

UKS2 – Mechanical Forces

Learning Objectives

- ☉ To recognise that some mechanisms, including levers, pulleys and gears, allow a smaller force to have a greater effect (UKS2 Science – Forces)
- ☉ To understand and use mechanical systems in their products [for example, gears, pulleys, cams, levers and linkages] (KS2 Design and Technology)



Activities covered

- ☉ Tour of the Mill
- ☉ Forces Competition
- ☉ Make a Waterwheel

What will happen on your visit?

- ☉ Children will have the opportunity to see mechanical forces in action – Howsham Mill is powered by an Archimedes Screw Turbine and a water wheel which turns gears to generate electricity.
- ☉ Children will be given the opportunity to explore how gears, levers, pulleys and cams work.
- ☉ Children will complete a challenge which involves applying their knowledge of mechanical forces.
- ☉ Children will have the opportunity to make a Water wheel (optional – discuss timings and whether the school want to include this as it is not in the curriculum).
- ☉ Children will spend some time designing their own project (you may wish to liaise with the Education Officer about an appropriate project to fit in with the topics that your children are studying).

Before your visit

- Introduce the children to the concept of mechanical forces including: gears, levers, pulleys, cams and linkages
 - A force is a push or pull, and can be measured in Newtons
 - In science, a machine is anything that can make a force greater
 - For your own subject knowledge, you may wish to look at:
 - <http://www.explainthatstuff.com/toolsmachines.html>
 - <http://www.bbc.co.uk/schools/gcsebitesize/design/systemscontrol/mechanismsrev1.shtml>
- Watch the video clips and/or look at real life examples
 - Pulleys: <http://video.mit.edu/watch/pulleys-are-cool-13528/>
 - Gears: <http://www.neok12.com/video/Simple-Machines/zX606b6c434d64714f5f6e59.htm>
 - Levers: <http://www.neok12.com/video/Simple-Machines/zX7a7d457d065b790405707f.htm>
 - Cams: <http://www.strettonhandley.derbyshire.sch.uk/oldwebsite/cams/camstext.html>
 - Linkages: <https://www.youtube.com/watch?v=-mA0KOqpzUw>
- Consider cross curricular approaches
 - Romans: http://www.bbc.co.uk/ahistoryoftheworld/objects/6_wufiJaTE-KiKM35bTb5w
 - Ancient Egypt: <http://www.egyptianpulley.com/>;
http://www.history.org.uk/resources/primary_resource_3873_135.html;
<http://archimedespalimpsest.org/about/history/archimedes.php>
 - Ancient Greece: <http://classroom.synonym.com/ancient-greek-invention-pulley-9468.html>
- Other useful resources:
 - <http://www.scienceoxford.com/schools/schools/engineer-resources>

After your visit

- Children should be given the opportunity to complete their own project based on the design that they have started at Howsham Mill.
- Children should have the opportunity to make an Archimedean Screw.
 - watch this youtube link - <https://www.youtube.com/watch?v=UXpq4whPoGU>
 - You will need plastic bottles and card.
 - As an alternative, they could make Archimedean screws using piping and plastic tubing – however, this could prove quite expensive. (<https://explorable.com/archimedes-screw>)