Primary Phase Curriculum Map 2020-21

Subject Area: Design & Technology

William Hulme's Grammar School
The best in everyone™
Part of United Learning

At William Hulme's Grammar School, Design and Technology is an inspiring, fun and practical subject. Using creativity and imagination, pupils investigate, design, make and evaluate products that solve real and relevant problems within a variety of contexts, considering their own and others' needs, wants and values. Pupils acquire a broad range of cross curricular subject knowledge and draw on disciplines such as maths, science, computing and art. This is achieved whilst considering our local industrial heritage and core British values.

The foundations of our Design and Technology curriculum are based upon The National Curriculum (2014) and the projects are taught termly through 'Projects on a Page', produced by The Design and Technology Association. Running through the curriculum are five vertical concepts that enable children to make connections between projects, developing their skills and knowledge. These concepts are: Mechanisms/Mechanical Systems, Food, Textiles, Structures and Electrical Systems. Through these projects, children are continuously building upon previously taught skills, which have been mapped across the school to ensure progression between year groups/key stages and to make links with other wider curriculum areas where possible. Pupils design and make products that solve real and relevant problems within a variety of contexts. Food technology is also implemented across the school with children developing an understanding of where food comes from, the importance of a varied and healthy diet and how to prepare this. Design and technology lessons are taught as a block, so that children's learning is focused throughout each unit of work. Pupils will build knowledge through the projects and at the start and end of the unit, complete a pop quiz to show their progress.

Through our curriculum, we prepare all our pupils for the future world by nurturing wider skills, such as resilience, problem-solving and leadership. Children learn how to take risks, be resourceful, enterprising and innovative. High-quality design and technology education make an essential contribution to the creativity, culture, wealth and well-being of the nation. We want to inspire children to become the next generation of innovators.

We ensure the children

- develop the creative, technical and practical expertise needed to perform everyday tasks confidently, and to participate successfully in an increasingly technological world.
- build and apply a repertoire of knowledge, understanding and skills in order to design and make high-quality prototypes and products for a wide range of users.
- critique, evaluate and test their ideas and products and the work of others.
- understand and apply the principles of nutrition and learn how to cook.

Subject and school leaders monitor the impact of our curriculum provision through completing regular monitoring, this includes book looks, learning walks and listening to the voice of our children.

Our Curriculum – The Design and Technology curriculum consists of:

- long term plans. This gives teachers an overview of the areas that they are going to teach to ensure EYFS/National Curriculum coverage.
- project plans. These detail exact features, skills and knowledge that will be taught.

- knowledge organisers. These are focused on the key vocabulary, skills and concepts that will be taught.
- Pop quizzes to show progression through the project.

The suggested projects are laid out in the curriculum map below.

Vertical Concept	Definition	Units
Mechanisms/ Mechanical	Planning, making, selecting tools and using finishing techniques. Exploring books and products; evaluating own product against original criteria. Exploring sliders and levers; understanding types of movement; technical vocabulary. Select a range of tools, equipment and materials to perform practical tasks. Explore wheels and axles and evaluate their ideas and products against original criteria Select and use tools with some accuracy to cut, shape and join paper and card. Investigate and analyse their own and others' products with lever and linkage mechanisms. Understand and use lever and linkages, and fixed and loose pivots. Select and use tools with some accuracy, cut and join materials and components such as tubing, syringes and balloons. Investigate and find information on and products with pneumatic mechanisms and evaluate their own products and ideas against criteria and user needs. Understand and use pneumatic mechanisms. Select use a range of tools and equipment to make products that that are accurately assembled and well finished within the constraints of time, resources and cost. Compare the final product to the original design specification and test the quality of the design, manufacture and functionality with the user. Investigate famous manufacturing and engineering companies relevant to the project.	Year 1 – Sliders and Levers Year 2 – Wheels and Axles Year 3 – Levers and Linkages Year 4 – Pneumatics Year 5 – Pulleys or Gears Year 6 – Cams

