



# 3<sup>rd</sup> Grade Lesson Plan: Motion and Force

**Objective:** Review the basic laws of motion with the students. Teach students that motion is the process of moving or being moved. Explain how the amount of force applied to an object will determine its change in speed and direction.

**Materials:** Tape, paper towel tubes, unsharpened pencils, spools of ribbon, toilet paper tubes, scissors, items to add weight (such as small toys or markers), and the motion and force "What You Discovered" worksheet revised for classroom use.

## Procedure:

1. Start with a class discussion about motion (the process of moving or being moved) and its basic properties. Explain how there are three laws of motion, but today we are focusing on the first law.
  - a. Ask students an opening question, such as: What is motion? What are some examples of motion?
2. Teach the first part of the first law of motion: an object at rest will stay at rest.
  - a. Use an example to explain this concept. Example: if there's a soccer ball sitting on the field and no one kicks it, will it move? Note: Teachers can bring in a soccer ball or other objects to demonstrate this concept.
3. Ask the students another question, such as: How do things move? What makes things move? Explain what force is. Force: influencing the movement of an object.
  - a. Kick the soccer ball. By kicking it, I am exerting force.
  - b. Show that the greater the force applied to an object, the greater the change in speed or direction. Use soccer ball example.
  - c. Compare what happens when the force is weak or the force is strong.
  - d. Explain that the heavier an object, the more force it takes to move it. The lighter an object, the less force it takes to move it.
4. Motion is happening all around us. Scientists study the motion of tiny particles but they also study huge things like planets.
  - a. Ask students if they can think of objects, both big and small, that are in motion.
5. Follow the steps outlined in the dōTERRA® Science for Kids Motion and Force Activity. Have the students complete the "What You Discovered" worksheet.

**Evaluation:** Evaluate students' understanding by reviewing their responses to the questions on the "What You Discovered" worksheet as well as the notes they recorded in their notebook.



# Motion and Force

## What You'll Need:

- Tape
- 2 paper towel tubes
- Toilet paper tube
- An unsharpened pencil
- Spool of string or ribbon
- Items to weigh down the lift (small toys, markers, etc.)
- Scissors

## Hint:

This activity is designed to be done in groups (5-6 groups works well). As the students work together, assign jobs within the group to help everyone participate.

## What You'll Do:

1. Before beginning the experiment, take a moment to answer question 1 on your "What You Discovered" worksheet. If you're doing this at home, be sure to get your parent's help and permission before gathering the materials you need.
2. Cut two small sections out of the top of each paper towel tube (this will be used for the pencil to rest on). These sections should be about a quarter inch deep and a quarter inch wide (just enough room for the pencil to fit). The cuts should be parallel to each other.
3. Tape the two paper towel tubes upright to a solid surface. Be sure they are placed far enough apart for the pencil to fit between them.
4. Slip the pencil through the middle of the spool of string. To keep the spool in place, use tape to secure it to the pencil. **Note:** *Make sure you don't tape the string to the spool. You need it to be able to unwind.*
5. Place the pencil (which now has the spool on it) so that it is resting on paper towel tubes in the cuts you made earlier. The spool should be suspended between the tubes.
6. Use the scissors to cut the toilet paper tube in half. You will use one half as your "basket" to lift different objects into the air. Flatten the tube both ways to make corners for the basket sides. Cut half-inch slits down each crease and fold the pieces under and over each other to create a secure bottom. Tape the folds down and punch holes in the top sides of the basket and thread the ribbon through it.

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8. Take a moment to draw a picture of your lift in your notebook for question 2 on your "What You Discovered" worksheet.
9. Twist the pencil and notice what happens to your basket. Use your observations to answer question 3 on your "What You Discovered" worksheet. **Note:** *If only the pencil moves when turned, you may need to adjust the tape to better secure the spool.*
10. Add different objects to the basket and observe how the amount of force needed to lift the objects changes when you add more weight. Take some time to finish your "What You Discovered" worksheet.

### What Does It Mean?

In this activity, you applied different amounts of force to different objects in order to create motion and lift the objects in the air. When you applied more force to an object, you were able to move it a lot quicker. On the other hand, when you applied small amounts of force to an object, it moved slower. Additionally, when you added weight to the pulley system, it took more force to lift up the object. The amount of motion that you created was dependent on the amount of force.

Like a lot of concepts in science, motion and force play a big role in our lives. Motion allows us to drive to school in a car, play soccer at recess, or to fly in an airplane across the United States! What types of motion and force do you notice in your day-to-day life?

### What to Do Next:

- Explore motion and force at home by observing situations where motion or force occurs. For example, notice how a car moves or how you pass a ball back and forth with a friend.
- With the help and permission of a parent, try this activity at home and post your results on Facebook or Instagram. Make sure to use the hashtags **#doterrascienceforkids** and **#featureme** for a chance to be featured on the doTERRA® Science Facebook page.
- Check out the dōTERRA® Science for Kids page located on the dōTERRA Science Blog for more modules and fun experiments.



# Motion and Force

Name Teacher's Copy

## What You Discovered:

*As part of your motion and force activity, answer the questions below.*

1. Define motion.

The process of moving or being moved.

2. Draw a picture of the lift below or in your Science for Kids notebook.

3. What happened when you twisted the pencil?

Force was exerted that caused the basket to move upwards.

4. In this activity, how was the force created?

By twisting the pencil and making the ribbon turn.

5. Did it take more force to lift the object when it was lighter or heavier?

Heavier

6. Give an example of motion in your life.

Running, tossing a baseball, pushing your friend on a swing, etc.

7. What did you learn about motion and force from this activity?

Answers will vary.



# Motion and Force

Name \_\_\_\_\_

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**2.** Draw a picture of the lift below or in your Science for Kids notebook.

**3.** What happened when you twisted the pencil?

\_\_\_\_\_

**4.** In this activity, how was the force created?

\_\_\_\_\_

**5.** Did it take more force to lift the object when it was lighter or heavier?

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**6.** Give an example of motion in your life.

\_\_\_\_\_

**7.** What did you learn about motion and force from this activity?

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