



Force and Motion

KEY VOCABULARY

analyzing: considering information gathered during an experiment

force: a push or a pull

investigating: gathering information by observing or testing

motion: the act of moving or of not staying still

observing: using our senses to gather information

reflecting: considering observations about the experiment

reporting: telling others about the experiment

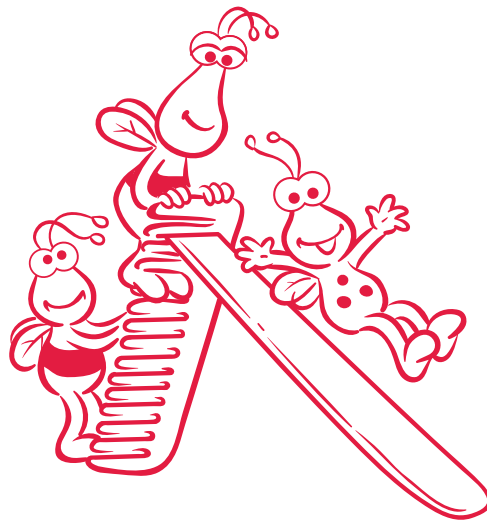
WELCOME, EDUCATOR!

You and the children you work with are about to embark on an engaging multimedia experience exploring concepts in Science, Technology, Engineering, and Math (STEM). **Sesame Street Little Discoverers: Big Fun with Science, Math, and More** is a resource to help you discover exciting new ways to build on children's natural fascination with STEM concepts.

In this topic, children will investigate how different forces affect the movement of different things.

HELP CHILDREN TALK ABOUT FORCE AND MOTION:

- » A force is a push or pull that can cause an object to move, change direction or speed, or stop and stay still.
- » When the same amount of force is pushing on all sides of an object, the object is balanced.
- » Children are constantly exploring force and motion with their bodies wherever they go! Playing on the playground and kicking a ball can help children learn about how force affects motion.



For more fun ideas, videos, and games, check out sesamestreet.org/STEM on your computer or mobile device.



FORCE AND MOTION

Ramp It Up!

GOAL

Explore how the slope of a ramp affects force.

QUESTION

How does the height of a ramp affect the distance a toy car will roll?

TIME

20–30 minutes

MATERIALS

For each group of children:

- » 1 flat piece of cardboard
- » 3 standard, rectangular blocks
- » 1 toy car
- » sticky notes labeled “1 block, 2 blocks, and 3 blocks”
- » View and Do Chart
- » crayons



LET’S WATCH: “MURRAY EXPERIMENT: RAMPS”

In the video, Murray and his friends design cars that will roll down a ramp. They are curious to see which car will roll the farthest.

LET’S TALK ABOUT IT

After you watch the video together, ask some questions to prompt a discussion.

- » “What did Murray and his friends do?”
- » “What did they discover?”
- » “How would you design a car that would go far?”

LET’S DO AN ACTIVITY:


1. Set a car on the ground. Say, “Hmmm...The car isn’t moving. I wonder what we could do to put it in motion.” Allow children to respond. Then say, “The car needs force to move. A push is a type of force. We could push the car. But let’s use a ramp like Murray did and see if that will help the car have enough of a force to move.”
2. Have children build a ramp: put one block on the floor and position the cardboard to slope off the block and onto the floor.
3. Have one child put the toy car at the top of the cardboard ramp, then let it go.
4. Label a sticky note “one block” and place it on the floor where the car stopped.
5. Say, “This ramp allowed the car to have enough force to move. Let’s measure how far the car rolled.” Have one child place his foot so that his heel touches the end of the ramp. Then have him walk heel to toe. Ask the other children to count the number of “feet” to the sticky note.
6. On the sticky note labeled “1 block,” have a child tally how many “feet” the car moved.
7. Repeat the experiment two more times, making a two-block ramp and then a three-block ramp. Each time, have the same child do the “foot” measuring.
8. After rolling the down all three ramps, ask questions such as, “Which ramp made the car go the farthest?” and, “Which ramp do you think gave the car the most force?”



FORCE AND MOTION

Ramp It Up!

Have the children place the sticky notes for 1 block, 2 blocks, and 3 blocks, in the appropriate column, according to how many "feet" the car moved.

 Far	Farther	Farthest
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FORCE AND MOTION

How Toys Move

GOAL

Learn to describe different types of motion.

QUESTION

What are the different ways toys move?

