Level 3 Cambridge Technicals in Engineering: Diploma in Engineering

Ideal for ambitious, talented students who want to pursue a technology-based career.

Future Apprenticeships and Careers

Product Design

Engineering Sectors including Aviation, Automotive, Renewable Power etc.

Technician & Maintenance

Civil Engineering

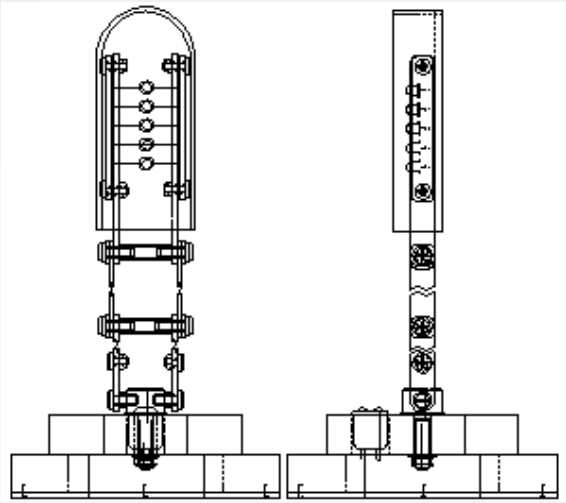
Building Services

Architecture

1.7 million employed in Engineering

Materials Technology & Science

Engineering Design

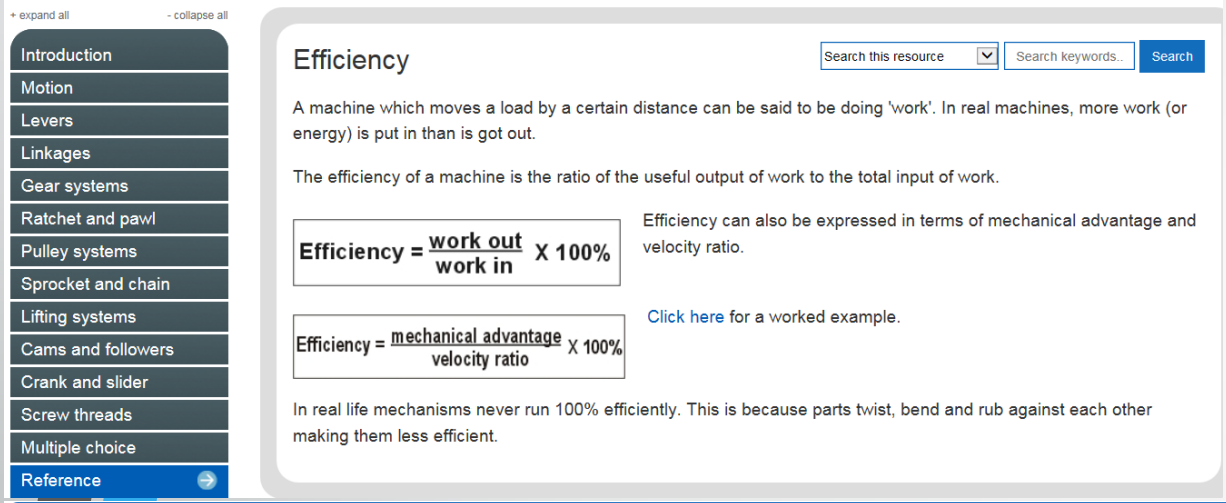


2D and 3D CAD

Mechanical Systems

Production and Manufacturing

