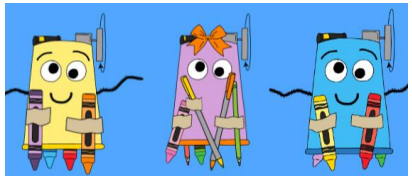
Uplands Junior Academy Subject Overview

Design and Technology

Intent: By incorporating Design and Technology in primary education, we aim to empower students with the skills and knowledge necessary to thrive in a rapidly evolving world, where innovation, problem-solving, and creativity are highly valued. Through engaging and practical experiences, we will nurture the next generation of designers, engineers, and critical thinkers, preparing them for the challenges and opportunities of the future.

Explore	Design	Make	Evaluate and improve
★ Evaluate, investigate and analyse existing products. ★ Understand how key events and individuals have helped to shape the world of D&T.	★ Create own design criteria. ★Tailor to an audience/user. ★ Products should be innovative, functional and appealing. ★ Idea development LKS2: annotated sketches, templates, pattern pieces, prototypes. ★ Idea development UKS2: cross-sectional and exploded diagrams, templates, pattern pieces, prototypes, computer aided design.	★ Select and use appropriate tools and equipment. ★ Understand and select materials and components (including ingredients) based on their aesthetic and functional properties. ★ Carry out practical tasks with increasing accuracy and precision. ★ Understand the importance of, and follow, the health and safety rules. ★ Technical knowledge LKS2: apply their understanding of how to strengthen, stiffen and reinforce structures; understand and use electrical systems in their products. ★ Technical knowledge UKS2: apply their understanding of how to strengthen, stiffen and reinforce more complex structures; understand and use mechanical systems – gears, pulleys and levers. Apply understanding of computing to program, monitor and control their products.	★ Evaluate against own design criteria. ★ Evaluate their own and others' ideas. ★ Consider feedback to make improvements.

	Year 3	Year 4	Year 5	Year 6

Autumn	**Unit: Mechanics** **Eric Laithwaite** was a British electrical engineer known for his development of the linear motor and maglev (magnetic levitation) train technology. **Question:** **How can a magnet be used to move a vehicle without touching it?** **Step 1: Explore and make** • Demonstrate how magnets can move objects without direct contact. • Explore simple wheeled vehicles by showing examples of toy cars and explaining the basic parts (wheels, axles, body). • Explore the work and impact of Eric Laithwaite. **Materials:** Variety of magnets (bar magnets, disc magnets). Small metal objects (paper clips, nails) to demonstrate magnetism.	**Unit: Electronics** **Mark Tilden -** is a robotics physicist known for developing BEAM robotics **Question :** **How can you design an 'Art using recycled materials that promotes sustainability?** **Step 1: Explore:** Set up a table with one or more of your pre-built Doodlers of varying designs on top of some large-sized paper. Without explaining what you are about to do, arrange your class so that the children can see the table clearly, and turn the Doodlers on for a few moments for them to observe. • Chn to take the Doodler apart and rebuild it. • Tinker with the Doodler's configuration to alter its form and function. • Identify and explain what factors can be changed (size of cup, position of motor, changing the drawing tools) with the Doodler and the impact that these changes have on its form and function • Explore work and impact of Mark Tilden.  **Materials**: A range of art bots/doodlers **Step 2: Design** Tailor to an audience/user. Sketch a finished Doodler and label the key	**Unit: Mechanics** **Archimedes (Greek)** is famous for his understanding of levers, pulleys, and other simple machines. **Using simple machines to solve classroom problems (pulleys, levers, gears)** **Question:** **How can we use pulleys, levers, and gears to make it easier to lift a heavy object in our classroom?** **Step 1: Explore** Explore how gears in clocks or hand-mixers work. Explore how pulley system works in flag poles. Explore how a stapler uses a lever mechanism to drive staples through paper. Explore the work of Archimedes. **Materials:** Clocks, hand mixers, staplers **Step 2: Design** Tailor to an audience/user. Brainstorm and plan a gear-powered display board. **Cross-sectional and exploded diagrams, templates, pattern pieces, prototypes, computer aided design.** **Cross-section diagrams:** **A two-dimensional drawing of what something would look like**	**Unit: Structure** **Sir William Paterson.** **Paterson** - who designed the Anderson shelter during World War II. **Question:** **What makes an Anderson Shelter effective?** **Step 1: Explore** • Explore and annotate Anderson Shelters. • Use a variety materials and textiles to test water resistance. **Materials:** Toilet roll (1 each), plastic sheets/wrappers, Card (cereal box), Tins (baked beans/sweet corn tin), Felt, a copper sheet (on one table) **Step 2: Design** Tailor to an audience/user. Design an Anderson Shelter thinking about layout, size, structural strength, comfort, material, entrance, durability, aesthetics. tel Cross-sectional and exploded diagrams, templates, pattern pieces, prototypes, computer aided design.

