Milton Mount Primary School

Design and Technology Planning Summary Document

EYFS, Key Stage 1 & Key Stage 2

Year 1

Year 1 Autumn	
Challenge	Can I make a fruit salad for The Tiger that came to tea?
Knowledge	Learn how and where fruits are grown. Identify if a food is a fruit or vegetable and use this knowledge to form your design. Describe and group fruits by texture and taste. Know how to keep them and their workspace clean and safe.
Disciplinary Knowledge	Cooking and Nutrition
Skills	Test and evaluate different food combinations, describing their likes and dislikes. Describe the appearance, taste and smell. Design a healthy fruit salad using a food combination which work well together. Chop fruit safely using a chopping board and children's knife. Use a bridge or claw grip to cut fruit safely. Evaluate which grip was most effective. Suggest information that would need to go on the packaging.
Vocabulary	Healthy, Combination, Safe, Workspace, Bridge grip, Claw grip, Ingredients, amount, Prefer, effective, plan, prepare, Evaluate
Year 1 Spring	
Challenge	Can I make an interactive storybook?
Knowledge	Learning that levers and sliders are mechanisms and can make things move Determining what movement the mechanism will make Using the vocabulary: up, down, left, right, vertical and horizontal to describe movement
Disciplinary Knowledge	Mechanisms
Skills	Design purposeful, functional, appealing products for themselves and other users based on design a design brief. (Learn the importance of a design brief) Generate, develop, model and communicate their ideas through talking and drawing, Follow a design to create moving models that use levers and/or sliders. Independently cut and assemble parts with support from the teacher to position the moving part correctly. As a group, test a finished product, seeing whether it moves as planned and if not, explain how it can be fixed. Review the success of a product against a design brief.
Vocabulary	Lever, Slider, Mechanism, Movement, Up/down, Left/right, Vertical/horizontal, Product, Design brief, model, improve, successful, Unsuccessful
Year 1 Summer	
Challenge	Can I make a purse for a Monarch?
Knowledge	Learning different ways in which to join fabrics together: pinning, stapling, gluing
Disciplinary Knowledge	Textiles
Skills	Design a purposeful and functional object using templates. Design an appealing story book using a guide to control a moving part Cut fabric neatly with scissors and use fabric glue or a running stitch to decorate a product. Sequence steps for construction so that the product is functional. Identify aspects of their peers work that they particularly like and why. Reflect on a finished product, explaining likes and dislikes. Troubleshoot scenarios posed by the teacher. Discuss as a class the success of their joining.
Vocabulary	Template, fabric, running stitch, Step sequence, Pinning, Stapling, Gluing, Attach, Cloth, foam, felt, appealing, materials

Year 2

Year 2 Autumn	
Challenge	Can I make a stable Tudor house with openings?
Knowledge	Identifying natural and man-made structures Identifying when a structure is more or less stable than another Knowing that shapes and structures with wide, flat bases or legs are the most stable Understanding that the shape of a structure affects its strength Using the vocabulary: strength, stiffness and stability Knowing that materials can be manipulated to improve strength and stiffness Building a strong and stiff structure by folding paper
Disciplinary Knowledge	Materials and Structures
Skills	Compare the stability of different shapes and identify the weakest part. Learn the importance of a clear design criteria. Generate, develop, model and communicate their ideas through the use of mock ups and labelled drawings. Design a stable structure with functional opening or moving parts based on different types of structures found in your local area. Make a structure using 3d shapes according to design criteria. Create joints and structures from paper/card, tape and glue. Test the strength of their own structure and evaluate the strength, stiffness and stability of their own structure and adapt your design accordingly. Evaluate own designs against design criteria.
Vocabulary	Stable, Functional, Structure, 3d shape, Joints, Tabs, Strength, Weakness, Base, Stiffness, manipulated, Labelled, Design Criteria, Mock ups, openings
Year 2 Spring	
Challenge	Can I make a useful airport vehicle with moving axles?
Knowledge	Learning that mechanisms are a collection of moving parts that work together in a machine Learning that there is an input and output in a mechanism Identifying mechanisms in everyday objects Learning that a linkage is a system of levers that are connected by pivots Exploring wheel mechanisms Learning how axels help wheels to move a vehicle
Disciplinary Knowledge	Mechanisms
Skills	Evaluate what you like, dislike and what works best about different designs. Design purposeful, functional, appealing products for themselves and other users based on design criteria Generate, develop, model and communicate their ideas through the use of labelled drawings which show the product from different angles. Design a functional moving vehicle which uses wheels, axles and axle holders which allow the vehicle to move. Follow a given process flow chart to cut and assemble parts in the correct order so that the wheels on a vehicle are able to move smoothly. Use jigs to accurately mark, measure and make axle holders that are in line. Test your design and use peer feedback to modify/adapt your final design better match the design criteria. Evaluate the effectiveness of your axle and wheel system and discuss what would improve the performance of your vehicle.
Vocabulary	Input, Output, Linkage, Pivots, Axle, jig, Measure, Purposeful, Functional, Modify, Adapt, Progress

