



Solid and Liquid Matter

Slow Solids and Lively Liquids

Did you know that molecules are in motion? They do not just rest quietly but are always moving around. Remember, matter is made of molecules. Just how much molecules move depends on the amount of energy they have. The more energy they have, the more they move around. This idea of molecules moving around is very important in explaining the difference between solids and liquids. Do you know the difference between a solid and a liquid? A liquid can be poured from one container to another, but you can't pour a solid. Let us look in more detail at the difference between a solid and a liquid.

Solids

Any kind of matter that has definite shape is a solid. Definite shape means that the shape doesn't change. Pretend that you are holding a piece of copper. It has a definite shape and can be made into a coin. This coin, we know as the penny. When you put it a coin purse, it still keeps its shape. Another important characteristic of solids is that they have definite volume. Volume is the amount of space something occupies or how much space there is inside of something. Let's think about a brick – the kind you might find in a building or a sidewalk. We can measure its length (say, 7 inches); we can measure its height (say, 2 inches); and we can measure its width (say, 3 inches). If we know the dimensions of an object, we can easily calculate its volume.

$$\text{VOLUME} = \text{LENGTH} \times \text{WIDTH} \times \text{HEIGHT}$$

$$7 \text{ in.} \times 2 \text{ in.} \times 3 \text{ in.}$$

$$42 \text{ cubic inches}$$

The volume of the brick is 42 cubic inches.

Solids are characterized by their definite shape and definite volume. Just remember that even if something is solid and keeps its shape, the molecules that it is made of are still moving, even if they are only moving a little.

Liquids

We said that the molecules in all matter move around. In solids they move very little, and that explains why the solid has a definite shape. For liquids the molecules move much faster because they have more energy. This is why liquids don't have a definite shape, but instead have an indefinite shape. This means that the liquids can take on different shapes depending on the shape of the container. Liquids do have a definite volume, and the volume can be measured. Let's look at liquid water. If we put some water into a measuring cup, we are able to look at the marks on the side of the cup and read the volume. This reading represents the exact (or pretty close) volume of the liquid water. The volume is definite. On the other hand, the shape is not definite. Let's say the volume of water is measured at exactly 8 ounces. While in the measuring cup, the water takes on the shape of the measuring cup. If we pour the water from the cup into a bowl, the water takes on the shape of the bowl. If we put the 8 ounces of water in a flower vase, the water takes the shape of the vase. Even though the shape changes, the amount of liquid obviously stays the same. The water can take on different shapes. Liquids have definite volume, but indefinite shape.