On the move: simple mechanisms

Think Physics,
Northumbria University

March 2015

Outcomes

- Know key terms related to levers, pulleys and gears
- Identify opportunities for different types of scientific enquiry with levers, pulleys and gears
- Considered how to link science and DT

Science KS2

Year 5

- recognise that some mechanisms, including levers, pulleys and gears, allow a smaller force to have a greater effect.

Draft performance indicators:

- describe how simple mechanisms (*at least: pulleys, levers, gears*) increase the effects of a force.

Design and Technology KS2

Technical knowledge

- understand and use mechanical systems in their products [for example, gears, pulleys, cams, levers and linkages]

Types of scientific enquiry

- Observing over time
- Pattern seeking
- Identifying, classifying and grouping
- Comparative (and fair) testing
- Researching using secondary sources

Household object sorting activity

What is a simple machine?

A mechanical device which is used to change:

- the size of a force
- the direction of a force

Simple machines: making life easier

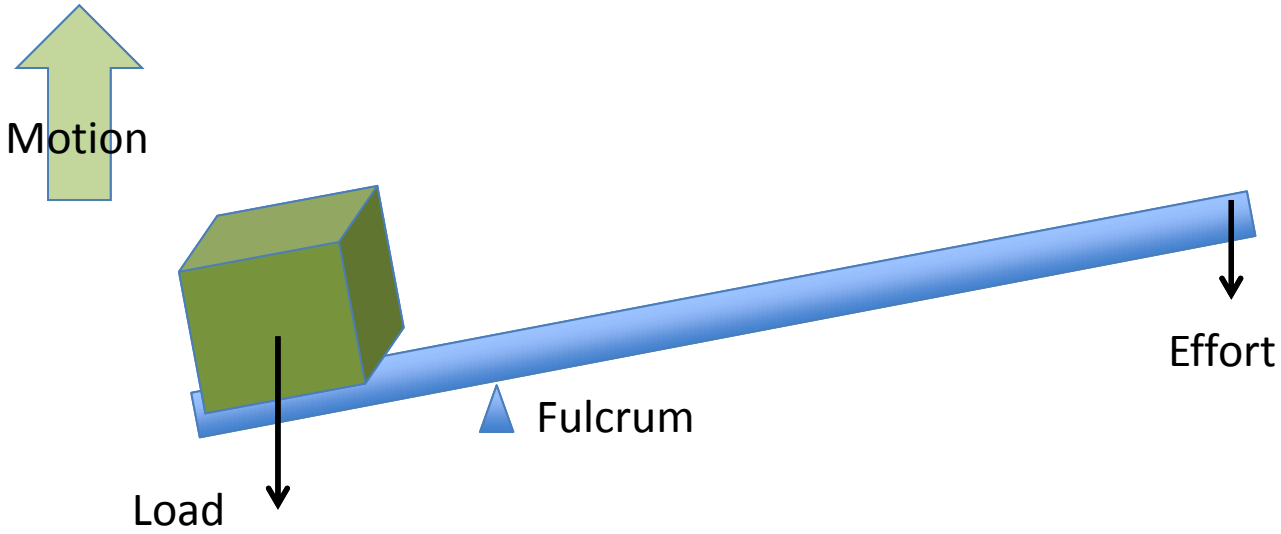
Six basic machines

- Inclined plane (slope)
- Wedge
- Lever
- Pulley
- Wheel and axle
- Screw

- Gears

How can a child lift an adult off the floor?

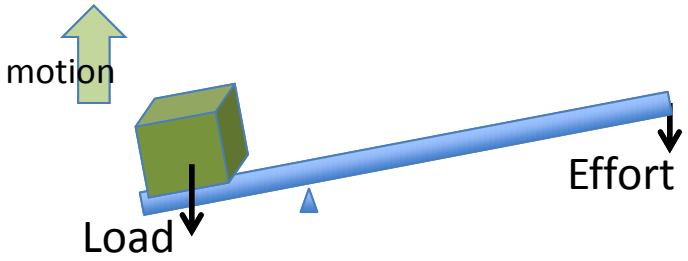
Levers – Key terms



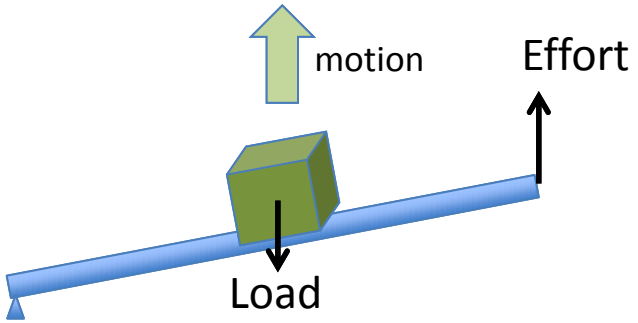
Load: The weight (force) that is being moved
Effort: The force being used to move the load
Fulcrum: The point about which the lever pivots