Year 2 Summer	
Challenge	Can I design an aid to help someone whose mobility is restricted?
Knowledge	Learn that User Centred Design focusses on the users and their needs in each phase of the design process Learn that uses within a group of people all have their own varying needs e.g. varied height, arm length or mobility.
Disciplinary Knowledge	User Centred Design/Mechanisms
Skills	Design a user centred tool to aid a user whose mobility is restricted. Design a tool which uses levers and linkages to scoop or grab another object. Draw and label a series of design options before choosing your preferred design. Make a' helping hand' using linkages using card for levers and split pins for pivots Experimenting with linkages adjusting the widths, lengths and thicknesses of card used Evaluate the success of your lever and linkage system against the specific users' personal needs. Evaluate the effect adjusting the widths, lengths and thicknesses of card used had on the output of the mechanism.
Vocabulary	User centred design, Restricted, Phase, Varying needs, User Feedback, Effect/impact, Reflection, Original, mobility

Year 3

Year 3 Autumn	
Challenge	Make a Stone Age vegetable soup
Knowledge	Learning that climate affects food growth Working with cooking equipment safely and hygienically Learning that imported foods travel from far away and this can negatively impact the environment Describe the benefits of seasonal and local vegetables and the impact on the environment. Learning that vegetables and fruit grow in certain seasons Learning that each fruit and vegetable gives us nutritional benefits Learning to use, store and clean a knife safely.
Disciplinary Knowledge	Cooking and Nutrition
Skills	Taste test food combinations describing the taste, texture and smell of vegetables. Design a healthy and nutritious savoury snack/meal considering the taste, texture, smell and appearance of the dish. Know how to prepare themselves and their workspace to cook safely in, learning the basic rules to avoid food contamination. Cook safely using basic hygiene rules. Use equipment safely including knives and ovens. Follow the instructions within a baking recipe. Cut, weigh/measure ingredients as listed in the recipe. Use design criteria to help test and review the success of your dish. Suggest points for improvement when making a savoury product against the intended users nutritious needs.
Vocabulary	Nutritious, Balanced, vitamins, Savoury, Taste, Texture, Smell, Appearance, Contamination, disease, Hygiene, Weigh, Measure, Grams/kilograms, Recipe, Seasonal/local, Climate, Imported, Source, Benefits, Test
Year 3 Spring	
Challenge	Create a robot face with a working pneumatic feature
Knowledge	Understanding how pneumatic systems work Learning that mechanisms are a system of parts that work together to create motion Understanding that pneumatic systems can be used as part of a mechanism Learning that pneumatic systems force air over a distance to create movement
Disciplinary Knowledge	Mechanisms
Skills	Use research and design criteria to inform the design of functional, appealing products that are fit for purpose, aimed at particular consumers e.g an individual Generate, develop, model and communicate their ideas through discussion and annotated sketches which show the impact of the pneumatic mechanism and where this sits within the secure housing. Design a functional and appealing toy which uses pneumatic systems to make parts move. Create a product with a desired motion using a pneumatic system that sits within a secure housing. Use Syringes and balloons to create your choice pneumatic systems to make a functional and appealing pneumatic toy. Testing and modifying the functionality of a product and its outcome, suggesting improvements. Use the views of others to improve the appeal of a product against the requirements of an intended user.
Vocabulary	Pneumatic, Housing, Secure, Syringe, Motion, force, fit for purpose, Aim, Individual Annotated sketches, Consumer, Develop

