

Ernest Rutherford -1911

- gold foil experiment
- a tiny dense positive core called the nucleus
- surrounded by mostly empty space containing the rapidly moving negative electrons

Inside the Atom

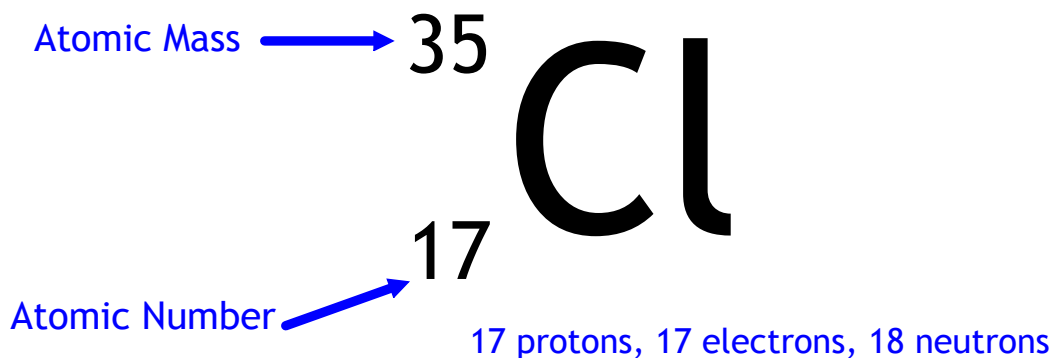
- atoms consist of sub-atomic particles
 - protons-positively charged
 - electrons-negatively charged
 - neutrons-neutral
- the number of protons is significant since it is this that determines what the element actually is

atomic number = number of protons

number of protons = number of electrons

number of neutrons = mass number - number of protons

Standard Atomic Notation



-Can also be written as Cl-35

Charged Atoms

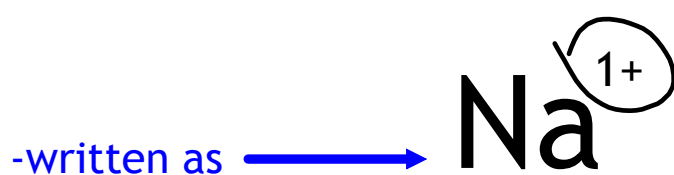
- normally # of protons = # of electrons
- # of protons NEVER changes
- gaining or losing electrons produces what is called an ion
- this is a charged particle

EXAMPLE:

-sodium, Na, is atomic #11, therefore 11 protons and 11 electrons

-a sodium atom can lose 1 electron and therefore have 11 protons and 10 electrons

