



Overchurch Junior School Design Technology Subject Content and Long Term

Key Stage 2

Design

- Use research and develop design criteria to inform the design of innovative, functional, appealing products that are fit for purpose, aimed at particular individuals or groups.
- Generate, develop, model and communicate their ideas through discussion, annotated sketches, cross sectional and exploded diagrams, prototypes, pattern pieces and computer-aided design.

Make

- Select from and use a wider range of tools and equipment to perform practical tasks (for example cutting, shaping, joining and finishing), accurately.
- Select from and use a wider range of materials, textiles and ingredients, according to their functional properties and aesthetic qualities.

Evaluate

- Investigate and analyse a range of existing products.
- Evaluate their ideas and products against their own design criteria and consider the views of others to improve their work.
- Understand how key events and individuals in design and technology have helped shape the world.

Technical Knowledge

- Apply their understanding of how to strengthen, stiffen and reinforce more complex structures
- Understand and use mechanical systems in their products (for example gears, pulleys, cams, levers and linkages).
- Understand and use electrical systems in their products (for example series circuits incorporating switches, bulbs, buzzers and motors).
- Apply their understanding of computing to programme, monitor and control their products.

Cooking and nutrition

- Understand and apply the principles of a healthy and varied diet.
- Prepare and cook a variety of predominantly savoury dishes using a range of cooking techniques.
- Understand seasonality, and know where and how a variety of ingredients are grown, reared, caught and processed.

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Year	Autumn	Spring	Summer
3	<p><u>Textiles product English link 'In The Forest'</u></p> <p><u>Make your own cushion to sit on in the forest</u></p> <p>2-D shape to 3-D Demonstrate a range of stitching techniques and allow children to practise sewing two small pieces of fabric together, demonstrating the use of, and need for, seam allowances.</p> <ul style="list-style-type: none"> • Allow children to use a textile product they have taken apart to create a paper pattern using 2-D shapes. • Provide a range of fabrics – children to consider whether fabrics are suitable for the chosen purpose and user. <p>The fabrics also can be used for demonstrating and testing out a range of decorative finishing techniques e.g. appliqué, embroidery, fabric pens/paints, printing.</p> <ul style="list-style-type: none"> • Use questioning to develop understanding e.g. Which joining technique makes the strongest seam? <p>Why? Which stitch is appropriate for the purpose? Which joining techniques are suitable for the fabric and purpose? How can you stiffen your fabric? What is the purpose of the fastenings? Which one is most suited to the purpose and user? What decorative techniques have been used? What effect do they have?</p>	<p><u>Packaging linked to Science and 3D shape nets in maths.</u></p> <p><u>Create various packaging prism, cube or cylinder and use a range of ideas for strengthening.</u></p> <p>Children use kit parts with flat faces to construct nets. Practise making nets out of card, joining flat faces with masking tape to create 3-D shapes. Experiment with assembling in nets in numerous ways.</p> <ul style="list-style-type: none"> • Demonstrate skills and techniques of scoring, cutting out and assembling using pre-drawn nets. Then allow children to practise by constructing a simple box. Show how a window could be cut out and acetate sheet added. • Demonstrate how to use different ways of stiffening and strengthening their shell structures e.g. folding and shaping, corrugating, ribbing, laminating. Provide opportunities for the children to practise these and to carry out tests to find out where their structures might need to be strengthened or stiffened. • Children discuss and explore the graphics techniques and media that could be used to achieve the desired appearance of their products. • Practise using computer-aided design (CAD) software to design the net, text and graphics for their products according to purposes. 	<p><u>Healthy Sandwich Snacks</u></p> <p><u>Healthy and varied diet (including cooking and nutrition requirements for KS2)</u></p> <p>Learn to select and use a range of utensils and use a range of techniques as appropriate to prepare ingredients hygienically including the bridge and claw technique, grating, peeling, chopping, slicing, mixing, spreading, kneading and baking.</p> <ul style="list-style-type: none"> • Food preparation and cooking techniques could be practised by making a food product using an existing recipe. • Discuss basic food hygiene practices when handling food including the importance of following instructions to control risk e.g. What should we do before we work with food? Why is following instructions important?

	<p>Technical knowledge and understanding</p> <ul style="list-style-type: none">• Know how to strengthen, stiffen and reinforce existing fabrics.• Understand how to securely join two pieces of fabric together.• Understand the need for patterns and seam allowances.• Know and use technical vocabulary relevant to the project.	<p>Technical knowledge and understanding</p> <ul style="list-style-type: none">• Develop and use knowledge of how to construct strong, stiff shell structures.• Develop and use knowledge of nets of cubes and cuboids and, where appropriate, more complex 3D shapes.• Know and use technical vocabulary relevant to the project.	<p>Technical knowledge and understanding</p> <ul style="list-style-type: none">• Know how to use appropriate equipment and utensils to prepare and combine food.• Know about a range of fresh and processed ingredients appropriate for their product, and whether they are grown, reared or caught.• Know and use relevant technical and sensory vocabulary appropriately
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OVERCHURCH DESIGN TECHNOLOGY LONG TERM PLAN 2020-21

