

Vision Empower & XRCVC
Teacher Instruction KIT
Measurement of Volume

Syllabus: Karnataka State Board

Subject: Mathematics II

Grade: 4

Textbook Name: Mathematics II Text cum Workbook

Chapter Number & Name: 13, Measurement of Volume

1. OVERVIEW

1.1 OBJECTIVE AND PREREQUISITES

Objective

Students will be able to:

- identify the capacity of the given container.
- relative litre to millilitre, know the relationship between litres and millilitre.
- add and subtract the given volume.
- estimate the volume and then verify the accurate volume by measuring.

Prerequisite Concept

- Importance of having units to measure.
- *None*

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*Kindly Note: Activities marked with * are mandatory*

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2. LEARN

2.1 KEY POINTS

- Volume: Volume is defined as the amount of space taken up by an object. And the units to measure the volume of liquids are litre and millilitre.

2.2 LEARN MORE

3. ENGAGE

3.1 INTEREST GENERATION ACTIVITY

Activity 1: Volume

Materials Required: Small jar, pebbles and box.

Prerequisites: None

Activity Flow

- Ask the following question to the children.
 - What does it mean for something to be big?
 - The answer is, big things can hold a lot of stuff.
- Divide the students into a group of four.
- Distribute two different size containers?
- Ask them which container can hold more pebbles? Let them guess.
- Ask them to fill the container with pebbles.
- Explain to them that the container holding more pebbles is bigger than the other one.

- *Now ask them to count the number of pebbles in each container then ask them to tell which one is bigger.*
- *Explain, the amount of pebbles held by the container is called the volume of that container.*
- *Now ask the number of pebbles in container 1 and container 2.*

3.2 CONCEPT INTRODUCTION ACTIVITIES

CONCEPT OF VOLUME

Activity 2: Know the concept of volume and how to measure

Materials Required: Thread, ping pong ball with a hole in the middle, 1000 ml measuring jar with tactile markings.

Prerequisites: None

Activity Flow

- *Explain to the students, in the olden days they had different sizes of jars and pots to measure oil, milk etc. Now, we have a standard way of measuring liquid items such as oil, milk, ghee etc.*
- *What is volume?*
Is volume termed as capacities of containers?
- *As we know that in the olden days, they used to use different sizes and shapes of containers to measure. So, the volume also varied accordingly.*
For example: There are four measuring cylinders with a capacity of 5, 10, 15 and 20 readings respectively but the water is filled till the reading 5.
- *Here we can observe that the capacity of each cylinder is different but the amount of water is the same in all the cylinders. This amount is called volume.*
- *Volume represents the amount of a liquid or how much space the liquid takes up in a container. Hence, there is a difference between capacity and volume.*
- *Capacity: Capacity is the amount of space of a container for holding a liquid.*
- *Volume: Volume is the amount of space the liquid takes in a container.*
Example:
 - *There is 2 litres water bottle having only one litre of water in it.*
 - *Here in this example, we can observe that the capacity of the water bottle is 2 litres but the volume of water in the bottle is 1 litre.*

To measure volume:

- *Give them the 1000 millilitres jug having tactile readings. The reading of 1000 ml starts from the bottom to 0 ml in the top.*
- *Give them the ping pong ball and thread and ask them to tie the ball with thread. Then*

fill the jug completely so that the ball should float on the top then follow the thread till the bottom of the jug and cut the extra thread. So, we have a thread tied to a ball which has a length equal to the height of a jug.

- *Now, we can observe that the tip of the thread is touching the 1000 ml reading which says that the jug has a volume of 1000 ml water.*
- *Now, empty the 100 ml of water with the help of a measuring cylinder. As soon as we empty the water from the jug the water level goes down, the ball will also go down pulling the thread upwards. We can observe that the thread points at 900 ml reading.*
- *Similarly, ask them to remove 250 ml, 500 ml and check the readings.*
- *It is very obvious that the amount of water taken out is known and we can easily calculate the amount of remaining in the jug just by subtracting with the previous reading.*
- *Try to remove some unknown quantity of water and find the amount of water remaining in the jug with the same method.*

Note: In the process of filling and taking out the water, sometimes the thread might not move easily. So just ask them to pull the thread once smoothly and leave it.

UNITS

Activity 3: Use of different units to measure the volume.

Materials Required: None

Prerequisites: None

Activity Flow

The standard unit for measuring volume is Litre. The symbol l is used for litres and ml for millilitre.

