DT Curriculum Progression Map

Strike Lane Primary School – Design and Technology Curriculum

Curriculum Intent:

Design and technology should be an inspiring, rigorous and practical subject. This curriculum will allow children to explore and appreciate the design process that has influenced the products we use in everyday life. Through the programmes of study children will gain the knowledge to understand the design process and why and how specific construction techniques have been used. They will master practical techniques and skills needed to create high quality products. Finally, they will use their knowledge and skills to design, make, evaluate and improve products which have a specific purpose. There is a clear progression of knowledge, skills and techniques which are built on throughout this whole school curriculum and children are encouraged to build on previously learned knowledge and skills as projects become increasingly more complex.

Design and Technology draws on disciplines such as mathematics, science, engineering, computing and art in order for pupils to consolidate learning in a practical way. This curriculum provides pupils with opportunities to learn how to take risks, become resourceful, innovate creatively and learn the skills of enterprise. Through the evaluation of past and present design and technology, pupils should develop a critical understanding of their work's impact on daily life as they learn to participate successfully in an increasingly technological world.

		Knowledge	Skills	Vocabulary
EYFS*	1.2 structures	▪ Know what the word structure means. ▪ Know that structures are either man-made or natural. ▪ Be able to group different structures into the two categories. ▪ Give examples of natural and man-made structures around school	▪ Be able to recognise different structures and name them. ▪ Be able to put them into groups Natural: spider web, birds nest. Man-made: water bottle, table. ▪ Look at different materials used in the structures. ▪ Collect natural and man-made materials to try to build a structure. ▪ Build a structure for each category, take pictures.	▪ Structures ▪ Natural ▪ Man-made ▪ Building

	1.7 wheels (and axle mechanisms)	▪ Know what a wheel is and how it works. ▪ Know what uses a wheel. ▪ Be able to give examples of things that use wheels. ▪ Be able to collect items that have wheels.	▪ Be able to spot wheels in the surrounding area. ▪ Identify the shape of a wheel and why that shape is used. ▪ Collect different items that use a wheel and put them into groups, collect images. ▪ Experiment with different materials that could be used to make a wheel. ▪ Make a wheeled vehicle, use different materials to experiment with.	▪ Wheel ▪ Vehicle ▪ Shape ▪ Collect
	1.4 solid structures	▪ Know what a natural solid structure is. ▪ Know what a man-made solid structure is. ▪ Be able to name solid structures from images. ▪ Know how a solid structure works ▪ Know what materials can be used to make a solid structure in class.	▪ Be able to show what a natural solid structure is and what a man-made solid structure is. ▪ Be able to sort the structures into groups. ▪ To be able to investigate how solid structures work, building a wall and removing a brick near the base. ▪ Build a wall out of bricks or solid items that can stand tall without falling or breaking.	▪ Solid ▪ Structures ▪ Man-made ▪ Natural
	Reception Early Learning Goals	**EYFS Framework 2021** • Explore, use and refine a variety of artistic effects to express their ideas and feelings • Return to and build on their previous learning, refining ideas and developing their ability to represent them. • Create collaboratively, sharing ideas, resources and skills. • 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		

		Knowledge	Skills	Vocabulary
Year 1	<u>1.1 What is DT</u> <u>1.5 Slider Mechanism</u> <u>1.6 Levers</u>	▪ Know that Design and Technology is designing and making things that are useful ▪ Know that designs come from things that are already around us and over time designers improve them ▪ Know that DT is different to Art in that designs are always for someone to us ▪ Know how bridges have evolved over time due to the design process ▪ Understand the Think, Make, Break, Repeat design process ▪ Know and describe what a slider and guide bridge is ▪ Know and describe what a lever, pivot point and fulcrum are ▪ Describe how a lever works using the words force, input and output	▪ Collect pictures of the earliest to latest phones ▪ Describe ways in which phones have improved over time ▪ List a range of inventions and describe who might use them ▪ Experiment with sliders with and without guide bridges ▪ Experiment with curved and wavy slots ▪ Decorate sliding mechanism pictures so they have a purpose ▪ Practice with many examples for finger fluency ▪ Draw annotated diagrams of slider mechanisms explaining purpose, materials and functions ▪ Make a sliding picture using the mechanisms taught ▪ Adapt a slider design diagram for inspiration ▪ Make a slider design and annotate ▪ Make a slider prototype ▪ Test and re-think the prototype ▪ Modify slider design ▪ Explain decisions for modifications ▪ Create lever mechanisms and decorate for a purpose ▪ Design and make a product with a lever mechanism ▪ Thinking – complete a product outline for a lever mechanism product eg a model seesaw, litter picker, balance scale ▪ Create a mood board ▪ Decide on materials and techniques to be used ▪ Draw a design diagram including construction steps and annotations ▪ Make a prototype ▪ Test for weaknesses ▪ Re-think / Modify the design ▪ Explain modifications	▪ Product ▪ Purpose ▪ Intended User ▪ Inspiration ▪ Features ▪ Materials ▪ Techniques ▪ Rear ▪ Guide bridge ▪ Rotating ▪ Horizontal ▪ Vertical ▪ Diagonal ▪ Attach ▪ Automatically ▪ Fluency ▪ Inspiration ▪ purpose ▪ User ▪ Transparent ▪ Opaque ▪

