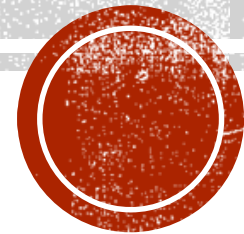


1.3 VOLUME

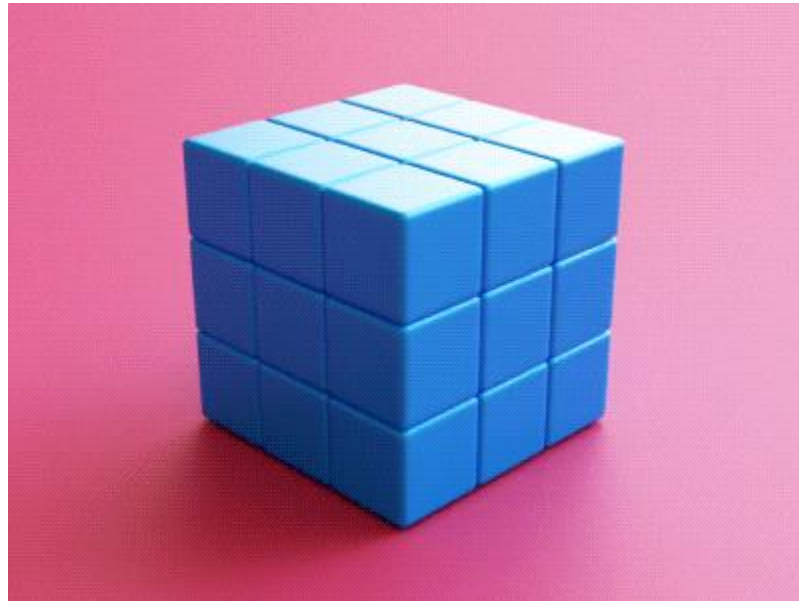


**WHEN WE TALK ABOUT
THE VOLUME OF AN
OBJECT, WHAT IS THAT?**



VOLUME

- The **amount of space** an object takes up
 - This is a three-dimensional measurement



MEASURING VOLUME

- The basic unit of measurement for volume is going to depend if the substance is a solid or liquid/gas
- For **solids**:
 - We usually use mm^3 , cm^3 or m^3
- For **liquids and gases**:
 - We usually use mL or L



SOLID

CUBIC MILLIMETRE (mm³)

- This is used for very small solid objects
 - If you would measure the sides of the object in mm then it will probably have a volume in mm³



CUBIC CENTIMETRE (cm³)

- This is used for small to medium sized solid objects
 - If you would measure the length of one of their sides with a 30cm ruler then it'll probably have a volume in cm³



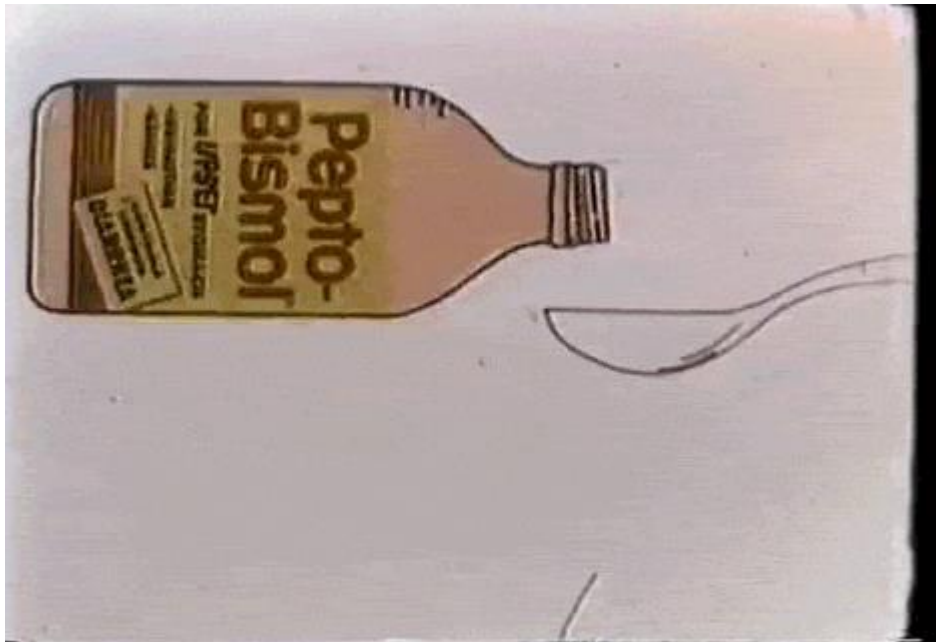
CUBIC METRE (m³)

- This is used for large solid objects.



