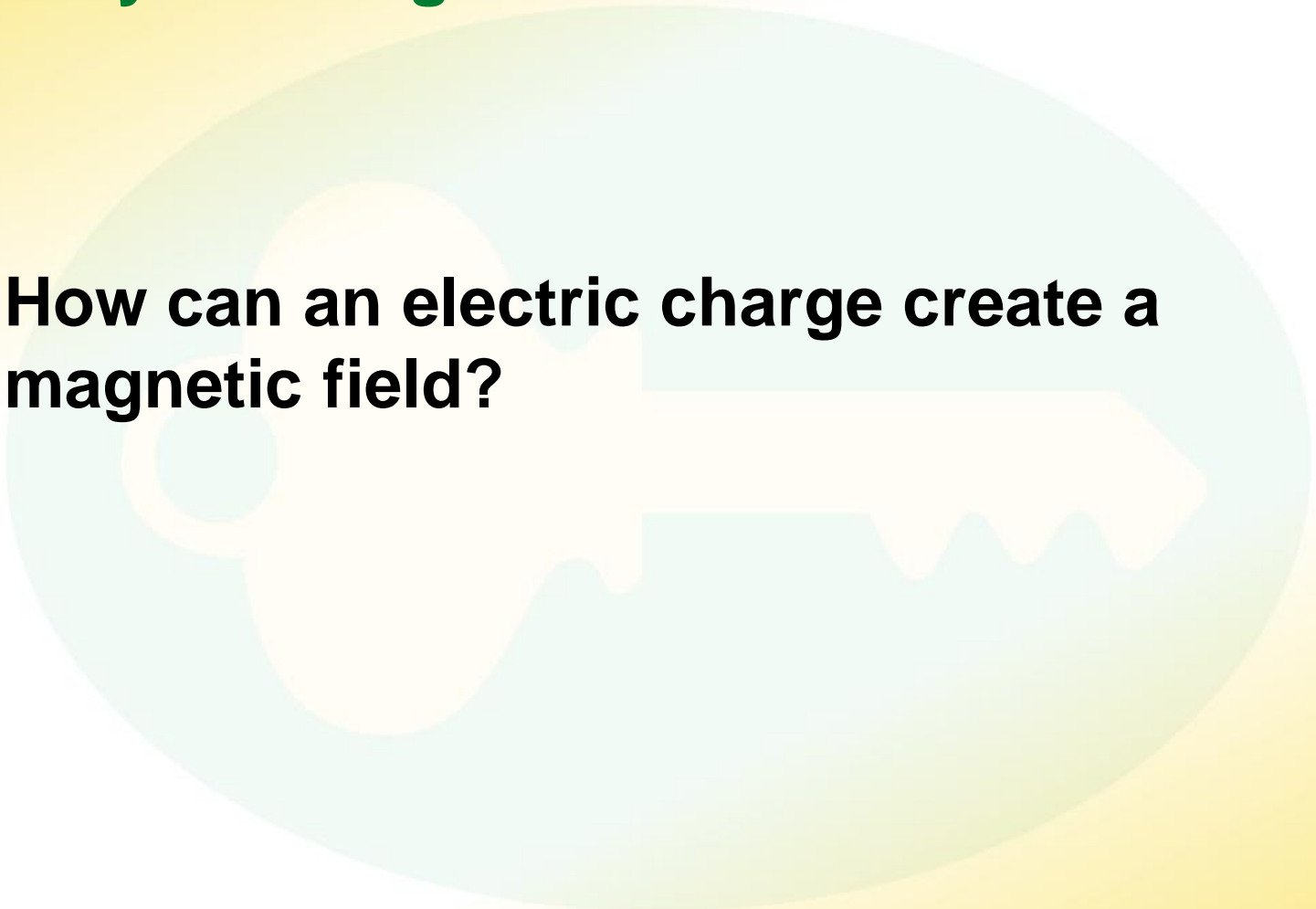


Electricity and Magnetism



How can an electric charge create a magnetic field?