	1.8 Portable Snacks	▪ Know what a portable snack means and its purpose and key features ▪ Describe safety features to be taken into account when preparing portable snacks ▪ List ingredients that snacks are made from ▪ Describe how snacks can be transported	▪ Label and annotate design features of pictures of portable snacks ▪ Practise food preparation techniques including : spreading; grating; peeling; fork secure slicing; the bridge hold, folding; weighing; snipping; stirring ▪ Draw and annotate these different skills and foods used to practice on ▪ Compare different ways of folding a wrap ▪ Create a n annotated mood board for a portable snack ▪ Decide on ingredients and techniques to be used ▪ Create a design diagram showing construction steps ▪ Make the prototype ▪ Wrap the snack ▪ Evaluate and re-think the design ▪ Modify the recipe and explain decisions	▪ Inspiration ▪ Purpose ▪ User ▪ Automatically ▪ Fluency ▪ Grating ▪ Slicing ▪ Peeling ▪ Folding ▪ Spreading ▪
	1.2 Structures 1.3 Frame Structures	▪ List 4 types of structures ▪ Name natural and manufactured structures ▪ Know why people might manufacture structures ▪ Understand what is meant by stable and unstable and the centre of gravity ▪ Know what the words 'rigid' and 'properties' mean and give examples of materials. ▪ Know that a frame structure is made up of beams, columns and slabs ▪ Give examples of natural frames structures eg coral, tree, leaf, spider's web, skeleton ▪ Give examples of manufactured frame structures eg chair, table, pylon, bridge, bicycle ▪ Understand how designers take inspiration from existing products and must consider safety. ▪ Describe safety features of framed products ▪ Apply techniques learned to a design for a chair for a soft toy ▪ Explain decisions for modifications	▪ Build stable structures with building materials ▪ Use flanges to make a stable tube structure ▪ Make an anchored frame (A frame) ▪ Make a stable frame with no anchors ▪ Make a triangle tower to demonstrate strengthening of paper ▪ Make a newspaper tower through rolling sheets to create strength ▪ Laminate card to show uncreased strength ▪ Experiment with folding, rolling and joining paper structures ▪ Annotate diagrams of own experimentation and creations ▪ Draw a labelled diagram of a frame structure pointing out it's features ▪ Cut and join straws to create 2D and 3D (cuboid, triangular prism) and anchored frames ▪ Adapt and refine the joints ▪ Compare and contrast first and final efforts ▪ Label and annotate frame pictures to show design features ▪ Use knowledge of frame structures to design a chair ▪ Thinking – complete a product outline for a chair for a soft toy ▪ Create a mood board ▪ Decide on materials and techniques to be used ▪ Draw a design diagram including construction steps and annotations ▪ Make a prototype ▪ Test for weaknesses ▪ Re-think / Modify the design ▪ Design and make a fame structure independently	▪ Structure ▪ Nature ▪ Combined ▪ Manufactured ▪ Protect ▪ Span ▪ Connected ▪ Balanced ▪ Centre of Gravity ▪ Stable ▪ Free-standing ▪ Anchor ▪ Brace ▪ Base ▪ Rigid ▪ Properties ▪ Construct ▪ Beam ▪ Column ▪ Slab ▪ Automatically ▪ Fluency ▪ Accurate ▪ Inspiration ▪ Purpose ▪ User ▪

