Hemingway Name:

How Charges Behave

Electrons carry a negative charge, and protons carry a positive charge.

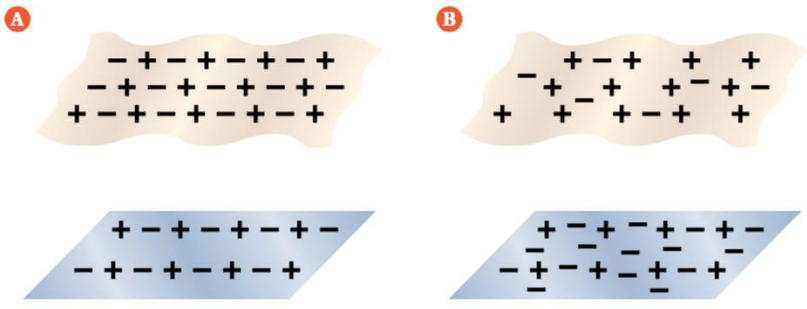
- **Negative charges**:
  - The charges of _____
  - Surround the nucleus; can be _____ off a material
- **Positive charges**:
  - The charges of_____
  - Part of the nucleus of atoms and are held _____ in place

Negative Charges and Positive Charges

- **Charging by friction**: Charging a material by _____
  - When electrons are rubbed off a material, it becomes _____ charged
  - Material gains_____ and becomes negatively charged

Electrically Neutral and Electrically Charged Materials

- **Uncharged Materials:**
  - Before two materials are rubbed together: they have _____numbers of positively charged protons and negatively charged electrons
  - Materials are *electrically* _____(equal numbers of positive and negative charges cancel each other out)



This diagram shows a paper towel (top) and an acetate strip (bottom) before they are rubbed together. Therefore, each one has an equal number of positive and negative charges. These cancel each other out so each material is electrically neutral.

This diagram shows the two materials after they are rubbed together. Electrons are rubbed off the paper towel and transferred to the acetate strip. The paper towel now has fewer negative charges, and the acetate strip has more negative charges. The paper towel is positively charged, and the acetate strip is negatively charged.

- **Charged Materials:**
  - If electrons rubbed off one material, the protons stay behind and the material becomes *electrically* _____
  - The material that gains the electrons also becomes electrically charged
  - Electrically charged materials have an _____number of positive and negative charges

Hemingway Name:

Discussion Questions

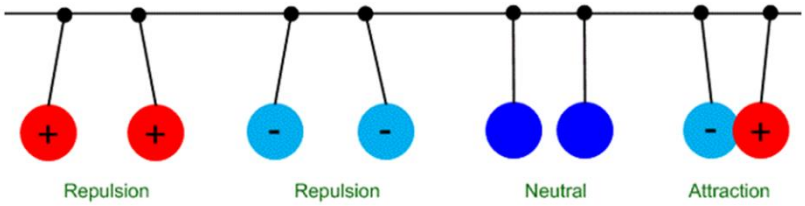
1. **Explain the relationship among negative charges, positive charges, electrons, and protons.**
2. **Describe what sometimes happens in terms of charges when you rub two different types of materials together.**
3. **Complete pg 117 in workbook**

Try This

Positive and Negative charges

Opposite charges attract each other, and like charges repel each other.

- **The Law of Electric Charge**
  - Opposite charges _____ each other
  - Like charges _____each other

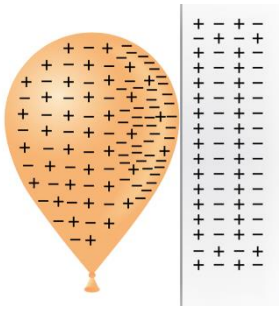


The Laws of Attraction and Repulsion

- The law of electric charge applies to all _____ charges
  - Every negative charge attracts every positive charge
  - Every negative charge repels every other negative charge
  - Every positive charge repels every other positive charge

Attraction Between Charged Objects and Neutral Objects

- The law of electric charge explains why charged objects attract _____ objects
- All neutral objects have an equal number of protons and electrons
- Why a charged balloon sticks to an electrically neutral wall:
  - When a charged object (balloon) is brought near a neutral object (wall), the electrons in the neutral object do not come off
  - Negative charges in the wall are _____ from the surface by the negative charges on the balloon
  - Positive ends of the molecules in the wall are attracted to the negative charges on the balloon
  - This attraction is strong enough to _____ the balloon to the wall



Workbook: 120-125, Try This: Attracting Neutral Object