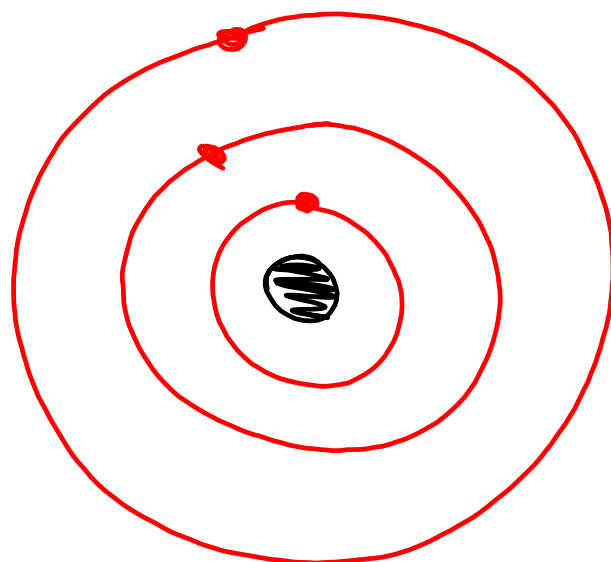
-this is one more + charge

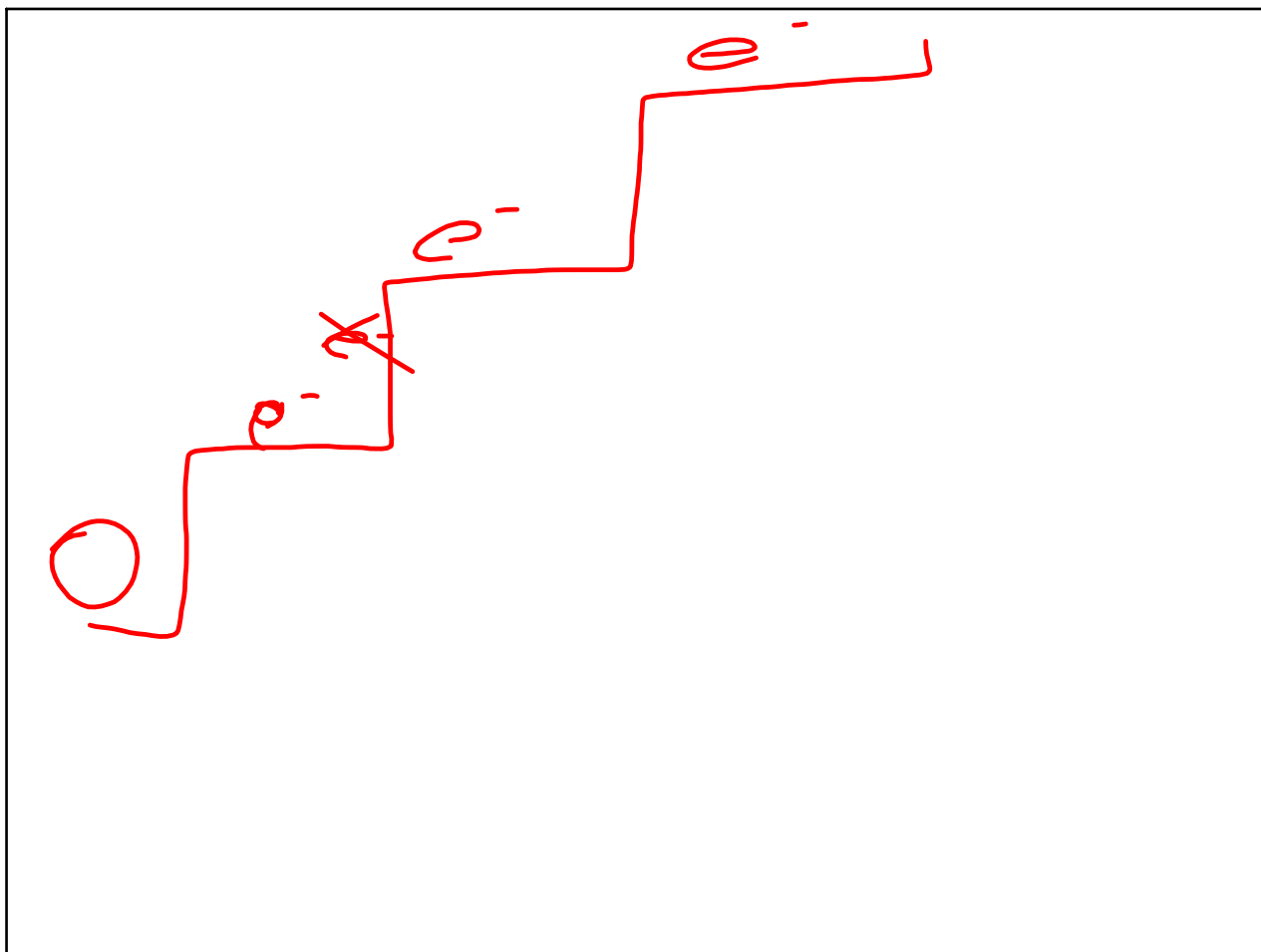


A Planetary Model of the Atom

Niels Bohr, suggested the following:

- electrons can move around the nucleus in nearly circular orbits
- each electron has a specific amount of energy
- the farther away from the nucleus the greater the amount of energy
- electrons cannot exist 'between' these orbits, but can move up and down from one orbit to another
- the order of filling these orbits is 2, 8, 8 for the the first three orbits
- electrons are more stable at lower energy, closer to the nucleus

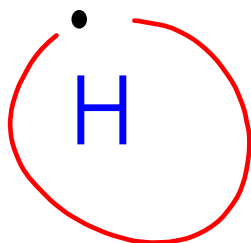




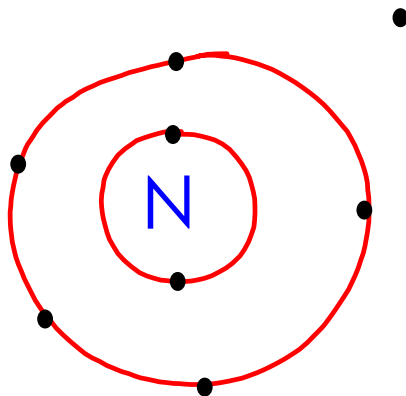
Bohr Diagrams the element symbol is written in the center and the electrons are 'filled' into the orbits around this nucleus

Example:
Hydrogen has 1 proton, and 1 electron

● Electron

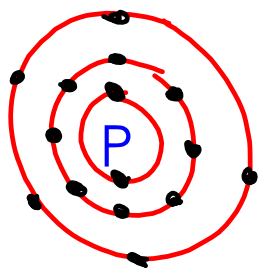


Nitrogen has 7 protons and 7 electrons
 (Hint: remember 2,8,8)

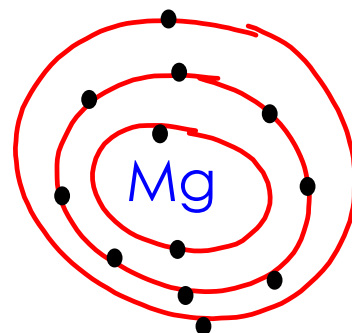
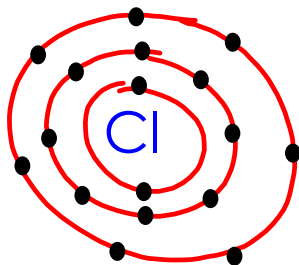


Try these!
 determine the # of protons and electrons
 Dont forget the 2, 8, 8

● Electron

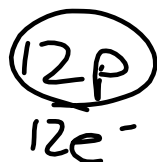


15e-



Electron Arrangement in Ions

- ions are atoms that have gained a positive or negative charge because of gaining or losing electrons.
- the atom WANTS to have a completely filled outer orbit
- it will either gain or lose electrons to achieve this state



$$\begin{array}{r} 12 + \\ 10 - \\ \hline 2 \times \end{array}$$