Focus on Learning Software



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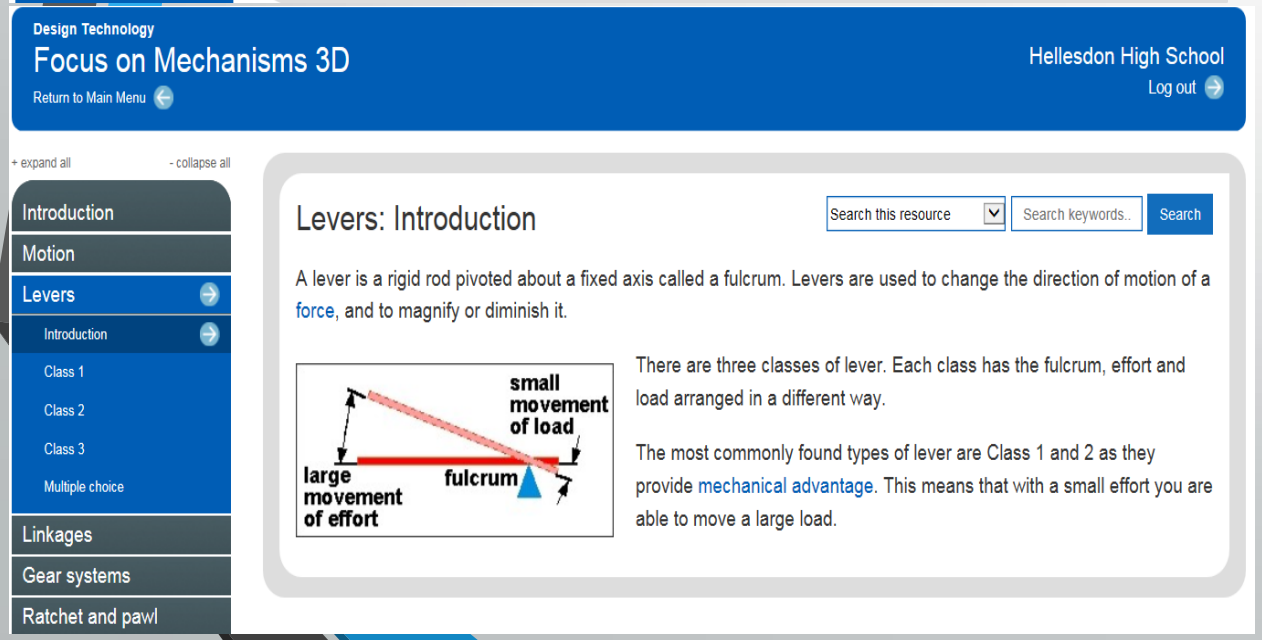
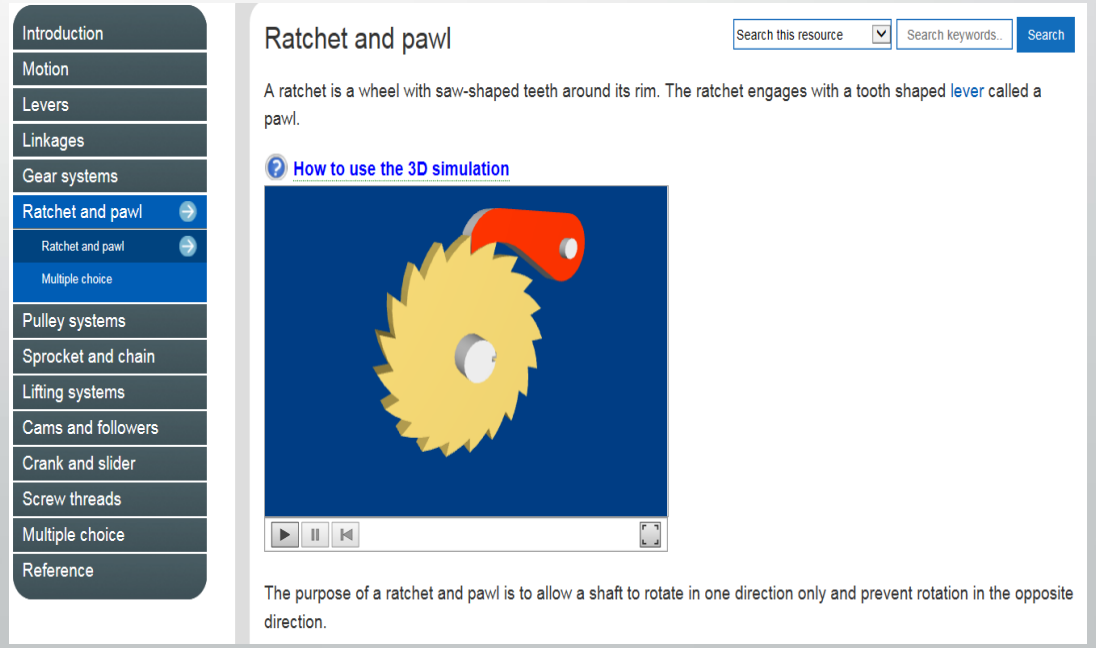




Your Brief Today:

You are to investigate a **range of mechanisms** as part of a **product study** linked to the **Summer Tasks.**

Task 1

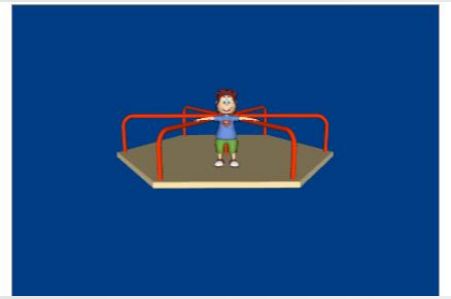
You must start to build up a bank of information in a **portfolio** to show that you have covered the full range of mechanisms on the specification list . This can be in electronic form to be saved in your Public Folder later in the course.

