

WHAT IS DENSITY?

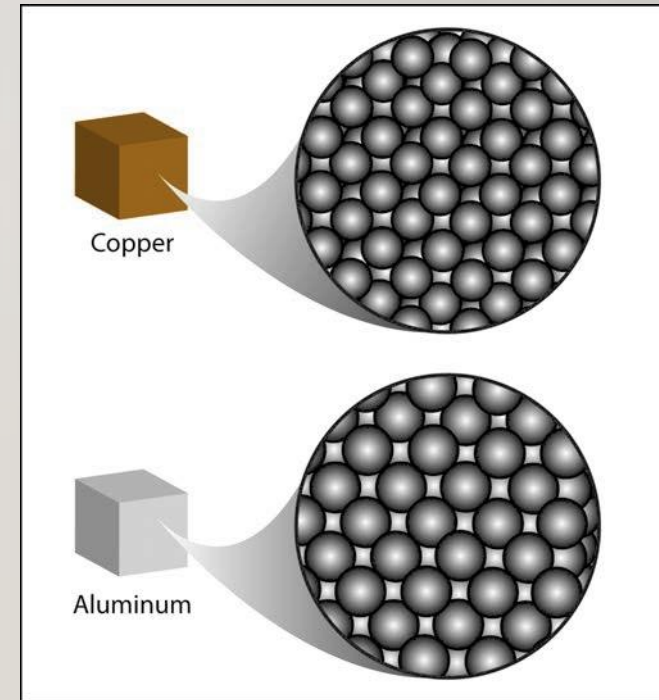


OBJECTIVES:

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

DEMONSTRATION OF COPPER CUBE AND ALUMINUM CUBE.

- How can two objects, which are exactly the same size and shape, have a different mass?
- Copper atoms are slightly smaller than aluminum atoms. The smaller size means that more copper atoms can fit in the same amount of space. So, the copper cube contains more atoms than the aluminum cube.



DENSITY IS HOW HEAVY SOMETHING IS COMPARED TO THE AMOUNT OF SPACE IT TAKES UP.

- Volume is a measurement of the amount of space an object takes up. It is always three dimensions.
- To find the volume of an object like a cube or a box, you measure the length, width, and height and then multiply them.
- **Volume = Length X Width X Height.**
- The unit volume is measure in is cm^3

This is number 3 on your lab activity sheet.

MASS

- To find the mass of an object, place it on the scale. The unit mass is measured in in grams.

This is number 4 on your lab activity sheet.

DENSITY

- To calculate density, you divide mass by the volume.
- $\text{Mass} \div \text{Volume} = \text{Density}$
- The answer will be grams per cubic centimeter (g/cm^3)

This is number 5 on your lab activity sheet.

CALCULATING DENSITY

- Calculate the density on number 6 of your lab activity sheet.

What is the mass? 128g

What is the volume? $4\text{ cm} \times 4\text{ cm} \times 4\text{ cm} = 64\text{ cm}^3$

What is the density? $\text{Mass} \div \text{Volume}$
 $128\text{ g} \div 64\text{ cm}^3 = 2\text{ g/cm}^3$

ACTIVITY:

- Calculate the density of 8 different cubes.
- You will not need to calculate volume, since they are all the same size.
- Use the density to correctly identify each of the 8 cubes.

KEY CONCEPTS:

- **Density** is a characteristic property of a substance.
- The **density** of a substance is the relationship between the **mass** of the substance and how much space it takes up (**volume**).
- The **mass** of the atoms, their **size**, and how they are arranged determine the **density** of a substance.
- Density equals the **mass** of a substance divided by its **volume**. $D=m/v$
- Objects with the same volume but different mass have different **density**.