

Unit 1: Motion and Stability: Forces and interactions

Content Area: **Science**
Course(s):
Time Period: **Generic Time Period**
Length: **4 weeks**
Status: **Published**

Disciplinary Core Ideas

1. 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

2. When objects touch or collide, they push on one another and can change motion.

3. A bigger push or pull makes things speed up or slow down more quickly.

4. 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.

MA.K.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.

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.

LA.K.SL.K.3

Ask and answer questions in order to seek help, get information, or clarify something that is not understood.

SCI.K-PS2

Motion and Stability: Forces and Interactions

LA.K.RI.K.1

With prompting and support, ask and answer questions about key details in a text.

LA.K.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).

MA.K.K.MD.A

Describe and compare measurable attributes.

MA.K.K.MD.A.1

Describe measurable attributes of objects, such as length or weight. Describe several measurable attributes of a single 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.

Essential Question

Forces, Machines, & Engineering

1. What's the biggest excavator? (Pushes, Pulls, & "Work Words") (Week 1)
2. How can you knock down a wall made of concrete? (Strength & Direction of Force) (Week 3)

Extension Questions

3. How do objects move?
4. How can you make an object move?
5. How can you change an object's direction?
6. What causes moving objects to stop?

Activity

Mystery 1: Pushes, Pulls, & "Work Words"

Exploration Video (15 Minutes)

Activity: *Be a Digging Machine (Make sure students have enough space to move*

around as they dig like a digging machine.)

Extras: Drawing Prompt: Ask students to draw a machine doing work.

Read Along Mystery: *Duck In the Truck* by Jez Alborough or *Construction* by Sally Sutton.

Mystery 2: Strength & Direction of Force

Exploration Video (10 Minutes)

Activity: Don't Crush The House (20 min)

To set up the game stations, you will need a small piece of transparent tape for the wrecking ball and masking tape to tape down the game board and set up the wrecking ball.

1. Cut out and fold the Foldable Houses page. (If you are making multiple stations, you can use a paper cutter.)
2. Fold the Foldable Wrecking Ball and tie it to the end of the ribbon, following the instructions printed on the sheet. Use transparent tape to keep the Wrecking Ball from unfolding.
3. You are going to use masking tape to attach the yardstick to your support. For easier taping, clip the stick to the support first. Make sure the stick is at a 45° angle. Tape at two points — high & low.

Extras: Drawing Prompt: Ask students to draw a wrecking ball doing work.

Read-aloud Mystery: *Demolition* by Sally Sutton

Extension Activities Using Student Notebook:

- Introduce force and motion vocabulary.
- Compare objects that can be pushed or pulled.
- Talk about different motions of different types of balls.
- Introduce position words and complete science notebook activity.
- Investigate how to move stacked plastic cups and beach balls.

Enduring Understanding

1. People (scientists) make observations and try to understand what is always true.
2. Objects move in many different ways when pushed or pulled.
3. Identify/brainstorm objects that can be moved.
4. Identify and problem solve how to move objects

Assessment

1. Student Notebook Activities
2. Writing prompts
3. Participation in Activities
4. Teacher Observation

Materials and Resources

<https://mysteryscience.com>

1. printout of game station pieces from Mystery Science
2. one 8- $\frac{1}{2}$ x 11 sheet of paper (from the recycling bin if you like)
3. Yardstick or meterstick
4. Ribbon, yarn, or string (48" or 1 $\frac{1}{4}$ meters long)
5. 2 large binder clips (1 $\frac{1}{4}$ " wide)
6. a wastebasket, chair, or box to serve as a support
7. 3 Solo or paper cups (we use 9 oz cups. If you use larger cups, you will need to move the houses farther from the wall.)
8. Read Aloud: Duck in the Truck, Construction, Demolition.
9. Science Notebook
10. Beach balls
11. Plastic Cups

Accommodations and Modifications

- Large print textbooks
- Additional time for assignments
- Review of directions
- Have student restate information
- Provision of notes or outlines
- Concrete examples
- Adaptive writing utensils
- Support auditory presentations with visuals
- Weekly home-school communication tools (notebook, daily log, phone calls or email messages)
- Space for movement or breaks
- Extra visual and verbal cues and prompts
- Books on tape
- Graphic organizers
- Quiet corner or room to calm down and relax when anxious
- Preferential seating
- Alteration of the classroom arrangement
- Reduction of distractions
- Answers to be dictated
- Hands-on activities
- Use of Manipulatives
- Follow a routine/schedule

- Alternate quiet and active time
- Teach time management skills
- Rest breaks
- Verbal and visual cues regarding directions and staying on task
- Daily check-in special education teacher
- Visual daily schedule
- Varied reinforcement procedures
- Immediate feedback
- Personalized examples