Design & Technology at Mousehold Infant and Nursery School and George White Junior School - We are Designers and Engineers

At Mousehold Infant & Nursery School and George White Junior School, our aim with DT Is to provide children with knowledge, understanding and skills that prepare them for life beyond primary education and ultimately help them become resourceful, innovative, enterprising and capable citizens. Our children make real products or prototypes of real products designed to solve real problems in ways which are relevant to the children´s ages and stages of development. Children are encouraged to use their imagination and creativity but also to consider the needs of the product user be it themselves or another individual or group.

Children will learn that designing and making is an iterative process through which they will need to continually evaluate their product by testing their ideas and making improvements. They will also use these important critical thinking skills to critique existing products and the work of others. Process over product is paramount in D&T – an immaculate end product is not what we strive for. This is where our children learn resilience and the ability to take risks, adapting designs as they make them.

Throughout their time at Mousehold Infant & Nursery School, children complete projects where they design and make: structures; mechanisms and mechanical systems; textiles products and food products. These projects can be linked to topics and should always be based within a problem that needs to be solved by the child individually, in a pair or group.

We have worked in partnership to develop our progression of Knowledge, Understanding and Skills. It is important that at Mousehold, we know how our children will develop later and the important foundations we lay for our children whilst they are with us. Equally the teachers at George White can feel confident knowing what has come before to ensure the learning is 'sticky'.

Through DT children will draw on and develop a broad range of knowledge from other subjects including English, maths, science, computing and art.

MILESTONES:

EYFS ELGs	Years 1 & 2
EAD Children at the expected level of development will: - 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 PD Children at the expected level of development will: - 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, paint brushes and cutlery. - Begin to show accuracy and care when drawing.	• Cut, peel or grate ingredients safely and hygienically. • Measure or weigh using measuring cups or electronic scales. • Assemble or cook ingredients. • Cut materials safely using tools provided. • Measure and mark out to the nearest centimetre. • Demonstrate a range of cutting and shaping techniques (such as tearing, cutting, folding and curling). • Demonstrate a range of joining techniques (such as gluing, hinges or combining materials to strengthen). • Shape textiles using templates. • Join textiles using running stitch.Colour and decorate textiles using a number of techniques (such as dyeing, adding sequins or printing). • Use materials to practise drilling, screwing, gluing and nailing materials to make and strengthen products. • Create products using levers, wheels and winding mechanisms. • Design products that have a clear purpose and an intended user. • Make products, refining the design as work progresses. • Explore objects and designs to identify likes and dislikes of the designs. • Suggest improvements to existing designs. • Explore how products have been created.

