Overview:

One way to change how something moves is to give it a push or a pull.

Objectives:

The student will:

- describe how pushing or pulling an object causes it to move;
- ask and answer simple questions about pushing and pulling objects; and
- complete a storyboard about push and pull.

Targeted Alaska Grade Level Expectations:

Science

[4] SB4.1 The student demonstrates an understanding of motions, forces, their characteristics, relationships, and effects by simulating that changes in speed or direction of motion are caused by forces.

[3] SA1.2 The student demonstrates an understanding of the processes of science by observing and describing the student's own world to answer simple questions.

Writing

[2] W1.2.2 The student writes for a variety of purposes and audiences by using expressive language when responding to literature or producing text (e.g., journals, pictures supported by text or poetry).

Vocabulary:

effort - force applied against inertia; the power or energy required to do work

force - strength or power exerted upon an object; in physics, an influence on a body or system, producing or tending to produce a change in movement or in shape or other effects; the intensity of such an influence

movement - the action or process of moving or going from one place or position to another; change of position or posture; passage from place to place

pull - to draw or haul toward oneself or itself, in a particular direction, or into a particular position; to draw or tug at with force

push - to press upon or against (a thing) with force in order to move it away

rub - to subject the surface of a thing to pressure and friction; to move (two things) with pressure and friction over or back and forth over each other

simple questions - sentences that are easy to understand and are not elaborate or complex, in an interrogative form, addressed to someone to get information in reply

work - force times the distance through which it acts; specifically, the transference of energy equal to the product of the component of a force that acts in the direction of the motion of the point of application of the force and the distance through which the point of application moves

NOTE: These vocabulary words are for teacher use only.

Materials:

- Chart paper
- Index cards (one per student)
- Wagons (one per group)
- 30 pounds of flour or other material in 10-pound increments (one per group)
- Plastic garbage bags, ropes, bungee cords, other lengths of material for moving flour bags
- Thick dowels to act as rollers
- Ramps

- Vagin, V. (1998). *The Enormous Carrot*. New York, NY: Scholastic Press.
- Butzow, C. M., and Butzow, J. W. (2000). *Science Through Children's Literature: An Integrated Approach*. 2nd ed. Englewood, CO: Teacher Ideas Press.
- STUDENT WORKSHEET: "Push Me Pull You Storyboard"
- STUDENT WORKSHEET: "Move the Bags"
- STUDENT WORKSHEET: "Move the Panda"

Activity Preparation:

1. Place the bags of flour in the middle of the room.

Activity Procedure:

Gear Up

Process Skills: communicating and inferring

1. Invite students to help you solve the flour bag problem! Tell students these bags of flour were in the room when you arrived today. Distribute an index card to each student and ask students to write and draw to show how they would move the bags.
2. Ask students to share their ideas. Ask what they would do or use to help them.

Explore

Process Skills: describing, communicating, and observing

3. Divide students into groups and distribute STUDENT WORKSHEET: "Move the Bags." Explain each group should discuss ways to move the bags, and write their chosen method to move the bags on their worksheet. As they try to move the bags, groups should complete the worksheet. Facilitate exploration by listening to groups interacting, asking questions, and observing.

Generalize

Process Skills: questioning and communicating

4. Ask groups to share their ideas and results with the class.
5. Ask the following questions as a class. Record student responses on chart paper.
   a. What kinds of pushing and pulling work were useful?
   b. Why was it useful?
   c. What didn't work?
   d. Why didn't it work?
   e. How were the observations on your index card different from what you have found during your Move The Bags exploration? Explain what has changed.
   f. What would you do differently? Why?

Apply

Process Skills: making generalizations and communicating

6. Distribute the STUDENT WORKSHEET: "Move the Panda" and ask students to complete the worksheet using the knowledge gained in the Exploration.

Extension Idea(s):

1. Read *The Enormous Carrot* to the class and discuss.
2. Conduct various kinds of tug-of-war contests with varying weights/team sides.

Assessment Task:

On STUDENT WORKSHEET: "Push Me Pull You Storyboard," write at least two simple questions you have about how wagons will move with people in them. With your team, move your wagon as far as you can with one person sitting in the bed of the wagon, two people sitting in the bed of the wagon, and three people sitting in the bed of the wagon.

Answer your simple questions. Be sure to tell how pushing and pulling can move an object. Your storyboard must include at least four colors and two sentences for each section. Each team member must complete an individual storyboard.

Rubric:

Objective	GLE	Below Proficient	Proficient	Above Proficient
The student describes how pushing or pulling an object causes it to move.	[4] SB4.1	On his or her storyboard, the student does not use words and pictures to describe that pushing or pulling can move an object.	On his or her storyboard, the student uses words and pictures to describe that pushing or pulling can move an object.	On his or her storyboard, the student uses words and pictures to describe that pushing or pulling can move an object. The student shows that the amount of force used on an object can change the direction and/or distance it can move
The student asks and answers simple questions about pushing and pulling objects.	[3]SA1.2	The student asks or answers less than two simple questions about pushing and pulling objects	The student asks and answers at least two simple questions about pushing and pulling objects.	The student asks and answers three or more simple questions about pushing and pulling objects.
The student completes a story about push and pull.	[2]W1.2.2	The student uses expressive language with words or pictures, and less than four colors, to answer less than two simple questions about moving a loaded wagon.	The student uses expressive language with words and pictures, and at least four colors, to ask and answer two or more simple questions about moving a loaded wagon.	The student uses expressive language with words and pictures, and five or more colors, to ask and answer three or more simple questions about moving a loaded wagon.

NAME: _____

MOVE THE BAGS

Directions:

1. Using words, labels, and pictures, explain your group's idea for moving the bags.

_____

_____

_____

2. Explain what happened when your group tried to move the bags. Use words, labels, and pictures.

_____

_____

_____

NAME: _____

MOVE THE PANDA

Directions: Imagine you have a pet panda. The panda has fallen asleep in front of the refridgerator. You are very hungry but also very kind, and you don't want to wake her up. How can you move the panda back into her bedroom? You may use words, pictures, or both. Use everything you learned from trying to move the bag with your group.

NAME: _____

PUSH ME PULL YOU STORYBOARD

PUSH ME PULL YOU STORY BOARD

WAGON WITH ONE PERSON	WAGON WITH TWO PEOPLE	WAGON WITH THREE PEOPLE

Write two questions you have about how wagons will move with people in them. Answer the question after your investigation.

1. _____

Answer _____

2. _____

Answer _____