TIME

20–30 minutes

MATERIALS

- » 1 large bin that includes different kinds of toys – balls, cars, trains, play food and dishes, wind-up toys, spinning tops, etc. Make sure the toys can represent the types of motion in the chart (bounce, roll, and spin).
- » Activity Chart (one per child)
- » crayons

In this activity, children will observe the different kinds of motion toys can display.

STEPS

1. Show children the bin of toys and say, “The toys we play with show us different kinds of motion. Some roll, some spin, some bounce.”
2. Take a ball from the toy bin and say, “What kind of motion do you think the ball can show us?” Then ask one child to show a way that the ball moves.
3. Record the movement on the chart by writing “ball” or drawing a picture of a ball in the appropriate motion square.
4. Then ask, “Can the ball show us a different kind of motion?” Have a child demonstrate another way the ball moves. Record it on the chart.
5. Say, “Now it’s your turn to explore. I’ll pass out toys and you observe how they can move. Talk with your neighbor to share what kind of motion your toys show you.”
6. Give children a few minutes to explore and observe their toys.
7. Ask children to share different ways their toys move, and record that on the chart. A toy may fit into multiple squares, and children may come up with other forms of motion!

TUBE EXPLORATION

Investigate if a paper towel tube can spin, roll, or bounce. Ask, “What kind of motion can the paper towel tube show us?” Prompt children to say, “I think the paper towel tube is good at _____ because _____.”






FORCE AND MOTION

How Toys Move



Have children record which toys showed which form of motion, by either writing the name of or drawing the toy in the appropriate box.

 <p>Bounce</p>	<p>Roll</p>
<p>Spin</p>	<hr/>



Force and Motion

Sesame Street Little Discoverers: Big Fun with Science, Math, and More is a resource to help you and your child explore STEM.

Remember, it's okay to not know the answers to all of her questions. Model a sense of curiosity by saying something like, "That's a great question! I don't know the answer but let's find out together."

HELLO, FAMILIES!

Your child is full of curiosity. She is always observing, questioning, testing her thinking, and collecting information. These are important critical-thinking and problem-solving skills that help set her up for success in Science, Technology, Engineering, and Math (STEM).

HELP YOUR CHILD TALK ABOUT FORCE AND MOTION

- » A force is a push or a pull.
- » An object is in motion when a force acts on it (and it moves).
- » When all forces pushing or pulling on an object are equal, the object is balanced.

TRY THIS AT HOME

Pick and choose the activities that work best for you and your child.

Let's Talk. Use the word force as many times as you can this week! Say things like, "Can you use force to blow some bubbles?" or "Your tricycle is in motion because you put force on the pedals." Give a high-five anytime someone in the family uses these words.

Push and Pull. Point out things that you pull or push throughout the day (pulling a wagon, pushing a toy car). You'll notice forces are everywhere!

Compare the Force. Ask your child to push or pull a wagon or stroller. Compare the empty wagon or stroller to one filled with heavy objects. Which one takes more force to push or pull?

Have a Ball. Ask your child to think of different ways she can use force on a ball to make it move (throwing, kicking, rolling, dropping, bouncing). Which way uses the most force and therefore moves the ball farthest?



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FORCE AND MOTION

Bowling Alley

TUBE EXPLORATION

Use paper towel tubes to explore force and motion. How many ways can your child make a tube move? Does it spin? Bounce? Roll down a ramp?

WATCH "FINISHING THE SPLAT"

In the video, Oscar wants to make a grouchy, horrible painting. He uses squeeze bottles to make paint splats. Then, he mixes different paints together to make a brownish-green color. Fluffy the Elephant helps by blowing on the paint with a lot of force to make an even bigger splat. Oscar is sure this design will make everyone mad, but his friends think it's an amazing work of art!

ACTIVITY

Set up a "bowling alley" at home to investigate force and motion.

MATERIALS

- » A ball that can be used indoors, such as a tennis ball, bouncy ball, or small beach ball
- » 6 plastic bottles half-filled with water
- » smooth floor surface
- » Activity Chart
- » crayons

STEPS

1. Set up a bowling alley by placing the bottles on a smooth surface.
2. Help your child roll the ball lightly aiming towards the "pins". Record on the Activity Chart how many pins were knocked over.
3. Next, help your child roll the ball towards the pins with more force. Record how many pins were knocked over.
4. Ask questions such as, "Which roll worked best – the one with less force or more force?" "Who gave the ball the force to move?"



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FORCE AND MOTION

Bowling Alley



Have your child circle how many "pins" were knocked over with a little bit of force and with more force.

Less Force	More Force
 <p data-bbox="402 1444 578 1476">Number of pins</p> 	<p data-bbox="1068 1444 1243 1476">Number of pins</p> 