

Ramp it Up Racetrack!

Use household materials to explore how angles can change how objects roll down ramps.

Big Idea

Children will explore how the incline of ramps make objects move faster through engineering and art.

Standards

12.D.ECb Explore the effect of force on objects in and outside the early childhood environment.	Children will explore the force of gravity on objects as they test out different inclined planes.
11.A.ECc Plan and carry out simple investigations.	Children will plan and test using different ramps, heights and objects.
K-PS2-2. Analyze data to determine if a design solution works as intended to change the speed or direction of an object with a push or a pull	Children will explore and test how ramps can affect the speed and travel distance of objects.

Materials

- Shoe box
- Scissors
- Empty cereal box
- Blocks of any kind
- Tape
- Balls of various sizes (and anything else that can roll)
- Paper
- Watered down paint
- Cups
- Tray (optional)
- Droppers or pipettes (optional)

Setup

This lesson will utilize three different stations. Children will try to roll a ball through a cardboard box; construct their own ramp using a cereal box and blocks; and explore how paint moves when it is on an angle.

Directions

Hole in One!

- Take a shoe box lid, or any cardboard box with raised sides, and cut a hole at one end that is large enough to fit a ball through. Hold the box so that the side with the raised edges is facing you and try to roll a ball into the hole. To make it harder, build in some obstacles that the ball has to go around to get to the hole!

Cereal Box Ramps

- Take the empty cereal box and stand it upright. Use scissors to cut off the long sides (where the nutrition facts are usually listed). The sides you cut off will be the ramps. Leave part of the front and back of the box on the side so objects will have a railing or bumper. Cut open one of the long ends of the box so objects will be able to exit the ramp. Use blocks (or anything that stacks) to build a platform to hold up the ramps. When the platform is ready, place the cereal box where desired and tape it to the platform for added security. Test out the ramp! Add more ramps and platforms to make a track for objects to roll through.

Ramp Painting

- Create a ramp by propping up a plastic tray (or any flat surface you don't mind getting a messy) with books, blocks, or whatever you have on hand to create an angled painting surface. Tape a piece of paper to the tray. Place paint in cups and add water to thin it a bit. Use droppers (or spoons) and drop the paint at the top of the ramp. Watch what happens and mix up the colors! What new colors can you make?

Investigation Questions:

- *What happens if you use a different ball that is heavier? That is lighter? That is larger? That is smaller? Does this change what angles you need to use?*
- *Change the incline, or angle, of your ramp. What happens? What happens if you DO NOT angle your ramp?*
- *How can you make the ball roll faster? Slower?*
- *Try rolling an object down your ramp that is not round. What happens? Why would the shape of the object matter?*
- *What happens if you add multiple balls?*
- *Where have you seen a ramp before? How do ramps make things easier?*
- *When painting, what would happen if the paint had less water in it? More water?*