# Exploring Mixtures

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

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| **School** | (write school name) | **Teacher** | (write name) |
| **Date** | (date) | **Class** | Grade 1 |
| **Subject** | Science | **Enrolment** | Boys ___ Girls ___ Total ___ |
| **Time** | 80 minutes | **Topic** | Exploring Mixtures |

Learners make and sort mixtures, add numbers up to 100 without carrying, take away tens and two-digit numbers without regrouping, and sort household waste safely. It is a long topic made of three parts and may be taught over several periods; this guide gives two periods with the parts in order.

## Specific outcomes

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

1. Make a mixture from two things and say what it is made of
2. Sort a mixture by colour, size or kind and explain how
3. Add two numbers up to 100 without carrying using bundles and sticks
4. Take away tens and take away a two-digit number without regrouping
5. Sort household waste into groups and say why chemical waste must not be touched without a grown-up

## Prior knowledge

- Learners know ten as a bundle and ones as loose sticks
- Learners can count to 100 in tens
- Learners know the words clean, dirty and dangerous

## Teaching and learning materials

- Chalk and board
- Sand, rice, beans, maize, salt, sugar and water in small containers
- Sticks and string or rubber bands for bundles
- A number line from 0 to 40 drawn on the floor or ground
- Clean empty plastic bottles, paper, peels, bins and gloves; a chart of warning signs, if available

## References

Ministry of Education (CDC) Grade 1 Science syllabus and module; 25Schools learners' note: Exploring Mixtures.

## Lesson development

| Stage and time | Teacher activities | Learner activities |
|---|---|---|
| **Introduction: mixing things 8 min** | Show sand, rice, beans, water, sugar and salt. Ask: Which of these can be mixed. Let learners pick two things and mix them. Ask: Why did you choose these two. What mixture have you made. Say that soil, a salad and salt water are mixtures. | Choose two things, mix them and tell the class what they made. |
| **Sorting mixtures 12 min** | Give each group a mixture of beans of different colours or maize of different sizes. Ask them to sort it by colour, texture or size and to explain how they sorted. Ask learners to name other mixtures they have seen at home. | Sort the mixture and explain their reasoning. |
| **Adding with bundles and sticks 20 min** | Read a word problem twice: Sililo has 26 guavas and Mutinta gives her 13 more. Ask: What is given. What are you asked to do. Write 26 + 13. Draw a frame with tens and ones on the floor. Let two learners show 26 and 13 with bundles and sticks. Add the loose sticks first, 6 and 3 make 9. Then add the bundles, 2 and 1 make 3. The answer is 39. | Act out the problem, add the ones then the tens and write 39. |
| **Taking away tens 20 min** | Read: A farmer has 30 chickens and 10 are sold. Write 30 - 10. Give each group 3 bundles and ask them to take one away and count what is left. Then draw 3 bundles and cross out one. Use the floor number line: stand at 30 and jump back 10 to land on 20. Do 50 - 20 and 90 - 40 by thinking 5 - 2 and 9 - 4. | Take away bundles, jump back on the number line and say the answers. |
| **Taking away two-digit numbers 8 min** | Read: A farmer has 64 cows and 22 are sold. Write 64 - 22. Draw a place value chart with 64 above 22. Take away the ones first, 4 - 2 = 2. Then take away the tens, 6 - 2 = 4. The answer is 42. | Use bundles and sticks to take away and write 42. |
| **Waste from home 12 min** | Show plastic bottles, paper and peels. Let learners say which are domestic waste. Show gloves, a broom and a dust pan and how to use them. Show bins labelled plastic, paper and general waste. Ask why we use different bins. Sort items into poisonous, non-poisonous, useful and not useful. Explain that empty pesticide and insecticide bottles must never be touched without a grown-up and show a warning sign chart. | Sort the waste, practise putting it in the right bin and match warning signs to items. |

## Teacher's content notes

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

### Mixtures

A mixture is formed when two or more things are put together. Learners make mixtures from sand, rice, beans, water, sugar, salt and maize, and sort them by colour, texture or size. Soil, waste, salads and salt water are mixtures from the surroundings.

