Unit: 2 Forces and Motion

Content Area: **Science**
Course(s): **Science - Grade 3**
Time Period: **8 weeks**
Length: **8 Weeks**
Status: **Published**

Unit Overview

Students observe images and videos of moving objects, describing their position and motion. Then they identify the forces acting on the object and how these forces change the object's motion. Students observe balanced and unbalanced forces through videos, a simulation, and an experimental set-up using spring scales and a pulley system. Students observe balanced and unbalanced forces through videos, a simulation, and an experimental set-up using spring scales and a pulley system. Students make electromagnets and investigate magnetic forces. Then they read and interpret a letter to identify engineering criteria and constraints and design a magnetic. Students build electroscopes and then use them to investigate static electricity. latch.

Transfer

Students will be able to independently use their learning to...

- Plan and conduct an investigation collaboratively to produce data to serve as the basis for evidence, using fair tests in which variables are controlled and the number of trials considered.
- Learn Science investigations use a variety of methods, tools, and techniques.
- Make observations and/or measurements to produce data to serve as the basis for evidence for an explanation of a phenomenon or test a design solution.
- Ask questions that can be investigated based on patterns such as cause and effect relationships.
- Define a simple problem that can be solved through the development of a new or improved object or tool.
- Ask questions that can be investigated based on patterns such as cause and effect relationships.
- Plan and conduct an investigation collaboratively to produce data to serve as the basis for evidence, using fair tests in which variables are controlled and the number of trials considered.

Meaning

Understandings

Students will understand that...

- All forces carry out an action.
- Balanced and unbalanced forces have different actions.
- You can predict patterns of motion.
- Magnetic forces carry out an action.
- Electric Forces result in an action.

Essential Questions

Students will keep considering...

- What do forces do?
- What happens when forces are balanced or unbalanced?
- How can you predict patterns of motion?
- What cna magnetic forces do?
- What can electric forces do?

Application of Knowledge and Skill

Students will know...

Students will know...

- All forces carry out an action.
- Balanced and unbalanced forces have different actions.
- You can predict patterns of motion.
- Magnetic forces carry out an action.
- Electric Forces result in an action.

Students will be skilled at...

Students will be skilled at...

- Planning and carrying out investigations
- Asking questions and defining problems

Academic Vocabulary

force

motion

position

balanced forces

gravity

unbalanced forces

predict

electromagnet

magnetic force

permament magnet

electric force

static electricity

Learning Goal 1 - Lessons 1 & 2

Plan and conduct an investigation to provide evidence of the effects of balanced and unbalanced forces on the motion of an object.

- Plan and conduct an investigation to provide evidence of the effects of balanced and unbalanced forces on the motion of an object.

SCI.3-PS2-1	Plan and conduct an investigation to provide evidence of the effects of balanced and unbalanced forces on the motion of an object.

Target 1 - Lesson 1

Define forces. Describe motion and how it is related to force.

- Define forces. Describe motion and how it is related to force.

Target 2 - Lesson 1

Explain how strength and direction affect forces.

- Explain how strength and direction affect forces.

Target 3 - Lesson 2

Explain how forces from differnt sources can combine.

- Explain how forces from differnt sources can combine.

Target 3 - Lesson 2

Compare balanced and unbalanced forces.

- Compare balanced and unbalanced forces.

Target 4 - Lesson 2

Demonstrate how forces can be measured.

- Demonstrate how forces can be measured.

Learning Goal 2 - Lesson 3

Make observations and/or measurements of an object's motion to provide evidence that a pattern can be used to predict future motion.

- Make observations and/or measurements of an object's motion to provide evidence that a pattern can be used to predict future motion.

SCI.3-PS2-2	Make observations and/or measurements of an object's motion to provide evidence that a pattern can be used to predict future motion.

Target 1 - Lesson 3

Explain how patterns of an object's motion in various situations can be observed and measured.

- Explain how patterns of an object's motion in various situations can be observed and measured.

Target 2 - Lesson 3

Predict the pattern of future motion by using the regular pattern of the past motion.

- Predict the pattern of future motion by using the regular pattern of the past motion.

Learning Goal 3 - Lessons 4 & 5

Ask questions to determine cause and effect relationships of electric or magnetic interactions between two objects not in contact with each other.