Aside: Classes of lever

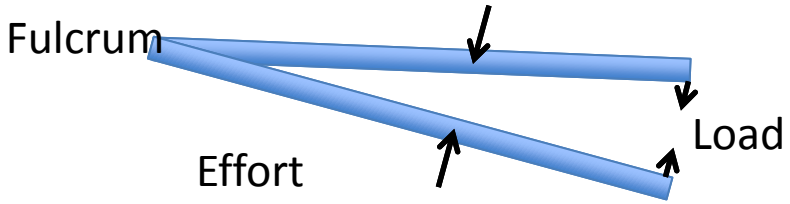
Class 1: Fulcrum between Load and Effort



Class 2: Load between Fulcrum and Effort



Class 3: Effort between Fulcrum and Load

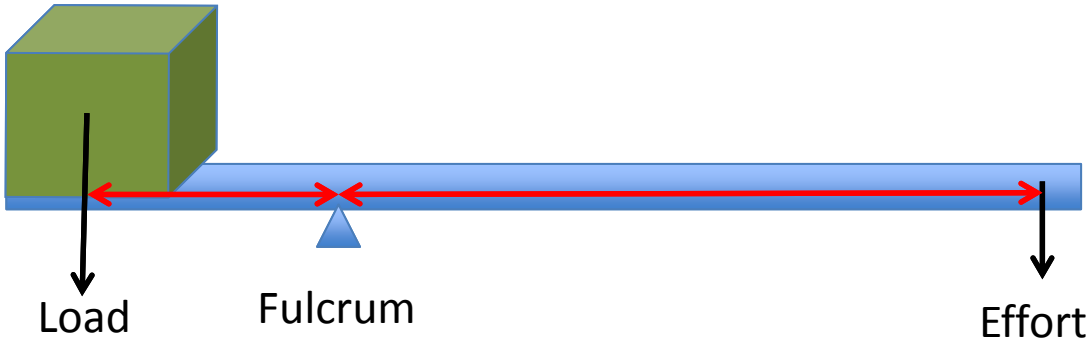


Levers Activity

Pattern seeking

Comparative testing

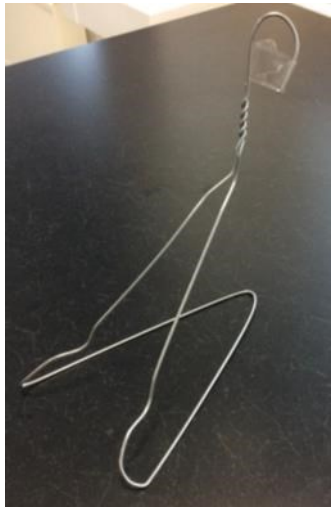
Links with numeracy

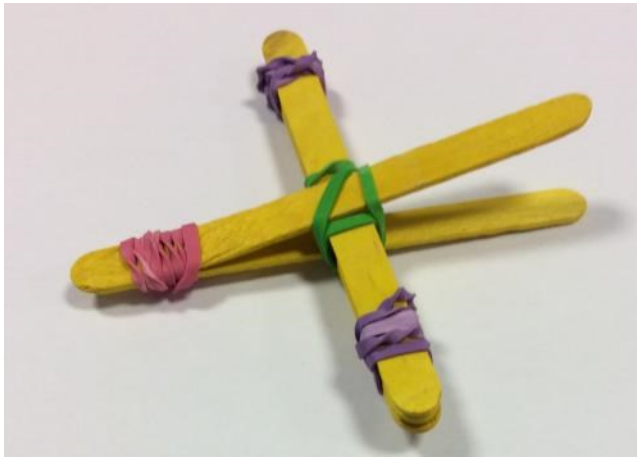


Load x distance of load to fulcrum = effort x distance of effort to fulcrum

Links with DT

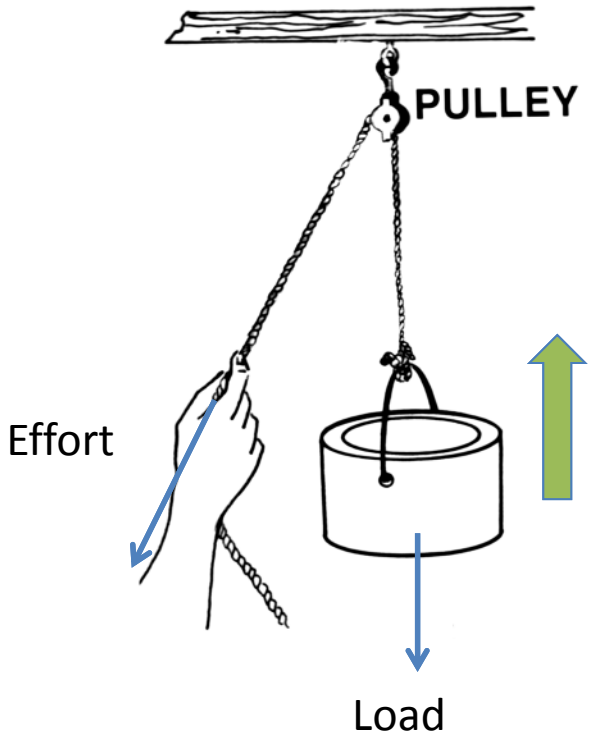
- Launching a ping-pong ball (see-saw)
- Saving the Gingerbread man (coathanger)
- Building a trebuchet / catapult (lollysticks)



