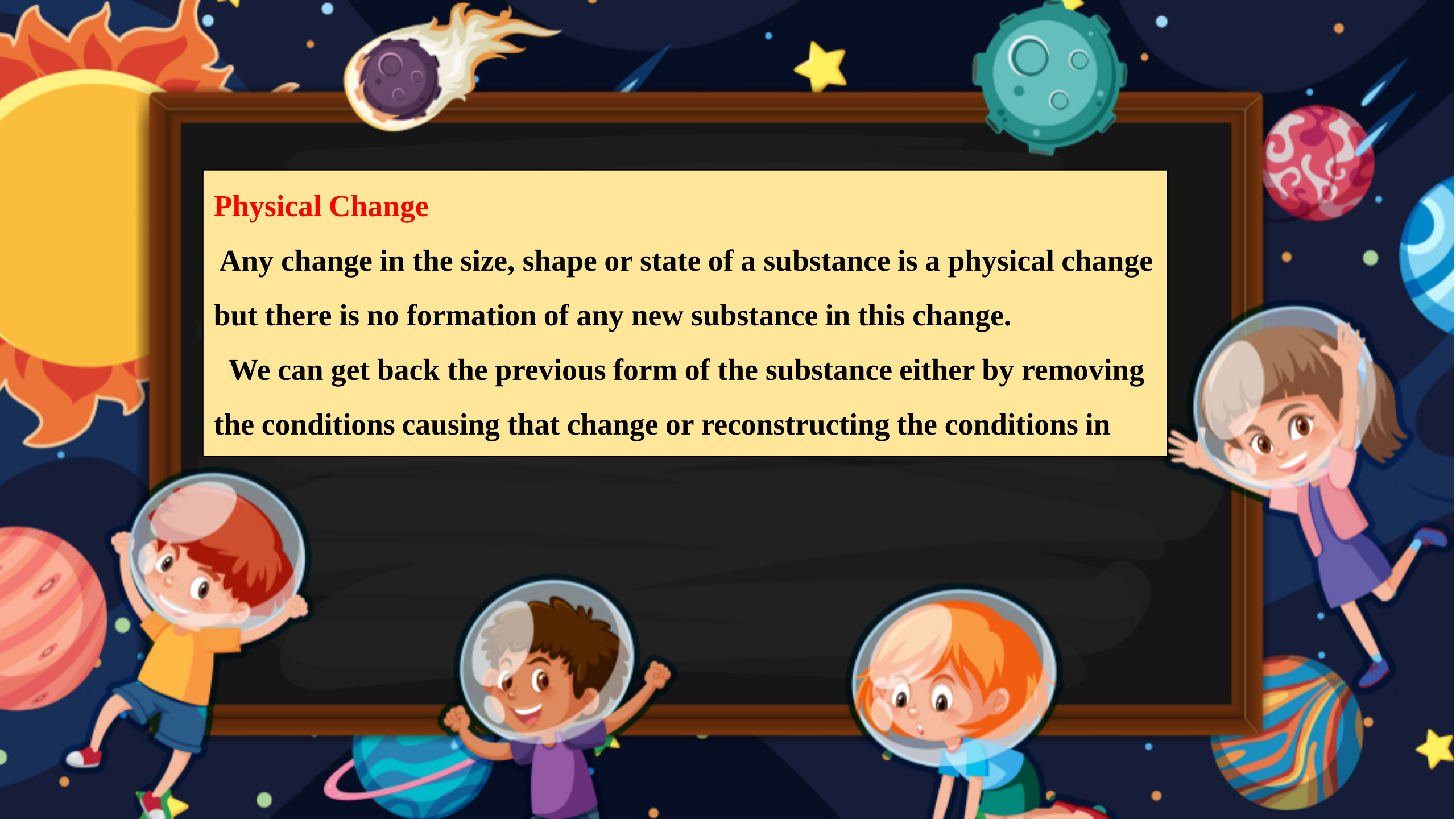
Sugar water solution


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.

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.

