HT Progression of skills and knowledge – DT

Structures

Year group		**1**	**2**	**3**	**4**	**5**	**6**
Topic							
Kapow DT Unit		Stable Structure	Baby bear's chair	Product Packaging	Helmets	Building a bridge across the River Nile	Playgrounds
Skills	Design	• Beginning to recognise how products and designs in the world around us solve certain needs. • Considering who they are designing for – identifying the user. • Stating what they intend to make and why – identifying the purpose. • Talking about ideas, with purpose and user in mind. • Using basic drawing skills to communicate ideas.	• Generating and communicating ideas using sketching and modelling. • Learning about different types of structures, found in the natural world and in everyday objects.	• Creating simple design criteria that outline basic functionality and appeal to individual users or target audiences. • Beginning to use 2D CAD software to communicate their ideas.	• Creating simple design criteria that outline basic functionality and appeal to individual users or target audiences. • Beginning to use 2D CAD software to communicate their ideas. • Developing drawing and sketching skills with a focus on clarity and simplicity. • Developing designs by adding detail and justifications about materials, tools, methods. • Beginning to recognise the benefit of a range of diagram types or prototypes to communicate ideas. (eg. sketches, cross-sectional diagram, thumbnail sketches and exploded diagrams)	• Designing a stable structure that is able to support weight. • Creating a frame structure with a focus on triangulation.	• Designing a playground featuring a variety of different structures, giving careful consideration to how the structures will be used, considering effective and ineffective designs.

HT Progression of skills and knowledge – DT

	Make	Choosing between a small number of materials, ingredients or components. Refining their grip to cut competently and confidently. Cutting straight and evenly spaced lines. Beginning to cut large shapes and thicker materials like card.	• Making a structure according to design criteria. • Creating joints and structures from paper/card and tape. • Building a strong and stiff structure by folding paper.	• Creating accurate shapes from templates. • Cutting out more complex shapes accurately. • Choosing shapes to suit the function of a product.	• Selecting materials, components or ingredients based on their form as well as their functional properties. • Following detailed safety instructions. • Using a ruler as a measuring tool with increasing accuracy. • Cutting out more complex shapes accurately. • Handle different sizes and types of scissors with confidence. • Creating accurate shapes from templates. • Painting or colouring precisely to improve the finish. • Making facades from a range of materials.	• Making a range of different shaped beam bridges. • Using triangles to create truss bridges that span a given distance and support a load. • Building a wooden bridge structure. • Independently measuring and marking wood accurately. • Selecting appropriate tools and equipment for particular tasks. • Using the correct techniques to saws safely. • Identifying where a structure needs reinforcement and using card corners for support. • Explaining why selecting appropriating materials is an important part of the design process. • Understanding basic wood functional properties.	• Building a range of play apparatus structures drawing upon new and prior knowledge of structures. • Measuring, marking and cutting wood to create a range of structures. • Using a range of materials to reinforce and add decoration to structures.
	E v	Discussing existing products, saying what they like about them. Comparing two products and discussing which is better for a specific purpose. Saying what they like about their peers' designs and products. Accepting feedback and understanding it is meant to improve their work.	• Exploring the features of structures. • Comparing the stability of different shapes. • Testing the strength of own structures. • Identifying the weakest part of a structure. • Evaluating the strength, stiffness and stability of own structure.	• Explaining why they think certain aspects of a peer's design are effective or why they suggested specific improvements. • Investigating and analysing a range of existing products by looking at their functionality and appeal. Reflecting on feedback to decide if and how it could be used to improve future iterations.	• Evaluating their designs by comparing them against design criteria and considering feedback from peers to suggest improvements. • Evaluating how effective their chosen materials and tools were in fulfilling the design brief. • Explaining why they think certain aspects of a peer's design are effective or why they suggested specific improvements. • Reflecting on feedback to decide if and how it could be used to improve future iterations.	• Adapting and improving own bridge structure by identifying points of weakness and reinforcing them as necessary. • Suggesting points for improvements for own bridges and those designed by others.	• Improving a design plan based on peer evaluation. • Testing and adapting a design to improve it as it is developed. • Identifying what makes a successful structure.

