

Activity 1

Science Connection

Cars and Trucks on Ramps (Exploration)

Gravity pulls vehicles down a ramp. Vehicles will move faster on a smooth surface than a bumpy one. Sand provides friction to slow the vehicles down.

What You Need

- ramp*
- toy vehicles
- sand or dirt

*Hint: use a big piece of cardboard, a storage box lid or a wooden plank. Prop up one end with blocks or cushions.

Instructions

1. Roll vehicles down the ramp.
2. Put sand or dirt at the end of the ramp. Experiment to see how this changes the speed of the vehicles.

Key Questions

1. How can we change the ramp to make the vehicles go faster and farther?
2. Do some vehicles roll faster/smooth than others?
3. How far does your vehicle travel after it leaves the ramp?
4. How can you slow down your vehicle?
5. Which goes farther, a vehicle on sand or a vehicle on a bare floor? Test your vehicle on the bare floor and see how

quickly it moves. Now test your vehicle on sand, in a sandbox or on the floor. How well does your vehicle move compared to the bare floor? Did you notice that the vehicle moved slower? This is due to friction which slows things down.

6. Do some vehicles travel over the sand better than others?

Extensions

- Have your child draw their experiment and what they discovered. Help them label their drawing.
- Take your experiment to the playground and use a slide as the ramp.
- Find ideas for more ramp explorations on the Ramp Rollers page of the Round the Circle activities: scienceworld.ca/bslh.



Early childhood educators often explore themes by integrating related curriculum. Here's an example of how you can explore science, technology, engineering, art and math at home, using a fun picture book.

Book of Choice and Other Resources

- *Sheep in a Jeep* by Nancy Shaw
ISBN:13: 978-0395470305

Fiction:

- *Duck in the Truck* by Jez Alborough
Fix it Duck by Jez Alborough

Non-fiction:

- *Roll, Slope, and Slide: 5 Book About Ramps (Amazing Science: Simple Machines)* by Michael Dahl

Online:

- scienceworld.ca/bslh (Round the Circle)
- peepandthebigwideworld.com/guide/pdf/peep-guide-ramps.pdf
- pbs.org/parents/curiousgeorge/activities/pc_ramp_n_roll
- pbskids.org/sid/funwithfriction

Activity 2 Art Connection

Design a Vehicle (Make this)

Before creating a new kind of vehicle, designers use their imaginations to draw what it might look like.

What You Need

- paper
- art supplies (markers, crayons, pencils, tape etc.)

Instructions

1. (Adult) If your designer is stumped for ideas, suggest a challenge. For example, have the designer draw a vehicle that can travel on really bumpy roads.
2. (Child) Sketch your vehicle design.
3. (Adult) Help label the vehicle's features.

Key Questions

1. What features makes your vehicle special?

Extensions

- Make a three-dimensional sculpture of your vehicle idea.
- Create new vehicle designs by making collages—collect images of wheels, chassis, windows, etc. and put them together in new ways.
- Create art by rolling small balls or vehicles through paint. See the Marbles and Paint page of the Round the Circle activities: scienceworld.ca/bslh.

Activity 3 Math Connection

Build a Vehicle (Make this)

Engineers use science and technology to find a solution to a problem. They test and modify their concepts until they find the appropriate solution. The simplified way to illustrate this challenge is to use a commercial building toy (like LEGO) to create a vehicle. If you want to make this more challenging, try making your own wheels!

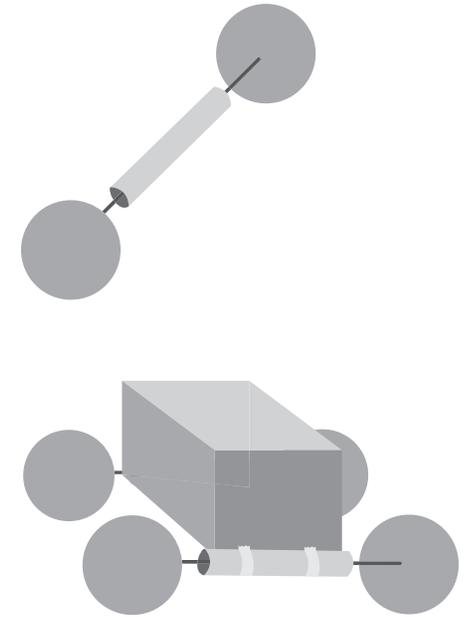
What You Need

- Building toys with wheels (LEGO®, K'NEX®, etc.)
- cardboard or small boxes
- skewers
- styrofoam balls
- straws
- tape
- glue and small objects for cargo

Instructions

1. (Adult) Present the challenge: create a vehicle that will carry the cargo down the ramp.
2. (Child) Basic challenge: construct your vehicle from LEGO or another building toy with wheels.
3. (Child and Adult) Harder challenge: construct a vehicle from a small box. Tape drinking straws to the bottom of the box at the back and front. Thread

skewers through the straws and stick Styrofoam balls on the ends of the skewers for wheels. (diagram required here)



Key Questions

1. How will your vehicle help move the cargo? What features does it have?
2. What will you change to help your vehicle move in dirt or mud?
3. Does the number of wheels affect how the vehicle moves?

Extensions

- For more complex vehicle designs, see: [Rocket Cars at: scienceworld.ca/resources/activities/rocket-cars](http://scienceworld.ca/resources/activities/rocket-cars)
- *Car models that zoom (Creativity in Motion Book 1)* by Ed Sobey
- *Rocket Science: 50 Flying, Floating, Flipping, Spinning Gadgets Kids Create Themselves* by Jim Wiese

Activity 4 Math Connection

Using your Math Skills (Exploration)

Math skills are used in each one of these activities. Take the opportunity to measure, count and identify shapes, as you build and test vehicles.

What You Need

- paper
- art supplies (markers, crayons, pencils, tape etc.)

Instructions

1. Count the number of circles, rectangles, triangles and other shapes that make up your home-made vehicle (A three-dimensional rectangle is known as a rectangular prism). Child) Sketch your vehicle design.
2. If your vehicle is made of LEGO bricks or other building toys, count how many of each kind of brick you used, or sort them by size.
3. Use a stopwatch to time your vehicle as it runs down the ramp.
4. Use a ruler to measure how far your vehicle travels past the end of the ramp (or use a nonstandard measurement, like the number of paperclips that the vehicle travelled past the end of the ramp).
5. Compare the performance of different vehicles, using vocabulary like: faster, slower, bigger, smaller, more, less etc.

Key Questions

1. What shapes make up the design of your vehicle?
2. How many seconds did it take for your vehicle to reach the end of the ramp?
3. How far did your vehicle go?
4. How many objects could fit into your vehicle?
5. How many objects fell out of the vehicle when it reached the bottom of the ramp?

