

8th GRADE: Physical Science

Unit 5: Electricity and Magnetism

Standard S8P5 Students will recognize characteristics of gravity, electricity, and magnetism as major kinds of forces acting in nature.

Element b) Demonstrate the advantages and disadvantages of series and parallel circuits and how they transfer energy.

Element c) Investigate and explain that electric currents and magnets can exert force on each other.

Standard S8P2 Students will be familiar with the forms and transformations of energy.

Element c) Compare and contrast the different forms of energy (heat, light, electricity, mechanical motion, sound) and their characteristics.

Vocabulary

- **electric current** - flow of charge - either flowing electrons or flowing ions - through a conductor.
- **magnetic field** - area surrounding a magnet through which magnetic force is exerted and that extends between a magnet's north and south poles.
- **series circuit** - circuit that has only one path for electric current to follow.
- **parallel circuit** - circuit that has more than one path for electric current to follow.
- **electromagnet** - magnet created by wrapping a current-carrying wire around an iron core.
- **electric motor** - device that transforms electrical energy into kinetic energy or mechanical.
- **voltage** - the difference in electrical potential energy between two places in a circuit.
- **induction** - A method of charging an object by means of the electric field of another object.
- **conduction** - A method of charging an object by allowing electrons to flow by direct contact from one object to another object.
- **conductor** - A material through which charges can easily flow.
- **insulator** - A material through which charges cannot easily flow.
- **resistor** - A material through which charges cannot flow.
- **transformer** - A device that increases or decreases voltage.

The essential questions is are:

1. How does electricity work?
2. How will electricity affect magnetism?
3. How will magnetism affect electricity?
4. How do magnets interact?
5. What is electric current and how does it flow?

Students will know that:

- Electricity can be static or current.
- Electricity is the flow of electrons.
- A circuit must be complete in order for electricity to flow.
- Series circuits have only one available path through which electrons may move.
- Parallel circuits provide more than one complete path for electrons to follow.
- Magnetism is a force of attraction or repulsion between like or unlike poles.
- Opposite poles attract. Like poles repel.
- The area around a magnet where forces act is called a magnetic field.
- An electric current produces a magnetic field.
- Electricity can be used to create an electromagnet.
- Magnetism can be used to generate electric current.
- Motors transform both electric and magnetic energy into mechanical energy.

(Skills) Students will be able to:

- Analyze parallel and series circuit diagrams.
- Explain the effect of an electric current passing through a wire on a compass / iron filings.
- Describe how an electric current can be used to make a magnet.
- Define electricity.
- Give examples of electricity being transformed into heat, light and sound.