	PROGRESSION OF SKILLS AND KNOWLEDGE					
EYFS	Opportunities to choose the resources they need for their chosen activities. Handle equipment and tools effectively. Children know the importance for good health of a healthy diet. They safely use and explore a variety of materials, tools and techniques, experimenting with colour, design, texture, form and function. Children use what they have learnt about media and materials in original ways, thinking about uses and purposes. They represent their own ideas, thoughts and feelings through design and technology .					
	Nursery – Birth to Five Range 4: 36-48 months			**Reception – Birth to Five Range 5: 48-60 months & Range 6: 60-71 months**		
Expressive Arts and Design: Creating with materials	• Experiments with ways to enclose a space, create shapes and represent actions, sounds and objects • Enjoys and responds to playing with colour in a variety of ways, for example combining colours • Uses 3D and 2D structures to explore materials and/or to express ideas Uses everyday materials to explore, understand and represent their world – their ideas, interests and fascinations			• Continues to explore colour and how colours can be changed • Develops an understanding of using lines to enclose a space, and begins to use drawing to represent actions and objects based on imagination, observation and experience • Uses various construction materials, e.g. joining pieces, stacking vertically and horizontally, balancing, making enclosures and creating spaces • Uses tools for a purpose • Uses their increasing knowledge and understanding of tools and materials to explore their interests and enquiries and develop their thinking • Develops their own ideas through experimentation with diverse materials, e.g. light, projected image, loose parts, watercolours, powder paint, to express and communicate their discoveries and understanding.		
Physical Development: Moving and Handling	Shows increasing control in holding, using and manipulating a range of tools and objects such as tambourines, jugs, hammers, and mark making tools • Holds mark-making tools with thumb and all fingers			• Creates lines and circles pivoting from the shoulder and elbow • Manipulates a range of tools and equipment in one hand, tools include paintbrushes, scissors, hairbrushes, toothbrush, scarves or ribbons • Uses simple tools to effect changes to materials • Handles tools, objects, construction and malleable materials safely and with increasing control and intention		
SKILLS	**Year 1**	**Year 2**	**Year 3**	**Year 4**	**Year 5**	**Year 6**
Generating ideas - designing	• Design appealing products for a particular user based on simple design criteria. • Generate initial ideas and design criteria through own experiences. • Develop and communicate these ideas through talk and drawings and mock ups where relevant.	• Generate ideas based on simple design criteria and their own experiences, explaining what they could make. • Develop, model and communicate their ideas through talking, mock-ups and drawings.	• Generate realistic ideas through discussion and design criteria for an appealing, functional product fit for purpose and specific user/s. • Use annotated sketches, prototypes, final product sketches and pattern pieces; communication technology, such as web-based recipes, to develop and communicate ideas.	• Generate and clarify ideas through discussion with peers to develop design criteria to inform the design of products that are fit for purpose, aimed at particular individuals or groups. • Use annotated sketches and appropriate information and communication technology, such as web-based recipes, to develop and communicate ideas. • Generate, develop, model and communicate realistic ideas through discussion and, as appropriate, annotated sketches, cross-sectional and exploded diagrams.	• Generate innovative ideas through research including surveys, interviews and questionnaires and discussion with peers to develop a design brief and criteria for a design specification. • Design purposeful, functional, appealing products for the intended user that are fit for purpose based on a simple design specification. • Develop and communicate ideas through discussion, annotated drawings, exploded drawings and drawings from different views. And, where appropriate, computer-aided design.	• Use research using surveys, interviews, questionnaires and web-based resources. To develop a design specification for a range of functional products. • Develop a simple design specification to guide the development of their ideas and products, taking account of constraints including time, resources and cost. • Generate and develop innovative ideas and share and clarify these through discussion. • Communicate ideas through annotated sketches, pictorial representations of electrical circuits or circuit diagrams.

Making	• Select and use simple utensils, tools and equipment to perform a job e.g. peel, cut, slice, squeeze, grate and chop safely; marking out, cutting, joining and finishing; cut, shape and join paper and card. • Select from a range of ingredients and materials according to their characteristics to create a chosen product.	• Plan by suggesting what to do next. • Select and use tools, equipment, skills and techniques to perform practical tasks, explaining their choices. • Select new and materials, components, reclaimed materials and construction kits to build and create their products. Use simple finishing techniques suitable for the products they are creating.	• Plan the main stages of making. • Select from and use a range of appropriate utensils, tools and equipment with some accuracy related to their product. • Select from and use finishing techniques suitable for the product they are creating.	• Order the main stages of making. • Select and use appropriate tools to measure, mark out, cut, score, shape and combine with some accuracy related to their products. • Explain their choice of materials according to functional properties and aesthetic qualities. Select from and use materials and components, including ingredients, construction and electrical components according to their function and properties.	• Produce detailed lists of equipment and fabrics relevant to their tasks. • Write a step-by-step plan, including a list of resources required. • Select from and use, a range of appropriate utensils, tools and equipment accurately to measure and combine appropriate ingredients, materials and resources.	• Formulate a step-by-step plan to guide making, listing tools, equipment, materials and components. • Competently select from and use appropriate tools to accurately measure, mark, cut and assemble materials, and securely connect electrical components to produce reliable, functional products. • Use finishing and decorative techniques suitable for the product they are designing and making.
Evaluating	• Taste, explore and evaluate a range of products to determine the intended user's preferences for the product • Evaluate their ideas throughout and finished products against design criteria, including intended user and purpose.	• Explore a range of existing products related to their design criteria. • Evaluate their product by discussing how well it works in relation to the purpose, the user and whether it meets the original design criteria	• Investigate a range of 3-D textile products, ingredients and lever and linkage products relevant to their project. • Test their product against the original design criteria and with the intended user. • Evaluate the ongoing work and the final product with reference to the design criteria and the views of others.	• Investigate and evaluate a range of products including the ingredients, materials, components and techniques that are used. • Test and evaluate their own products against design criteria and the intended user and purpose. • Evaluate their ideas and products against their own design criteria and identify the strengths and areas for improvement in their work.	• Investigate and analyse products linked to their final product. • Compare the final product to the original design specification and record the evaluations. • Test products with intended user and critically evaluate the quality of the design, manufacture, functionality and fitness for purpose. • Consider the views of others to improve their work.	• Continually evaluate and modify the working features of the product to match the initial design specification. • Critically evaluate their products against their design specification, intended user and purpose, identifying strengths and areas for development, and carrying out appropriate tests. • Test the system to demonstrate its effectiveness for the • intended user and purpose.
Vocabulary	planning, investigating design, evaluate, make, user, purpose, ideas, product. • Understand and use basic principles of a healthy and varied diet to prepare dishes, including how fruit and vegetables are part of the eat well plate. • Know and use technical and sensory vocabulary relevant • to the project.	• Investigating, planning, design, make, evaluate, user, purpose, ideas, design criteria, product, function.	• User, purpose, design, model, evaluate, prototype, annotated sketch, functional, innovative, investigate, label, drawing, function, planning, design criteria, annotated sketch, appealing.	• Evaluating, design brief design criteria, innovative, prototype, user, purpose, function, prototype, design criteria, innovative, appealing, design brief, planning, annotated sketch, sensory evaluations.	Design decisions, functionality, authentic, user, purpose, design specification, design brief, innovative, research, evaluate, • design criteria, annotate, evaluate, mock-up, prototype.	Function, innovative, design specification, design brief, user, purpose • design brief, design specification, prototype, annotated sketch, purpose, user, innovation, research, functional, mock-up, prototype.