1 litre = 1000 ml

$\frac{1}{2}$ litre = 500 ml

$\frac{1}{4}$ litre = 250 ml

$\frac{3}{4}$ litre = 750 ml

- *We measure everything that is liquid in Liter. If the amount is too small, we use millilitre.*
- *For example, we buy milk in litres. Pharmaceutical products like Tonic, Syrup are measured in millilitres.*
- *The word millilitre means one-thousandth of a litre.*

- Ask the students to give examples of what are the things we measured in litres and millilitres.

LITRE TO MILLILITRE

Activity 4: Relative litre to millilitre, know the relationship between litres and millilitre.

Materials Required: None

Prerequisites: None

Activity Flow

- Whenever we require items in small quantities we measure it in grams rather than kg.
- Similarly, whenever we want liquid items in small quantities we measure it using millilitre.

To convert litre into millilitre:

- 1 litre = 1000 millilitre. Using this relation, it is possible to convert litres to millilitre.

Examples:

- Convert 7 litres to millilitre.
 - $7 \text{ l} = 7 \times 1000 = 7000 \text{ ml}$
- Convert 5 litres 35 ml to millilitre.
 - $5 \text{ l } 35 \text{ ml} = 5 \times 1000 + 35 = 5000 + 35 = 5035 \text{ ml}$

Note: To convert litre to millilitre multiply by 1000.

To convert millilitre to litre:

1000 millilitres = 1 litre.

Examples:

- Convert 9000 millilitres to litre.
 - $9000 \text{ ml} = 9000 / 1000 = 9 \text{ l}$
- Convert 8520 millilitres to litre.
 - $8520 \text{ ml} = 8000 / 1000 + 520 \text{ ml} = 8 \text{ l} + 520 \text{ ml}$

Note: To convert millilitre to litre divide by 1000

ADDITION AND SUBTRACTION

Activity 4: Add and subtract the given volume.

Materials Required: None

Prerequisites: Addition and Subtraction

Activity Flow

Note: For prerequisites refer to TIK_MATH_G3_CH3_Addition, TIK_MATH_G3_CH4_Subtraction.

Addition of volume:

- Use the following examples to explain the addition of volume to the students.

Example 1:

- Vijay has 4 buckets of capacities, 10 l, 12 l 50 ml, 34 l and 13 l 40 ml. How much water can be stored in the four containers?

$$10\text{ l} + 12\text{ l} + 34\text{ l} + 13\text{ l} + 50\text{ ml} + 40\text{ ml} =$$

- Answer: $(10\text{ l} + 12\text{ l} + 34\text{ l} + 13\text{ l}) + (50\text{ ml} + 40\text{ ml}) = 69\text{ l } 90\text{ ml}$

- Note: Adding the liters together and the milliliters together.

● Example 2:

- A shopkeeper sold 14 l, 270 ml of groundnut oil, 11 l 500 ml of coconut oil and 1 l of castor oil. How many litres of oil did he sell altogether?
- Answer: Groundnut oil = 14 l 270 ml
- Coconut oil = 11 l 500 ml
- Castor oil = 1 l 120 ml.
- Total litres = 26 l 890 ml

Subtraction of Volume:

- Use the following examples to explain the subtraction of volume to the students.

Example 1:

- In a 750 ml of cold drink bottle, only 250 ml of cold drink is left. How much cold drink is consumed?
- Answer: Amount of cold drink consumed = $750\text{ ml} - 250\text{ ml} = 500\text{ ml}$
- Kiran fills 15 l 950 ml of petrol to his car. After travelling a certain distance only 7 l 725 ml of petrol is remaining in the tank. How much petrol was used for the journey?
- Answer: Amount of petrol used for the journey = $15\text{ l } 950\text{ ml} - 7\text{ l } 725\text{ ml} = 8\text{ l } 225\text{ ml}.$

ESTIMATION

Activity 5: Estimate the volume and then verify the accurate volume by measuring.

Materials Required: None

Prerequisites: None

Activity Flow

- Ask the students to fill their water bottle with water using a glass. Before filling it, ask them how many glasses of water is required to fill the bottle?
- Do you think we can say the exact number of glasses of water? Discuss with students and ask their opinion.

- *Later, they might say, they can guess the number of glasses required. This kind of guessing or approximating the number is called estimation.*
- *Unless we use any measuring jar we cannot tell the accurate or exact number of glasses of water required to fill the bottle.*
- *Ask them if they have come across situations like this in their daily life where estimation is used and ask them to write.*

3.3 LET'S DISCUSS: RELATE TO DAILY LIFE*

- Give the following examples to the students.

