

<b>Y3 Moving Robot</b>	
<b>Links made with other subjects</b>	<p><b>Science:</b> Forces and magnets</p> <p><b>English:</b> Class reader: The Iron Man</p> <p><b>Art:</b> Drawing unit in Year 3: eg colour, shape, texture</p>
<b>The BIG Question</b>	How can air produce movement?
<b>The BIG Outcome</b>	To create a Robot with a moving body feature.
<b>DT objectives</b> (link to NC)	<p><b><u>Design</u></b></p> <ul style="list-style-type: none"> <li>• use research and develop design criteria to inform the design of innovative, functional, appealing products that are fit for purpose, aimed at particular individuals or groups</li> <li>• generate, develop, model and communicate their ideas through discussion, annotated sketches, cross-sectional and exploded diagrams, prototypes, pattern pieces and computer-aided design</li> </ul> <p><b><u>Make</u></b></p> <ul style="list-style-type: none"> <li>• select from and use a wider range of tools and equipment to perform practical tasks [for example, cutting, shaping, joining and finishing], accurately</li> <li>• 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</li> </ul> <p><b><u>Evaluate</u></b></p> <ul style="list-style-type: none"> <li>• investigate and analyse a range of existing products</li> <li>• evaluate their ideas and products against their own design criteria and consider the views of others to improve their work</li> <li>• understand how key events and individuals in design and technology have helped shape the world</li> </ul> <p><b><u>Technical knowledge</u></b></p> <ul style="list-style-type: none"> <li>• apply their understanding of how to strengthen, stiffen and reinforce more complex structures</li> <li>• understand and use mechanical systems in their products [for example, gears, pulleys, cams, levers and linkages]</li> <li>• understand and use electrical systems in their products [for example, series circuits incorporating switches, bulbs, buzzers and motors]</li> <li>• apply their understanding of computing to program, monitor and control their products.</li> </ul>
<b>Prior knowledge</b> What prior knowledge is needed for children to be successful in this unit?	<p>This unit builds on the mechanisms unit covered in year 1 (moving pictures)</p> <p>Children should be able to:</p> <ul style="list-style-type: none"> <li>• Join materials to allow movement</li> <li>• generate and communicated ideas in a variety of ways</li> <li>• join and combine materials using simple hand tools</li> <li>• evaluate their work as it progresses and at the end</li> </ul>
<b>Future learning</b> Consider the conceptual knowledge within a subject that pupils need for future learning not just the recall of facts but the importance of concepts	<p>This unit gives prior knowledge to:</p> <p>Y4 – Design and make a story book using a range of mechanisms</p> <p>Y5 – Design and make a moving vehicle using a battery</p> <p>Y6 – Design and make a fairground using electronic systems</p>
<b>Resources</b>	Examples of products that use air eg pneumatic toys, foot pump for inflating air mattress, balloon pump