Task 2

As part of the **product study** you should:

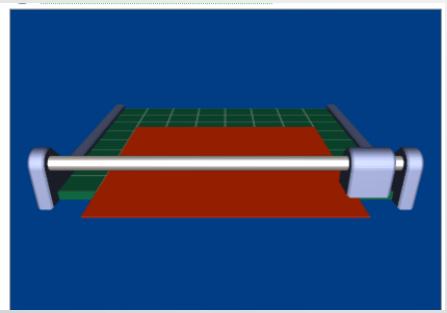
a) Analyse and disassemble(if possible) the product.
b) Identify any types of motion and transmission of movement.
c) Look at ways to calculate the movement of working parts.
d) Study and consider concepts such as mechanical advantage, velocity ratio, efficiency, speed, RPM, torque, etc.
e) Identify materials and manufacturing processes.

Types of Motion

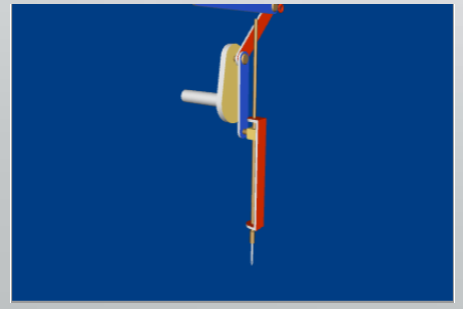


ROTARY

OSCILLATING

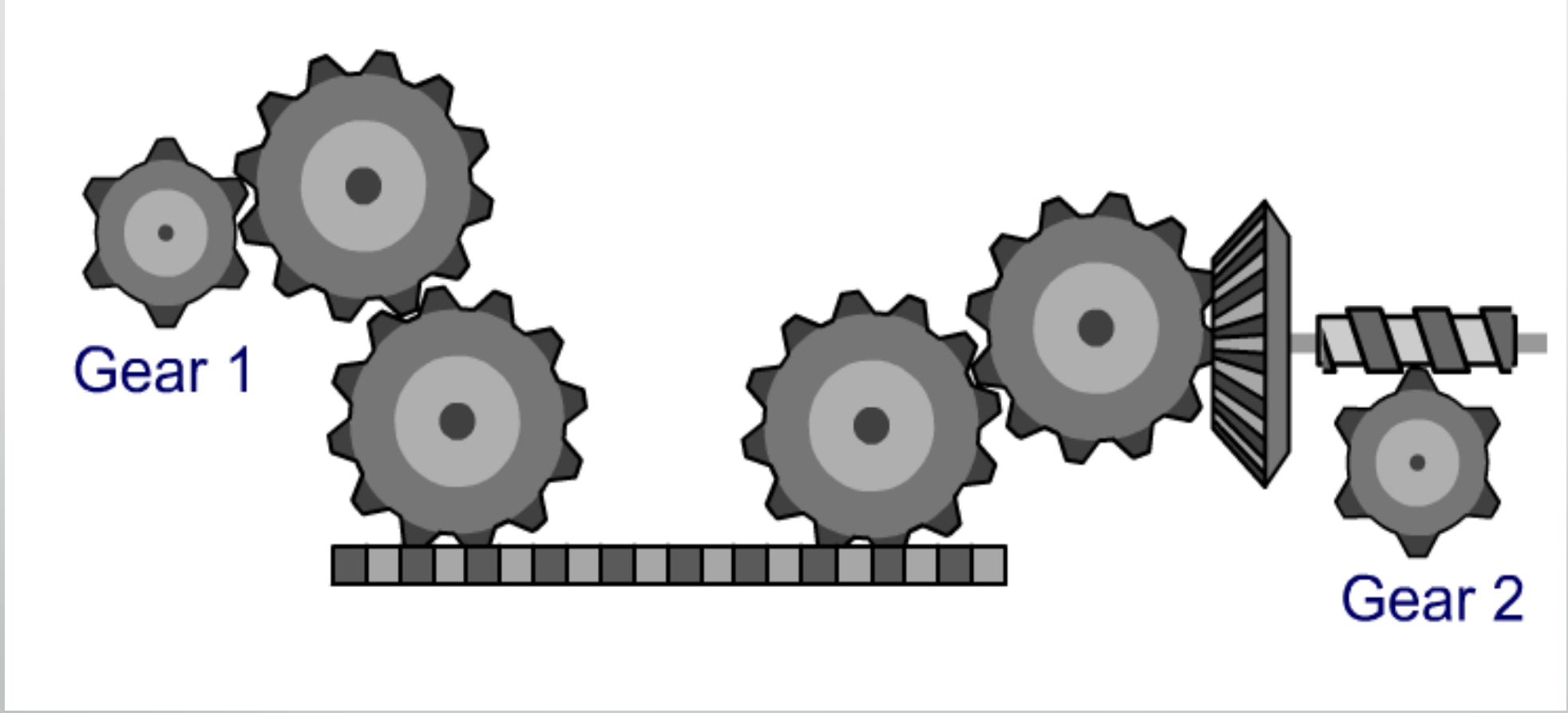


LINEAR

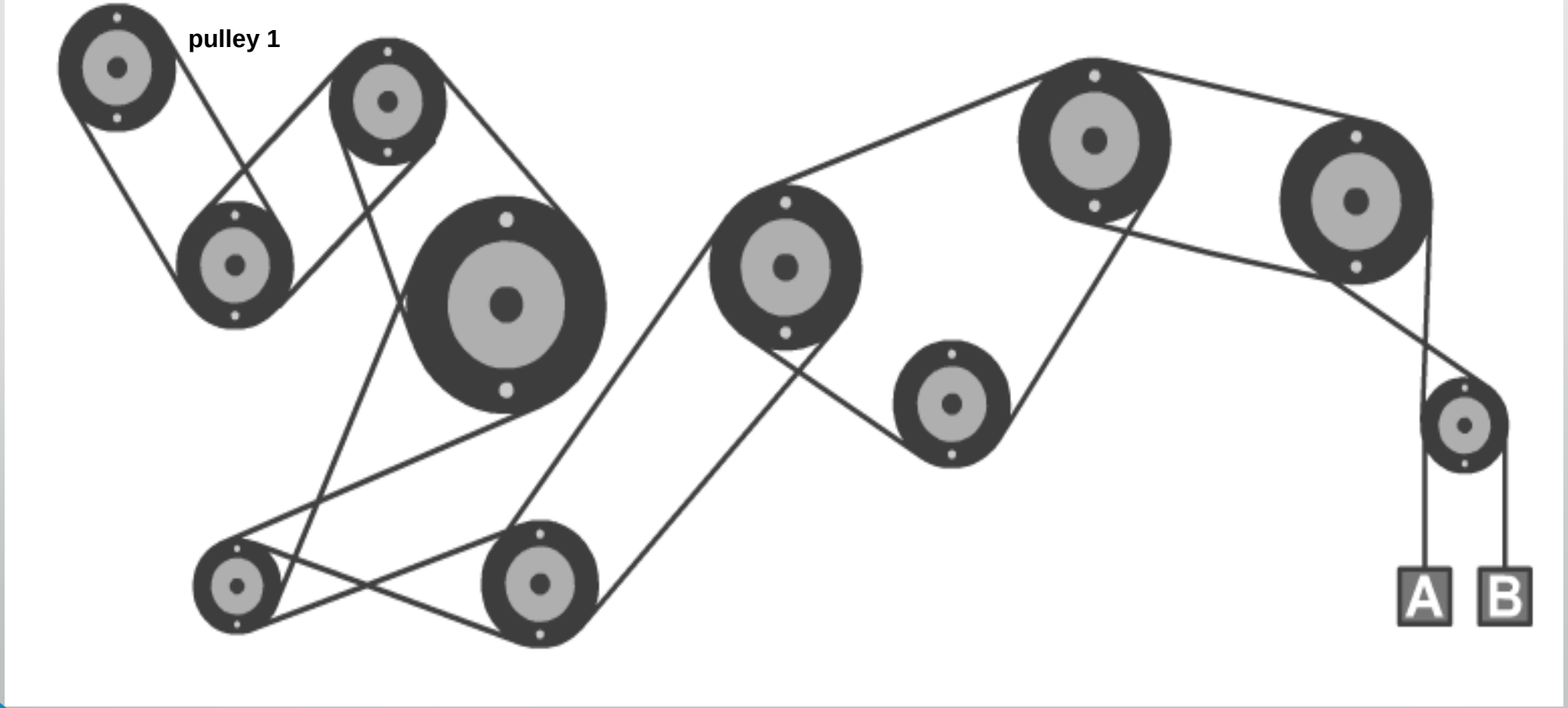


RECIPROCATING

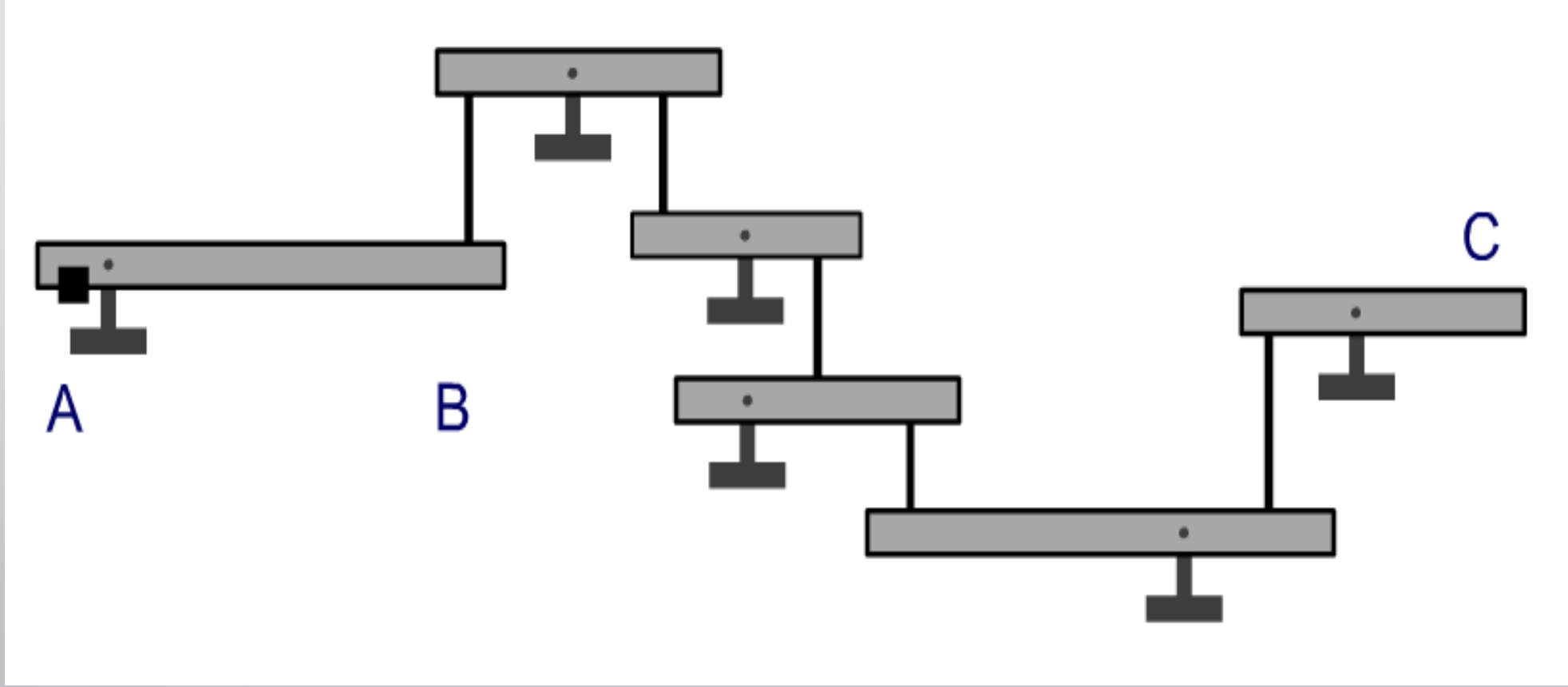
If gear 1 turns in a clockwise direction, which direction will gear 2 turn in?



