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, $\rho = 19.3 \times 10^3$ kg/m$^3$. The volume $V$ of a cube is related to the length $L$ of one side by $V = L^3$.

$$m = \left(1 \times 10^6\right) \left(\frac{1 \text{ troy ounce}}{426.60}\right) \left(\frac{31.1035 \times 10^{-3} \text{ kg}}{1 \text{ troy ounce}}\right) = 72.9 \text{ kg}$$

**Execute:**

$$\rho = \frac{m}{V} \quad \text{so} \quad \rho = \frac{72.9 \text{ kg}}{19.3 \times 10^3 \text{ kg/m}^3} = 3.78 \times 10^{-3} \text{ m}^3$$

$$V = \frac{72.9 \text{ kg}}{19.3 \times 10^3 \text{ kg/m}^3} = 0.156 \text{ m} = 15.6 \text{ cm}$$

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