**Design Technology Long Term Overview**

| **EYFS** | **Expressive Arts 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.**Physical Development** Fine Motor Skills • Hold a pencil effectively in preparation for fluent writing – using the tripod grip in almost all cases. • Use a range of small tools, including scissors, paintbrushes and cutlery. • Begin to show accuracy and care when drawing**Personal, Social and Emotional Development**Managing Self• Manage their own basic hygiene and personal needs, including dressing, going to the toilet and understanding the importance of healthy food choices. |
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|  | **Autumn Cycle A – On the Move**  | **Spring Cycle A – Healthy Heroes** | **Summer Cycle A - Habitats** |
| **Year** **1 & 2** | **Design a boat that floats*** Design a purposeful product based on design criteria.
* Generate, develop, model and communicate their ideas through talk and drawings.
* When building their structure, explore how it can be made stronger, stiffer and more stable.
* Select appropriate materials from a wide range based on their properties (knowledge gained in Science.)
* Select from and use a range of tools and equipment to perform practical tasks.
* Demonstrate an understanding of joining techniques.
* Test and evaluate their designs.

*Visit to Transport museum and links to history.* * *Compare first car (Benz) at museum and visit from Alpine F1 to discuss design today.*
* *Explore how boats, cars and trains have changed over time.*
 | **Cooking and Nutrition - Prepare a healthy and nutritious dish*** Plan a dish according to a design criteria.
* Apply the principals of nutrition and healthy eating to prepare dishes (Eatwell plate and food groups.)
* Understand where food comes from.
* Select from a range of tools and equipment to perform practical tasks.
* Use tools and utensils confidently and safely.

Safety in the kitchen (the claw grip when using knives.)* Understand hygiene principals (washing hands, tying back hair etc.)
* Evaluate their products against design criteria.

*Design, prepare and evaluate soup and bread rolls for a Parents event to link with* *English text and Science.* | **Freestanding Structures*** Understand that a structure that is stable is less likely to fall over.
* Know what an architect is. Explore the work of Gaudi, Hundertwasser, Frank Gehry, Norman Foster.
* Know how to make freestanding structures stiffer and stronger and more stable.
* Apply this knowledge gained about how to make structures stronger in own work. For example, by using a wider base, triangle shapes, structs, a buttress, or by folding and layering materials for strength.
* Generate ideas based on simple design criteria and own experiences.
* Develop, model and communicate ideas through talking, mock-ups and drawings.
* Select tools and techniques explaining choices.
* Demonstrate an understanding of effective joining techniques.
* Evaluate against the design criteria. Self and peer assessment.

*Links to art and design project ‘Be An Architect’ in cycle B where Hundertwasser, I.M Pei and Antoni Gaudi are studied.* |
| **Autumn Cycle B – Around the world** | **Spring Cycle B – Fire! Fire!** | **Summer Cycle B – Roald Dahl** |
| **Textiles****Design a Christmas Decoration*** Design a purposeful, functional, appealing product based on design criteria.
* Develop, communicate ideas through talking, sketches and drawings.
* Show an awareness of the properties of different materials and fabrics.
* Know how simple textile products are made, use a template to create two identical shapes.
* Use tools competently and safely.
* Join fabrics using different joining techniques e.g. running stitch, over stitch, gluing, stapling.
* Explore finishing techniques (embellishments etc.)
* Evaluate against the design criteria. Self and peer assessment.
 | **Make a vehicle****(wheels and axels)*** Know what wheels and axels are mechanisms that help things to move.
* Distinguish between fixed and freely moving axles.
* Understand that the chassis is the frame or base on which the vehicle is built.
* Design a purposeful product based on design criteria.
* Generate, develop, model and communicate their ideas through talk mock- ups and drawings.
* Select from a range of tools to perform practical tasks.
* Use tools safely and competently.
* Select from a wide range of materials according to their characteristics.
* Evaluate their vehicle against the design criteria.