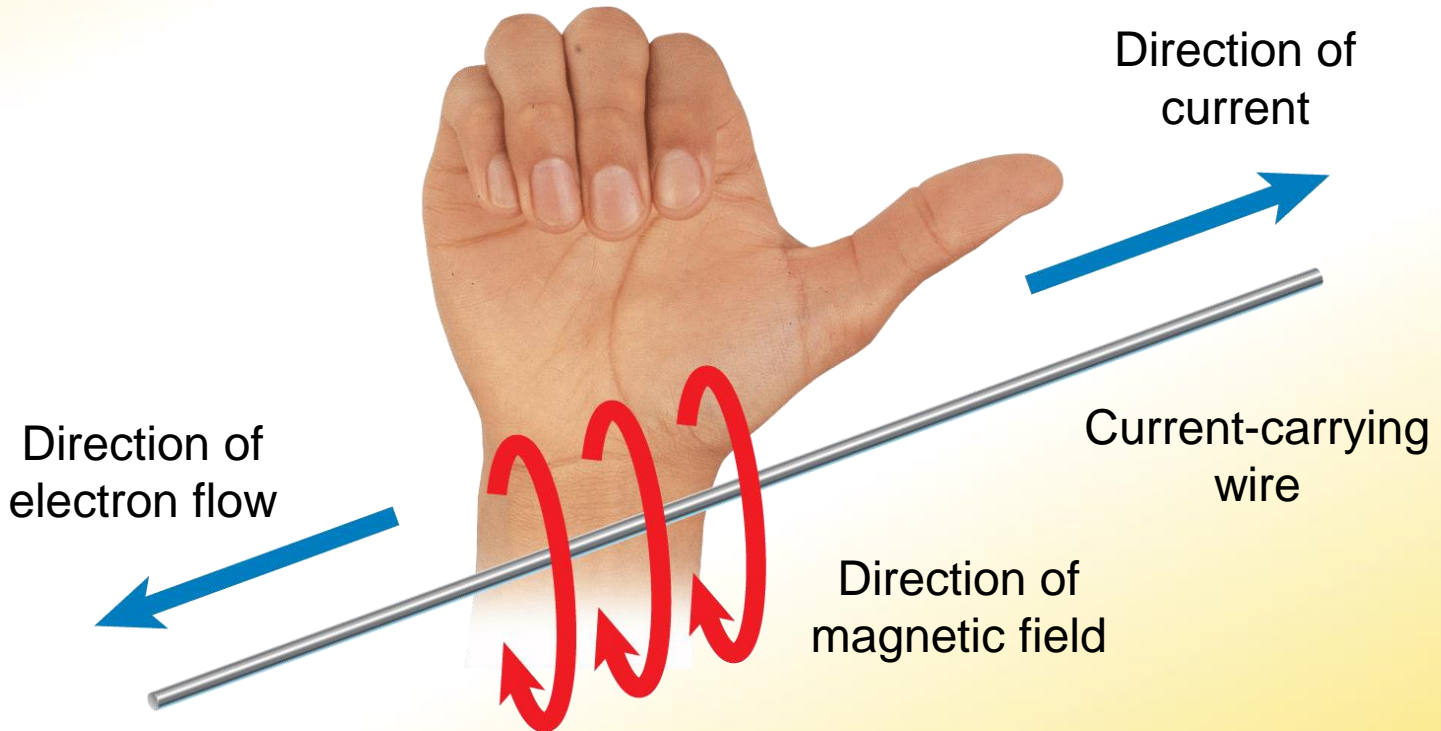


Electricity and Magnetism

Electricity and magnetism are different aspects of a single force –

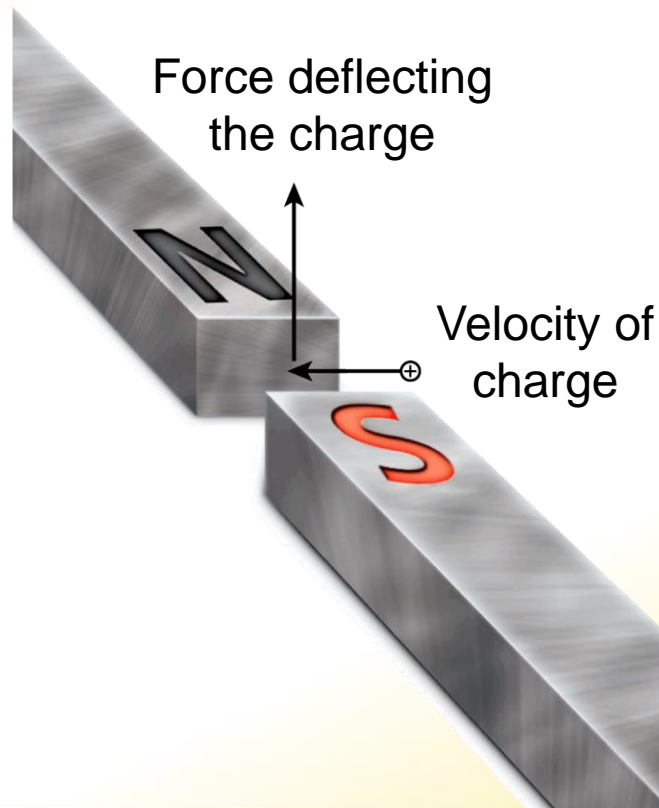
