



Design & Technology - Year 3

Moving Monsters

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ABOUT THE UNIT

This unit helps to develop children's understanding of control through investigating simple pneumatic systems and designing and making a model of a monster that has moving parts controlled by pneumatics. This could be linked to stories or poems, or another purpose. A good context is toys to amuse children who are ill in bed. The designing and making assignment requires children to develop skills in working as part of a team.

EXPECTATIONS/ASSESSMENT:

most children will: have developed an understanding of simple pneumatic systems; have worked as part of a team to design and make a model monster with at least one moving part controlled by a pneumatic system

some children will not have made so much progress and will: have developed a limited understanding of simple pneumatic systems; have needed support in working with others to design and make a model monster with a moving part controlled by a pneumatic system

some children will have progressed further and will: have developed an understanding of simple pneumatic systems relating their work in the classroom to products in the wider world; have worked as part of a team to design and make a model of a monster that incorporates two or more moving parts controlled effectively by pneumatic systems, taking account of available resources

RESOURCES

examples of products that use air *eg pneumatic toys, foot pump for inflating air mattress, balloon pump*

washing-up liquid bottles, 5mm diameter plastic tubing, balloons, sterile syringes
construction kits

suitable reclaimed materials, card, plastic sheet

materials for finishing *eg coloured papers, paint, papier mache, fabric, foil*

PVA glue, masking tape, parcel tape, lower temperature glue gun, pipe-cleaners
scissors, snips

INTERNET

www.eriding.net/dandt/primary.shtml

www.standards.dfes.gov.uk/schemes2/designtech/det3c/?view=get

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	Learning Objectives	Key Questions	Activities	Differentiation
1 / 2	<p>how air pressure can be used to produce and control movement</p> <p>techniques for making simple pneumatic systems</p> <p>to compare the effectiveness of different systems</p> <p>to use appropriate vocabulary to describe how things work</p>	<p>Investigative, disassembly and evaluative activities:</p> <p>How can air pressure be used to produce and control movement?</p>	<p>In Lesson1: Show the children familiar objects that use air to make them work <i>eg recorder, whistle, bicycle pump, balloon, inflatable swimming aids, foot pump for inflating an air bed, coiled party blowers</i>. 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: -<i>What happens to the air when you squeeze the bottle?</i> -<i>What happens when you let go?</i> -<i>What happens if you put fabric over the balloon and then squeeze the bottle?</i> -<i>Can you lift a book with the balloon?</i></p> <p>Construct an alternative pneumatic system by joining two syringes with a piece of plastic tubing. Ask questions to help children investigate <i>eg What happens when the plunger of one syringe is pressed in?</i> Compare the two systems and discuss their similarities and differences. (Note: take care as the plunger may come out with force!)</p> <p>In Lesson 2: Make a class collection of images of monsters for the children to refer to - real, fictional, scary or friendly, human, animal or alien.</p> <p>Collect some small creatures <i>eg ladybirds, woodlice and caterpillars</i> and examine their bodies and legs using viewers and/or magnifying glasses.</p> <p>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.</p>	<p>Children could find out about other air-operated equipment <i>eg automatic doors, dentist's drill</i>.</p> <p>Some children could use the internet to search for images of monsters or other creatures that move.</p>
3	<p>how to assemble simple pneumatic systems</p> <p>ways of fixing components</p> <p>ways of using pneumatic systems in conjunction with simple levers to control movement</p> <p>to explore ideas through 3D modelling</p>	<p>Focused Practical Tasks:</p>	<p>Recall the techniques for assembling the two pneumatic systems used in the first lesson.</p> <p>Show children how balloons or syringes can be used in conjunction with simple levers to control movement <i>eg</i> -<i>place the balloon in a small box with a lid so that when inflated it raises the lid</i> -<i>use a card hinge to attach one of the syringes to a lever so that it can raise and lower the lever</i> -<i>explore the effect of moving the syringe closer to or further from the pivot point</i></p> <p>Provide children with components for making pneumatic systems, pieces of card and plastic sheet with temporary fixings <i>eg masking tape</i>. Ask them to make a pneumatic system and explore using it with the other materials to make something move.</p> <p>Discuss the outcomes and highlight good ideas and solutions to any problems encountered.</p>	
4	<p>to work as a team to choose an idea according to logistical constraints of materials, time, size</p> <p>to plan through discussion</p>	<p>Design and Make Assignment:</p> <p>Design and make a monster with moving parts controlled by pneumatic systems</p>	<p>Arrange the children into groups of between two and four children. Explain to each group that their task is to design and make a monster with parts controlled by pneumatic systems.</p> <p>Discuss with the children who the monster is for. What does it have to do? Discuss possible ideas for moving parts <i>eg moving wings, opening and closing mouth</i> and for ways of making <i>eg using reclaimed materials for the structure</i>.</p> <p>Ask each team to brainstorm ideas, recording them in words and sketches. <i>What could you do? How could you do this? What do you need to know? What does this product need to do?</i> Ask each team to present their idea to the rest of the class, explaining what they are going to make, what they will use and what it will look like.</p> <p>Ask each team to produce a list of the materials and tools they expect to use. Remind them that they can bring in reclaimed materials from home.</p>	<p>Mixed ability groups.</p>
5	<p>to work safely and accurately with a range of simple hand tools</p> <p>to think about their ideas as they make progress and be willing to change things if this helps them to improve their work</p>	<p>Design and Make Assignment:</p>	<p>Allow each group plenty of time to create their 'moving monster'. This may take a whole afternoon or more.</p> <p>At the beginning ask each group: <i>What will you need? Where will you work? Who will do what? What will you need to do first?</i></p> <p>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.</p>	
6	<p>to evaluate as a team</p>	<p>Design and Make Assignment:</p>	<p>Ask the children to evaluate how they went about their work and the strengths and weaknesses of the finished product.</p> <p>Ask them to record their work in storyboard form showing how they made their monster.</p>	