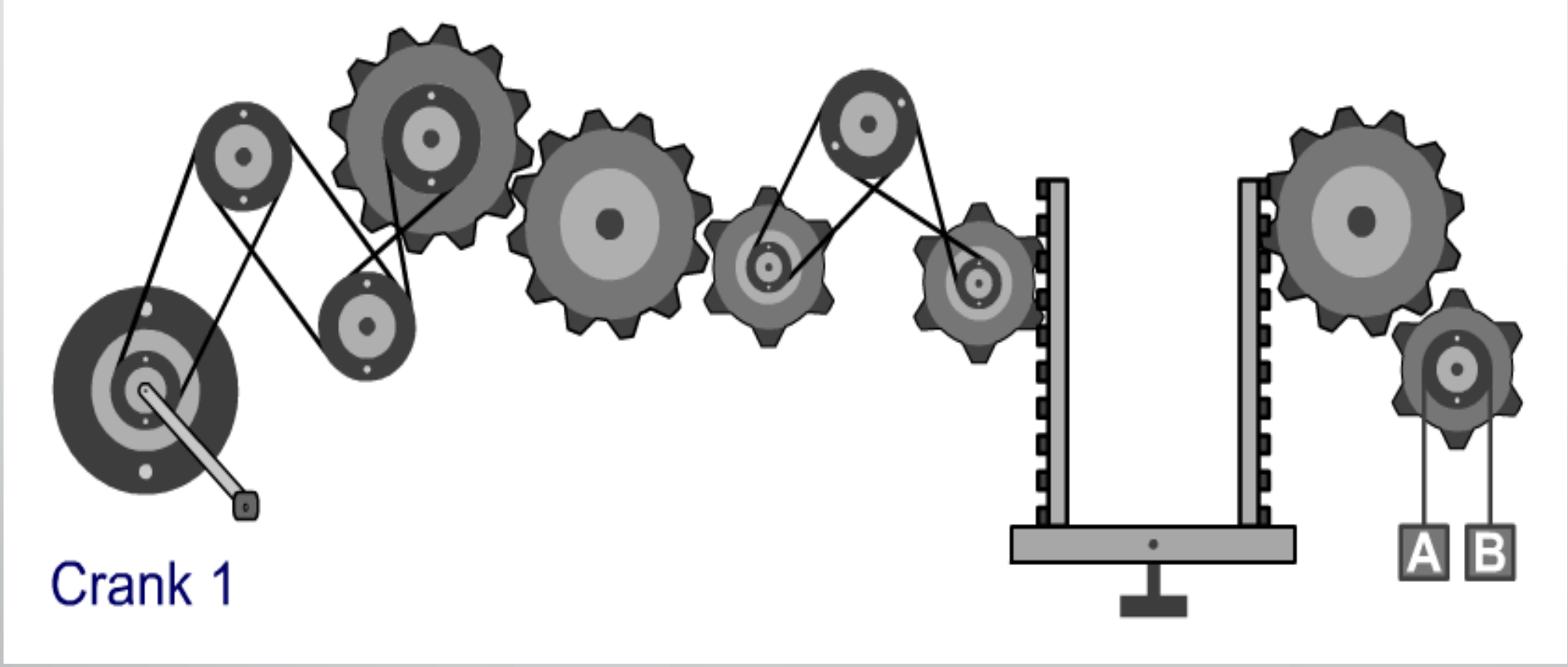
If pulley 1 turns in a clockwise direction, will weight A rise or fall?



If the weight moves from point A to point B, will point C rise or fall?



If crank 1 turns in a clockwise direction, does weight A rise or fall?



Product analysis is an important starting point.

You need to collect information about **products**.

You then need to **analyse** their workings carefully.