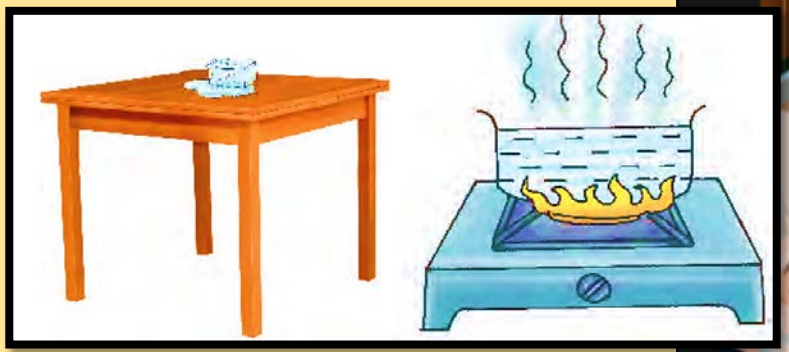
We can get back the previous form of the substance either by removing the conditions causing that change or reconstructing the conditions in



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.



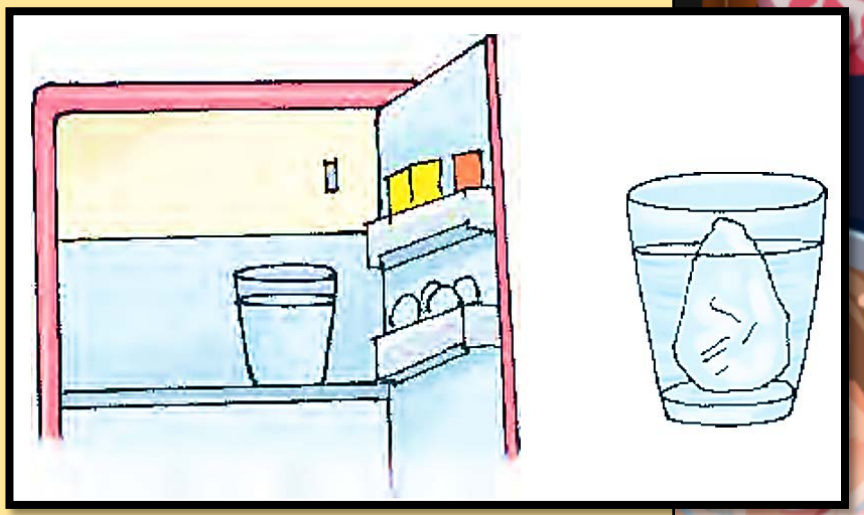
Thus a solid becomes liquid. A liquid becomes gas on heating. On cooling, the opposite changes occur. When water is cooled, it changes to ice.

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.

