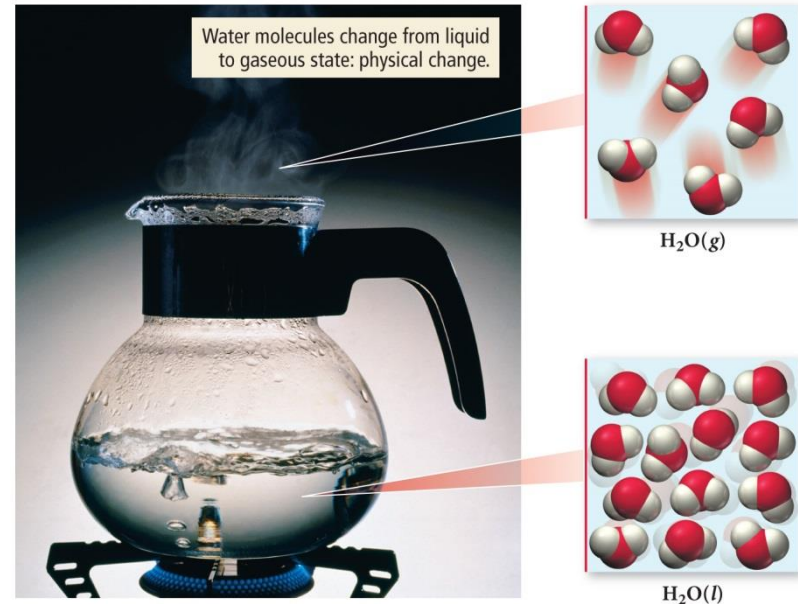


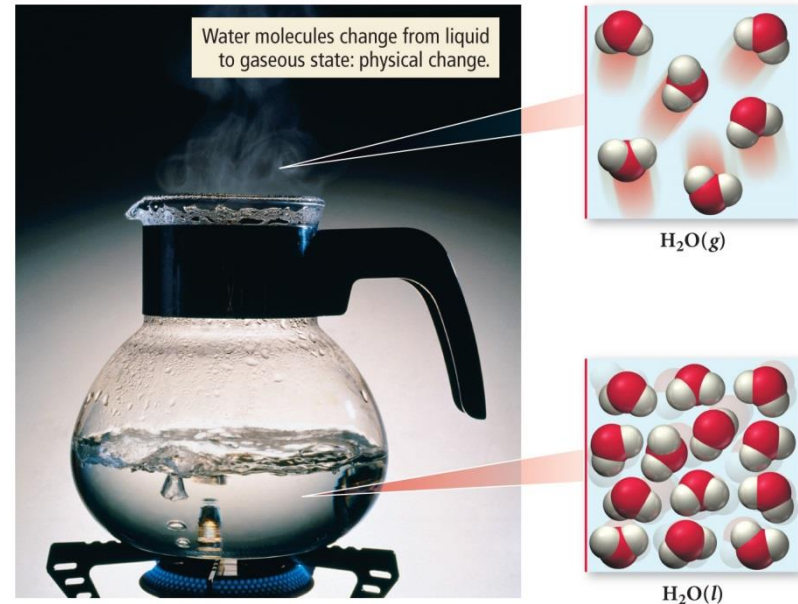
# Which of the following is a hypothesis?

- a) Bubbles form when a liquid is heated in a tea pot.
- b) The bubbles are the gas state of the original liquid.
- c) The molecules in the liquid have enough energy to escape.
- d) We can test whether the bubbles are the gas state of the liquid by removing the heat, at which point the gas should condense.