Year 3 Summer	
Challenge	Make a stable working aqueduct based on historical research
Knowledge	Identifying suitable materials to be selected and used for the chosen building considering weight, compression, tension Extending the knowledge of wide and flat based objects are more stable Understanding the difference between frame and shell structure
Disciplinary Knowledge	Materials and Structures
Skills	Use research and design criteria to inform the design of functional, appealing products that are fit for purpose, aimed at particular consumers e.g a group Generate, develop, model and communicate their ideas through discussion and annotated sketches which highlight the special features and facades. Design a stable structure that is aesthetically pleasing with key features to appeal to a specific group/purpose by selecting materials to create a desired effect. Make a structure using nets of 3d shapes according to design criteria. Create joints and structures from paper/card, tape and glue that show special features for individual designs. Make facades from a range of recycled materials. Suggest points of modification to improve the strength, stiffness, stability and aesthetics of their own individual model. Evaluate own work and the work of others based on the aesthetics of the finished product in comparison to the original design.
Vocabulary	Key features, Net, Facades, Compression, Tension, Frame, Shell, group, desired, Review

Year 4

Year 4 Autumn	
Challenge	Can I create an Anglo Saxon inspired bookmark?
Knowledge	Learning the importance of a strong knot. Learning that stitches can be used for aesthetic purposes such as cross stitch. Learning the steps that make it easier to successfully thread a needle with support. Decide how many of the criteria should be met for a product to be considered successful
Disciplinary Knowledge	Textiles
Skills	Create a design a template inspired by an existing object on the market that matches the design criteria. Tie a strong knot using a pre-threaded or independently threaded needle. Making and testing a paper template with accuracy and in keeping with the design criteria. Use a selection of running stitch and cross stitch to create an aesthetically pleasing design. Evaluate the end product and think of other ways in which to create a similar item. Suggest modifications for improvement – identifying particular skills that were a strength.
Vocabulary	Cross stitch, Knot, Pre-threaded, threaded, aesthetic, Marke, Accuracy, modifications, Existing
Year 4 Spring	
Challenge	Can I make a dinner for Egyptian times?
Knowledge	Understanding the impact of the cost and importance of budgeting while planning ingredients Understanding the environmental impact of using seasonal and local vegetables. Understand that the nutritional value of a meal alters if you remove, substitute or add ingredients. Describe the benefits of seasonal and local vegetables and the impact on the environment.
Disciplinary Knowledge	Cooking and Nutrition
Skills	Use research and design criteria to inform the design of appealing products that are fit for purpose/nutritious, aimed at particular consumer from a different area of the world. Evaluate and compare food combinations and product variety describing the taste, texture and smell of a variety of ingredients. Design a healthy and nutritious snack/meal within a given budget, drawing upon previous taste testing. Write an amended method for a recipe to incorporate the relevant changes to ingredients. Work safely and hygienically with independence. Know how to avoid cross-contamination. Follow the instructions within a baking recipe and adapt this where necessary to ensure the consistency and texture is correct. Cut, weigh/measure ingredients as listed in the recipe adapting these measures where needed. Use equipment safely including knives, hot pans and hobs. Use design criteria to help test and review the success of your dish and discuss the impact of the budget on the selected ingredients. Suggest points for improvement when making a product against the nutritional value.
Vocabulary	Budget, Nutritional value, Dietary requirements, Cross contamination, Bacteria, disinfect, Storage, Substitute, Incorporate, Consistency, presentation, Variety, environmental, Alter, Amend, incorporate

Year 4 Summer	
Challenge	Can I make an effective torch for a treasure hunter?
Knowledge	Learning how electrical items work Learning what electrical conductors and insulators are Understanding that a battery contains stored electricity and can be used to power products Identifying the features of a torch Understanding how a torch works Articulating the positives and negatives about different torches
Disciplinary Knowledge	Electrical Systems
Skills	Use research and design criteria to inform the design of functional, appealing products that are fit for purpose, aimed at particular consumers e.g an individual or group Generate, develop, model and communicate their ideas through discussion, annotated diagrams using electrical symbols and annotated cross-sectional diagrams. Design a torch which used a simple electrical circuit by identifying a design criteria and target audience. Make and assemble a functional torch with a working electrical circuit and switch to match the design criteria and brief. Use appropriate equipment to attach materials. Test and evaluate the success of a final product taking inspiration from the work of peers. Evaluate the effectiveness of the electrical system.
Vocabulary	Simple circuit, Switch, Device, Conductor, Insulator Inform, Cross-sectional diagrams, Target audience, assemble, Appropriate, Inspired