Vertical Concept	Definition	Units
	Produce lists of tools and materials and plans to make accurately assembled and well finished products within constraints. Compare final product to the original specification; test products with the intended user and critically evaluate the product, considering the views of others. Investigate famous manufacturing and engineering companies relevant to the project	
Food	Selecting a range of fruits and vegetables; using simple utensils and equipment. Tasting and evaluating user's preference; evaluating ideas and finished products against original criteria. Understand where ingredients come from and the basis of a healthy and varied diet. Select from a range of ingredients to make appropriate food products. Carry out and record evaluations of a variety of ingredients and products. Know a range of appropriate ingredients, and whether they are grown, reared or caught. Evaluate a range of relevant products and ingredients and the final product with reference to the design brief and specification. Understand seasonality and the source of different food products.	Year 1 – Preparing Fruit and Vegetables Year 2 – Preparing Fruit and Vegetables Year 3 – Health and Varied Diet Year 5 – Celebrating Culture and Seasonality
Textiles	Understand how 3-D textile products are made, using joining, templates and finishing to create two identical shapes. Select fabrics and fastenings according to their functional characteristics. Investigate a range of 3-D textile products. Test their product against the original criteria and with the intended user. Know that a 3-D textile product can be made from a combination of pattern pieces, fabric shapes and different fabrics and that fabrics can be strengthened, stiffened and reinforced	Year 1 – Templates and Joining Techniques Year 4 – 2D Shape to 3D Product Year 6 – Combining Different Fabric Shapes

Vertical Concept	Definition	Units
Structures	Planning making, selecting tools and new and recycled materials; using finishing techniques. Exploring existing freestanding structures; evaluating their own products against original criteria. Know about strengthening structures; knowledge of vocabulary. Investigate and evaluate shell structures, and construct strong, stiff shell structures. Test and evaluate own products against design criteria and intended user and purpose. Use tools to accurately measure, mark out, cut, shape and join materials to make frameworks. Use finishing techniques suitable for the product and critically evaluate their products against a range of criteria. Research key events and individuals relevant to frame structures.	Year 2 – Freestanding Structures Year 3 – Shell Structures (nets) Year 5 – Frame Structures
Electrical Systems	Connect simple electrical components in a series circuit and program an interface to enhance the way the product works. Investigate and analyse a range of powered products, including programmed, and evaluate their own products and design criteria. Understand and use computing to program and control products with electrical systems. Generate and communicate ideas through annotated sketches and representations of electrical circuits or circuit diagrams. Using a step-by-step plan, select and accurately assemble materials, electrical components, to produce a functional product. Create and modify a computer control program to enable their electrical product to respond to changes in the environment.	Year 4 – Simple Programming and Control (Science – Spring 1 - Circuits) Year 6 – Monitoring and Control (Science - Autumn 2 - What affects bulb brightness, buzzer volume, voltage & circuit symbols) The Projects taught in Years 4 and 6 complement the science teaching of electricity in KS2.

	Autumn 1	Autumn 2	Spring 1	Spring 2	Summer 1	Summer 2
EYFS	The most relevant early years outcomes for DT are taken from the following areas of learning: • Physical Development • Understanding the World and • Expressive Arts and Design. Within these areas of learning, children will develop the pre-requisite skills required to feed into the wider curriculum subject of DT in Year 1 of the National Curriculum. In early years, children learn skills through adult focussed tasks and consolidation through using continuous provision in the environment. In Nursery, children will be familiarising themselves to different construction kits, building vertically and horizontally and making enclosures, working towards making an identifiable model. Outdoors, they will use crates and planks to build and balance. They will be introduced to Sellotape, glue sticks and PVA glue to attach feathers, lolly sticks, pipe cleaners, plastic lids and introducing paperclips to attach card to paper. They are encouraged to use scissors with more control and use 3-d materials to make models. Reception Construction challenges include following activity cards to build models (K-nex, Lego, Duplo, Mobilo), planning and designing sheets for their own creations, joining skills including glue, Sellotape, split pins, treasury tags, paper clips, pipe cleaners, elastic bands, stapler (with adult supervision). They also develop attaching skills, including sequins, glitter, string, corks, straws. Children will experiment with different materials to create planned effects, using cardboard, collage, felt, paper, wool and making their own playdough. Outdoors, they will use planks and crates, poles and wheels to make moving vehicles. Throughout Early Years, the children will be introduced to baking.					
Year 1	**Food – Preparing Fruit and Vegetables** **Finished Project – Fruit Salad for a Class Party** (NC: use the basic principles of a healthy and varied diet to prepare dishes) **Designing** • Design appealing products for a particular user based on simple design criteria. • Generate initial ideas and design criteria through investigating a variety of fruit and vegetables. • Communicate these ideas through talk and drawings. **Making** • Use simple utensils and equipment to e.g. peel, cut, slice, squeeze, grate and chop safely. • Select from a range of fruit and vegetables according to their characteristics e.g. colour, texture and taste to create a chosen product. **Evaluating**		**Mechanisms - Sliders and Levers** **Finished Project – Moving Story Book for a Reception Child** **Designing** • Generate ideas based on simple design criteria and their own experiences, explaining what they could make. • Develop, model and communicate their ideas through drawings and mock-ups with card and paper. **Making** • Plan by suggesting what to do next. • Select and use tools, explaining their choices, to cut, shape and join paper and card. • Use simple finishing techniques suitable for the product they are creating. **Evaluating** • Explore a range of existing books and everyday products that use simple sliders and levers.		**Textiles – Templates and Joining Techniques** **Finished Project – Soft Toy for 5/6yr old** **Designing** • Design a functional and appealing product for a chosen user and purpose based on simple design criteria. • Generate, develop, model and communicate their ideas as appropriate through talking, drawing, templates, mock-ups and information and communication technology. **Making** • Select from and use a range of tools and equipment to perform practical tasks such as marking out, cutting, joining and finishing. • Select from and use textiles according to their characteristics. **Evaluating** • Explore and evaluate a range of existing textile products relevant to the project being undertaken.	

