

# READING ASSIGNMENT FOR JANUARY 16

## SECTIONS 20.1 AND 20.2

Please notice that this file is two pages long.

### 20.1 - Charges and Force

- Electric Force - Fundamental force of nature caused by charge.
- Charge is a hard concept to define. Hoping that it will make it easier for you, the book spends a lot of time developing its charge “model”.
- Charge comes in two types - positive and negative.
- Two objects with the same type of charge (either both positive or both negative) repel each other.
- Two objects with opposite charge (one positive and the other negative) attract each other.
- Neutral object don't experience the electric force at all.
- Neutral objects contain an equal amount of positive and negative charge.
- Conservation of charge - When one object becomes positively charged, another one must become negatively charged.

### 20.2 - Charges, Atoms, and Molecules

- Atoms are made up of three smaller “pieces” - protons, electron, and neutrons.
- Protons and electrons are the source of all charge. Protons have positive charge, electrons have negative charge, neutrons have no charge.
- A positively charged ion has lost electrons.
- A negatively charged ion has gained electrons.
- The unit of charge is called the Coulomb ( $C$ ).

- Every proton has the same amount of positive charge:  $e = 1.6 \times 10^{-19} C$ .
- Every electron has the same amount of negative charge:  $-e = -1.6 \times 10^{-19} C$ .
- An atom with an equal number of protons and electrons is neutral.
- Conductor - solid object that has “free” electrons - electrons that are free to move from nucleus to nucleus.
- Insulator - solid object that doesn’t have free electrons - electrons are held tightly to their individual nuclei.
- Electric Dipole - an object that was originally neutral that has become “polarized” - the charges have separated from each other enough for it to feel a small electric force.

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