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How can magnetism produce electricity? How can electricity produce magnetism? Why is this useful?

State Curriculum Standard:

8.PS2: Design and conduct investigations depicting the relationship between magnetism and electricity in electromagnets, generators, and electrical motors, emphasizing the factors that increase or diminish the electric current and the magnetic field strength.

Objectives:

- Accurately using the engineering design process, students will construct prototypes of electromagnets and motors that function correctly.
- Students will compare/contrast the electricity/magnetism/kinetic energy conversion by accurately drawing and labelling diagrams of the electromagnet, motor, and the generator and using arrows to indicate the conversions.
- Students will explain what increases or decreases the strength of the electromagnets, motors, and generators by writing conclusion paragraphs at the end of their explorations

Students work in collaborative groups to work through the Engineering Design Process with the Goal of building 3 working prototypes.

Electromagnet

:

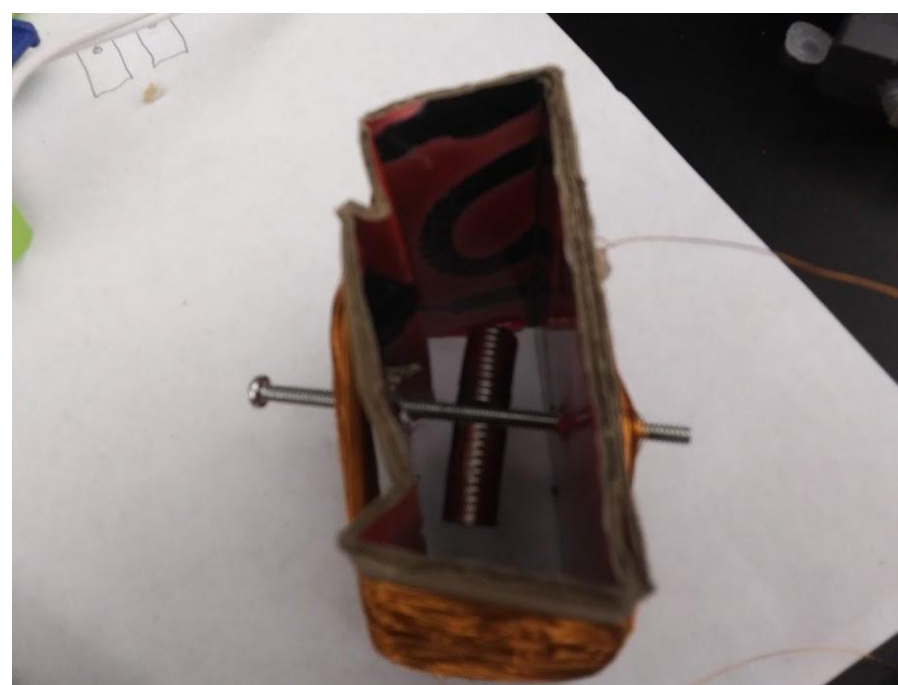


Students test 2 variables
To determine what most
Affects the strength of
Magnetism:

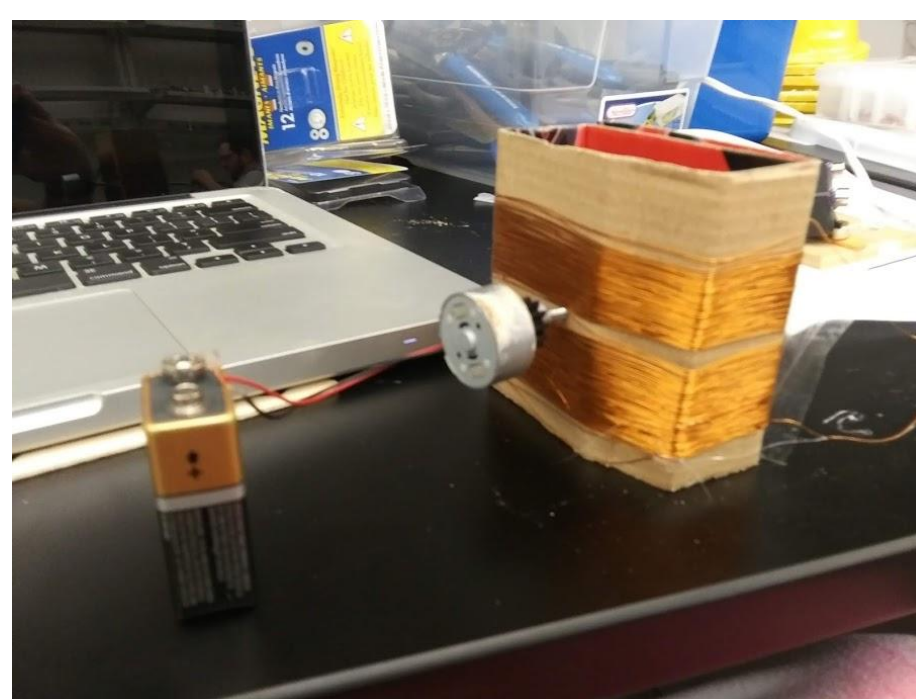
1. Size of battery
2. Number of coils

Generator:

Design 1:



