

14

How Big? How Heavy?



Sarika collects things like marbles, coins, erasers etc. She takes some water in a glass and marks the level of water as '0'.



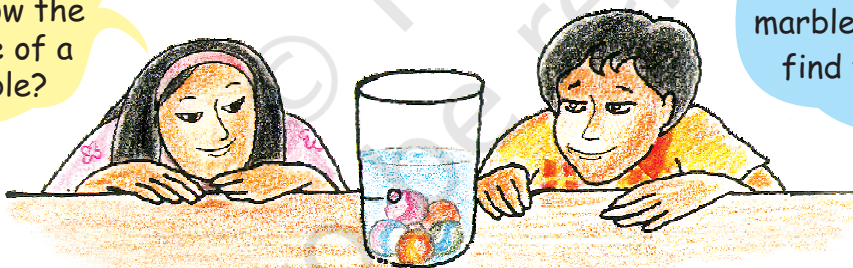
If I drop 5 marbles in this glass, can you guess what will be the level of water?



I think this much.

She drops 5 marbles in the glass. She marks the new level of water as 5 marbles.

Oh, how did you guess! Do you know the **volume** of a marble?



I just made a guess about how much water will be pushed up by the marbles. How do you find the volume?



See, each marble pushes up some water. Right? That is because it takes up some space which is its volume.

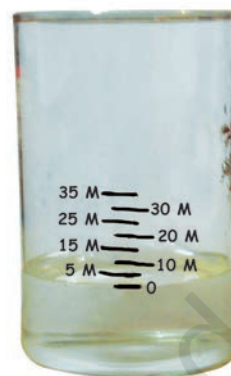
Children will need more exercises to compare the volume of solid bodies by guessing and by informal measurement (using marbles, coins, matchboxes, etc.) before they begin to use formal measures such as litres and cubic centimetres.

Your Measuring Glass

Now make a guess. Do you think the volume of 10 five-rupee coins will be more than that of 10 marbles?

Guess the volume of each of these:

- ❖ A ball is nearly _____ marbles.
- ❖ An eraser is nearly _____ marbles.
- ❖ A lemon is nearly _____ marbles.
- ❖ A pencil is nearly _____ marbles.
- ❖ A potato is nearly _____ marbles.



Now make your own measuring glass using 35 marbles.

Take a glass of water and mark the level of water as '0'. Then put in 5 marbles and mark the level of water as 5 M.

Again drop 5 marbles and mark the level of water as 10 M. Likewise make the markings for 15 M, 20 M, 25 M, 30 M and 35 M.

Now put each thing in the measuring glass and check your guess.

Try with different things like a matchbox, a stone, etc. and fill the table.

The matchbox floats. How do I find its volume?

Let's fill it with sand or nails.



Name of the thing	Its volume (nearly how many marbles?)

Children can paste a paper strip on the glass and mark the level of water using a pen or a pencil. The aim is to develop a sense of the concept of volume through examples and hands on activities without giving a definition of volume. Comparing things on the basis of volume is more abstract than comparison in terms of length or area.

Which has More Volume?

Can you tell me the volume of 6 marbles in mL?



Yes, if we make a measuring bottle.

In Class IV you made a measuring bottle for 250 mL.

Can you think of ways for making a measuring bottle which can measure 10 mL, 20 mL, 30 mL,, 60 mL? Discuss with your friend.

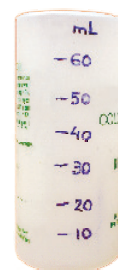
Tariq and Mollie made their measuring bottles.

Tariq had an injection. He used it to make his measuring bottle. Mollie used an empty medicine bottle.

I took 5 mL once in my injection. I filled it twice to mark 10 mL on my bottle.



I used this bottle which measures 10 mL to make my measuring bottle.



Mollie used her measuring bottle to find the volume of five-rupee coins. She found that **9 five-rupee coins push up 10 mL of water**. So you can also use 9 five-rupee coins to make your measuring bottle! Go ahead!

Use your measuring bottle to find out:

a) What is the volume of 6 marbles? _____ mL.

b) What is the volume of 16 one-rupee coins? _____ mL.

Now solve these in your mind.

c) The volume of 24 marbles is _____ mL.

d) The volume of 32 one-rupee coins? _____ mL.

e) Mollie puts some five-rupee coins in the measuring bottle.
How many coins has she put in it:

* if 30 mL water is pushed up? _____

* if 60 mL water is pushed up? _____

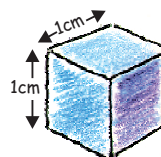
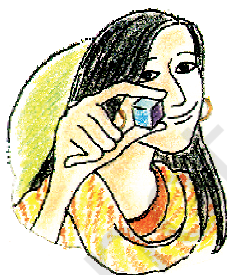
First guess and then use your measuring bottle to find out the volume in mL of some other things.

Thing	Its volume (in mL)

Guess how many litres of water your body will push up?!



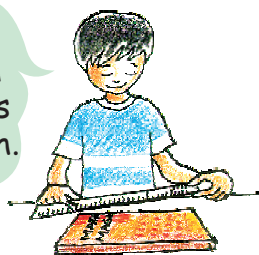
How Many Can Fit In?



This is a cube whose sides are of 1 cm each. See, your Math-Magic book is 1 cm high. So guess how many such centimetre cubes will take the same space as your Math-Magic book?

