

Chapter 19: Magnetism

Holt Text Sections

- 19-1 Magnets and Magnetic Fields
- 19-2 Magnetism from Electricity
- 19-3 Magnetic Force

Summary

Chapter 19 introduces magnetic fields and magnetic forces. A moving charge will experience a force in a magnetic field if a component of its velocity is perpendicular to the field. Thus, a current-carrying wire may experience a force, and a current-carrying loop may experience a torque in a magnetic field as well. Magnetic fields arise from moving charges. The specific fields due to current-carrying straight wires and wire loops are examined. Magnetism in matter and the Earth's magnetic field are also discussed.

Major Concepts

By the end of the chapter, you should understand each of the following and be able to demonstrate their understanding in problem applications as well as in conceptual situations.

- Magnets and the magnetic field
 - North and south poles
 - Field lines
 - Earth's magnetic field
- Magnetic force
 - Moving charged particle
 - Magnetic force right-hand rule
 - Current-carrying wire
- Magnetic fields
 - Magnetic field right-hand rule
 - Long, straight wire
 - Current loop
- Ferromagnetism

Formulas

FORCE ON A CURRENT CARRYING WIRE IN A PERPENDICULAR MAGNETIC FIELD:

$$F = BIL$$

FORCE ON A MOVING CHARGED PARTICLE IN A PERPENDICULAR MAGNETIC FIELD:

$$F = qvB$$