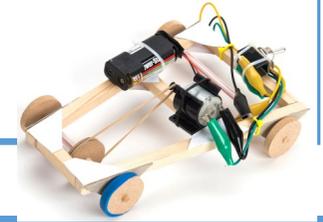# Year 6 Design and Technology: Electrical Systems

How can we design and control an electronic buggy?

Prior Learning

- I have explored movement through different mechanisms including cams, axels, pneumatics, sliders and levers.
- I have learnt some cutting and joining techniques with a range of materials including card, plastic and wood.
- I have learned some ways to stiffen and reinforce structures.
- I understand the components needed to make a working series circuit.

Sticky Knowledge

Understand and use electrical systems in their products.
- Apply their understanding of computing to program, monitor and control their products.
- Communicate ideas through annotated sketches, pictorial representations of electrical circuits or circuit diagrams.
- Formulate a step-by-step plan to guide making, listing tools, equipment, materials and components.
- Competently select and accurately assemble materials, and securely connect electrical components to produce a reliable, functional product.
- Create and modify a computer control program to enable an electrical product to work automatically in response to changes in the environment.
- Continually evaluate and modify the working features of the product to match the initial design specification.
- Test the system to demonstrate its effectiveness for the intended user and purpose.
- Investigate famous inventors who developed ground-breaking electrical systems and components.

Vocabulary

|	
User*	The person or people who will use the product.
Purpose*	What the product will be used for.
Function*	What the product should be able to do to work properly.
Design*	A plan or idea of what the product will be like and how it will function.
Pulley	A pulley is a wheel with a groove which is used to create a simple mechanism for lifting heavy objects.
Components	Are the parts needed to make something work.
Control Box	A device that gives commands to manage the movement of another object or device.
Control Program	A program is used to create a list of instructions (algorithms) that are transferred to a device through a control box.
Circuit	A complete path through which electricity can flow.
Input devices	Components which are used to control an electrical circuit e.g. switches or sensors
Output devices	Components that produce an outcome e.g. bulbs and buzzers
Switch	Is used to control circuits and to stop and start the flow of electricity.

Year 6 Design and Technology: Electrical Systems

How can we design and control an electronic buggy?

How will we program our buggy to create movement?
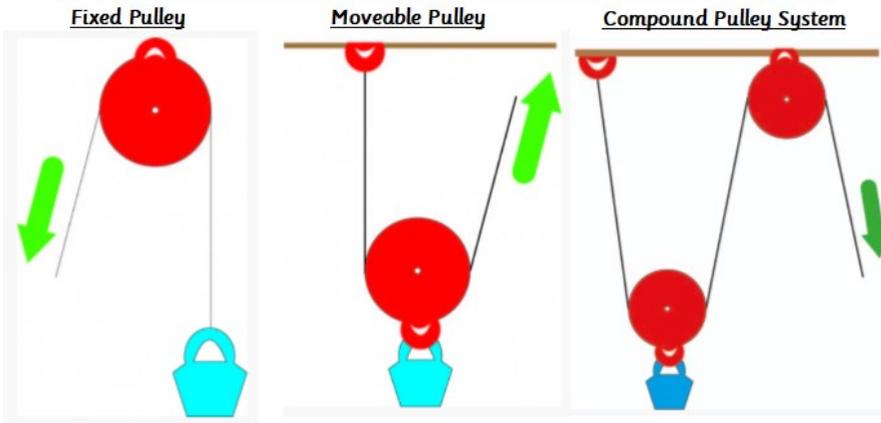
Connecting Motors
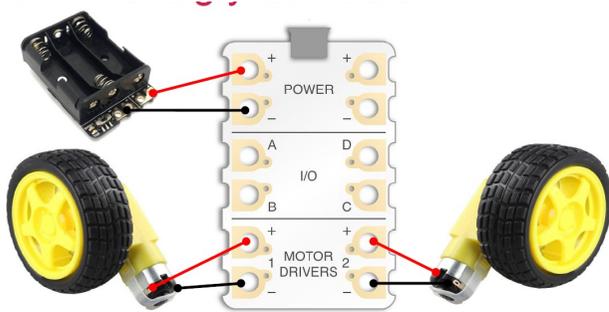
Programming a 'Crumble'
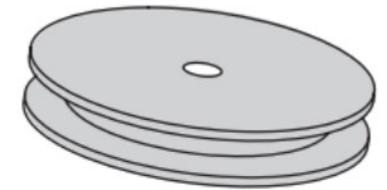
```
program start
do forever
  motor 1 FORWARD at 75 %
  motor 2 FORWARD at 75 %
  wait 1.0 seconds
  motor 1 STOP
  motor 2 STOP
  wait 1.0 seconds
loop
```

How do Pulley Systems Work?

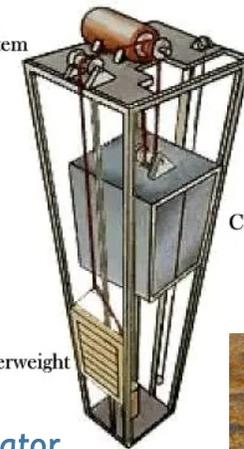Fixed Pulley

Moveable Pulley

Compound Pulley System

A pulley is **a simple machine that makes it easier to lift or move a heavy object**. It includes at least one wheel and a length of rope.

<u>Nikola Tesla</u> was a brilliant scientist and inventor. His work with electricity led to many advances in communication and technology. He is best known for **creating the Alternating Current electric system**, which is still used today as the world's primary electrical system.

Electrical Pulley Systems
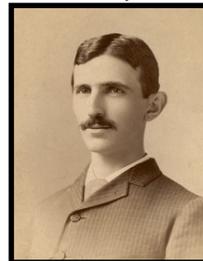
Electric motor with pulley system

Car

Counterweight

Lift/ elevator

Crane