Design and Technology Knowledge and Skills Map

Culture Capital British Values KPI's

	Autumn 2 Structures and Textiles		Spring 2 Cooking and Nutrition		Summer 2 Mechanisms	
EYFS	Picture frames **Knowledge:** Evaluate different picture frames. Know what has to be in place for it to do its job. Look at hanging picture frames and ones that are freestanding. Know that some have glass but other do not. Know what a hinge does. Know what a picture hook does. Design a frame to display a digital photograph of themselves, someone else, a pet etc. Design its size, how it will look, and how it will work e.g. a handing or freestanding? Know how to follow the design, make, and evaluate process to create a product.	**Skills:** Know how to make butt joints. Know how materials fix together in different ways. Investigate which way is sturdiest. Make a template/try out. Freestanding. Hinge. Butt joints. Know how to fix things and make them study with glue, nails, firmer materials such as wood. Push and pull apart larger construction pieces, such as, Duplo. Begin to test out materials for building Evaluate their work and look at how they can make it better next time. Cath Kidston	Fruit and Vegetable Shop/ Fruit salad **Knowledge:** Know 10 different types of fruit and can describe how they look, feel, smell and taste: *banana, apple, orange, pear, strawberries, grapes, melon, mango, kiwi, blueberries.* Know 10 different types of vegetables and can describe how they look, feel, smell and taste: *carrots, broccoli, peas, potatoes, cabbage, spinach, courgette, peppers, sweet potato, asparagus.* Known that there are different ways you can grow fruit and vegetables (fruit from trees, vegetables from the ground). Know that fruit and vegetable are health foods and that they contain vitamins and minerals. Know that vitamins are needed to help our bodies grow and function. Know how to follow the design, make, and evaluate process to create a product.	**Skills:** Prepare fruit and vegetables – washing, peeling, chopping. Recognise what, how and why we use fruit and vegetables. Present fruit and vegetables as seen in shops. Understand how much fruit and vegetables are to buy. Asda	**Knowledge:** Make a vehicle Know that a wheel helps things move. Know that a wheel is a type of mechanism. Know that there are different types of wheels for different transport *(bicycle wheel, car wheel, tram wheel).* Know that different transport goes on different surfaces. Know how to follow the design, make, and evaluate process to create a product.	**Skills:** Design their own transport with wheels (draw, annotate). Make a wheel using card. Draw a wheel and cut out accurately using cutting techniques. Shape a wheel correctly and use tools to cut it out (scissors). Evaluate their work and look at how they can make it better next time. Karl Von Drais (invented the first bicycle)
Vocabulary	Materials, textiles, fabric, glue, buttons, sewing, thread		Fruit, healthy, banana, apple, orange, pear, strawberries, grapes, melon, mango, kiwi, blueberries, vitamins		Wheels, round, circle, smooth, bicycle, tram, car, mechanism	
Trips/Visitors	Furniture shop/galleries/antique shop		Asda – fruit and vegetable shopping		Bike shop	
Key Texts			Recipe books, supermarket catalogues		Mr Grumpy's motor car – John Birningham	
	End of Early Years Expectation: Early Years Framework ELGs Expressive Art and Design: Creating with Materials - Safely use and explore a variety of materials, tools and techniques, experimenting with colour, design, texture, form and function. - Share their creations, explaining the process they have used. - Make use of props and materials when role playing characters in narratives and stories.		**End of Early Years Expectation: Early Years Framework ELGs** Understanding the World: The Natural World -Explore the natural world around them, making observations and drawing pictures of animals and plants -Know some similarities and differences between the natural world around them and contrasting environments, drawing on their experiences and what has been read in class. -Understand some important processes and changes in the natural world around them, including the seasons and changing states of matter.		**End of Early Years Expectation: Early Years Framework ELGs** Expressive Art and Design: Creating with Materials - Safely use and explore a variety of materials, tools and techniques, experimenting with colour, design, texture, form and function. - Share their creations, explaining the process they have used. - Make use of props and materials when role playing characters in narratives and stories.	