KNOWLEDGE	YEAR 1	YEAR 2	YEAR 3	YEAR 4	YEAR 5	YEAR 6
Cooking & Nutrition	• Understand where a range of fruit and vegetables come from e.g. farmed or grown at home. • Understand and use basic principles of a healthy and varied diet to prepare dishes, including how fruit and vegetables are part of The eat well plate. • Know and use technical and sensory vocabulary relevant to the project		• 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.	• 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.	• 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.	• 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.
Vocabulary	fruit and vegetable names, names of equipment and utensils, sensory vocabulary e.g. soft, juicy, crunchy, sweet, sticky, smooth, sharp, crisp, sour, hard flesh, skin, seed, pip, core, slicing, peeling, cutting, squeezing, healthy diet, choosing, ingredients		name of products, names of equipment, utensils, techniques and ingredients texture, taste, sweet, sour, hot, spicy, appearance, smell, preference, greasy, moist, cook, fresh, savoury, hygienic, edible, grown, reared, caught, frozen, tinned, processed, seasonal, harvested healthy/varied diet	name of products, names of equipment, utensils, techniques and ingredients texture, taste, sweet, sour, hot, spicy, appearance, smell, preference, greasy, moist, cook, fresh, savoury, hygienic, edible, grown, reared, caught, frozen, tinned, processed, seasonal, harvested healthy/varied diet	ingredients, yeast, dough, bran, flour, wholemeal, unleavened, baking soda, spice, herbs fat, sugar, carbohydrate, protein, vitamins, nutrients, nutrition, healthy, varied, gluten, dairy, allergy, intolerance, savoury, source, seasonality, utensils, combine, fold, knead, stir, pour, mix, rubbing in, whisk, beat, roll out, shape, sprinkle, crumble.	
Structures	• Know how to make freestanding structures stronger, stiffer and more stable. • Know and use technical vocabulary relevant to the project.		• 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	• Understand how to strengthen, stiffen and reinforce 3-D frameworks. • Know and use technical vocabulary relevant to the project. • Develop and use knowledge of how to construct strong, stiff shell structures.		
Vocabulary	• cut, fold, join, fix structure, wall, tower, framework, weak, strong, base, top, underneath, side, edge, surface, thinner, thicker, corner, point, straight, curved, metal, wood, plastic circle, triangle, square, rectangle, cuboid, cube, cylinder.	• Year 1 vocabulary and: shell structure, three-dimensional (3-D) shape, net, cube, cuboid, prism, vertex, edge, face, length, width, breadth, capacity, marking out, scoring, shaping, tabs, adhesives, joining, assemble, accuracy ,material, stiff, strong, reduce, reuse, recycle, corrugating, ribbing, laminating, font, lettering, text, graphics, decision	shell structure, three- dimensional (3-D) shape, net, cube, cuboid, prism, vertex, edge, face, length, width, breadth, capacity, marking out, scoring, shaping, tabs, adhesives, joining, assemble, accuracy, material, stiff, strong, reduce, reuse, recycle, corrugating, ribbing, laminating, font, lettering, text, • graphics, decision		frame structure, stiffen, strengthen, reinforce, triangulation, stability, shape, join, temporary, permanent	