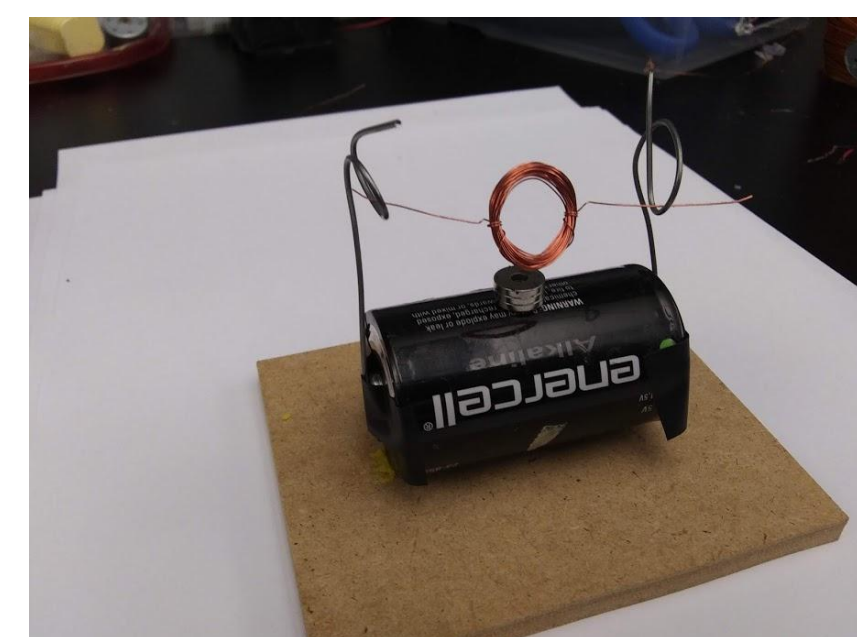
Design 2:



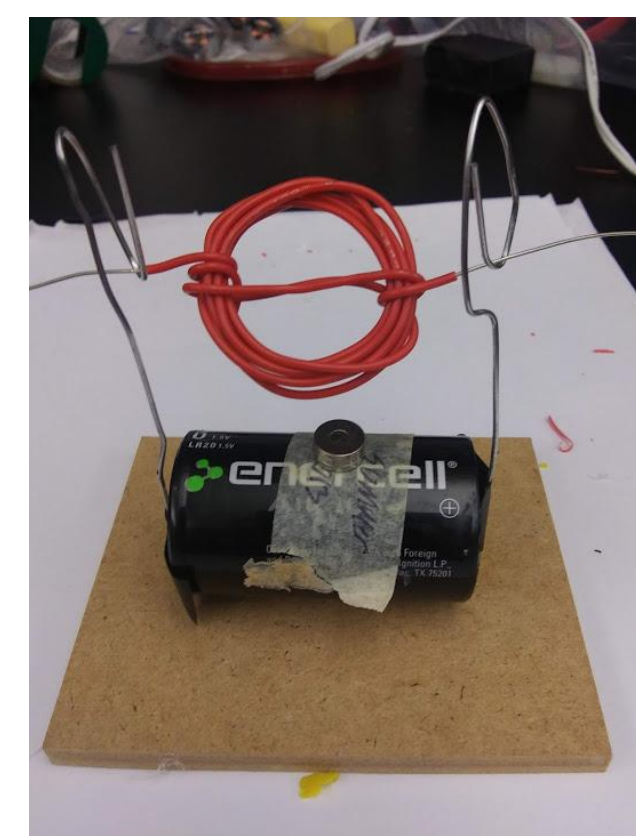
Modifications are made as
Needed in step 5 of the
Engineering Design Process.

Motor:

Design 1:



Design 2:



Students are supplied with
Various materials so they
Can modify and retest the
Prototypes as necessary.

Materials

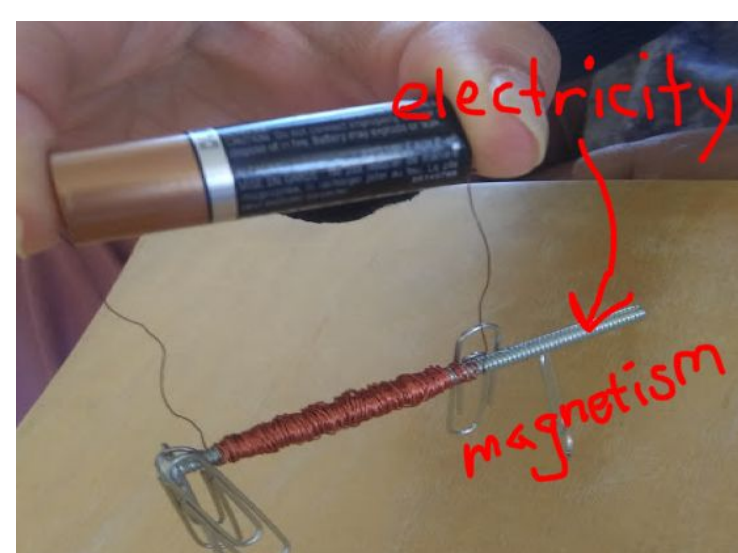
Electromagnet:

- Battery
 - Wire
 - Nail
- Generator:
- Cardboard
 - Wire
 - Large nail
 - 4 ceramic bar magnets

Motor:

- Platform
- Glue gun
- Wire
- Battery
- Paper clips

Outcomes and Assessments:



- Students will compare and contrast the conversion between Magnetism, electricity, and kinetic energy in electromagnets, Generators, and motors by drawing diagrams and labeling the Conversions with arrows. (See picture)
- Students will evaluate their understanding of what is Produced by each machine by completing real life Scenarios in which they choose which machine they need.