

## Unifying Theme: Magnetism & Electricity

### Essential Standard and Clarifying Objectives

#### **4.P.1 Explain how various forces affect the motion of an object.**

**4.P.1.1** Explain how magnets interact with all things made of iron and with other magnets to produce motion without touching them.

**4.P.1.2** Explain how electrically charged objects push or pull on other electronically charged objects and produce motion.

#### **4.P.2 Understand the composition and properties of matter before and after they undergo a change or interaction.**

**4.P.2.1** Compare the physical properties of samples of matter: (strength, hardness, flexibility, ability to conduct heat, ability to conduct electricity, ability to be attracted by magnets, reactions to water and fire).

#### **4.P.3 Recognize that energy takes various forms that may be grouped based on their interaction with matter.**

**4.P.3.1** Recognize the basic forms of energy (light, sound, heat, electrical, and magnetic) as the ability to cause motion or create change.

**4.P.3.2** Recognize that light travels in a straight line until it strikes an object or travels from one medium to another, and that light can be reflected, refracted, and absorbed.

### Unpacking

What does this clarifying objective mean a child will know, understand and be able to do?

**4.P.1.1** Students know that a magnet pulls on all things made of iron without touching them, and that this pulling can result in motion. Students know that a magnet attracts some metals, but not all of them. Students know that a magnet has a force field and poles that determine how a metal affected by the magnet will behave within its field.

**4.P.1.2** Students know that an object that been electrically charged pulls or pushes on all other charged objects and that this can result in motion. Students know that electrical charges can result in attraction, repulsion or electrical discharge.

**4.P.2.1** Students know that samples of matter have many observable properties that can be measured. Students know that samples of matter can be described according to the characteristics of the materials they are made from. Students are familiar with, and can test for the following properties: strength, hardness, flexibility, ability to conduct heat, ability to conduct electricity, ability to be attracted by magnets, reactions to water (dissolve) and heat/fire (melt/evaporate).

**4.P.3.1** Students know basic forms of energy: light, heat, sound, electrical, and energy of motion. Students know that electricity flowing through an electrical circuit produces magnetic effects in the wires. In an electrical circuit containing a battery, a bulb, and a bell, for example, energy from the battery is transferred to the bulb and the bell, which in turn transfer the energy to their surroundings as light, sound, and heat (thermal energy).

**4.P.3.2** Students know that light travels in a straight line. Students know that light can be refracted, reflected, and/or absorbed.