Materials and Energy

Lesson plan and teacher's notes · Grade 4 Science · 2 periods of 40 minutes

School	(write school name)	**Teacher**	(write name)
Date	(date)	**Class**	Grade 4
Subject	Science	**Enrolment**	Boys ___ Girls ___ Total ___
Time	80 minutes	**Topic**	Materials and Energy

An overview of Grade 4 Term 3 Materials and Energy. Learners meet matter, its states and changes of state, soluble and insoluble substances, and common materials and their uses, and learn which sub-topics follow. Two periods of 40 minutes.

Specific outcomes

By the end of the lesson, learners should be able to:

1. Define matter, mass and volume
2. Name the three states of matter with examples
3. Describe melting, freezing and evaporation
4. Distinguish soluble from insoluble and name common materials and their uses

Prior knowledge

- Learners know common objects such as stones, water and air
- Learners have used sugar and salt in water at home

Teaching and learning materials

- A stone, a book, a cup of water, cooking oil
- A bottle of air, a balloon
- Sugar, salt, sand and cups
- Samples of wood, metal, plastic and rubber
- Manila paper and markers

References

Ministry of Education (CDC) Grade 4 Science syllabus and module; 25Schools learners' note: Materials and Energy.

Lesson development

Stage and time	Teacher activities	Learner activities
Period 1 Matter and states 20 min	Show a stone, water and an air-filled balloon. Explain matter as anything with mass that takes up space. Sort the examples into solid, liquid and gas and say how each behaves in a container.	Sort objects into solid, liquid and gas.
Period 1 Changes of state 20 min	Use melting, freezing and evaporation with everyday examples. Learners draw the changes in order and name each one.	Draw and name changes of state.
Period 2 Soluble and insoluble 20 min	Stir sugar, salt and sand in separate cups of water. Learners record which dissolve and use the words soluble, insoluble, solution and mixture.	Test and record what dissolves.
Period 2 Materials and uses 20 min	Show wood, metal, plastic and rubber. Learners say what each is used for in housing, tools, clothes and transport. Name the sub-topics that follow: metals and non-metals, measuring matter, air, simple machines, communication devices and light energy.	Match materials to uses.

Teacher's content notes

Read these before the lesson. They are what you need to know, not what to copy onto the board.

Matter

Matter is anything that has mass and takes up space. It has three states: solid, liquid and gas. Changes of state are melting, freezing and evaporation.

Dissolving

Soluble substances dissolve in a liquid. Insoluble substances do not. A solution is a solid dissolved completely in a liquid. A mixture is substances mixed but not joined permanently.

Materials

Materials such as metal, timber, plastic, cellulose and ceramics are used for housing, tools, clothes and transport. The topic also covers measuring matter, air, simple machines, communication devices and light energy.

Questions to ask during the lesson

Question	Expected answer

The teacher holds up a stone, a cup of water and a balloon filled with air in the classroom. (a) Which has a fixed shape. (b) Which takes the shape of the cup. (c) Which spreads to fill all the space.	(a) The stone. (b) The water. (c) The air.
The teacher asks about an ice block that Mulenga left in the sun outside his house and which turned to water. (a) What state was it. (b) What state did it become. (c) What is the change called.	(a) Solid. (b) Liquid. (c) Melting.
The teacher asks about a mother at a village home who stirs salt into water for cooking. (a) Is salt soluble. (b) What do we call the mixture. (c) What would happen with sand.	(a) Yes. (b) A solution. (c) It would not dissolve.

Worked examples for the board

Sorting states

Step 1: Take an object, such as a book. Step 2: Ask if it has a fixed shape. Step 3: It has, so it is a solid.

Testing dissolving

Step 1: Put sugar in water and stir. Step 2: Look to see if it disappears. Step 3: It dissolves, so it is soluble.

Board plan

Write the title Materials and Energy. Draw the table of three states with an example of each.

State	Example
Solid	Stone
Liquid	Water
Gas	Air

The finished board

Mistakes to expect

Learners often think	Put it right
Air is not matter because we cannot see it.	Show that air takes up space by filling a balloon, so air is matter.
Sand dissolves in water like sugar.	Stir both in water and show that sand stays separate, so it is insoluble.

Differentiation

Learners who struggle

Use real objects and teach only the three states first.

Learners who finish early

Ask learners to list five materials at home and group them as metal or non-metal.

Hearing or visual impairment

Let learners touch and handle materials. Pair learners who find reading hard with a helper and use pictures.

No projector, no printing

Use stones, water, a plastic bag of air, salt and sand from home.

If time is short

Keep the three states and soluble versus insoluble. Move the materials activity to the next lesson.

Evaluation

Question or task	A correct answer shows
The teacher puts a stone, a cup of water and a balloon of air on the desk and asks Bupe to explain them. (a) Which is a solid. (b) Which is a liquid. (c) Which is a gas.	(a) Stone. (b) Water. (c) Air.
Mwamba stirs sugar in one cup and sand in another cup of water at home. (a) Which dissolves. (b) What is that called. (c) What is the other called.	(a) Sugar. (b) Soluble. (c) Insoluble.

Homework

Njavwa looks around her home for materials. (a) Name one thing made of metal. (b) Name one thing made of wood. (c) Name one thing made of plastic and say its use.

Extra practice with answers

Question	Answer
1. Chanda finds water in a cup, a desk and air in a bottle at school. (a) Which is solid. (b) Which is liquid. (c) Which is gas.	(a) Desk. (b) Water. (c) Air.
2. Bwalya puts water in a freezer at home and it becomes ice. (a) What was the starting state. (b) What state did it become. (c) What is the change called.	(a) Liquid. (b) Solid. (c) Freezing.
3. A teacher shows Banji a pile of sand and stones mixed together at school. (a) What do we call this. (b) Are the two joined permanently. (c) Name another mixture.	(a) A mixture. (b) No. (c) Salt and water.
4. Mulenga's family builds a house using timber, metal and plastic items for their new home. (a) Which is wood from trees. (b) Which is hard and shiny. (c) Which is man-made.	(a) Timber. (b) Metal. (c) Plastic.

Answers to the learners' check-yourself questions

1. What is matter.
   Anything that has mass and takes up space.
2. Name the three states of matter.
   Solid, liquid and gas.
3. What is evaporation.
   The change from liquid to gas.
4. What does insoluble mean.
   It does not dissolve in a liquid.
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.
   (a) Sugar. (b) Sand. (c) A solution.
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.
   (a) Liquid. (b) Gas. (c) Evaporation.

Teacher's reflection

What went well:

What I will change next time:

Learners who need follow-up: