50. A student measures the mass of some sucrose as 0.947 mg. Convert that quantity to grams and to kilograms.

51. A student calculates the density of iron as 6.80 g/cm^3 using lab data for mass and volume. A handbook reveals that the correct value is 7.86 g/cm^3. What is the percent error?

HANDBOOK SEARCH

52. Find the table of properties for Group 1 elements in the *Elements Handbook*, pages 726–783. Calculate the volume of a single atom of each element listed in the table using the equation for the volume of a sphere.

$$\frac{4}{3}\pi r^3$$

53. Use the radius of a sodium atom from the *Elements Handbook* to calculate the number of sodium atoms in a row 5.00 cm long. Assume that each sodium atom touches its two neighbors.

54. a. A block of sodium with measurements 3.00 cm × 5.00 cm × 5.00 cm has a measured mass of 75.5 g. Calculate the density of sodium.
    b. Compare your calculated density with the value in the properties table for Group 1 elements. Calculate the percent error for your density determination.

RESEARCH & WRITING

55. Find out how the metric system, which was once a standard for measurement, differs from SI. Why was it necessary to change to SI?

56. Find out what ISO 9000 standards are. How do they affect industry on an international level?

ALTERNATIVE ASSESSMENT

57. **Performance** Obtain three metal samples from your teacher. Determine the mass and volume of each sample. Calculate the density of each metal from your measurement data. (Hint: Consider using the water displacement technique to measure the volume of your samples.)

58. Using the data from the Nutrition Facts label below, answer the following.
    a. Use the data given on the label for grams of fat and Calories from fat to construct a conversion factor with the units Calories per gram.
    b. Calculate the mass in kilograms of 20 servings of the food.
    c. Calculate the mass of protein in micrograms for one serving of the food.
    d. What is the correct number of significant figures for the answer in item a? Why?

Nutrition Facts

Serving Size ¾ cup (30g)
Servings Per Container About 14

Amount Per Serving	Corn Crunch	with ½ cup skim milk
Calories	120	160
Calories from Fat	15	20
	% Daily Value**	
Total Fat 2g*	3%	3%
Saturated Fat 0g	0%	0%
Cholesterol 0mg	0%	1%
Sodium 160mg	7%	9%
Potassium 65mg	2%	8%
Total Carbohydrate 25g	8%	10%
Dietary Fiber 3g		
Sugars 3g		
Other Carbohydrate 11g		
Protein 2g		

*Amount in Cereal. A serving of cereal plus skim milk provides 2g fat, less 5mg cholesterol, 220mg sodium, 270mg potassium, 31g carbohydrate (19g sugars) and 6g protein.

**Percent Daily Values are based on a 2,000 calorie diet. Your daily values may be higher or lower depending on your calorie needs:

	Calories	2,000	2,500
Total Fat	Less than	65g	80g
Sat Fat	Less than	20g	25g
Cholesterol	Less than	300mg	300mg
Sodium	Less than	2,400mg	2,400mg
Potassium		3,500mg	3,500mg
Total Carbohydrate		300g	375g
Dietary Fiber		25g	30g