

Year: 3/4 Subject: D.T PoS: Pneumatics		Topic Question/Title: Creatures in a box.	Term – Autumn 1	Curriculum - A
Prior Knowledge Children in year 2, the children will have looked at simple mechanisms using sliders and levers, they will have experience using paper and card to make simple flaps and hinges. They will also have an understanding that different mechanisms produce different types of movement. Children in year 3, will have looked previously at simple mechanisms, such as levers, sliders and simple structures. They have learn how materials can be joined to allow movement and how to join and combine materials using simple tools and techniques.		Key Vocabulary components, fixing, attaching, tubing, syringe, plunger, split pin, paper fastener pneumatic system, input movement, process, output movement, control, compression, pressure, inflate, deflate, pump, seal, air-tight linear, rotary, oscillating, reciprocating.	Outcome Designing, making and evaluating a moving ‘creature in a box’ toy for small children.	
Future Learning In year 5/6 children will continue their learning about structures, mechanisms and using a range of materials to achieve these goals. They will look at understanding that mechanical and electrical systems have an input, process and an output. They will understand how gears and pulleys can be used to speed up, slow down or change the direction of movement.		Stimulus Look at a range of different toys that exist already for example a jack in a box.	World of Work Engineer, toy designer	
National Curriculum PoS Design - To 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 - To generate, develop, model and communicate their ideas through discussion, annotated sketches, cross-sectional and exploded diagrams, prototypes, pattern pieces and computer-aided design Make - To select from and use a wider range of tools and equipment to perform practical tasks [for example, cutting, shaping, joining and finishing], accurately. - To 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. Evaluate - To investigate and analyse a range of existing products - To evaluate their ideas and products against their own design criteria and consider the views of others to improve their work - To understand how key events and individuals in design and technology have helped shape the world Technical Knowledge - To understand and use mechanical systems in their products [for example, gears, pulleys, cams, levers and linkages]	Key Knowledge		Possible evidence	
	Technical knowledge and understanding - Understand and use pneumatic mechanisms. - Know and use technical vocabulary relevant to the project.		Discuss with children the purpose of the products they will be designing and making and who the products will be for. Ask the children to generate a range of ideas, encouraging creative responses. Agree on design criteria that can be used to guide the development and evaluation of the children’s products. - Using annotated sketches and prototypes, ask the children to develop, model and communicate their ideas. - Ask the children to consider the main stages in making before assembling high quality products, drawing on the knowledge, understanding and skills learnt through IEAs and FTs. - Evaluate the final products against the intended purpose and with the intended user, where safe and practical, drawing on the design criteria previously agreed.	
	Application of Key Skills		Possible evidence	
	Designing - Generate realistic and appropriate ideas and their own design criteria through discussion, focusing on the needs of the user. - Use annotated sketches and prototypes to develop, model and communicate ideas Making - Order the main stages of making. - Select from and use appropriate tools with some accuracy to cut and join materials and components such as tubing, syringes and balloons. - Select from and use finishing techniques suitable for the product they are creating. Evaluating - Investigate and analyse books, videos and products with pneumatic mechanisms. - Evaluate their own products and ideas against criteria and user needs, as they design and make		- Children investigate, analyse and evaluate familiar objects that use air to make them work e.g. bicycle pump, balloon, inflatable swimming aids, foot pump for inflating an air bed. What does the air do? How has it been used in the design of these products? - Construct a simple pneumatic system by joining a balloon to 5mm tubing and then to a washing-up liquid bottle. What happens to the air when you squeeze the bottle? What happens when you let go? Can you lift a soft toy or a note pad using a balloon? - Demonstrate lifting an object and ask the children to think about ways in which this might be used in a product. Who might it be for? What is its purpose? What part moved and how did it move? - Demonstrate a range of pneumatic mechanisms using prepared teaching aids including two syringes joined by plastic tubing; three syringes connected using a T-connector and using different sized syringes. Ask the children: What happens when the plunger of one syringe is pressed in? Why do the syringes move at different speeds? Note: take care as the syringe may come out with force. Discuss why, when pressing a large syringe, it can take time and feel ‘squishy’ before the smaller syringe is moved.	

Year: 3/4 Subject: D.T PoS: Electrical systems		Topic Question/Title: Shine bright like a diamond		Term - Spring 1	Curriculum - A 
Prior Knowledge Last half term, the children will have constructed a simple series electrical circuit in science, using bulbs, switches and buzzers. In previous D.T units they will have cut and joined a variety of construction materials, such as wood, card, plastic, reclaimed materials and glue. They will have also used the D.T skills of exploring, designing, making and evaluating.			Key Vocabulary series circuit, fault, connection, toggle switch, push-to-make switch, push-to-break switch, battery, battery holder, bulb, bulb holder, wire, insulator, conductor, crocodile clip		Outcome Designing, making and evaluating a night light for a brother, sister or friend.
Future Learning In year 5/6 children will continue their learning and understanding into different units. Each unit will build on the main parts of D.T including designing, making evaluating. They will look further into electricity during their units of mechanical systems using gears and pulleys. They will also look at cams using electricity to make them work. They will design, make and evaluate different projects incorporating electrical circuits.			Stimulus Various types of lights First hand experiences (enrichment)		World of Work Electrical engineer, electrician, designer
National Curriculum PoS <u>Design</u> To 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 To generate, develop, model and communicate their ideas through discussion, annotated sketches, cross-sectional and exploded diagrams, prototypes, pattern pieces and computer-aided design <u>Make</u> To select from and use a wider range of tools and equipment to perform practical tasks [for example, cutting, shaping, joining and finishing], accurately To 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 <u>Evaluate</u> To investigate and analyse a range of existing products To evaluate their ideas and products against their own design criteria and consider the views of others to improve their work To understand how key events and individuals in design and technology have helped shape the world <u>Technical knowledge</u> To understand and use electrical systems in their products [for example, series circuits incorporating switches, bulbs, buzzers and motors]	Key Knowledge		Possible evidence		
	- To gather information about needs and wants, and develop design criteria to inform the design of products that are fit for purpose, aimed at particular individuals or groups. - To understand and use electrical systems in their products, such as series circuits incorporating switches, bulbs and buzzers. - To apply their understanding of computing to program and control their products. - To know and use technical vocabulary relevant to the project.		- Recap with the children how to make manually controlled, simple series circuits with batteries and different types of switches, bulbs and buzzers. Discuss which of the components in the circuit are input devices e.g. switches, and which are output devices e.g. bulbs and buzzers. - Discuss, investigate and, where practical, disassemble different examples of relevant battery-powered products, including those which are commercially available.		
	Application of Key Skills		Possible evidence		
- Generate, develop, model and communicate realistic ideas through discussion and, as appropriate, annotated sketches, cross-sectional and exploded diagrams. - Order the main stages of making. - Select from and use tools and equipment to cut, shape, join and finish with some accuracy. - Select from and use materials and components, including construction materials and electrical components according to their functional properties and aesthetic qualities. - Investigate and analyse a range of existing battery-powered products. • Evaluate their ideas and products against their own design criteria and identify the strengths and areas for improvement in their work.		- Ask children to investigate examples of switches, including those which are commercially available, which work in different ways e.g. push-to-make, push-to-break, toggle switch. Let the children use them in simple circuits. - Ask the children to make a variety of switches by using simple classroom materials e.g. card, corrugated plastic, aluminium foil, paper fasteners and paper clips. Encourage children to make switches that operate in different ways e.g. when you press them, when you turn them, when you push them from side to side. Ask the children to test their switches in a simple series circuit. - Using annotated sketches, cross-sectional and exploded diagrams, as appropriate, ask the children to develop, model and communicate their ideas. - Ask the children to consider the main stages in making and testing before assembling high quality products, drawing on the knowledge, understanding and skills learnt through IEAs and FTs. - Evaluate throughout and the final products against the intended purpose and with the intended user, drawing on the design criteria previously agreed.			