When you are analysing a product it is helpful if you can **divide the task** into separate areas.

Go through each step of the analysis of your products and answer the questions:

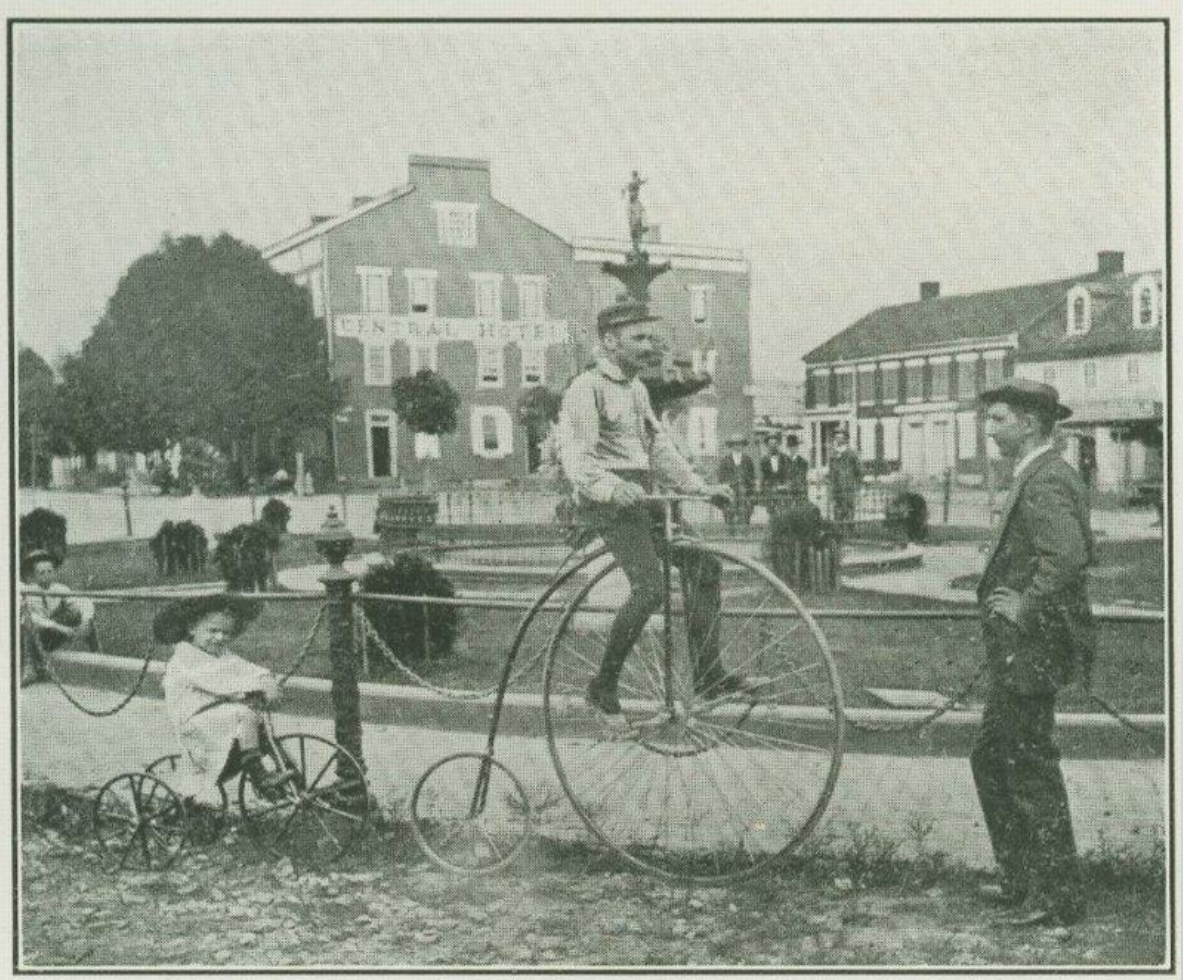
- What is the product for?
- What is its function?
- What is its form?
- How does it move?
- What mechanisms are used?
- How efficient is it?
- How is it made/manufactured?
- What materials have been used?

Analysis of products

For people who could not afford horses, the problem of **personal transport** required a new product.

Bicycles were early examples of **solutions to the problem** of personal transport; they were quicker and easier than walking.

Early solutions were **interesting**!

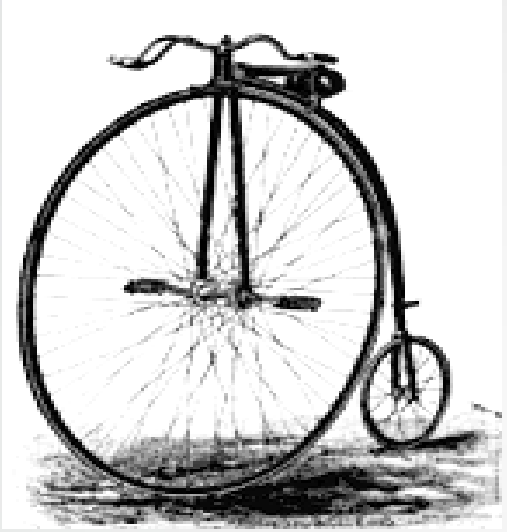


FIRST BICYCLE IN HANOVER
Allen H. Wentz on bicycle, Arnold Kleff on velocipede

1817

A walking bicycle

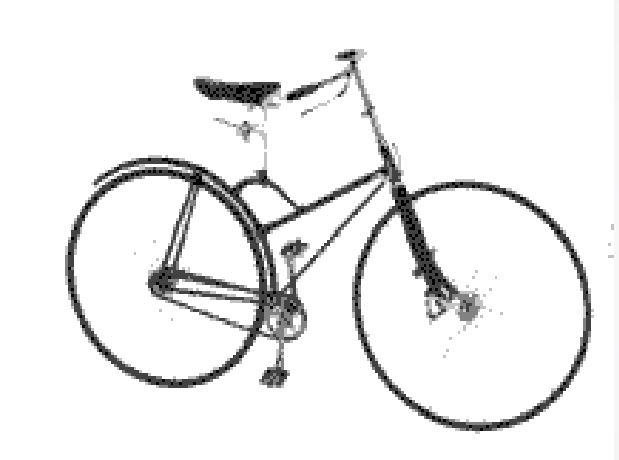
1870



The High Wheel Bicycle

(Penny Farthing)

1880



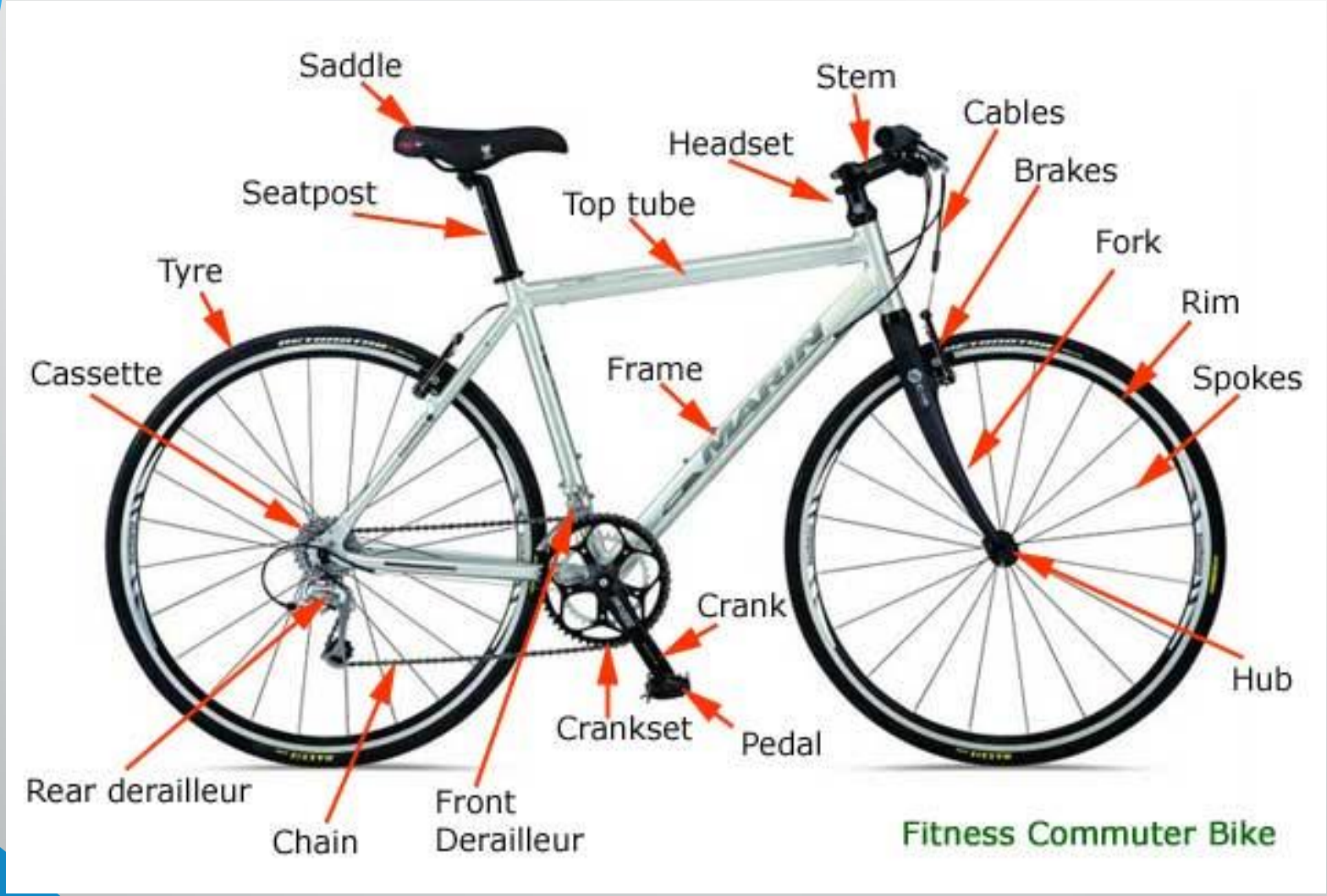
A pedal cycle with solid tyres

1890

A pedal cycle with pneumatic tyres

Over time, **mechanisms** on bicycles **developed** and became more sophisticated and efficient.

Modern Bicycle Product Study



Type/Make:

Purpose: off road etc

Cost:

Mechanisms:

Materials:

Processes:

Think how you could carry out a product analysis on an unusual bicycle like this one.

Developments due to new technology

In the 1970s an inventor called **Clive Sinclair** introduced miniature televisions, pocket calculators and digital watches to Britain. The next problem he tried to solve was to:

Design and manufacture an electric vehicle

- In the mid-1980s people were concerned about **pollution** and oil reserves.
- Sinclair decided to invent an **environmentally friendly** vehicle, something between a bicycle and a small car.
- The machine would be **pedalled** as well as being **battery powered**.
- It would be a vehicle that young people would buy and use.

The design team came up with a contemporary design – the **Sinclair C5**

It was marketed as an **environmentally friendly** personal transport system that everyone would want.
Sinclair predicted sales of **100,000**.

You could carry out a product analysis on the Sinclair C5 and investigate to mechanisms and systems used to drive it along

Do you think that the Sinclair C5 should now be looked at again as a viable transport alternative?

Do you think that it could be re-developed to include newer technologies that we now have?

Do you think that you are the type of person that would be able to investigate this sort of problem?

Work Experience can be linked with the course