Mass in Space

Measure mass and volume to compare materials.

SC.8.P.8.3 "Explore and describe the densities of various materials through measurement of their masses and volumes."

NAME _____ DATE _____

1 READ AND MARK

Read it twice

YOUR JOB Underline each measurement unit and circle each phrase that tells how to calculate or compare density. These marks will help you connect mass, volume, and density.

Equal-Size Samples

1 Density describes how much mass is packed into a certain volume. To investigate it, a lab team measured several equal-size solid samples. They found each sample's mass with a balance in grams. They found volume by measuring length, width, and height in centimeters, then multiplying those three measurements to get cubic centimeters.

2 The table shows the team's measurements. Because every sample had a volume of 10 cm^3, differences in mass are easy to compare. In general, divide mass by volume to calculate density. A density written as g/cm^3 tells how many grams of matter fill one cubic centimeter. Use measured numbers, not appearance, to compare materials.

MEASUREMENTS OF EQUAL-SIZE SAMPLES

Material	Mass (g)	Volume (cm^3)
Pine wood	5	10
Acrylic plastic	12	10
Aluminum	27	10
Copper	89	10

3 A material with a larger density has more mass in the same volume, so it is more tightly packed. Density is a property that can help identify a material, but a single measurement may have error. Carefully reading the balance and ruler, using matching units, and repeating trials make a density comparison more reliable.

2 ANSWER WITH EVIDENCE

Use the passage

1. How did the lab team measure the volume of each solid sample?

2. Calculate the density of the acrylic plastic sample. Show the division and include units.

3. Which sample has the greatest density? Use its mass and volume to support your answer.

4. Order the four materials from least dense to most dense. Explain why the mass values can be used for this comparison.

3 YOUR TURN

Your own words

A rectangular mystery block has a mass of 54 g. Its length is 3.0 cm, width is 2.0 cm, and height is 1.5 cm. Complete the table, then write one sentence explaining what its density means.

QUANTITY	MEASUREMENT

ANSWER KEY

Mass in Space

GRADE 8 · SC.8.P.8.3

PART 1 · READ AND MARK

Underline each measurement unit and circle each phrase that tells how to calculate or compare density. These marks will help you connect mass, volume, and density. Accept any marking that follows this job and points at the right text.

PART 2 · ANSWERS

#	QUESTION	ANSWER
1	How did the lab team measure the volume of each solid sample?	**They measured length, width, and height in centimeters and multiplied the three measurements to find volume in cubic centimeters.**
2	Calculate the density of the acrylic plastic sample. Show the division and include units.	**12 g ÷ 10 cm^3 = 1.2 g/cm^3.**
3	Which sample has the greatest density? Use its mass and volume to support your answer.	**Copper. Its density is 89 g ÷ 10 cm^3 = 8.9 g/cm^3, the greatest value.**
4	Order the four materials from least dense to most dense. Explain why the mass values can be used for this comparison.	**Pine wood, acrylic plastic, aluminum, copper. All samples have the same volume, so the sample with more mass has greater density.**

PART 3 · YOUR TURN (SAMPLE ANSWER)

Mass | 54 g Length | 3.0 cm Width | 2.0 cm Height | 1.5 cm Volume | 9.0 cm^3 Density | 6.0 g/cm^3 Its density means that each cubic centimeter of the block has a mass of 6.0 g.

Accept correct calculations with equivalent unit notation. For the open task, accept 9 cm^3 for volume and 6 g/cm^3 for density, with a sentence that correctly connects density to mass in one cubic centimeter.