Textiles	• Understand how simple 3-D textile products are made, using a template to create two identical shapes. • Understand how to join fabrics using different techniques e.g. running stitch, glue, over stitch, stapling. • Explore different finishing techniques • Know and use technical vocabulary relevant to the project.	Year 1 plus: • 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.		• Understand how to securely join two pieces of fabric together • Produce a 3-D textile product from a combination of accurately made pattern pieces, fabric shapes and different fabrics. • Understand how fabrics can be strengthened, stiffened and reinforced where appropriate. • Know and use technical vocabulary relevant to the project.
Vocabulary	joining and finishing techniques, tools, fabrics and components, template, pattern pieces, mark out, join, decorate, finish		fabric, names of fabrics, fastening, compartment, zip, button, structure, finishing technique, strength, weakness, stiffening, templates, stitch, seam, seam, allowance	seam, seam allowance, wadding, reinforce, right side, wrong side, hem, template, pattern pieces, name of textiles and fastenings used, pins, needles, thread, pinking shears, fastenings
Mechanisms	• Explore and use sliders and levers. • Understand that different mechanisms produce different types of movement. • Know and use technical vocabulary relevant to the project. • Explore and use wheels, axles and axle holders. • Distinguish between fixed and freely moving axles. • Know and use technical vocabulary relevant to the project.		• Understand and use lever and linkage mechanisms. • Distinguish between fixed and loose pivots. • Know and use technical vocabulary relevant to the project	Year 3 plus: • 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.
Vocabulary	slider, lever, pivot, slot, bridge/guide, card, masking tape, paper fastener, join, pull, push, up, down, straight, curve, forwards, backwards vehicle, wheel, axle, axle holder, chassis, body, cab assembling, cutting, joining, shaping, finishing, fixed, free, moving, mechanism names of tools, equipment and materials used		mechanism, lever, linkage, pivot, slot, bridge, guide system, input, process, output linear, rotary, oscillating, reciprocating	pulley, drive belt, gear, rotation, spindle, driver, follower, ratio, transmit, axle, motor, circuit, switch, circuit diagram, annotated drawings, exploded diagrams, mechanical system, electrical system, input, process, output
Electrical Systems				• Understand and use electrical systems in their products linked to science coverage. • Apply their understanding of computing to program and control their products. • Know and use technical vocabulary relevant to the project. • Understand and use electrical systems in their products linked to science coverage. • Apply their understanding of computing to program, monitor and control their products. • Know and use technical vocabulary relevant to the project.
Vocabulary				series circuit, fault, connection, toggle, switch, push-to-make switch, push-to-break switch, battery, battery holder, bulb, bulb holder, wire, insulator, conductor, crocodile clip, control, program, system, input device, output device. *reed switch, toggle switch, push-to-make switch, push-to-break switch, light dependent resistor (LDR), tilt switch, light emitting diode (LED), bulb, bulb holder, battery, battery holder, USB cable, wire, insulator, conductor, crocodile clip control, program, system, input device, output device,* *• series circuit, parallel circuit (Year 5&6 vocab)*