Vocabulary	Resources	VAK	Curriculum Links	Learning Outcomes
<p>designing eg brainstorm, suggestion, evaluate, ideas, constraints, appropriate, graph, data, sort, order, set, label, title, list, probable, possible, impossible</p> <p>making eg planning, storyboard, components, fixing, tubing, syringe, attaching, finishing</p> <p>knowledge and understanding eg control, pneumatic system, pressure, inflate, deflate, input, output, pump, hinge, fastest, slowest, often, always, sometimes, never</p>	<p>Eg: recorder, whistle, bicycle pump, balloon, inflatable swimming aids, foot pump for inflating an air bed, coiled party blowers</p> <p>Tubing, syringes, balloons, washing-up liquid bottles</p> <p>Images of monsters and creatures that move</p>		<p>Speaking and listening:</p> <p>Teach discussion skills to help children reach an agreement about what is to be done and so that they can evaluate their work <i>eg developing a list of key questions to ask themselves, teaching phrases like 'could have' and 'if' to signal tentative thoughts</i></p> <p>Music:</p> <p>This links to the unit 'Robots and Monsters' in our scheme of work</p>	<p>explain how simple pneumatic systems work using appropriate vocabulary</p> <p>are familiar with techniques for making simple pneumatic systems</p> <p>discuss how products have been made, and how models replicate real-life features</p>
	<p>Tubing, syringes, balloons, washing-up liquid bottles, levers</p>			<p>construct effective pneumatic systems</p> <p>know of techniques for fixing components</p> <p>investigate ways of using their pneumatic systems with other materials to control movement</p>
				<p>work together on an appropriate idea generated through brainstorming and discussion of the constraints</p> <p>plan the stages of their work and record these at the end of the project in a storyboard</p>
	<p>Tubing, syringes, balloons, washing-up liquid bottles, levers</p> <p>Reclaimed materials</p> <p>Tools</p>			<p>work safely and accurately with a range of simple hand tools</p>
	<p>Storyboards</p>			<p>know how to evaluate their product as a team and suggest improvements</p>

DESIGN AND TECHNOLOGY

Name:

Date:

DESIGN BRIEF:

DESIGN CRITERIA:

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WHAT WILL YOU NEED?

(tools and materials)

HOW WILL YOU MAKE IT?

(use words and pictures to show how it is made)

EVALUATION: (Does it meet the design criteria?

Have you tested it? What does the user think of the product?

What could you do to improve/modify your product?)