		Knowledge	Skills	Vocabulary
Year 2	**1.9 Couscous Dish**	▪ Know what a nutritious meal is ▪ Understand safety features when preparing a meal ▪ Know and list ingredients used for a nutritious meal ▪ Know and understand that food comes from two main sources : plants and animals ▪ Be able to give examples of food from these sources ▪ Understand that certain types of plant foods are seasonal and therefor harvested at specific times of the year ▪ Know some foods which are available in different seasons ▪ Know aspects of food safety eg how to store foods correctly in a cupboard or fridge; hygiene rules; safe cooking – asking an adult before using equipment and adult supervision with sharp knives	▪ Label and annotate pictures of a variety of couscous dishes ▪ Create a product outline for a specific type of couscous dish ▪ Create a design diagram with annotations to give clear detail for someone else to understand – use the skills from portable snacks topic in Year 1 ▪ Make the prototype of the couscous dish using seasonal ingredients ▪ Cost and time how much the recipe will cost and how it will take to make ▪ Evaluate the look and taste of the dish for weaknesses ▪ Re-think and apply technical and practical knowledge of cooking and nutrition ▪ Modify recipe and explain decisions ▪ ▪	▪ Inspiration ▪ Purpose ▪ Use ▪ Ingredients ▪ Nutritious ▪ Reared ▪ Grown ▪ Caught ▪ Processed food ▪ Seasonal food ▪ Food poisoning ▪ Prepare ▪ stored
	1.7 Wheel and Axle Mechanism	▪ Know a wheel and axle is a mechanism used for moving things and that they work together. ▪ Know a wheel axle is a rotating lever – the axle is the fulcrum ▪ Know that a big wheel does not take much force to move ▪ Know a smaller axle turns more slowly but with more force ▪ Know the bigger the handle the easier it is to turn ▪ Know in a car the engine turns the axle	▪ Draw annotated diagrams to show speed and force of a wheel and axle when one or other is turned. ▪ Practise making wheel and axle mechanisms and attaching to chassis such as cardboard rolls; sheet materials; clothes pegs ▪ Design a wheeled vehicle applying knowledge of wheel and axle mechanisms which is powered by wind ▪ Annotate the design and show how the car will be constructed and powered ▪ Make a prototype ▪ Test, evaluate and re-design using technical and practical knowledge ▪ Modify the design and explain decisions ▪ Design a wheel and axle mechanism using the techniques above eg a wheeled vehicle, a screwdriver, a big wheel fairground ride, a water wheel, a wheelbarrow	▪ Mechanism ▪ Rotating ▪ Force ▪ Attach ▪ Chassis ▪ Automatically ▪ Fluency ▪ Inspiration ▪ Purpose ▪ user
	1.4 Solid Structures	▪ Know a solid structure is one made from one or lots of solid object/s ▪ Know stone and brick structures are joined with mortar ▪ Know solid structures are not hollow and can be very strong	▪ Create stacked and running bond walls and remove the bottom middle brick to test for strength ▪ Explain this through annotated diagrams ▪ Investigate with construction kits - building with narrow, wider and very wide bases and draw and annotate what happens to the building when they shake	▪ Solid ▪ Mortar ▪ Hollow ▪ Dam ▪ Arranged ▪ Bond

		▪ Give examples of natural and manufactured solid structures ▪ Know solid structures made from lots of small solid objects are strong because of the way the bricks are arranged and that this is called the bond of the bricks ▪ Know what stability means ▪ Know that a stable structure has a centre of gravity over it's base ▪ Know that in some countries buildings need to be more stable due to earthquakes and that buildings with very wide bases are designed for this reason ▪ Know that often bases can be underground and these are called foundations.	▪ Label and annotate design features of a garden wall, a concrete dam, a marble statue; a stone bridge ▪ Create a design for a bridge applying knowledge of techniques and materials to decide which are the most appropriate ▪ Annotate the design with step by step instructions ▪ Make the prototype ▪ Re-think techniques such as how to build the arch over and arch shape before it dries to stop it collapsing ▪ Use the techniques above to design and create an igloo; a tall building; a pyramid; a bridge	▪ Remove ▪ Balanced ▪ Earthquake ▪ Architects ▪ Foundations ▪

	Knowledge	Skills	Vocabulary

	2.1 What is design and technology. 2.7 Shell structures	▪ To understand that design technology has a purpose/use. ▪ To know that all designs have already been inspired from a previous design. ▪ Understand the time line of a design and where is originated from. ▪ To know the process of how to design a product, **Think, Make, Break, Repeat**. ▪ Understand the purpose of the design and who is the intended user. ▪ Understand what materials are used and why. ▪ Show knowledge of material based research, why have they been used compared to other materials. ▪ Understand what a shell structure is. ▪ Understand the difference between a natural shell structure and a man-made shell structure. ▪ Know and give examples of both versions of shell structures. ▪ Know that a man-made shell structure can have a frame structure within. ▪ Know and list materials in shell structures.	▪ To show a clear product idea, research previous products to compare to/ evaluate. ▪ Show an understanding of the intended user, who will use it and why? ▪ Show the purpose of the design, why are you designing it. ▪ Design the product and annotate. ▪ Label features of the design that are significant to the products purpose ▪ List the materials used and the properties of these, why have you selected these materials over others? ▪ Show how the product will be made, detailed design step by step process. ▪ Make a prototype using a basic material. ▪ Show any changes that have had to be made and evaluate. ▪ Show an understanding of why a product design is different to art. ▪ Show a variety of shell structures and put them into categories. ▪ List the key features of these shell structures and their purpose. ▪ Describe the construction of the shell design, showing annotation to back up understanding. ▪ How does the framework and shell structure work in conjunction with each other. ▪ Demonstrate different types of shaping used within shell structures (cardboard for hands on approach) ▪ Show different joining methods (p261) ▪ Show understanding of these steps by making a prototype, annotate and experiment with different fold/joints for the same product.	▪ Device ▪ App- enabled ▪ Respond ▪ Inspiration ▪ Purpose ▪ User ▪ Intended user ▪ Materials ▪ Techniques ▪ Features ▪ Variety ▪ Purpose ▪ Contain ▪ Conjunction ▪ External ▪ Automatically ▪ Fluency ▪ Aspects ▪ Component parts ▪ Coordinate ▪ Assemble ▪ Inspiration ▪ User ▪ Annotate ▪ Scale

		▪ Know why shell structures are used.	▪ Using CAD can you show how a 2d plan would be turned into a 3D object. (P263) ▪ Apply knowledge of CAD and make 2 d plans that will then be used to construct a 3D object, annotate. ▪ Using an igloo show your understanding of the shapes used, structure and design features. ▪ List the materials used and apply this knowledge to making a 3D version scaled down. ▪ Using all of this , design, make and evaluate a product (box with compartments or boat)	

	2.4 Linked Levers	▪ Know what a lever is. ▪ Know what a linked lever is and it's purpose. ▪ Know that it changes the force and movement of an object. ▪ Know the types of movements made and be able to list them. ▪ Know what mechanism's use levers and linked levers and why. ▪ Know why they are used.	▪ Show understanding of a linked lever and what a pivot is. ▪ Define the word 'fulcrum' ▪ Describe the following types of movements, linear, rotary, reciprocating and oscillating. ▪ Draw a range of annotated diagrams to show different outputs that you would see using different linked levers. ▪ Look at design inspiration, what linked levers have been used and how does it work. ▪ Explore the product, it's intended use and intended users. ▪ Make a mood board of the product and compare to similar products. ▪ Practise your knowledge by designing a fold away barrier, what linked levers would you use, how would it fold, dimensions, purpose. ▪ Annotate your design, showing a step by step plan. ▪ Use this design and knowledge to design and make either an extendable grabber or a scissor- lift platform. Show annotation, detailed drawings and problem solving. Evaluate	▪ Pivot ▪ Fulcrum ▪ Linear ▪ Rotary ▪ Reciprocating ▪ Oscillating ▪ Automatically ▪ Fluency ▪ Inspiration ▪ Purpose ▪ User ▪ Levers ▪ Prototype

