



DT knowledge progression

	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Vocabulary	<p>Textiles: Decorate, Design, Fabric, Glue, Model, Hand puppet, Safety pin, Staple, Stencil, Template,</p> <p>Mechanisms: Axle, Axle holder, Chassis, Evaluation, Fix, Mechanic, Mechanism, Model, Test, Wheel</p> <p>Structures: Client, Design, Evaluation, Net, Stable, Strong, Test, Weak, Windmill</p> <p>Food: Blender, Carton, Fruit, Healthy, Ingredients, Peel, Peeler, Recipe, Slice, Smoothie, Stencil, Template, Vegetable</p>	<p>Mechanisms: Axle, Decorate, Evaluation, Ferris wheel, Mechanism, Stable, Strong, Test, Waterproof, Weak</p> <p>Structures: Function, Man-made, Mould, Natural, Stable, Stiff, Strong, Structure, Test, Weak</p> <p>Mechanisms: Input, Lever, Linear motion, Linkage, Mechanical, Mechanism, Motion, Oscillating motion, Output, Pivot, Reciprocating motion, Rotary motion, Survey</p> <p>Food: Alternative, Diet, Balanced diet, Evaluation, Expensive, Healthy, Ingredients, Nutrients, Packaging, Refrigerator, Sugar, Substitute</p>	<p>Mechanical Systems: Exploded-diagram, Function, Input, Lever, Linkage, Mechanism, Motion, Net, Output, Pivot, Pneumatic system, Thumbnail sketch</p> <p>Electrical Systems: Assemble, Battery, Battery pack, Benefit, Bulb, Bulb holder, Buzzer, Circuit, Circuit symbol, Component, Conductor, Copper</p> <p>Structures: 2D shapes, 3D shapes, Castle, Design criteria, Evaluate, Facade, Feature, Flag, Net, Recyclable, Scoring, Stable, Strong, Structure, Tab, Weak</p> <p>Food: Climate, Dry climate, Exported, Imported, Mediterranean climate, Nationality, Nutrients, Polar climate, Recipe, Seasonal food, Seasons, Temperate climate, Tropical climate</p>	<p>Structures: Aesthetic, Cladding, Design criteria, Evaluation, Frame structure, Function, Inspiration, Pavilion, Reinforce, Stable, Structure, Target audience, Target customer, Texture, Theme</p> <p>Electrical Systems: Battery, Bulb, Buzzer, Cell, Component, Conductor, Copper, Design criteria, Electrical item, Electricity, Electronic item, Function, Insulator, Series circuit, Switch, Test, Torch, Wire</p> <p>Mechanical Systems: Air resistance, Chassis, Design, Design criteria, Function, Graphics, Kinetic energy, Mechanism, Net, Structure</p> <p>Food: Adapt, Budget, Cooling rack, Creaming, Equipment, Evaluation, Flavour, Ingredients, Method, Net, Packaging, Prototype, Quantity, Recipe, Rubbing, Sieving, Target audience, Unit of measurement, Utilities</p>	<p>Mechanical Systems: Aesthetic, Computer-aided design (CAD), Caption, Design, Design brief, Design criteria, Exploded-diagram, Function, Input, Linkage, Mechanism, Motion, Output, Pivot, Prototype, Slider, Structure, Template</p> <p>Digital World: Analogue, Badge, CAD, Control, Design requirements, Develop, Digital, Digital revolution, Digital world, Display, Electronic, Electronic products, Fasten, Feature, Function, Initiate, Key features, Layers, Loops, Micro: bitBattery, Bulb, Circuit, Circuit component, Crocodile wires, Electrical product, Electrical system, Final design, Information design, Initial ideas, Peer assessment, Research, Self assessment, Sketch, Monitor, Net, Point of sale, Product, Product design, Program, Sense, Simulator, Smart wearables, Stand, Technology, Template, Test, User</p> <p>Structures: Abutment, Accurate, Arched bridge, Beam bridge, Coping saw, Evaluation, File, Mark out, Material properties, Measure, Predict, Reinforce, Research, Sandpaper, Set square, Suspension bridge, Tenon saw, Test, Truss bridge, Wood</p> <p>Food: Beef, Cross-contamination, Diet, Ethical issues, Farm, Healthy, Ingredients, Method, Nutrients, Packaging, Reared, Recipe, Research, Substitute, Supermarket, Vegan, Vegetarian, Welfare</p>	<p>Structure: Adapt, Apparatus, Bench hook, Cladding, Coping