Soluble and insoluble materials

Lesson plan and teacher's notes · Grade 2 Science · 1 period of 40 minutes

School	(write school name)	**Teacher**	(write name)
Date	(date)	**Class**	Grade 2
Subject	Science	**Enrolment**	Boys ___ Girls ___ Total ___
Time	40 minutes	**Topic**	Soluble and insoluble materials

Learners predict, then mix sugar, salt, chalk and sand with water, observe what dissolves, learn the words soluble, insoluble and dissolve, and sort materials into two groups. One period of 40 minutes.

Specific outcomes

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

1. Predict what happens when materials are put in water
2. Say which materials are soluble and which are insoluble
3. Use the words soluble, insoluble and dissolve

Prior knowledge

- Learners know sugar, salt, chalk and sand
- Learners can stir and observe
- Learners can work in groups

Teaching and learning materials

- Four containers or cups per group labelled A, B, C and D
- Water, sugar, salt, chalk and sand
- Spoons for stirring
- Picture cards of soluble and insoluble materials
- Worksheet with a table to complete

References

Ministry of Education (CDC) Grade 2 Science syllabus and module; 25Schools learners' note: Soluble and insoluble materials.

Lesson development

Stage and time	Teacher activities	Learner activities
Hook and predictions 8 min	Ask: What happens when we put materials in water. What would happen if we put salt in a cup of water. Show sugar, chalk, sand and salt. Write the learners' predictions on the board.	Predict and share.
Mixing experiment 14 min	Give each group four labelled containers and the four materials. Ask them to half fill each container with water. Add a spoon of one material to each container, one at a time. Stir and observe. Ask: What did you put in the container. What happened after you stirred. Who predicted correctly.	Mix, stir and observe.
Key terms and grouping 12 min	Build on learners' ideas and introduce soluble, insoluble and dissolve. Ask them to group the materials. Say that sugar, salt and soda dissolve in water and are soluble. Say that chalk and sand do not dissolve and are insoluble. Clear the misconception that dissolving is the same as melting.	Group materials and use the new words.
Assessment and conclusion 6 min	Give picture cards for learners to sort into soluble and insoluble. Give the worksheet. Summarise the lesson.	Sort cards and complete the worksheet.

Teacher's content notes

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

Key terms

Materials that dissolve in water are soluble. Materials that do not dissolve are insoluble. Dissolve means to mix completely with water.

Examples

Sugar, soda and salt are soluble. Chalk and sand are insoluble. Learners can test more materials such as soda, rice and chalk. Soda means sodium bicarbonate.

The experiment

Do the experiment one material at a time. Learners predict, stir, observe and check their predictions.

Misconception

Dissolving is not the same as melting.

Questions to ask during the lesson

Question	Expected answer
A group puts salt in a cup of water and stirs it. The teacher asks the group to describe what happens. (a) What do they see. (b) Is salt soluble or insoluble. (c) Name another soluble material.	(a) The salt disappears. (b) Soluble. (c) Sugar or soda.
A boy puts sand in water and stirs for a long time. The sand stays at the bottom. His teacher asks about it. (a) Does sand dissolve. (b) Is it soluble or insoluble. (c) Name another insoluble material.	(a) No. (b) Insoluble. (c) Chalk.
The teacher asks the class to predict what will happen to chalk in water before the experiment. A girl says it will disappear. (a) What do they do first. (b) How do they check. (c) Who is right after stirring.	(a) Write predictions. (b) Stir and observe. (c) Those who said it stays.

Worked examples for the board

Testing a material

Step 1: Half fill a cup with water. Step 2: Add one spoon of sugar. Step 3: Stir and watch. Step 4: The sugar disappears, so it is soluble.

Grouping

Step 1: List sugar, chalk, sand and salt. Step 2: Mark the ones that dissolved. Step 3: Write sugar and salt under soluble. Step 4: Write chalk and sand under insoluble.

Board plan

Write the title and the three words dissolve, soluble, insoluble. Draw two columns: soluble (sugar, salt, soda) and insoluble (chalk, sand).