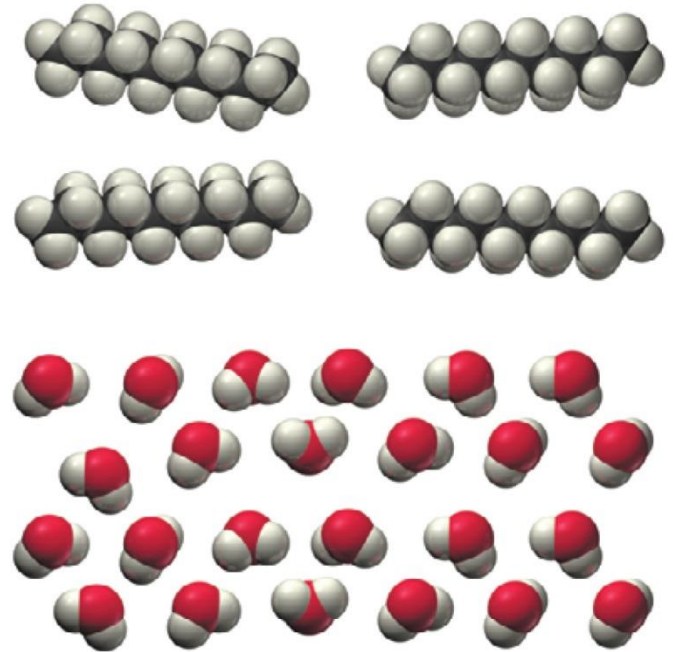
# Which of the following is a hypothesis?

- a) Bubbles form when a liquid is heated in a tea pot.
- b) The bubbles are the gas state of the original liquid.**
- c) The molecules in the liquid have enough energy to escape.
- d) We can test whether the bubbles are the gas state of the liquid by removing the heat, at which point the gas should condense.



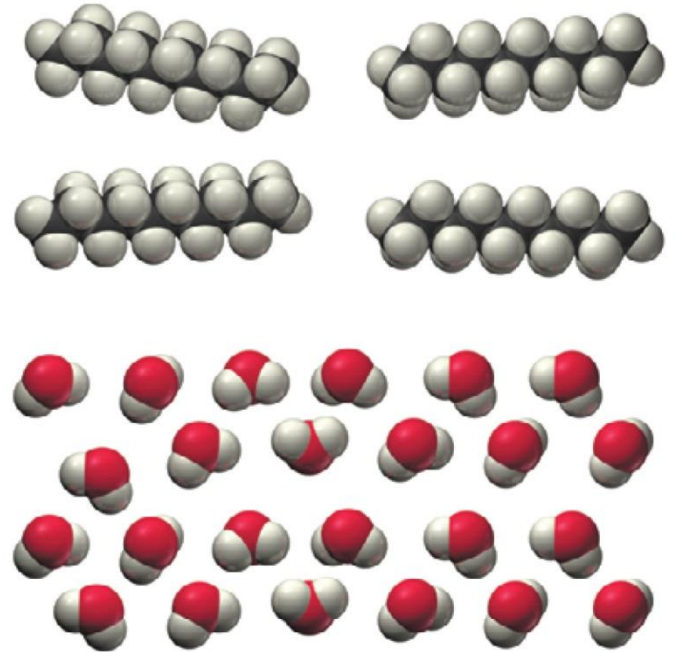
**Which of the following is correct for the material pictured?**

- a) A gaseous pure substance
- b) A liquid pure substance
- c) A gaseous mixture
- d) A solid mixture
- e) None of the above



**Which of the following is correct for the material pictured?**

- a) A gaseous pure substance**
- b) A liquid pure substance
- c) A gaseous mixture
- d) A solid mixture
- e) None of the above



**Which of the following is a pure substance?**

- a) Sweat
- b) Beef stew
- c) Coffee
- d) Apple juice
- e) Ice

**Which of the following is a pure substance?**

- a) Sweat
- b) Beef stew
- c) Coffee
- d) Apple juice
- e) Ice**

**Which of the following is a heterogeneous mixture?**

- a) Seawater
- b) Chicken soup
- c) Coffee
- d) Hydrogen peroxide
- e) Ice

**Which of the following is a heterogeneous mixture?**

a) Seawater

**b) Chicken soup**

c) Coffee

d) Hydrogen peroxide

e) Ice



**Which of the following mixtures is separated best by decanting?**

- a) Two aqueous liquids
- b) A solid and a liquid
- c) A volatile liquid and a non-volatile liquid
- d) Two solids

**Which of the following mixtures is separated best by decanting?**

a) Two aqueous liquids

**b) A solid and a liquid**

c) A volatile liquid and a non-volatile liquid

d) Two solids

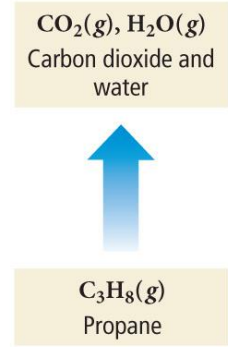
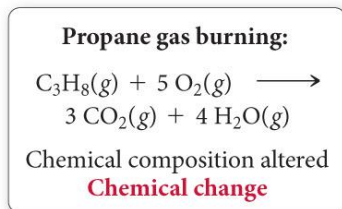
# Which of the following represents a chemical change?

