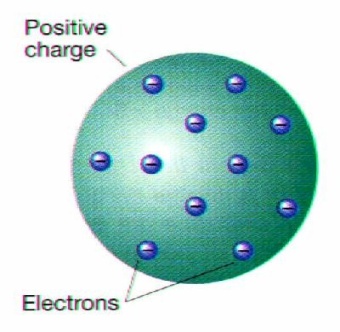
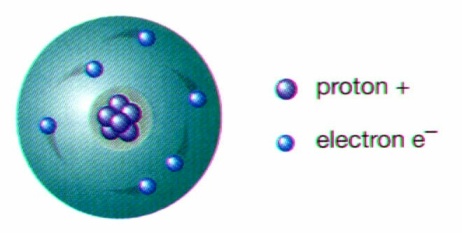
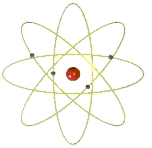
**Name\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_Period\_\_\_\_\_\_\_Date\_\_\_\_\_\_\_\_\_\_\_\_**

**Unit 7 Guided Notes: The Atom**

History of Atomic Models

* \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_(~400 BC)
  + Proposed that \_\_\_\_\_\_\_\_\_ was composed of tiny \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ particles
  + \_\_\_\_\_\_\_\_\_\_\_\_\_\_=small, solid, indestructible particles of different shapes and sizes
  + These were just ideas, not truly science
* **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**(next 2000 years)
  + Mixture of science and mysticism
  + Lab procedures were developed, but did not perform control experiments like real scientists
* \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
  + \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_Model
    - Atom is a small \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
  + Developed notion of conservation of \_\_\_\_\_\_\_\_\_\_\_ and that atoms combine in \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
* 5 Main Points of Dalton’s Atomic Theory
  1. Elements are made of \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
  2. Al atoms of a given element are \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
  3. Atoms of a given element are \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ than those of any other \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
  4. Atoms of one element can \_\_\_\_\_\_\_\_\_\_\_\_ with atoms of other elements to give \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
  5. Atoms cannot be \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
* Problems with Dalton’s atomic theory
  + Problem with #1: Atoms can be \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_, but only in a \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ reaction
  + Problem with #2: does not account for \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ (atoms of the same element but different \_\_\_\_\_\_\_\_ due to different number of \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_)
  + Problem with #3&4: NONE
  + Problem with #5: NONE, except for nuclear reactions that can change atoms of one element to a \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
* \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_(1896)
  + Discovered \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
    - Spontaneous emission of radiation from the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
    - Three types:
      * \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
      * \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
      * \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
* \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_(1903)
  + \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_Experiments
  + Discovered \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
    - \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_particles of \_\_\_\_\_\_\_\_\_\_\_\_\_ the atom
  + \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_Model
    - \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_sphere (Pudding) with \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_(plums) dispersed throughout
* Ernest \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_(1911)
  + \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_Experiment
  + Discovered the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
    - \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ of the atom
  + \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_Model
    - Dense positive nucleus surrounded by negative electrons
* Niels \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_(1913)
  + Bright Line Spectrum
    - Tried to explain the presence of specific colors in hydrogen’s spectrum
  + \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
    - \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ can only exists in \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
  + \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_Model
    - Electrons move in \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

* Erwin \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_(1926)
* Quantum Mechanics: Electrons can only exist in specified energy states
* \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_Model**:** \_\_\_\_\_\_\_\_\_\_\_\_\_: region around the nucleus where electrons are \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ to be found
* James \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_(1932)**:**  discovered \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Atomic Structure

