

# Bowling

## Changing Motion Cluster and Friction and Gravity Cluster (Lessons 5-13)

### TEACHER NOTES:

Use this assessment after Lesson 12.

Give each child a copy of the Bowling Scene Assessment Master (page 40) to use to answer the questions.

You can administer this task orally, individually, or in small groups.

Look at the bowling pictures to answer these questions.

### 1. Name at least two objects in the pictures whose motion changed.

Possible answers include the ball, one or more of the pins, or the bowler.

### 2. What do you think caused the objects you listed to change their motion?

Look for responses such as the following, depending on which objects the children chose:

- The change in the motion of the **ball** was caused by a push from the bowler, the bowler's arm, or the bowler's muscles.
- The change in the motion of the **pins** was caused by a collision with the ball or with another pin.
- The change in the motion of the **bowler** was caused by pushes from his arms, legs, or muscles.

### 3. If the bowler rolled the ball more gently, what might be different in the last picture? Why?

Most children will probably say that fewer pins will fall down, since gentler forces produce smaller changes in motion. A few children might say that more pins will fall down, since stronger forces are sometimes harder to control than gentler forces. When evaluating children's responses, consider whether the reasons they provide are consistent with their prediction about how the motion might change.

**4. Do you think there is a lot of friction between the bowling ball and the floor? Why or why not?**

- There is not a lot of friction between the bowling ball and the floor, since both are very smooth surfaces. Children may note that the bowling ball doesn't slow down very much as it rolls along the floor.
- You might gather additional information about the children's level of understanding about friction by prompting with additional questions, such as Would there be more or less friction if the floor was sticky? or How would more or less friction change the motion of the ball?

**5. Draw what these pictures would look like if there were no gravity.**

When evaluating children's drawings, consider whether they understand that gravity pulls all objects down. Children's drawings should show at least some objects "floating" above the ground.

# Changing Motion Cluster

## Quick Check Items

### TEACHER NOTE:

You might administer this assessment orally, individually, or in groups.

The following questions relate to the Changing Motion cluster. Use them after teaching the entire cluster, or select the applicable questions immediately following each lesson. You can also compile Quick Check items into an end-of-unit assessment.

### 1. (Lesson 5) Yes or No?

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

\_\_\_\_\_ *yes*

### 2. (Lesson 5) Circle **two** examples of changes in motion.

*starting to move*

standing still

*turning*

### 3. (Lesson 6) Wind can create a pushing or pulling force that moves leaves and trees.

Draw lines to match the strength of the wind with the motion it produces.

#### WIND STRENGTH

Gentle breeze

Strong wind

Very strong wind (hurricane or tornado)

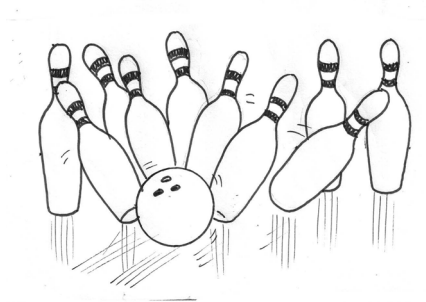
#### MOTION

Trees fall down

Leaves sway on trees

Leaves fall off trees

4. (Lesson 5-8) Circle the picture that is NOT an example of a push or a pull.



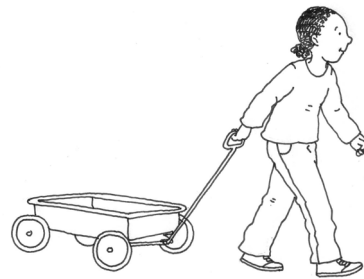
a. a collision



b. blowing



c. *looking*



d. tugging