LESSON MAKER PRO

Density by Design

Use measurements and graphs to find density.

HIGH SCHOOL · CHE.1.2

CHE.1.2 "Design and conduct experiments using appropriate measurements, significant figures, graphical analysis to analyze data."

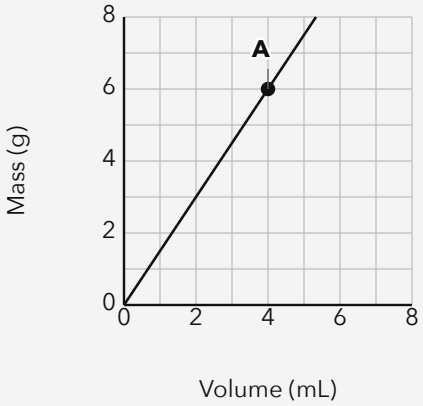
NAME _____ DATE _____

THE BIG IDEA

On a mass-versus-volume graph, a line through (0,0) has a slope equal to density: mass / volume. When you divide measurements, report the density using the same number of significant figures as the measurement with the fewest.

WORKED EXAMPLE

At point A, a sample has a measured volume of 4.0 mL and mass of 6.0 g. Find its density from the graph.



1. The line passes through (0,0), so density = mass / volume.
2. 6.0 g / 4.0 mL = 1.5 g/mL.
3. Both measurements have two significant figures, so keep two.

Answer: 1.5 g/mL

PRACTICE 4 problems

1 Find the density of a sample with a mass of 5.0 g and a volume of 2.0 mL. Use the correct significant figures.

ANSWER _____

2 Find the density of a sample with a mass of 9.0 g and a volume of 3.0 mL. Use the correct significant figures.

ANSWER _____

3 Find the density of a sample with a mass of 14.0 g and a volume of 7.0 mL. Use the correct significant figures.

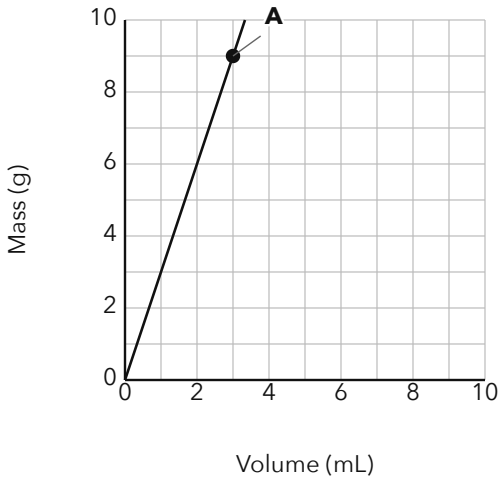
ANSWER _____

4 Find the density of a sample with a mass of 11.0 g and a volume of 8.0 mL. Use the correct significant figures.

ANSWER _____

APPLY IT Show your work

1 A student tests material for a handmade keychain. At point A, the measured volume is 3.0 mL and mass is 9.0 g. Find its density from the graph. Would it sink in water, which has a density of 1.0 g/mL?



ANSWER _____

2 A metal charm for a bracelet has a mass of 12.0 g. It displaces 5.0 mL of water. What is its density? Use the correct significant figures.

WORK SPACE

ANSWER _____

CHALLENGE One step up

Two pieces of the same material are measured. One has a mass of 5.0 g and a volume of 2.0 mL. The other has a mass of 7.5 g and a volume of 3.0 mL. Do they support the same density? Calculate it and explain why 2.50 g/mL would not be an appropriate report.

WORK SPACE AND ANSWER

Density by Design

PART 1 · PRACTICE

#	PROBLEM	ANSWER
1	Find the density of a sample with a mass of 5.0 g and a volume of 2.0 mL. Use the correct significant figures.	**2.5 g/mL**
2	Find the density of a sample with a mass of 9.0 g and a volume of 3.0 mL. Use the correct significant figures.	**3.0 g/mL**
3	Find the density of a sample with a mass of 14.0 g and a volume of 7.0 mL. Use the correct significant figures.	**2.0 g/mL**
4	Find the density of a sample with a mass of 11.0 g and a volume of 8.0 mL. Use the correct significant figures.	**1.4 g/mL**

PART 2 · APPLY IT

1. **3.0 g/mL; it would sink.** Divide 9.0 g by 3.0 mL and keep two significant figures. The material is denser than water.
2. **2.4 g/mL** Divide 12.0 g by 5.0 mL. Report two significant figures because 5.0 has two.

CHALLENGE

Yes. Both 5.0 / 2.0 and 7.5 / 3.0 equal 2.5 g/mL. Each measurement has two significant figures, so 2.50 g/mL reports more precision than the measurements support.

Accept g/mL or g per mL. Require the stated significant figures, including the trailing zero in 3.0 and 2.0.