Name: _____ Period: _____

The Atom

Chapter 4 Section 2

Atom

- **Atom**: _____

  _____

- ***How Small is an atom?*** 20,000,000,000,000,000,000,000 atoms of copper and zinc in a penny

What is an atom made of?

- ***Protons:***

  _____

  - The atomic number is = to the number of protons

- ***Neutron:***

  _____

  _____

- ***Electrons:***

  _____

  _____

  - Orbiting around the nucleus in energy levels, shells, or clouds
  - Electrons have smallest amount of _____

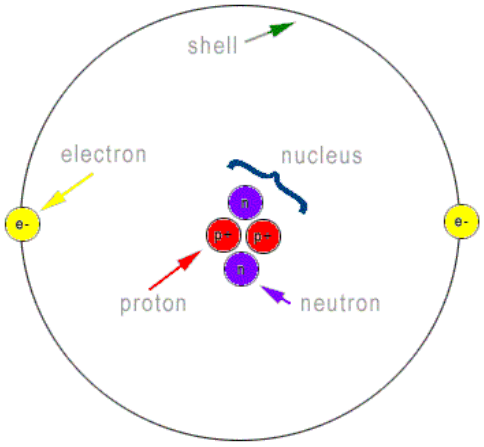
- ***Atomic Mass Unit***: Used to express the masses of particles (_____ + _____) in atoms

Ion

- Charges of _____ and _____ are opposite but equal, so their charges cancel out.
- Atoms have no overall charge
  - *Unless* the number of _____ and _____ are unequal
- Ion: Charged particle formed when electrons and protons are not equal
  - More electrons → negatively charged ion
  - Less electrons → positively charged ion

Remember: **Electrons** and **Ions** go together!

Atomic Structure



How do atoms of different elements differ?

- All atoms contain _____ and _____
- Most atoms contain _____, but not all ex. hydrogen
- An atom does not have to have an equal number of protons and neutrons
- ***Atomic Number:*** The # of _____ in the nucleus

Isotopes

- ***Isotope:***
  _____
  _____
- Atoms that are isotopes of each other are always the same _____ because isotopes always have the same number of _____
- Have different # of _____ which gives them different _____

Remember: **Neutrons** and **Isotopes** go together!!

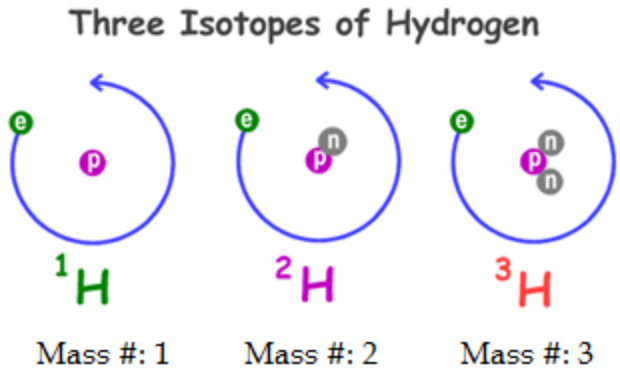
Properties of Isotopes

- Some isotopes are _____
- An unstable atom is an atom with a nucleus that will change over time – _____
- Radioactive atoms spontaneously fall apart over time

Telling Isotopes Apart:

- You can tell isotopes of an element apart by its _____

  - _____ + _____ =mass number (figure 5 page 92)



- _____ are not included in the mass number because they are so small that they have little effect on the element's atomic mass.
- **Atomic Mass:** _____

  _____

  - The weighted average of the masses of all the naturally occurring isotopes of that element.

Forces in an Atom

- Each atom has _____ that act between the particles
- **Gravitational force**: acts between all objects all the time
- **Electromagnetic force**: objects with opposite charges attract one another, same charges repel
- **Strong force**: holds protons together in the nucleus
- **Weak force**: in unstable atoms, a neutron can change into a proton and an electron
  - (page 94 figure 7)