Electricity and Magnetism

If you point the thumb of your right hand in the direction of the current –



Electricity and Magnetism

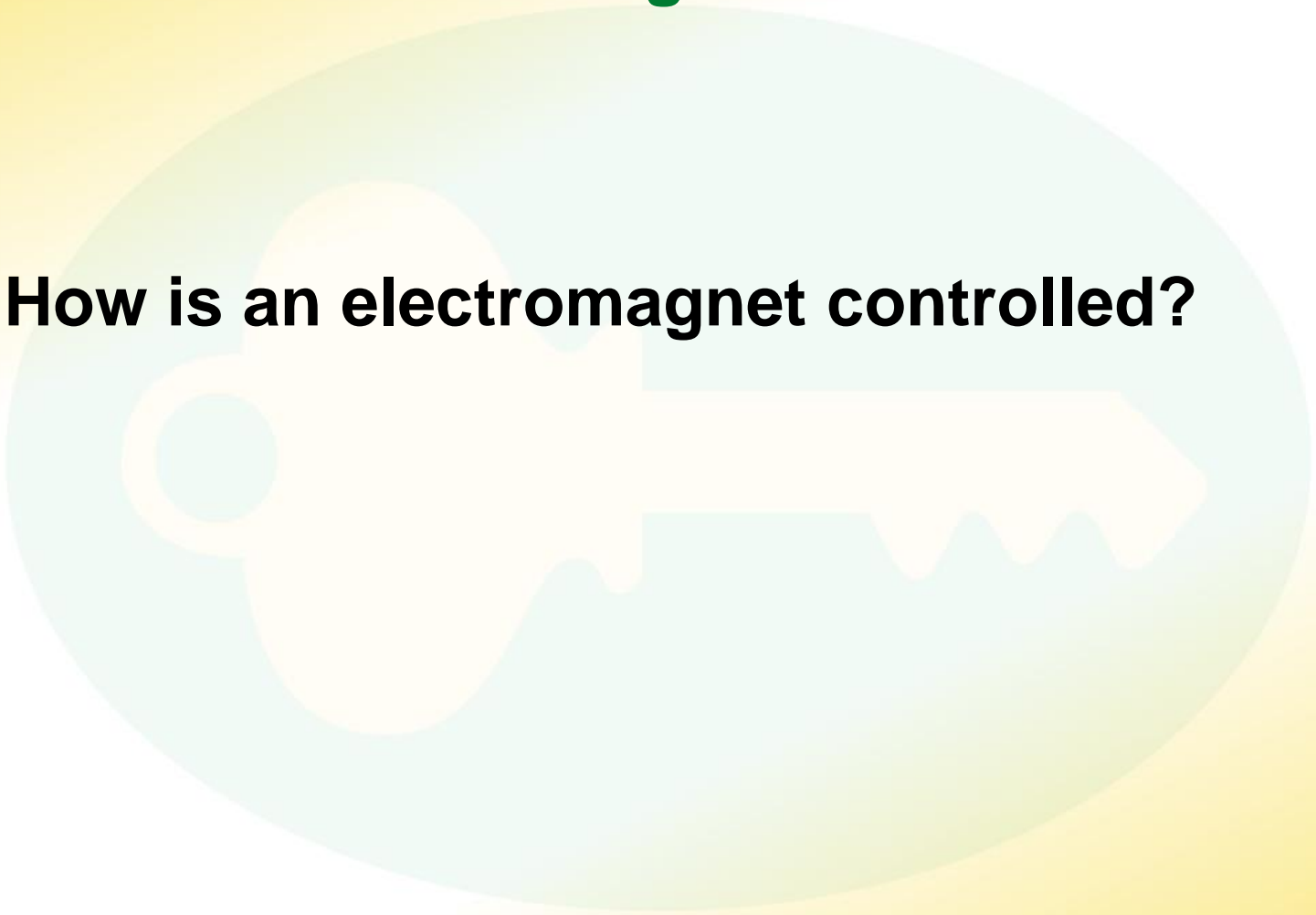
A moving positive charge is –



