Name _____ Date _____ Period _____ Page _____

Finding Volume (The Water Displacement Method) - Activity Sheet

Objectives:

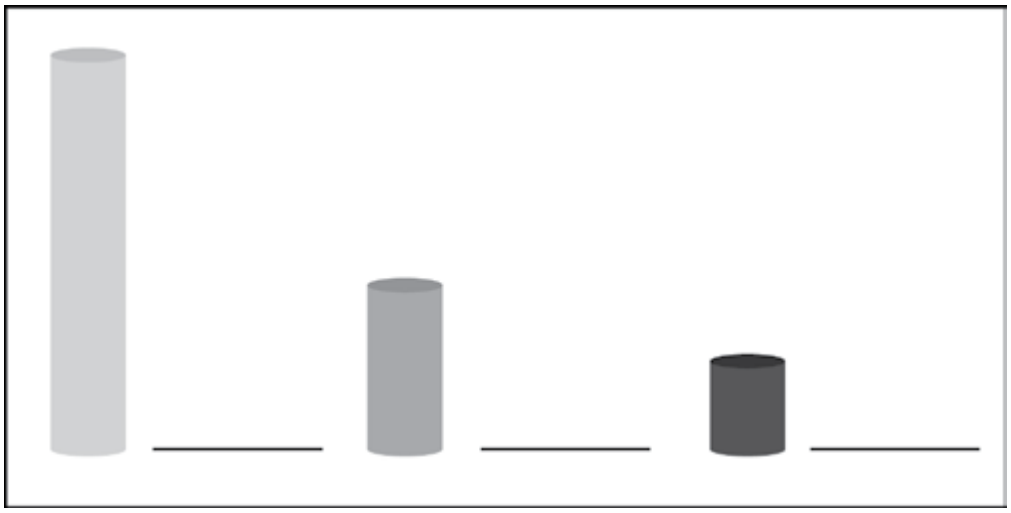
1. To be able to explain that materials have characteristic densities because of the different mass, size, and arrangement of their atoms.

2. To use the water displacement method to find the volume of an object.

DEMONSTRATION

Think about the longest, middle sized and shortest rods your teacher showed you. All of these samples have the same mass, but their volumes are different.

1. Predict the densities of each sample by writing a phrase from the box on the line next to each sample.

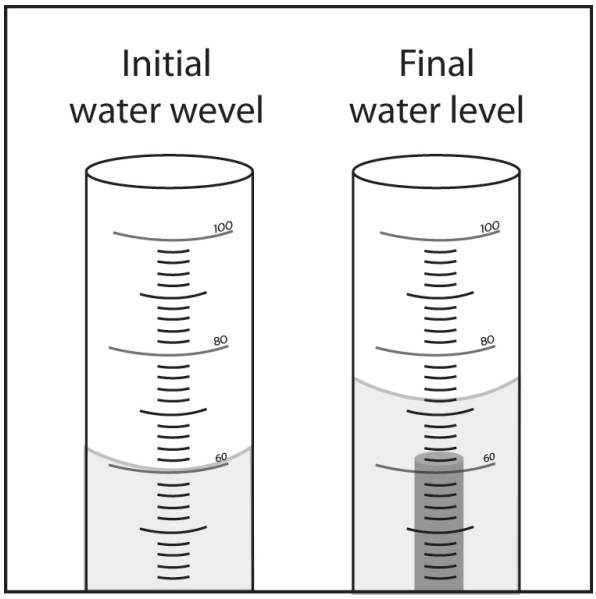


Least dense Medium dense Most dense

2. Explain why you think each rod is either the most, medium, or least dense.

3. The animation showed you how to find the volume of a sample using the water displacement method.

Look at the illustrations showing the water level in a graduated cylinder before and after a sample is submerged in water. What does this difference in water level tell you about the sample?



How much would the water level rise if you submerged a cube with a volume of 1 cm^3 in a graduated cylinder filled with 40 mL of water?

4. What is the density of the sample described below?

Be sure to write the units in g/cm^3.

- Water level rose from 60mL to 85mL
- Mass = 50g

ACTIVITY

Your group will work with five rods each with the same mass, but made of a different material. Carefully measure the volume of each sample and calculate the density. Then use density to correctly identify each of the five samples.

Question to investigate
Can you use density to identify all five rods?

Hint: the volume of the smallest rod is between 1.5–2.0 cm^3.

Materials for each group

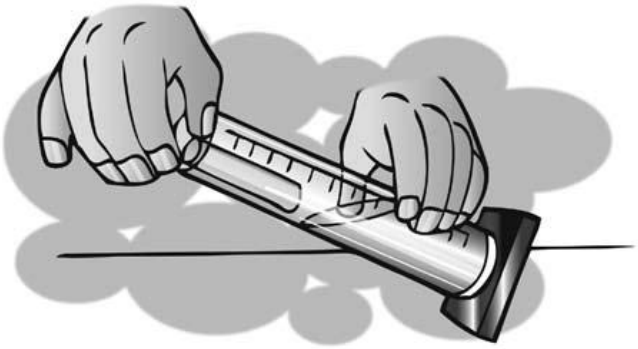
- Set of five different rods that all have the same mass
- Graduated cylinder, 100 mL
- Water
- Calculator

Procedure

Volume

1. Pour enough water from your cup into the graduated cylinder to reach a height that will cover the sample. Read and record the volume.

2. Slightly tilt the graduated cylinder and carefully place the sample into the water.



3. Place the gradated cylinder upright on the table and look at the level of the water. If the sample floats, use a pencil to gently push the top of the sample just under the surface of the water. Record the number of milliliters for this final water level.

4. Find the amount of water displaced by subtracting the initial level of the water from the final level. This volume equals the volume of the cylinder in cm^3.

5. Record this volume in the chart on the activity sheet.

6. Remove the sample by pouring the water back into your cup and taking the sample out of your graduated cylinder.

Density

7. Calculate the density using the formula D = m/v. Record the density in (g/cm^3).

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

Identify the samples

8. Compare the values for density you calculated to the values in the chart. Then write the letter name for each sample in the chart.

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	

On the first page of this activity sheet, you name a prediction about the density of a small, medium and long rod. Based on your calculations for density in your chart, were your predictions correct? If a short rod and a long rod have the same mass, explain why the short one will be more dense than the long one.