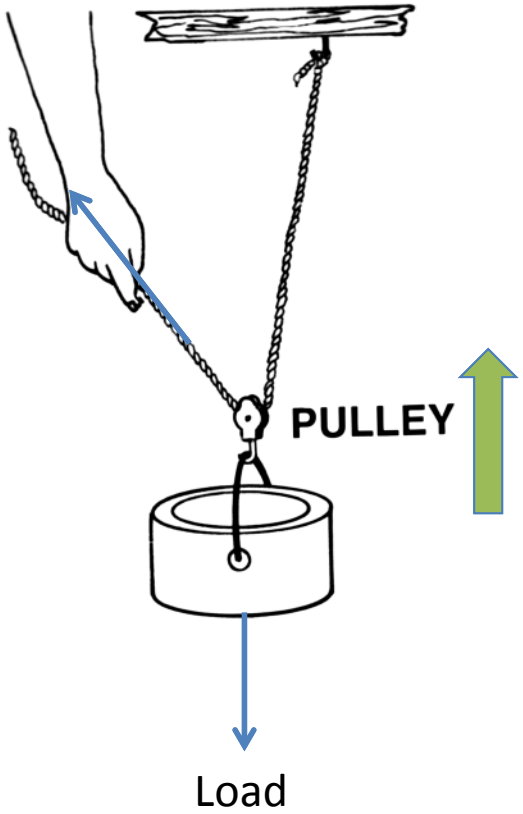


Pulleys

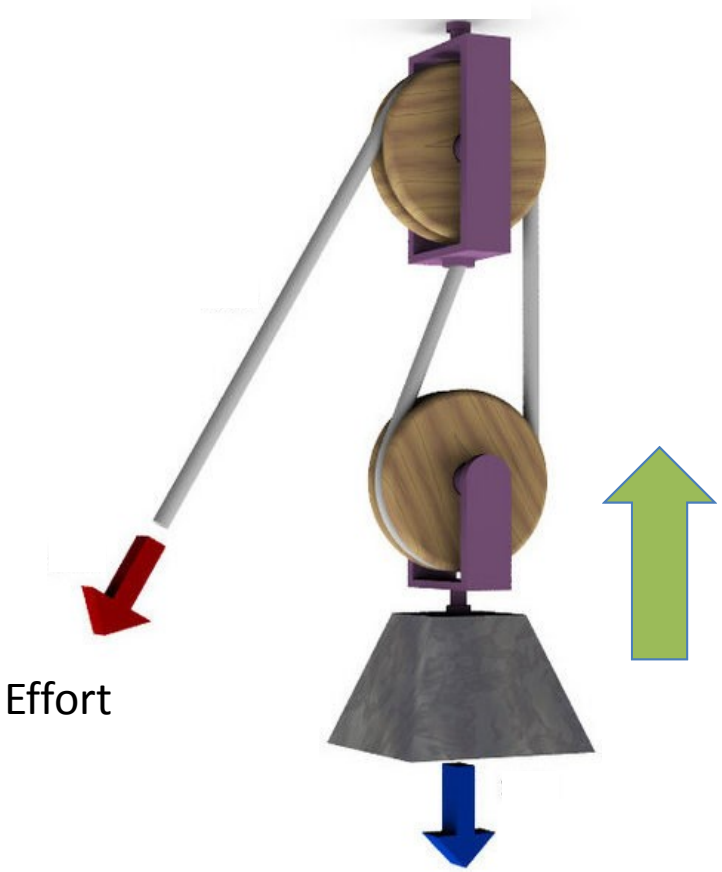
Fixed pulley



Moveable pulley



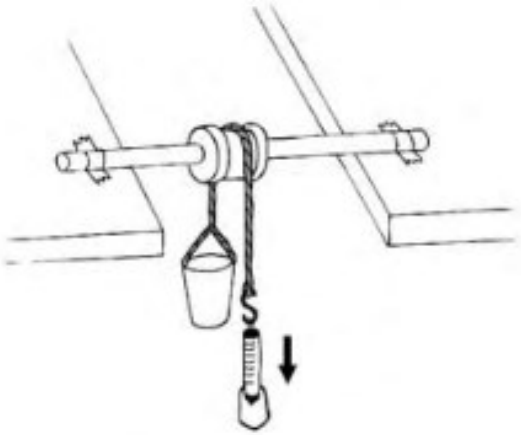
Block and tackle

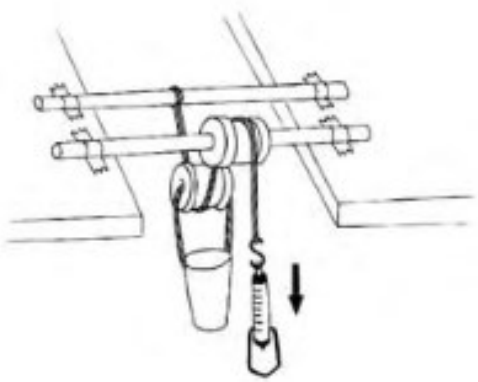


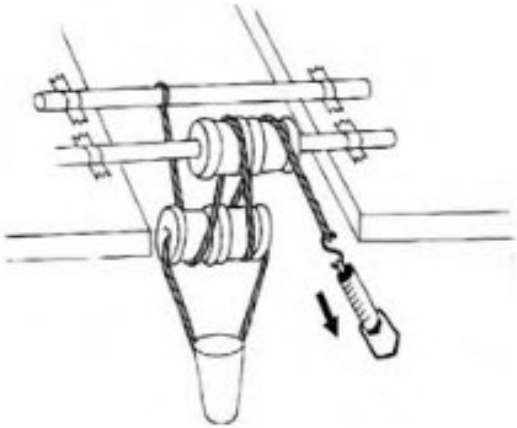
Demo Pulley

Pulley activity

- The Power of Pulleys







Taken from Activity 4a
http://museumvictoria.com.au/pages/6995/imagination-factory-concept-activities.pdf

Link with DT

Squashed tomato challenge

To design, build and test a way of moving tomatoes that won't squash them!