	Autumn 2 Construction and Textiles		Spring 2 Cooking and Nutrition		Summer 2 Mechanisms	
Year 1	Design a tray and box **Knowledge:** Know how to follow the design, make, and evaluate process to create a product. Know how to make structures stronger, stiffer, and more stable. Learn how to label a diagram to show what it will look like. Learn how to use the design to make the box.	**Skills:** Research existing products. Design their own simple enclosure. Make butt joints to make a box more solid. Learn how to use triangle supporters to make something solid. Use saws and scissors to cure lengths to size. Make a small prototype of the box. Use non-standard measures Use joining techniques appropriately and safely (glue, tape).	**Knowledge:** Vegetable frittata Know that fruit and vegetables are healthy. Know where different types of vegetables come from: *carrots, onions, broccoli, spinach, cabbage.* Know that everyone should eat at least five portions of fruit and vegetables every day.	**Skills:** Boil an egg. Crack an egg. Prepare vegetables for the frittata. Use tools to cut and chop fruit (knife, peeler, chopping board) Use tools safely. Prepare fruit hygienically. Design and annotate the vegetable frittata.	**Knowledge:** Make a moving picture of a car Know how to explore existing products. Know how mechanisms can move a picture. Know what a slider is. Know what a lever is. Know how to follow the design, make, and evaluate process to create a product.	**Skills:** Research existing products. Design a mini wheelbarrow and annotate. Write a list of materials needed. Add the wheels to axels. Make a wheelbarrow out of straw/out of cardboard. Use cutting and joining techniques (scissors, glue). Place the axle and wheels in the correct position. Evaluate their work and look at how they can make it better next time.

	Learn that the shape of materials can be changed to improve the strength and stiffness of structures. Know what a hinge does and how hinges are used in boxes. Know what a clap is and how they are used in boxes. Evaluate wooden trays and boxes. Understand how the purpose of an object can affect the materials and its design. Look at the different sizes and purposes of trays and wooden boxes. Evaluate how effect or ineffective they are for different things e.g. carrying bowls of porridge, carrying toast.	Evaluate their work and look at how they can make it better next time. Christopher Wren (St Pauls Cathedral)	Know the five groups in the Eatwell Guide: *fruit and vegetables, carbohydrates, proteins, dairy and alternatives, oils, and spreads.* Know that eggs can be hard and soft, know that there are different ways of cooking eggs. Know how to follow the design, make, and evaluate process to create a product.	Pick vegetables for the frittata. Follow the design, make, and evaluate process to create a product. Jamie Oliver		Ushborne slide and see books, pop up books
Vocabulary:	Structure, construction, joining, evaluate, strong, stiff, stable, architect		Healthy, eat well guide, hard boiled, boiling, soft, fried.		Sliders, levers, movement, books	
Trips/Visitors			Visit the school kitchen.		Visit to a library to explore books that have movement.	