saw, Design, Dowel, Evaluation, Feedback, Idea, Jelutong, Landscape, Mark out, Measure, Modify, Natural materials, Plan view, Playground, Prototype, Reinforce, Sketch, Strong, Structure, Tenon saw, Texture, User, Vice, Weak</p> <p>Textiles: Accurate, Adapt, Annotate, Design, Design criteria, Detail, Fabric, Fastening, Knot, Properties, Running-stitch, Seam, Sew, Shape, Target audience, Target customer, Template, Thread, Unique, Waistcoat, Waterproof</p> <p>Digital World: 3D CAD, Application (apps), Biodegradable, Boolean, Cardinal compass, Client, Compass, Concept, Convince, Corrode, Duplicate, Environmentally friendly, Equipment, Feature, Finite, Function, Functional, GPS tracker, If statement, Infinite, Structures, Playgrounds, Adapt, Apparatus, Bench hook, Cladding, Coping saw, Design, Dowel, Evaluation, Feedback, Idea, Jelutong, Landscape, Mark out, Measure, Modify, Natural materials, Plan view, Playground, Prototype, Reinforce, Sketch, Strong, Structure, Tenon saw, Texture, User, Vice, Weak, Investment, Lightweight, Loop, Manufacture, Materials (wood, metal, plastic etc.), Mouldable, Navigation, Non-recyclable, Product lifecycle, Product lifespan, Program, Recyclable, Smart, Sustainable, Sustainable design, Unsustainable design, Variable, Workplane</p> <p>Food: Accompaniment, Collaboration, Cookbook, Cross-contamination, Equipment, Farm, Flavour, Illustration, Imperative-verb, Ingredients, Method, Nationality, Preparation, Processed, Reared, Recipe, Research, Storyboard, Target audience, Top tips, Unit of measurement</p>
Technical	<ul style="list-style-type: none"> To understand that the shape of materials can be changed to improve the strength and stiffness of structures. To understand that cylinders are a strong type of structure (e.g. the main shape used for windmills and lighthouses). To understand that axles are used in structures and mechanisms to make parts turn in a circle. To begin to understand that different structures are used for different purposes. To know that a structure is something that has been made and put together. 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 wheels need to be round to rotate and move. To understand that for a wheel to move it must be attached to a rotating axle. To know that an axle moves within an axle holder which is fixed to the vehicle or toy. To know that the frame of a vehicle(chassis) needs to be balanced. 	<ul style="list-style-type: none"> 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. To know that different materials have different properties and are therefore suitable for different uses. 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. 	<ul style="list-style-type: none"> To understand how pneumatic systems work. To understand that pneumatic systems can be used as part of a mechanism. To know that pneumatic systems operate by drawing in, releasing and compressing air. To understand that, in programming, a 'loop' is code that repeats something again and again until stopped. To know that a Micro:bit is a pocket-sized, codeable computer. 	<ul style="list-style-type: none"> To understand what a frame structure is. To know that a 'free-standing' structure is one which can stand on its own. 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 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. 	<ul style="list-style-type: none"> 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. 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. 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. 	<ul style="list-style-type: none"> To know that structures can be strengthened by manipulating materials and shapes. To know that accelerometers can detect movement. To understand that sensors can be useful in products as they mean the product can function without human input.
