

- 14.4. Gold Brick.** You win the lottery and decide to impress your friends by exhibiting a million-dollar cube of gold. At the time, gold is selling for \$426.60 per troy ounce, and 1.000 troy ounce equals 31.1035 g. How tall would your million-dollar cube be?

**Identify:** Find the mass of gold that has a value of  $\$1.00 \times 10^6$ . Then use the density of gold to find the volume of this mass of gold.

**Set Up:** For gold,  $\rho = 19.3 \times 10^3 \text{ kg/m}^3$ . The volume  $V$  of a cube is related to the length  $L$  of one side by  $V = L^3$ .

**Execute:** 
$$m = (\$1.00 \times 10^6) \left( \frac{1 \text{ troy ounce}}{\$426.60} \right) \left( \frac{31.1035 \times 10^{-3} \text{ kg}}{1 \text{ troy ounce}} \right) = 72.9 \text{ kg}$$
 
$$\rho = \frac{m}{V} \text{ so}$$

$$V = \frac{m}{\rho} = \frac{72.9 \text{ kg}}{19.3 \times 10^3 \text{ kg/m}^3} = 3.78 \times 10^{-3} \text{ m}^3, \quad L = V^{1/3} = 0.156 \text{ m} = 15.6 \text{ cm}.$$

**Evaluate:** The cube of gold would weigh about 160 lbs.