Spring	**Unit: Textiles** **Elias Howe** – created the first sewing machine **Question:** **How is sewing different from gluing or taping?** **Step 1: Explore (2 lessons)** • Show examples of different bags. Think about purpose and intended user. Discuss shape, materials, size, fastenings etc. • Explore a range how to sew using a running stitch: - threading a needle -tying a knot -running stitch -sewing two pieces of fabric together. • Explore the work and impact of Elias Howe. **Materials:** range of bags, needle, threads, fabrics **Step 2: Design**	**Unit: Structure** **Thomas Chippendale** - A renowned British cabinet-maker and furniture designer in the 18th century, Chippendale's workshops produced ornate chests and boxes. **Question:** When did people start using shell structures in their designs? **Step 1: Explore** • Research the work of Thomas Chippendale. • Explore a range of shell structures to annotate the purpose. • Explore joining art straws . **Step 2: Design** Tailor to an audience/user. Children provided with a variety of structures to created with art straws. Design a keepsake box of their own shape with a detachable lid showcasing where the art straws will be joined. **Annotate sketches, templates, pattern pieces, prototypes.** **Step 3: Make** Assemble art straws to create their structure of their own choice with a detachable lid. **Materials: art straws, paper mache**	**Unit: Textiles** **Salvatore Ferragamo -** An Italian shoe designer and inventor known for his innovations in shoe design and construction techniques. **Question:** How is sewing connected to different cultures around the world? **Step 1: Explore** • Explore a range of Greek and modern sandals to compare. • Explore backstitch, blanket stitch and overstitch. • Explore the work and impact of Salvatore Ferragamo. **Materials:** Sandals (modern for chn to analyse), images of Greek sandals **Step 2: Design** Tailor to an audience/user. Design a prototype Greek Sandal with 'modernised' comfort. Focus on straps and how they sandal will be tied/buckled.	**Unit: Food** **Nisha Kotana – chef of Mowgli street.** **Question:** How can we adapt traditional samosa chaat by using different ingredients to create a unique and flavourful dish? **Step 1: Explore** Explore and discuss the key ingredients used in samosa chaat, such as samosas, chutneys (tamarind and mint), yogurt, chickpeas, and spices. Explore various ingredients that could be paired with the chaat. Discuss the origins and cultural significance of samosa chaat in Indian cuisine. Explore the work and impact of Vikas Khanna. **Materials:** Ingredients for demonstration (samosas, chutneys, yogurt, chickpeas, spices). Taste testing ingredients

	Tailor to an audience/user. Design bag and create prototype out of paper. **Annotate templates, pattern pieces, and create prototypes.** **Step 3: Make** Use prototype as paper pattern. Cut own fabric (choose colours based on design) **Materials: paper, printing paint, needles, thread, fabric** **Knowledge:** Measure, mark out, cut and shape materials and components with some accuracy. **Step 4: Evaluate** Evaluate their own and others' ideas. • Does it meet the design brief? • Consider feedback and make improvements. **End point:**	**Knowledge:** 2D/3D shapes, assemble, robust shell structure **Step 4: Evaluate** Evaluate their own and others' ideas. • Which elements of the process went well? • Have they achieved all they hoped to achieve? • Which elements were more difficult/didn't go to plan? • What improvements/changes would they make if they were to do the project again? • Would Arthur be happy with their design for his keepsake box? Consider feedback and make improvements. **End point:** A keepsake box made from art straws.	Materials: a range of materials for the sole for chn to investigate (rope, cork, card, foam), sandals **Cross-sectional and exploded diagrams, templates, pattern pieces, prototypes, computer aided design.** Exploded diagram and pattern piece. Create a prototype. **Step 3: Make** Materials: cork, string, card, rope, hole punch, glue stick gun, threads, needles. **Knowledge:** Measure, trace, weave, cut, assemble, durability, blanket stitch, backstitch, overstitch, knot tying. **Step 4: Evaluate** Evaluate their own and others' ideas. • Does the sandal meet your design brief? • Does it function? • How durable is the sandal with the chosen materials?	Visual aids (images or videos showcasing samosa chaat preparation). **Step 2: Design** Tailor to an audience/user. Brainstorm and plan the preparation and presentation of samosa chaat. **Materials: Recipe cards or templates for recording ideas.** **Cross-sectional and exploded diagrams, templates, pattern pieces, prototypes, computer aided design.** **Cross sectional diagram and prototype.** **Step 3: Make** Prepare samosa chaat following the designed recipe. Organise a cooking session where students work in groups to prepare their samosa chaat recipes. Provide guidance on food safety, hygiene, and cooking