Additional	<ul style="list-style-type: none"> 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 a windmill harnesses the power of wind for a purpose like grinding grain, pumping water or generating electricity. To know that windmill turbines use wind to turn and make the machines inside work. To know that a windmill is a structure with sails that are moved by the wind. To know the three main parts of a windmill are the turbine, axle and structure. To know some real-life items that use wheels such as wheelbarrows, hamster wheels and vehicles. 	<ul style="list-style-type: none"> To know the features of a ferris wheel include the wheel, frame, pods, a base an axle and an axle holder. To know that it is important to test my design as I go along so that I can solve any problems that may occur. To know some real-life objects that contain mechanisms. 	<ul style="list-style-type: none"> To understand how sketches, drawings and diagrams can be used to communicate design ideas. To know that exploded-diagrams are used to show how different parts of a product fit together. To know that thumbnail sketches are small drawings to get ideas down on paper quickly. To know what the 'Digital Revolution' is and features of some of the products that have evolved as a result. To know that in Design and technology the term 'smart' means a programmed product. To know the difference between analogue and digital technologies. To understand what is meant by 'point of sale display.' To know that CAD stands for 'Computer-aided design'. 	<ul style="list-style-type: none"> To know that a pavilion is a decorative building or structure for leisure activities. To know that cladding can be applied to structures for different effects. 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 know that architects consider light, shadow and patterns when designing. 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 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. 	<ul style="list-style-type: none"> 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. 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. To understand the difference between arch, beam, truss and suspension bridges. To understand how to carry and use a saw safely. 	<ul style="list-style-type: none"> 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. To know that designers write design briefs and develop design criteria to enable them to fulfill a client's request. To know that 'multifunctional' means an object or product has more than one function. To know that magnetometers are devices that measure the Earth's magnetic field to determine which direction you are facing.

DT skills progression

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Design	<ul style="list-style-type: none"> Learning the importance of a clear design criteria. Including individual preferences and requirements in a design. Using a template to create a design for a puppet. Designing a vehicle that includes wheels, axles and axle holders, that when combined, will allow the wheels to move. Creating clearly labelled drawings that illustrate movement. 	<ul style="list-style-type: none"> Generating and communicating ideas using sketching and modelling. Selecting a suitable linkage system to produce the desired motion. Designing a wheel. Creating a class design criteria for a moving monster. Designing a moving monster for a specific audience in accordance with a design criteria. 	<ul style="list-style-type: none"> Designing a toy which uses a pneumatic system. Developing design criteria from a design brief. Generating ideas using thumbnail sketches and exploded diagrams. Learning that different types of drawings are used in design to explain ideas clearly. Problem solving by suggesting potential features on a Micro: bit and justifying my ideas. Developing design ideas for a technology pouch. Drawing and manipulating 2D shapes, using computer-aided design, to produce a point of sale badge. 	<ul style="list-style-type: none"> Designing a stable pavilion structure that is aesthetically pleasing and selecting materials to create a desired effect. Building frame structures designed to support weight. 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 torch, giving consideration to the target audience and creating both design and success criteria focusing on features of individual design ideas. 	<ul style="list-style-type: none"> 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. 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. Designing a stable structure that is able to support weight. Creating a frame structure with a focus on triangulation. 	<ul style="list-style-type: none"> Designing a playground featuring a variety of different structures, giving careful consideration to how the structures will be used, considering effective and ineffective designs. Writing a design brief from information submitted by a client. Developing design criteria to fulfil the client's request. Considering and suggesting additional functions for my navigation tool. Developing a product idea through annotated sketches. Placing and manoeuvring 3D objects, using CAD. Changing the properties of, or combining one or more 3D objects, using CAD. Designing a waistcoat in accordance to a specification linked to set of design criteria. Annotating designs, to explain their decisions. 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.

