BOTTLES AND CAPACITY

You will need some water and a collection of jars and bottles of different sizes and shapes like those in the picture, or a mixture of jars or bottles and paper cups of different shapes and sizes.

Which holds the most?

Which holds the least?

How could you find out? Explore

Put your containers in order from smallest capacity to largest capacity.

Can you find a way of counting how many times each of the other containers will fill the smallest container?

You could create your own questions for yourself or friends to answer.

HELP

Start with just 2 containers and explore the question of how many of the smaller container it would take to fill the larger one. If possible, test this practically using water or sand.

Compare the capacities of other containers 2 at a time and try to put all of them in order from smallest to largest.

NEXT

This activity has been all about comparing the capacities of various containers and estimating how much bigger one container is compared to another. Choose the largest and smallest of your collection of bottles. Predict what level a liquid would come up to in the larger vessel when it's poured from the smaller one. Then check to see how accurate your estimate was.

The NEXT activity takes you into the measurement of capacity. If you have an empty plastic bottle in your kitchen (for example a bottle for milk), that has the capacity in litres stated on the label, then mark lines on it to represent 1 litre, 500 millilitres and every 100 millilitres from 100 millilitres to 1 litre. By pouring water from other containers check the accuracy of your markings.

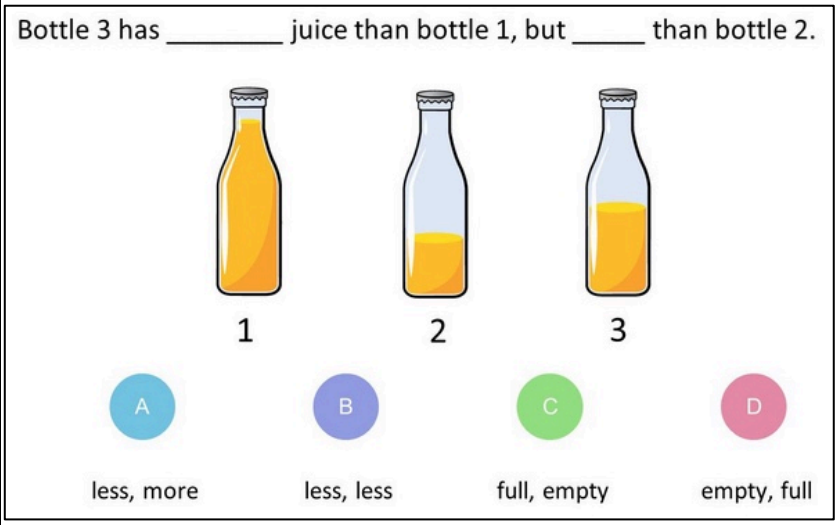
Use your home-made measuring bottle to measure the capacities of all your jars and bottles in litres or millilitres. If you have a measuring jug then use it for checking.

NOTES FOR TEACHERS

Diagnostic Assessment This should take about 5–10 minutes.

Write the question on the board, say to the class:

"Put up 1 finger if you think the answer is A, 2 fingers for B, 3 fingers for C and 4 fingers for D".



1.Notice how the learners respond. Ask a learner who gave answer A to explain why he or she gave that answer and DO NOT say whether it is right or wrong but simply thank the learner for the answer.
2. It is important for learners to explain the reasons for their answers to help them to develop communication skills and perhaps to sort out their own thinking in order to give an explanation.

3.Then do the same for answers B, C and D. Try to make sure that learners listen to these reasons and try to decide if their own answer was right or wrong.
4. Ask the class to vote again for the right answer by putting up 1, 2, 3 or 4 fingers. Notice if there is a change and who gave right and wrong answers.

A. is the correct answer.

B, C & D. Learners will find this quite easy and it gives an opportunity for developing the language 'more (or greater) than', 'equal to' and less than', 'full', 'empty', and perhaps introducing the symbols > and <. https://diagnosticquestions.com

Why do this activity?

This activity is useful for young learners to start thinking about capacity and to begin to calculate in that context. It will encourage discussion between learners and between learners and the teacher. At this stage the learners are not required to measure in millilitres but merely to compare capacities.

Learning objectives

In doing this activity learners will have an experience of:

- practical **measuring of capacity and volume**: estimating, comparing, ordering and recording that will lead to the use of measuring instruments: measuring spoons, measuring cups, measuring jugs;
- calculations and problem solving in contexts involving capacity/volume.

Generic competences

In doing this activity students will have an opportunity to:

- **think flexibly**, be creative and innovative and apply knowledge and skills;
- **visualize and estimate quantities** and check estimates;
- **develop practical skills.**

Suggestions for teaching

Start with the diagnostic quiz as a warm-up to this topic.

You could ask learners to bring empty bottles and containers that would otherwise be thrown away at home. Some discussion could be had by looking at the bottles in the picture. You could take in some water and conduct this class as a demonstration. But it would be very much better for the learners to have a variety of bottles or jars to talk about and to explore the capacities practically for themselves.

If you have a sink in your classroom, or if you can make some sand available, then it would be ideal if the learners could be given the opportunity to work on this activity in pairs or small groups.

Teachers should give the learners plenty of time to discuss how the capacities compare and then how they could explore the capacities further, before testing this out and discussing the findings.

You might ask some learners to help you in the demonstration of how to find the answers to the questions posed. Encourage them to ask other questions and together find the answers.

Key questions

- Tell me about your ideas.
- Why do you think this?
- Why do you think that bottle is the largest? (Or why is it the smallest?)
- Why have you chosen this as the smallest container"

Follow up

Then goes on to use a measuring jug or cylinder and measure quantities of liquids (or sand) in millilitres and litres. See: 'Cups and Capacity'
https://aiminghigh.aimssec.ac.za/years-5-7-cups-and-capacity/

Go to the **AIMSSEC AIMING HIGH** website for lesson ideas, solutions and curriculum links: http://aiminghigh.aimssec.ac.za
Subscribe to the **MATHS TOYS YouTube Channel**
https://www.youtube.com/c/mathstoys
Download the whole AIMSSEC collection of resources to use offline with the **AIMSSEC App** see https://aimssec.app or find it on Google Play.

Note: The Grades or School Years specified on the AIMING HIGH Website correspond to Grades 4 to 12 in South Africa and the USA, to Years 4 to 12 in the UK and school years up to Secondary 5 in East Africa.
New material will be added for Secondary 6.
For resources for teaching A level mathematics (Years 12 and 13) see https://nrich.maths.org/12339
Mathematics taught in Year 13 (UK) & Secondary 6 (East Africa) is beyond the SA CAPS curriculum for Grade 12

	Lower Primary Approx. Age 5 to 8	Upper Primary Age 8 to 11	Lower Secondary Age 11 to 15	Upper Secondary Age 15+
South Africa	Grades R and 1 to 3	Grades 4 to 6	Grades 7 to 9	Grades 10 to 12
East Africa	Nursery and Primary 1 to 3	Primary 4 to 6	Secondary 1 to 3	Secondary 4 to 6
USA	Kindergarten and G1 to 3	Grades 4 to 6	Grades 7 to 9	Grades 10 to 12
UK	Reception and Years 1 to 3	Years 4 to 6	Years 7 to 9	Years 10 to 13