Activity Guide: Ramps and Rollers Activity Part 1

Purpose: Investigate cause and effect. Observe object properties and characteristics of building materials, ramps, rollers, and sliders to discover that objects move differently depending on materials and shape.

Museum Connection: We are curious, creative and playful!

Main Idea: Forces make objects move.

Background Information for Educator:

- Gravity The attraction that objects exert on one another - a force that always attracts or pulls objects toward each other without direct contact or impact. Gravitational attraction depends on the mass of the two objects and the distance they are apart. Objects on Earth are pulled toward the center of Earth. The force of gravity, like all other forces, can cause changes in the speed of objects. As an object falls, its speed will continually increase as Earth's gravity continually pulls it downward. When air resistance is ignored, all objects will speed up at the same rate as they fall.
- Friction A force that occurs when one object rubs against another object. Two factors determine the amount of friction – (1) the kinds of surfaces, and (2) the force pressing the surfaces together. Friction is the force that acts to resist sliding between two surfaces that are touching. It can slow down or stop the motion of an object. The smoother the two surfaces are, the less friction there is between them; therefore, the moving object will not slow down as quickly.

Sources:

http://www.communityplaythings.com/resources/articles/2014/teaching-stem-with-ramps
http://resourcesforearlylearning.org/unit/437/overview/

Prep (Time): 5-15 minutes approximate

Materials:

Item	Quantity
Short table, box, or any object that be used to hold ramp at an incline	Several
Objects that roll and slide (e.g. crayon, ball, marble, small toys, dice, cylindrical block)	Variable
Cardboard pieces or other material for ramp	Several
Clay or play dough	

Recording chart (Object & Prediction & Results)	1
Foil, sandpaper, felt, foam, wood, fabric, carpet, etc. to cover the ramp and create friction	Several

Talking Points:

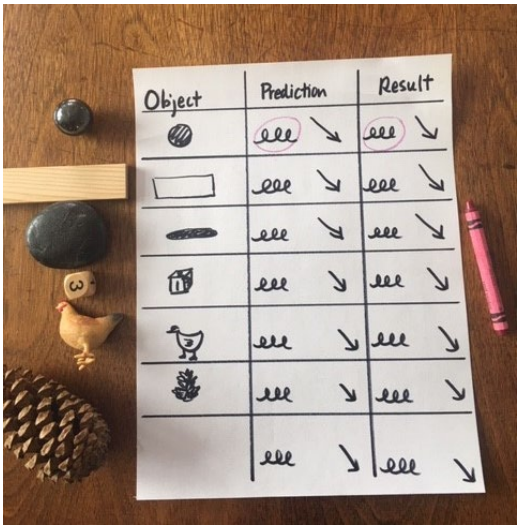
- Force: Put a marble or ball on the floor. What is it doing? Write the answers on the recording chart. What could happen that might make this object move? Define those actions (e.g. push, pull) as forces. Forces make objects move.
- Gravity: Hold one of the objects above the floor. What would happen if I let go of this? Record answers. It would fall to the floor because of the force called gravity. Gravity pulls objects to the ground. What would it look like if there was no gravity on Earth?
- Do you think the ball will roll or slide when we put it on the ramp and let go? Let's write down your answer and then give it a try? What happened? We can record the results. Was your prediction correct?
- Can you shape the clay to make it roll? To make it slide? To make it stay still?
- What do you think will happen (make a prediction) if we put foil on the ramp? Test it. Follow with other suggested materials for creating friction.
- What might make the object move faster? Slower?

Step-by-Step Instructions:

1. Place ramp on table or box to create incline.
2. Set out objects to test.
3. Introduce the concept of force.
4. Introduce and discuss the concept of gravity as a force.
5. Introduce concept of predicting and discuss what it means to roll and slide. Brainstorm real world examples of rolling and sliding such as going down a slide at a playground and rolling down a grassy hill.
6. Show an object and predict whether it will roll, slide, or do a combination of both. Record on chart.
7. Place item on ramp and observe.
8. Discuss results and record results.
9. Compare results to predictions (idea of trial and error)
10. Continue with the remaining objects.

11. Experiment with a small piece of clay by changing its shape and testing each time.
12. Share results.
13. Extend activity by covering ramp with different types of material (sandpaper, felt, foam, wood, foil, fabric, carpet, etc.) to create friction.

Picture of Final Project:



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