Lesson 10.5: Displacement and Density

In this lesson you will:
- learn how the idea of displacement can be used to find the volume of an object
- learn how to calculate the density of an object

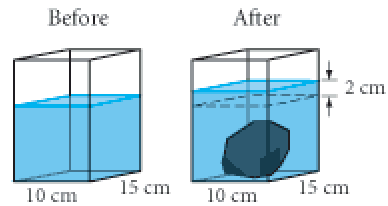
What happens if you step into a bathtub that is filled to the brim? If you add a scoop of ice cream to a glass filled with root beer? In each case, you'll have a mess! The volume of the liquid that overflows in each case equals the volume of the solid below the liquid level. This volume is called an object's ____________________. You can use this concept to find the volumes of irregularly shaped objects.

An important property of a material is its density. Density is the mass of matter in a given ____________. You can find the mass of an object by weighing it. You calculate density by dividing the mass by the ___________.

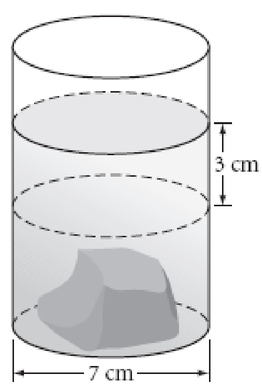
$$Density = \frac{mass}{volume}$$

*Add "displacement" and "density" to your dictionary.

•Example 1: Mary Jo wants to find the volume of an irregularly shaped rock. She puts some water into a rectangular prism with a base that measures 10 cm by 15 cm. When the rock is put into the container, Mary Jo notices that the water level rises 2 cm because the rock displaces its volume of water. What is the volume of the rock?



•Example 2: When Tom puts a rock into a cylindrical container with diameter 7 cm, the water level rises 3 cm. What is the volume of the rock to the nearest tenth of a cubic centimeter?



•Example 3: A clump of metal with mass 351.4 grams is dropped into a cylindrical container, causing the water level to rise 1.1 cm. The radius of the base of the container is 3.0 cm.

a.) What is the density of the metal?

Metal	Density
Aluminum	2.81 g/cm^3
Copper	8.97 g/cm^3
Gold	19.30 g/cm^3
Lead	11.30 g/cm
Lithium	0.54 g/cm^3
Nickel	8.89 g/cm^3
Platinum	21.40 g/cm^3
Potassium	0.86 g/cm^3
Silver	10.50 g/cm^3
Sodium	0.97 g/cm^3

b.) Given the table to the right, and assuming the metal is pure, what is the metal?

•Example 4: A chemist is given a clump of metal and is told that it is sodium. She finds that the metal has a mass of 184.3 g. She places it into a nonreactive liquid in a cylindrical beaker with a base diameter of 10 cm. If the metal is indeed sodium, how high should the liquid level rise?

⇒**ASSIGNMENT**: ____