*History link – changes to fire engines (Great Fire of London.)* |  |
| **Year** **3 & 4** | **Autumn Cycle A – The Groovy Greeks** | **Spring Cycle A – Our World** | **Summer Cycle A – The Brave & the Bold** |
|  | **Shell Structures*** Identify the purpose of shell structures (to contain and protect things.)
* Understand that a shell structure has a solid outer surface (which can be curved or flat) and a hollow inner area.
* Explore real life examples of buildings using a shell structure such as The Shard and O2. Understand that shell structures can also be used as packaging (Toblerone etc.)
* Explain how a shell structure is formed and give examples of ways in which the structure can be reinforced and strengthened (curved structures spread weight evenly, folding layering, corrugating, ribbing or lamination.).
* Know and use technical vocabulary relating to structures.
* Generate, develop, model and communicate ideas through discussion, annotated sketches, exploded diagrams and prototypes.
* Create simple 3D shell structures from 2D nets with tabs and explore the different ways these can be assembled.
* Evaluate how effective their shell structures are in terms of stability/strength and structure.
* Explore using CAD to design nets (TinkerCAD)
 | **Cooking and Nutrition - Prepare a healthy and nutritious dish*** Plan savory dishes according to a design criteria.
* Apply the principals of nutrition and healthy eating to prepare dishes (Eatwell plate and food groups.)
* Research and evaluate a range of existing products (taste tests/ packaging/ visual appeal evaluation)
* Learn about seasoning and adapting recipes.
* Understand the source, seasonality and characteristics of a range of ingredients.
* Plan a recipe, listing ingredients, utensils and equipment and method.
* Understand cooking techniques, selecting ingredients, preparing ingredients safely and hygienically.
* Use tools and utensils, including some electrical equipment, confidently and safely.

Safety in the kitchen (the claw grip and bridge grip when using knives.)* Understand hygiene principals (washing hands, tying back hair etc.)
* Evaluate their products against design criteria, considering the views of others to improve work.

*Design, prepare dishes to link with learning on The Shang Dynasty.* |
| **Autumn Cycle B – Lights, Camera, Action!** | **Spring Cycle B – The Human Machine** | **Summer Cycle B–Rocks, Stones & Bones** |
| **Textiles****Design a Felt Coin Purse*** Use research and develop design criteria to inform the design of a functional, appealing product that is fit for purpose, aimed at particular individuals or groups.
* Generate, develop, model and communicate ideas through discussion, annotated sketches, prototypes samples and pattern pieces.
* Select materials and components based on functional and aesthetic properties.
* Select tools and techniques explaining choices.
* Join fabrics using different joining techniques e.g. running stitch, over stitch, back stitch and blanket stitch, as well as gluing, pinning and stapling.
* Explore finishing techniques (applique and embellishments)
* Know the need for a pattern and seam allowance and that designs have a ‘right and wrong’ side.
* Evaluate against the design criteria. Self and peer assessment.

***Electrical Systems (Taught in Science)**** *Know the key features of electrical safety.*
* *Know how to create an electrical circuit.*
 | **Mechanisms (levers and linkages)*** Explore and use mechanisms such as flaps, sliders and levers.
* Explore every day levers (such as a can ring pull or a spade as well as linkages, window hinge, fold up clothes airer etc.)
* Understand how to use lever and linkage mechanisms.
* Distinguish between fixed and loose pivots.
* Generate, develop, model and communicate ideas through discussion, annotated sketches, prototypes.
* Investigate and analyse a range of existing pop up books and, where available, other products with lever and linkage mechanisms. https://www.youtube.com/watch?v=kamxGHTvafg
* Order the main stages of making.
* Select from and use appropriate tools with some accuracy to cut, shape and join paper and card.
* Use finishing techniques suitable for the product they are creating.
* Evaluate their ideas and products against their own design criteria and consider the views of others to improve their work.

