Three Systems for Measuring Temperature

- Fahrenheit

- Celsius

- Kelvin
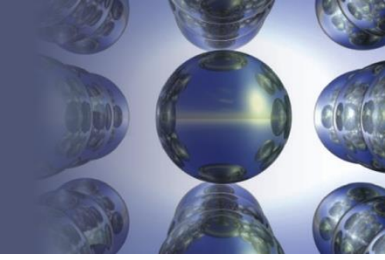
Converting Between Scales

$$T_{\text{K}} = T_{\text{C}} + 273.15 \qquad\qquad T_{\text{C}} = T_{\text{K}} - 273.15$$

$$T_{\text{C}} = \left(T_{\text{F}} - 32{}^{\circ}\text{F}\right)\frac{5{}^{\circ}\text{C}}{9{}^{\circ}\text{F}} \qquad T_{\text{F}} = T_{\text{C}} \times \frac{9{}^{\circ}\text{F}}{5{}^{\circ}\text{C}} + 32{}^{\circ}\text{F}$$
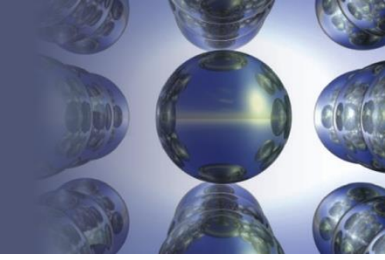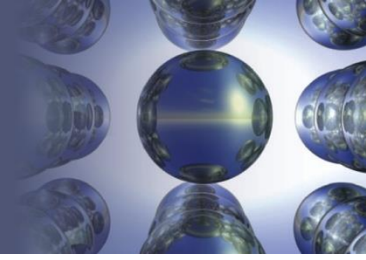
- Mass of substance per unit volume of the substance.

- Common units are g/cm^3 or g/mL.

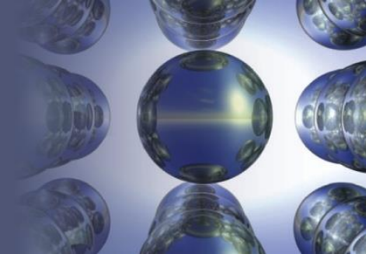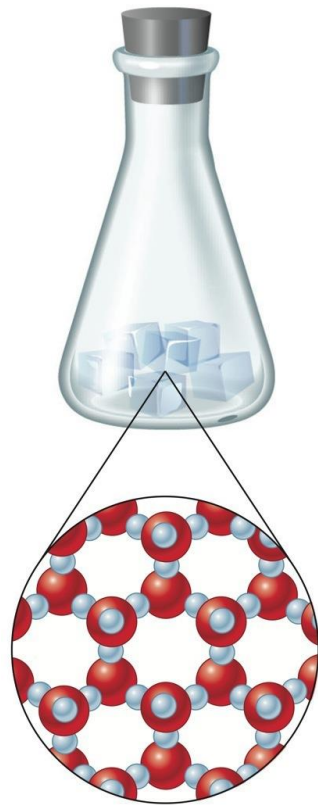$$\text{Density} = \frac{\text{mass}}{\text{volume}}$$

Matter

- Anything occupying space and having mass.

- Matter exists in three states.
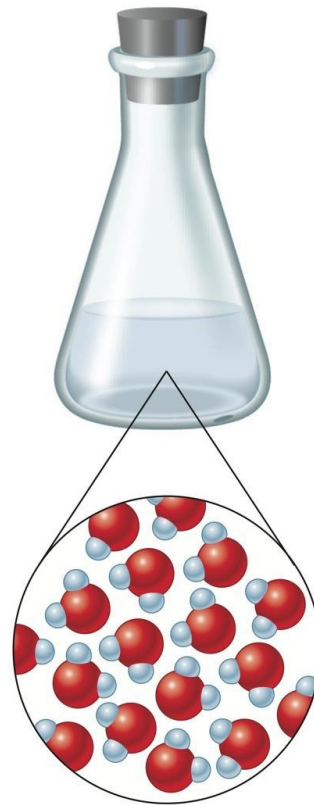
  - Solid

  - Liquid

  - Gas

The Three States of Water
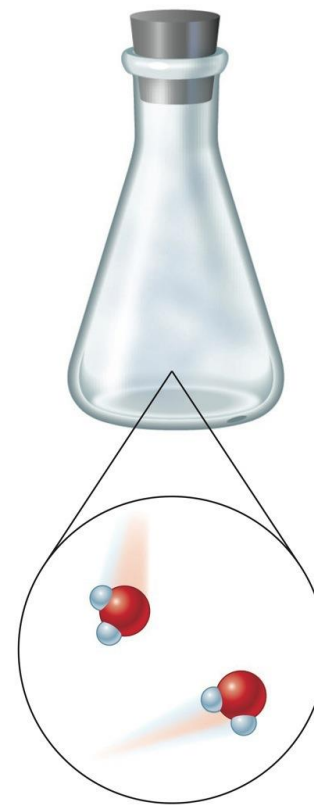

Ice

Solid: The water molecules are locked into rigid positions and are close together.

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Water

Liquid: The water molecules are still close together but can move around to some extent.
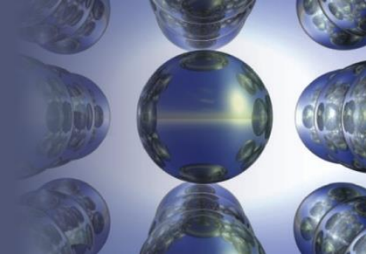
Steam

Gas: The water molecules are far apart and move randomly.

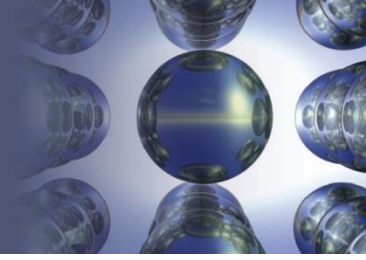## Solid

- Rigid
- Has fixed volume and shape.

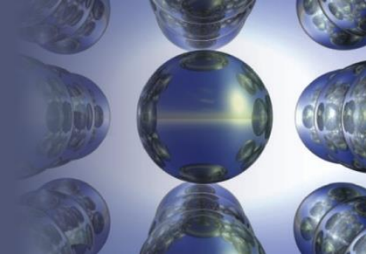## Liquid

- Has definite volume but no specific shape.

- Assumes shape of container.

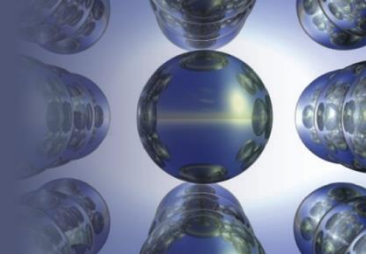## Gas

- Has no fixed volume or shape.

- Takes on the shape and volume of its container.

Mixtures

- Have variable composition.

   Homogeneous Mixture

   - Having visibly indistinguishable parts; solution.

   Heterogeneous Mixture

   - Having visibly distinguishable parts.

The Organization of Matter