Solenoids and Electromagnets



How is an electromagnet controlled?



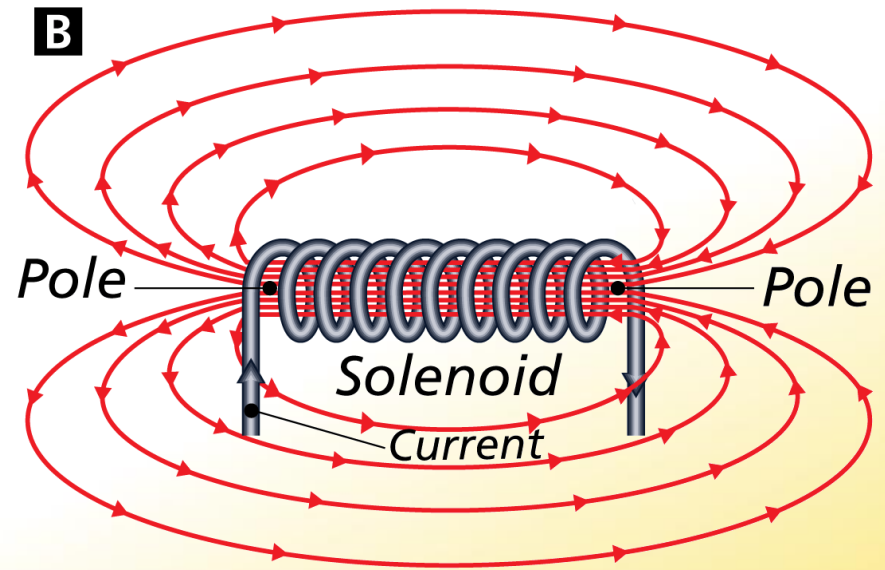
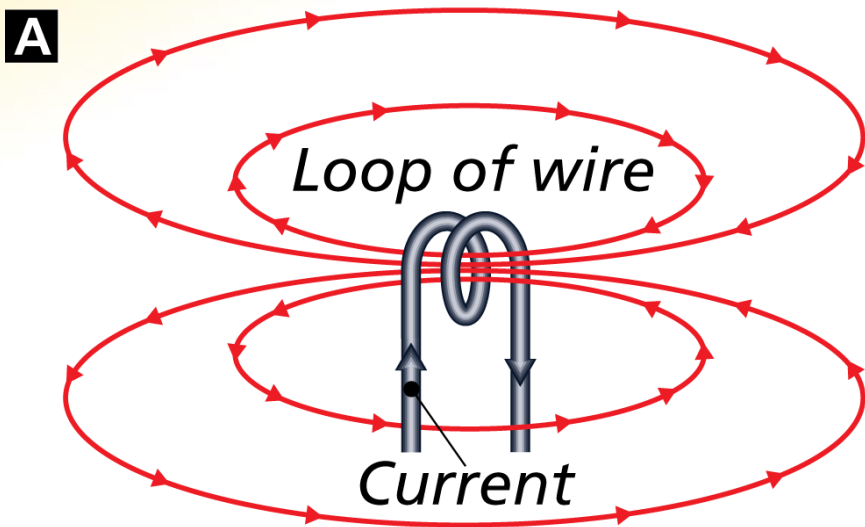
Solenoids and Electromagnets