- a) Freezing water to make ice cubes
- b) Dry ice evaporating at room temperature
- c) Toasting a piece of bread
- d) Dissolving sugar in hot coffee
- e) Crushing an aluminum can



# Which of the following represents a chemical change?

- a) Freezing water to make ice cubes
- b) Dry ice evaporating at room temperature
- c) Toasting a piece of bread**
- d) Dissolving sugar in hot coffee
- e) Crushing an aluminum can



**Which of the following is a chemical property?**

- a) Squeezing oranges to make orange juice
- b) Melting butter for popcorn
- c) Separating sand from gravel
- d) Hydrogen peroxide decomposing to water and oxygen
- e) Ozone as a gas at room temperature

**Which of the following is a chemical property?**

- a) Squeezing oranges to make orange juice
- b) Melting butter for popcorn
- c) Separating sand from gravel
- d) Hydrogen peroxide decomposing to water and oxygen**
- e) Ozone as a gas at room temperature

## Which of the following is true?

- a) Energy is always conserved in a physical or chemical change.
- b) Systems with low potential energy tend to change in a direction of high potential energy spontaneously.
- c) Thermal energy is a form of potential energy.
- d) Objects with high potential energy are stable.
- e) Chemical potential energy is a form of kinetic energy.

**Which of the following is true?**

- a) Energy is always conserved in a physical or chemical change.**
- b) Systems with low potential energy tend to change in a direction of high potential energy spontaneously.
- c) Thermal energy is a form of potential energy.
- d) Objects with high potential energy are stable.
- e) Chemical potential energy is a form of kinetic energy.



**Which of the following is NOT a base unit?**

- a) Meter
- b) Kilogram
- c) Liter
- d) Kelvin
- e) Ampere

**Which of the following is NOT a base unit?**

- a) Meter
- b) Kilogram
- c) Liter**
- d) Kelvin
- e) Ampere

**Chlorine vaporizes at  $-34.4\text{ }^{\circ}\text{C}$ . What is this temperature in degrees Fahrenheit?**

- a)  $-34.4\text{ }^{\circ}\text{F}$
- b)  $-29.9\text{ }^{\circ}\text{F}$
- c)  $238.75\text{ }^{\circ}\text{F}$
- d)  $307.55\text{ }^{\circ}\text{F}$
- e)  $273.15\text{ }^{\circ}\text{F}$

**Chlorine vaporizes at  $-34.4^{\circ}\text{C}$ . What is this temperature in degrees Fahrenheit?**

- a)  $-34.4^{\circ}\text{F}$
- b)  $-29.9^{\circ}\text{F}$**
- c)  $238.75^{\circ}\text{F}$
- d)  $307.55^{\circ}\text{F}$
- e)  $273.15^{\circ}\text{F}$

**Temperatures in Death Valley can rise above  $120^{\circ}$  F.  
What is this temperature in Kelvin?**

- a) 393 K
- b)  $-153$  K
- c) 322 K
- d) 234 K



Temperatures in Death Valley can rise above  $120^{\circ}\text{F}$ .  
What is this temperature in Kelvin?

- a) 393 K
- b)  $-153\text{ K}$
- c) 322 K**
- d) 234 K



**Which of the following would NOT be considered an *intensive property* describing an unknown sample?**

- a) It is a solid at 25 ° C.
- b) It has a density of 1.38 g/cm<sup>3</sup>.
- c) It melts at 62.0 ° C.
- d) It has a volume of 0.52 cm<sup>3</sup>.
- e) It is shiny.