Year 3	2.5 Pneumatics	▪ Show knowledge of pneumatic-powered machines ▪ Know that compressed air or other gases are used to create motion. ▪ Know that the air or gas is compressed into small areas to create high pressure. ▪ Know that the pressure is used to create the movement. Know that this is called hydraulics. ▪ Know where the words pneumatic and hydraulics come from (Greek and Latin) ▪ Understand how designers use previous products to build their own understanding and design.	▪ Show an understanding of a pneumatic mechanism and define the word compressed. ▪ List examples of machines that use either pneumatic or hydraulics. ▪ Choose one of these machines, draw and annotate a diagram, showing understanding of the different components with the type of movement used. ▪ Show your understanding of these systems by making a prototype of a pneumatic system (p228 – bottle model) ▪ Explain how the system works, you could video/take pictures of the process and annotate. ▪ Choose a design or a product that uses these systems and label. (P231) ▪ Creating a mood board using this design, show the key elements that could be used, techniques required, materials, features. ▪ Adapt design (p235) to create your own pneumatic lifting device. Show stages and annotate, make sure it can be followed clearly by another person. ▪ Explore the stage of the designed lifter, problem solve. (P238 – 239) ▪ Finally design and make a **lifter**, using all the previous knowledge, making sure you understand the purpose, inspiration, intended user and force needed.	▪ Pneumatics ▪ Compressed ▪ Pressure ▪ Hydraulics ▪ Piston ▪ Hollow cylinder ▪ Reciprocating ▪ Automatically ▪ Fluency ▪ Inspiration ▪ Purpose ▪ User ▪

		Knowledge	Skills	Vocabulary
Year 4	2.3 Paper circuits	▪ Know how a circuit works ▪ Know what an LED light , a switch and batteries are. ▪ Know that electrical connections between LED's, switches and batteries can be made from copper. ▪ Know the advantages of using copper (lightweight, thinner and adhesive) ▪ Know where the positive and negative end of the batteries are. ▪ Be able to identify the parts of a basic circuit are. ▪	▪ Be able to explain what conductive means. ▪ Show an understanding of copper wire and the advantages of this. ▪ Show what an LED light is and why it is used in comparison to other light sources. ▪ Explain how an LED is connected to the cell. ▪ Explain what an exploded diagram is. ▪ Draw a diagram of an LED connected to the cell and then draw an exploded diagram of how a switch can be made using copper wire. ▪ Explore how paper circuits can be used to enhance a picture. ▪ Apply this knowledge and design a spare circuit, draw a diagram of this and annotate. Can a different circuit be used in this design. ▪ Create a mood board of appear circuits that have already been designed, then annotate the design and the circuit that has been used. ▪ Design a card with a paper circuit using inspiration from your mood board. Draw diagrams and annotate, make and evaluate the finished product. ▪ Show an exploded diagram of your circuit, labelled. ▪ Problem solve any areas that didn't work and annotate. ▪ ▪	▪ LED ▪ Conductive ▪ Adhesive ▪ Exploded diagram ▪ Illuminate ▪ Automatically ▪ Fluency ▪ Enhance ▪ Inspiration ▪ Purpose ▪ User ▪ Call ▪ Circuit
	3.3	▪ Know what an electronic motor is and it's purpose.	▪ Be able to show a variety of motors with a propeller or gear and axles.	▪ Rotary ▪ Propeller

	Electronic motors	▪ Know we're it is used and why. ▪ Know that it uses rotary movement and can be combined with gears to alter the speed. ▪ Know what type of motion is created when using a motor. ▪ Know that the design is born from a previous design and improved. ▪ Know the intended user of the product and life expectancy of the product. ▪ Know the materials needed to produce the product. ▪ Be able to show a clear design with annotated diagrams and easy to follow instructions. ▪ Show they can evaluate and modify/adapt the product if needed. ▪	▪ Draw and annotate different types of products such as a pulley, propeller, fan and gear/axles and wheels. ▪ Explain how a product is made, what materials are used and experiment with different types of motors. ▪ Create a mood board of motorised cars, comparing the different styles and materials used.can you identify the intended user. ▪ Using your knowledge and assessment of previous products which one is best to base your design on. ▪ Draw diagrams of your chosen product, show clear understanding of how the motors work and the materials used. Evaluate areas that you will change and why. ▪ Now design and make your own product, either a vehicle or fan. ▪ Remember to include detailed diagrams, an inspiration mood board, clear annotation of your product and materials used. ▪ Demonstrate it working and evaluate any changes you have made or would make to improve it.	▪ Combined ▪ Automatically ▪ Fluency ▪ Inspiration ▪ Purpose ▪ User ▪ Pulleys ▪ Motors ▪ Chassis