- Ask questions to determine cause and effect relationships of electric or magnetic interactions between two objects not in contact with each other.

SCI.3-PS2-3	Ask questions to determine cause and effect relationships of electric or magnetic interactions between two objects not in contact with each other.

Target 1 - Lesson 4

Explain the properties of magnetic forces.

- Explain the properties of magnetic forces.

Target 2 - Lesson 4

Compare the structures and characteristics of the different types of magnets.

- Compare the structures and characteristics of the different types of magnets.

Target 3 - Lesson 5

Explain electrical forces and their properties.

- Explain electrical forces and their properties.

Target 4 - Lesson 5

Compare the sources and properties of different types of electrical forces.

- Compare the sources and properties of different types of electrical forces.

Learning Goal 4 - Lesson 4

Define a simple design problem that can be solved by applying scientific ideas about magnets.

- Define a simple design problem that can be solved by applying scientific ideas about magnets.

3-PS2-4	Define a simple design problem that can be solved by applying scientific ideas about magnets.

Target 1 - Lesson 4

Demonstrate how magnets can be used to solve problems.

- Demonstrate how magnets can be used to solve problems.

Formative Assessment and Performance Opportunities

- TCI Lesson Game: Students test their understanding of key concepts with an education game.
- TCI Interactive Tutorial: Students can work independently to check their understanding in a safe environment that provides instant feedback but is not graded.
- TCI Interactice Student Notebook: Students record their understanding of both the reading and activity. Review during the lesson to gauge student understanding.
- TCI Vocabulary Cards: Students check their understanding of key vocabulary terms with digital flip cards.

Summative Assessment

TCI Assessment: What Can Electric Forces Do?

Teacher made assessment

Accommodations/Modifications

- Teach *Motion* and *Position* Before Showing the Videos
- Provide Cloze Notes to Support Student Answers in the Interactive Student Notebook
- Spread Out the Lesson To Get Students Comfortable with Forces
- Provide Context Before Students Read
- Have Students Investigate the Four Situations Separately
- Perform the Investigation with Various Amounts of Washers
- Set the Context for Alex's Results
- Reduce Group Size
- Adapt the Setup of the Stations
- Confirming Predictions
- Focus on the Crosscutting Concept: Cause and Effect
- Build Electromagnets Before Class
- Building and Testing a New Design
- Support the Investigation
- Support the Processing Assignment

Unit Resources

- TCI online manual and student text books
- TCI Interactive Student Notebook
- TCI Vocabulary Cards
- TCI Teacher Material Kit
- TCI activity cards

21st Century Life and Careers

CAEP.9.2.4.A.1	Identify reasons why people work, different types of work, and how work can help a person achieve personal and professional goals.

CAEP.9.2.4.A.2	Identify various life roles and civic and work - related activities in the school, home, and community.
CAEP.9.2.4.A.3	Investigate both traditional and nontraditional careers and relate information to personal likes and dislikes.
CAEP.9.2.4.A.4	Explain why knowledge and skills acquired in the elementary grades lay the foundation for future academic and career success.

Interdisciplinary Connections

MA.K-12.2	Reason abstractly and quantitatively.
MA.K-12.5	Use appropriate tools strategically.
LA.RI.3.1	Ask and answer questions, and make relevant connections to demonstrate understanding of a text, referring explicitly to the text as the basis for the answers.
LA.RI.3.3	Describe the relationship between a series of historical events, scientific ideas or concepts, or steps in technical procedures in a text, using language that pertains to time, sequence, and cause/effect.
LA.RI.3.8	Describe the logical connection between particular sentences and paragraphs in a text (e.g., comparison, cause/effect, first/second/third in a sequence) to support specific points the author makes in a text.
MA.3.MD.A.2	Measure and estimate liquid volumes and masses of objects using standard units of grams (g), kilograms (kg), and liters (l). Add, subtract, multiply, or divide to solve one-step word problems involving masses or volumes that are given in the same units, e.g., by using drawings (such as a beaker with a measurement scale) to represent the problem.
LA.W.3.7	Conduct short research projects that build knowledge about a topic.
LA.W.3.8	Recall information from experiences or gather information from print and digital sources; take brief notes on sources and sort evidence into provided categories.
LA.SL.3.3	Ask and answer questions about information from a speaker, offering appropriate elaboration and detail.