THE STANDARD

Electric & Magnetic Force Strength

Ask questions about data to determine the factors that affect the strength of electric and magnetic forces.

DCI — DISCIPLINARY CORE IDEA

PS2.B · Types of Interactions

> *Electric and magnetic (electromagnetic) forces can be attractive or repulsive, and their sizes depend on the magnitudes of the charges, currents, or magnetic strengths involved and on the distances between the interacting objects.*

Electric forces and magnetic forces can pull objects together or push them apart, and their strength isn't fixed. It depends on how much charge or current is involved, how strong the magnet is, and how far apart the interacting objects sit. Same force, dialed up or down depending on the conditions. **That's the move students are reasoning about.**

SEP — SCIENCE & ENGINEERING PRACTICE

Asking Questions and Defining Problems

> *Ask questions that can be investigated within the scope of the classroom, outdoor environment, and museums and other public facilities with available resources.*

Students aren't running every experiment themselves. They're looking at a phenomenon or a dataset and asking questions that could actually be tested with classroom tools. **"What happens if we add more coils?" "What if the magnet is farther away?" The work is interrogating the data, identifying the variables, and writing the question worth investigating.**

CCC — CROSSCUTTING CONCEPT

Cause and Effect

> *Cause and effect relationships may be used to predict phenomena in natural or designed systems.*

Every question in this standard is a cause-and-effect question. Change the current, the force changes. Change the distance, the force changes. Students are building a habit: when something gets stronger or weaker, ask what variable was responsible. **That habit transfers to every science domain they'll touch after this.**