		Knowledge	Skills	Vocabulary
	2.6 Frame structure	▪ Know what a structure means . ▪ Know why some shapes are more rigid than others. ▪ Know that a triangle is the most rigid shape and why it's used in frame structure. ▪ Know that this is called triangulation. ▪ Know that trusses are used interlocking to create a rigid form and that this is used in bridge structure. ▪ Know that this allows the weight to be distributing across the frame more evenly allow more weight to be carried across it.	▪ Show the different frame structures and the shapes used to create it. ▪ Show understanding of the word triangulation. ▪ Define the word rigid. ▪ Investigate the words truss, strut and joining plate. ▪ Draw an annotated diagram of triangulation to show understanding. ▪ Apply knowledge of frame structure by make a cuboid, annotate on iPad. ▪ Experiment using different 3D shapes, explain how the frame for the shape is made and joined. ▪ Investigate a truss bridge, look at the design, features, materials and techniques. ▪ Using this design adapt it to create your own design for a truss bridge. ▪ Organise the diagram so that it is clear for some ones else understand. Experiment different ways in ledge so far to demonstrate this. ▪ Design and make a bridge or picture frame using your knowledge so far. Show a design, diagrams, annotation and inspiration.	▪ Rigid ▪ Truss ▪ Distribute ▪ Strut ▪ Joining plate ▪ Automatically ▪ Fluency ▪ Pioneer ▪ Purpose ▪ Inspiration ▪ User ▪ Chord ▪ Pier ▪ Braces ▪ Interlocking

		Knowledge	Skills	Vocabulary
Year 5	**3.1 What is a design technology** **3.9 Bread**	▪ Know what design Technology is and it's purpose. ▪ Know that designs come mostly from designs that already exist. ▪ Understand the evolution of a design. ▪ Know that design goes through four stages, think, make, break, repeat and the concept behind this. Understand the purpose and user of the product. ▪ Know that designers take inspiration from existing products. ▪ Know who the intended audience is and what the product aims are. ▪ Know the key features of a product and be able to identify them. ▪ Know the process in which the product needs to go through to achieve the end product.	▪ **Be able to describe what design technology is and why it is different to design.** ▪ **Show examples of how designs evolve and why.** ▪ **Show how a design goes through the different stage, think, make, break and repeat and why this process is so important.** ▪ **Be able to show how materials are a key part in a design.** ▪ Show understanding of different breads, be able to label them and identify the difference between them. ▪ Show the impact of kneading has on dough and why it is used. ▪ Experiment with kneading different types of dough and the results of this. ▪ Investigate recipes that use kneading and adapt your work with improvements as you go. ▪ Create a mood board for different types of breads, annotate. ▪ Decide on the appropriate bread to make using your mood board, why and list the ingredients needed. ▪ Draw a detailed diagram of each stage of the process, from ingredient mixing order, to kneading style, to baking.make sure it can be followed clearly by someone else. ▪ Now make your bread, list any additions to your bread or changes along the way. ▪ Now evaluate your end product, how it it turn out, was it as per your plan?	▪ **Product** ▪ **Purpose** ▪ **Intended user** ▪ **Inspiration** ▪ **Materials** ▪ **Features** ▪ **Techniques** ▪ Inspiration ▪ Purpose ▪ User ▪ Automatically ▪ Fluency ▪ Accurate ▪ Measurements ▪ Temperature ▪ Weighing

			▪ Investigate the possible changes you could make to improve this product. ▪ Think about what would accompany the bread to make it part of a balanced meal.	
	3.4 Arch structures 3.5 Frame structures	▪ Know what keystone, voussoir, impost and pier to in terms of arch structures ▪ Apply knowledge of solid structures to make products that have an arch ▪ Explain how arches are made through annotated diagrams ▪ Know that frame structures are made from lightweight materials and that their strength comes from the way in which they are joined and assembled.	▪ Draw and describe elliptical, parabolic and catenary shapes ▪ Draw an annotated 3D diagram showing arch structure and how it gains its strength ▪ Become finger fluent in creating arch structures in different ways ▪ Experiment with a variety of arches in products ▪ Label and annotate design features in pictures of buildings with arch structures ▪ List materials that the product is likely to be made from ▪ Make a product eg building, shelter, bridge based on knowledge of designs studied ▪ Create a mood board showing how to overcome design challenges ▪ Apply knowledge of techniques to decide on most appropriate for task – decide on materials to be used ▪ Make prototypes and re-think design, modify and explain decisions • Practise with techniques to make frame structures from art straws including extending straws and corners • Use annotated diagrams to explain these techniques and how the joins give strength to a frame structure	▪ Perfected ▪ Ellipse ▪ Parabola ▪ Keystone ▪ Voussoir ▪ Impost ▪ Pier ▪ Automatically ▪ Fluency • Assemble • Technique • Construct • Extend • Automatically • Fluency •

