**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. |
| **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. |

**‘I can do everything through Him who gives me strength.’ Philippians 4:13**