MILLILITRE (mL)

- This is used for smaller quantities of liquid or gas



LITRE (L)

- This is used for larger quantities of liquid or gas



HOW DO WE MEASURE VOLUME?

It depends...



MEASURING VOLUME OF LIQUIDS



Learning Port

Volume of Liquids

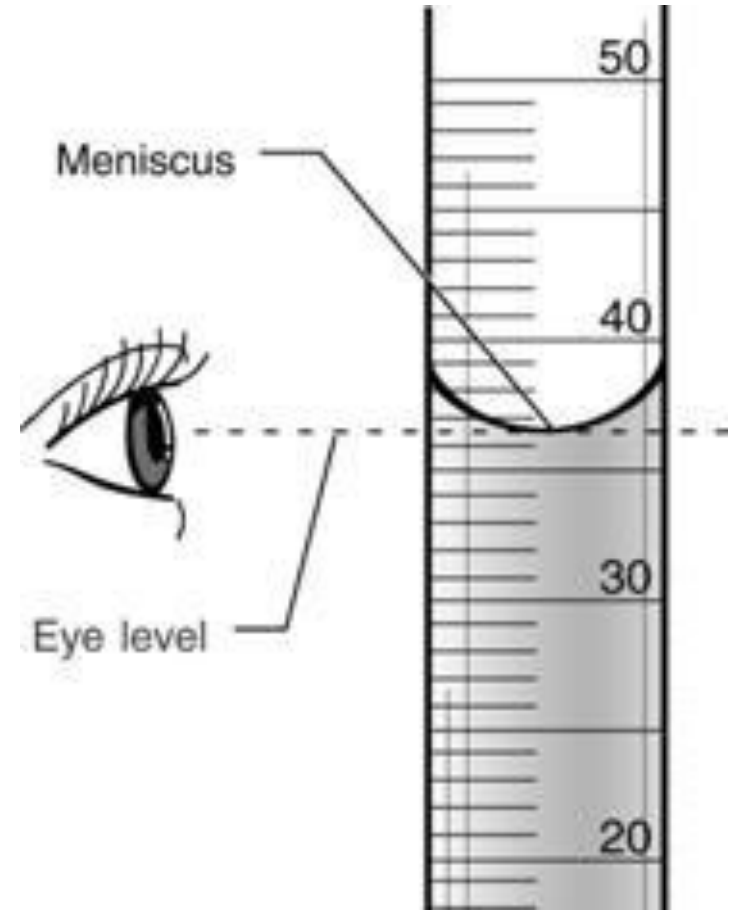
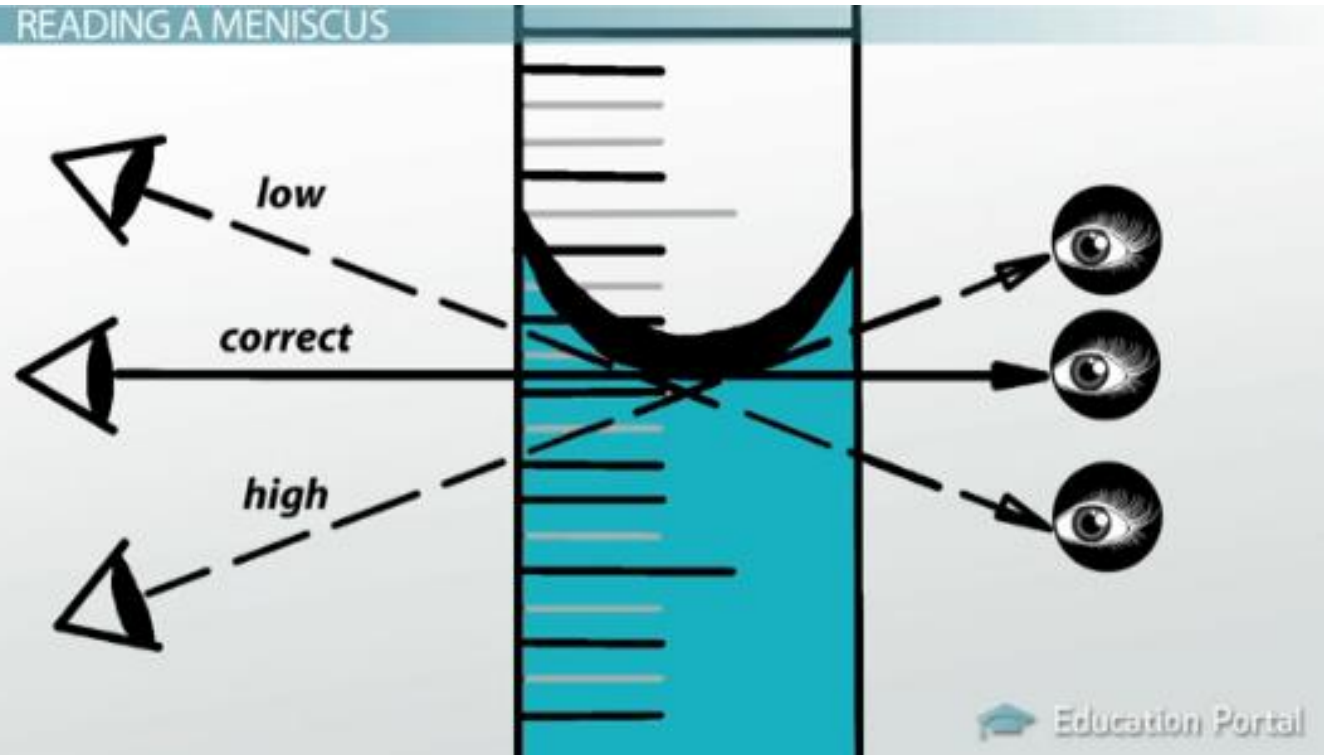