Year 5

Year 5 Autumn	
Challenge	Can I make an ancient Greek theatre with moving parts?
Knowledge	Knowing that an input is the motion used to start a mechanism Knowing that output is the motion that happens as a result of starting the input Knowing that mechanisms control movement Describing mechanisms that can be used to change one kind of motion into another
Disciplinary Knowledge	Mechanisms
Skills	Use research and develop design criteria to inform the design of innovative, functional, appealing products that are fit for purpose, aimed at particular individuals Generate, develop, model and communicate their ideas through annotated cross-sectional sketches and exploding diagrams. Design a functional, appealing toy aimed at a particular individual or group, naming each mechanism and its input and output accurately. Explain your choice of cam to create a desired movement. Create a process flow chart that can be used to assemble parts in order. Measure, mark, cut and assemble with increasing accuracy to create a toy with linkage systems to convert a rotary movement to a linear movement that animates a scene. Independently measure, and mark wood accurately. Use correct sawing techniques to saw safely. Evaluate the effect of shape and workmanship has on the speed, direction and accuracy of the final product. Suggest and act on points for improvement to ensure the products is fit for purpose for its intended user.
Vocabulary	Cam, Cam box, Dowel, Snail cam, Peg cam, Pear-shaped cam, Off-centre cam, Shaft, Crank, Handle, saw, Rotation, Rotary motion, linear motion, Oscillating, reciprocating, Innovative, Exploding diagrams, Process flow chart, Workmanship, Intended user
Year 5 Spring	
Challenge	Can I make the most effective bridge for the Amazon Rainforest? (suspension / arch/ truss / beam)
Knowledge	Exploring how to create a strong beam Identifying arch and beam bridges and understanding the terms: compression and tension Identifying stronger and weaker structures Finding different ways to reinforce structures Understanding how triangles can be used to reinforce bridges Articulating the difference between beam, arch, truss and suspension bridges
Disciplinary Knowledge	Materials and Structures
Skills	Use research and develop design criteria to inform the design of innovative, functional, appealing products that are fit for purpose, aimed at improving the life of a particular group Generate, develop, model and communicate their ideas through annotated sketches which shows the impact of load on the tension of the bridge as well as detailing the reinforcements or support put in place to strengthen the design. Design a stable structure that is able to support weight, considering how the structure will be used, considering effective and ineffective design. Make a chosen bridge style (truss, suspension, beam etc) that spans a given distance and supports a load. Identify where a structure needs reinforcement, using card corners for support. Independently mark, measure and cut materials to the desired lengths. Describe what characteristics of a design and construction made it the most effective considering ineffective designs and models. Test and adapt and improve their own bridge structure by identifying points of weakness and reinforcing them as necessary. Identify what makes a successful structure and suggest points for improvement for own bridges and those of others using technical vocabulary.
Vocabulary	Support, Truss, Suspension, Beam, Span, arch, Load, reinforcement, Consider, Effective/ineffective,

Year 5 Summer	
Challenge	Can I make an electronic ‘steady hand’ game?
Knowledge	Learning the key components used to create a functioning circuit Learning that graphite is a conductor and can be used as part of a circuit Learning what a series circuit is Understanding that breaks in a circuit will stop it from working
Disciplinary Knowledge	Electrical Systems
Skills	Generate, develop, model and communicate their ideas through discussion, trial and error and annotated diagrams with electrical symbols which detail the positive and negative parts in relation to the battery. Design an electronic ‘steady hand’ game using a simple controlled electrical circuit which contains a buzzer. Create a labelled diagram showing the positive and negative parts in relation to the battery. Make an electronic game using a simple controlled electrical circuit referring to the design criteria. Map out where different components of the circuit will go. Use appropriate equipment to attach materials, cutting the wire for the game component so that it is the desired length. Evaluate the completed product against the original design sheet and looking at modifications that could be made to improve the reliability or aesthetics of it or to incorporate another type of electrical device e.g. buzzer.
Vocabulary	Components, Graphite, Conductor, Series circuit, Controlled, Positive, negative, Reliability

