

Fly a Flag – Pre Activity

Assessment	model
Cross-curricular	Tech/Arts

Big Ideas

50 minutes

Movement is a change in position of an object.

Simple machines help objects to move.

Mechanisms are made up of one or more simple machines.

Pulleys and gears change speed, direction, and motion of, and force exerted on, moving objects.

Pulleys and gears make it possible for a small input force to generate a large output force.

Specific Expectations

1. Investigate the structure and function of simple machines (2.3 - grade 2)
2. Use technological problem-solving skills to design, build, and test:
 - a. a mechanism that includes one or more simple machine (2.4 - grade 2)
 - b. devices that use forces to create controlled movements (2.4 - grade 3)
 - c. a pulley system that performs a specific task (2.3 - grade 4)
3. Describe the purposes of pulley systems (3.1 - grade 4)
4. Identify pulley systems that are used in daily life (3.6)

Description

Use pulleys to raise and lower a mini flag.

Materials

Wooden skewer	Styrofoam block	2 spools
Acrylic paint	Paintbrush	String
Hot glue gun and glue sticks (string and tape may also be used, but hot glue is easiest)		
Ruler	Scissors	
Craft foam or construction paper		

Introduction

1. Discuss with students about simple machines and pulleys.
2. Introduce the structure and function of a pulley (to help lift or move a load) and list pulleys that we see or use every day (e.g., pulleys in elevators, clotheslines, window blinds, garage doors, cranes, and ski lifts).

Action

1. Paint the skewer, Styrofoam, and spools to make the flagpole more colourful. Allow the paint to dry.
2. Stick the pointed end of the skewer into the foam. How glue a spool near the top of the skewer. Glue another spool near the bottom (leave a little space between the spool and the foam). Let the glue dry.
3. Cut a 60 cm piece of string. Tie it lightly around both spools, making one long loop. Trim the ends.
4. Cut a triangle out of craft foam or construction paper. Make the sides of the triangle about 5 cm long. Decorate the flag. Use hot glue or tape to attach the flag to the string.
5. The spools are pulleys. Pull on the string to raise and lower the flag.

Consolidation/Extension

Could you redesign your flagpole using only one pulley? Sketch it on paper. Now try building it. Which system works better? Why?

In the pushing and pulling school program, students will be building three-pulley system: single fixed pulley, single mobile pulley, and compound pulley (one fixed, one mobile). They will be comparing these systems in terms of how much effort is required to lift a load (measured using a force sensor) and how comfortable the pulling experience was for the student (pulling down on a rope versus pulling up).