Http://practicalaction.org/squashed-tomato-challenge-5

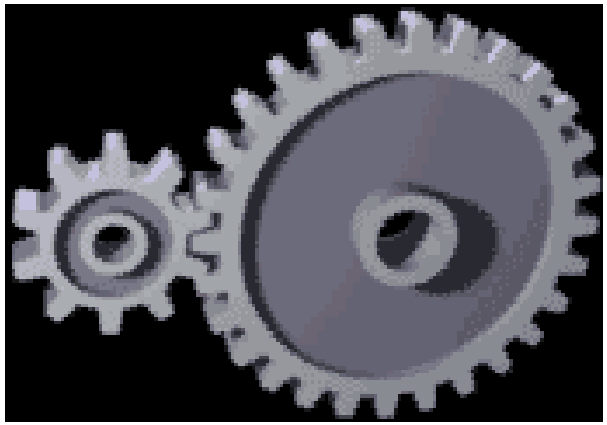
Gears

- Kaleidogears

- Build your own clock

Gears – Key terms

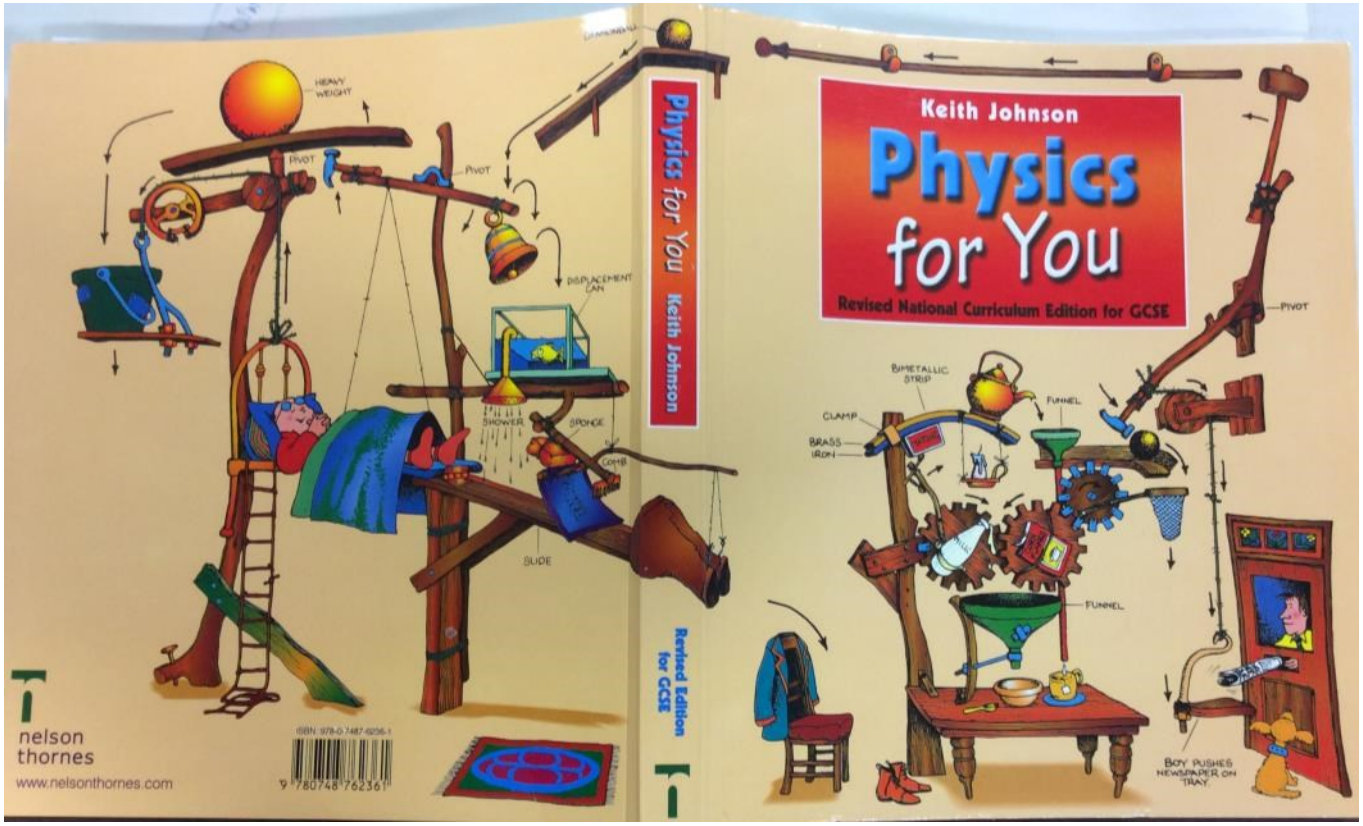
- Rotating wheel with teeth (or cogs) cut into the edge.
- The fit into the teeth of a second wheel.



- Can change speed and direction of applied forces

Bringing it all together

- Heath Robinson / Rube Goldberg machines



[OK Go!]

Useful links

- http://museumvictoria.com.au/pages/6995/imagination-factory-concept-activities.pdf
- http://www.robives.com/blogshop
- http://www.connectionsacademy.com/blog/posts/2014-04-25/Build-Your-Own-Rube-Goldberg-Machine.aspx

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