

Science

WALT explain why pulleys make lifting objects easier.

Key vocabulary:

pull, lift, force, effort, mechanism, machine, pulley - You could look up the meaning of the key vocabulary first, if you are unsure. (the glossary is below).

This week there are two investigations. The second investigation is more challenging so choose the one you think is the most appropriate for you, or you may wish to try both investigations.

This week we are going to investigate the use of pulleys, which are another type of mechanism. **Check you have permission to use all objects in your investigations!**

To start with, go through the Pulley Mechanism activity on Education City. Then, complete the first investigation.

If you are unable to access a computer, read the facts on the “What is a Pulley?” worksheet, before trying the investigations.



First investigation

Equipment:

A pencil, tape, wool or twine, an empty ribbon or thread spool, small plastic cup or yogurt pot and hole punch.

If you don't have the right equipment, which other objects could you use?

Record what equipment worked, what didn't work- this is the fun part of Science!

Using instructions from the First Science Investigation sheet, construct your pulley. - NOT CLEAR to me

Which objects did you place in the cup? **(Record the answers to ALL questions on the investigation sheet, or in your Home Learning book.)**

Draw a diagram of your investigation which shows the direction of the forces.

Second investigation

Equipment:

Wooden dowel - short thin piece of wood or metal- (at least 2 cm diameter) or brush handles, metal coat hangers and curtain rings to slide on dowel, cotton reels and string or thin rope.

Now, watch the next activity on Education City, which gives you more detailed information about pulleys.



1. Using the instructions on the Second Science Investigation sheet, set up a two-pulley system.
2. Find 5 objects of different weights from around the house; weighing for example 100 g, 250 g, 500 g, 750 g and 1000 g. Use objects which you know the weight of from the kitchen, or, if you have scales weigh your chosen objects.
3. Then chose another object, which you know the weight of, and **is not** 1 of your 5 chosen objects. Place it on the hanger and measure the distance you need to pull the string.
4. Use this knowledge to predict the distance you will need to pull the weight in order to lift the 5 chosen objects and **record your estimated predictions** in the PULLEY SYSTEMS: RESULTS TABLE on the worksheet.
5. After that, place each object on your pulley system and measure the distance required to pull the object up, repeat twice more for each object.
6. Work out the average distance. (add the three measurements together, then divide by 3. e.g. $25\text{cm} + 23\text{cm} + 29\text{cm} = 77\text{cm}$. 77 divided by 3 is 25.66cm. Round to the nearest whole number which is 26cm)

What do you notice about the distance you needed to push the lighter objects compared to the heavier objects?

To finish the lesson, watch the video below.

Science/Physics KS2/KS3: Will pulleys let 9 year olds beat Britain's strongest man?

BBC Teach > Primary resources > Science KS2 / Physics KS3 > Operation Awesome



<https://www.bbc.co.uk/teach/class-clips-video/science-physics-ks2-ks3-will-pulleys-let-9-year-olds-beat-Britain's-strongest-man/zvm4d6f>

Glossary

Force - A force is a push or pull applied to an object.

Newton - A newton is the unit of measure of a force.

Effort - The effort is the force applied to a pulley, to alter the motion of the load.

Load - The load is the object being moved by the pulley.

Pulley - A pulley is a mechanism designed to move an object. It is made from a wheel with a groove around its circumference, through which a rope is passed.

Axle - The centre of a pulley wheel is called an axle.

Fixed pulley - On a simple fixed pulley, the wheel and axle always stay in one place.

Movable pulley- On a movable pulley, the pulley is free to move up and down.

Combined pulley - A combined pulley is a pulley system consisting of both fixed and movable pulleys.

Mechanical advantage - The mechanical advantage of a pulley system shows how much effort is needed to move a load.