

Unit 2: Pushes and Pulls

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

Unit Overview

During this unit of study, students apply an understanding of the effects of different strengths or different directions of pushes and pulls on the motion of an object to analyze a design solution. The crosscutting concept of cause and effect is called out as the organizing concept for this disciplinary core idea. Students are expected to demonstrate grade-appropriate proficiency in planning and carrying out investigations and analyzing and interpreting data. Students are also expected to use these practices to demonstrate understanding of the core ideas

Transfer

Students will be able to independently use their learning to...
differentiate between the forces of pushes and pulls.

Meaning

Understandings

People use different ways to study the world.

- Simple tests can be designed to gather evidence to support or refute student ideas about causes.
- Pushes and pulls can have different strengths and directions.

- Pushing or pulling on an object can change the speed or direction of its motion and can start or stop it.
- When objects touch or collide, they push on one another and can change motion.
- A bigger push or pull makes things speed up or slow down more quickly.

Simple tests can be designed to gather evidence to support or refute student ideas about causes.

- Pushes and pulls can have different strengths and directions.
- Pushing or pulling on an object can change the speed or direction of its motion and can start or stop it.
- A situation that people want to change or create can be approached as a problem to be solved through engineering. Such problems may have many acceptable solutions.
- Because there is always more than one possible solution to a problem, it is useful to compare and test designs.

Essential Questions

What happens if you push or pull an object harder?

How can you design a simple way to change the speed or direction of an object using a push or pull from another object?

Application of Knowledge and Skill

Students will know...

- People use different ways to study the world.
- Simple tests can be designed to gather evidence to support or refute student ideas about causes.
- Pushes and pulls can have different strengths and directions.

- Pushing or pulling on an object can change the speed or direction of its motion and can start or stop it.
- When objects touch or collide, they push on one another and can change motion.
- A bigger push or pull makes things speed up or slow down more quickly
 - Simple tests can be designed to gather evidence to support or refute student ideas about causes.
- Pushes and pulls can have different strengths and directions.
- Pushing or pulling on an object can change the speed or direction of its motion and can start or stop it.
- A situation that people want to change or create can be approached as a problem to be solved through engineering. Such problems may have many acceptable solutions

Students will be skilled at...

- planning and carrying out investigations
- analyzing and interpreting data
- asking questions and defining problems
- developing and using models
- cause and effect
- structure and function

Academic Vocabulary

light, pull, push, roll, heat, ramp, straight-line motion, force

Learning Goal 1

Plan and conduct an investigation to compare the effects of different strengths or different directions of pushes and pulls on the motion of an object.

- Plan and conduct an investigation to compare the effects of different strengths or different directions of pushes and pulls on the motion of an object.

SCI.K-PS2-2

Analyze data to determine if a design solution works as intended to change the speed or direction of an object with a push or a pull.

SCI.K-PS2-1

Plan and conduct an investigation to compare the effects of different strengths or different directions of pushes and pulls on the motion of an object.

Target 1

SWBAT plan and conduct an investigation with guidance.

- SWBAT plan and conduct an investigation with guidance.

Target 2

SWBAT analyze data from tests.

- SWBAT analyze data from tests.

Learning Goal 2

Analyze data to determine if a design solution works as intended to change the speed or direction of an object with a push or a pull.

SCI.K-PS2-2

Analyze data to determine if a design solution works as intended to change the speed or direction of an object with a push or a pull.

SCI.K-PS2-1

Plan and conduct an investigation to compare the effects of different strengths or different directions of pushes and pulls on the motion of an object.

Target 1

SWBAT analyze data from tests.

- SWBAT analyze data from tests.

Target 2

SWBAT determine a speed or direction of an object with a push or pull.

- SWBAT determine a speed or direction of an object with a push or pull.

Learning Goal 3

Analyze data from tests of two objects designed to solve the same problem to compare the strengths and weaknesses of how each performs.

- Analyze data from tests of two objects designed to solve the same problem to compare the strengths and weaknesses of how each performs.

SCI.K-PS2-2

Analyze data to determine if a design solution works as intended to change the speed or direction of an object with a push or a pull.

SCI.K-PS2-1

Plan and conduct an investigation to compare the effects of different strengths or

different directions of pushes and pulls on the motion of an object.

Target 1

SWBAT test two objects and compare the strengths and weaknesses.

- SWBAT test two objects and compare the strengths and weaknesses.

Summative Assessment

Teacher observations.

Teacher will create a unit test.

21st Century Life and Careers

CAEP.9.2.4.A	Career Awareness
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.

Formative Assessment and Performance Opportunities

Teacher directed Q and A.

Small group investigations.

Logs and journals.

Accommodations/Modifications

- Structure lessons around questions that are authentic, relate to students' interests, social/family background and knowledge of their community.
- Provide students with multiple choices for how they can represent their understandings (e.g. multisensory techniques-auditory/visual aids; pictures, illustrations, graphs, charts, data tables,

multimedia, modeling).

- Provide opportunities for students to connect with people of similar backgrounds (e.g. conversations via digital tool such as SKYPE, experts from the community helping with a project, journal articles, and biographies).
- Provide multiple grouping opportunities for students to share their ideas and to encourage work among various backgrounds and cultures (e.g. multiple representation and multimodal experiences).
- Engage students with a variety of Science and Engineering practices to provide students with multiple entry points and multiple ways to demonstrate their understandings.
- Use project-based science learning to connect science with observable phenomena.
- Structure the learning around explaining or solving a social or community-based issue.
- Provide ELL students with multiple literacy strategies.
- Collaborate with after-school programs or clubs to extend learning opportunities.

Restructure lesson using UDL principals (http://www.cast.org/our-work/about-udl.html#.VXmoXcfD_UA).

Unit Resources

<http://ngss.nsta.org/Resource.aspx?ResourceID=129>

<http://ngss.nsta.org/Resource.aspx?ResourceID=211>

Interdisciplinary Connections

MA.K-12.2	Reason abstractly and quantitatively.
LA.RI.K.1	With prompting and support, ask and answer questions about key details in a text.
MA.K.MD.A.1	Describe measurable attributes of objects, such as length or weight. Describe several measurable attributes of a single object.
MA.K.MD.A.2	Directly compare two objects with a measurable attribute in common, to see which object has “more of”/“less of” the attribute, and describe the difference.
LA.W.K.7	Participate in shared research and writing projects (e.g., explore a number of books by a favorite author and express opinions about them).
LA.SL.K.3	Ask and answer questions in order to seek help, get information, or clarify something that is not understood.