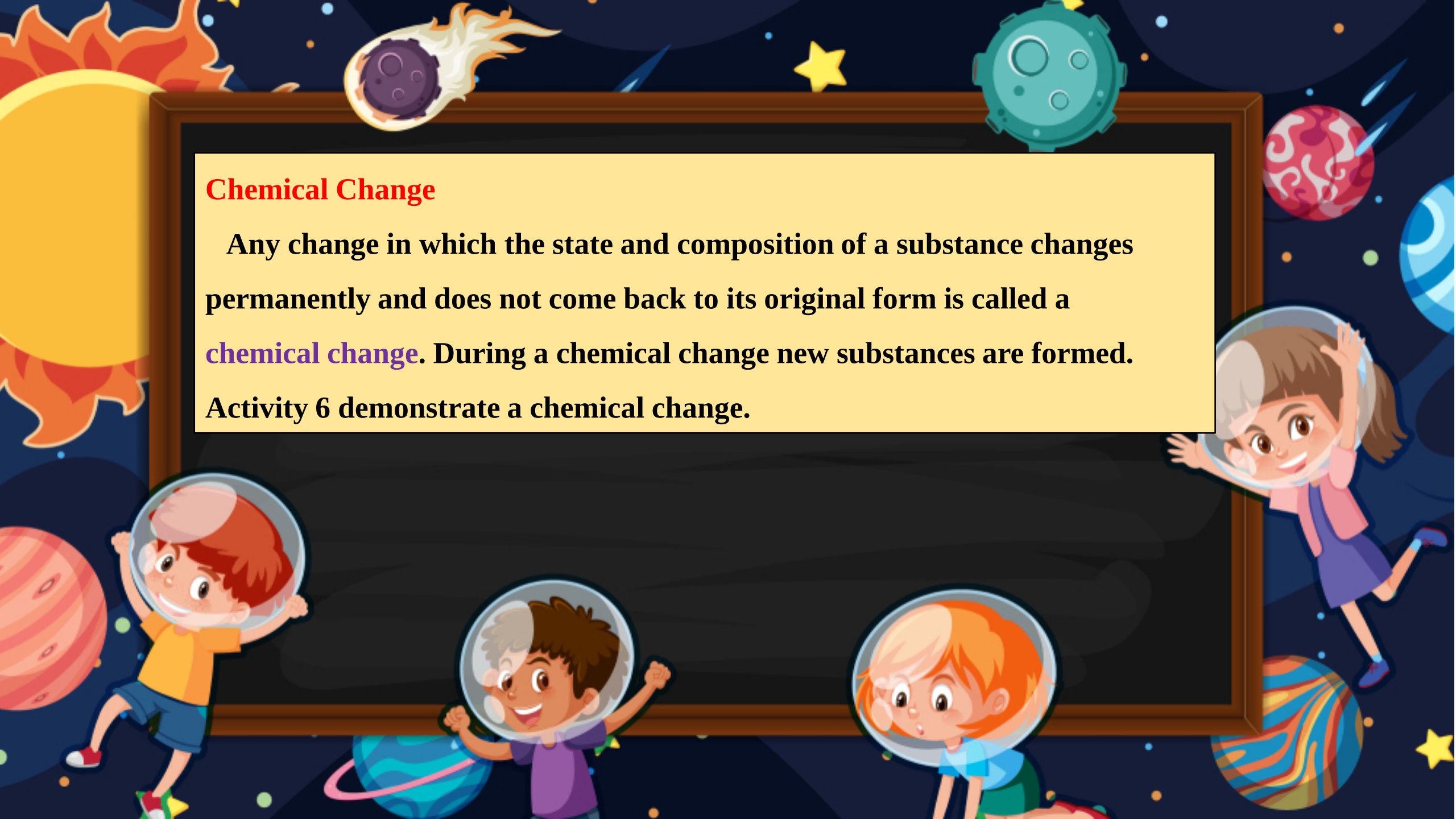
Take some water in a glass and keep it into a refrigerator. Water changes into ice. Now keep this glass containing ice in open for sometime. The ice changes back into water.

There is change only in the physical form of the substance. No new substance is formed.