**Chemical Symbols**

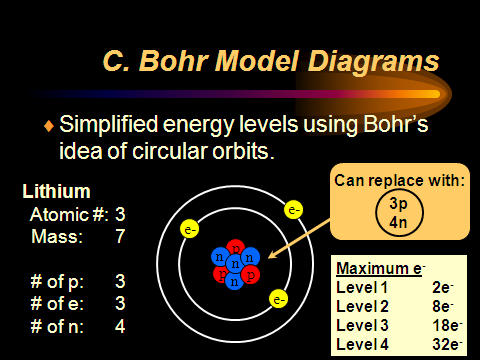
* Capitals matter!!!
* Element symbols contain \_\_\_\_\_\_\_ capital letter followed by \_\_\_\_\_\_\_\_\_\_\_\_\_\_ letter(s) if necessary.
* Example:

**Atomic Structure Basics**

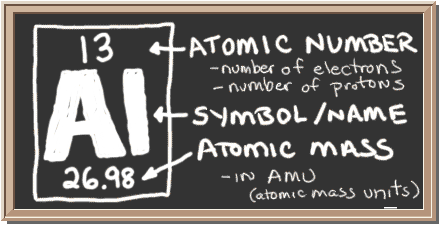
* Remember, the atom is the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ unit of \_\_\_\_\_\_\_\_\_\_\_ and is made up \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
* **Subatomic Particles**



* Electrons
  + \_\_\_\_\_\_\_\_\_ compared electrons to \_\_\_\_\_\_\_\_\_\_\_\_\_\_, saying that electrons \_\_\_\_\_\_\_\_\_\_\_\_ the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ in specific and \_\_\_\_\_\_\_\_\_\_\_\_\_\_ paths
  + However, an electron’s \_\_\_\_\_\_\_\_\_\_\_\_\_ location \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ be determined
  + Electrons exist in energy levels called \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
  + The number of \_\_\_\_\_\_\_\_\_\_\_\_ orbitals depends on how many \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ an atom has
  + Electrons occupy the orbitals that have the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
  + Four different kinds of orbitals: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
  + \_\_\_\_\_\_\_\_\_\_\_\_\_\_: region where there is a \_\_\_\_\_\_\_\_\_\_\_probability of finding an \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
  + Electrons located in the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ orbital are called \_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
  + These electrons determine the atom’s \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ and its abilities to form \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
  + Atoms with the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ of valence electrons have \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
* Bohr Model Diagrams



* \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
  + Equals the # of \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
  + Equals the # of \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ in a NEUTRAL atom
  + Always a \_\_\_\_\_\_\_\_\_\_\_\_\_\_ number
* \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
  + Atomic mass unit: \_\_\_\_\_\_\_\_\_
  + 1 proton=\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
  + 1 neutron=\_\_\_\_\_\_\_\_\_\_\_\_\_\_
  + 1 electron=\_\_\_\_\_\_\_\_\_\_\_\_\_\_
  + Lightest subatomic particle is an \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
* \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
  + Equals the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
  + Measured in \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
  + \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_: atoms of the \_\_\_\_\_\_\_\_\_\_ element with different \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
    - Differ in number of \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
    - Examples: Carbon-13, Carbon-14, Boron-10, Boron-11



* Calculating # of Neutrons
  + \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
  + Example: Aluminum
    - 13 protons
    - \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_=\_\_\_\_\_\_\_\_\_\_\_ neutrons
* Isotopes
  + Elements of the same element with \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
  + Hyphen Notation=\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
* Chlorine-37
  + Atomic #=
  + Mass #=
  + # P=
  + #E=
  + #N=
* Average Atomic Mass
  + Weighted \_\_\_\_\_\_\_\_\_\_\_\_ of all \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
  + This is the mass on the periodic table
  + Round to \_\_\_\_\_\_\_\_ decimal places
  + Example: calculate the average atomic mass of oxygen if its abundance in nature is 99.76% O-16, 0.4% O-17, and 0.20% O-18
  + Find the chlorine’s average atomic if approximately 8 of every 10 atoms are chlorine-35 and 2 are chlorine-37
* Average Mass of Compounds
  + Use the periodic table to find the masses of the elements present.
  + Add them up appropriately accounting for the number of each element.
  + Example: Hydrogen gas, H2
  + Example: ammonia, NH3

* + Example: Potassium sulfate, K2SO4