HT Progression of skills and knowledge – DT

Knowledge	Technical	Recognising that different structures are used for different purposes. Exploring the features of structures. Describing structures as buildings or freestanding structures. Making stable structures from card. Creating supporting structures to aid stability. Using stable objects like cylinders to create structures.	• To know that shapes and structures with wide, flat bases or legs are the most stable. • To understand that the shape of a structure affects its strength. • To know that materials can be manipulated to improve strength and stiffness. • To know that a structure is something which has been formed or made from parts. • To know that a 'stable' structure is one which is firmly fixed and unlikely to change or move. • To know that a 'strong' structure is one which does not break easily. • To know that a 'stiff' structure or material is one which does not bend easily.	• Beginning to understand how different structures are built. • Strengthening structures by ribbing. • Constructing a range of 3D shapes	• Beginning to understand how different structures are built. • To stiffen structures by layering. • To strengthen structures by layering materials (lamination). • To strengthen structures by ribbing.	• To understand some different ways to reinforce structures. • To understand how triangles can be used to reinforce bridges. • To know that properties are words that describe the form and function of materials. • To understand why material selection is important based on properties. • To understand the material (functional and aesthetic) properties of wood.	• To know that structures can be strengthened by manipulating materials and shapes.
	Additional	• To know that a client is the person I am designing for. • To know that design criteria is a list of points to ensure the product meets the clients needs and wants.	• To know that natural structures are those found in nature. • To know that man-made structures are those made by people	• To know that creating accurate shapes improves how they look and sometimes their function. • To know good suggestions help give better feedback. • To know that they can choose to use feedback or not. • To know that a shell structure is a hollow shape with a thin outer layer. • To know that 3D shapes can form structures. • To know structures can be strengthened by manipulating materials and shapes.	• To know that aesthetics are how a product looks. • To know that a product's function means its purpose. • To understand that the target audience means the person or group of people a product is designed for.	• To understand the difference between arch, beam, truss and suspension bridges. • To understand how to carry and use a saw safely.	• To understand what a 'footprint plan' is. • To understand that in the real world, design, can impact users in positive and negative ways. • To know that a prototype is a cheap model to test a design idea.

Mechanisms/mechanical systems

HT Progression of skills and knowledge – DT

Year		**1**	**3**	**4**	**5**
Topic					
Kapow DT Unit		Wheels and Axles-pull along toy	Making a moving monster	Making a slingshot car	Making a pop-up book
Skills	Design	Thinking about what others might want from a design. ● Considering who they are designing for - by identifying the user. ● Stating what they intend to make and why - by identifying the purpose. ● Talking about ideas with purpose and user in mind. ● Talking about existing products when generating ideas. ● Using basic drawing skills to communicate ideas.	• Creating a class design criteria for a moving mammoth. • Designing a moving mammoth for a specific audience in accordance with a design criteria.	• Designing a shape that reduces air resistance. • Drawing a net to create a structure from. • Choosing shapes that increase or decrease speed as a result of air resistance. • Personalising a design.	• Designing a pop-up book which uses a mixture of structures and mechanisms. • Naming each mechanism, input and output accurately. • Storyboarding ideas for a book.
	Make	● Planning more than one step ahead. ● Choosing between a small number of materials, ingredients or components. ● Explaining their choices based on personal experiences. ● Explaining in simple terms why certain tools must be handled carefully. ● Following and recalling simple safety instructions. ● Finding the middle of an object. ● Refining their grip to cut competently and confidently. ● Cutting straight lines and evenly spaced lines. ● Beginning to cut large shapes and thicker materials like card. ● Puncturing holes. ● Recognising the edges of paper and card need to be stuck firmly using a glue stick. ● Using tools, like scissors, to create shapes. ● Beginning to cut large shapes and thicker materials like card. ● Beginning to use controlled painting or colouring techniques to finish a product. ● Adding texture to create visual interest.	• Making linkages using card for levers and split pins for pivots. • Experimenting with linkages adjusting the widths, lengths and thicknesses of card used. • Cutting and assembling components neatly	• Measuring, marking, cutting and assembling with increasing accuracy. • Making a model based on a chosen design.	• Following a design brief to make a pop-up book, neatly and with focus on accuracy. • Making mechanisms and/or structures using sliders, pivots and folds to produce movement. • Using layers and spacers to hide the workings of mechanical parts for an aesthetically pleasing result.

