Grades 6–8

3.2.6-8.K Physical Science: Forces and Interactions

Students who demonstrate understanding can *conduct an investigation and evaluate the experimental design to provide evidence that fields exist between objects exerting forces on each other even though the objects are not in contact.*

Clarifying Statement: Examples of this phenomenon could include the interactions of magnets, electrically-charged strips of tape, and electrically-charged pith balls. Examples of investigations could include first-hand experiences or simulations.

Assessment Boundary: Assessment is limited to electric and magnetic fields, and limited to qualitative evidence for the existence of fields.

Science and Engineering Practices (SEP)	Disciplinary Core Ideas (DCI)	Crosscutting Concepts (CCC)
Planning and Carrying Out Investigations Planning and carrying out investigations in 6-8 builds on K-5 experiences and progresses to include investigations that use multiple variables and provide evidence to support explanations or solutions. • Conduct an investigation and evaluate the experimental design to produce data to serve as the basis for evidence that can meet the goals of the investigation.	**Types of Interactions** • Forces that act at a distance (electric, magnetic, and gravitational) can be explained by fields that extend through space and can be mapped by their effect on a test object (a charged object, or a ball, respectively).	**Cause and Effect** • Cause and effect relationships may be used to predict phenomena in natural or designed systems.

Pennsylvania Context: N/A

PA Career Ready Skills: Analyze various perspectives on a situation.

Connections to Other Standards Content and Practices

Standard Source	Possible Connections to Other Standard(s) or Practice(s)
Agriculture (AFNR)	CS.01.02.01.c: Solve problems in AFNR workplaces or scenarios using technology.
Science, Environmental Literacy and Sustainability (NAAEE)	5-8 Strand 1.C. Collecting information: Learners locate and collect quantitative and qualitative information about the environment and environmental topics, using a range of methods and sources. They explain why they used selected information collection methods.
PA Core Standards: ELA	CC.3.5.6-8.C: Follow precisely a multistep procedure when carrying out experiments, taking measurements, or performing technical tasks. CC.3.6.6-8.F: Conduct short research projects to answer a question (including a self-generated question), drawing on several sources and generating additional related, focused questions that allow for multiple avenues of exploration.

Standard Source	Possible Connections to Other Standard(s) or Practice(s)
PA Core Standards and Practices: Math	N/A
PA Standards: Social Studies	N/A
Educational Technology (ISTE)	1.4. Innovative Designer: Students use a variety of technologies within a design process to identify and solve problems by creating new, useful or imaginative solutions.
Technology and Engineering (ITEEA)	STEL-1K: Compare and contrast the contributions of science, engineering, mathematics, and technology in the development of technological systems.