

GLOBAL SKILLS

Critical thinking and problem solving
Innovation, creativity and
entrepreneurship
Collaboration

INITIATIVES & INTEGRATED LEARNING

[A. STEM Skills and Connections](#)

MATERIALS

Sets of the following materials for
each group:

- 1 pair of scissors
- 5 plastic cups
- 1 marble
- 2 empty cereal boxes
- 10 paper towel tubes
- 1 roll of duct or masking tape
- Materials to make pulleys and gears
(e.g. string, plastic containers etc.)

CHUTES AND LUMBER

Junior (Grade 4-6) Level

ACTIVITY DESCRIPTION

3, 2, 1, Go! Let your wooden ball roll down over 30 metres of track built into the hillside of Blue Mountain. Interactive elements like peg mazes, tunnels, twists and turns keep you on your toes as your ball plunks its way through our latest attraction. Students will get the opportunity to apply their knowledge and skills in structures and mechanisms.

CURRICULUM CONNECTIONS

[Science and Technology 2022](#)



Ontario
Curriculum



D. Structures and Mechanisms; Everyday Materials, Objects, and Structures

D1. Relating Science and Technology to Our Changing World: evaluate the impacts of various machines and their mechanisms on society and the environment.

D2. Exploring and Understanding Concepts: demonstrate an understanding that objects, including structures, have observable characteristics and are made from materials with specific properties that determine how they are used.

BEFORE YOU GO

Learning Goal

Students learn how to use a variety of materials to create a marble run. They will build structures, as well as explore the role of pulleys and gears in improving efficiency, functionality and performance when creating the marble run..

Minds On Activity:

- For engineers, moving things efficiently from one point to another is a challenge. Engineers use creativity to solve this and many other problems. Ask students to think about the following scenarios:
 - *What's the fastest way to get from your home to your school?* (e.g. pathway for a short cut, sidewalk, road).
 - *Where does water go when it goes down the drain?* (e.g. to the sewer, then to a sewage plant, then back the environment).
 - *How does water get to your home?* (e.g. pipes bring water into your house).
 - *What could go wrong with the way water comes to your home?* (e.g. pipes could break).

Action Activity

- Students work in teams of 3-4. Introduce a design challenge where groups design and build a marble run with the goal of keeping the marble rolling for the longest possible amount of time.
- Each team gets the following materials: 10 paper tubes, 2 cereal boxes, 5 cups, 1 pair of scissors, 1 roll of tape, and at least 1 marble.
- Success Criteria:
 - The goal is to keep the marble rolling as long as possible, not as far as possible.
 - Students can cut the tubes in half lengthwise to make chutes.
 - Encourage students to use the environment to their advantage (e.g. building off of walls, chairs, tables)
- Possible topics that you may want to explore during this challenge: Gravity, friction, structures, etc.
- Once the initial marble run is built provide students with materials to add pulleys and gears:
 - *How does adding different pulley systems, levers or gear systems help improve your marble run?*
 - *Describe the relationship between the force required and the distance over which the force moves in your marble run?*

WHILE YOU ARE THERE

At Blue Mountain Resort

Students will be able to see a variety of simple machines using peg mazes, tunnels, twists and turns are used to move a ball from one location to another.

ONCE YOU GET BACK

Consolidation Activity

- Ask students to compare and contrast their marble run to the chutes and lumber activity.
 - *What was similar?*
 - *What was different?*
- Extension activities:
 - Have students experiment with putting other small objects, such as coins/beads/paper clips, down the tracks. Before placing the new objects on the tracks, ask students to predict whether they think the new object will go down the course faster or slower than the marbles did.
 - Give students the opportunity to make adjustments to their marble run to keep their object moving/rolling for an even longer period of time.