Year	Autumn	Spring	Summer
4	<p><u>Electrical Systems</u></p> <p><u>Simple circuits and switches (including programming and control)</u></p> <p>Recap with the children how to make manually controlled, simple series circuits with batteries and different types of switches, bulbs and buzzers. Discuss which of the components in the circuit are input devices e.g. switches, and which are output devices e.g. bulbs and buzzers.</p> <ul style="list-style-type: none"> • Demonstrate how to find a fault in a simple circuit and correct it, giving pupils opportunities to practise. • Use a simple computer control program with an interface box or standalone control box to physically control output devices e.g. bulbs and buzzers. • Ask the children to make a variety of switches by using simple classroom materials e.g. card, corrugated plastic, aluminium foil, paper fasteners and paper clips. Encourage children to make switches that operate in different ways e.g. when you press them, when you turn them, when you push them from side to side. Ask the children to test their switches in a simple series circuit. • Teach children how to avoid making short circuits 	<p><u>Food product Bird Feeders.</u></p> <p>(including cooking and nutrition requirements for KS2)</p> <p>Follow instructions. Join and combine a range of ingredients. Work safely and hygienically. Understand and appropriate diet for wild birds. Measure and weigh food items.</p>	<p><u>Mechanical Systems</u></p> <p><u>Levers and linkages</u> <u>Pop up books.</u></p> <ul style="list-style-type: none"> • Demonstrate a range of lever and linkage mechanisms to the children using prepared teaching aids. • Use questions to develop children's understanding e.g. Which card strip is the lever? Which card strip is acting as the linkage? Which part of the system is the input and which part the output? What does the type of movement remind you of? Which are the fixed pivots and which are the loose pivots? • Demonstrate the correct and accurate use of measuring, marking out, cutting, joining and finishing skills and techniques. • Children should develop their knowledge and skills by replicating one or more of the teaching aids.

	<p>Technical knowledge and understanding</p> <ul style="list-style-type: none">• Understand and use electrical systems in their products, such as series circuits incorporating switches, bulbs and buzzers.• Apply their understanding of computing to program and control their products.• Know and use technical vocabulary relevant to the project.	<p>Technical knowledge and understanding</p> <ul style="list-style-type: none">• Know how to use appropriate equipment and utensils to prepare and combine food.• Know about a range of fresh and processed ingredients appropriate for their product, and whether they are grown, reared or caught.• Know and use relevant technical and sensory vocabulary appropriately	<p>Technical knowledge and understanding</p> <ul style="list-style-type: none">• Understand and use lever and linkage mechanisms.• Distinguish between fixed and loose pivots.• Know and use technical vocabulary relevant to the project.
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5	<p style="text-align: center;"><u>Electrical Systems</u></p> <p style="text-align: center;"><u>Focus</u> <u>Monitoring and control.</u></p> <ul style="list-style-type: none"> • Through teacher demonstration and explanation, recap measuring, marking out, cutting and joining skills with construction materials that children will need to create their electrical products. • Using a model circuit, demonstrate and enable children to practise using different input and output devices. Allow them to practise methods for making secure electrical connections e.g. using wire strippers, twist and tape connections, screw connections, crocodile clips and connecting blocks. • Remind children how to avoid making short circuits. • Drawing on science understanding, ask the children to explore a range of electrical systems that could be used to control their products, including a simple series circuit where a single output device is controlled, a series circuit where two output devices are controlled by one switch and, where appropriate, parallel circuits where two output devices are controlled independently by two separate switches. • Drawing on related computing activities, ensure that children can write and modify computer control programs that include inputs, outputs and decision making. Test out the programs using electrical components connected to microcontrollers, interface boxes or standalone boxes. 	<p style="text-align: center;"><u>Create Anglo Saxons homes structures in 3D.</u></p> <p style="text-align: center;"><u>Frame structures</u> <u>Anglo Saxon history link</u> <u>Shelters</u></p> <ul style="list-style-type: none"> • Use a construction kit consisting of plastic strips and paper fasteners to build 2-D frameworks. Compare the strength of square frameworks with triangular frameworks. Ask the children to reinforce square frameworks using diagonals to help develop an understanding of using triangulation to add strength to a structure. • Demonstrate how paper tubes can be made from rolling sheets of newspaper diagonally around pieces of e.g. dowel. Ask children to use these tubes and masking tape or paper straws with pipe cleaners to build 3-D frameworks such as cubes, cuboids and pyramids. How could each of the frameworks be reinforced and strengthened? • Demonstrate the accurate use of tools and equipment. Develop skills and techniques using junior hacksaws, G-clamps, bench hooks, square section wood, card triangles and hand drills to construct wooden frames, as appropriate. • Demonstrate skills and techniques for accurately joining framework materials together e.g. paper straws, square sectioned wood. Ask children to practise these, mounting their joints onto card for future reference. 	<p style="text-align: center;"><u>Food</u> <u>Quick and easy cup cakes</u></p> <p style="text-align: center;"><u>Celebrating culture and seasonality (including cooking and nutrition requirements for KS2)</u></p> <p>Select and prepare foods for a particular purpose. Weigh and measure using scales. Cut and shape ingredients using appropriate tools and equipment (for example grating). Join and combine food ingredients appropriately (for example beating, rubbing in). Decorate appropriately. Work safely and hygienically. Understand a balanced diet..</p>

