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Determining the Thickness of Aluminum Foil

Many products such as aluminum foil are too thin to measure easily. However, it is important for manufacturers to know how thick these products are. They wouldn't be useful if they were made too thick or too thin. In this activity, you will use the same method that manufacturers use to determine the thickness of aluminum foil.

Problem: How can you determine the thickness of aluminum foil?

Materials
- metric ruler
- aluminum foil
- scissors
- balance
- graph paper

Procedure

1. Cut out three squares of aluminum foil with sides of the following lengths: 50 mm, 100 mm, and 200 mm.

2. To determine the area of the 50-mm foil square, measure the length of one of its sides and then square it. Record the length and area in the data table.

DATA TABLE

Length (mm)	**Area (mm^2)**	**Mass (g)**	**Volume (mm^3)**	**Thickness (mm)**

Density of aluminum = _____ g/mm^3

3. Place the foil square on the balance to determine the mass of the foil. Record the mass of the foil square in the data table.

4. You will need the density of aluminum foil to calculate the volume of the foil square from its mass. The density of aluminum foil is 2.71 g/cm^3. Convert cm^3 to mm^3 and record the density of aluminum foil (in g/mm^3) on the line provided at the bottom of the data table.

5. To determine the volume of the foil square, divide its mass by its density in g/mm^3. Record the volume in the data table.

6. To determine the thickness of the foil square, divide its volume by its area. Record this thickness in the data table.

7. Repeat Steps 2 through 6, using the 100-mm foil square.

8. Repeat Steps 2 through 6, using the 200-mm foil square.

9. Construct a graph of your data on a separate sheet of graph paper. Plot length on the horizontal axis and thickness on the vertical axis. Draw a straight line connecting all three points.

Analyze and Conclude

1. Measuring - How many significant figures were there in your measurement of the length of each square of aluminum foil?

2. Using Graphs - What effect, if any, did the length of the square have on your estimate of the thickness of the foil?

3. Comparing - Which estimate of thickness was most precise? Explain your answer.

4. Controlling Variables - What factors limited the precision of your measurements?