

# Design Technology

## Year 5 and 6

### Autumn 1



**Topic WW2**

To make a robot with lights and or a buzzer and or a motor.  
Link with Art- structures

**Rationale**

Creating the cross-curricular link between the study of Structures in Art and Electricity in Science, the children will design, make and evaluate a Robot with lights or buzzer or a motor. The children will use construction skills previously learned and will have the opportunity to learn further, more refined skills. The children will have a context for learning the skills and a real life purpose creating their finished product.

**NC Objective**

- Use research and develop design criteria to inform the design of innovative, functional, appealing products that are fit for purpose, aimed at individuals or groups
- Generate, develop, model and communicate their ideas through discussion, annotated sketches, cross-sectional and exploded diagrams, prototypes, pattern pieces and computer aided design
- Select from and use a wider range of tools and equipment to perform practical tasks for example, cutting, shaping, joining, and finishing, accurately
- Select from and use a wider range of materials and components including construction materials, textiles, and ingredients, according to their functional properties and aesthetic qualities Investigate and analyse a range of existing products.
- Investigate and analyse a range of existing products.
- Evaluate their ideas and products against their own design criteria and consider the views of others to improve their work.
- Understand how key events and individuals in design and technology have helped shape the world.
- Apply their understanding of how to strengthen, stiffen and reinforce more complex structures.
- Understand and use mechanical systems in their products [for example, gears, pulleys, cams, levers and linkages].
- Understand and use electrical systems in their products [for example, series circuits incorporating switches, bulbs, buzzers and motors].
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**Links to other Subject/Topics.**

**Art** - Structures

**Science** – Electricity.

**Inspiration for Aspiration**

Architect, CAD Operator, Builder, Electrician, plumber, technician, inventor

**Key Content**

**Structures, Mechanisms, Electricity**

- What will a robot with mechanisms, lights and or a buzzer and or a motor look like?
- How will I make a robot structure?
- How can I add mechanisms to my robot structure to make it move?
- Can I add some electrical components (lights, buzzer and motor) to my robot structure?
- How can I evaluate a robot structure with mechanisms, lights and or a buzzer and or a motor?

**Concepts**

Design Technology	1	2	3	4	5	6
Design, Make, Evaluate						
Structures						
Mechanisms						
Electrical						
Textiles						
Food and Nutrition						

