

Speed and Motion Activity Bag

Forces, Motion, and Direction: Student Activity Guide

Have you ever been on a roller coaster or a swing? If so, you have experienced going up, going down, going forwards, going backward, going fast, going slow, starting, and stopping. All these things have to do with forces, motion, and direction. It takes forces to get you going. Going fast, slow, starting, and stopping are kinds of motion. Going up, down, forwards, or backwards are directions. This activity will explore these topics.

Materials From The Bag

- Ping Pong Ball
- Index Card
- Labels
- Tape Measure
- Pom Pom
- Craft Stick
- Rubber Band
- Straw

You Will Need

- Science Notebook or Student Activity Sheet from the teacher.

Part 1: Exploring Forces

1. Place the pom pom on a flat surface.

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- Using only the craft stick your challenge is to find as many different ways as you can to move the pom pom.
- Record what you did to the pom pom in your notebook or on your student activity sheet.
- Repeat **steps 2-3** using only the index card.
- Repeat **steps 2-3** using only the rubber band.
- Repeat **steps 2-3** using only the straw.

What's happening...

The ball moved because you applied force in all four of your examples. A **force** is a push or a pull on an object. Sometimes forces cause objects to move, slow down, stop, or change direction. The craft stick, index card, rubber band, and straw were tools you used to create a force on the pom pom.

- Record in the chart on the next page three things you did to move the ball, the tool you used, and if the force is a push or a pull. For the third example circle which force you used.

What did you do to the pom pom?	Tool	Force
		Push
		Pull
		Push Pull

Part 2: Exploring Motion & Direction

1. Pick up the ping pong ball and drop it on a flat surface. Observe the ball until it stops.
2. Repeat **step 1** a couple more times.
3. Record in your notebook or on your student activity sheet what happened to the ping pong ball. Include as many details as you can.

What's happening...

Motion is everything that happened to the ping pong ball from when you released it until it stopped. Direction is the location of something compared to something else.

Some examples of direction are **up, down, right, left, forward, backward, and sideways.**

4. Look at your description of how the ball moved. Circle all of the directions your ball went. If your description does not have many direction words, add them to your description. How many different directions did your ball travel?

Part 3: Force and Direction Challenge

Your challenge is to move the ping pong ball or pom pom from the “start” label to the “finish” label using any of the materials from the bag.

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Rules:

- The “start” label must be at least 500mm away from the “finish” label.
- Apply at least one pull force.
- Apply at least one push force.
- Make the ping pong ball or pom pom go in **three** different directions.
- Stop on the “finish” label

Procedure:

1. Write the word “**start**” on a label. Write the word “**finish**” on a different label.
2. Place the “start” label somewhere on a flat surface.
3. Measure 500mm away from the “start” label and place the “finish” label on the surface.
4. Place the ping pong ball or pom pom on the “start” label.
5. Complete the challenge.
6. Draw the path of the ping pong ball or pom pom. Explain the forces and directions the ping pong ball or pom pom moved from start to finish.

Extension: Exchange your drawing with a classmate and see if they can complete the challenge by following your drawing and explanation.