To make a measuring bottle, make children use a wide-mouthed and transparent bottle so that markings can be made easily. The activity aims to develop measurement skills in children and involves both making and handling apparatus (such as measuring bottle) in the mathematics classroom.

Hey, my Math-Magic book is about ____ cm long. So ____ cm cubes will fit along its length.



And it is about ____ cm wide. So ____ cubes will fit along the width.



So total ____ cm cubes will fit on the Math-Magic book.



* Now if all these cubes are arranged in one line then how long will that line be? ____ cm



Practice time

1. A stage (platform) is made with 5 Math-Magic books. The volume of this stage is the same as ____ cm cubes.

2. Guess the volume of these things in cm cubes.

* A matchbox is about ____ cm cubes.

* A geometry box is about ____ cm cubes.

* An eraser is about ____ cm cubes.

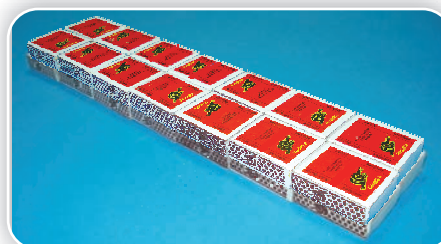


How will you check your guess? Discuss.

Matchbox Play

Tanu is making a stage with matchboxes.

She first puts 14 matchboxes like this in the first layer.



The activity 'How many can fit in' requires a sense of the size of a cm cube. For finding the volume of different shapes, the teacher can make cm cubes and use matchboxes to make different models. Tanu's stage or Mohan's model are examples where children calculate volume in terms of matchboxes, which may later be converted into cm cubes.



She makes 4 such layers and her stage looks like this.

* She used _____ matchboxes to make this stage.

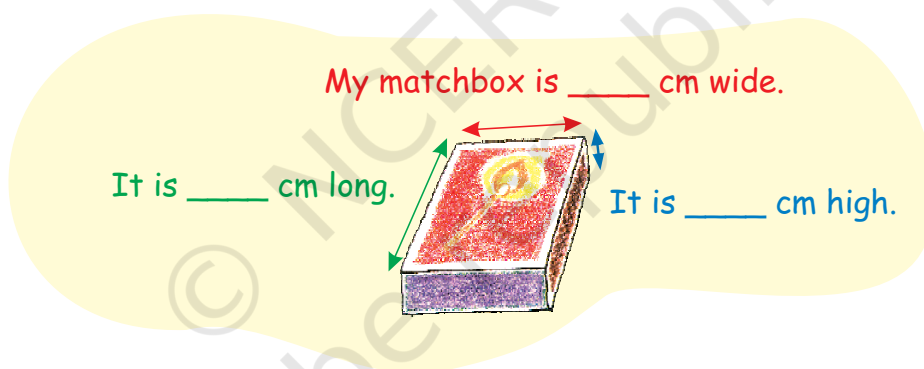


* The volume of one matchbox is the same as 10 cm cubes. Then the volume of this stage is same as _____ cm cubes.

* If all these cubes are arranged in a line, how long will that line be? _____ cm.

* Which has more volume — your Math-Magic book or Tanu's platform?

With your friends, collect many empty matchboxes of the same size. Measure the sides and write here.



* Use 56 matchboxes to make platforms of different heights. Fill this table.

	How high is it?	How long is it?	How wide is it?
Platform 1			
Platform 2			
Platform 3			

The volume of each platform is equal to _____ matchboxes.

* Make deep drawings of the platforms you have made.

Practice time

Mohan arranged his matchboxes like this.

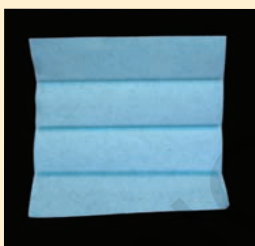
- * How many matchboxes did he use to make it? What is its volume in matchboxes? _____ matchboxes.
- * Collect empty matchboxes. Arrange them in an interesting way. Make a deep drawing of it.



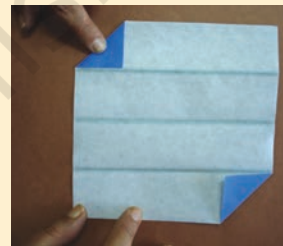
Making a Paper Cube

Aanan and his friends are making a cube with paper. They cut a sheet of paper into a square of **19.5 cm** side. They cut 6 such squares. Follow these photos to make your paper cube.

1. Fold the paper into four equal parts to make lines like this.



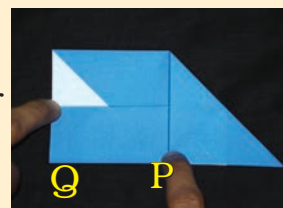
2. Fold the top **left** corner and the corner opposite to it like this.



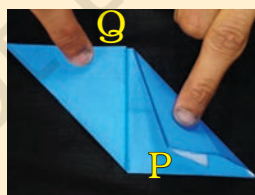
3. Fold the top and the bottom edges to meet the centre line. Now fold corner P...



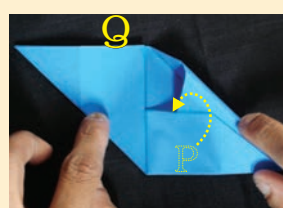
4. So that the paper looks like this.



5. Fold corner Q in the same way. The paper will look like this now.



6. Lift corner P and slip it under the folded paper like this.



Encourage children to make different shapes of the same volume using identical units, for example, bricks or matchboxes. To calculate the sides of the platform, lengths can be rounded off to the nearest centimetre.