**Magnetism**

Wysession, M., Frank, D., & Yancopoulos, S. (2009). *Physical Science: Concepts in action*. Pearson Prentice Hall, Boston, MA.

**Magnets and Magnetic Fields**

**\*** Like magnetic poles repel one another, and opposite magnetic poles attract one another.

\* A magnetic field, which is strongest near a magnet’s poles, will either attract or repel another magnet that enters the field.

\* When a material is magnetized, most of its magnetic domains are aligned.

*magnetic force*

*magnetic field*

*magnetosphere*

*magnetic domain*

*ferromagnetic material*

**Electromagnetism**

**\*** Moving electric charges create a magnetic field.

\* Changing the current in an electromagnet controls the strength and direction of its magnetic field.

\* Electromagnetic devices such as galvanometers, electric motors, and loudspeakers change electrical energy into mechanical energy.

*electromagnetic force*

*solenoid*

*electromagnet*

*galvanometer*

*electric motor*

**Electrical Energy Generation and Transmission**

\* According to Faraday’s law, a voltage is induced in a conductor by a changing magnetic field.

\* The two types of generators are AC generators and DC generators.

\* A transformer changes voltage and current by inducing a changing magnetic field in one coil. This changing field then induces an alternating current in a nearby coil with a different number of turns.

\* Most of the electrical energy generated in the United States is produced using coal as an energy source. Some other sources are water (hydroelectric), nuclear energy, wind, natural gas, and petroleum.

*electromagnetic induction*

*generator*

*transformer*

*turbine*

***Assessment***

1. Where is the field of a magnet strongest?
2. near the north pole
3. near the south pole
4. near both poles
5. near the middle.
6. If you cut a magnet in half, you have
7. no magnets
8. two half magnets
9. one magnet
10. two magnets.
11. A magnet’s field lines always start near
12. middle
13. south pole
14. north pole
15. side
16. A ferromagnetic material is
17. always a magnet
18. a magnet if its domains are aligned
19. a magnet if its domains are not aligned
20. never a magnet
21. An iron bar is placed in a solenoid to
22. decrease the voltage
23. increase the voltage
24. increase the magnetic field strength
25. decrease the magnetic field strength
26. Which of these cannot increase the strength of an electromagnet?
27. making the loops smaller in the coil
28. placing an iron bar in the coil
29. winding more loops in the coil
30. increasing the current in the coil
31. An electric generator converts
32. electrical energy into mechanical energy
33. power into energy
34. mechanical energy into electrical energy
35. energy into power
36. What effect does a magnetic field have on a charge moving perpendicular to the field?
37. It has no effect.
38. It pulls the charge forward.
39. It pushes the charge backward.
40. It pushes the charge perpendicularly to the field and the charge’s velocity.
41. A galvanometer is a device used to measure
42. Current.
43. resistance.
44. voltage.
45. magnetic field strength.
46. A transformer increases or decreases
47. energy.
48. resistance.
49. voltage.
50. direct current.