Year 6

Year 6 Autumn	
Challenge	Can I create a motorised World War ll vehicle? (propeller/ wheels)
Knowledge	Understanding how motors work Learning that batteries contain acid, which can be dangerous if they leak. Understand that switches create a break in a circuit and help to save energy. Learning that when electricity enters a magnetic field it can make a motor
Disciplinary Knowledge	Electrical systems
Skills	Use market research and product testing to develop design criteria to inform the design of innovative, functional, appealing products that are fit for purpose and mimic vehicles from a time in British history. Design an object using a simple controlled electrical circuit controlled by a switch to make a part move. Generate, develop, model and communicate their ideas through cross sectional, exploded diagrams and circuit diagrams with electrical symbols which detail the positive and negative parts and movements. Make and test an electronic circuit to control a moving part, mapping out where different components of the circuit will go in order to improve its function. Construct a stable base to house the electrical equipment. Use appropriate equipment to cut and attach materials, cutting and reattaching wires where parts need fixing or adapting. Test own and others finished products, identifying what went well and suggestions for improvements using technical vocabulary. Evaluate the completed product against the original design sheet and looking at modifications that could be made to improve the reliability or functionality of it and/or to incorporate another type of electrical device e.g. working lights or siren with a switch.
Vocabulary	Motors, Acid, Break, Magnetic field, mimic, Components
Year 6 Spring	
Challenge	
Knowledge	Learn that products vary and can adapt depending on the varying needs of the user. Learn that User Centred Design tries to understand the context in which users may use a system or product. Learn that we do not all use equipment in the same way. Prototypes can be used to assess the effectiveness of a product on the intended user.
Disciplinary Knowledge	User Centred Design
Skills	Research the varying needs and/or characteristics of a user whose mobility has suddenly become restricted by becoming the user for a period of time. Use this to develop your own design brief and success criteria aimed at meeting the needs of a specific user. Generate, develop, model and communicate their ideas through computer-aided design. Design a prototype for a functional and purposeful tool based on user centred design which uses a range of previously taught DT skills to produce the required output. To carefully consider the manufacture process by selecting the required tools, resources, materials and processes needed to make a working prototype of your chosen model. To create a functional prototype for a functional and purposeful tool based on user centred design which uses a range of previously taught DT skills to produce the required output. Evaluate the success of the prototype by conducting market research with the intended user. Plan and discuss adaptations and alterations with the required user to better suit the product to the individual users varying needs.
Vocabulary	Context, prototypes, Market research, survey, Computer aided design, Graphics, Varying, Context, Survey, Restricted, Manufacture process, Characteristics

Year 6 Summer	
Challenge	Can I use the correct stitches to create a cushion?
Knowledge	Understanding that fabrics can be layered for affect Understanding the need to count the thread on a piece of even weave fabric in each direction to create uniform size and appearance Articulating the benefits and disadvantages of different fastening types Learning the steps that make it easier to successfully thread a needle independently. Learning different stitches are used for different purposes. Understanding that there are different types of fastenings and what they are.
Disciplinary Knowledge	Textiles
Skills	Generate, develop, model and communicate their ideas using a scrap book to show their thought and design process from initial ideas and research through to final product design. Discuss whether some aspects of design criteria are more important than others. Create an initial mood board for your design. Create a design using appropriate templates considering the main component shapes, sizes and proportions. Select, measure, mark and cut fabric independently using fabric scissors. Using template pinning panels on to the fabric. Thread a needle and tie a strong knot independently. Sewing accurately with even regularity of stiches Decorate and join fabric using applique using an individually designed template aimed at a specific user or audience. Select a stitch style to join neatly using a range of running stitches and back stitches, working neatly sewing small neat stitches. Use a blanket stitch or fastening to seal the cushion so that it is functional. Sewing accurately with even regularity of stiches Test and evaluate the strength and neatness of their stitches and the impact this would have on the intended user. Evaluate work continually as it is created, discussing adaptations or next steps to improve their own work and that of others.
Vocabulary	Proportion, Mark, Applique, pinning panel, Back stitch, Blanket stitch, Fastening, Layered, uniform size, Proportions, Aspects