### Addition without carrying

Use bundles and sticks. Add the loose sticks first, then the bundles. For 26 + 13: 6 + 3 = 9 ones and 2 + 1 = 3 tens, so 39. This does not need carrying because the ones total is less than 10.

### Subtraction of tens and two-digit numbers

Take away bundles of ten from a number of bundles. For tens, use patterns: 3 - 1 = 2, so 30 - 10 = 20 and 8 - 3 = 5, so 80 - 30 = 50. On the 100 square chart, moving up one row takes away 10. For 64 - 22, take away the ones, 4 - 2 = 2, then the tens, 6 - 2 = 4, giving 42. No regrouping is needed.

### Domestic waste and chemical safety

Domestic waste includes plastic bottles, paper, empty detergent containers and peels. Use different bins and sort waste into poisonous, non-poisonous, useful and not useful. Glass and chemicals can harm people. Empty pesticide bottles must never be touched without an adult. Keep chemicals away from children.

## Questions to ask during the lesson

| Question | Expected answer |
|---|---|
| Two girls mix salt with water in a cup at school. One girl says she made a mixture. The other says she only has salt. (a) Who is right. (b) Name the two things in the mixture. (c) Name one other mixture at home. | (a) The first girl. (b) Salt and water. (c) Any, such as a salad, soil, or beans and maize. |
| A boy has 41 stones. His friend gives him 23 more. (a) Write the addition sentence. (b) Add the ones. (c) Say how many stones the boy has now. | (a) 41 + 23. (b) 1 + 3 = 4. (c) 64. |
| A mother finds a plastic bottle, a banana peel and an empty bottle of weed killer in the yard. She tells her child to help. (a) Which one must the child not touch. (b) Who must pick it up. (c) What sorting group is it in. | (a) The weed killer bottle. (b) A grown-up. (c) Poisonous. |

## Worked examples for the board

### 26 + 13 with bundles and sticks

Step 1: Show 26 as 2 bundles and 6 sticks. Step 2: Show 13 as 1 bundle and 3 sticks. Step 3: Add the loose sticks first: 6 + 3 = 9. Step 4: Add the bundles: 2 + 1 = 3. Step 5: Write 3 tens and 9 ones, which is 39.

### 64 - 22 with a place value chart

Step 1: Write 64 above 22 in a chart with tens and ones. Step 2: Take away the ones: 4 - 2 = 2. Step 3: Take away the tens: 6 - 2 = 4. Step 4: Write 4 tens and 2 ones, which is 42.

## Board plan

Left: a mixture web with soil, salad, salt water and beans and maize. Middle: the place value frame with 26 + 13 = 39 and 64 - 22 = 42. Right: four waste groups and the warning to never touch chemical waste without a grown-up.

| Problem | Tens | Ones | Answer |
|---|---|---|---|
| 26 + 13 | 2 + 1 = 3 | 6 + 3 = 9 | 39 |
| 30 - 10 | 3 - 1 = 2 | 0 | 20 |
| 64 - 22 | 6 - 2 = 4 | 4 - 2 = 2 | 42 |

The finished board: adding and taking away

## Mistakes to expect

| Learners often think | Put it right |
|---|---|
| A mixture is only something we drink. | Show soil, a salad, salt water and a bowl of beans and maize. A mixture is any two or more things put together. |
| Add the tens first. | The Ministry rule is to add the loose sticks first, then the bundles. Repeat the rule every time. |
| Empty containers of chemicals are safe to play with. | Say clearly that children never touch chemical containers or pesticide bottles. Only a grown-up handles them. |

## Differentiation

### Learners who struggle

Use real bundles and sticks until learners can do the sum without them. Practise one step at a time: first ones, then tens. Use small numbers such as 12 + 13 before 26 + 13.