	• Taste and evaluate a range of fruit and vegetables to determine the intended user's preferences. • Evaluate ideas and finished products against design criteria, including intended user and purpose.	• Evaluate their product by discussing how well it works in relation to the purpose and the user and whether it meets design criteria.	• Evaluate their ideas throughout and their final products against original design criteria.
Year 2	**<u>Food – Preparing Fruit and Vegetables</u>** **<u>Finished Project – Fruit Kebab for Year 2 child</u>** (NC: understand where food comes from) **Designing** • Design appealing products for a particular user based on simple design criteria. • Generate initial ideas and design criteria through investigating a variety of fruit and vegetables. • Communicate these ideas through talk and drawings. **Making** • Use simple utensils and equipment to e.g. peel, cut, slice, squeeze, grate and chop safely. • Select from a range of fruit and vegetables according to their characteristics e.g. colour, texture and taste to create a chosen product. **Evaluating** • Taste and evaluate a range of fruit and vegetables to determine the intended user's preferences. • Evaluate ideas and finished products against design criteria, including intended user and purpose.	**<u>Mechanisms – Wheels and Axles</u>** **<u>Finished Project – Model Fire Engine for a Reception Child</u>** **Designing** • Generate initial ideas and simple design criteria through talking and using own experiences. • Develop and communicate ideas through drawings and mock-ups. **Making** • Select from and use a range of tools and equipment to perform practical tasks such as cutting and joining to allow movement and finishing. • Select from and use a range of materials and components such as paper, card, plastic and wood according to their characteristics. **Evaluating** • Explore and evaluate a range of products with wheels and axles. • Evaluate their ideas throughout and their products against original criteria.	**<u>Structures – Freestanding Structures</u>** **<u>Finished Project - A Toy Deck Chair for an EY's child</u>** **Designing** • 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. **Making** • Plan by suggesting what to do next. • Select and use tools, skills and techniques, explaining their choices. • Select new and reclaimed materials and construction kits to build their structures. • Use simple finishing techniques suitable for the structure they are creating. **Evaluating** • Explore a range of existing freestanding structures in the school and local environment e.g. everyday products and buildings. • Evaluate their product by discussing how well it works in relation to the purpose, the user and whether it meets the original design criteria.

Year 3	**Mechanical Systems – Levers and Linkages** **Finished Product – A Moving Greetings Card for a female member of the family** **Designing** • Generate realistic ideas and their own design criteria through discussion, focusing on the needs of the user. • Use annotated sketches and prototypes to develop, model and communicate ideas. **Making** • Order the main stages of making. • Select from and use appropriate tools with some accuracy to cut, shape and join paper and card. • Select from and use finishing techniques suitable for the product they are creating. **Evaluating** • Investigate and analyse books and, where available, other products with lever and linkage mechanisms. • Evaluate their own products and ideas against criteria and user needs, as they design and make.	**Structures – Shell Structures (nets)** **Finished Project – Jewellery Box for a female family member** **Designing** • Generate realistic ideas and design criteria collaboratively through discussion, focusing on the needs of the user and purpose of the product. • Develop ideas through the analysis of existing products and use annotated sketches and prototypes to model and communicate ideas. **Making** • Order the main stages of making. • Select and use appropriate tools to measure, mark out, cut, score, shape and assemble with some accuracy. • Explain their choice of materials according to functional properties and aesthetic qualities. • Use finishing techniques suitable for the product they are creating. **Evaluating** • Investigate and evaluate a range of existing shell structures including the materials, components and techniques that have been used. • Test and evaluate their own products against design criteria and the intended user and purpose.	**Food – Healthy and Varied Diet** **Finished Project – A Healthy Sandwich for a Picnic, after a Sports Event.** (NC: Understand and apply the principles of a healthy and varied diet.) **Designing** • Generate and clarify ideas through discussion with peers and adults to develop design criteria including appearance, taste, texture and aroma for an appealing product for a particular user and purpose. • Use annotated sketches and appropriate information and communication technology, such as web-based recipes, to develop and communicate ideas. **Making** • Plan the main stages of a recipe, listing ingredients, utensils and equipment. • Select and use appropriate utensils and equipment to prepare and combine ingredients. • Select from a range of ingredients to make appropriate food products, thinking about sensory characteristics. **Evaluating** • Carry out sensory evaluations of a variety of ingredients and products. Record the evaluations using e.g. tables and simple graphs. • Evaluate the ongoing work and the final product with reference to the design criteria and the views of others.