The field through the center of the coil is the sum of the fields from all the turns of the wire.

A coil of current-carrying wire that produces a magnetic field is –

Solenoids and Electromagnets

The magnetic field -



Solenoids and Electromagnets

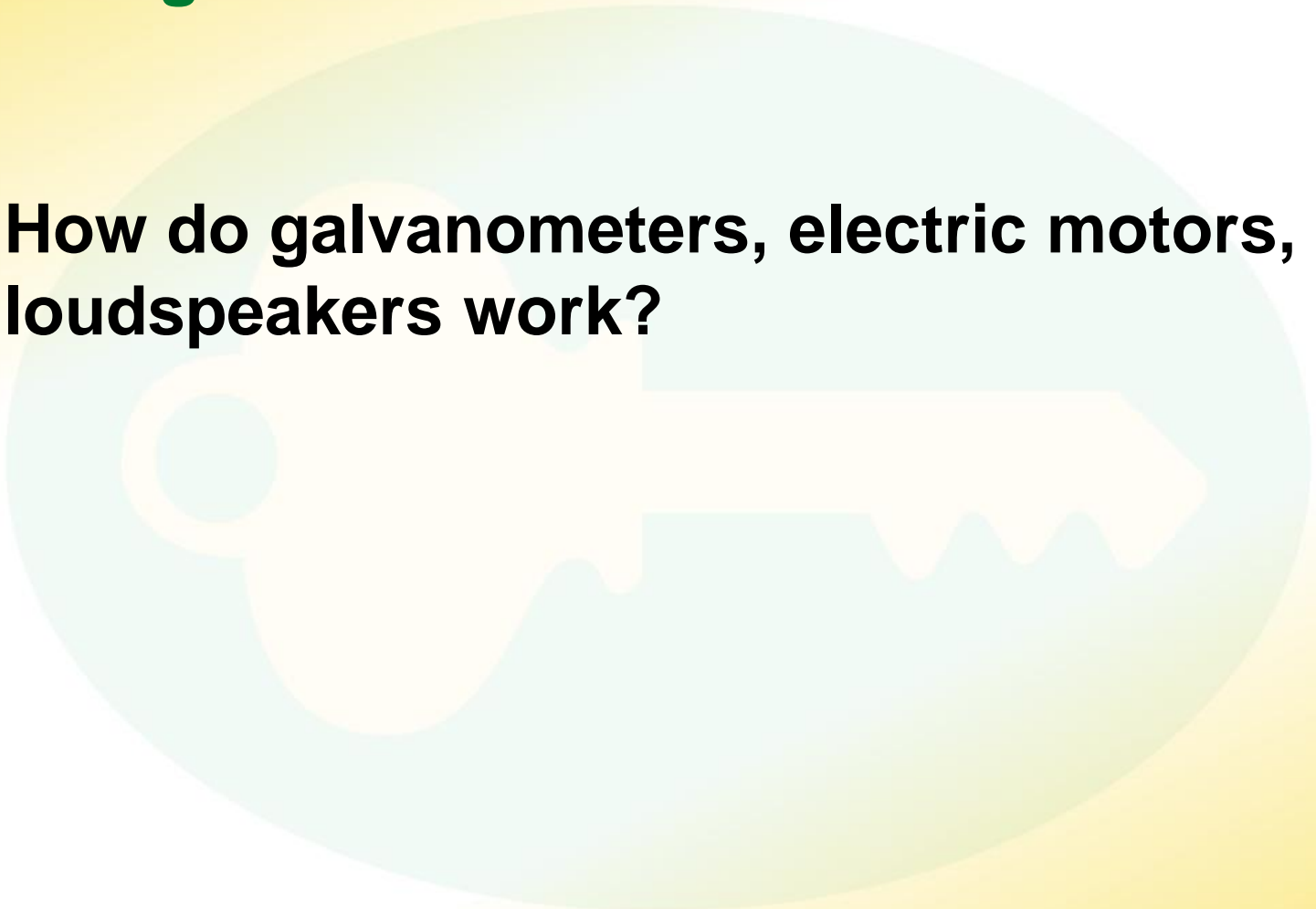
If a ferromagnetic material, such as an iron rod is placed inside the coil of a solenoid, the strength of the magnetic field increases.