	<p>Technical knowledge and understanding</p> <ul style="list-style-type: none">• Understand and use electrical systems in their products.• Understand the use of computer control systems in products.• Apply their understanding of computing to program, monitor and control their products.• Know and use technical vocabulary relevant to the project.	<p>Technical knowledge and understanding</p> <ul style="list-style-type: none">• Understand how to strengthen, stiffen and reinforce 3-D frameworks.• Know and use technical vocabulary relevant to the project.	<p>Technical knowledge and understanding</p> <ul style="list-style-type: none">• Know how to use appropriate equipment and utensils to prepare and combine food.• Know about a range of fresh and processed ingredients appropriate for their product, and whether they are grown, reared or caught.• Know and use relevant technical and sensory vocabulary appropriately
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6	<p><u>Mechanical Systems</u></p> <p><u>Pulleys or gears</u> <u>Use a pulley system to drive your vehicle.</u></p> <ul style="list-style-type: none"> Using a construction kit, investigate combinations of two different sized pulleys to learn about direction and speed of rotation e.g. How many times does the smaller pulley turn each time the larger pulley turns once? Do the pulleys move in the same direction? How can you reverse the direction of rotation? AND/OR Using a construction kit, explore combinations of two different size gears meshed together. Investigate the direction and speed of rotation focusing on how the size of the driver gear affects the speed of the follower gear. Ask the children to use the number of teeth on each gear to decide upon the gear ratios e.g. 10 tooth driver gear meshed with a 20 tooth follower gear produces a ratio of 2:1 Build a working circuit that incorporates a battery, a motor and a handmade switch, such as a reversing switch. Demonstrate the accurate use of tools and equipment including cutting and stripping wire, and making secure electrical connections. Remind children about the dangers of mains electricity. Draw a pictorial representation of the circuit or draw a circuit diagram using correct symbols. Develop measuring, marking, cutting, shaping and joining skills using junior hacksaws, G-clamps, bench hooks, square section wood, card triangles and hand drills to construct wooden frames as appropriate. Demonstrate the accurate use of tools and equipment. 	<p><u>Textiles</u></p> <p><u>Combinig different fabric shapes (including computer-aided design)</u></p> <ul style="list-style-type: none"> Develop skills of threading needles and joining textiles using a range of stitches. This activity must build upon children’s earlier experiences of stitches e.g. improving appearance and consistency of stitches and introducing new stitches. If available, demonstrate and allow children to use sewing machines to join fabric with close adult supervision. Develop skills of sewing textiles by joining right side together and making seams. Children should investigate how to sew and shape curved edges by snipping seams, how to tack or attach wadding or stiffening and learn how to start and finish off a row of stitches. Develop skills of 2-D paper pattern making using grid or tracing paper to create a 3-D dipryl mock-up of a chosen product. Remind/teach how to pin a pattern on to fabric ensuring limited wastage, how to leave a seam allowance and different cutting techniques. Develop skills of computer-aided design (CAD) by using on-line pattern making software to generate pattern pieces. Investigate using art packages on the computer to design prints that can be applied to textiles using iron transfer paper. 	<p><u>Food</u></p> <p><u>Celebrating culture and seasonality (including cooking and nutrition requirements for KS2)</u> <u>Bread</u></p> <ul style="list-style-type: none"> Demonstrate how to measure out, cut, shape and combine e.g. knead, beat, rub and mix ingredients. Demonstrate how to use appropriate utensils and equipment that the children may use safely and hygienically. Techniques could be practised following a basic recipe to prepare and cook a savoury food product. Ask questions about which ingredients could be changed or added in a basic recipe such as types of flour, seeds, garlic, vegetables. Consider texture, taste, appearance and smell. When using a basic dough recipe, explore making different shapes to change the appearance of the food product e.g. Which shape is most appealing and why?

	<p>Technical knowledge and understanding</p> <ul style="list-style-type: none">• Understand that mechanical and electrical systems have an input, process and an output.• Understand how gears and pulleys can be used to speed up, slow down or change the direction of movement.• Know and use technical vocabulary relevant to the project.	<p>Technical knowledge and understanding</p> <ul style="list-style-type: none">• A 3-D textile product can be made from a combination of accurately made pattern pieces, fabric shapes and different fabrics.• Fabrics can be strengthened, stiffened and reinforced where appropriate.	<p>Technical knowledge and understanding</p> <ul style="list-style-type: none">• Know how to use utensils and equipment including heat sources to prepare and cook food.• Understand about seasonality in relation to food products and the source of different food products.• Know and use relevant technical and sensory vocabulary.
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