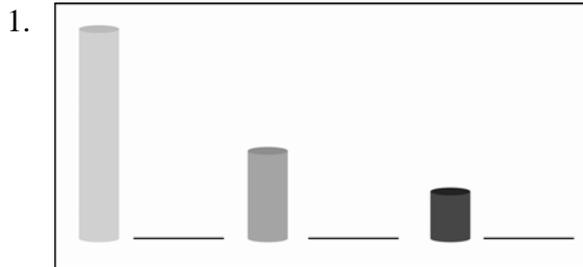


Chapter 3, Lesson 2 Activity Sheet Answers



Least dense Medium dense Most dense

2. If all the masses are the same, then the largest rod must have the *smallest* density. Since $D=m/v$, the larger the value for Volume in the denominator of the equation, the smaller the calculated value of Density will be.

Conversely, the smallest rod must be the densest, because its value for volume is the smallest. With a small value for V in the denominator, the value for density goes up. So the smallest rod must be most dense. By the same logic, the medium sized rod should be somewhere in between the smallest and largest rod in overall density.

Looking at it a different way, if you have two different objects, one clearly larger in volume than the other, but you know they have the same mass, the only way that can be possible is if the small volume object is more dense than the larger volume object.

3. The difference in water level, or the volume of water that is displaced, is equal to the volume of the cylinder. In this case, the volume of the cylinder in the picture is roughly 12 cm^3 .

If a cube with a volume of 1 cm^3 were placed in a graduated cylinder with an initial volume of 40 mL, the water level would rise 1mL, up to a final volume of 41 mL.

4. To calculate density, use the equation $D=m/v$. The volume of the sample is equal to the volume of water displaced, which is $85-60$, or 25 mL. Substituting values into the equation for Density gives $D=50/25$, or 2 cm^3 .
5. Answers will vary by student. A shorter rod must be more dense than a longer rod of the same mass because the mass is in a smaller volume. Since density is mass per unit volume, having the same mass in a smaller volume makes the smaller rod more dense.

6. Polyvinyl chloride is denser than polyethylene because it contains atoms of chlorine which have a large mass for their size. The long molecule chains are also closer together in polyvinyl chloride than they are in polyethylene, contributing to its greater density.
7. The way that copper and zinc atoms are packed closely together in brass makes it denser than the plastics because it means that there is more mass in a given volume of space, which is the definition of density.
8. Although sulfur atoms are less massive than calcium atoms, a sample of sulfur is denser than a sample of calcium. This is because the sulfur atoms are small and able to pack closely together. This enables sulfur to concentrate more mass into a unit of volume than calcium.