Soluble in water	Insoluble in water
Sugar	Chalk
Salt	Sand
Soda	

The finished board

Mistakes to expect

Learners often think	Put it right
Dissolving is the same as melting.	Show sugar mixing in water and ice melting in the sun. Explain that melting is a solid turning to liquid and dissolving is a material mixing with water.
Sugar has gone for ever when it disappears.	Explain that the sugar is still in the water but is mixed in and cannot be seen.

All white powders dissolve.	Put chalk and salt in water side by side. Let learners see that chalk stays and salt dissolves.

Differentiation

Learners who struggle

Use only two materials: salt and sand. Let learners stir each and point to the one that disappears.

Learners who finish early

Ask learners to test rice and soda at home or at school and say whether each is soluble or insoluble.

Hearing or visual impairment

For learners with a visual impairment, let them stir, feel the grains before and after, and describe what they sense. For learners with a hearing impairment, face them, show each step and write the three words on the board.

No projector, no printing

Use cups or cut plastic bottles, a teaspoon, salt and sugar from the kitchen, and sand from the yard. Use a piece of chalk crushed into a powder.

If time is short

Keep the predictions, the mixing experiment and the grouping. Move the picture cards and worksheet to the next lesson.

Evaluation

Question or task	A correct answer shows
The teacher gives picture cards showing sugar, sand, salt and chalk in water. Learners sort them. (a) Which cards go in the soluble group. (b) Which go in the insoluble group. (c) Explain one choice.	(a) Sugar and salt. (b) Sand and chalk. (c) Soluble materials dissolve in water, insoluble ones do not.
Bwalya stirs a spoon of salt into a cup of water and a spoon of sand into another cup. His friend watches. (a) Which material disappears. (b) Which is insoluble. (c) What word describes salt mixing with water.	(a) The salt. (b) The sand. (c) Dissolve.

Homework

Thandiwe has a cup of water, a spoon of sugar and a stone at home. She stirs the sugar in one cup and puts the stone in another cup. Her mother asks what happens. (a) Which one dissolves. (b) Which one is insoluble. (c) Is dissolving the same as melting.

Extra practice with answers

Question	Answer

1. Mulenga puts salt, sand, sugar and chalk in four cups of water and stirs each. He lists what happened. (a) Which two disappear. (b) Which two stay. (c) What do we call materials that disappear in water.	(a) Salt and sugar. (b) Sand and chalk. (c) Soluble.
2. A teacher says that melting and dissolving are the same. A learner puts ice in the sun and sugar in water to compare. (a) What happens to the ice. (b) What happens to the sugar. (c) Are they the same.	(a) It melts. (b) It dissolves in the water. (c) No.
3. Njavwa wants to test soda and rice at school. She uses two cups of water and one spoon of each. (a) What does she do after adding. (b) What does she watch for. (c) Which should be added one at a time.	(a) Stir. (b) Whether it disappears. (c) The materials.
4. The class has picture cards showing chalk in water, salt in water and sand in water. The teacher asks learners to sort them. (a) Which card shows a soluble material. (b) Which show insoluble materials. (c) How do you know.	(a) Salt. (b) Chalk and sand. (c) Salt dissolves and the others do not.

Answers to the learners' check-yourself questions

1. What does soluble mean.
   It dissolves in water.
2. Name one insoluble material.
   Chalk or sand.
3. Name one soluble material.
   Sugar, salt or soda.
4. Is dissolving the same as melting.
   No.
5. Mwamba stirs a spoon of salt in a cup of water and a spoon of sand in another cup. His teacher asks what he sees. (a) Which one disappears. (b) Which one stays. (c) Which one is insoluble.
   (a) The salt. (b) The sand. (c) The sand.
6. Chanda puts sugar, chalk, salt and sand in four containers of water and stirs each. She groups the materials for her class. (a) Which two are soluble. (b) Which two are insoluble. (c) What word means the sugar mixes with the water.
   (a) Sugar and salt. (b) Chalk and sand. (c) Dissolves.

Teacher's reflection

What went well:

What I will change next time:

Learners who need follow-up: