

# Why Things Move

## BROWARD COUNTY ELEMENTARY SCIENCE BENCHMARK PLAN

### Grade 1—Quarter 3

#### Activity 22

##### SC.B.2.1.1

*The student recognizes systems of matter and energy*

##### SC.C.1.1.2

*The student knows that there is a relationship between force and motion.*

##### SC.C.2.1.1

*The student knows that one way to change how something is moving is to give it a push or a pull.*

##### SC.H.1.1.1

*The student knows that in order to learn, it is important to observe the same things often and compare them.*

##### SC.H.1.1.3

*The student knows that in doing science, it is often helpful to work with a team and to share findings with others.*

## ACTIVITY ASSESSMENT OPPORTUNITIES

The following suggestions are intended to help identify major concepts covered in the activity that may need extra reinforcement. The goal is to provide opportunities to assess student progress without creating the need for a separate, formal assessment session (or activity) for each of the 40 hands-on activities at this grade level.

1. Ask students to identify whether each of the following actions involves a push or a pull.
  - (a) *A woman uses a hammer to remove a nail from a piece of wood. (a pull)*
  - (b) *A cook stirs spaghetti in a pot of water. (Both pushes and pulls may be used.)*
  - (c) *A child uses a nutcracker to break open a walnut. (a push)*
2. Use the Activity Sheet(s) to assess student understanding of the major concepts in the activity.

In addition to the above assessment suggestions, the questions in bold and tasks that students perform throughout the activity provide opportunities to identify areas that may require additional review before proceeding further with the activity.



# Why Things Move

## OBJECTIVES

Students discover that a force is needed to make an object move. They compare results when the same object is moved with different amounts of force.

### The students

- ▶ observe how pushing and pulling a toy cart makes it move
- ▶ compare the motion of a toy cart when it is pushed and when it is pulled
- ▶ recognize that a force is needed to make an object move
- ▶ conclude that a strong push makes an object move farther and faster than a weak push does

## SCHEDULE

About 40 minutes

## VOCABULARY

force  
pull  
push

## MATERIALS

### For each student

- 1 Activity Sheet 22
- 1 straw, plastic
- 1 pc tape, masking, about 1 inch long

### For each team of four

- 1 cart, yellow

### For the class

- 1 pc string, about 12 inches long
- 1 pc tape, masking, about 2 inches long

\*provided by the teacher

## PREPARATION

- 1 Make a copy of Activity Sheet 22 for each student.
- 2 If the carts are not yet assembled, put them together by attaching the wheels and axles.
- 3 Tape the string to one end of one cart so it can be pulled.

## BACKGROUND INFORMATION

An object at rest tends to stay at rest. What then makes an object move? For example, what causes a soccer ball that is at rest on a soccer field to roll towards the goal? A **force**, which can be described as a push or a pull, must be applied to the ball to make it move. Kicking the ball applies a force, so the ball moves. When the ball is kicked, energy is transferred from the player's foot to the ball. This increase in energy is what makes the ball move. The stronger the force, the farther and faster the ball will roll. Once an object is in motion, it tends to stay in motion unless a force is applied to stop it.

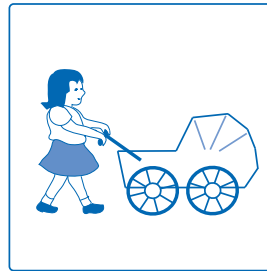
Force is all around us. If you drop a book, it falls to the floor. The force that pulls on the book is gravity. Gravity is an attractive force that pulls objects toward each other. When any force **pulls** on an object, the object moves toward the source of the force. When a force **pushes** on an object, the object moves away from the source of the force.

In this activity, students will investigate the motions caused by pushes and pulls.

### ▼ Activity Sheet 22

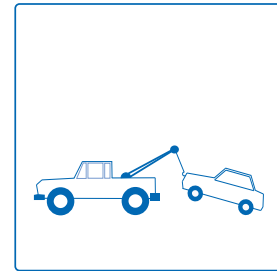
#### Why Things Move

Look at each picture. If it shows a push, write *push* on the line below the picture. If it shows a pull, write *pull* on the line.



