

What is Density? - Activity Sheet

Objectives:

1. To observe copper and aluminum cubes of the same volume place on a balance.
2. To explain how two cubes the same size can have different masses.
3. To determine the densities of cubes of different materials that all have the same volume.

DEMONSTRATION

Your teacher places a copper and an aluminum cube on the balance. Even though the cubes are the same size and shape, the copper cube has a greater mass than the aluminum cube. Both cubes are solid and are not hollowed out anywhere inside. The copper cube is made up of only copper atoms and the aluminum cube is made up of only aluminum atoms.

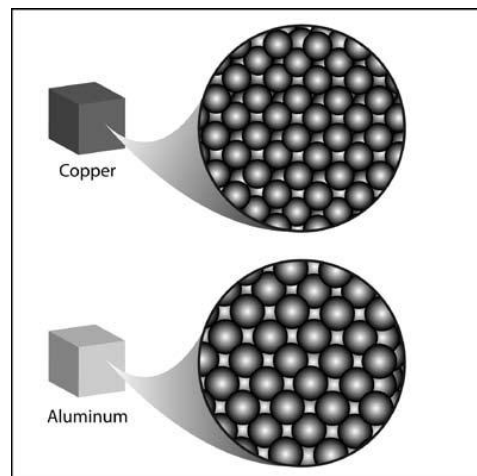
1. Look at the drawing of the copper and aluminum cubes and their atoms.

What are two possible explanations for why the copper cube has a greater mass than the aluminum cube?

Hint: Just because the aluminum atoms are larger, they are not necessarily heavier.

Explanation One-

Explanation Two-



2. The density of a substance like copper or aluminum is its mass divided by its volume (how much space it takes up).

Density = mass/volume or $D = m/v$.

Which is more dense, copper or aluminum?

How do you know?

3. How do you find the volume of a cube?

4. How do you find the mass of a cube?

5. Once you know the volume and mass of a cube, how do you find the density of the cube?

6. Calculate the density of a cube using the following information:

- Each side is 4cm long.
- The mass of the cube is 128g.

ACTIVITY: You will be calculating the density of 8 cubes of different materials on your note sheet.

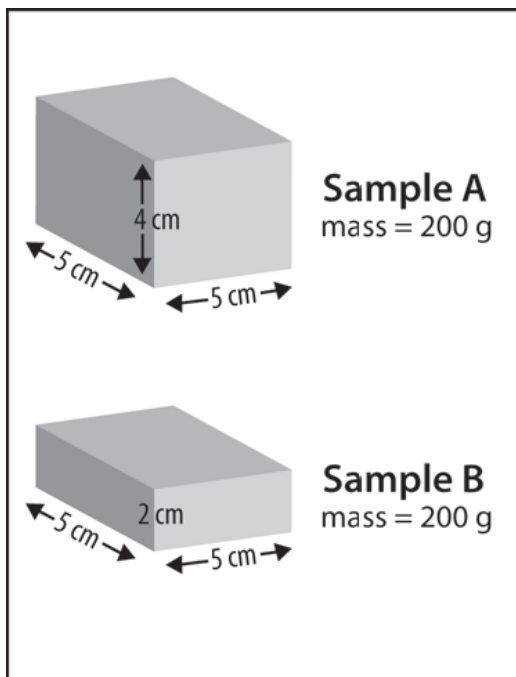
What is Density? continued....

TAKE IT FURTHER

In this activity, you investigated cubes made of out of different substances. The cubes had the same volume, but different masses. When you calculated the density of each cube, you found that this was different, too.

Now imagine two blocks (Sample A and Sample B) made of different substances that both have the *same mass* but *different volumes*.

a. What is the density of Sample A?



b. What is the density of Sample B?

c. Give two possible explanations for why one sample is more dense than the other.

Hint: The size, mass, and arrangement of molecules affect the density of a substance.