

Finding Volume- The Water Displacement Method

5 CYLINDERS

- ALL HAVE THE SAME MASS
- WHICH CYLINDER IS THE MOST DENSE?
- WHICH IS THE LEAST DENSE?

ANIMATION OF WATER DISPLACEMENT

[Water Displacement](#)

LIVE DEMONSTRATION OF WATER DISPLACEMENT METHOD OF FINDING VOLUME

IMPORTANT: KNOW YOUR STARTING VOLUME!

READ THE BOTTOM OF THE MENISCUS



TILT THE GRADUATED CYLINDER AND
SLOWLY SLIDE THE SAMPLE

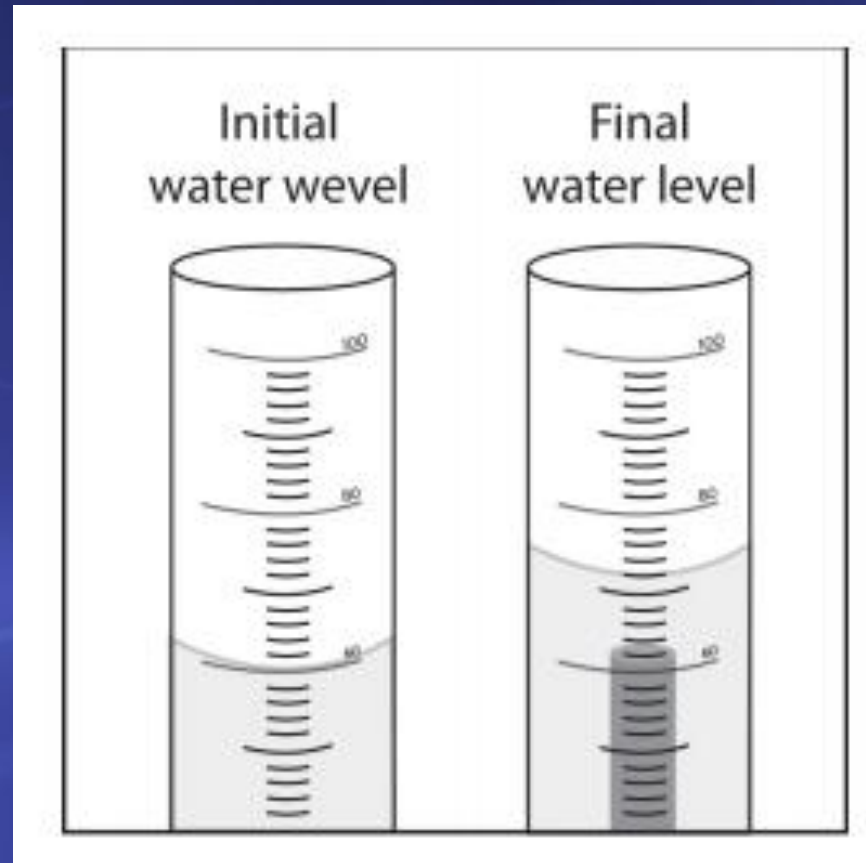


PUT THE GRADUATE UPRIGHT, RECORD THE “FINAL” WATER LEVEL.
FIND OUT HOW MUCH THE WATER LEVEL CHANGED:

VOLUME OF SAMPLE = FINAL WATER LEVEL – INITIAL WATER LEVEL

- When you place a sample in water, why does the water level go up?
- Is the volume of the sample equal to the final water level?
- What units should you use when you record the volume of the sample?

WHAT'S THE VOLUME OF THE CYLINDER?



CALCULATE THE DENSITY OF THE 5 CYLINDERS

YOU WILL NEED TO KNOW THE MASS AND THE VOLUME
IN ORDER TO CALCULATE DENSITY

$$\text{DENSITY} = \text{MASS} \div \text{VOLUME}$$

Sample	Initial water level (mL)	Final water level (mL)	Volume of the rods (cm ³)	Mass (g)	Density (g/cm ³)
A				15.0	
B				15.0	
C				15.0	
D				15.0	
E				15.0	

IDENTIFY THE SAMPLES

Material	Approximate density (g/cm ³)	Sample (Letters A-E)
Brass	8.8	
Aluminum	2.7	
PVC	1.4	
Nylon	1.2	
Polyethylene	0.94	

KEY CONCEPTS:

- A submerged object displaces a volume of liquid equal to the **volume of the object**.
- One milliliter (1 mL) of water has a volume of **1 cubic centimeter (1cm³)**.
- Different atoms have different **sizes** and **masses**.
- Atoms on the periodic table are arranged in order according to the number of **protons in the nucleus**.

KEY CONCEPTS:

- Even though an atom may be smaller than another atom, it might have more **mass**.
- The **mass** of atoms, their **size**, and how they are **arranged** determine the **density** of a substance.
- **Density** equals the mass of an object divided by its volume;
$$D = m/v$$
- Objects with the same mass but a different **volume** have different densities.