

Design and Technology Knowledge and Skills Progression Map

	Year 3		Year 4		Year 5		Year 6	
National Curriculum	Structures: Photo Frames (Autumn 2)	Mechanical: Moving pictures (Summer 2)	*Textiles: Seasonal Stockings (Autumn 2) *See additional document	Structures: Bridges (Summer 2)	Electrical Systems/Structures: Moving Vehicles (Autumn 2)	*Textiles: Pencil Cases (Summer 2) *See additional document for more detail of skill progression	Mechanical: Moving Toys (Spring 2)	Digital World: 3D printer Programming (Summer 2)
<u>Design</u>								
Progression evidenced through increasing knowledge of researching and designing different products, testing prototypes and adapting ideas. .								
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	Analyse a range of photo frames and other structures to research how structures are free-standing. Research how to make structures free-standing through testing of different shapes, materials and joining techniques. Use research to identify how appearance and structure of a photo frame would appeal to different audiences. Use research to develop design	Analyse a range of pop-up books/cards to research range of moving parts and methods. Research how to make materials move in different ways through testing of different materials and joining techniques. Use research to identify how appearance and moving parts of a card would appeal	Analyse a range of stockings to research different designs and joining methods. Research how to make materials join effectively by testing different sewing styles for strength and appearance. Use research to identify how appearance of a stocking would appeal to different audiences. Use research to develop design criteria for own stocking.	Analyse a range of bridge images to research different designs bridge designs. Research how to make structures strong through testing of different shapes, materials and joining techniques. Use research to identify how structure of a bridge is essential to users. Use research to develop	Research how a motor and pulley uses an electrical circuit to make a car move through creating electrical circuits. Research how to make structures strong through testing of different shapes, materials and joining techniques. Use research to identify how appearance of a car would appeal to different audiences. Use research to develop design criteria for group car	Analyse a range of pencil cases to research different designs, functions and joining methods. Research how to make materials join effectively by testing different sewing styles for strength and appearance. Use research to identify how appearance of a appearance and functions of a pencil case would appeal to different audiences. Use research to develop design criteria for own pencil case.	Analyse a range of moving toys to research methods how different parts move. Research how to make materials move in different ways/directions through testing of different techniques. Use research to identify how appearance of toys would appeal to different audiences. Use research to develop design criteria for own moving toy.	Analyse a range of key rings to research materials used and joining techniques. Research and explore how computer aided design packages can be used in the design process and can be linked to 3D printers. Use research to identify how appearance of a key ring appeals to different audiences.

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	criteria for own photo frames.	to different audiences. Use research to develop design criteria for own pop-up card		design criteria for group bridge				Use research to develop design criteria for own key rings.
Generate, develop, model and communicate their ideas through discussion, annotated sketches, cross-sectional and exploded diagrams, prototypes, pattern pieces and computer-aided design	Generate and develop annotated sketches of photo frames With support, create prototype photo frames to analyse effectiveness of structure to stand independently. Further develop/adapt designs using outcomes from prototype and discussions with others.	Generate and develop annotated sketches of pop-up card With support, create prototypes of pop-up card to analyse effectiveness of moving parts. Further develop/adapt designs using outcomes from prototype and discussions with others.	Generate and develop annotated sketches and exploded diagrams stockings With support, create prototypes of stocking using pattern pieces to analyse effectiveness of design and function. Further develop/adapt designs using outcomes from prototype and discussions with others.	Generate and develop annotated sketches of bridges In groups, create prototypes of bridges to analyse strength of structure Further develop/adapt designs using outcomes from prototype and discussions with others.	Generate and develop cross-sectional diagrams of moving cars. In groups, create prototypes of car to analyse effectiveness of shape and structure of car. Further develop/adapt designs using outcomes from prototype and discussions with others.	Generate and develop annotated sketches and exploded diagrams of pencil cases Create prototypes of pencil case using pattern pieces to analyse effectiveness of design and functions Further develop/adapt designs using outcomes from prototype and discussions with others.	Generate and develop annotated sketches and cross-sectional diagrams of moving toys In pairs, create prototypes of moving toy to test effectiveness of moving parts. Create prototypes of pop-up card to analyse effectiveness of moving parts. Further develop/adapt designs using outcomes from prototype and discussions with others.	Generate and develop sketch of key rings Generate and develop computer-aided designs of key rings using initial sketch Adapt/further develop initial CAD designs after first attempts

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Make Progression shown through increasing range of tools, equipment, materials and components to select from and use.								
Select from and use a wider range of tools and equipment to perform practical tasks [for example, cutting, shaping, joining and finishing], accurately	Select most suitable tool to cut card to create frame. With support, use scissors, sellotape and gluestick to cut card, and a range of colouring pens/pencils to improve aesthetics.	Select most suitable tool to cut card and join pieces of moving card. With support, use scissors to cut card and split pins to join pieces.	Select most suitable needles and threads to join pieces of stocking. Select most suitable equipment and joining methods for aesthetics. With support, use needle and thread to join material, and glue for additional finishing (e.g. glue on stars)	Select most suitable tools for cutting and joining straws to make bridges. In groups, use scissors and sellotape/ making tape to cut and join straws.	Select most suitable electrical components to build a circuit with a working bulb. In groups, select most suitable equipment to cut wood and card, and to join pieces. In groups, use saws, glue guns (adult support), pritt stick and sellotape to cut and join materials.	Select most suitable needles and threads to join pieces of stocking. Select most suitable equipment and joining methods for additional functions (e.g. zips/buttons) and aesthetics. Use needle and thread to join material, and zips/buttons/ Velcro/ glue for additional functions/ aesthetics.	Select most suitable tools to cut dowel and card and to join pieces. Use saws, glue guns, pritt stick and sellotape to cut and join materials.	
Select from and use a wider range of materials and components, including construction materials, textiles and	Select from and use paper or card to create frame and stand of photo frame. Select from crayons, felt	Select from and use paper or card to create card and moving parts of pop-up. Select from and use crayons,	Select from felt or cotton to create stocking. Select from and use felt tips, fabric paints and other objects (e.g.	Select from and use newspaper rolls, paper straws or dowel to create bridge	Select from and use paper, card, dowel, paper straws or wood to create, base, frame (chassis) and exterior of car.	Select from felt, cotton or other materials to create stocking. Select from and use stencils, rollers, paint, felt tips, fabric paint,	Select from and use paper, card, dowel, paper straws or wood to create mechanism of moving toy.	

