Unit 5J
Magnetism
Note-Taking Guide

Main Ideas, Key Points, Questions:

After watching the video segment, write down key points, main ideas, and big questions.

Objective(s):
- Understand how objects become magnetized, and how electrical and magnetic fields affect one another.
- Calculate the magnitude and direction of the magnetic force acting upon a moving charge in a magnetic field.

Notes:

During the video segment, use words, phrases, or drawings to take notes.

Summary:

After watching the video segment, write at least three sentences explaining what you learned. You may ask yourself: "If I was going to explain this to someone else, what would I say?"
Answer the following.

1. How is the Aurora Borealis created?

   

2. When a compass is used, to what magnetic pole does the needle point?

   

3. Define electromagnetism in your own words.

   

4. Describe how magnetic and electric fields interact, specifically with regards to light.

   

5. Define magnetism in your own words.

   

6. What happens when two like poles of magnets interact with one another?

   

7. The areas in which the individual magnetic orientations of atoms line up are called

   

questions continued on next page

Unit 5J Notes and Questions STUDENT

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8. What makes iron an ideal material to use as a magnet?

9. In the right-hand rule for the magnetic force, identify what each part of the hand represents:
   a. Thumb
   b. Pointer finger
   c. Middle finger

10. What three factors could cause a material to become unmagnetized?

11. What is the unit for magnetic field strength?

12. Complete the equation for the magnetic force:

   \[ F_{\text{magnetic}} = \]
1. Using the right-hand rule, in which direction will the magnetic force act on a positively charged particle that is moving to the left and experiencing a magnetic field straight ahead?

2. Using the right-hand rule, in which direction will the magnetic force act on a negatively charged particle that is moving to the left and experiencing a magnetic field straight down?

3. Two charged particles, each having the same magnitude of charge but with opposite signs, enter a magnetic field that is perpendicular to their direction of motion. How will the motion of the two particles differ when they enter the magnetic field?

4. An electron that is moving to the right experiences a magnetic field of 2.5 T directed upward. If the force on the electron is $2.4 \times 10^{-12}$ N, what is the speed of the electron?

5. A proton is moving north at $7.5 \times 10^7$ m/s, and encounters a uniform magnetic field of 4.5 T directed east. What are the magnitude and direction of the force that act on the proton?
6. What is the magnitude of charge on a particle that is moving at $3.6 \times 10^6$ m/s and experiences a magnetic force of $1.2 \times 10^{-10}$ N when it encounters a magnetic field of 3.0 T?

7. What are the direction and magnitude of a magnetic field that act upon a proton moving to the left at $4.2 \times 10^8$ m/s and experiences a force of $1.4 \times 10^{-10}$ N downward?

8. An electron moves to the west at $1.2 \times 10^6$ m/s and experiences a magnetic force of $6.0 \times 10^{-13}$ N upward. What is the magnitude and direction of the magnetic field acting on the electron?