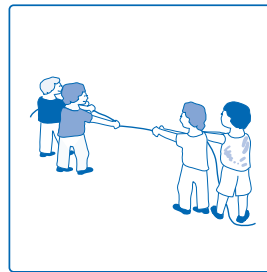
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push



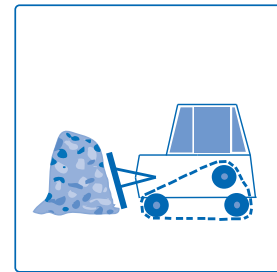
\_\_\_\_\_

pull



\_\_\_\_\_

pull



\_\_\_\_\_

push

## Guiding the Activity

**1** Show students the yellow cart with the string. Have them observe that the cart does not move when you put it on a desk. Ask a volunteer to give the cart a push. Have students observe that the cart moves. Ask, **Why do you think the cart moved when it was pushed?**

Have another volunteer pull the cart by the string. Again, have students observe that the cart moves. Ask, **Why do you think the cart moved when it was pulled?**

Explain to the class that the cart moved when it was pushed and pulled because a force acted on it. Write the word *force* on the board and read it aloud. Tell students that a **force** is a push or a pull. A force makes things move. If something is already moving, a force can make it stop moving. Ask, **Can you think of something on a playground that starts to move when it is pushed?**

## Additional Information

*Accept all responses.*

*Accept all answers.*

*Students may suggest that a swing starts to move when it is pushed. Accept all responses.*

## Guiding the Activity

### Additional Information

Ask, **How can you get the swing to stop moving?**

*Students may suggest that the swing stops when someone grabs it and pulls it to a stop. Accept all responses.*

Ask, **Can you think of something that starts to move when it is pulled?**

*Accept all responses. A drawer or a door moves when it is pulled open.*

- 2** Have students think about the motions that were caused by pushing and by pulling the cart. Ask, **How were the motions different?**

*Accept all answers. Students may have observed that the cart moved away from the pusher and toward the puller. Have the two volunteers repeat their demonstrations if necessary.*

Write the words *push* and *pull* on the board. Explain that when you **push** on something, you move it away from you. When you **pull** on something, you move it toward you.

- 3** Have the class brainstorm some everyday objects that move when they are pushed and objects that move when they are pulled. Write students' suggestions in two lists on the board under the headings *Push* and *Pull*.

*Students may suggest that bikes, cars, swings, baseballs, and so forth move when they are pushed. Tow trucks, a tug-of-war game, and wagons move when they are pulled.*

- 4** Form students into teams of four. Distribute a drinking straw and a small piece of tape to each student and a yellow cart to each group. Tell students that they are going to try to move the cart by blowing on it through a straw. Explain that blowing air on the cart is a force. Have each student blow through a straw onto the palm of his or her hand to feel the force of the air. Ask, **Is blowing air through the straw a push or a pull?**