### Learners who finish early

Give extra problems such as 35 + 24 and 87 - 10 on the 100 square chart. Ask learners to make up their own word problems with Zambian items such as mangoes, chickens or maize.

### Hearing or visual impairment

For learners with a visual impairment, use bundles and sticks they can count by touch, and keep the number line as a rope with knots every ten. For learners with a hearing impairment, face them, write each sentence on the board and show the bundles as you say each number.

### No projector, no printing

Use sticks, stones, bottle tops and grass for bundles. Draw the tens and ones frame, the number line and the 100 square chart on the ground with a stick. Use any safe food or soil from home for mixtures.

### If time is short

Keep the bundle and sticks addition and take away work. Move the mixture sorting and the waste sorting to the next period, and give the safety message about chemical bottles in every case.

## Evaluation

| Question or task | A correct answer shows |
|---|---|
| Mwamba has 32 maize cobs and his sister gives him 14 more. (a) Write the addition sentence. (b) Add the ones first and say the answer. (c) How many cobs does Mwamba have now. | (a) 32 + 14. (b) 2 + 4 = 6. (c) 46. Learners add the ones, then the tens. |
| A mother finds an empty bottle of insecticide and a plastic bottle near the garden. Her young son wants to pick them up. (a) Which bottle is dangerous. (b) Who should pick it up. (c) What should he do with the plastic bottle. | (a) The insecticide bottle. (b) A grown-up. (c) Put it in the right bin, using gloves or a dust pan. |

### Homework

At home you have salt and water, and some maize and beans. (a) Make a mixture from two of them and say what it is. (b) You have 15 beans and your friend gives you 12 more. Write 15 + 12 and the answer. (c) Name one waste at home that you must not touch without a grown-up.

## Extra practice with answers

| Question | Answer |
|---|---|
| 1. A farmer has 50 goats. He sells 20 of them. (a) Write the take away sentence. (b) Use the pattern 5 - 2. What is it. (c) How many goats are left. | (a) 50 - 20. (b) 3. (c) 30. |
| 2. At the market a woman has 45 oranges. She gets 33 more from her farm. (a) Write the addition sentence. (b) What do you get when you add the ones. (c) How many oranges does she have now. | (a) 45 + 33. (b) 5 + 3 = 8. (c) 78. |
| 3. A shop has 87 notebooks. It sells 10 of them. (a) Write the take away sentence. (b) On a 100 square chart, how many rows do you move up. (c) How many are left. | (a) 87 - 10. (b) One row. (c) 77. |

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|---|---|
| 4. A class makes a mixture of red beans and white beans and sorts them. They get 24 red beans and 15 white beans. (a) How did they sort the mixture. (b) Write the addition sentence for all the beans. (c) How many beans are there. | (a) By colour. (b) 24 + 15. (c) 39. |

## Answers to the learners' check-yourself questions

1. Name two mixtures you can find around you.
   **Any two of: soil, salad, salt water, beans and maize.**
2. What is 30 - 10.
   **20.**
3. Why must children not touch an empty insecticide bottle.
   **It can harm them. Only a grown-up should handle it.**
4. Write one way to sort a mixture of beans.
   **By colour or by size.**
5. Chanda has 24 mangoes. Her aunt gives her 15 more. (a) Write the addition sentence. (b) Add the ones first. What do you get. (c) How many mangoes does Chanda have now.
   **(a) 24 + 15. (b) 4 + 5 = 9. (c) 39 mangoes, because 2 tens + 1 ten = 3 tens, and 3 tens and 9 ones is 39.**
6. A shop keeper has 64 bottles of cooking oil. He sells 22 of them. (a) Write the take away sentence. (b) Take away the ones. What do you get. (c) How many bottles are left.
   **(a) 64 - 22. (b) 4 - 2 = 2. (c) 42 bottles, because 6 tens - 2 tens = 4 tens, and 4 tens and 2 ones is 42.**

## Teacher's reflection

What went well:

What I will change next time:

Learners who need follow-up: