Dial Park Primary– Design & Technology– Mechanical Systems – Even Year– Concepts: Leadership, Influence and Conflict– UKS2 (Spring)

Design and Make a modern day machine to move rocks in Ancient Egypt to create the Pyramids of Giza.

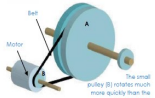
Discovery

Investigate, analyse and evaluate existing everyday products and toys that include gear or pulley systems.

What type of movement can be seen? What types of mechanical components are used and where are they positioned? What are the input, process and output of the system? How well does the product work?

Initiative

gears



pulleys

What are gears and pulleys?

Gears are toothed wheels (cogs) that lock together (mesh). Pulleys are joined by a looping rope over one or more wheels.

Using construction kits, explore how the size of the gears affects the speed of rotation.

How many times does the smaller pulley turn each time the larger pulley turns once?

I know the difference between gears and pulleys.

Awareness

Gears and pulleys can be operated using motors and circuits. and making secure electrical connections.

Why do we need to have an awareness of the dangers of mains electricity ?

As a designer, I use my mathematical knowledge of measuring and use sharp tools safely, using cuts and joins for the main structure of the design.

Listening

Design and Make a modern day machine to move rocks in Ancient Egypt to create the Pyramids of Giza.

You should have a working circuit that incorporates a battery, a motor and a handmade switch, such as a reversing switch

Communicate ideas through detailed, annotated drawings from different views and/or exploded diagrams.

Where will you locate the electrical and mechanical components?

Inspire Me!

Ralph Braun designed a motorised scooter called the 'Tri-wheeler' which enabled him to get to work. He now manufactures devices which make vehicle accessibility easier for wheelchair users.

Vocabulary

axle

driver

drive belt

gear

gear ratio

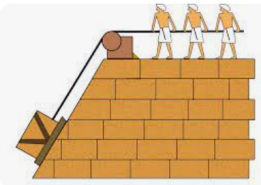
follower

motor

pulley

spindle

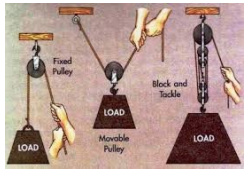
Positivity



How can the gears and pulleys be used to speed up, slow down or change the direction of movement of your mechanism?
How will they work with the input and output processes?

I know how gears and pulleys speed up, slow down or change direction of movement.
I know that a mechanical system can include sliders, levers, linkages, gears, pulleys, hydraulics and pneumatics.

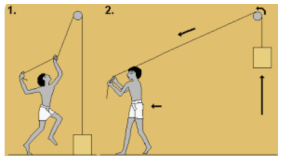
Acceptance



What order will you work in?
What constraints are you working to?
Do you need to adapt and change anything in order for your product to be effective?

I am able to use innovative combinations of electronics (or computing) and mechanics in product designs.

Relationships



Evaluate the effectiveness of your product. Be a critical friend and evaluate each others product to ensure they are fit for purpose.

Does your product meet the user needs?
Does your mechanism move rocks smoothly and effectively?
What might you do differently next time?

As a designer, I'm able to plan ahead to anticipate future actions and evaluate products.

Kindness

How might your mechanical system change the lives of the Egyptian builders?

Ask your friends questions about the choices they have made. How innovative are your ideas?

Prior Learning

Experience of axles, axle holders and wheels that are fixed or free moving.

- Basic understanding of electrical circuits, simple switches and components.
- Experience of cutting and joining techniques with a range of materials including card, plastic and wood.
- An understanding of how to strengthen and stiffen structures.

Protected Characteristics

Gender: How might engineering companies inspire more girls to join the engineering profession?

Declarative Knowledge: National Curriculum/Dial Park subject knowledge

Procedural Knowledge: Skills

Disciplinary Knowledge: As an engineer, I use my knowledge of mechanisms to understand how to control movement with a cam, gears or pulley mechanism