August 25th

Electric Charge

Chapter 22

How to succeed?

- **Read the book** before class!
- **Come to class:**
  - listen, think, observe
  - take quiz
- **Do homework:**
  - as much as possible on your own
  - if stuck work together
  - or go to PLC
- **Review for exam:**
  - go over homework
  - work review problems
  - get help at PLC

Electric Charge

- Electric charge is a fundamental property of atomic particles
  - such as electrons and protons
- Two types of charge: negative and positive
  - Electron is negative, proton is positive
- Usually object has equal amounts of each type of charge so no net charge
- Object is said to be electrically neutral

Electric Charge

- Object has a net charge if two types of charge are not in balance
- Object is said to be charged
- Net charge is always small compared to the total amount of positive and negative charge contained in an object
- The net charge of an isolated system remains constant

Electric Charge

- Charged objects interact by exerting forces on one another
- **Law of Charges**:

  Like charges repel, and opposite charges attract

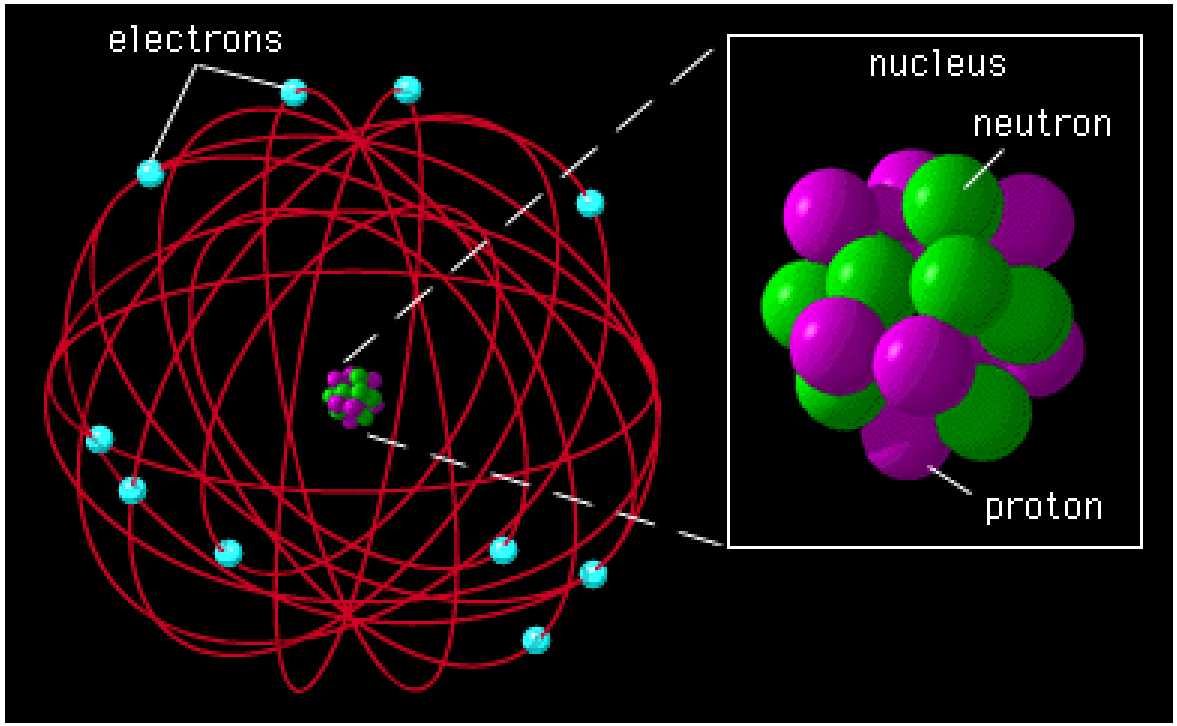
- The standard unit (SI) of charge is the Coulomb (C)

Electric Charge

- Electrical properties of materials such as metals, water, plastic, glass and the human body are due to the structure and electrical nature of atoms

- Atoms consist of protons (+), electrons (-), and neutrons (electrically neutral)

Electric Charge



Schematic view of an atom

- Electrically neutral atoms contain equal numbers of protons and electrons

Electric Charge

- Atoms combine to form solids
- Sometimes outermost electrons move about the solid leaving positive ions
- These mobile electrons are called conduction electrons
- Solids where electrons move freely about are called conductors – metal, body, water
- Solids where charge can’t move freely are called insulators – glass, plastic

Electric Charge

- Only the conduction electrons can move
- The positive ions are fixed in place
- Electric charge transfer is a transfer of electrons
- Charging positively: Removal of electrons from an object
- Charging negatively: Addition of electrons to an object