Our feeder high school snapshot KS3 DT curriculum

Norwich School **The 4th Form Art and Design course challenges pupils in a variety of media through rigorous contextual research on specific themes, experimentation with materials and techniques, and the processes of generating and developing ideas.** **By equipping pupils with up-to-date technical, IT and process skills we remove the limitations to their creativity in ideational and practical experimentation.** **By giving pupils the opportunity to take risks we encourage them to develop an individual approach to their work and a refreshingly personal response to stimuli.** **They are encouraged to create artefacts of value, reflecting social, cultural, technological, scientific and environmental influences. In this way they gain an insight into the broader context in which their creations must exist**	**Open Academy:** **Electronics, graphic design and 2D CAD** **The focused practical task, in the second half of the autumn term, is making a wooden picture frame. Students will be able to use a range of hand and power tools safely and will be familiar with the process of making and evaluating a well finished product. Students complete a 2D Design CAD project, learning the basics of this programme and having the opportunity to apply these skills in the summer term.** **Students will make a speaker and packaging, designed for a particular user. They will learn to solder and work with wood (MDF); measuring, marking, cutting, joining and finishing accurately, safely and to a high standard. They will design and make the packaging for the speaker, learning about graphic design and blister style packaging.**
Sprowston Community Academy: **Wooden robot: introduction to materials**	**The Hewett Academy:** **Graphics: extinction awareness posters** **Food technology: Locally sourced produce**
CNS: Product Design Topic: Materials / timber and polymers. The designer Alessi How you can help: Visit high street shops and websites to research Alessi products **Food Topic: Healthy eating How you can help: Discuss what your child has made at school and look at how healthy it is – can they make it at home?** **Textiles Topic: Cultures and printing techniques How you can help: Investigate different methods of printing used around the world.**	**City Academy:** **Textiles - Students explore the work of Clare Youngs, a pattern maker and designer. Students then explore a range of textiles techniques, including stitching, applique, printmaking and direct painting. They learn to form opinions on their own work and the work of others. Year 7 projects include: Clare Youngs Textile Animals** **Food - All students will learn the fundamental skills needed to live a healthy lifestyle and will develop an understanding of food safety, nutrition, preparation, cooking skills, environmental impact and sustainability. In Year 7, students learn how to handle food safely and hygienically whilst gaining confidence using a wide variety of kitchen equipment. They have the opportunity to develop a wide range of dishes using a variety of fresh, seasonal ingredients. They come to understand the importance of eating a healthy, well balanced diet.** **Students will make a range of mainly Savoury dishes during their street food project including:** **Pasta Salad, Lemon Posset, Omelette, Loaded Wedges, Chicken Kebab, Cupcakes, Falafel, Burgers**
Thorpe St Andrew School: **Year 7 students will have one Food Technology lesson per fortnight. They will make a range of both sweet and savoury dishes. This will teach students a variety of food preparation and cooking techniques** **Dishes may include: • Fruit salad • Happy carrot salad • Stewed apples • Potato wedges • Savoury pinwheels • Sponge cakes • Stir fry • Chilli con carne** **Product design** **How energy is generated and stored in order to choose and use appropriate sources to make products; including the advantages and disadvantages of fossil fuels – oil, gas, coal, biofuels – biodiesel and biomass, tidal, wind, solar and hydroelectric. How products or systems can be powered including batteries and cells, solar cells, mains electricity and wind power.** **The categorisation of the types, properties and structure of thermoforming and thermosetting polymers. To apply knowledge and understanding of working properties, characteristics, applications, advantages and disadvantages of acrylic, high impact polystyrene (HIPS) and biodegradable polymers e.g. Biopol®, polyester resin and urea formaldehyde. How to analyse their product including the specification criteria of function, user requirements and aesthetics. The work of past and present designers and companies including Tesla. Develop and use a range of communication techniques to present design ideas, including freehand sketching (2D and/or 3D), annotated sketches and computer-aided design (CAD). Record and justify design ideas clearly and effectively using written techniques.** **Ormiston Victory Academy:**	**Sewell Park Academy:** **Unit Summary: In year 7 learners are introduced to D&T (design and technology - resistant materials) by completing a range of projects over one term, this is often their first experience of learning D&T. Learners are introduced to D&T through the underlying principles of; mainly designing, mainly making and D&T in society. *Big ideas* are introduced to learners throughout year 7 D&T lessons, this includes; exploring structural engineering through a team building project and exploring the *big idea* of new, emerging and disruptive technologies. *Future you* opportunities are present by exploring careers linking to D&T lessons such as structural engineers and carpenters. Learners are set high expectations of their work and a focus on high quality outcomes within both practical and non-practical work is developed.** **Year 7 D&T is split into three main areas, these are:** **Mainly designing - learners begin to appreciate that everything is designed for a purpose and respond to a design brief exploring both good/bad design principles.** **Mainly making - learners make a wooden picture frame using a range of tools and equipment to begin to understand making principles such as marking out, cutting and joining timber.** **D&T in society - learners are introduced to a range of new, emerging and disruptive technologies. Each category of technology is explored in detail, with learners using their creativity skills to produce a story about a technology of the future.**
Hellesdon High School: Resistant materials **Year 7 Push along toy.** **Students learn the basic hand tool skills required to manufacture a cam operated toy made from wood.** **Textiles** **Tools and equipment/safety** **Fibres & Fabrics** **Responding to a Specification** **Use of Sewing machine** **Printing/construction Planner cover**	**Notre Dame High School: Design skills** **Coloured pencil rendering** **Refining idea** **3D construction (clay or recycled materials)** **Evaluating final outcome**
Jane Austen: No information available	