Year: 3/4 Subject: DT PoS: Structures - Shell structures		Topic Question/Title: Party pieces		Term - Summer 1	Curriculum - A 
<u>Prior Knowledge</u> Prior learning • Experience of using different joining, cutting and finishing techniques with paper and card. • A basic understanding of 2-D and 3-D shapes in mathematics and the physical properties and everyday uses of materials in science.		Key Vocabulary shell structure, net, cube, cuboid, prism, vertex, edge, face, length, width, breadth, capacity, marking out, scoring, shaping, tabs, adhesives, joining, assemble, accuracy, material, stiff, strong, reduce, reuse, recycle, corrugating, ribbing, laminating, font, lettering, text, graphics, decision,		Outcome Designing, making and evaluating packaging for a gift for a family member	
<u>Future Learning</u> • Investigate and evaluate a range of existing frame structures. • Competently select from and use appropriate tools to accurately measure, mark out, cut, shape and join construction materials to make frameworks. • Understand how to strengthen, stiffen and reinforce 3-D frameworks. • Critically evaluate their products against their design specification, intended user and purpose, identifying strengths and areas for development, and carrying out appropriate tests.		Stimulus A variety of party boxes of all shapes and designs First hand experiences (enrichment) Visit from a party planner		World of Work Architect, designer,	
<u>National Curriculum PoS</u> Designing • To 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 • To generate, develop, model and communicate their ideas through discussion, annotated sketches, cross-sectional and exploded diagrams, prototypes, pattern pieces and computer-aided design Making • To select from and use a wider range of tools and equipment to perform practical tasks [for example, cutting, shaping, joining and finishing], accurately • To 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 Evaluating • To investigate and analyse a range of existing products • To evaluate their ideas and products against their own design criteria and consider the views of others to improve their work • To understand how key events and individuals in design and technology have helped shape the world Technical knowledge • To apply their understanding of how to strengthen, stiffen and reinforce more complex structures		Key Knowledge <u>Technical knowledge and understanding</u> • Develop and use knowledge of how to construct strong, stiff shell structures. • Develop and use knowledge of nets of cubes and cuboids and, where appropriate, more complex 3D shapes. • Know and use technical vocabulary relevant to the project.		Possible evidence • Children investigate a collection of different shell structures including packaging. • Children take a small package apart identifying and discussing parts of a net including the tabs. • Develop and use knowledge of how to construct strong, stiff shell structures. • Develop and use knowledge of nets of cubes and cuboids and, where appropriate, more complex 3D shapes. • Know and use technical vocabulary relevant to the project.	
		Application of Key Skills		Possible evidence	
		<u>Designing</u> • Generate realistic ideas and design criteria collaboratively through discussion, focusing on the needs of the user and purpose of the product. • Develop ideas through the analysis of existing products and use annotated sketches and prototypes to model and communicate ideas. <u>Making</u> • Order the main stages of making. • Select and use appropriate tools to measure, mark out, cut, score, and shape and assemble with some accuracy. • Explain their choice of materials according to functional properties and aesthetic qualities. • Use finishing techniques suitable for the product they are creating. <u>Evaluating</u> • Investigate and evaluate a range of existing shell structures including the materials, components and techniques that have been used. • Test and evaluate their own products against design criteria and the intended user and purpose.		• Select and use appropriate tools and software to measure, mark out, cut, score, shape and assemble with some accuracy. • Produce a design that appeals to the user. • Children to identify the main stages of making and the appropriate tools and skills they learnt through focused tasks. • Party box fits criteria and can hold a cupcake and a drink. • Make nets out of card, joining flat faces with masking tape to create 3-D shapes. • Use the techniques of scoring, cutting out and assembling using pre-drawn nets. • Use different ways of stiffening and strengthening their shell structures e.g. folding and shaping, corrugating, ribbing, laminating. • Use computer-aided design (CAD) software to design the net, text and graphics for their products according to purposes. • Evaluate throughout and the final products against the intended purpose and with the intended user, where safe and practical, drawing on the design criteria previously agreed.	