HT Progression of skills and knowledge – DT

	Evaluate	Discussing existing products, saying what they like about them. ● Comparing two products and discussing which is better for a specific purpose. ● Discussing how their products could be improved based on personal preferences. ● Comparing their finished products with their original designs. ● Saying what they like about their peers' designs and products. ● Accepting feedback and understanding it is meant to improve their work.	• Evaluating own designs against design criteria. • Using peer feedback to modify a final design.	• Evaluating the speed of a final product based on: the effect of shape on speed and the accuracy of workmanship on performance.	• Evaluating the work of others and receiving feedback on own work. • Suggesting points for improvement.
Knowledge	Technical	● Recognising and exploring everyday objects that have mechanisms. ● Many things that move have parts inside to help them work. ● Mechanisms usually limit unwanted movement. ● An axle allows the wheel to turn without falling off.	• To know that mechanisms are a collection of moving parts that work together as a machine to produce movement. • To know that there is always an input and output in a mechanism. • To know that an input is the energy that is used to start something working. • To know that an output is the movement that happens as a result of the input. • To know that a lever is something that turns on a pivot. • To know that a linkage mechanism is made up of a series of levers.	• To understand that all moving things have kinetic energy. • To understand that kinetic energy is the energy that something (object/person) has by being in motion. • To know that air resistance is the level of drag on an object as it is forced through the air. • To understand that the shape of a moving object will affect how it moves due to air resistance.	• To know that mechanisms control movement. • To understand that mechanisms can be used to change one kind of motion into another. • To understand how to use sliders, pivots and folds to create paper-based mechanisms.

HT Progression of skills and knowledge – DT

	Additional	● To know that the 'user' is the person who will use the product. ● To know that different users may want different things from a design. ● To know that who they are designing for makes a difference to what they design. ● To know that the purpose is what something is for. ● To know that existing products can help when deciding what to design. ● To know that drawings are a way to explain ideas. ● To know that a plan is deciding what to do first and next. ● To know the names of common pieces of equipment. ● To know that following instructions helps with safety. ● To know that different materials can be shaped by different tools. ● To know that their ideas or products can be made better. ● To know that their final product might be different to their original idea. ● To know that their ideas can make someone else's work better. ● To know that other people's ideas can help make their work better.	• To know some real-life objects that contain mechanisms.	• To understand that products change and evolve over time. • To know that aesthetics means how an object or product looks in design and technology. • To know that a template is a stencil you can use to help you draw the same shape accurately. • To know that a birds-eye view means a view from a high angle (as if a bird in flight). • To know that graphics are images which are designed to explain or advertise something. • To know that it is important to assess and evaluate design ideas and models against a list of design criteria.	• To know that a design brief is a description of what I am going to design and make. • To know that designers often want to hide mechanisms to make a product more aesthetically pleasing.

Electrical systems & digital world (KS2 only)

Year	**4**	**5**
Topic		
Kapow DT Unit	Torches	Electrical & Programmable systems: Fairground ride using Crumbl kit

HT Progression of skills and knowledge – DT

Skills	Design	• Designing a torch, giving consideration to the target audience and creating both design and success criteria focusing on features of individual design ideas.	• Identifying factors that could be changed on existing products and explaining how these would alter the form and function of the product. • Developing design criteria based on findings from investigating existing products. • Developing design criteria that clarifies the target user.
	Make	• Making a torch with a working electrical circuit and switch. • Using appropriate equipment to cut and attach materials. • Assembling a torch according to the design and success criteria.	• Making a functional series circuit, incorporating a motor. • Constructing a product with consideration for the design criteria. • Breaking down the construction process into steps so that others can make the product.
	Evaluat	• Evaluating electrical products. • Testing and evaluating the success of a final product.	• Carry out a product analysis to look at the purpose of a product along with its strengths and weaknesses. • Determining which parts of a product affect its function and which parts affect its form. • Analysing whether changes in configuration positively or negatively affect an existing product. • Peer evaluating a set of instructions to build a product.
Knowledge	Technical	• To understand that electrical conductors are materials which electricity can pass through. • To understand that electrical insulators are materials which electricity cannot pass through. • To know that a battery contains stored electricity that can be used to power products. • To know that an electrical circuit must be complete for electricity to flow. • To know that a switch can be used to complete and break an electrical circuit.	• To know that series circuits only have one direction for the electricity to flow. • To know when there is a break in a series circuit, all components turn off. • To know that an electric motor converts electrical energy into rotational movement, causing the motor's axle to spin. • To know a motorised product is one which uses a motor to function.
	Add	• To know the features of a torch: case, contacts, batteries, switch, reflector, lamp, lens. • To know facts from the history and invention of the electric light bulb(s) - by Sir Joseph Swan and Thomas Edison.	• To know that product analysis is critiquing the strengths and weaknesses of a product. • To know that 'configuration' means how the parts of a product are arranged.