Year 4	**Textiles – 2-D shape to 3-D Product** **Finished Project – Pencil Case, ch to choose target audience** **Designing** • Generate realistic ideas through discussion and design criteria for an appealing, functional product fit for purpose and specific user/s. • Produce annotated sketches, prototypes, final product sketches and pattern pieces. **Making** • Plan the main stages of making. • Select and use a range of appropriate tools with some accuracy e.g. cutting, joining and finishing. • Select fabrics and fastenings according to their functional characteristics e.g. strength, and aesthetic qualities e.g. pattern. **Evaluating** • Investigate a range of 3-D textile products relevant to the project. • Test their product against the original design criteria and with the intended user. • Consider others' views. • Understand how a key event/individual has influenced the development of the chosen product and/or fabric.	**Electrical systems – Simple Programming and Control** **Finished Product – Torch, ch to choose target audience** **Designing** • Gather information about users' needs and wants and develop design criteria to inform the design of products that are fit for purpose. • Generate, develop, model and communicate realistic ideas through discussion and, as appropriate, annotated sketches, cross-sectional and exploded diagrams. **Making** • Order the main stages of making. • Select from and use tools and equipment to cut, shape, join and finish with some accuracy. • Connect simple electrical components and a battery in a series circuit to achieve a functional outcome. • Program a standalone control box, microcontroller or interface box to enhance the way the product works. **Evaluating** • Investigate and analyse a range of existing battery-powered products, including pre-programmed and programmable products. • Evaluate their ideas and products against their own design criteria and identify the strengths and areas for improvement in their work.	**Mechanical Systems – Pneumatics** **Finished Product – Moving Monster Toy for KS1 child** **Designing** • Generate realistic and appropriate ideas and their own design criteria through discussion, focusing on the needs of the user. • Use annotated sketches and prototypes to develop, model and communicate ideas. **Making** • Order the main stages of making. • Select from and use appropriate tools with some accuracy to cut and join materials and components such as tubing, syringes and balloons. • Select from and use finishing techniques suitable for the product they are creating. **Evaluating** • Investigate and analyse books, videos and products with pneumatic mechanisms. • Evaluate their own products and ideas against criteria and user needs, as they design and make.
Year 5	**Food – Celebrating Culture and Seasonality** **Finished Project – Bread, ch to choose target audience** (NC: prepare and cook a variety of predominantly savoury dishes using a range of	**Structures – Frame Structures** **Finished Product – Photo Frame,ch to choose target audience** **Designing**	**Mechanical Systems – Pulleys or Gears** **Finished Product -Toy with pulley/gear mechanism, ch to choose target audience** **Designing**

	cooking techniques. Understand seasonality, and know where and how a variety of ingredients are grown, reared, caught and processed) **Designing** • Generate innovative ideas through research and discussion with peers and adults to develop a design brief and criteria for a design specification. • Explore a range of initial ideas and make design decisions to develop a final product linked to user and purpose. • Use words, annotated sketches and information and communication technology as appropriate to develop and communicate ideas. **Making** • Write a step-by-step recipe, including a list of ingredients, equipment and utensils • Select and use appropriate utensils and equipment accurately to measure and combine appropriate ingredients. • Make, decorate and present the food product appropriately for the intended user and purpose. **Evaluating** • Carry out sensory evaluations of a range of relevant products and ingredients. Record the evaluations using e.g. tables/graphs/charts such as star diagrams. • Evaluate the final product with reference back to the design brief and design specification, considering the views of others when identifying improvements.	• Carry out research into user needs and existing products, using surveys, interviews, questionnaires and web-based resources. • Develop a simple design specification to guide the development of their ideas and products, taking account of constraints including time, resources and cost. • Generate, develop and model innovative ideas, through discussion, prototypes and annotated sketches. **Making** • Formulate a clear plan, including a step-by-step list of what needs to be done and lists of resources to be used. • Competently select from and use appropriate tools to accurately measure, mark out, cut, shape and join construction materials to make frameworks. • Use finishing and decorative techniques suitable for the product they are designing and making. **Evaluating** • Investigate and evaluate a range of existing frame structures. • Critically evaluate their products against their design specification, intended user and purpose, identifying strengths and areas for development, and carrying out appropriate tests. • Research key events and individuals relevant to frame structures.	• Generate innovative ideas by carrying out research using surveys, interviews, questionnaires and web-based resources. • Develop a simple design specification to guide their thinking. • Develop and communicate ideas through discussion, annotated drawings, exploded drawings and drawings from different views. **Making** • Produce detailed lists of tools, equipment and materials. Formulate step-by-step plans and, if appropriate, allocate tasks within a team. • Select from and use a range of tools and equipment to make products that that are accurately assembled and well finished. Work within the constraints of time, resources and cost. **Evaluating** • Compare the final product to the original design specification. • 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. • Investigate famous manufacturing and engineering companies relevant to the project.