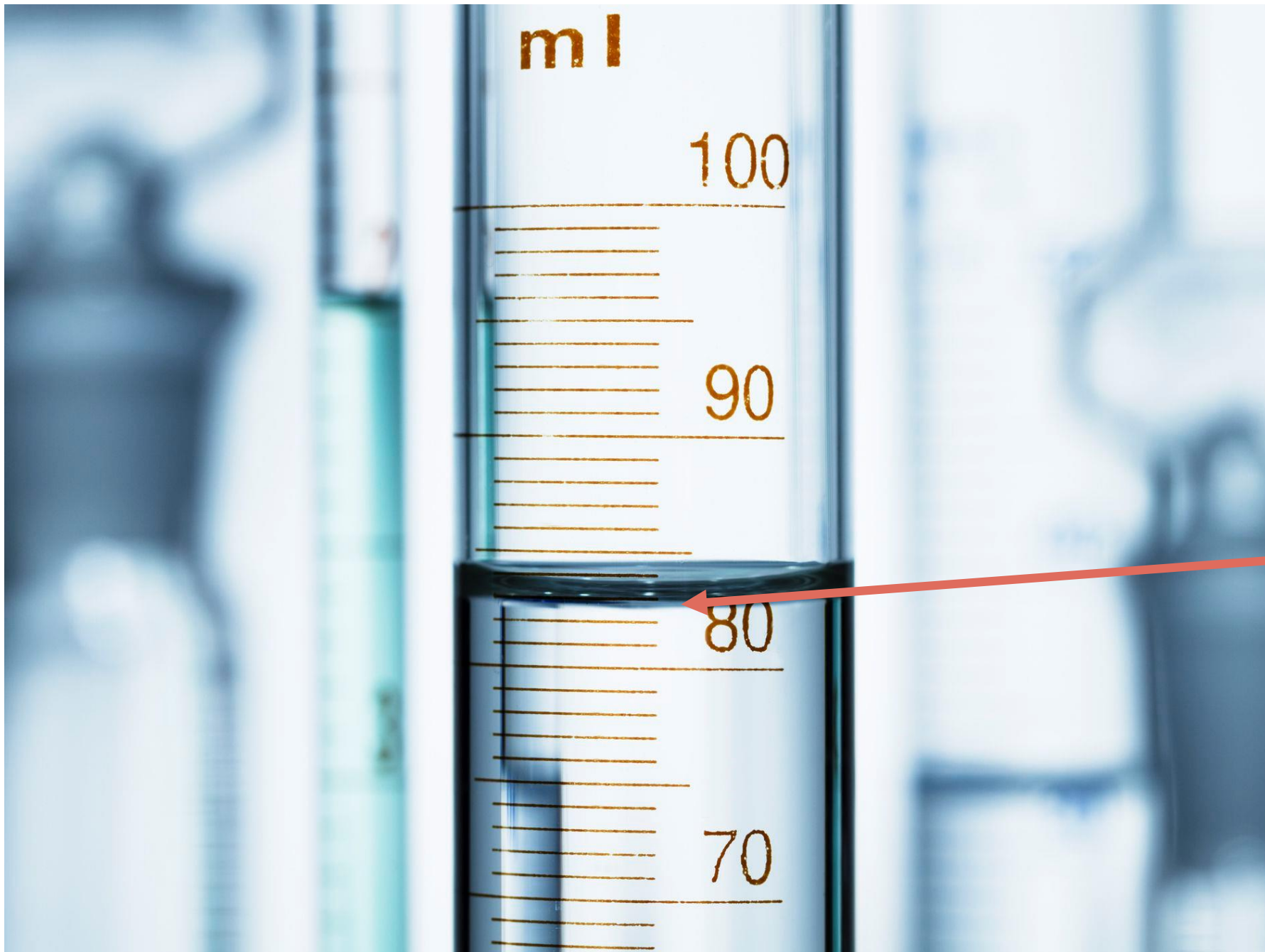
MEASURING THE VOLUME OF LIQUIDS

- Pour the liquid into a **graduated cylinder**
- Determine the size of each division on the cylinder
 - Is it 1 mL? 2 mL?
- Read the level of liquid by looking at the meniscus at **eye level**



READING A MENISCUS





What is the volume of this liquid?

83 mL



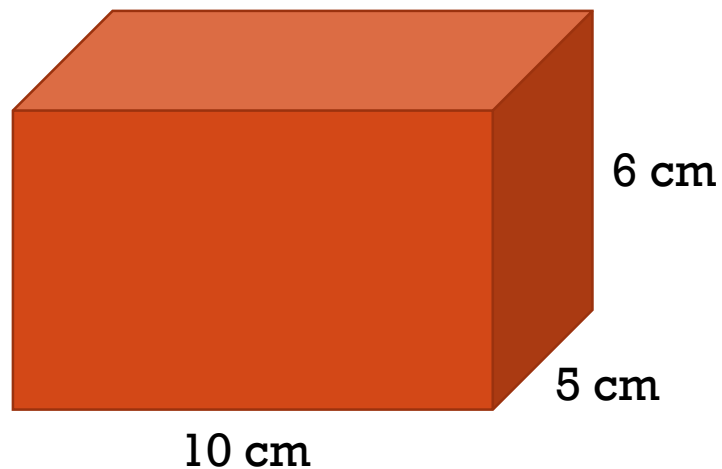
MEASURING THE VOLUME OF SOLIDS



MEASURING THE VOLUME OF REGULAR SOLIDS

- Measure the length, width and height

$$V = l \times w \times h$$



What is the volume?

$$V = l \times w \times h$$

$$V = 10 \times 5 \times 6$$

$$V = 300 \text{ cm}^3$$



MEASURING THE VOLUME OF IRREGULAR SOLIDS

- Use water displacement
 - For **smaller objects**: we use a **graduated cylinder**
 - For **larger objects**: we use an **overflow can** and graduated cylinder