- The magnetic field produced by the current causes the iron rod to become a magnet.
- An **electromagnet** is -

Electromagnetic Devices



How do galvanometers, electric motors, and loudspeakers work?



Electromagnetic Devices

Electromagnets can convert –

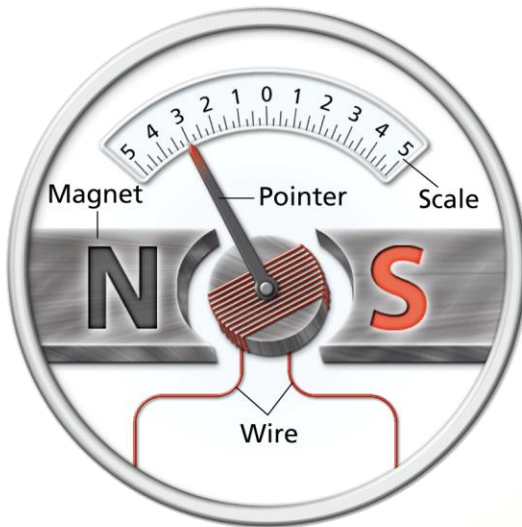
Electromagnetic Devices

Galvanometers

A galvanometer is –

Electromagnetic Devices

A galvanometer uses an -

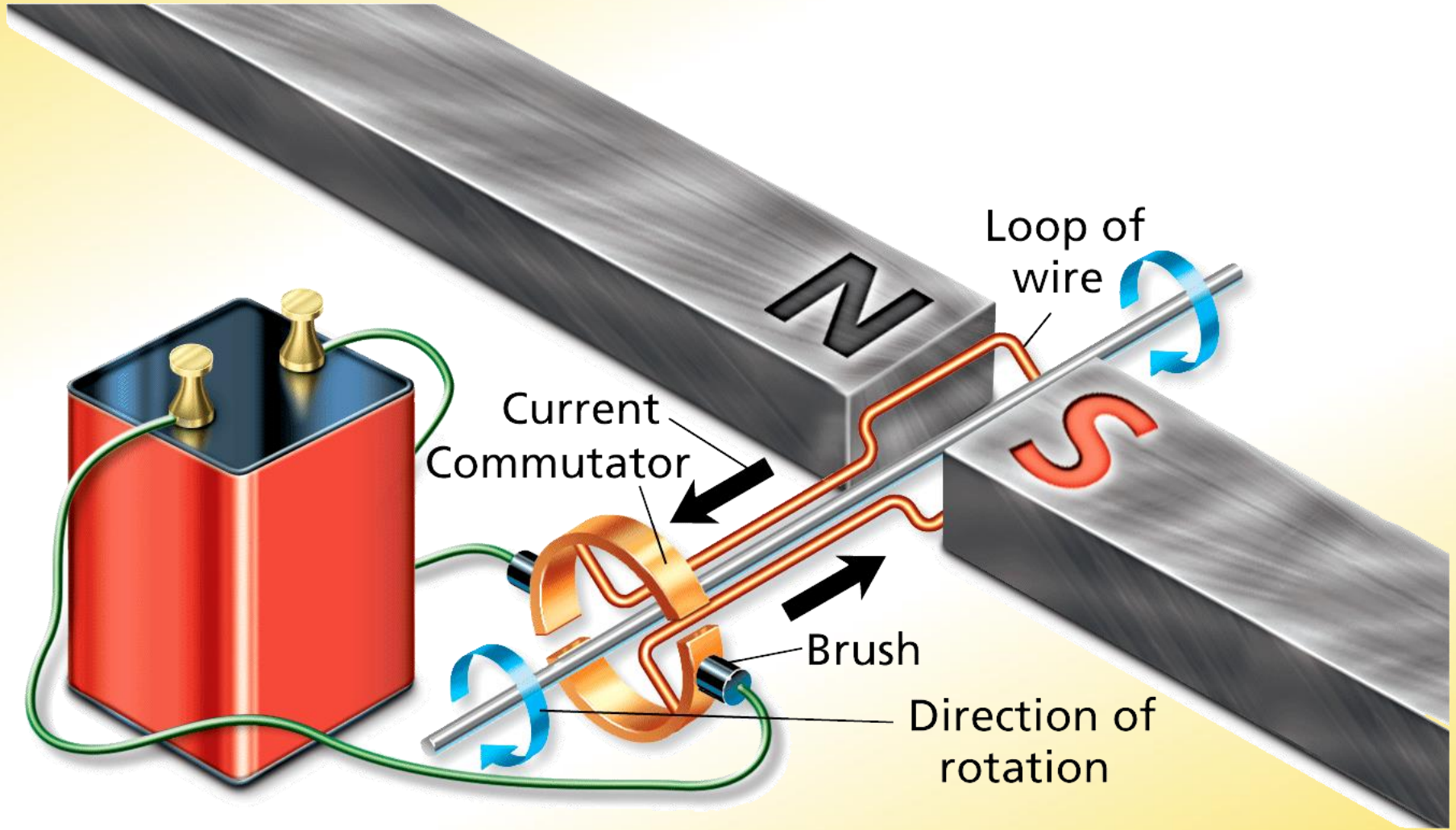


Electromagnetic Devices

Electric Motors

An **electric motor** is -

Electromagnetic Devices



Electromagnetic Devices

In this motor -

Assessment Questions

1. A charged particle is moving across a plane from left to right as it enters a magnetic field that runs from top to bottom. How will the motion of the particle be changed as it enters the magnetic field?
 - a. It will accelerate.
 - b. It will deflect either up or down on the plane.
 - c. It will deflect perpendicular to the plane.
 - d. Its motion will not be affected.

Assessment Questions

2. Which change will increase the strength of an electromagnet made by wrapping a conductive wire around an iron nail?
- reversing the direction of current flow
 - replacing the nail with a wooden dowel
 - increasing the number of coils of wire around the nail
 - using a longer nail

Assessment Questions

3. A loudspeaker uses a magnet to cause which energy conversion?
- a. mechanical energy to magnetic energy
 - b. electrical energy to mechanical energy
 - c. electrical energy to magnetic energy
 - d. mechanical energy to electrical energy

Assessment Questions

1. The motion of an electric charge creates an electrical field.

True

False