

Playing with Push and Pull

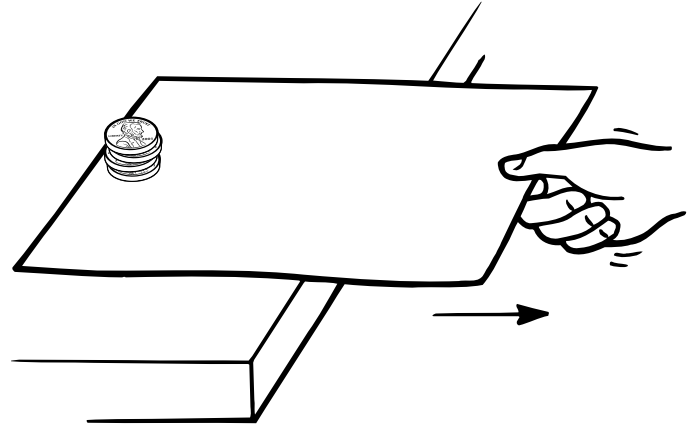
1st–2nd Grade

Objectives

- Students will define force as the push or pull on an object.
- Students will identify whether the force being exerted on an object is pushing or pulling.
- Students will understand and demonstrate that an object at rest tends to stay at rest.

Materials Needed

- Small washers or coins
- Strip of paper
- Chart paper
- Playground equipment
- Masking tape
- Variety of small objects (e.g., pencils, pennies, balls, toy cars, etc.)
- Measuring tape
- Push/Pull recording sheet



Introduction

Place a stack of three or four washers or coins on top of a strip of paper on a table or flat desktop surface, making sure that most of the paper is hanging off the surface. Ask students to predict what will happen if you quickly pull the strip of paper off the table. After they have made their guesses, grab the paper and swiftly pull it out from under the washers or coins in a downward motion. (The objects should stay on the table.) Explain how the coins or washers resisted movement even though the paper below them was moved away.

Procedure

1. Explain to students that objects at rest, like the washers or coins lying on the table, tend to stay at rest. Introduce this property as *inertia*. (Inertia also involves moving objects that stay in motion.) Objects only move if we push or pull them in a new direction. This pushing or pulling is called *force*.
2. Have students stand up behind their chairs. Ask, “Why isn’t your chair moving?” Invite responses and then explain that the chair is standing still. Nothing is forcing the chair to move.
3. Ask students to help you make a list of things that could cause an object, such as the chair, to move. (For example, someone pushing or pulling it, another object hitting it, a strong wind pushing it, a magnet pulling it, etc.)
4. Encourage students to think of daily activities—at home, at school or on the playground—that require them to push or pull an object. (For example, pushing a swing forward, pushing on a pencil to write, pulling a sheet up to make the bed, pushing a door open or pulling it closed, etc.) Write a few of their ideas on chart paper.
5. Invite students to play a game of charades. Have volunteers take turns acting out an activity that uses force. Have other students guess the action and identify it as pushing or pulling.
6. Remind students that an object at rest tends to stay at rest unless a direct force (push or pull) makes it move. Ask students to recall the coins or washers on the paper at the beginning of this lesson. Reinforce the idea that the objects themselves—not the things around them, like the paper—have to be pushed or pulled.

Guided Practice

1. Tell students that they will go out to the playground to learn about force. Explain that they will choose an activity and decide whether it involves pushing or pulling.
2. When you go outside, have students try a few of these activities:
 - Doing a chin-up on a horizontal bar
 - Climbing up a slide
 - Rolling a ball down a slide
 - Moving a partner on a swing
 - Rolling or kicking a ball across the grass
 - Playing a game of tug-of-war
3. After students have completed the activities, review each one and discuss whether it involved a pulling or pushing motion.

Independent Practice

1. Photocopy a Push/Pull recording sheet for each pair of students in your class. Pair students with a partner and explain that students are going to test how force is used to move a variety of objects.
2. Have each pair stick a small piece of masking tape to the floor to use as a starting line. Give each pair three or four small objects to test (e.g., a pencil, a penny, a ball, a toy car, etc.), some measuring tape and a copy of the Push/Pull recording sheet.
3. Challenge students to place the objects on the starting line and give each object a push. Ask students to measure and record on the sheet how far each object traveled before it stopped.
4. Have students repeat the test, giving each object a pull instead. Ask them to measure and record how far each object traveled this time.
5. After they have tested the objects, engage students in a discussion about their observations. Ask:
 - Did you find that certain objects traveled farther than others when pushed or pulled? Which ones? (Explain that the weight of an object can affect how fast it moves.)
 - Did any of your objects stop moving on their own? Did other objects have to run into something else that made them stop? (Introduce the concept of *friction*, explaining that objects slow down when they come in contact with each other. For example, a toy car rolling on the ground can slow down when it hits pebbles or a clump of grass.)
 - Do you think the strength of your push or pull motion affected the outcome of these tests? (Help students understand that the amount of force used to push or pull an object affects the distance it travels.)

Push/Pull Recording Sheet

Name _____

Date _____

Directions: Place an object on the starting line. Give it a push or pull. Then measure and record the distance the object traveled.

Object	Push	Pull
1.		
2.		
3.		
4.		
5.		
6.		