Unit 1-Invisible Forces

Content Area: **Science**
Course(s): **Science 3**
Time Period: **Marking Period 1**
Length: **MP 1**
Status: **Published**

Essential Questions

- How and why do objects move?

Big Ideas

- The effect of unbalanced forces on an object results in a change of motion.
- Patterns of motion can be used to predict future motion.
- Some forces act through contact, some forces act even when the objects are not in contact.
- The gravitational force of earth acting on an object near earth's surface pulls that object toward the planet's center.

Science and Engineering Practices

Developing and Using Models:

- Identify limitations of models.
- Collaboratively develop and/or revise a model based on evidence that shows the relationships among variables for frequent and regular occurring events.
- Develop a model using an analogy, example, or abstract representation to describe a scientific principle or design solution.
- Use a model to test cause and effect relationships or interactions concerning the functioning of a natural or designed system.

Constructing Explanations and Designing Solutions:

- Use evidence (e.g., measurements, observations, patterns) to construct or support an explanation or design a solution to a problem.
- Apply scientific ideas to solve design problems.
- Generate and compare multiple solutions to a problem based on how well they meet the criteria and constraints of the design solution.

Science and Society

Joseph B. Strauss

Chief Engineer of Golden Gate Bridge

CSDT Technology Integration

● 8.1.5.DA.1: Collect, organize, and display data in order to highlight relationships or support a claim.

Activity:

Students will review the Mystery Science lesson: How can you go faster down a slide? Students will keep track of their data on paper and then import it into Google Sheets to create a graph to analyze their data. The class data will be inputted into one sheet to highlight data correlations.

Enduring Understanding

Next Generation Standards

Forces and Motion

3-PS2.A Each force acts on one particular object and has both strength and a direction. An object at rest typically has multiple forces acting on it, but they add to give zero net force on the object. Forces that do not sum to zero can cause changes in the object's speed or direction of motion.

3-PS2.A The patterns of an object's motion in various situations can be observed and measured; when that past motion exhibits a regular pattern, future motion can be predicted from it.

Types of Interactions

3-PS2.B Objects in contact exert forces on each other.

3-PS2.B Electric, and magnetic forces between a pair of objects do not require that the objects be in contact. The sizes of the forces in each situation depend on the properties of the objects and their distances apart and, for forces between two magnets, on their orientation relative to each other.

Student Learning Standards

Mathematics

3.G1 Understand that shapes in different categories may share attributes and that shared attributes can define a larger category.

Focus Areas

Knowledge

- Forces are pushes and pulls.
- Motion occurs in predictable patterns.
- The cause and effect relationships of electric interactions.
- The cause and effect relationships of magnetic interactions.
- Magnets can be used to solve design problems.

Skills

- Plan and conduct investigations about forces.
- Make observations and measurements of motion.
- Ask questions about electric and magnetic interactions.
- Define a problem that can be solved with magnets

Understandings

- Plan and conduct an investigation to provide evidence of the effects of balanced and unbalanced forces on the motion of an object.
- Make observations and/or measurements of an object's motion to provide evidence that a pattern can be used to predict future motion.
- Ask questions to determine cause and effect relationships of electric or magnetic interactions between two objects not in contact with each other.
- Define a simple design problem that can be solved by applying scientific ideas about magnets.

Resources

Primary Resources

● Mystery Science

○ Invisible Forces

Supplemental Resources

BrainPop Jr- Pushes and Pulls

BrainPop Jr- Magnets

Flocabulary- Force

Leveled Readers:

● How Things Move

● Changes in Matter

● Energy

● Forces and Motion

Scientific Inquiry

Core

● How could you win a tug of war?

● What makes bridges so strong?

● How can you go faster down a slide?

● What can magnets do?

● How can you unlock a door using a magnet?

● Developing and using models- collaboratively