*Links to ‘The Human Body’ for moving book page*. |  |
| **Years** **5 & 6** | **Autumn Cycle A – Woeful War?** | **Spring Cycle A – Evolution & Inheritance** | **Summer Cycle A - Shakespeare** |
| **Make a Frame Structure*** Understand that frame structures use beams, columns and slabs to hold heavy weights.
* Know how frames are strengthened, reinforced and made (rigid joints, foundations, triangulation, bracing etc.).
* Explore real life examples where a truss, gussets and braces have been used such as The London Eye or Iron Bridge constructed by Abraham Darby.
* Generate a design brief.
* Develop, model and communicate ideas that meet the deign brief through discussion, annotated sketches, cross sectional diagrams and prototypes.
* Using carpentry equipment appropriately and safely. Saw lengths of wood using clamps to create a frame.
* Evaluate their designs against design the design brief, testing the structures and making modifications after evaluation if necessary. Self and peer assessment.

*Link to history - Explore Anderson and Morrison shelters used in World War II and consider what was needed in these structures to ensure stability- links to LKS2 learning on shell structures and corrugation rather than frame structure.* |  | **Cooking and Nutrition - Prepare a healthy and nutritious meal*** Plan a meal, to include mainly savory dishes, according to a design criteria. To include a budget.
* Apply the principals of nutrition and healthy eating to prepare dishes (Eatwell plate and food groups.)
* Research and evaluate a range of existing products undertaking market research and taste tests. Consider packaging designs evaluating choice of colour, font, materials, size and functionality.
* Record the evaluations (using tables graphs, charts and computing where appropriate.) Use this knowledge to inform the design criteria.
* Learn about seasoning and adapting recipes.
* Understand the source, seasonality, characteristics and cost implications of a broad range of ingredients.
* Understand how key chefs have influences eating habits to promote varied and healthy diets.
* Plan a recipe, listing ingredients, utensils and equipment and method.
* Understand cooking techniques, selecting ingredients, preparing ingredients safely and hygienically.
* Use tools and utensils, including some electrical equipment and heat sources, confidently and safely.

Safety in the kitchen (the claw grip and bridge grip when using knives.)* Understand hygiene principals (washing hands, tying back hair etc.)
* Evaluate their products against design criteria, considering the views of others to improve work.
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| **Autumn Cycle B – Super Settlers** | **Spring Cycle B – We are Astronomers**  | **Summer Cycle B – Ancient Civilizations** |
| **Mechanisms (Pulleys and Gears)**Make a simple Rube Goldberg Machine* Know that mechanical and electrical systems have an input, process and an output.
* Know that gears and pulleys can be used to speed up, slow down or change the direction of movement.
* Gears and Pulleys can be used to increase or decrease a speed or force.
* Explore everyday gears and levers (bicycle gears, pulley systems for lifting stones/ modern day cranes etc.)
* Work in a group to design a simple Rube Goldberg Machine (chain reaction) involving a pulley or gear.
* Decide what the end goal to achieve at the completion of Rube Goldberg Machine will be. For example, drop a bottle in a recycling bin, water a plant, pop a balloon, fill a glass with water, squeeze toothpaste onto a toothbrush etc. Use this to inform the design criteria.
* Select from a range of tools, materials and equipment to make a machine. Work within the restraints of time and resources.
* Work as a team to generate, develop, model and communicate ideas through discussion, annotated sketches, cross sectional diagrams and prototypes.
* Evaluate their machines against design criteria and make modifications after evaluation if necessary.
 |  | **Textiles****Create a phone case (tie dye or batik.)*** Know how technological advancements have changed and influences the textile industry.
* Consider the environmental impact of the textile industry and sustainability.
* Use research and develop design criteria to inform the design of an innovative, functional, appealing product that is fit for purpose, aimed at particular individuals or groups.
* Generate, develop, model and communicate ideas through discussion, annotated sketches, prototypes samples and pattern pieces.
* Know that a 3-D textile product can be made from a combination of pattern pieces, fabric shapes and different fabrics.
* Select materials and components based on functional and aesthetic properties.
* Select tools and join fabrics using appropriate joining techniques e.g. pinning, running stitch, over stitch, back stitch and blanket stitch. Explain their choices.
* Explore finishing techniques (applique, embroidery and embellishments)
* Create surface pattern by learning the process for tie dye or batik.
* Know the need for a pattern and seam allowance and that designs have a ‘right and wrong’ side.
* Evaluate against the design criteria. Self and peer assessment.
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 **‘I can do everything through Him who gives me strength.’ Philippians 4:13**