## DT Scheme of Work

	<ul style="list-style-type: none"> <li>washing-up liquid bottles, 5mm diameter plastic tubing, balloons, sterile syringes</li> <li>construction kits</li> <li>suitable reclaimed materials, card, plastic sheet</li> <li>materials for finishing eg coloured papers, paint, papier mâché, fabric, foil</li> <li>PVA glue, masking tape, parcel tape, lower temperature glue gun, pipe-cleaners</li> <li>scissors, snips</li> </ul>
<b>Vocabulary/ Glossary</b>	<p><u>Designing</u>: idea, discuss, choose, drawing, labelling</p> <p><u>Making</u>: hole punch, paper fastener, join, cut carefully, planning</p> <p><u>Knowledge and understanding</u>: moving, handle, lever, pivot, slider, direction, blade, metal, order, sequence, length</p> <p><u>Types of movement</u>: balance, movement, forward, backwards, pull, push</p>
<b>Knowledge</b>	<p>The knowledge that children will learn and remember:</p> <ul style="list-style-type: none"> <li>to know how air pressure can be used to produce and control movement</li> <li>to know how to construct effective pneumatic systems</li> <li>to know how to investigate ways of using their pneumatic systems with other materials to control movement</li> <li>to know techniques for making simple pneumatic systems</li> <li>to use appropriate vocabulary to describe how things work</li> <li>to know how to assemble simple pneumatic systems</li> <li>to know how to fix components</li> <li>to know and use different ways of using pneumatic systems in conjunction with simple levers to control movement</li> <li>to know how to work collaboratively within a team</li> <li>to choose an idea according to logistical constraints of materials, time, size</li> <li>work safely and accurately with a range of simple hand tools</li> <li>know how to identify aspects of their design that they could have improved upon</li> <li>demonstrate an understanding of the process of evaluation</li> </ul>
<b>SEND expectations</b>	Children will have developed an understanding of simple pneumatic systems; have needed support in designing and making a model robot with a moving part controlled by a pneumatic system.
<b>Questioning</b> Questions you can pose to deepen, consolidate and challenge pupil's understanding	<ol style="list-style-type: none"> <li><i>Who is your robot for? (audience)</i></li> <li><i>What is the purpose of your robot? (persuade, inform, entertain)</i></li> <li><i>What topic or subject does your robot link to? (theme/ topic area)</i></li> <li><i>How will you decorate your robot so it (persuade/ inform/entertain) appeals to your audience?</i></li> <li><i>Which body parts of your robot will move? Why have you chosen these?</i></li> <li><i>How will you use the pneumatics mechanism?</i></li> <li><i>Will this mechanism be the only one to create your moving parts?</i></li> <li><i>Does your product do what you intended it to do? (fulfil its purpose)</i></li> </ol>
<b>Suggested activities</b>	<p>Show the children familiar objects that use air to make them work eg recorder, whistle, bicycle pump, balloon, inflatable swimming aids, foot pump for inflating an air bed, coiled party blowers. What does the air do? How has it been used in the design of these products?</p> <p>Construct a simple pneumatic system by joining a balloon to 5mm tubing and then to a washing-up liquid bottle. Encourage the children to investigate: – What happens to the air when you squeeze the bottle? – What happens when you let go? – What happens if you put fabric over the balloon and then squeeze the bottle? – Can you lift a book with the balloon?</p> <p>Make a class collection of images of Robots for the children to refer to – real, fictional, scary or friendly, human, animal or alien.</p>

## DT Scheme of Work

Construct an alternative pneumatic system by joining two syringes with a piece of plastic tubing. Ask questions to help children investigate eg What happens when the plunger of one syringe is pressed in? Compare the two systems and discuss their similarities and differences. (Note: take care as the plunger may come out with force!)

Collect some small creatures eg ladybirds, woodlice and caterpillars and examine their bodies and legs using viewers and/or magnifying glasses.

Collect toy or model animals and creatures. Discuss how they have been made, in particular, how the colouring, markings and texture of the body parts have been replicated.

Show children how balloons or syringes can be used in conjunction with simple levers to control movement eg – place the balloon in a small box with a lid so that when inflated it raises the lid – use a card hinge to attach one of the syringes to a lever so that it can raise and lower the lever – explore the effect of moving the syringe closer to or further from the pivot point

Provide children with components for making pneumatic systems, construction kits, pieces of card and plastic sheet with temporary fixings eg masking tape. Ask them to make a pneumatic system and explore using it with the other materials to make something move. Discuss the outcomes and highlight good ideas and solutions to any problems encountered.

Explain to the children the task, including constraints eg time, size and materials and the individual children's design input on aspects of the Robot.

Discuss with the children who the Robot is for. What does it have to do?

Discuss with the children possible ideas for moving parts eg moving wings, opening and closing mouth and for ways of making eg using reclaimed materials for the structure.

Organise the children into small teams and ask them to brainstorm ideas, recording them in words and sketches. What could you do? How could you do this? What do you need to know? What does this product need to do?

Ask each team to evaluate their ideas, choose one and explain how they are going to make it. How could you do this? What could you use? What will it look like?

Ask each team to produce a list of the materials and tools they expect to use. What will you need? Where will you work? Who will do what? What will you need to do first?

At certain stages, gather the children together to talk about their work so far, what they need to do next and share successful techniques and good ideas.

During the work, ask the children to evaluate how they went about their work and the strengths and weaknesses of the finished product.

Ask them to record their work in storyboard form showing how they made their Robot.

