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FREE LEARNING NOTES FOR ZAMBIA

GRADE 4 · TERM 3

Science

# Materials and Energy

Lesson notes for learners · Competence-Based Curriculum

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Materials are all around us in the environment. In this note you will learn what matter is, the three states of matter, and how materials are used. You will also meet the topics that follow: metals and non-metals, measuring matter, air, simple machines, communication devices and light energy.

**AFTER THESE NOTES YOU SHOULD BE ABLE TO**

- Say what matter is and name the three states
- Name changes of state: melting, freezing and evaporation
- Explain soluble and insoluble, solution and mixture
- Name common materials and say how they are used

**KEY WORDS**

| | |
|---|---|
| **Matter** | Anything that has mass and takes up space. A stone, water and air are all matter. |
| **Mass** | How heavy something is, measured in grams or kilograms. |
| **Volume** | How much space something takes up. |
| **Solid** | A state of matter with a fixed shape and size, such as a stone, a desk or a book. |
| **Liquid** | A state of matter with a fixed volume but no fixed shape. It takes the shape of its container, like water. |
| **Gas** | A state of matter with no fixed shape and no fixed volume, like air or steam. |
| **Soluble** | Able to dissolve in a liquid, like sugar in water. |
| **Insoluble** | Does not dissolve in a liquid, like sand in water. |

## 1 Matter and its states

Matter is anything that has mass and takes up space. Mass tells how heavy something is. Volume tells how much space it takes up.

Matter has three states. A solid has a fixed shape and size. A liquid has a fixed volume but takes the shape of its container. A gas has no fixed shape and no fixed volume, and it spreads to fill all the space.

Matter can change state. Melting is the change from solid to liquid when heated. Freezing is the change from liquid to solid when cooled. Evaporation is the change from liquid to gas, often when heated or left open.

| State | Shape | Example |
|---|---|---|
| Solid | Fixed shape and size | Stone, desk, book |
| Liquid | Takes the shape of its container | Water, cooking oil |
| Gas | No fixed shape or volume | Air, steam |

**Figure 1.** The three states of matter

## 2 Dissolving and mixing

A substance that can dissolve in a liquid is soluble, like sugar in water. A substance that does not dissolve is insoluble, like sand in water.

A solution is a mixture where a solid dissolves completely in a liquid, such as salt in water. A mixture is two or more substances mixed together but not joined permanently, for example sand and stones, or salt and water.

## 3 Materials and their uses

A material is the substance something is made from, like wood, metal or plastic. Metal is a hard, shiny material like iron or copper, used for tools and buildings. Timber is wood from trees used for making furniture, houses and tools. Plastic is a man-made material that can be shaped in many ways. A non-metal is a material that is not metal, such as wood, plastic, rubber and ceramics.

Materials help us with housing, tools, clothes and transport. Mining is digging into the earth to get minerals and metals. Fossil fuels such as coal, oil and gas formed from dead plants and animals over many years.

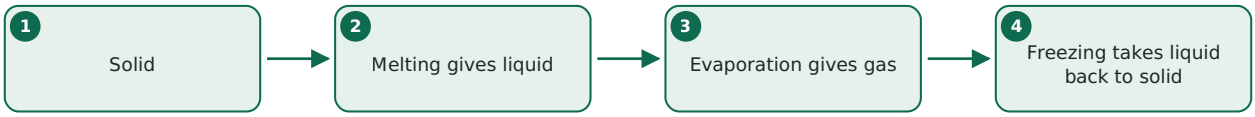



**Figure 2.** Changes of state

**TRY THIS**

Find a stone, some water and the air in a bottle. Say which is a solid, a liquid and a gas. Then stir sugar and sand in separate cups of water and tell a friend which is soluble.

**REMEMBER**

- Matter has mass and takes up space
- The three states are solid, liquid and gas
- Melting, freezing and evaporation are changes of state
- Soluble things dissolve and insoluble things do not
- Materials such as metal, timber and plastic are used for housing, tools, clothes and transport

## ? Check yourself

1. What is matter.
2. Name the three states of matter.
3. What is evaporation.
4. What does insoluble mean.
5. Mulenga is helping his mother cook at home in the evening. She stirs sugar into a cup of water and puts sand into another cup of water. (a) Which is soluble. (b) Which is insoluble. (c) What is the sugar and water mixture called.
6. Chanda leaves a puddle of water in the school yard and after a hot afternoon it is gone. Her teacher asks what happened. (a) What state was the water. (b) What state did it change to. (c) What is this change called.

**ANSWERS**

1. Anything that has mass and takes up space.
2. Solid, liquid and gas.
3. The change from liquid to gas.
4. It does not dissolve in a liquid.
5. (a) Sugar. (b) Sand. (c) A solution.
6. (a) Liquid. (b) Gas. (c) Evaporation.

Written by 25Schools to follow the Grade 4 Science syllabus of the Zambian competence-based curriculum. Free for learners to read, download and share. More notes and quizzes at 25schools.com.