Examples:

1. Milk and oil are often sold in litres.
2. We fill fuels for the vehicles in litres.
3. We buy deodorant and shampoos in millilitres.

4. EXERCISES & REINFORCEMENT

4.2 PRACTICE EXERCISES

Activity 6: Recall and Practice.

Materials Required: None

Prerequisites: Conversion of litre to millilitre and conversion of millilitre to litre.

Activity Flow

- Write the suitable unit of measurement used in the situations given below.*
 - 1) Kerosene in a drum _____
 - 2) Milk in a cup _____
 - 3) Bottle of ink _____
 - 4) Water in a bucket _____
 - 5) Syrup in a bottle _____
- Convert the following litre/measurements to millilitre.*
 - 1) 3 l = _____
 - 2) 7 l = _____
 - 3) 2 l 500 ml = _____
 - 4) 6 l 250 ml = _____
- Convert to litre.*
 - 1) 5000 ml = _____
 - 2) 9000 ml = _____

3) $6000 \text{ ml} = \underline{\hspace{2cm}}$

IV. Fill up the blanks with suitable words.

1) $7250 \text{ ml} = \underline{\hspace{1cm}} \text{ l} + \underline{\hspace{1cm}} \text{ ml}$

2) $3000 \text{ ml} = \underline{\hspace{1cm}} \text{ l} + \underline{\hspace{1cm}} \text{ ml}$

3) $7025 \text{ ml} = \underline{\hspace{1cm}} \text{ l} + \underline{\hspace{1cm}} \text{ ml}$

V. Add the following:

A. $250 \text{ ml} + 500 \text{ ml}$

B. $400 \text{ ml} + 500 \text{ ml}$

C. $125 \text{ ml} + 220 \text{ ml}$

VI. Solve these problems.

1) A milkman delivered $85 \text{ l } 250 \text{ ml}$ of milk to Dairy on Monday and $97 \text{ l } 500 \text{ ml}$ of milk on Tuesday. Find the total quantity of milk he delivered in those two days.

2) Hari has 3 buckets of capacities, 9 l , 15 l and 20 l . How much water can be stored in the three containers?

3) A ration shopkeeper has three drums of capacities 100 l , 150 l , and 50 l filled with kerosene. What is the total quantity of kerosene he has stored?

4) A shopkeeper sold 12 l of groundnut oil, 5 l of coconut oil and 2 l of gingely oil. How many litres of oil did he sell altogether?

5) Bengaluru city received rainfall of 150 ml in the month June, 320 ml in July and 240 ml in August. Find the total rainfall in these three months.

VII. Subtract the following:

1) $800 \text{ ml} - 500 \text{ ml}$

2) $500 \text{ ml} - 350 \text{ ml}$

3) $181 \text{ ml} - 81 \text{ ml}$

4) $29 \text{ l } 870 \text{ ml} - 14 \text{ l } 600 \text{ ml}$

5) $169 \text{ l } 870 \text{ ml} - 25 \text{ l } 450 \text{ ml}$

VII. Solve these problems.

1) Sarita bought 3 l of kerosene. She used 2 l of kerosene. How much quantity of kerosene remains?

2) The capacity of the milk cooker is $2 \text{ l } 500 \text{ ml}$. This contains $1 \text{ l } 200 \text{ ml}$ of milk. How much more milk can be filled in the vessel?

3) The capacity of a water tank is 500 l . The tank contains 375 l of water. How much water should be poured to fill the tank to its capacity?

4) In a 500 ml cold drink bottle only 320 ml of cold drink is left. How much cold drink is consumed?

5) Rajiv fills 12 l 800 ml of petrol to his car. After travelling a certain distance only 3l 500 ml of petrol is remaining in the tank. How much petrol was used for the journey?

4.1 IMPORTANT GUIDELINES*

Exercise Reading

It is very important that the children practice their learnings as well as their reading. Hence have the children read out the newly learned concepts from their textbooks or other available resources.

Perform Textbook Activity

It is good practice to have the children perform the textbook activities. Your textbook activities might not be accessible hence go through this resource to learn how to make textbook content accessible

Provide Homework

To evaluate their understanding and to help the student revise and implement the new learnt concept ensure to provide them with homework. Students should perform one or two of the questions mentioned above or from the textbook exercises with the teacher in Class and the remaining may be given for homework. Also, ensure that the student knows their special skills linked to independently using their accessible books as it will be critical to doing homework independently

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