

Introduction to volume in elementary grades

Activities based on how a student can easily understand use volume (liters and milliliters), using materials which they use in real life

Learning Outcomes:

The students will be able to

- Estimate the capacity of a container and verify by measuring.
- Understand the units of volume.

TLMs used:

- Paper cups of different sizes
- Empty bottles of different capacities (labelled & non-labelled)
- A Jug and a mug
- A large cup labelled as grams

Before beginning the session, the TLMs mentioned above were displayed in the classroom. Students were asked if they had any idea about the topic of discussion. Children gave responses indicating they are going to see something related to bottles, cups and water. They were given an introduction to the lesson on Jugs and Mugs. A question was posed to them about the difference between jugs and mugs. Students responded that mugs are used for bathing and jugs are used for drinking water while some said that both were the same.

To avoid confusion, a jug and a mug were shown and students were asked – “Which one is a jug and which one is a mug?” The students were then able to grasp the difference between a jug and a mug.

Introducing the unit - ‘litres’

Students were allowed to examine the containers. They observed that some bottles were labelled according to the capacity of liquid it could hold while the others were unmarked. One of the containers was a chocolate container that appeared like a large cup and was labelled in grams instead of litres. A student raised a query on why that container is marked in grams and not litres. In response to that query, a question was posed to the class - “What can this material hold?” The responses were - It can contain milk, water, 7up, Sprite and so on. This was followed up by an interesting question - “Can a cup hold pebbles or rocks?” The response was that it can hold pebbles or rocks but it is generally used to hold water, for drinking. When the student examined the container, he found that it was used to hold chocolates and hence it was marked in grams.

Students were asked to segregate the materials



based on whether their measure/capacity is known or unknown. They were then asked to list on paper, the measurements of their capacities in ascending order. Later they were also asked to arrange the materials based on the capacity they could hold. Students were able to identify the measurement of capacity of the known materials (in litres) and could write them in ascending order, but there was confusion in the arrangement because of the 'height' factor of the containers, i.e. students had arranged the materials in ascending order based on the height of the container. They were not able to recognize the fact that the volume of a container is also dependent on the width of the material. To provide clarity on this, students were asked to compare two materials – a thin container with a greater height and a wider container whose height is a little less than the thin container. Students were then able to identify the material with greater capacity. Now, when they were asked to arrange the containers in the ascending order of their capacity, they were able to arrange them correctly.



the difference. They responded that there are gaps in between when stones are dropped and in the case of water there are no gaps. They were then asked if all stones are identical and have the same size, to which the students answered in the negative.

When they were asked which is the best material – 'Stones or water' for measuring the capacity of the container, students had different responses initially and then came to the conclusion that water should be used to measure capacity as it can occupy the whole space of the container without gaps.

Students were then asked - "There is water in this container, can you tell its capacity?" Students started thinking. When probed further with questions like - "Why aren't you able to tell its capacity? What should you do to be able to find its capacity?"

After some thought and discussion among themselves, students came up with the response that if they pour water using a smaller cup of known capacity, multiple times, they will be able to find the measure of the unknown volume of the container. They started pouring water using



Measuring the volume of containers whose capacity is unknown

What will happen when we drop stones into the container and what will happen when water is poured into it? After asking this question, the action was demonstrated and students observed

the smaller cup of known capacity and counted the number of times this was repeated. With the available data of the volume of the smaller cup and the number of times this process was repeated, students were asked about which operation should be performed to find the

volume – Addition or Subtraction? Students came up with the answer that repeated addition has to be performed as they could visually see the raising water level each time. They also added that subtraction is to be done only when some quantity of water is removed.



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