	• Understand how key chefs have influenced eating habits to promote varied and healthy diets.		
Year 6	**<u>Textiles – Combining Different Fabric Shapes</u>** **<u>Finished Product – A Felt Phone Case for Year 6 child</u>** **Designing** • Generate innovative ideas by carrying out research including surveys, interviews and questionnaires. • Develop, model and communicate ideas through talking, drawing, templates, mock-ups and prototypes and, where appropriate, computer-aided design. • Design purposeful, functional, appealing products for the intended user that are fit for purpose based on a simple design specification. **Making** • Produce detailed lists of equipment and fabrics relevant to their tasks. • Formulate step-by-step plans and, if appropriate, allocate tasks within a team. • Select from and use a range of tools and equipment to make products that are accurately assembled and well finished. Work within the constraints of time, resources and cost. **Evaluating** • Investigate and analyse textile products linked to their final product. • Compare the final product to the original design specification.	**<u>Electrical Systems – Monitoring and Control</u>** **<u>Finished Product – Night light for EY's child</u>** **Designing** • Develop a design specification for a functional product that responds automatically to changes in the environment. • Generate, develop and communicate ideas through discussion, annotated sketches and pictorial representations of electrical circuits or circuit diagrams. **Making** • Formulate a step-by-step plan to guide making, listing tools, equipment, materials and components. • Competently select and accurately assemble materials, and securely connect electrical components to produce a reliable, functional product. • Create and modify a computer control program to enable their electrical product to respond to changes in the environment. **Evaluating** • Continually evaluate and modify the working features of the product to match the initial design specification. • Test the system to demonstrate its effectiveness for the intended user and purpose.	**<u>Mechanical Systems – Cams</u>** **<u>Finished Product – Moving Wooden Animal to sell for charity</u>** **Designing** • Generate innovative ideas by carrying out research using surveys, interviews, questionnaires and web-based resources. • Develop a simple design specification to guide their thinking. • Develop and communicate ideas through discussion, annotated drawings, exploded drawings and drawings from different views. **Making** • Produce detailed lists of tools, equipment and materials. Formulate step-by-step plans and, if appropriate, allocate tasks within a team. • Select from and use a range of tools and equipment to make products that that are accurately assembled and well finished. Work within the constraints of time, resources and cost. **Evaluating** • Compare the final product to the original design specification. • Test products with the intended user, where safe and practical, and critically evaluate the quality of the design, manufacture, functionality and fitness for purpose. • Consider the views of others to improve their work.

	• 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		• Investigate famous manufacturing and engineering companies relevant to the project.
KS3	In Key Stage 3 students will follow two separate subjects: Design & Technology and Food & Nutrition. Throughout Key Stage 3, students cover a broad and varied range of design & technology disciplines in their weekly lessons. At the beginning of Year 7, students will complete a health and safety project. This consists of making a stationery holder with an animal theme made from wood. The focus of this project is to familiarise students with the safety precautions needed when using tools and equipment in the workshop. The second project the students will be completing is a novelty mirror made from wood and plastic. The focus of this project is the design process and designing for a specific target market. All projects will have opportunities for group work, independent investigations, class presentations and practical work. All pupils study Food & Nutrition at Key Stage 3. Pupils learn a wide range of practical and organisational skills, enabling them to produce high-quality food products which meet nutritional targets and promote good health. Pupils will work with a range of foods to experience, first-hand, the working characteristics and processing techniques used when making food products. As well as developing a sound knowledge and a wide range of practical skills, there will be opportunities for investigation of recipe ideas, experimentation, testing and exploration.		