Key Texts	Come Over to My House – Theo LeSieg , We Build our homes – Laura Knowles		Jamie Oliver recipe books			
	Autumn 2 Construction and Textiles		Spring 2 Cooking and Nutrition		Summer 2 Mechanisms	
Year 2	<u>Design and make a chair</u> **Knowledge:** Know that different materials are used for different purposes. Know which materials are man-made and natural. Evaluate different stools and chairs. Understand how they are made to be stable. Learn that some legs are cylinders and some are cuboid. Identify when a structure is more or less stable than another. Understand that the shape and the materials of a structure affects its strength. Know that furniture uses different materials to help the purpose. Know how to follow the design, make, and evaluate process to create a product. Learn how to design with an exploded diagram showing how each of the parts will fit together. Understand that cylinders are a strong type of structure that are often used for windmills and lighthouses, for legs e.g. stools, for curved boxes. Know that shapes and structures with wide, flat bases or legs are the most stable. Know that materials can be manipulated to improve strength and stiffness. Identify suitable materials to be selected and used for a structure,	**Skills:** Research existing products. Follow the building design process. Extend the knowledge of wide and flat based objects being more stable. Make a prototype to test stability. Plan an order for making components and putting them together. Learn how to strengthen and stiffen different materials and how to combine different materials. Make the structure stable and strong. Use tools to shape the materials. Use tools to cut out pieces of material. Use tools to join and fasten materials together. Use finishing media on the product. Evaluate their work and look at how they make it better next time. Dame Jane Drew (air-raid shelters)	**Knowledge:** <u>Vegetable soup</u> Know that vegetables can originate from different parts of the World and can explain where carrots, parsnips, onion, ginger, and potatoes come from. Know that a root vegetable are underground plant parts eaten by humans as food. Know that all food comes from plants or animals. Know that food must be farmed, grown elsewhere, or caught. Know what the Eatwell Guide is used for. Know that everyone should eat at least five portions of fruit and vegetables every day and start to explain why. Know the basic recipe and ingredients for a vegetable soup. Know how to follow the design, make, and evaluate process to create a product.	**Skills:** Prepare vegetables. Use tools to cut and chop vegetables (knife, peeler, chopping board). Boil, blend, blanch. Prepare and cook vegetables safely and hygienically. Make vegetable soup. Follow the design, make, and evaluate process to create a product. Jamie Oliver	**Knowledge:** <u>Make a racing car</u> Know that wheels and axles work together to make things move. Know the different types of wheels *(alloy, steel, cast, split rim),* discussing the properties of these materials. Know that an axle is a rod that goes through the wheel, letting the wheels turn to move. Know that wheels and axles reduce friction when moving – (*only friction on the very small part of the wheel that is touching the ground at any given time).* Know examples of wheels and axels in everyday life: *bicycle, car tires, Ferris wheel, electric fan, analogue clock, winch.* Know how to follow the design, make, and evaluate process to create a product.	**Skills:** Research existing products. Design their own race car and annotate. Select resources and materials needed o create the vehicle. Add wheels and axels on the vehicle, choosing the right size. Use tools and equipment appropriately. Evaluate their work and look at how they can make it better next time. (Did it go down the ramp?) Karl Benz

	considering weight, compression, tension. Learn about Thomas Chippendale and his work. Eero Saarinen Tulip Chair. Learn about the Ming arm chair and Louis XIV arm chair. Marcel Breuer Cesca Chair. Learn about the Windsor chair and Frank Gehry Wiggle Side Chair. The peacock chair.					
Vocabulary:	Materials, weatherproof, man-made, natural, structure, stable, strong		Root vegetable, eatwell guide, peel, boil, blend, blanch		Wheels, axles, alloy, steel, cast, split rim, friction, ramp	
Trips/Visitors	Visit a furniture shop		Visit the school kitchen.		Science and industry museum	
Key Texts	Goldilocks and the three bears		Soup recipe books			
	Autumn 2 Construction and Textiles		Spring 2 Cooking and Nutrition		Summer 2 Mechanisms	