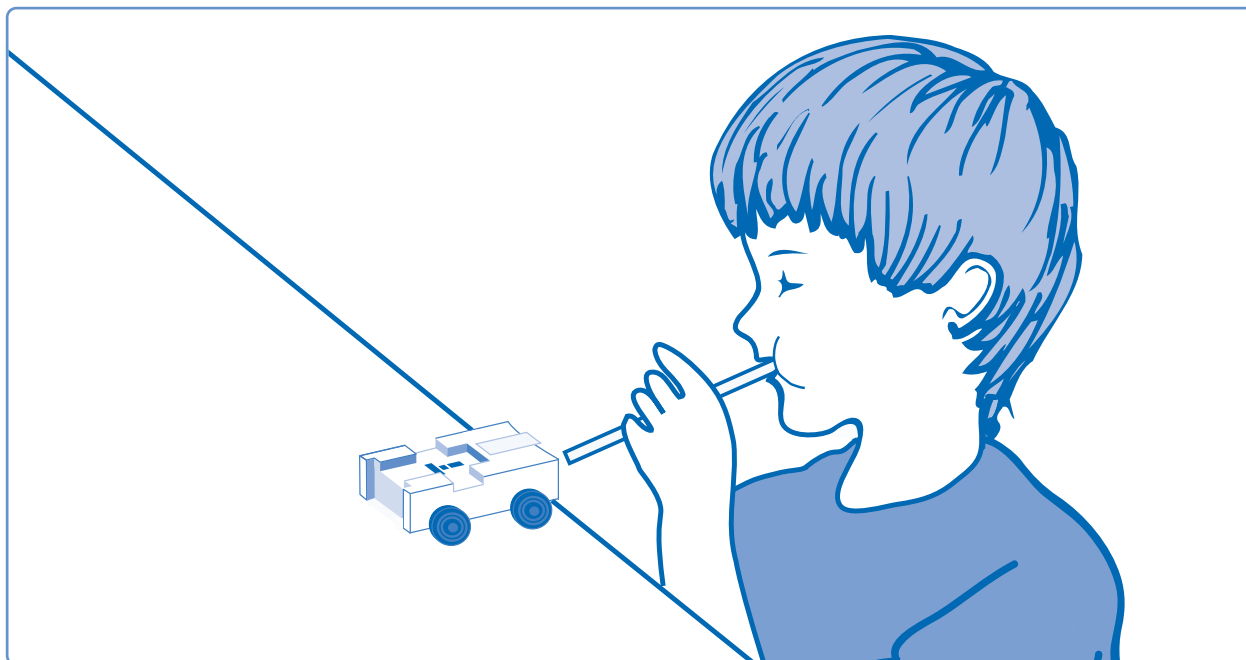
*a push*

- 5** Have one student on each team place the cart so its back is even with one edge of the desk (see Figure 22-1). Tell these students to take a deep breath and blow through the straw at the back of the cart to make it move. When the cart stops moving, the student should place his or her strip of tape where the front of the cart stopped.

*Students should use only one big blow, so tell them to blow as hard as they can.*

## Guiding the Activity

## Additional Information



▲ Figure 22-1. The cart should be placed so its back is even with one edge of the desk.

Have the students on each team take turns blowing on the cart and marking the stopping point until all students have had a turn.

- 6 Now tell students that they are going to pair up so two students will blow on the cart at the same time. Ask, **How will the force be different if two people are blowing?**

Ask, **Do you think the cart will move differently if two people are blowing on it at the same time?**

*Students should recognize that the force will be stronger.*

*Accept all answers.*

- 7 Have a pair of students from each group position the cart at the desk edge as before, take deep breaths, and blow through the straw onto the back of the cart. Tell students to observe how the cart moves. Have them compare the position of the cart with the pieces of tape that marked the positions when one student blew. Then have the other pair of students from each group take a turn moving the cart.

## Guiding the Activity

Ask, **How did the cart move differently when two people blew on it at the same time?**

Ask, **What can you conclude about how the size of a force makes an object move differently?**

8

Distribute **Activity Sheet 22** to each student. Tell students to look at each picture and decide if it shows a push or a pull. Have them write either *push* or *pull* on the line below each picture.

## Additional Information

*Students should say that the cart moved farther when two students blew on it. They should also observe that the cart moved faster, or had more speed.*

*Students should conclude that a large force makes an object move farther and faster than a small force.*

## REINFORCEMENT

Have students cut out pictures from newspapers and magazines that show pushing and pulling motions. The pictures can be pasted into a scrapbook or displayed on a bulletin board with the label *push* or *pull* below each one.

## SCIENCE JOURNALS

Have students place their completed activity sheets in their science journals.

## CLEANUP

Have students return the carts to the kit and discard the straws and tape.

## Connections

### Science Extension

- ▶ Have students play the game of charades, taking turns acting out an activity that involves some kind of a force—either a push or a pull. The rest of the class must guess what action was acted out and then tell whether the force used was a push or a pull.
- ▶ Have students think about their activities from the time they wake up in the morning until they arrive at school. Have them list all the activities that involve pushing and all those that involve pulling. Even a simple activity such as brushing the teeth involves both pushing and pulling.

### Science and Language Arts

Have students find some books about sports and/or outdoor games. As they read the books or look at the pictures, have them make a list of the pushes and pulls that happen in the activities.

### Science and the Arts

Have students fold a piece of white paper into quarters. Mark two quarters of the paper with the heading *Push* and the other two quarters with the heading *Pull*. Have students draw two pictures showing a push and two pictures showing a pull.

### Science, Technology, and Society

- ▶ Ask students to bring to class some common tools that they have at home. Display the tools, and have students group them according to whether a push or a pull would be needed to operate each tool. For example, a hammer requires a push, and a pair of pliers requires a pull. Discuss other tools and common devices that might require a push or pull. For example, radios, TVs, and computers are turned on by pushing a button. The keys on a computer keyboard must be pushed.
- ▶ Have students analyze the action of a pair of scissors. Do the scissors have to be pushed or pulled to cut a piece of paper? (Both; first the blades must be pushed to close, then they must be pulled to open.)