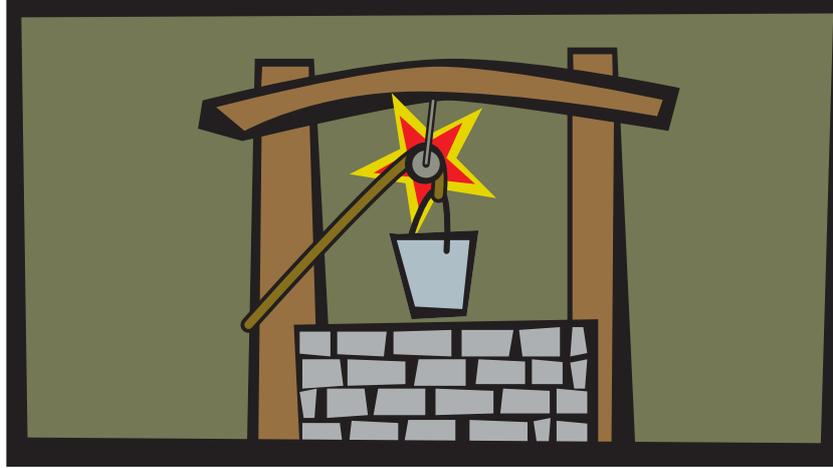


tiny tinkering tasks

Task theme

Pulleys



Task title

How does a fixed pulley make your work easier?

Learning outcomes

- To understand how a fixed pulley works and describe the different components.
- To use this knowledge to design a mechanism to raise a flag.

EHoM link



PROBLEM FINDING

Ask questions based on observations.



SYSTEMS THINKING

Create an object or tool from joined parts.
Give thought to how parts join.

EDP link



Key Stage/Year Group KS1 – Year 2.

Resources required

FOR EACH GROUP:

- 1 x empty spool
- 1 x Dowel rod
- 1-pint plastic milk carton with handle (if empty fill with water)
- String

FOR FLAGPOLE:

- Flag – paper, coloured crayons, Sellotape
- 2 x spools
- Skewer / piece of dowel
- Cardboard box lid / piece of Styrofoam to fix flagpole in
- String

How to run the task

1. Engage the children by asking them to lift the milk carton off the ground with their hands. How heavy does it feel?
2. Show the children a picture of a well, which has a fixed pulley. Elicit their understanding by asking them how the water is fetched from the bottom. What simple machine can they see in the picture? How is it constructed?
3. Provide the children with the dowel, empty spool and string to explore making their own pulley systems to lift the milk carton. Ask the children if it is easier to lift the milk carton with their pulley. Can they explain why? What is the difference between lifting it this way? (Because with the pulley you are pulling down in the same direction as gravity, whereas by the first method you are pulling up against gravity).

DEFINITION: A pulley is a simple machine that consists of a wheel with a groove in that holds a cord. A fixed pulley stays in place; the pulley turns as the cord moves over the wheel, and a load is raised as the cord is pulled.

4. Challenge the children to extend their knowledge to design and create a pulley to raise a flag. Design the flag and use the equipment to create their pulley system.
 - Stick the pointed end of the skewer into the foam making sure that it is secure.
 - Hot glue a spool near the top of the skewer and another spool near the bottom, leaving a little space above the foam.
 - Tie a piece of string tightly around both spools, making a long loop. Trim the ends.
 - Make your flag and attach it to one side of the string.
 - Pull on the string to raise and lower the flag.
5. Encourage the children to evaluate each other's designs. Can they gain the same effect with one spool? Which works better?

Top Tips

- <https://www.youtube.com/watch?v=9T7tGosXM58> – although quite old, this is still quite an engaging video about pulleys by Bill Nye.

Evaluate learning

- Ask the children to observe the distance the string is pulled down and the distance and the direction in which the flag moves. (The distance is the same but the flag moves in the opposite direction)
- Would the size of the spool affect the results?

Author: Mrs Julie Wiskow, SEERIH Teacher Champion | Rode Heath Primary School

As a practising teacher, Julie has written these 12 tasks to encourage more children to engage in engineering in primary schools. They have been stimulated by real-world engineering and inspirational ideas shared by others. They are linked to the Tinkering for Learning research and development project run by SEERIH.



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