Year 3	Textiles – Upcycle – 2D to 3D **Knowledge:** Know what upcycling is. Know that upcycling can help the environment. Understand the difference of upcycling and recycling. Know that upcycling increases the value of the product. Know that there are different finishing techniques. Know what items can be upcycled. Know how to follow the design, make, and evaluate process to create a product.	**Skills:** Research existing products that have been upcycled. Follow the design process. Find products that can be upcycled. Use tools to cut out pieces of material. Use tools to join and fasten materials together. Make a prototype out of paper/cardboard. Evaluate their work and look at how they can make it better next time. https://www.drench.co.uk/blog/latest-news/upcycling-20-of-the-best-examples-weve-seen upcycling examples	**Knowledge:** Making bread Know that a healthy diet is made up of a variety and balance of different food and drink, represented in the Eatwell Guide. Know how bread is made. Know that there are different types of bread (Sourdough etc). Know the basic ingredients to make bread. Know how to follow the design, make, and evaluate process to create a product.	**Skills:** Design and make a recipe for bread. Make dough. Knead dough. Use heat source to cook ingredients showing awareness of the need to control the temperature of the hob and/or oven. Prepare ingredients using appropriate cooking utensils. Measure and weigh ingredients to the nearest gram and millilitre. Independently follow a recipe. Follow the design, make, and evaluate process to create a product. Nadiya Hussain	**Knowledge:** Make a pulley – flagpole Know that a pulley is a type of mechanical system. Know that a pulley is a wheel with a grooved rim in which a rope, chain, or belt can run to change the direction or force applied to the rope. Know objects with pulleys – *flagpoles, blinds, elevators, cranes, clothesline.* Know how to make a simple pulley. Know how to follow the design, make, and evaluate process to create a product.	**Skills:** Research existing products. Design and draw a pulley machine. Make a prototype (pulley bucket). Make a flagpole using a pulley mechanism. Use tools and equipment safely to cut, join and shape materials. Evaluate their work and look at how they can make it better next time. https://www.youtube.com/watch?v=UIPXJH9AO14 Mary Anderson (Car wipers) Lift designer – Famous pulley designer
Vocabulary:	Upcycling, products, value, textiles, recycling		Bread, dough, yeast, flour, knead, sourdough		Pulley, wheel, grooved rim, mechanism, prototype	
Trips/visitors	https://www.emmaussouthmanchester.org.uk/about-us Emmaus, South Manchester Visit a clothes alteration shop		Visit to Greens Restaurant, Didsbury (Vegetarian restaurant)			
Key Texts	10 things I can do to help my World What a waste: Rubbish, Recycling, and Protecting our Planet		Nadiya Hussain recipe book			
	Autumn 2 Construction and Textiles		Spring 2 Cooking and Nutrition		Summer 2 Mechanisms	
Year 4	Shell Structure **Knowledge:** Know the properties of 3D shapes. Know what nets are. Know how to make a net using CAD. Know how to stiffen and strengthen materials. Know what properties and suitable materials are best for purpose. Know how to use CAD in the design process. Know how to follow the design, make, and evaluate process to create a product.	**Skills:** Research existing products. Recognise 2D and 3D shapes. Follow the design process. Use a CAD programme to design the shell structure. Use tools and equipment to help strengthen and stiffen the materials. Evaluate their work and look at how they can make it better next time. Frank Llyod Wright (Floating House)	**Knowledge:** Make a chilli Know how to make a chilli. Know the basic ingredients of a chilli. Know that meat can change and be substituted for meat-free options. Know how herbs can add flavour. Know how chillies can differ in flavour and heat. Know the quantities needed when adding herbs and spices.	**Skills:** Draw an annotated drawing of the chilli. Use parsley and mint to add flavour. Make a prototype of the chill. Adapt and refine recipes by adding or substituting one or more ingredients to change appearance, taste, texture, and aroma. Prepare and cook a meal safely and hygienically. Use a range of cooking techniques, such as griddling, grilling, frying, and boiling.	**Knowledge:** Make a slingshot car Know that gears and pulleys are types of mechanism that help make things move. Know that a pulley can make things move. Know how to make a pulley mechanism. Know how to follow the design, make, and evaluate process to create a product.	**Skills:** Research existing products. Design a slingshot car and annotate. Build a car chassis. Draw a cross-sectional diagram. Build a launch mechanism. Make a prototype. https://www.kapowprimary.com/subjects/design-technology/lower-key-stage-2/year-4/mechanical-systems-making-a-slingshot-car/ Evaluate their work and look at how they can make it better next time. Nikola Tesler

			Know how to follow the design, make, and evaluate process to create a product.	Alter methods, cooking times and/or temperatures. Measure ingredients accurately. Independently follow a recipe. Follow the design, make, and evaluate process to create a product. Joe Wicks		
Vocabulary:	Waterproof, buoyancy, aesthetic, weatherproof, angles, sails, CAD.		Chilli, parsley, mint, herbs, griddling, frying, boiling, grilling, flavours		Gears, pulleys, mechanism, cross-sectional diagram, prototype	
Trips/visitors			Visit to a supermarket/ restaurant.			
