

Unit 3a-Forces & Motion

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

Essential Questions

- Can pushes and pulls have different strengths and directions?
- What can increase the speed of an object or make the object turn?

Big Ideas

- Pushes and pulls can have different strengths and directions, and can change the speed or direction of its motion or start or stop it.
- Bigger pushes and pulls cause bigger changes in an objects motion or shape.

Technology Integration

8.1.2.DA.4: Make predictions based on data using charts or graphs.

Activity:

Students will watch the Brain Pop Jr video: Float and Sink. Students will make predictions on whether objects will float or sink using the graph on Google Slides.

Technology Connection

8.1.2.NI.1: Model and describe how individuals use computers to connect to other individuals, places, information, and ideas through a network.

Science and Engineering Practices

Planning and Carrying Out Investigations:

- With guidance, plan and conduct an investigation in collaboration with peers (for K).
- Make predictions based on prior experiences.
- Make observations (firsthand or from media) and/or measurements to collect data that can be used to

make comparisons.

Analyzing and Interpreting Data:

- Record information (observations, thoughts, and ideas).
- Use and share pictures, drawings, and/or writings of observations.
- Compare predictions (based on prior experiences) to what occurred (observable events).
- Use observations (firsthand or from media) to describe patterns and/or relationships in the natural and designed world(s) in order to answer scientific questions and solve problems.

Enduring Understandings

Next Generation Standards

Forces and Motion

K-PS2.A Pushes and pulls can have different strengths and directions.

K-PS2.A Pushing or pulling on an object can change the speed or direction of its motion and can start or stop it.

Type of Interactions

K-PS2.B When objects touch or collide, they push on one another and can change motion.

Relationship Between Energy and Forces

K-PS3.C A bigger push or pull makes things go faster.

Defining Engineering Problems

K-ETS1.A 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.

Student Learning Standards

Mathematics

K.MP.2 Reason abstractly and quantitatively.

K.M D.A.1 Describe measurable attributes of objects, such as length or weight. Describe several measurable attributes of a single object.

Focus Areas

Essential Knowledge

- 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 start or stop it.
- When objects touch or collide, they push on one another and can change motion.
- A larger push or pull makes things go faster

Essential Skills

- With guidance, students will plan and conduct an investigation of forces and interactions, in collaboration with peers. They will be able to design solutions (through engineering) to change the speed or direction of an object with pushes or pulls. The students may include tools (such as a ramp or structure) to solve this problem.
- Analyze data from force and interaction tests (with tools) to determine if plan work as intended.

Understandings

- 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.
- 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.

Resources

Primary Resources

- BrainPop, Jr
- NJCTL Unit 7 Forces & Motion
- Mystery Science

Scientific Inquiry

Core

- Pushes and Pulls Lab
- BrainPop, Jr. Pushes and Pulls
- BrainPop, Jr. Sink or Float
- Sink or Float Experiment
- BrainPop, Jr. Magnets
- Magnet Experiment
- Mystery Science - Force Olympics "What's the Biggest Excavator?"
- Mystery Science - Force Olympics "How Can You Knock Down a Wall of Concrete?"

Supplemental

- Investigation and Analyzing Data – Changing Direction (Problem Solving) Lab
- Different Forces Lab
- Transferring Energy – Types of Interactions Lab
- Relationship of Energy and Force - Changing Speed Lab
- Investigation and Analyzing Data – Changing Speed (Problem Solving) Lab