

Notes: Chapter 1 Describing Matter

matter	anything that has <u>mass</u> and <u>takes up space</u> the amount of matter in an object - measure as weight volume
different types of matter	<u>substance</u> - matter that has same make up and properties

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matter has 2
kinds of
properties

Physical Properties

a characteristic that can
be observed without
changing the substance

Chemical Properties

describes the ability of a
substance to change into
another substance.

atoms

All matter is made up of tiny
particles called atoms

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Atoms

made of protons, neutrons and electrons

Protons -> positive charge

neutrons -> neutral charge

electrons -> negative charge

Elements

- matter made up of only one type of atom
- simplest substances - cannot be broken down into any other substance
- about 100 elements on earth - make up all matter on Earth and in universe

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Elements

examples:

- gold
- helium
- oxygen
- copper

Combining atoms

atoms have the ability to combine to form new substances

atoms combine with **chemical bond**

force of attraction between 2 atoms

molecules

groups of 2 or more atoms held together by chemical bonds

molecules have different properties than the elements that make them up

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molecules

Examples:

water: H_2O - hydrogen + oxygen
carbon dioxide: CO_2 - carbon + oxygen

compound

- a pure substance made of 2 or more elements, chemically combined in a set ratio
- compounds formed only with a chemical reaction - bond formed
- compounds have different properties than the elements that form them
- cannot be separated unless chemical bond is broken

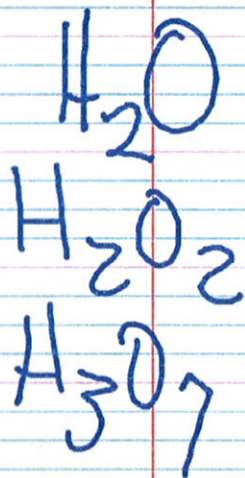
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chemical
formula

formula that shows the elements in a compound and the number of each type of atom in that compound

mixtures

- mixture is made of two or more substances that are together, but not chemically combined
- each substance keeps individual properties
- substances NOT combined in a set ratio
- mixtures can be separated easily, without breaking chemical bonds



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Heterogeneous Mixtures

Heterogeneous mixture - different parts of mixtures able to be seen - not evenly mixed **ex. salad, chex mix**

- Homogeneous Mixtures

Homogeneous mixture - evenly mixed - can't see the different parts **ex. lemonade, brass, pop**

2 types of mixtures

Physical Change

A change in form or appearance but the substance stays the same

Changes of state

solid -> liquid = melting

liquid -> solid = freezing

liquid -> gas = evaporation

gas -> liquid = condensation

Changes in shape or form

physical change - changes appearance:

ripping, tearing, dissolving, crushing, grinding, bending

Chemical Change

chemical change changes the substance into 1 or more new substances with different properties

Signs of a physical change

- no new substance
- change in appearance - size, shape, state of matter

Examples of Chemical Change

1) combustion -
burning

2) Electrolysis
breaking apart or
putting together
substances using
electricity

3) tarnishing -
substance reacts with another
substance:
silver + sulfur in air -> tarnish
copper -> tarnishes

4) oxidizing
substance reacts with
oxygen: rusting

Indication of Chemical Change

- **New substance is made**
- **color change**
- **gas released (bubbles)**
- **odor**
- **light released**
- **heat released (feels hot)**
- **heat absorbed (feels cold)**

Law of Conservation of Mass/Matter
Matter cannot be created or destroyed
-> it only changes form

33.5g - Poly B
56.4g - Poly A
54.4 - Total after

Energy - the ability to do work

Energy - all physical and chemical changes require a change in energy

Thermal energy always flows from warmer matter to cooler matter

Endothermic change

Energy is taken in

- feels cold
- ex: ice melting

Exothermic change

Energy is given off

- feels hot
- ex: fire burning

visual

Ch. 2-1: States of Matter - Notes p. 42-47

state of matter properties

Solids

definition:

have a definite shape and volume

Particles in a solid: tightly packed in a fixed position

2 types of solids:

1. crystalline - particles form regular - repeating pattern
2. amorphous - particles do not form a regular, repeating pattern

Liquids

definition:

have a definite volume but not a definite shape

particles in a liquid: tightly packed but move freely

properties of a liquid:

surface tension: inward pull of molecules

viscosity: resistance to flowing

high viscosity - flow slowly

low viscosity - flow fast

Gases

definition:

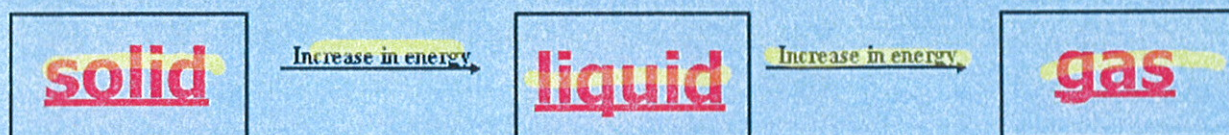
have no definite shape or volume

As gas particles move, they - spread apart to fill the space they are in

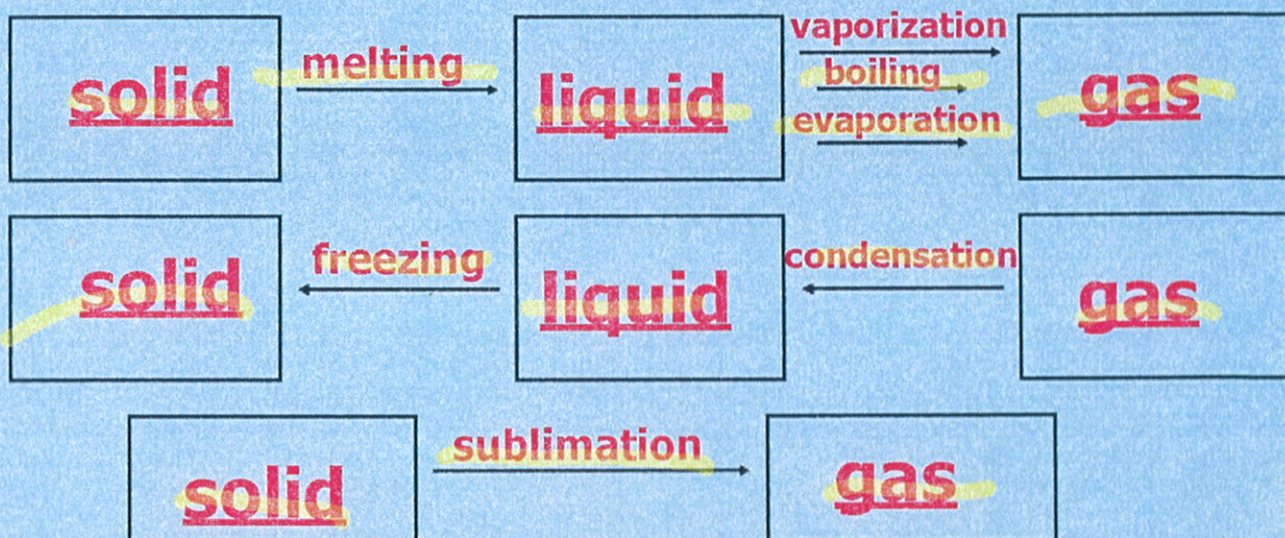
2-2: Changes of State

Changes in state occur when thermal energy increases or decreases.

List the states in order from least energy to most energy:



Label the states of matter and the changes that occur between states:



Melting point - the temperature at which a solid becomes a liquid

Boiling point - the temperature at which a substance boils

reset
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