Key Texts			Joe Wicks recipe books			
	Autumn 2 Construction and Textiles		Spring 2 Cooking and Nutrition		Summer 2 Mechanisms	
Year 5	Make a bridge **Knowledge:** Evaluate different bridges. Beam Bridges. Integral Beam Bridges. Cantilever Bridges. Arch Bridges. Cable-Stayed Bridges. Learn how they work. Look at video clips of badly designed bridges or those that collapse. Learn about famous bridges: Tower; Iron bridge, Forth Road bridge, Golden Gate, Sydney harbour, Rialto, Brooklyn, Ponte Vecchio, etc. Explore how to create a strong beam. Identify arch and beam bridges and understand the terms: compression and tension. Identify stronger and weaker structures with reasons. Find different ways to reinforce structures. Understand how triangles can be used to reinforce bridges. Articulate the difference between beam, arch, truss and suspension bridges. Understand the terminology of strut, tie, span, beam. Understand the difference between frame and shell structure. Know how to follow the design, make, and evaluate process to create a product.	**Skills:** Research existing products. Follow the design process. Design a bridge for a purpose e.g. to take a toy car over the gap between bookcases. Use an exploded diagram to show how different pieces will connect together. Understand the bridge must be stable but also must be strong enough to carry the weight and movement. Make a template with a different material e.g. lolly sticks or straws. Learn about different way of fixing and stabilising. Measure accurately and mark out to the nearest millimetre. Evaluate their work and look at how they can make it better next time. Joseph Strauss (Golden Gate Bridge)	**Knowledge:** Make a curry Know that seasonality can affect the food availability. Know what vegetables are in season (*asparagus, radish, carrots, peas).* Know and explain how food is grown, reared, and caught in the UK, Europe, and the wider world (*potatoes - grown, poultry - reared, fish - caught*). Know how spices can change and add flavour in meals. Know quantities needed for spices. Know how to make a curry. Know the basic ingredients for curries. Know how to make rice. Know how you can add flavour in rice. Know how to follow the design, make, and evaluate process to create a product.	**Skills:** Draw an annotated diagram of the curry. Plan recipes according to the season. Prepare and cook savoury dishes safely and hygienically including use of a heat source. Use a range of cooking techniques – griddling, grilling, frying, and boiling. Make naan bread, adding herbs and flavours. Measure accurately and calculate rations of ingredients to scale up or down from a recipe. Boil rice. Make a prototype of the curry - adapt and refine recipes by adding or substituting one or more ingredients to change appearance, taste, texture, and aroma. Know how to independently follow a recipe. Follow the design, make, and evaluate process to create a product. Nadiya Hussain	**Knowledge:** Pulley motorised vehicle Know that a pulley is a type of mechanical system. Know that a pulley is a wheel with a grooved rim in which a rope, chain, or belt can run to change the direction or force applied to the rope. Know that electrical systems can be used to help objects move. Know the basic circuit process and components *(battery holder, battery snap, toggle switch, motor, motor mount, crocodile leads, plastic band).* Know that mechanical and electrical systems have an input, process, and output. Know famous electric car designers *(Elon Musk, Pole Star)* Know the environmental impact of electric cars. Know how to follow the design, make, and evaluate process to create a product.	**Skills:** Research existing products. Design your own environmentally friendly electric car. Draw an exploded diagram of the motorised vehicle. Use tools and equipment safely to cut, join and shape materials. Use electrical systems and components safely. Check that the electrical circuits are working and how to monitor them. Make a pulley motorised vehicle. Evaluate their work and look at how they can make it better next time. *https://www.tts-group.co.uk/blog/2016/11/02/pulley-motorised-vehicle.html* Nikola Tesler Elon Musk
Vocabulary:			Seasonality, spices, flavour, quantities, griddling, grilling, frying, boiling, naan bread, chilli, substitute		Pulley, mechanical, battery holder, battery snap, toggle switch, motor, motor mount, crocodile leads, plastic and, electrical car, exploded diagram	
Trips/visitors	Visit to Bridgewater Canal, Castlefield , visit to local bridges.		Trip to curry mile.		Motor show/car garage	
Key Texts						
	Autumn 2 Construction and Textiles		Spring 2 Cooking and Nutrition		Summer 2 Mechanisms	
Year 6	Frame Structures mini tent / small world houses + complex switches **Knowledge:** Know what materials to use for a bird house.	**Skills:** Research existing products. Draw an exploded diagram. Use CAD and CAM programme correctly. Create a prototype.	3 course meal **Knowledge:** Know that different food substances are needed for health and be able to apply	**Skills:** Make a menu with ingredient and allergy information. Prepare and cook a variety of savoury dishes safely and	**Knowledge:** Steady hand game. Know how to use CAM programmes.	**Skills:** Research existing products. Use CAMs effectively. Make a prototype.