Cooking and nutrition

Year group	**2**	**3**	**6**
Topic			

HT Progression of skills and knowledge – DT

Kapow DT Unit		Balanced diet	Seasonal tart	Developing a new recipe
Skills	Design	Designing three wrap ideas	• Designing a recipe for a savoury tart.	• Adapting a traditional recipe, understanding that the nutritional value of a recipe alters if you remove, substitute or add additional ingredients. • Writing an amended method for a recipe to incorporate the relevant changes to ingredients. • Designing appealing packaging to reflect a recipe. • Researching existing recipes to inform ingredient choices.
	Make	Chopping foods safely to make a wrap. • Constructing a wrap that meets a design brief. • Grating foods to make a wrap. • Snipping smaller foods instead of cutting. • Spreading soft foods to make a wrap. • Identifying the five food groups. • Learning about balanced diet	• Following the instructions within a recipe. • Tasting seasonal ingredients. • Selecting seasonal ingredients. • Peeling ingredients safely. • Cutting safely with a vegetable knife	• Cutting and preparing vegetables safely. • Using equipment safely, including knives, hot pans and hobs. • Knowing how to avoid cross-contamination. • Following a step by step method carefully to make a recipe.
	Evaluate	• Describing appearance, smell and taste. • Taste and evaluating different food combinations. • Describing the information that should be included on a label.	• Establishing and using design criteria to help test and review dishes. • Describing the benefits of seasonal fruits and vegetables and the impact on the environment. • Suggesting points for improvement when making a seasonal tart.	• Identifying the nutritional differences between different products and recipes. • Identifying and describing healthy benefits of food groups.
Knowledge		• To know that 'diet' means the food and drink that a person or animal usually eats. • To know what makes a balanced diet. • To know that the five main food groups are: Carbohydrates, fruits and vegetables, protein, dairy and foods high in fat and sugar. • To know that I should eat a range of different foods from each food group, and roughly how much of each food group. • To know that 'ingredients' means the items in a mixture or recipe. • To know how to cut, grate, snip and spread to prepare foods. • To know how to review and give a score to evaluate.	• To know that not all fruits and vegetables can be grown in the UK. • To know that climate affects food growth. • To know that vegetables and fruit grow in certain seasons. • To know that cooking instructions are known as a 'recipe'. • To know that imported food is food which has been brought into the country. • To know that exported food is food which has been sent to another country. • To know that eating seasonal foods can have a positive impact on the environment. • To know that similar coloured fruits and vegetables often have similar nutritional benefits. • To know that the appearance of food is as important as taste.	• To understand where meat comes from - learning that beef is from cattle and how beef is reared and processed. • To know that recipes can be adapted to suit nutritional needs and dietary requirements. • To know that I can use a nutritional calculator to see how healthy a food option is. • To understand that 'cross-contamination' means bacteria and germs have been passed onto ready-to-eat foods and it happens when these foods mix with raw meat or unclean objects. • To know that coloured chopping boards can prevent cross-contamination. • To know that nutritional information is found on food packaging. • To know that food packaging serves many purposes.

Textiles

Year group	**1**	**2**	**6**
Topic			

HT Progression of skills and knowledge – DT

Kapow DT Unit		Puppets	Pouches	Sew a waistcoat
Skills	Design	• Using a template to create a design for a puppet.	• Designing a pouch	• Designing a waistcoat in accordance to a specification linked to set of design criteria. • Annotating designs, to explain their decisions.
	Make	• Cutting fabric neatly with scissors. • Using joining methods to decorate a puppet. • Sequencing steps for construction.	• Selecting and cutting fabrics for sewing. • Decorating a pouch using fabric glue or running stitch. • Threading a needle. • Sewing running stitch, with evenly spaced, neat, even stitches to join fabric. • Neatly pinning and cutting fabric using a template.	• Using a template when cutting fabric to ensure they achieve the correct shape. • Using pins effectively to secure a template to fabric without creases or bulges. • Marking and cutting fabric accurately, in accordance with their design. • Sewing a strong running stitch, making small, neat stitches and following the edge. • Tying strong knots. • Decorating a waistcoat, attaching features (such as appliqué) using thread. • Finishing the waistcoat with a secure fastening (such as buttons). • Learning different decorative stitches. • Sewing accurately with evenly spaced, neat stitches.
	Evaluate	• Reflecting on a finished product, explaining likes and dislikes	• Troubleshooting scenarios posed by teacher. • Evaluating the quality of the stitching on others' work. • Discussing as a class, the success of their stitching against the success criteria. • Identifying aspects of their peers' work that they particularly like and why.	• Reflecting on their work continually throughout the design, make and evaluate process.
Knowledge		• To know that 'joining technique' means connecting two pieces of material together. • To know that there are various temporary methods of joining fabric by using staples. glue or pins. • To understand that different techniques for joining materials can be used for different purposes. • To understand that a template (or fabric pattern) is used to cut out the same shape multiple times. • To know that drawing a design idea is useful to see how an idea will look.	• • To know that sewing is a method of joining fabric. • To know that different stitches can be used when sewing. • • To understand the importance of tying a knot after sewing the final stitch. • • To know that a thimble can be used to protect my fingers when sewing.	• To understand that it is important to design clothing with the client/ target customer in mind. • To know that using a template (or clothing pattern) helps to accurately mark out a design on fabric. • To understand the importance of consistently sized stitches.