			• Become finger fluent on constructing frames by creating tetrahedrons to make triangular pyramids • Experiment with a variety of arches in own products • Create a box kite, model pyramid o r geodesic dome (eg Eden Project) using knowledge of frame structures and materials • Create a mood board to explain shape, design, materials and design challenges. • Make prototype • Adapt design diagram by applying practical and technical knowledge • Modify design and explain decisions	
	2.2 App control 3.2 Artificial Intelligence	▪ Know what app controlled means. ▪ Know that lots of everyday devices use app controls. ▪ Show understanding that app controlled devices usually use Bluetooth or WiFi. ▪ Know that apps that have programmed allow users to send instructions to them. ▪ Know that the app controlled device will respond to the instructions and act accordingly. ▪ ▪ Understand what AI stands for. ▪ Know the three parts that all devices use, input, processes and outputs. ▪ Understand that devices use different types, some manual and others a sensor. ▪ Can identify devices that use AI. ▪ Be able to annotate diagram of a device that uses AI.	▪ Be able to list a variety of app controlled devices. ▪ Show understanding of why app controlled devices are used and why the the user would choose it. ▪ Be able to show an understanding of internal and external apps. ▪ Be able to annotate an app controlled picture of a device, listing the electrical system components in the product (p178) ▪ Create a mood board of 'lifestyle helpers' annotating different areas. ▪ Design a 'lifestyle helper' of your own, showing overall design and a breakdown of each key area. ▪ Show a design diagram of the code you would need to control your design. ▪ Make sure that your design, diagram and coding can be followed easily by someone else. ▪ Test out your coding, will the sequence work? ▪ Now make a prototype of your design including the coding, problem solve any issues along the	▪ Device ▪ App-controlled ▪ Respond ▪ Automatically ▪ Fluency ▪ Inspiration ▪ Purpose ▪ User ▪ Components ▪ Coding ▪ ▪ Artificial intelligence ▪ Sensor ▪ Component ▪ Detect ▪ Component ▪ Detect ▪ Automatically ▪ Fluency ▪ Inspiration ▪ Purpose ▪ User

		▪ Show understanding if how an app waiting for an instruction where that be manually or remotely. ▪ Understand how distance sensors work and be able to give a brief example/description of this. ▪ Be able to draw and annotate a smart device. ▪ Know what a force device and distance detector device is. ▪ Know how AI is used to help us by large companies (p324) ▪	way and record, evaluate and identify any areas that would need improvement. ▪ ▪ Show a range of AI devices and be able to categorise them and give reasoning to tho categories. ▪ Be able to show understanding of the three parts that help to make up the processes of an AI devices programming. ▪ Give examples of how AI works when using a remote or sensor. ▪ Be able to show how sensors can work to help a device. ▪ Create a mood board of devices that use sensors and annotate. ▪ Design your own device that would use AI and sensors, annotate and draw detailed diagram of the device' programming and the sensors. ▪ Make sure that the device meets the requirements of the intended user. ▪ Make a prototype of your product using all the design features. ▪ Show any problem that you had along the way and adaptation you made. ▪ Evaluate the final product, how did it work, how can it be improved and if it met it's intended purpose and user.	▪

