

Standards Covered by this Lesson

Massachusetts Standards

Introductory Physics, High School

Learning Standards for a Full First-Year Course

5. Electromagnetism

Central Concept: Stationary and moving charged particles result in the phenomena known as electricity and magnetism.

5.1 Recognize that an electric charge tends to be static on insulators and can move on and in conductors. Explain that energy can produce a separation of charges.

5.2 Develop qualitative and quantitative understandings of current, voltage, resistance, and the connections among them (Ohm's law).

5.3 Analyze simple arrangements of electrical components in both series and parallel circuits. Recognize symbols and understand the functions of common circuit elements (battery, connecting wire, switch, fuse, resistance) in a schematic diagram.

5.4 Describe conceptually the attractive or repulsive forces between objects relative to their charges and the distance between them (Coulomb's law).

5.5 Explain how electric current is a flow of charge caused by a potential difference (voltage), and how power is equal to current multiplied by voltage.

NGSS Standards

HS-PS3-5. Develop and use a model of two objects interacting through electric or magnetic fields to illustrate the forces between objects and the changes in energy of the objects due to the interaction. [Clarification Statement: Examples of models could include drawings, diagrams, and texts, such as drawings of what happens when two charges of opposite polarity are near each other.] [Assessment Boundary: Assessment is limited to systems containing two objects.]

Plan and conduct an investigation to provide evidence that an
HS- electric current can produce a magnetic field and that a changing
PS2- magnetic field can produce an electric current. [*Assessment*
5. *Boundary: Assessment is limited to designing and conducting*
investigations with provided materials and tools.]