Overview - Vocabulary progression

Overview - Vocabulary progression

Design					
Year 1	**Year 2**	**Year 3**	**Year 4**	**Year 5**	**Year 6**
design product user mock-up sketch test	survey opinion design brief design criteria model label purpose	computer-aided design diagram thumbnail sketch	target audience cross-sectional diagram prototype	annotate market research exploded diagram	constraint

**Words on this page are classified as Tier 2 words unless stated otherwise.*

Overview - Vocabulary progression

Make					
Year 1	**Year 2**	**Year 3**	**Year 4**	**Year 5**	**Year 6**
choose tools join cut straight line space even	select measure curved material dowel	accurate asymmetrical equipment components finish form function	width length research	assemble equipment list risk	N/A

safety decorate		instructions plan symmetrical wood			

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Overview - Vocabulary progression

Evaluate					
Year 1	**Year 2**	**Year 3**	**Year 4**	**Year 5**	**Year 6**
like dislike better worse explain compare	evaluate improve	investigate successful feedback	analyse effective reflect iteration	sustainable inform technique specific	aesthetic innovative alternative

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Overview - Vocabulary progression

Technical knowledge						
	Year 1	**Year 2**	**Year 3**	**Year 4**	**Year 5**	**Year 6**
Mechanisms	slider wheel axle					

	axle holder mechanism turn movement					
Structures	base freestanding stable structure unstable	strong weak thicker thinner shape stiff flexible	shell structure net three dimensional tab	strengthen	frame structure	triangulation reinforce
Textiles	thread needle fabric pattern stitch weave	template running stitch seam sew			Textiles blanket stitch tacking appendage fastening pinning	pattern piece seam allowance

Overview - Vocabulary progression

Technical knowledge						
	Year 1	**Year 2**	**Year 3**	**Year 4**	**Year 5**	**Year 6**
Cooking and nutrition		balanced diet peel grate ingredient taste smell	recipe seasonality imported stir flavour texture			nutritional value savoury cross-contamination Fibre dietary requirement farm

		chop mix healthy				rear
Mechanical systems			mechanical system housing push pull input output	force increase chassis bearing	fixed pivot moving pivot gear pulley teeth linkage	

Overview - Vocabulary progression

Technical knowledge						
	Year 1	**Year 2**	**Year 3**	**Year 4**	**Year 5**	**Year 6**
Electrical systems				electrical battery bulb electricity wire switch circuit buzzer	motor flow charge push	N/A

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Overview - Vocabulary progression

Design					
Year 1	**Year 2**	**Year 3**	**Year 4**	**Year 5**	**Year 6**
design product user mock-up sketch test	survey opinion design brief design criteria model label purpose	computer-aided design diagram thumbnail sketch	target audience cross-sectional diagram prototype	annotate market research exploded diagram	constraint

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Overview - Vocabulary progression

Make					
Year 1	**Year 2**	**Year 3**	**Year 4**	**Year 5**	**Year 6**
choose tools join cut straight line space even safety decorate	select measure curved material dowel	accurate asymmetrical equipment components finish form function instructions plan symmetrical wood	width length research	assemble equipment list risk	N/A

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Overview - Vocabulary progression

Evaluate					
Year 1	**Year 2**	**Year 3**	**Year 4**	**Year 5**	**Year 6**
like dislike better worse explain compare	evaluate improve	investigate successful feedback	analyse effective reflect iteration	sustainable inform technique specific	aesthetic innovative alternative