

Measuring the Density of Regular Objects

PROBLEM

How do the densities of different blocks of wood compare?

INTRODUCTION

The density of an object is determined by dividing the object's mass by its volume ($D=m/V$). Volume can be measured in several ways depending upon the object. To measure the volume of a regularly shaped object such as a wood block, simply measure the length, the width, and the height, and find the product. In this laboratory investigation you will measure the densities of several wood blocks. Wood blocks of different colors and textures may be different types of wood while those blocks that look similar may be the same type of wood. You will compare the densities of blocks of same type of wood and blocks of different types of wood.

MATERIALS (per group)

Balance; metric ruler; wood blocks

PROCEDURE

1. Obtain a wood block and describe its appearance with respect to color, grain, and/or texture in the data table below. This is in order to help you keep track of which blocks of wood are of the same type.
2. Measure the mass of the wood block with a balance. Record the result in the data table below.
3. Measure the length, width and height of the block in centimeters. Record the result in the data table below.
4. Calculate the volume of the wood block by multiplying the length, by the width, by the height. Record the result in the data table below.
5. Calculate the density of the wood block by dividing its mass by its volume. Record the result in the data table below.
6. Repeat this procedure four more times for a total of five wood blocks. When you have completed your measurements, you should have examined two or three different types of wood (based on their appearance).

OBSERVATIONS

Block No.	Appearance	Mass	Dimensions			Volume	Density
			Length	Width	Height		
1							
2							
3							
4							
5							

CONCLUSIONS

1. Based on their appearance, which blocks are made of the same type of wood? (Refer to the blocks by their number from the data table.) _____

2. Do the blocks made of the same type of wood have the same densities? _____

3. Do the blocks made of different types of wood have the same densities? _____

4. Is the density of the wood related to its composition (composition = the type of wood of which the block is made)? Give evidence to support your answer. _____

5. Develop a hypothesis about how the densities of substances that are made of the same materials compare, and how the densities of substances that are made of different materials compare. Describe in detail how you would test your hypothesis, including all the procedures for making measurements. _____