

**CHAPTER 4****SKILLS LAB***Measuring*

# The Density of Minerals

In this lab, you will use water to help you measure the density of minerals.

## ◆ Problem

How can you compare the density of different minerals?

## ◆ Materials

graduated cylinder, 100 mL  
3 mineral samples: pyrite, quartz, and galena  
water  
balance

## ◆ Procedure Review the safety guidelines in Appendix A.

1. Check to make sure the mineral samples are small enough to fit in the graduated cylinder.
2. Place the pyrite on the balance and record its mass in the data table on the next page.
3. Fill in the cylinder with water to the 50-mL mark.
4. Carefully place the pyrite into the cylinder of water. Try not to spill any of the water.
5. Read the level of the water on the scale of the graduated cylinder. Record the level of the water with the pyrite in it.
6. Calculate the volume of water displaced by the pyrite. To do this, subtract the volume of water without the pyrite from the volume of water with the pyrite. Record your answer.
7. Calculate the density of the pyrite by using this formula.  
$$\text{Density} = \frac{\text{Mass of mineral}}{\text{Volume of water displaced by the mineral}}$$

(Note: Density is expressed as g/cm<sup>3</sup>. One mL of water has a volume of 1 cm<sup>3</sup>.)
8. Remove the water and mineral from the cylinder.
9. Repeat steps 2–8 for quartz and galena.

**SKILLS LAB** *(continued)*

## ◆ Data Table

	<i>Pyrite</i>	<i>Quartz</i>	<i>Galena</i>
<i>Mass of Mineral (g)</i>			
<i>Volume of Water without Mineral (mL)</i>	50	50	50
<i>Volume of Water with Mineral (mL)</i>			
<i>Volume of Water Displaced (mL)</i>			
<i>Volume of Water Displaced (cm<sup>3</sup>)</i>			
<i>Density (g/cm<sup>3</sup>)</i>			

## ◆ Analyze and Conclude

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*Write your answers in the spaces provided.*

1. Which mineral had the highest density? The lowest density?

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2. How does finding the volume of the water that was displaced help you find the volume of the mineral itself?

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3. Why won't the procedure you used in this lab work for a substance that floats or one that dissolves in water?

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4. **Apply** Pyrite is sometimes called “fool’s gold” because its color and appearance are similar to real gold. How could a scientist determine if a sample was real gold?

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**SKILLS LAB** *(continued)*

- 5. Think About It** Does the shape or size of a mineral sample affect its density? Explain.

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◆ More to Explore

Repeat the activity by finding the density of other minerals or materials. Then compare the densities of these materials with pyrite, quartz, and galena. Use the data table below to record your data.

<i>Mass of Mineral (g)</i>			
<i>Volume of Water without Mineral (mL)</i>			
<i>Volume of Water with Mineral (mL)</i>			
<i>Volume of Water Displaced (mL)</i>			
<i>Volume of Water Displaced (cm<sup>3</sup>)</i>			
<i>Density (g/cm<sup>3</sup>)</i>			