



Opportunities for teaching Diversity, Equality & Cultural Capital:
 Visit the old Skinningrove mine at Loftus. Visit the Sirius mine.

DT Knowledge Organiser – Pulleys & Levers

Upper KS2: Year 6

Recall and Remember:

What are the key parts of a lever?
What is the main purpose of a lever?
Can you describe the 3 classes of lever?

What are the key elements of a pulley?
What is the main purpose of a pulley?
Can you describe the 3 types of pulleys?

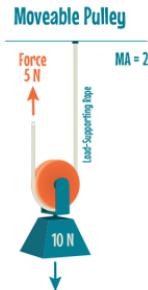
Key Knowledge about Pulleys

A pulley is a wheel on an axle designed to support movement or change the direction of a force using a cable along its circumference. Pulleys are used in a variety of ways to lift loads, apply forces, and to transmit power. The drive element of a pulley system can be a rope, cable, belt, or chain that runs over the pulley inside the groove.

There are different types of pulley systems:



A fixed pulley has a fixed axle, it is used to change the direction of the force on a rope/belt. A fixed pulley has equal force on both sides of the pulley and there is no multiplication of force.



A movable pulley has a free axle - the axle can move in space. Pulling on one end of the rope will apply a doubled force to the object attached to the pulley.



A compound pulley, which is a combination of pulley systems.

What you will have learnt by the end of this unit.

- ❖ To apply their understanding of structure and materials, to monitor and control products
- ❖ To produce detailed designs which have developed through a range of ideas, including cross-sectional and exploded diagrams
- ❖ To work with a range of tools, materials and equipment and show an understanding of their functional properties and aesthetic qualities
- ❖ To identify and solve design problems

What you have already learnt in Yr5.

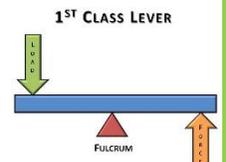
- To use prototypes and pattern pieces to communicate their ideas
- To select from a wide range of tools and materials based on their aesthetic qualities
- To investigate and analyse a range of existing products

Key Knowledge about Levers

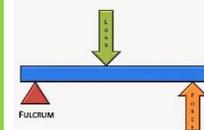
A lever can be used to raise a weight or overcome resistance. It consists of a bar, pivoted at a fixed point known as the fulcrum. Extra power can be gained for the same effort if the position of the fulcrum is changed.

Levers can be divided into classes:

First-class levers have the fulcrum in between the applied force and load, which are at opposite ends, such as with the seesaw.

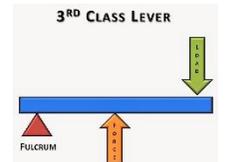


2ND CLASS LEVER



Second-class levers have the fulcrum at one end, and the applied force at the other, such as with a bottle opener.

Third-class levers have the effort in between the fulcrum and the load; for example, tweezers where 2 levers are pressed together to do the work for which they are designed.



Key Designing Skills I will learn/use:

Remember that in order to make a simple machine to work, it is essential that the mechanical system is planned effectively, and includes an input, a process, and an output.

Think:

- What is the purpose of your machine?
- What will be the input force? How will this be applied?
- What system are you going to use to transfer the force?
- What do you intend the output to be?

Sketch and annotate different ideas, then plan the main stages of making, using either a checklist, a storyboard, or a flowchart.

Key Vocabulary

Simple Machine	A device that can change the direction or the magnitude of a force, or the point where it is applied. T
Mechanical System	A set of related parts used to create movement
Mechanisms	Devices that transform input forces and movement into a desired set of output forces and movement
Lever	A rigid bar resting on a pivot, used to move a heavy load with one end when pressure is applied to the other.
Fulcrum	The point on which a lever turns or is supported.
Pulley	A grooved wheel over which a drive belt (cable) can run
Drive belt	A cable which connects and transfers movement between the force and the load
Axle	The horizontal shaft that holds a pulley wheel
Rigid	Firmly fixed, stiff
Design	To plan a project to make a new structure or product.
Experiment	Try out new ideas and methods.
Technique	Use a particular method or skill.
Refine	Make changes which improve the structure or function of the final product.
Critique	Express an analysis of the merits and faults of a product
Exhibit	Demonstrate the final product so it can be understood and appreciated by an audience.

Key Building & Evaluating Skills I will learn/use:

Building:

- Consider the materials you will need to build your simple machine.
- How will you make it fit for purpose?
- Do you need a fixed base for your lever or a rigid frame for your pulley system?
- How will you ensure each part is attached securely?
- How will you ensure all the components move smoothly?
- How will you test your simple machine?

Evaluating:

- How well does your mechanical system work? Does it move smoothly?
- Does it meet its purpose?
- What would your audience think about your product? What would they like about it? What would they not like?
- What problems did you face in constructing your mechanical system? What changes did you need to make?
- What could you still improve about your product? How would you do things differently next time?

My skills and Knowledge that I may use from other subjects

- That force and motion can be transferred through mechanical devices – Science.
- To take and record precise measurements - Maths

What will you have learnt by the end of UKS2.

- To follow and refine my plans.
- To justify my plans in a convincing way.
- To show that I consider culture and society in my plans and designs.
- To show that I can test and evaluate my own and others' products.
- To be able to alter or adapt my product to improve it after testing.
- To evaluate my product against clear criteria.