

Prompt: Build a Ramp

Objective(s):

- Students will work individually or in teams to design and build a ramp.
- Students will measure how far the object rolls

Activity that Involves problem-solving and strategic thinking:

- Students will plan a design and build a ramp
- Students will troubleshoot design problems as they construct the ramp
- Students will report out and share the process they used to construct a ramp
- Students will experiment with faster, slower, and distance

Standards addressed:

- **Common Core State Standard:** K.MD.A.2 - Directly compare two objects with a measurable attribute in common, to see which object has "more of"/"less of" the attribute.
- **Next Generation Science Standards: K-PS2-1** - Plan and conduct an investigation to compare the effects of different strengths or different directions of pushes and pulls on the motion of an object.
- **CCSS.Math.Content.1.MD.A.2:** Express the length of an object as a whole number of length units by laying multiple copies of a shorter object (the length unit) end to end.
- **NGSS.1-PS2-1:** Plan and conduct investigations to provide evidence that the shape of an object can be changed by applying a push or a pull.

Background knowledge needed:

What is a ramp?

What is an inclined plane?

Materials:

- Cardboard boxes, paper towel or toilet rolls, masking tape, scissors, marbles or balls of different sizes, containers

Questions or statements to elicit engagement:

- What could make the ball roll farther?
- Is keeping the ball on the track a challenge?
- Have you tried different size and weight balls?

Vocabulary:

Slope, measure, weight, size, ramp, steep, inclined plane, speed, distance

Reflection:

Did you work alone or with a Partner/group? 3,2,1,0 Scale

- 3: We worked together the whole time. We completed our plan.

- 2: We worked together most of the time and almost completed our plan.
- 1: We worked together a little bit. We needed some reminders to stay on task.
- 0: We did not work together. We did not finish our plan.

How well did you work together as a group?

What materials worked best for building?

What was the most challenging?

Extension/Adding more complexity:

- Mark the spot
- Move the ramp back or forward. Is it easier to predict the spot if the ball rolls off the table instead of directly from the ramp? What changed, speed or distance?
- Try with different sized/weight balls. Do you have to move your mark forward/backwards? What changed?
- Put some books under your ramp, or change the slope (make it steeper or more flat). Where does your mark go now? What changed?
- Can you predict where it will land? Measure how far your mark is and recreate somewhere else
- Build something that will stop your ball from rolling once it goes down the ramp.