
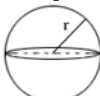
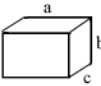



Homework Check: Density

Show work for all problems!

Name _____ Block _____

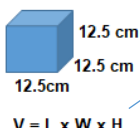
Volume

<p>• Cube:</p>  <p>Volume = a^3</p>	<p>• Sphere:</p>  <p>Volume = $(4/3) \times \pi \times r^3$</p>
<p>• Rectangular Prism:</p>  <p>Volume = $a \times b \times c$</p>	<p>• Cylinder:</p>  <p>Volume = $\pi \times r^2 \times h$</p>

1. Iron has a density of 7.86 g/cm^3 . What is the mass in grams of a **cube** of iron that measures 12.5 cm on a side?

$$\frac{\text{Density}}{1} = \frac{\text{Mass}}{\text{Volume}} \quad \frac{7.86 \text{ g/cm}^3}{1} = \frac{\text{Mass}}{(12.5 \text{ cm})^3} \quad \text{Mass} = 15351.5625 \text{ g}$$

with 3 sig figs... **15400 grams**



2. A flag pole has a mass of 30.0 kg and a length of 12 **meters**. If the radius is 9.5 **cm**, what is the density of the flag pole?

Units must match!!! So either convert meters to centimeters or vice versa!!!

$$\frac{12 \text{ meters}}{1} \left| \frac{100 \text{ cm}}{1 \text{ m}} \right| = 1200 \text{ cm}$$

$$V = \pi r^2 h = 3.14 \times (9.5 \text{ cm})^2 \times 1200 \text{ cm} = 340062 \text{ cm}^3$$

$$\text{Density} = \frac{\text{Mass}}{\text{Volume}} \quad \text{Density} = \frac{30.0 \text{ kg}}{340062 \text{ cm}^3} = \text{0.0000882 kg/cm}^3$$

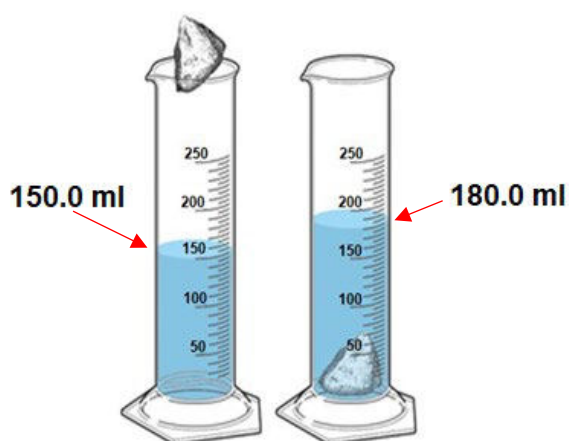
OR YOU COULD HAVE SOLVED FOR kg/m^3

$$\frac{9.5 \text{ cm}}{1} \left| \frac{1 \text{ m}}{100 \text{ cm}} \right| = 0.095 \text{ m}$$

$$V = \pi r^2 h = 3.14 \times (0.095 \text{ m})^2 \times 12 \text{ m} = 0.340062 \text{ m}^3$$

$$\text{Density} = \frac{\text{Mass}}{\text{Volume}} \quad \text{Density} = \frac{30.0 \text{ kg}}{0.340062 \text{ m}^3} = \text{88.2 kg/m}^3$$

or you could also do 0.088 g/cm^3



3. The density of a piece of metal is determined by the water displacement method. The metal had a mass of 17.30 g. Use the image to the left to determine the density of this object. Record your answer to the proper number of significant digits.

The first cylinder just measures the volume of water. The second cylinder measures the water and the rock. So you need to subtract the second volume from the first volume to get the volume of the rock. This is called **volume by displacement** because the rock displaces the water.

$$\text{Volume} = 180.0 \text{ ml} - 150.0 \text{ ml} = 30.0 \text{ ml}$$

$$\text{Density} = \frac{\text{mass}}{\text{Volume}} = \frac{17.30 \text{ g}}{30.0 \text{ ml}} = 0.577 \text{ g/ml}$$

Homework Check: Density
Show work for all problems!

Name _____ Block _____

Volume

<p>• Cube:</p> <p>Volume = a^3</p>	<p>• Sphere:</p> <p>Volume = $(4/3) \times \pi \times r^3$</p>
<p>• Rectangular Prism:</p> <p>Volume = $a \times b \times c$</p>	<p>• Cylinder:</p> <p>Volume = $\pi \times r^2 \times h$</p>

1. Silver has a density of 10.5 g/cm³. A rectangular block of silver has a width of 9.75 cm and a length of 11.40 cm and a mass of 5.25 kg. What is the height of the block?

Units must match!!! So convert kilograms into grams!!!

$$\frac{5.25 \text{ kg}}{1} \times \frac{1000 \text{ g}}{1 \text{ kg}} = 5250 \text{ g}$$

$$\frac{\text{Density}}{1} = \frac{\text{Mass}}{\text{Volume}}$$

$$\frac{10.5 \text{ g/cm}^3}{1} = \frac{5250 \text{ g}}{\text{Volume}}$$

$$\text{Volume} = 500 \text{ cm}^3 = \text{Length} \times \text{width} \times \text{height}$$

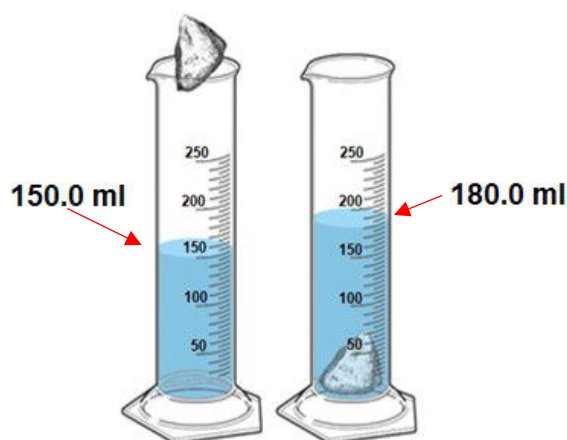
$$\text{Height} = \frac{\text{Volume}}{\text{length} \times \text{width}} = \frac{500. \text{ cm}^3}{(9.75 \text{ cm} \times 11.40 \text{ cm})} = \boxed{4.50 \text{ cm}}$$

2. A plastic ball has a mass of 4.25 grams and a radius of 1.5 cm. What is the density of the ball?

$$Volume = \frac{4 \pi r^3}{3} = \frac{4 \times (3.14) \times (1.5)^3}{3} = 14 \text{ cm}^3$$

$$Density = \frac{Mass}{Volume}$$

$$Density = \frac{4.25 \text{ g}}{14 \text{ cm}^3} = 0.30 \text{ g/cm}^3$$



4. The density of a piece of metal is determined by the water displacement method. The metal had a mass of 8.92 g. Use the image to the left to determine the density of this object. Record your answer to the proper number of significant digits.

The first cylinder just measures the volume of water. The second cylinder measures the water and the rock. So you need to subtract the second volume from the first volume to get the volume of the rock. This is called **volume by displacement** because the rock displaces the water.

$$Volume = 180.0 \text{ ml} - 150.0 \text{ ml} = 30.0 \text{ ml}$$

$$Density = \frac{8.92 \text{ g}}{30.0 \text{ ml}} = 0.297 \text{ g/ml}$$