**Which of the following would NOT be considered an *intensive property* describing an unknown sample?**

- a) It is a solid at 25 ° C.
- b) It has a density of 1.38 g/cm<sup>3</sup>.
- c) It melts at 62.0 ° C.
- d) It has a volume of 0.52 cm<sup>3</sup>.**
- e) It is shiny.



**What is the density of a solution that has a mass of 13.5 g and a volume of 15.8 mL?**

- a) 1.17 g/mL
- b) 0.213 g/mL
- c) 4.69 g/mL
- d) 0.854 g/mL

**What is the density of a solution that has a mass of 13.5 g and a volume of 15.8 mL?**

- a) 1.17 g/mL
- b) 0.213 g/mL
- c) 4.69 g/mL
- d) 0.854 g/mL**

## Which of the following has the largest density?

- a) A material that has a mass of 10.0 g and a volume of 2.00 L
- b) A material that has a mass of 5.00 g and a volume of 10.0 cm<sup>3</sup>
- c) A material that sinks in ethanol but floats on water

**TABLE 1.4 The Density of Some Common Substances at 20 °C**

Substance	Density (g/cm <sup>3</sup> )
Charcoal (from oak)	0.57
Ethanol	0.789
Ice	0.917 (at 0 °C)
Water	1.00 (at 4 °C)
Sugar (sucrose)	1.58
Table salt (sodium chloride)	2.16
Glass	2.6
Aluminum	2.70
Titanium	4.51
Iron	7.86
Copper	8.96
Lead	11.4
Mercury	13.55
Gold	19.3
Platinum	21.4

## Which of the following has the largest density?

- a) A material that has a mass of 10.0 g and a volume of 2.00 L
- b) A material that has a mass of 5.00 g and a volume of 10.0 cm<sup>3</sup>
- c) A material that sinks in ethanol but floats on water**

**TABLE 1.4 The Density of Some Common Substances at 20 °C**

Substance	Density (g/cm <sup>3</sup> )
Charcoal (from oak)	0.57
Ethanol	0.789
Ice	0.917 (at 0 °C)
Water	1.00 (at 4 °C)
Sugar (sucrose)	1.58
Table salt (sodium chloride)	2.16
Glass	2.6
Aluminum	2.70
Titanium	4.51
Iron	7.86
Copper	8.96
Lead	11.4
Mercury	13.55
Gold	19.3
Platinum	21.4

**When reading a graduated cylinder, read the volume at the bottom of the meniscus.**

**What volume of liquid is in the graduated cylinder?**

- a) 4 mL
- b) 5 mL
- c) 4.5 mL
- d) 4.6 mL
- e) 4.56 mL



**When reading a graduated cylinder, read the volume at the bottom of the meniscus.**

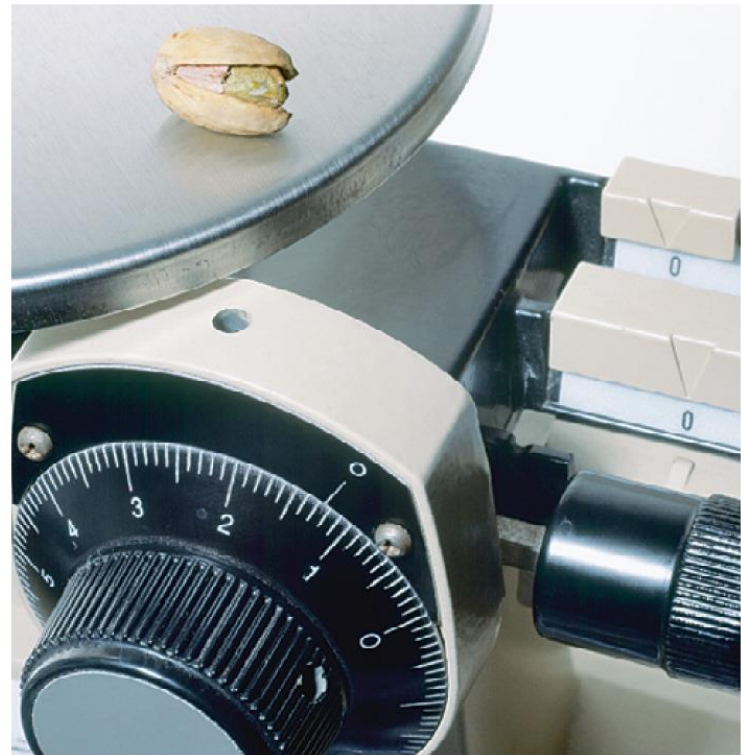
**What volume of liquid is in the graduated cylinder?**

