

Overview:

Pushing or pulling something can change how it moves.

Objectives:

The student will:

- describe how a marble moves through a maze;
- predict how a marble will move through a maze; and
- write about a maze activity.

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.
- [4] SA1.1 The student demonstrates an understanding of the processes of science by asking questions, predicting, observing, describing, measuring, classifying, making generalizations, inferring, and communicating.

Writing

- [4] 2.2.2 The student writes for a variety of purposes and audiences by writing in a variety of nonfiction forms using appropriate information and structure (i.e., personal letters, recounts, descriptions or observations).

Vocabulary:

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

motion – agitation or disturbance of a physical substance; an irregular movement, shaking, or oscillation

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

Materials:

- Masking tape
- A tub for each group filled with any/all of the following:
 - Toy(s) with string(s)
 - Yo-Yo
 - Spinning top
 - Magnets
 - Cardboard to make a ramp
 - Chart paper
 - Something magnetic
 - Something round/spherical
 - Something square/cubical
 - Something slick
 - Something rough
 - Something with wheels
- Shoebox lid (one per student)
- Play dough (one large lump per student)
- Marble (one per student)
- Chart paper
- STUDENT WORKSHEET: "It's A-Mazing"

Activity Preparation:

1. For the Explore, create masking-tape tracks (4 or 5 feet long) and squares (2 or 3 feet across) on the floor where students can manipulate items. Each group of students will need one track and one square.
2. Prepare vocabulary list with definitions on chart paper.

Activity Procedure:

Please refer to the assessment task and scoring rubric located at the end of these instructions. Discuss the assessment descriptors with the class before teaching this lesson.

Gear Up

Process Skills: observing

1. Divide students into pairs. Identify students as “Student #1” or “Student #2” in each pair. Ask them to face each other and hold hands. Tell Student #1 to push his/her hands forward. Ask students to share observations about what has happened; record on the board. (Student #2’s hand moved away.)
2. Ask Student #2 to push his/her hands forward while Student #1 also pushes forward. Ask students to share their observations; record on the board. Ask students to try again, with a pull instead of a push. Ask students to share their observations; record on the board.
3. Introduce or review vocabulary words: force, motion, push, and pull.

Explore

Process Skills: observing and questioning

4. Divide students into small groups. Distribute a tub of objects to each group (see Materials) and explain they will be making the objects in the tubs move in a variety of ways using the tracks and squares on the floor. Ask students to help make a list of questions about the objects and how the objects move. Record questions on chart paper.
5. Assign each group to a track and a square and allow them to explore and answer the questions they have listed.
6. During the activity, write ideas and new words on chart paper.

Generalize

Process Skills: communicating and inferring

7. Ask students the following questions and record ideas on chart paper or the board:
 - a. Which things did you have to pull? Push?
 - b. How did pushing or pulling change how things moved?
 - c. How did the things move? (straight line, in a circle, zigzag, fast, slow, etc.)
 - d. How were some things easier to move than others?
 - e. How else were you able to move things?
 - f. How were you able to make things move without touching them?
 - g. What items can you think of at home that might move in a way similar to something in the tub?
 - h. What questions do you have that you might answer if you could try the investigation again?

Apply

Process Skills:

8. Ask students to write a journal entry describing at least two objects from the tub and how they moved. Ask them to include at least one question they would like to answer with further investigation.

A-MAZING MOTION

INSTRUCTIONS

Assessment Task:

Use a shoebox lid and a can of play dough to create a maze with a start and end point and at least three corners or turns that you can move a marble through. When your maze is completed, draw a picture of the maze on the student worksheet “It’s Amazing” and make at least one prediction on how you can move a marble through the maze. Place the marble at the start point and move the marble through to the end of the maze. When you have moved the marble through at least once, complete the worksheet by describing how you moved the marble through the maze. You need to write at least two sentences.

Rubric:

Objectives	GLEs	Below Proficient	Proficient	Above Proficient
The student describes how a marble moves through a maze.	[4] SB4.1	The student does not describe how a marble moves through a maze by pushing or pulling.	The student describes how a marble moves through a maze by pushing or pulling one time.	The student describes how a marble moves through a maze by pushing or pulling two or more times.
The student predicts how a marble will move through a maze.	[4] SA 1.1	The student makes no prediction about how a marble will move through a maze.	The student makes one prediction about how a marble will move through a maze.	The student makes two or more predictions about how a marble will move through a maze.
The student writes about a maze activity.	[4] W2.2.2	The student writes fewer than two sentences describing a maze activity.	The student writes two sentences to describe a maze activity.	The student writes three or more sentences to describe a maze activity.