**Volume & Density Calculation Practice**

Name: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Core: \_\_\_\_ Date: \_\_\_\_\_\_\_\_\_\_\_\_

Volume:  *Irregular objects*

The **displacement method** is used whenever we have an *irregularly shaped* object. This simply means that the object cannot easily be measured with a ruler—it has no straight edges.

1. What objects from the lab were *irregular?* \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**FORMULA:** VOLUME = AFTER – BEFORE, units= mL

**How to use this formula:**

You will need the object, a graduated cylinder, and water.

**First,** put some amount of water in the cylinder. You want to choose a number that is easy to use in calculations, but you also want to make sure that you will have enough water that the object will be completely submerged. Make sure to WRITE THIS NUMBER DOWN as the *before* in our formula above.

**Second,** put the object in the graduated cylinder. (Do not add any more water. If there is not enough water to cover the object, repeat the first step with more water.) Measure the amount and record as the *after* number in the formula above.

**Third,** plug the numbers into the formula above and solve. Make sure to include the units in your answer. Viola! You have calculated the volume of an irregular object.

**Practice!**

1. Before starting, there are 50mL in the graduated cylinder. After you add the object, there are 62mL in the cylinder. What is the volume of this irregular object? SHOW YOUR WORK.
2. Before starting, there are 45mL in the graduated cylinder. After you drop in the object, there are 51mL in the cylinder. What is the volume of this irregular object? SHOW YOUR WORK.
3. After you’ve added the object, you read a volume of 44mL. Your partner calculated a volume of 8mL for the object. What was the initial volume of the water in the cylinder?

­Volume: *Regular objects*

The **standard formula** is used whenever we have a *regularly shaped* object. These objects can easily be measured with a ruler—they have three straight edges.

What objects from the lab were *regular?* \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**FORMULA:** LENGTH **×** WIDTH **×** HEIGHT, Unit: cm3

**How to use this formula**:

**First,** measure the three sides of the square/rectangle object (length, width, and height), using a ruler. Plug into the formula above and voila! You have calculated the volume of a regular object.

**Practice!**

1. You have measured a rectangular object with sides of 5cm, 8cm, and 2cm. What is the volume of this regular object? SHOW YOUR WORK.
2. You have measured a rectangular object with the sides of 12cm, 4cm, and 7cm. What is the volume of this regular object? SHOW YOUR WORK.
3. You have measured a *cube* with a side measuring 6cm. What is the volume of this regular object? SHOW YOUR WORK.
4. You have measured a *cube* with a side measuring 7 cm. What is the volume of this regular object? SHOW YOUR WORK.

Density

Density is the amount of matter within the space of an object. This is what determines if one object will float or sink in a substance.

**FORMULA:** DENSITY = MASS **÷** VOLUME Unit: g/mL OR g/cm3

**How to use this formula:**

You have probably already calculated the volume using one of the two formulas above. Plug that number into the equation. Then, get the mass of the object by placing the object on the digital scale. Plug in and solve! You now have the density of a regular OR irregular object.

**Practice!** SHOW WORK & INCLUDE UNITS!

1. You found that the mass of an irregular object is 5 grams. You calculated that the volume of this irregular object is 8mL. What is the density?
2. You found that the mass of an irregular object is 2 grams. You calculated that the volume of this irregular object is 4mL. What is the density?
3. You found that the mass of a regular object is 23 grams. You calculated that the volume of this object is 125cm3. What is the density?
4. You found that the mass of a regular object is 15 grams. You calculated that the volume of this regular object is 100cm3. What is the density?
5. Using the following information, calculate the density of this *irregular* object:

Mass: 7 grams, After: 19mL, Before: 11mL

1. Using the following information, calculate the density of this *regular* object:

Mass: 4 grams, Length: 3cm, Width: 3cm, Height: 9cm