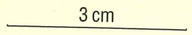
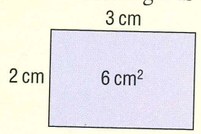
Estimating and Measuring Volume

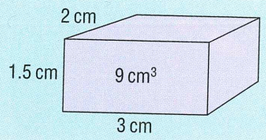
Length is the distance between 2 points.
Length has 1 dimension.
Length is measured in linear units.
The length of the line is 3 cm.



Area is the measure of a surface.
Area has 2 dimensions.
Area is measured in square units.
The area of the rectangle is 6 cm^2.

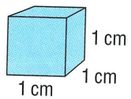


Volume is the amount of space filled by an object. Volume has 3 dimensions. Volume is measured in cubic units. The volume of the rectangular prism is 9 cm^3.



Activity ❶

A centicube has a volume of 1 cm^3. Choose the best estimate for the volume of each of the following. Explain your choice to a classmate.



a)
- 60 cm^3
- 100 cm^3
- 30 cm^3

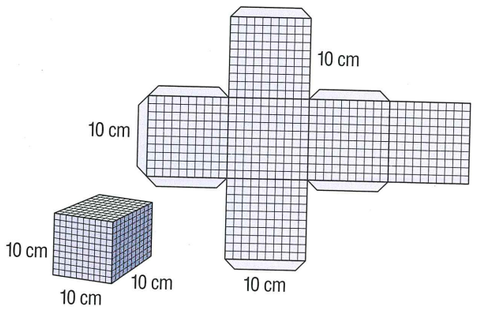
b)
- 600 cm^3
- 100 cm^3
- 350 cm^3

c)
- 10 cm^3
- 50 cm^3
- 75 cm^3

Activity ❷

1. Construct a cube from a net of cardboard, with each face 10 cm by 10 cm.

2. How many centicubes would you need to fill the cube you constructed?



3. Use your cube to estimate the volume of
- **a)** your desk
- **b)** a bookshelf
- **c)** a waste basket
- **d)** a filing cabinet
- **e)** a box of tissues

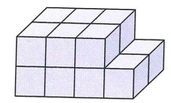
4. Describe how you obtained each estimate.

5. Compare your estimates with your classmates'.

Activity ❸

Construct each object from centicubes.
Determine the volume of each object.

a)



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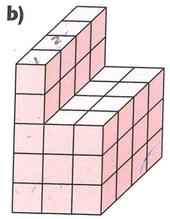
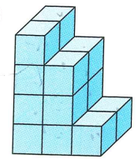
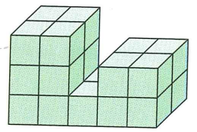


c)



d)

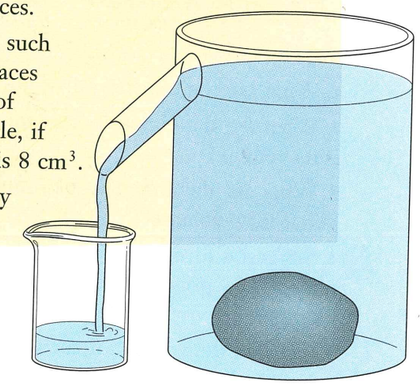


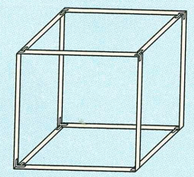
Activity ❹

When you cannot measure the dimensions of an object, you can measure its volume by finding the volume of water it displaces.

1. Fill an overflow can with water. Place an irregular object, such as a small stone, in the can. Catch the water the stone displaces and pour it into a graduated cylinder. Measure the volume of displaced water to find the volume of the object. For example, if the stone displaces 8 mL of water, the volume of the stone is 8 cm^3.

2. Estimate, then determine the volumes of several objects by displacement.





Activity ❺

1. Fasten metre-sticks together with rubber bands or tape to form a 1-m^3 skeleton.

2. How many centicubes would be needed to fill the skeleton?

3. Estimate the volume of each of the following in cubic metres.
- **a)** a teacher's desk
- **b)** your classroom
- **c)** a refrigerator
- **d)** the gymnasium
- **e)** a school bus

4. Describe how you obtained each estimate.

5. Compare your estimates with your classmates'.

Activity ❻

1. If you tried to build a cube with a volume of 1 m^3 from centicubes, how many would you need?

2. Express in cubic centimetres.
- **a)** 2 m^3
- **b)** 3.25 m^3
- **c)** 1.4 m^3
- **d)** 0.7 m^3
- **e)** 4.38 m^3
- **f)** 0.06 m^3

3. Express in cubic metres.
- **a)** 15 000 000 cm^3
- **b)** 6000 cm^3
- **c)** 4 500 000 cm^3
- **d)** 75 000 cm^3
- **e)** 2800 cm^3
- **f)** 930 000 cm^3