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ingredients, according to their functional properties and aesthetic qualities	tips or other materials (e.g. glitter/stars...) to improve aesthetic quality of frame.	felt tips or other materials (e.g. glitter/stars...) to improve aesthetic quality of frame.	plastic stars) to improve aesthetics.		Select from and use crayons, felt tips paints or other materials to improve aesthetics of car	additional material types and other objects (e.g. plastic stars) to improve aesthetics.	Select from and use crayons, felt tips paints or other materials to improve aesthetics of toy	
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Evaluate Progression shown through increasing knowledge of products and complexity of reasoning								
Investigate and analyse a range of existing products	Investigate and analyse photo frames from the present and the past (including those made by previous students).	Investigate and analyse pop-up books and cards from the present and the past (including those made by previous students).	Investigate and analyse Christmas stockings from the present and the past (including those made by previous students).	Investigate and analyse bridges from the present and the past (including those made by previous students).	Investigate and analyse cars (real and toy) from the present and the past (including those made by previous students).	Investigate and analyse pencil cases from the present and the past (including those made by previous students).	Investigate and analyse moving toys from the present and the past (including those made by previous students).	Investigate and analyse key rings (and other objects made using 3D printer) from the present and the past (including those made by previous students).
Evaluate their ideas and products against their own design criteria and consider the	Evaluate final photo frame against own design and design criteria.	Evaluate final pop-up card against own design and design criteria.	Evaluate final stocking against own design and design criteria, identifying an	Evaluate final bridge against own design and design criteria, identifying an area that could be improved.	Evaluate final car against own design and design criteria, identifying specific successes and	Evaluate final pencil case against own design and design criteria, identifying specific successes and	Evaluate final toy against own design and design criteria, giving reasons for specific successes and	Evaluate final key ring against own design and design criteria, giving reasons for specific

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views of others to improve their work	Consider views of others when evaluating their own frame.	Consider views of others when evaluating their own card.	area that could be improved. Consider views of others when evaluating how their stocking could be improved.	Consider views of others when evaluating how their bridge could be improved.	improvements needed. Consider views of others when evaluating successes and improvements needed for their car.	improvements needed. Consider views of others when evaluating successes and improvements needed for their pencil case.	improvements needed. Consider views of others when giving reasons for successes and improvements for their pencil case.	successes and improvements needed. Consider views of others when giving reasons for successes and improvements for their key ring.
understand how key events and individuals in design and technology have helped shape the world	Understand that the first picture frames were created in Ancient Egypt and that we know this as they were discovered in tombs.	Understand that British illustrator S. Louis Giraud, was a key figure in the world of pop-up books.	Understand that Birmingham has had an established role in the textiles industry since the reign of King Henry II in 1166.	Understand that the Morandi bridge disaster in Italy was a key event in evaluating the strength of certain designs.	Understand the role Tesla has played in the production and popularity of electric cars. Understand how climate change has encouraged car buyers to explore electric vehicles.	Understand that Faith Ringgold , Virgil Abloh and Coco Chanel are influential fashion designers of the 20 th and 21 st centuries	Understand that Frank Hornby was a key individual in the invention of toys using engineering principles.	Know that Chuck Hull was the inventor of the 3D printer and understands its benefits in the modern world
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<u>Technical Knowledge</u> Progression shown through increasing knowledge and understanding.								
apply their understanding of how to strengthen, stiffen and reinforce more	Demonstrate how to strengthen stand of photo frame for			Demonstrate how to strengthen and stiffen bridge to allow more	Demonstrate how to reinforce chassis on car for greater stability			

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complex structures	greater stability.			weight and stability				
Understand and use mechanical systems in their products [for example, gears, pulleys, cams, levers and linkages]		Demonstrate how to use levers and linkages					Demonstrate how to use a cam with other equipment to make a toy move up and down	
Understand and use electrical systems in their products [for example, series circuits incorporating switches, bulbs, buzzers and motors]			Electrical circuit skills developed in Science curriculum	Electrical circuit skills developed in Science curriculum	Demonstrate how to use motor, a pulley and an electrical circuit to make a car move.		Electrical circuit skills developed in Science curriculum	Electrical circuit skills developed in Science curriculum
Apply their understanding of computing to program, monitor and control their products.	Programming skills developed in Computing curriculum	Programming skills developed in Computing curriculum	Programming skills developed in Computing curriculum	Programming skills developed in Computing curriculum	Programming skills developed in Computing curriculum	Y5 Computing: SPHERO UNIT – program, monitor and control	Programming skills developed in Computing curriculum	Y6 Computing: Demonstrate how to program 3D printer using CAD software.

*See additional textile progression document for further details of progression from Y4 to Y5

See separate cooking progression for details of cooking progression from Y3-6