

PHYSICAL AND CHEMICAL PROPERTIES OF MATTER

The physical properties of matter

- ① We have already learned some physical properties of matter
 - Volume
 - Density

Physical properties of matter

- ⦿ Physical properties can be observed or measured without changing the identity of matter
- ⦿ Properties you notice when using your five senses:
 - Touch/feel- Mass, volume, texture
 - Sight- color
 - Hear
 - Smell
 - taste

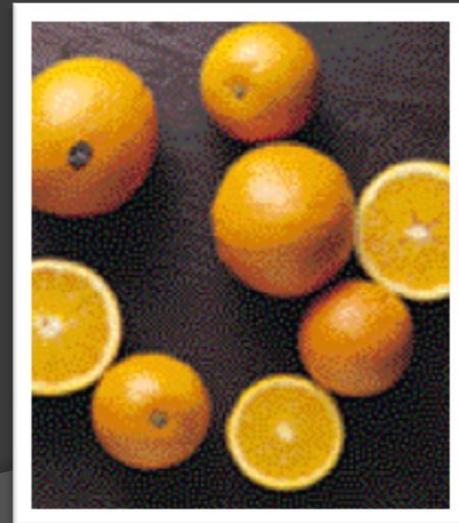
Physical properties

- Color
- Odor
- Luster- How shiny a substance is
- Malleability- the ability of a substance to be beaten into thin sheets
- Ductility- The ability of a substance to be drawn into thin wires

- **Conductivity**- the ability of a substance to allow the flow of electricity
- **Hardness**- how easily a substance can be scratched
- **Melting/freezing point**- the temperature at which the solid and liquid phases of a substance change
- **Boiling point**- the temperature at which the vapor pressure of the liquid is equal to the pressure of the liquid
- **Solubility**- if an object is soluble or insoluble

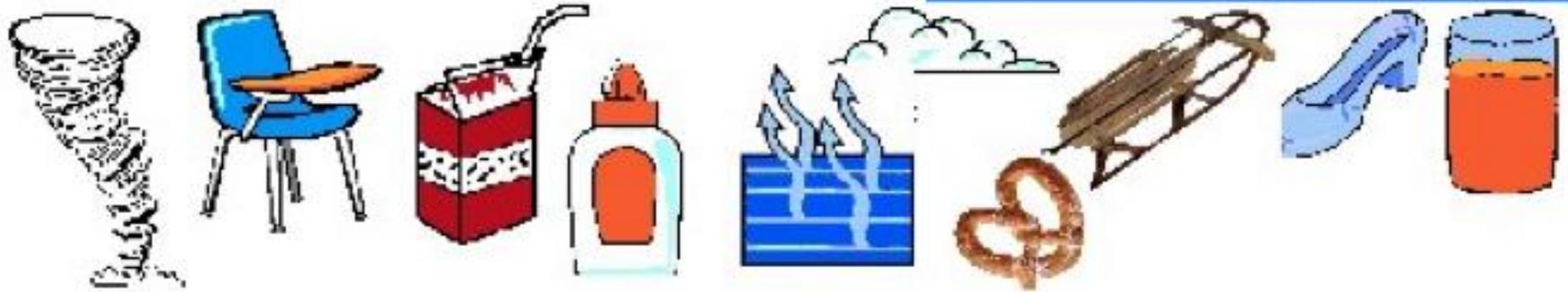
Properties of matter

- ⦿ Remember all objects take up space and has mass
- ⦿ You use your sense of taste and smell to tell the difference between spinach and an orange



Properties of matter

- A property describes how an object looks, feels or acts.
- The objects shown has different kinds of properties



Physical vs. Chemical

- Physical properties: observe without changing the identity of the substance
- Chemical properties: observe only when the identity changes
- How do you know if it's a chemical or physical change?
 - If it **CH**anges, it's **CH**emical

Chemical properties

- ⦿ common chemical property are:
 - Reactivity-the tendency of a substance to undergo chemical reaction.
 - Reactive to oxygen
 - Reactive to air
 - Reactive to water
 - pH- Measures how acidic (high concentrated) or how basic (low concentration)a solution is
 - Oxidation- the interaction between oxygen molecules and other substances (rust)

NOTICE: that a chemical properties aren't EASY to observe, unlike physical properties

I have Question, Who has the answer?

- ① You have an answer card or a question card.
- ① Match the appropriate answer with the correct question.
- ① When you have found your match sit down.
 - Let's review this vocabulary one more time!

Properties are constantly changing

- ⦿ Matter is constantly changing
 - Ice in your soda melts
 - Glass breaks
 - Paper is ripped

Where does the ice go? What does it become?

Physical Changes

- Changes in matter that do not alter the identity of matter itself

Physical Changes

- ⦿ Changes that do NOT change the identity of the substance
- ⦿ You may or may not be able to undo a physical change

Physical Changes

⦿ For example

- Size
- Shape
- State of matter: solid, liquid and gas
- Dilutions- the water doesn't turn into soil or macaroni. It remains water
- If water did change into macaroni, you would have an example of a chemical change

What are some signs of a chemical change?

⦿ Let's observe!

- What changes did you observe in the first cup?
- Do you think that chemical changes occurred? Why or Why not
- What are some characteristics of chemical changes?

Chemical Changes

- ⦿ Chemical changes DO alter the identity of a substance.
- ⦿ A substance changes into an entirely different substance
- ⦿ For example:
 - Iron rusting
 - Wood burning
 - Copper turning into brass
 - Baking a cake
 - Spoiled milk

Chemical properties

- ⦿ These are properties that can only be observed by changing the identity of the substances
- ⦿ A piece of paper burns and turns to a black substance
- ⦿ After the flame goes out you can no longer burn the new substance
- ⦿ The chemical properties have been changed

Spoiled milk

- ⦿ What happens when milk goes bad?
 - The milk gets a sour odor and becomes lumpy
 - Unlike a physical change, you cannot reverse chemical changes

Signs of a Chemical Change

- Production of odor
- Change in temperature
- Change in color
- Formation of gas (bubbles)
- Formation of a precipitate (solid)