

# Kindergarten

## Curriculum-Embedded STEM Experience

### Post-Visit Activity



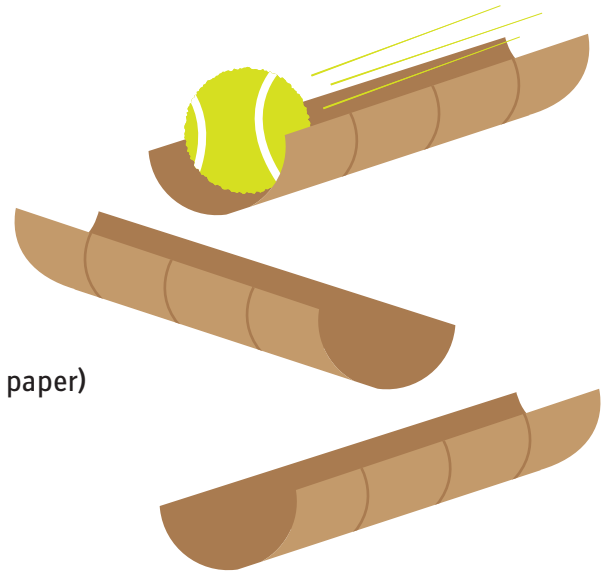
#### RECYCLED RAMPS

##### OBJECTIVE:

Students will learn about motion and force.  
Students will build and modify inclined planes.

##### MATERIALS:

- Ramp building materials
  - Cardboard
  - Tubes of various materials and lengths (cardboard, plastic, paper)
  - Books
  - Binders
  - Clipboards
  - Blocks
- Small scraps of carpet, fabric swatches or sandpaper
- Assorted balls (ping pongs, marbles, golf balls, tennis balls, etc.)
- Coffee cans or similar, optional (for catching balls)



##### PREP:

This activity has the potential to take up a lot of space. Choose an area of the classroom where the students will be able to collaboratively build and share materials.

##### VOCABULARY:

- *Motion* is a change in an object's place in space
- A *force* is a push or pull on an object that can make the object move or stop moving
- An *inclined plane* is a flat surface that is tilted at an angle
- Inclined planes are a type of simple machine designed to make work easier

##### PROCEDURES:

There are many ways for your students to explore these materials. If your students have experience building with these materials, you may want to leave this activity more open-ended with students developing their own challenges and setting their own goals. If your students need a more facilitated experience, you may want to provide specific challenges. Here are some challenges that we recommend:

- Make the longest ramp that you can
- Experiment with different balls to determine which rolls fastest or slowest
- Make a ramp with a turn or a corner
- Build a ramp that catches the ball in a coffee can

## TAKE IT FURTHER!

### *Explore Force*

A force is a push or pull on an object. When your students explore the balls and ramps, they are experimenting, making observations, and analyzing what happened. Students might wonder “How can I get the ball to roll here?” One student might apply their own pushing force by rolling the ball or nudging it along with their finger. Another student might build a tall ramp and release a ball at the top to watch it roll.

Here are some questions to ask your students as they are exploring:

- What materials can you use to change the direction the ball is moving?
- What type of force do you need to move the ball up a ramp?
- How can you stop the ball’s motion as it rolls?

### *Explore Friction*

Friction is a force that acts on an object by slowing it down. For this activity, set out some additional materials such as carpet pieces, sandpaper, or bits of fabric. Have your students feel the materials and discuss whether they are smooth or rough. Discuss as a group how this might affect the ball. Will it slow the ball down or speed the ball up? Encourage your students to set up a ramp using the additional materials and make observations to see how the material affects the speed of the ball as it rolls down the ramp. Rough materials often increase friction, causing the ball to roll slower. Smooth materials often decrease friction, allowing the ball to roll faster.

### *Explore Acceleration*

Acceleration is the increase in the speed of an object in motion. For this activity, set out a stack of books or blocks and encourage your students to build three ramps: one at a shallow angle, one at a medium-sized angle, and one at a steep angle. Discuss as a group how the angle of the ramp might affect how fast the ball rolls. Encourage your students to test out the ramps and compare the speed of the balls as they roll. The steeper the angle of the ramp, the bigger the pulling force is acting on the ball. A bigger pull makes the ball accelerate faster.

## WHERE DO I GET THESE MATERIALS?

Acquiring materials for a project such as this can seem daunting. Plan ahead and don’t be afraid to use your resources. Ask other teachers, friends, or neighbors for help collecting recyclable supplies. Here are some other ways to make collecting materials a little easier:

- Ask families to save and send in items like paper towel tubes, round oatmeal containers, or wrapping paper tubes. Children will be excited to know they helped contribute something to their classroom
- Check with local businesses that might have old mailing tubes that will be thrown away
- Home improvement stores often have free samples of flooring such as carpet and laminate wood flooring which are great for adding texture to your recycled ramps. These stores are also good places to check for small pieces of PVC pipe or irrigation tubing

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