	Know basic tent dimensions. Know how to make an exploded diagram. Know how to create a 3D diagram using CAD. Know how to use complex switches to make an automatic night light. Know the whole process of design to product using computer aids. Know how to follow the design, make, and evaluate process to create a product.	Strengthen, stiffen, and reinforce more complex structures. Use complex switches to enhance the frame structure. Evaluate their work and look at how they can make it better next time. Charles Waterton	these principles when planning and preparing dishes. *(Proteins, vitamins, calcium, omega, sugar)* Know how to create a starter, main, pudding thinking about flavours and cuisine. Know how to write a menu and recipe. Know how to add ingredients and allergies on a menu. Know how to follow the design, make, and evaluate process to create a product.	hygienically including, where appropriate, the use of a heat source. Use a range of cooking techniques for the courses, such as griddling, grilling, frying, and boiling, baking. Use a range of flavours from herbs and spices. Add or substitute meat protein for vegetarian protein. Alter methods, cooking times and/or temperatures. Measure accurately and calculate rations of ingredients to scale up or down from a recipe. Follow the design, make, and evaluate process to create a product. George Washington Carver (crop rotation)	Know that mechanical and electrical systems have an input, process, and output. Know the basic circuit process and components *(battery holder, battery snap, toggle switch, motor, motor mount, crocodile leads, plastic band)* Know how to follow the design, make, and evaluate process to create a product.	Design a steady hand game, using an annotated diagram. Make a net to create their bases for the game. Use their knowledge of electrical circuits to build a circuit with a buzzer which closes when the handle contacts the wire frame. Know to input instructions on a computer system. Know how to code. Know how to use scratch software on the computer. Know how to program, monitor, and control the vehicle on the computer programme. Evaluate their work and look at how they can make it better next time. https://www.kapowprimary.com/subjects/design-technology/upper-key-stage-2/year-6/electrical-systems-steady-hand-game/ Grace Hopper (computers to talk through coding) Margaret Hamilton (wrote software for 1st moon landing).
Vocabulary:	Dimensions, exploded diagram, CAM, CAD, strengthen, stiffen, reinforce, sanding, dowels		Starter, main, dessert, proteins, vitamins, calcium, omega, sugar, menu, substitute, scale up, scale down.		CAM, mechanisms, battery holder, battery snap, toggle switch, motor, motor mount, crocodile leads, plastic band	
Trips/Visitors	Visit EYFS to look at small world toys and look at the tents in EYFS.		Supermarket		Game shop/toy shop	
Key Texts						
	Construction and Textiles Whole School Experience: Science and Industry Museum workshops Visits to Chorlton water park/parks with water, bridges, bird houses. Looking after our environment.	**Food and Nutrition Whole School Experience:** Cooking demonstration Greens Restaurant cooking demonstration Visit markets/supermarkets	**Mechanisms Whole School Experience:** Visit to Museum of Transport Exploring different vehicles (fire engine, buses, bicycles, police cars, lorries..)			