- a) 4 mL
- b) 5 mL
- c) 4.5 mL
- d) 4.6 mL
- e) 4.56 mL**



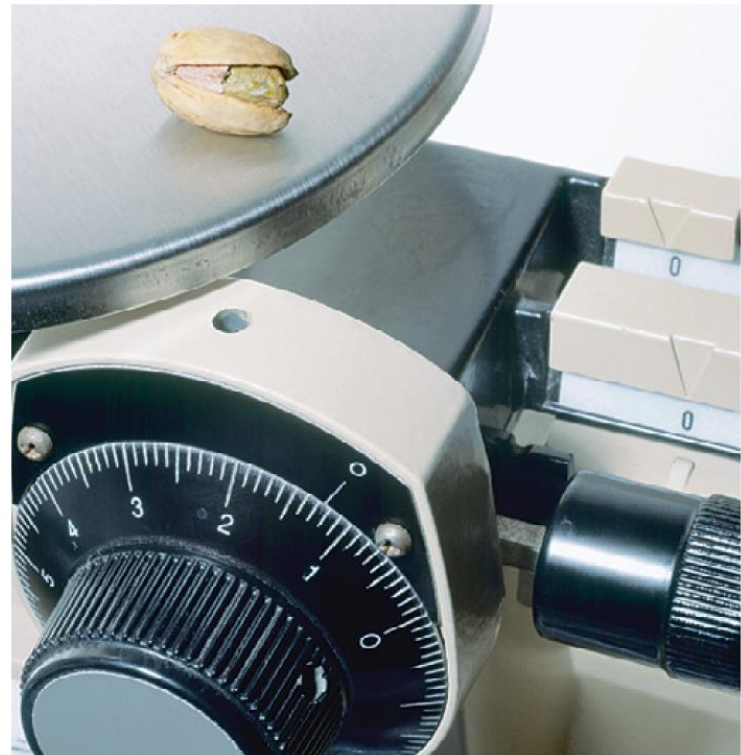
**Which of the following numbers has four significant figures?**

- a) 0.003
- b) 0.7180
- c) 0.10251
- d) 0.508



**Which of the following numbers has four significant figures?**

- a) 0.003
- b) 0.7180**
- c) 0.10251
- d) 0.508





**Calculate the following with the correct number of significant figures.**

$$\frac{(1.428 - 1.08)}{0.288} + (2.83 \times 0.360) =$$

- a) 2
- b) 1.4
- c) 2.2
- d) 1.36
- e) 2.23

**A student measures the mass of a penny four times and records the following data. What can be said about the data if the actual mass of the penny is 2.4987 g?**

- a) The data is both accurate and precise.
- b) The data is neither accurate nor precise.
- c) The data is accurate, but not precise.
- d) The data is not accurate, but it is precise.