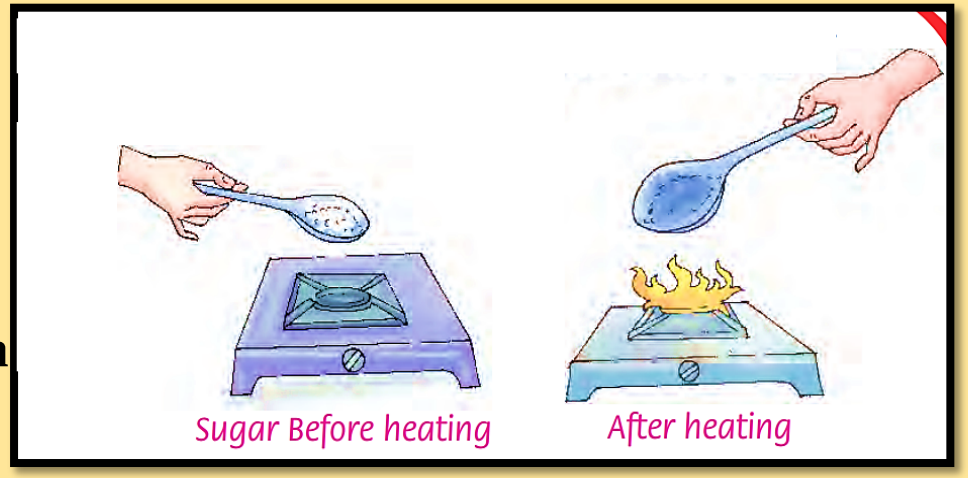


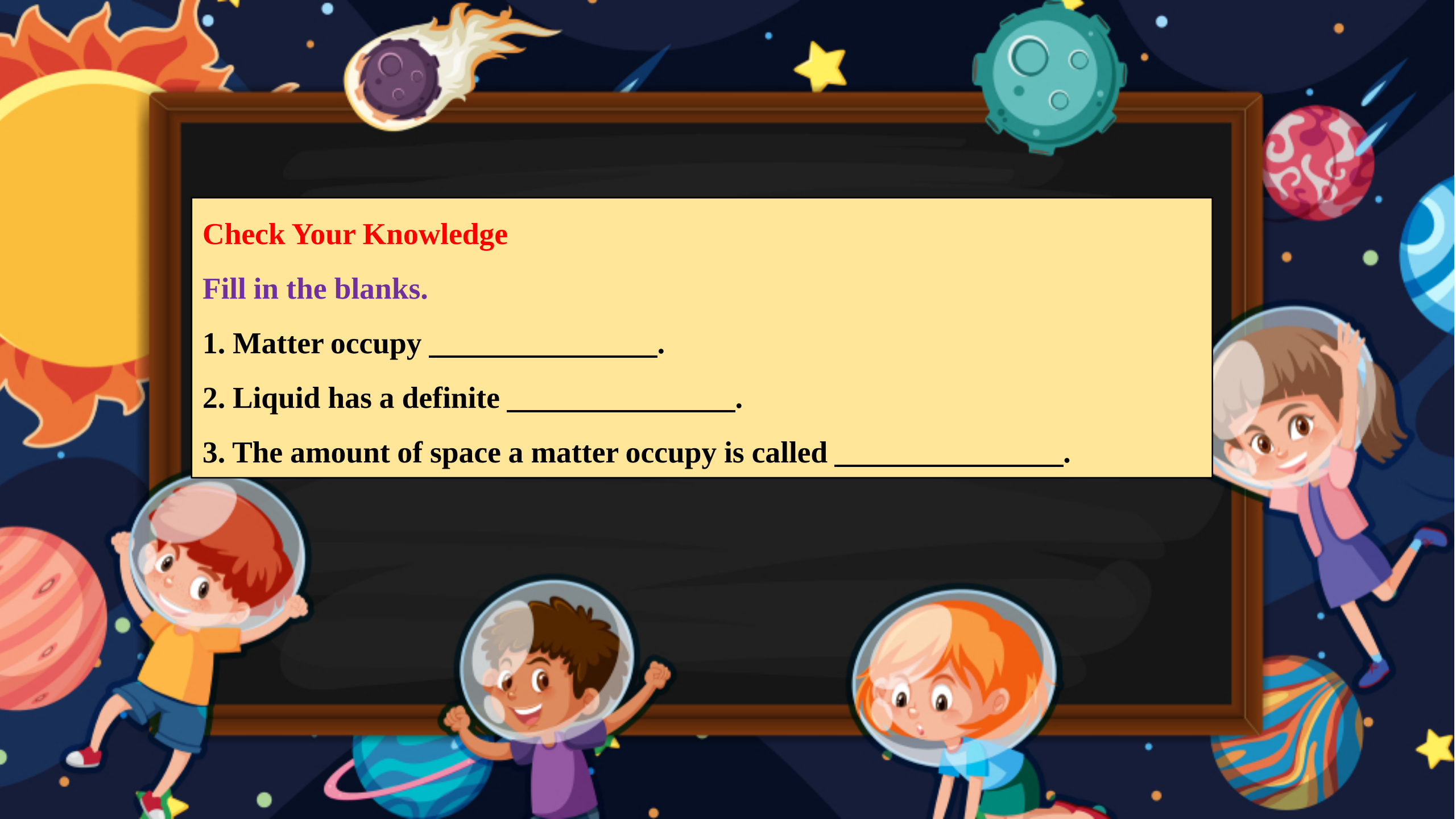
Chemical Change

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 _____.

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.

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!