		Knowledge	Skills	Vocabulary
Year 6	**3.6 Pulleys and gears**	▪ Know that a pulley and gears are types of mechanisms. ▪ Know that gears can be used as a change of speed and direction of movement. ▪ Know that a pulley is a grooved wheel on an axle. ▪ Know that pulleys are used to change the direction of a force or to obtain a mechanical advantage. ▪ Know that a pulley system allows a load to be lifted by using force that is less then the load of weight being moved. ▪ Know that two or more pulleys used together is called a block-and-tackle. ▪ Know that pulleys date back to the Greeks. ▪ Know the different types of gear trains. ▪ Know why pulleys are used and give examples. ▪ Know how gears interlock enabling them to move. ▪ Know and list where pulleys are used. ▪	▪ Be able to show an understanding of pulleys and gears and how they work. ▪ Be able to show how gears are used to change speed and direction of an object. ▪ Be able to show an example of a pulley system and how it works. ▪ Show how pulleys are used to change the direction of something. ▪ Be able to create a mood board of pulley systems with gears, where and why they are used. ▪ Demonstrate knowledge by labelling and annotation a pulley system (p392) listing the materials used and knowledge on pulley systems as to how it works. ▪ Design a pulley system, understand how it would work, the components needed, the intended use/user and the force needed for it to function. (P402) ▪ Show a detailed diagram of the system, detailing the various areas so that it is easy for anyone to follow. ▪ Make sure that your pulley system works and adapt any areas that you think may not work. ▪ Make a prototype of your design, problem solve and record along the way and make sure an adaptions made as detailed. ▪ Test your prototype and evaluate to system, did it work, oils it be improved again, we're the correct materials used.	▪ Circumference ▪ Mechanical advantage ▪ Physical ▪ Gear train ▪ Interlock ▪ Mitre gear ▪ Automatically ▪ Fluency ▪ Inspiration ▪ Purpose ▪ User

	3.8 Food throughout the year	▪ Know what seasonal and harvest means? ▪ Know what seasonal food is and when this is ready to harvest during which season. ▪ Know why foods are grow at different times of the year. ▪ Show an understanding of cultural events and the foods associated with these. ▪ Be able to know the different types of foods (comfort foods, winter foods etc)	▪ Show an understanding of seasons and how they effect when foods are grown. ▪ Be able to list different types of foods in the different seasons and when is best Pick/eat them. ▪ Show the benefits to eating seasonal foods and to not only yourself but also the environment. ▪ Be able to design a seasonal menu for each season (including a main course and dessert) ▪ List the ingredients used in a winter and summer soup and they those ingredients are used. ▪ Be able to show knowledge of where the foods have come from and the impact of this. ▪ Be able to show a mood board of the different foods eaten in different cultures and the benefits of these (p421 – 425) *reference RE*	▪ Seasonal ▪ Harvest ▪ Global impact
	3.7 Cams	▪ Know what a CAM is and show examples. ▪ Know that they follow a mechanism that turns a rotary motion into a linear reciprocating motion (or visa verse) ▪ Know what a reciprocating motion is and what it follows. ▪ Know that a CAM is a wheel but it isn't a circular shape. ▪ Be able to list the types of movements it does. ▪ Know the purpose of a CAM and what dwell means. ▪ Know where and give examples of how they are used. ▪ Show annotated diagrams of a CAM mechanism.	▪ Investigate at CAM and give examples/description of them. ▪ Draw diagrams if different styles of CAM's labelling and showing detailed descriptions of their direction of motion. ▪ Show what *fall, dwell and rise* means in relation to CAM. ▪ Be able to explain what reciprocating means in relation to CAM. ▪ Show that they can label and annotate the picture (p408) listing the materials used and apply knowledge of pulley systems. ▪ Create a mood board of automaton toys and annotate. Arrange these into groups and give reasoning for the groupings. List the materials used and why. ▪ Draw a design diagram, making sure you include details of how you will make it work. Use your knowledge of *frame structure.*	▪ Linear reciprocating ▪ Vice versa ▪ Dwell ▪ Eccentric circle ▪ Automatically ▪ Fluency ▪ Automaton ▪ Inspiration ▪ Purpose ▪ User ▪ Prototype

			▪ List materials and detail the CAM you will use. ▪ Experiment with different ways of presenting your diagram. ▪ Draw sketches of your automaton and make the first prototype of this part. Evaluate, make note of changes that you made or will need to make, does it complete the purpose required. ▪ Make your design (p418) remember to follow the design instruction, make notes of any changes you have made along the way, test your final product and evaluate. What if any changes would you make, how easy where the instructions to follow, did you use all the materials you listed?	