

Lesson 1: Properties of Matter/History of Chemistry

Physical Properties:

Physical Property	Description
Boiling/ Condensing Point	temp. of boiling
Melting/Freezing Point	temp. of melting
Malleability	ability to form sheets
Ductility	ability to be stretched
Colour	
State	Solid, liquid, gas
Solubility	dissolves
Crystal Formation	
Conductivity	Conduct electricity or heat
Magnetism	

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Chemical Properties: Describes the reactivity of a substance.

Chemical Property	Description
Ability to burn	combustion
Flash Point	temp to ignite
Behaviour in Air	tendency to degrade, react, or tarnish
Reaction with water	tendency to corrode or dissolve
Reaction with acids	corrosion, bubbles
Reaction to heat	melt, decompose
Reaction to red and blue litmus	red - acid blue - base

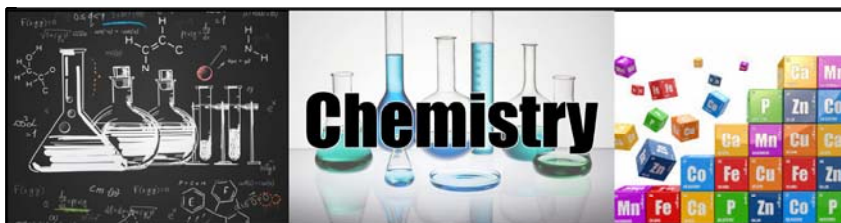
To observe chemical properties you must observe a reaction with substances. To observe physical properties you may observe a change in state.

Evidence of a chemical reaction includes a new substance being produced.

Recognizing chemical reactions

- > Produces a new substance
- > Change in temperature
- > Phase change (bubbles, solid, cloudy)  
precipitate

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### History of Chemistry

Metallurgy – science of producing and using metals

- Gold, copper, silver, lead, iron before 3000BC
- Copper was used in weapons but broke easily when shaped
- Heat the copper before shaping; annealing
- Smelting – heat the substance to separate the metals in a compound
- Alloy - mixing metals
  - Bronze = copper and tin
  - Steel = iron and carbon

Aristotle

- Matter composed of combinations of fire, earth, water, and air

Democritus

- Matter made up of tiny particles that cannot be divided
- He called the particles atoms

Alchemy – combination of science and magic

- Scientists tried to change lead into gold
- Made many advances; scientific process, lab equipment, element discovery

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### Models of the Atom

John Dalton (1766-1844)

- He thought the atoms were small spheres with varied size, mass, colour
- Dalton's Model of the Atom
  - All matter is made of small indivisible particles called atoms
  - All atoms of an element are identical in size and mass
  - Atoms of different elements have different properties
  - Atoms of different elements combine in specific fixed ratios to form new substances

JJ Thompson (1856-1940)

- Discovered the electron
- Suggested the atom was positively charged sphere with negative particles imbedded in it
- Japanese Scientist Nagaoko proposed that the electrons travelled around the sphere like the rings of Saturn

Rutherford (1871-1937)

- Discovered the nucleus of the atom
- disproved JJ Thompson's model to show that atom must have a tiny, positively charged core
- Calculated the nucleus to be about 1/10000 the size of the atom, an ant on a football field
- earned a Nobel Prize in Chemistry for his work on radioactivity

Neils Bohr (1885-1962)

- Proposed electron surrounded the nucleus at specific energy levels
- Electrons release light when they fall from an energy level
- Don't fall into positively charged nucleus because they cannot go past the lowest level

Quantum Model of the Atom

- Each electron is a cloud of negative charge, instead of a tiny negative charge
- The electron cloud surrounds the nucleus
- The nucleus contains protons and neutrons
- Protons have a positive charge, neutrons have no charge

Pg. 17 # 1, 3, 4, 6.

Pg. 25 # 10, 11.

Read Pg 6-26.

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