<b>Trial Number</b>	<b>Mass, g</b>
1	2.5104
2	2.5106
3	2.5102
4	2.5109

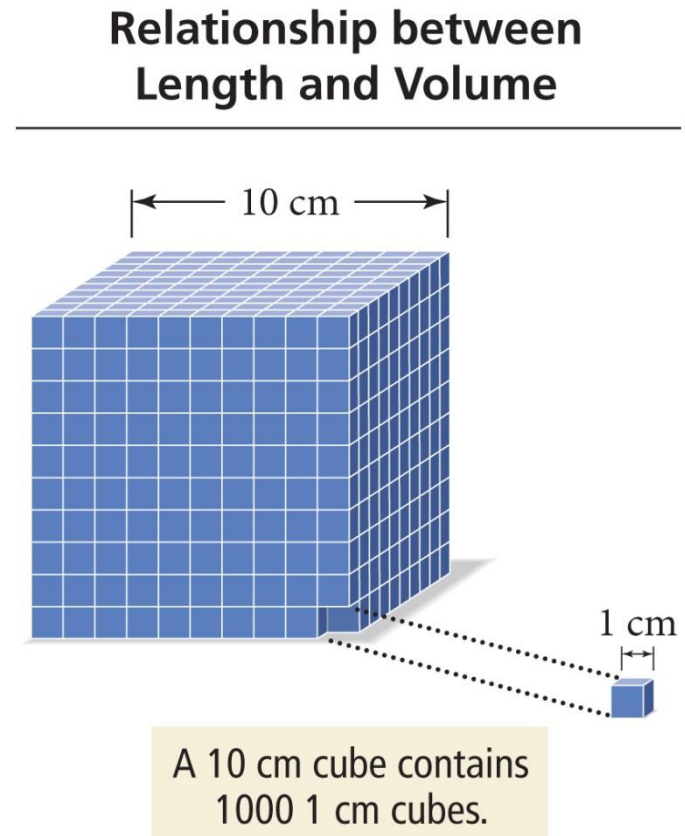
**A student measures the mass of a penny four times and records the following data. What can be said about the data if the actual mass of the penny is 2.4987 g?**

- a) The data is both accurate and precise.
- b) The data is neither accurate nor precise.
- c) The data is accurate, but not precise.
- d) The data is not accurate, but it is precise.**

<b>Trial Number</b>	<b>Mass, g</b>
1	2.5104
2	2.5106
3	2.5102
4	2.5109

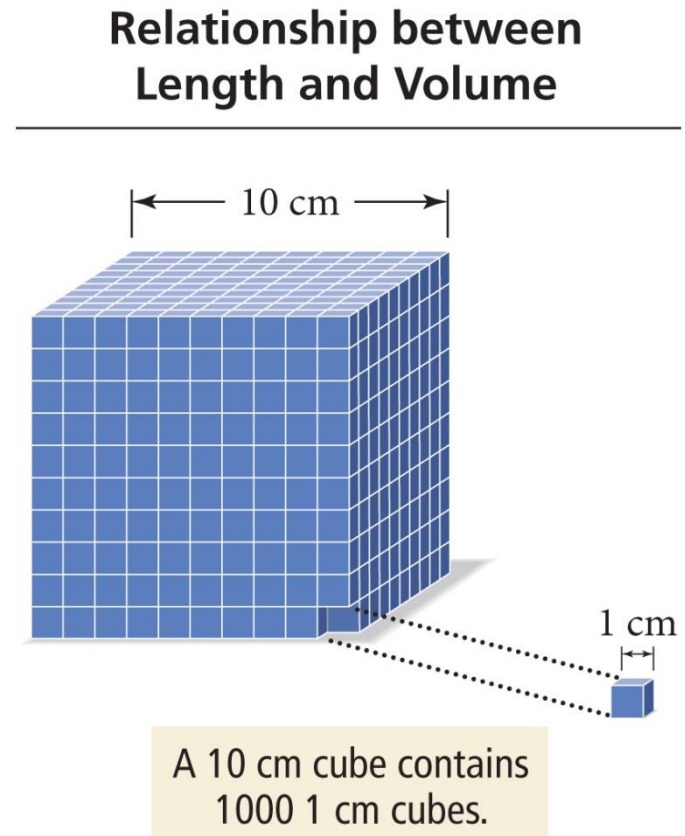
**How many ounces of mercury are in 1.0 cubic meters of mercury? Hint: the density of mercury is  $13.55 \text{ g/cm}^3$  and 1 ounce = 28.35g.**

- a)  $6.5 \times 10^6$  ounces
- b)  $4.8 \times 10^5$  ounces
- c)  $5.2 \times 10^4$  ounces
- d)  $6.5 \times 10^4$  ounces
- e) 48 ounces



How many ounces of mercury are in 1.0 cubic meters of mercury? Hint: the density of mercury is  $13.55 \text{ g/cm}^3$  and 1 ounce = 28.35g.