	To create a pouch for dragon snacks.		Consider feedback and make improvements. **End point:** Greek modernised sandal	techniques (assembling ingredients, mixing flavours, different cooking methods for different ingredients). Encourage teamwork and collaboration in the kitchen. **Materials: Cooking ingredients as per the designed recipes.** **Cooking utensils (bowls, spoons, plates).** **Cooking appliances (stove, oven if needed).** **Knowledge:** Cooking Methods: Awareness of different cooking methods such as frying (for samosas), boiling (for chickpeas), and mixing ingredients. Knife Skills: Basic cutting and chopping techniques for preparing vegetables or garnishes. Reading Recipes: Ability to read and understand a recipe, follow step-by-step instructions, and use measuring tools accurately. Recipe Adaptation: Flexibility to adapt recipes based on

				availability of ingredients or dietary preferences. **Step 4: Evaluate** **Assess the taste, presentation, and teamwork involved in making samosa chaat.** • Tasting and Presentation: • Each group presents their prepared samosa chaat to classmates and teachers. • Discuss the taste, texture, and visual appeal of each dish. Consider feedback and make improvements. **End point:** Make samosa chaat

Summer	**Unit: Food** **Nadiya Hussain – Bake off winner.** **Question:** **Can we grow and harvest a meal?** **Step 1: Explore** • Explore a farm and how ingredients are grown. **Step 2: Design** Tailor to an audience/user. Decide and discuss which selected harvested ingredients they would use to create a salad. **Annotate sketches** **Step 3: Make** Materials: chopping board, plates, sieves **Knowledge:** Washing ingredients, basic chopping, oven temperatures (for roasting). **Step 4: Evaluate** Evaluate their own and others' ideas.	**Unit: Food** **Buddy Oliver -** Oliver's recipes for a child focus. **Question:** **What makes a good picnic?** **Step 1: Explore** • Explore where food comes from. • Show on a map where food products come from. • Explain why food we eat in the UK comes from different parts of the world. • Explore what makes a healthy diet • Understand season ingredients Seasonal calendar - Good Food (bbcgoodfood.com) • Explore the work and impact of Jamie Oliver. **Step 2: Design** Tailor to an audience/user. Design the picnic including a savoury stir-fry wrap and fruit kebab. Allow children to taste some of the foods they could use to help them decide what we would like to include. Consider dietary requirements (substitutes) **Annotate sketches, pattern pieces, prototypes.** **Step 3: Make** Materials: One wrap per two children Ingredients chosen based on seasonal options.	**Unit: Food** Gino D'Acampo - Italian chef **Question:** **Can we make a tasty, vegetable pasta sauce?** **Step 1: Explore** • Explore a range of pasta sauces. • Explore the work of Gino D'Acampo. • **Step 2: Design** Tailor to an audience/user. Plan a recipe a for a pasta choice of their choice. **Cross-sectional diagram.** **Step 3: Make** Cook chosen pasta sauce and pasta. **Knowledge:** Understanding cooking time, boiling, chopping, seasoning ingredients. **Step 4: Evaluate** Taste test and make any adjustments at the point of tasting. Children to take their dish	**Unit: Electronics** **Chuck Hull – first 3D technology inventor.** **Question: How has 3D printing impacted lives of individuals?** **Step 1: Explore on TinkerCAD** • **Explore a range of 3D shapes from a variety of views and modify.** • **Explore the work of Chuck Hull.** i **Step 2: Design** Tailor to an audience/user. To plan my own 3D model of a name badge. Analyse a 3D model and choose objects to use in a 3D model. Combine objects in a design **Exploded diagrams and computer aided design.** **Step 3: Make** **Make a prototype from clay.** **Make the name badge on TinkerCAD.** **Knowledge:**

	• Taste test and evaluate which ingredients worked well. • If not, adapt at the point of taste testing to improve. Consider feedback and make improvements. **End point** **A salad from vegetables or fruit grown at school.**	Gluten free options. Equipment- plates, knives for spreading, cutting, chopping boards/paper plates, knives for cutting, skewers x30 **Knowledge:** Ingredients, recipe, peel, slice, vegan, vegetarian, diet, **Step 4: Evaluate** Evaluate their own and others' ideas. • What have you designed and made? How have you done that? • What was successful? • What could be improved? How could you improve it? Why would you improve it? Consider feedback and make improvements. **End point:** Make a picnic	home and evaluate what their family members thought of their pasta dish. Consider feedback and make improvements. **End point:** Create a pasta sauce for a pasta dish.	TinkerCAD: creating and manipulating shapes, adjusting dimensions, aligning and grouping shapes **Step 4: Evaluate** Evaluate their own product and make any adjustments on TinkerCAD to be printed again on the 3D printer. Consider feedback and make improvements. **End point:** Create a name badge through TinkerCAD and printed using a 3D printer.