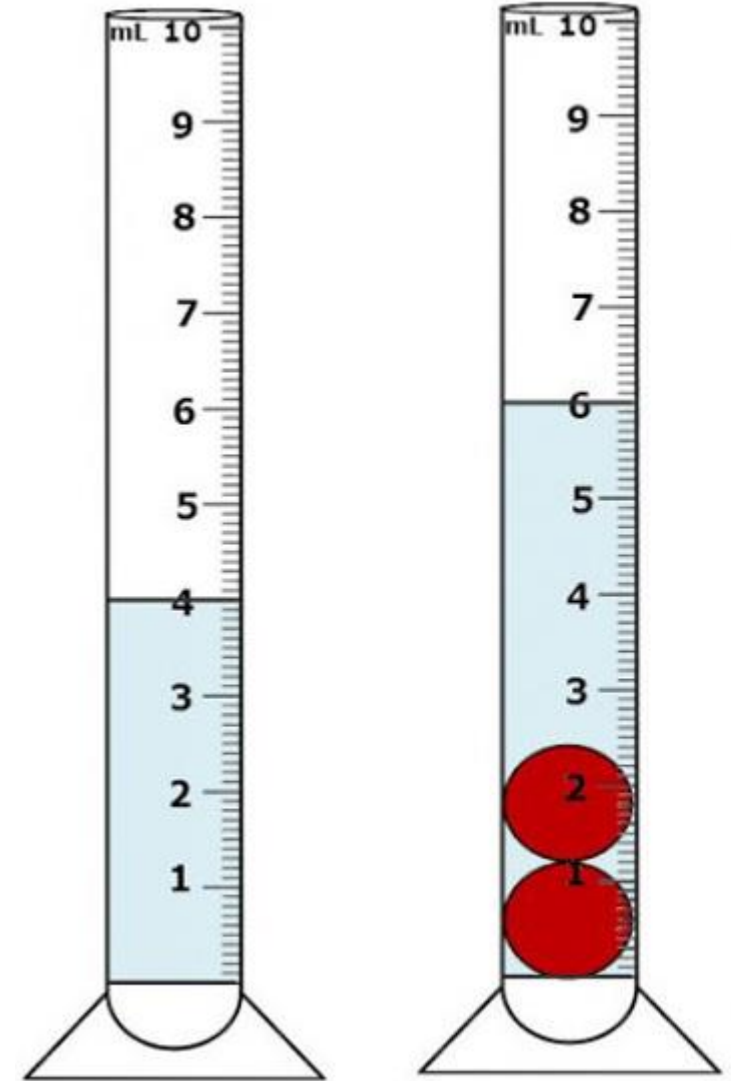


1 mL of water = 1 cm³

- 1) Fill a graduated cylinder with enough water to cover your object
- 2) Record the volume. **4.0 mL**
- 3) Carefully drop the object into the water
- 4) Record new volume **6.0 mL**
- 5) Calculate the difference

$$6.0 \text{ mL} - 4.0 \text{ mL} = 2 \text{ mL}$$

$$2 \text{ mL} \rightarrow 2 \text{ cm}^3$$

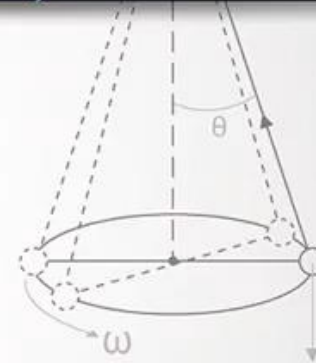


MEASURING VOLUME USING AN OVERFLOW CAN

EXPERIMENT GUIDE

ADVANCED PHYSICS¹

THROUGH INQUIRY PS-2848



PASCO 50
1964 - 2014



USING AN OVERFLOW CAN

- 1) Place the spout of the overflow can over a beaker or graduated cylinder
- 2) Fill an overflow can until water pours out the spout
- 3) Pour out the water collected and replace beaker/graduate cylinder
- 4) Lower object into the overflow can and collect the water in the graduated cylinder. Record volume.



WORKBOOK

p. 26-27