- a)  $6.5 \times 10^6$  ounces
- b)  $4.8 \times 10^5$  ounces**
- c)  $5.2 \times 10^4$  ounces
- d)  $6.5 \times 10^4$  ounces
- e) 48 ounces



**A cube has an edge length of 6.4 in. What is the volume of the cube in  $\text{cm}^3$ ?**

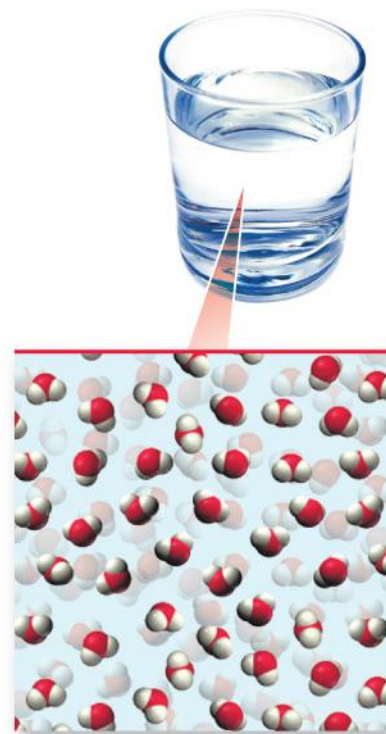
- a)  $4.3 \times 10^3 \text{ cm}^3$
- b)  $6.7 \times 10^2 \text{ cm}^3$
- c)  $16 \text{ cm}^3$
- d)  $1.0 \times 10^2 \text{ cm}^3$

**A cube has an edge length of 6.4 in. What is the volume of the cube in  $\text{cm}^3$ ?**

- a)  $4.3 \times 10^3 \text{ cm}^3$**
- b)  $6.7 \times 10^2 \text{ cm}^3$**
- c)  $16 \text{ cm}^3$**
- d)  $1.0 \times 10^2 \text{ cm}^3$**

**Determine the mass of 2.5 cups of water if the density of water is  $1.00 \text{ g/cm}^3$  and  $1 \text{ cup} = 240 \text{ mL}$ .**

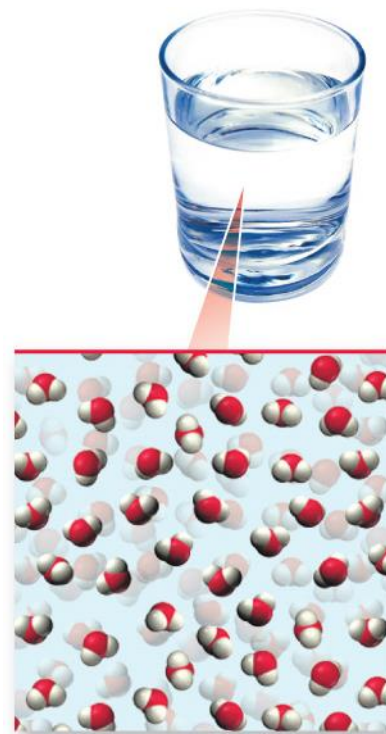
- a)  $2.5 \text{ g}$
- b)  $6.0 \times 10^2 \text{ g}$
- c)  $1.0 \times 10^{-2} \text{ g}$
- d)  $2.4 \times 10^2 \text{ g}$
- e)  $1.0 \times 10^2 \text{ g}$





**Determine the mass of 2.5 cups of water if the density of water is  $1.00 \text{ g/cm}^3$  and  $1 \text{ cup} = 240 \text{ mL}$ .**

- a) 2.5 g
- b)  $6.0 \times 10^2 \text{ g}$**
- c)  $1.0 \times 10^{-2} \text{ g}$
- d)  $2.4 \times 10^2 \text{ g}$
- e)  $1.0 \times 10^2 \text{ g}$



**A cube of aluminum (density = 2.70 g/mL) has a mass of 17.2 g. What is the edge length of the cube?**

- a) 6.34 cm
- b) 1.85 cm
- c) 2.58 cm
- d) 3.59 cm

**A cube of aluminum (density = 2.70 g/mL) has a mass of 17.2 g. What is the edge length of the cube?**

- a) 6.34 cm
- b) 1.85 cm**
- c) 2.58 cm
- d) 3.59 cm