Make	<ul style="list-style-type: none"> • Making stable structures from card, tape and glue. • Learning how to turn 2D nets into 3D structures. • Following instructions to cut and assemble the supporting structure of a windmill. • Making functioning turbines and axles which are assembled into a main supporting structure. • Cutting fabric neatly with scissors. • Using joining methods to decorate a puppet. • Sequencing the steps taken during construction. • Adapting mechanisms, when: <ul style="list-style-type: none"> • they do not work as they should. • to fit their vehicle design. • to improve how they work after testing their vehicle. 	<ul style="list-style-type: none"> • 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. • Selecting materials according to their characteristics. • Following a design brief. • Evaluating different designs. • Testing and adapting a design. • 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. 	<ul style="list-style-type: none"> • Creating a pneumatic system to create a desired motion. • Building secure housing for a pneumatic system. • Using syringes and balloons to create different types of pneumatic systems to make a functional and appealing pneumatic toy. • Selecting materials due to their functional and aesthetic characteristics. • Manipulating materials to create different effects by cutting, creasing, folding and weaving. • Using a template when cutting and assembling the pouch. • Following a list of design requirements. • Selecting and using the appropriate tools and equipment for cutting, joining, shaping and decorating a foam pouch. • Applying functional features such as using foam to create soft buttons. 	<ul style="list-style-type: none"> • Creating a range of different shaped frame structures. • Making a variety of free standing frame structures of different shapes and sizes. • Selecting appropriate materials to build a strong structure and cladding. • Reinforcing corners to strengthen a structure. • Creating a design in accordance with a plan. • Learning to create different textural effects with materials. • Measuring, marking, cutting and assembling with increasing accuracy. • Making a model based on a chosen design. • 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. 	<ul style="list-style-type: none"> • Altering a product's form and function by tinkering with its configuration. • Making a functional series circuit, incorporating a motor. • Constructing a product with consideration for the design criteria. • 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. • 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. 	<ul style="list-style-type: none"> • 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. • Considering materials and their functional properties, especially those that are sustainable and recyclable (for example, cork and bamboo). • Explaining material choices and why they were chosen as part of a product concept. • Programming an N.E, S, W cardinal compass. • 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.
Evavuate	<ul style="list-style-type: none"> • Reflecting on a finished product, explaining likes and dislikes. • Testing wheel and axle mechanisms, identifying what stops the wheels from turning, and recognising that a wheel needs an axle in order to move. 	<ul style="list-style-type: none"> • Testing the strength of own structure. • Identifying the weakest part of a structure. • Evaluating the strength, stiffness and stability of own structure. • Evaluating own designs against design criteria. • Using peer feedback to modify a final design. 	<ul style="list-style-type: none"> • Using the views of others to improve designs. • Testing and modifying the outcome, suggesting improvements. • Understanding the purpose of exploded-diagrams through the eyes of a designer and their client. • Analysing and evaluating an existing product. • Identifying the key features of a pouch. 	<ul style="list-style-type: none"> • Evaluating structures made by the class. • Describing what characteristics of a design and construction made it the most effective. • Considering effective and ineffective designs. • Evaluating the speed of a final product based on: the effect of shape on speed and the accuracy of workmanship on performance. • Evaluating electrical products. • Testing and evaluating the success of a final product. 	<ul style="list-style-type: none"> • 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. • 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. 	<ul style="list-style-type: none"> • 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. • Explaining how my program fits the design criteria and how it would be useful as part of a navigation tool. • Developing an awareness of sustainable design. • Identifying key industries that utilise 3D CAD modelling and explaining why. • Describing how the product concept fits the client's request and how it will benefit the customers. • Explaining the key functions in my program, including any additions. • Explaining how my program fits the design criteria and how it would be useful as part of a navigation tool. • Explaining the key functions and features of my navigation tool to the client as part of a product concept pitch. • Demonstrating a functional program as part of a product concept pitch. • Reflecting on their work continually throughout the design, make and evaluate process.