<p><b>Skills and Knowledge Year 3/4</b></p> <p><b>Design</b></p> <ul style="list-style-type: none"> <li>• Use research for design ideas</li> <li>• Show design meets a range of requirements and is fit for purpose</li> <li>• Begin to create own design criteria</li> <li>• Produce a plan and explain it to others</li> <li>• Include an annotated sketch</li> <li>• Make and explain design decisions considering resources</li> <li>• Make a prototype</li> <li>• Explain how product will work</li> <li>• Begin to use ICT to show design</li> </ul> <p><b>Make</b></p> <ul style="list-style-type: none"> <li>• Select suitable tools and equipment, explain choices in relation to required techniques and use accurately</li> <li>• Select appropriate materials, fit for purpose; explain choices</li> <li>• Work through plan in order</li> <li>• Measure, mark out, cut, and shape materials/ components with some accuracy</li> <li>• Assemble, join and combine materials and components with some accuracy and apply some finishing techniques</li> </ul> <p><b>Evaluate</b></p> <ul style="list-style-type: none"> <li>• Refer to design criteria while designing and making and use it to evaluate product</li> <li>• Begin to explain how I could improve original design</li> <li>• Evaluate existing products, considering how well they've been made, materials, whether they work, how they have been made, fit for purpose</li> <li>• Know about some inventors/designers/ engineers/chefs/ manufacturers of ground-breaking products</li> </ul> <p><b>Technical Knowledge</b></p> <p><b>Structures</b></p> <ul style="list-style-type: none"> <li>• Attempt to make product strong</li> <li>• Consider effective and ineffective designs</li> </ul> <p><b>Mechanisms</b></p> <ul style="list-style-type: none"> <li>• Use levers, linkages, and pneumatics to create movement</li> <li>• Learn that all moving things have kinetic energy</li> </ul> <p><b>Electricity</b></p> <ul style="list-style-type: none"> <li>• Use a simple circuit</li> <li>• Use a number of components in a circuit</li> <li>• Understand that batteries contain stored electricity and can be used to power products like torches</li> </ul>			<p><b>Skills and Knowledge Year 5/6</b></p> <p><b>Design</b></p> <ul style="list-style-type: none"> <li>• Draw on market research to inform design</li> <li>• Use research of user's individual needs, wants, requirements for design</li> <li>• Create own design criteria and specification</li> <li>• Use annotated sketches, cross-sectional planning and exploded diagrams</li> <li>• Make design decisions considering resources and cost</li> <li>• Clearly explain how parts of design will work, and how they are fit for purpose</li> <li>• Independently model and refine design ideas by making prototypes and using pattern pieces</li> <li>• Use ICT to create designs</li> </ul> <p><b>Make</b></p> <ul style="list-style-type: none"> <li>• Use selected tools and equipment precisely</li> <li>• Select appropriate materials, fit for purpose; explain choices, considering functionality and aesthetics</li> <li>• Create, follow, and adapt detailed step-by-step plans</li> <li>• Explain how product will appeal to audience; make changes to improve quality</li> <li>• Accurately measure, mark out, cut and shape materials/components</li> <li>• Accurately assemble, join and combine materials/components</li> <li>• Accurately apply a range of finishing techniques</li> <li>• Be resourceful with practical problems.</li> </ul> <p><b>Evaluate</b></p> <ul style="list-style-type: none"> <li>• Evaluate ideas and finished product against specification, stating if it's fit for purpose</li> <li>• Explain what would improve it and the effect different resources may have had</li> <li>• Do thorough evaluations of existing products considering how well they've been made, materials, whether they work, how they've been made, fit for purpose</li> <li>• Evaluate how much products cost to make and how innovative they are</li> <li>• Consider the impact of products beyond their intended purpose</li> <li>• Discuss some key inventors/designers/ engineers/ chefs/manufacturers of ground-breaking product</li> </ul> <p><b>Technical Knowledge</b></p> <p><b>Structures</b></p> <ul style="list-style-type: none"> <li>• Select materials carefully, considering the intended use of the product, the aesthetics and functionality</li> <li>• Explain how product meets design criteria</li> <li>• Reinforce and strengthen a 3D frame</li> </ul> <p><b>Mechanisms</b></p> <ul style="list-style-type: none"> <li>• Use cams, pulleys, and gears to create movement and incorporate hydraulics and pneumatics</li> <li>• Explore types of motions and directions of a motion</li> </ul> <p><b>Electricity</b></p> <ul style="list-style-type: none"> <li>• Use different types of circuits in a product</li> <li>• Learn that when electricity enters a magnetic field it can make a motor</li> </ul>			
<p><b>Year 3/4 DT Vocabulary Structure</b></p> <p>Shell structure</p> <p>Adhesive</p>	<p><b>Mechanical</b></p> <p>System</p> <p>Rotary</p> <p>Attaching</p> <p>Pneumatic systems</p>	<p><b>Electrical</b></p> <p>Motor</p> <p>Series circuit</p> <p>Fault</p> <p>Connection</p> <p>Switch</p>	<p><b>Design Technology Y5/6 DT Vocabulary Structure</b></p> <p>stiffen</p> <p>strengthen</p>	<p><b>Mechanical</b></p> <p>mechanism</p> <p>lever</p> <p>linkage</p> <p>pivot</p> <p>slot</p> <p>rotary</p>	<p><b>Electrical</b></p> <p>switch</p> <p>bulb holder</p> <p>battery holder</p> <p>battery holder</p> <p>Wire</p>	<p><b>Topic Specific Vocabulary Y5/6 DT Vocabulary</b></p> <p>Design</p> <p>Make</p>

Assemble Graphics Prototype Vice Accurate	Compression Inflate Deflate	Insulator Conductor Control Programme Device Battery Battery Holder Light Bulb Bulb Holder Buzzer	reinforce stability	oscillating	Insulator Conductor components crocodile clip control circuit motor program power source system input device output device series circuit	Evaluate Robot Fit for purpose re-cycle
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**By the end of the topic children will be able to successfully answer the following questions: -**

**Structures, Mechanisms, Electricity**

- Can I design a robot with mechanisms, lights and or a buzzer and or a motor?
- Can I make a robot structure?
- Can I add mechanisms to my robot structure to make it move?
- Can I add some electrical components (lights, buzzer and motor) to my robot structure?
- Can I evaluate a robot structure with mechanisms, lights and or a buzzer and or a motor?

**Assessment**

Fact file of design/designer or invention/inventor, in book.

Design, in book.

Observation of use of skills taught in finished product.

Observation assessment of finished product – is it fit for purpose?

Evaluation of finished product, in book.