The Final Density Challenge

Observe carefully. Measure accurately. Let the evidence lead.

NAME _____

CLASS _____

DATE _____

Use 3 different tagged samples. Test each sample 3 times.
Then calculate one average density for each sample.

1 Why density matters

Density tells us how much matter is packed into a certain amount of space. It lets us compare materials even when the objects are different sizes. Density helps explain why some objects float or sink, and it can help identify an unknown substance. Because many materials have a characteristic density, careful measurements can give us strong evidence about what a sample is.

2 What density is

Density is mass divided by volume. Mass is measured in grams. Volume is the space the sample takes up. For an irregular solid, we find volume by measuring how much water it displaces.

THE TWO CALCULATIONS

Sample volume = Final - Initial

Density = Mass ÷ Sample volume

3 Step by step

1. **Select and identify**
   Choose a sample. Read its tag number and use the identification key to identify the rock or mineral. Then record its luster and color.
2. **Measure mass**
   Make sure the sample is dry. Measure and record its mass in grams.
3. **Add water**
   Pour enough water into the graduated cylinder to cover the sample.
4. **Read initial volume**
   At eye level, read the bottom of the meniscus. Record milliliters.
5. **Lower the sample**
   Place it in gently. Submerge it completely without splashing.
6. **Check the water**
   Remove trapped air bubbles, then read and record the final volume.
7. **Find sample volume**
   Subtract: final water volume - initial water volume.
8. **Find density**
   Divide mass by sample volume. Record the answer in g/mL.

Measure first. Keep the units. Show the math.
Check whether the answer makes sense.

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Record every measurement with its unit. Show each calculation clearly.

VOLUME OF SAMPLE = FINAL WATER VOLUME - INITIAL WATER VOLUME

DENSITY = MASS ÷ SAMPLE VOLUME

TAGGED SAMPLE TAG # + ROCK / MINERAL NAME	TRIAL	LUSTER	COLOR	MASS (g)	INITIAL VOLUME (mL)	FINAL VOLUME (mL)	SAMPLE VOLUME (mL) Final - Initial	DENSITY (g/mL) Mass ÷ Sample volume
SAMPLE 1	TRIAL 1							
TAG NUMBER _____	TRIAL 2							
ROCK / MINERAL NAME _____	TRIAL 3							
_____	AVERAGE							
SAMPLE 2	TRIAL 1							
TAG NUMBER _____	TRIAL 2							
ROCK / MINERAL NAME _____	TRIAL 3							
_____	AVERAGE							
SAMPLE 3	TRIAL 1							
TAG NUMBER _____	TRIAL 2							
ROCK / MINERAL NAME _____	TRIAL 3							
_____	AVERAGE							

QUALITY BEFORE QUANTITY

I care more about the quality of your work than how much you finish. Do as much as you can, as carefully as you can. Your honest best is enough.

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