

Chemical and physical properties

## Physical Properties of Food...



Oh, it

**MATTER**.....

# Matter:

## Anything with mass & volume

- Every element/compound is ***unique*** in some way from all others.
- If you know enough about a substance, you can figure out what it is.
- If you know what a substance is, you can know all types of things about it.



# Matter

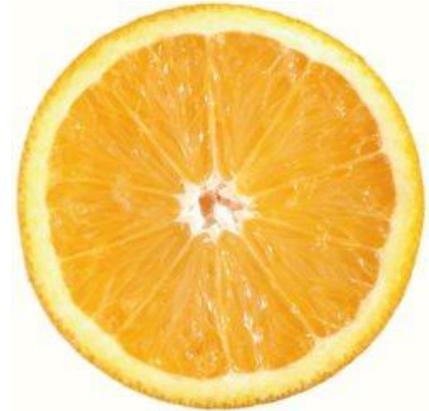
- All matter has 2 types of properties:
  - **Physical**
  - **Chemical**



# Physical **Properties** of Matter

- A **physical property** is a characteristic of a substance that can be observed without changing the substance into another substance.

You can see it without changing what you're looking at into something else.



# Physical **Properties** of Matter

Used to describe objects matter) and are used to identify  
compare different types of matter

Color, odor, size, shape, state (phase), texture, hardness, taste,  
density, boiling point, melting point, freezing point, magnetism,  
conductivity, conducts heat, mass, weight, volume, solubility ...

# Physical Properties

Physical properties can be extensive or intensive:

- **Extensive properties:**

- DEPENDENT on the amount of a substance that you have.

- **Intensive properties:**

- NOT DEPENDENT on how much you have.

# Physical Properties

- Examples of **extensive** physical properties include:
  - Volume
  - Mass
  - Weight
  - Size

# Physical **Properties**

- Examples of **intensive** physical properties include:
  - Density
  - Melting point
  - Boiling point

# Physical Properties

- Color
- Hardness
- Odor
- Taste
- State of matter
- Texture
- Luster (shine)
- Flexibility
- Heat conductivity
- Solubility:
  - ability to dissolve in water
- Shape
- Viscosity

Often characteristics found in  
**SENSORY EVALUATIONS**

# Physical Properties

- List as many physical properties as you can for this item



# Physical Change

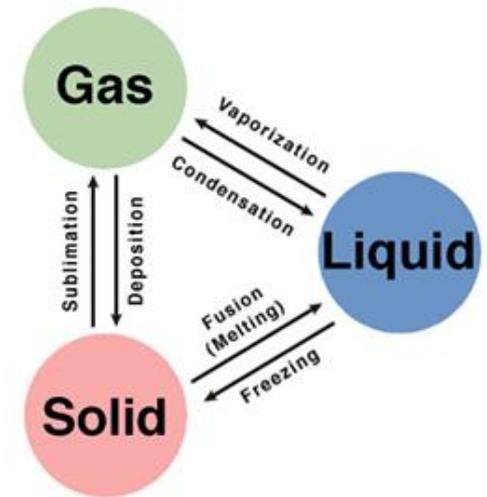


- Change in size, state or shape or changes in other physical properties.
- One or more **physical attributes transform**, but the **chemical identity is unchanged**.
  - i.e. The physical state changes but does not change what the substance is

# Physical Change Examples

- **Examples** of physical change include:

- Change in shape
- Change in form
- Change in size
- Change in **phase**
  - Melting (solid to liquid)
  - Boiling (liquid to gas)
  - Evaporation (liquid to gas)
  - Condensation (gas to liquid)
  - Freezing (liquid to solid)
  - Sublimation (solid to gas)
  - Deposition (gas to solid)



**Phase change** is a physical change in the visible structure without changing the molecular structure

# Physical Changes

- Physical changes might be caused by:
  - Grinding
  - Cutting
  - Crushing
  - Bending
  - Breaking
  - Heating/cooling
    - (change in phase)
  - Squishing



Physical changes are usually **reversible**

# Physical Changes

- What could you do to these items to cause a physical change to occur?



# Physical Changes & Mixtures

- **Mixtures** are substances that are put together, but not chemically combined
  - **Homogeneous mixtures**
  - **Heterogeneous mixtures**

# Physical Changes & Mixtures

- **Heterogeneous mixtures:**
  - **Nonuniform** distribution of particles
  - Not evenly mixed



# Physical **Changes & Mixtures**

- **Heterogeneous mixtures will be **INSOLUBLE:****
  - Will not dissolve

# Physical **Changes & Mixtures**

- **Homogeneous mixtures** have a **uniform distribution** of particles



# Physical Changes & Mixtures

- **Homogeneous** mixtures often have a **solution** in which a **solute** is dissolved by a **solvent**

**Solution = SOLUTE + SOLVENT**

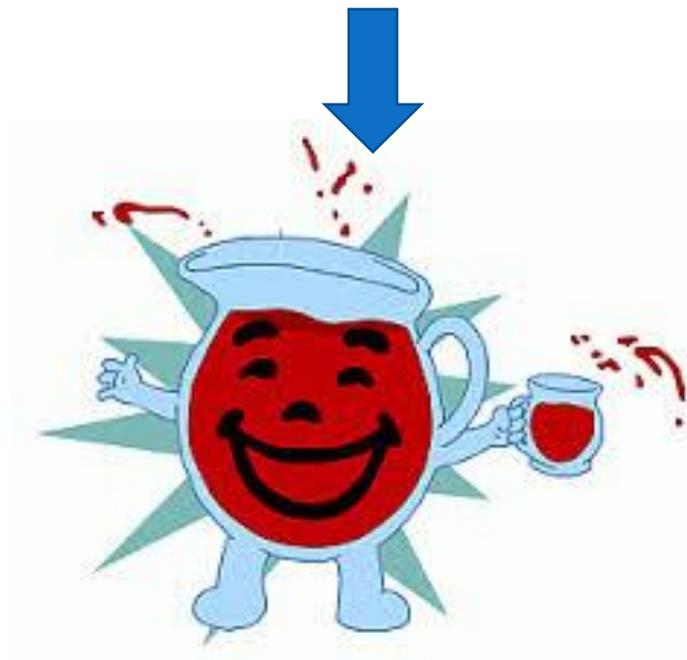
**Solute:** Gets dissolved

- May lower freezing point
- May increase boiling point

**Solvent:** Does the dissolving

# Physical Changes & Mixtures

- Which is the solute and which is the solvent in this solution?



# Physical Changes & Mixtures

Homogeneous or Heterogeneous?



# Physical **Changes & Mixtures**

Homogeneous or Heterogeneous?



# Physical **Changes & Mixtures**

Homogeneous or Heterogeneous?



# Physical **Changes & Mixtures**

Homogeneous or Heterogeneous?



# Physical Changes & Mixtures

- Place  $\frac{1}{2}$  a Graham Cracker on a small microwaveable plate. Top with  $\frac{1}{4}$  of a milk chocolate bar and one large marshmallow.
- Cook in the microwave on high for about 8-10 seconds or until marshmallow puffs and grows.
- Carefully remove the plate from the microwave, top with the other graham cracker half and gently press down on the gooey marshmallow. Let cool a bit before eating.

# Physical Changes & Sensory Evaluation

- As a group, create a sensory evaluation form that could be used to evaluate the product. Consider what tool you believe would be most effective for the age group who this product most likely is marketed for. Keep in mind physical changes that should be present if prepared correctly.
- **Evaluate one or all of the following (depending on scale used):**
  - Appearance
  - Texture
  - Hearing
  - Flavor:
    - Taste
    - Aroma