

## Chapter 21 – Magnetism

### Section 21.1 – Magnets and Magnetic Fields

- ❖ \_\_\_\_\_ is the force a magnet exerts on another \_\_\_\_\_, on iron or a similar metal, or on \_\_\_\_\_.
- ❖ Magnetic forces, like electric forces, act over a \_\_\_\_\_.
- ❖ Magnetic forces, like electric forces, \_\_\_\_\_ with distance.
- ❖ All magnets have \_\_\_\_\_ magnetic poles, regions where the magnet's force is \_\_\_\_\_.
- ❖ One end of a magnet is its \_\_\_\_\_; the other end is its \_\_\_\_\_.
- ❖ \_\_\_\_\_ magnetic poles \_\_\_\_\_ one another, and \_\_\_\_\_ magnetic poles \_\_\_\_\_ one another.
- ❖ A \_\_\_\_\_ surrounds a magnet and can exert magnetic forces.
- ❖ A magnetic field, which is \_\_\_\_\_ near a magnet's poles, will either \_\_\_\_\_ another magnet that enters the field.
- ❖ The magnetic field \_\_\_\_\_ always travel from the \_\_\_\_\_ pole to the \_\_\_\_\_ pole of a magnet.
- ❖ \_\_\_\_\_ is like a giant magnet surrounded by a \_\_\_\_\_.
- ❖ The area surrounding Earth that is influenced by this field is the \_\_\_\_\_.
- ❖ Within an atom, \_\_\_\_\_ move around the nucleus.
- ❖ This movement, along with a property called \_\_\_\_\_, causes electrons to act like tiny \_\_\_\_\_.

- ❖ In many materials, each electron is \_\_\_\_\_ with another having an \_\_\_\_\_ spin, so magnetic effects \_\_\_\_\_ each other out.
- ❖ Many other materials have one or more \_\_\_\_\_ electrons, but the \_\_\_\_\_ usually don't combine because the \_\_\_\_\_ of atoms is not right.
- ❖ In a few materials, such as iron, nickel, and cobalt, the \_\_\_\_\_ make a strong \_\_\_\_\_.
- ❖ Then the fields combine to form \_\_\_\_\_.
- ❖ A \_\_\_\_\_ is a region that has a very large number of atoms with \_\_\_\_\_ magnetic fields.
- ❖ A \_\_\_\_\_ can be magnetized because it contains \_\_\_\_\_.
- ❖ When a material is \_\_\_\_\_, most of its magnetic domains are \_\_\_\_\_.
- ❖ If the \_\_\_\_\_ of a ferromagnetic material are aligned \_\_\_\_\_, the magnetization of the domains is \_\_\_\_\_, and it is not a magnet.
- ❖ If a ferromagnetic material is placed in a \_\_\_\_\_, then the electron domain can \_\_\_\_\_ which produces a \_\_\_\_\_.
- ❖ \_\_\_\_\_ are materials whose domains will stay \_\_\_\_\_ for a long time.
- ❖ No matter how many times you \_\_\_\_\_ a magnet, each piece will always have a \_\_\_\_\_.

## Section 21.1 Assessment

- ❖ Describe the interaction of magnetic poles.
  
- ❖ What two things can happen to a magnet entering a magnetic field?
  
- ❖ What makes a material magnetic?
  
- ❖ Describe what happens to the fields of two bar magnets when you bring their north poles together.
  
- ❖ What happens if you suspend a bar magnet so that it can swing freely?
  
- ❖ How are electrons responsible for magnetism?

## **Section 21.2 - Electromagnetism**

- ❖ \_\_\_\_\_ and magnetism are different aspects of a single force known as the \_\_\_\_\_.
- ❖ The electric force results from \_\_\_\_\_.
- ❖ The magnetic force usually results from the \_\_\_\_\_ in an atom.
- ❖ Both aspects of the electromagnetic force are caused by \_\_\_\_\_.

- ❖ \_\_\_\_\_ electric charges create a \_\_\_\_\_.
- ❖ The magnetic field lines form \_\_\_\_\_ around a straight wire carrying a \_\_\_\_\_.
- ❖ A \_\_\_\_\_ moving in a magnetic field will be deflected in a direction \_\_\_\_\_ to both the \_\_\_\_\_ and to the \_\_\_\_\_ of the charge.
- ❖ If the current is \_\_\_\_\_ to the magnetic field, the force is \_\_\_\_\_ and there is no \_\_\_\_\_.
- ❖ The magnetic fields of \_\_\_\_\_ combine so that a coiled wire acts like a \_\_\_\_\_.
- ❖ A \_\_\_\_\_ of current-carrying wire that produces a magnetic field is called a \_\_\_\_\_.
- ❖ If you place a \_\_\_\_\_, such as an iron rod, inside the coil of a solenoid, the strength of the magnetic field \_\_\_\_\_.
- ❖ The magnetic field also \_\_\_\_\_ as the \_\_\_\_\_ increase.
- ❖ An \_\_\_\_\_ is a solenoid with a \_\_\_\_\_.
- ❖ Changing the \_\_\_\_\_ in an electromagnet controls the \_\_\_\_\_ of its magnetic field.

## Section 21.2 Assessment

- ❖ Besides a magnet, what can create a magnetic field?
- ❖ How is the magnetic field of an electromagnet controlled?

- ❖ How does a ferromagnetic rod inside a solenoid affect the strength of an electromagnet?
- ❖ What is the effect of a magnetic field on a stationary electric charge? On a moving electric charge?
- ❖ Why is it a good idea to have the coil of a solenoid wound closely with many turns of wire?