Design Technology Progression Document

DT intent:

At Welton Primary School we aim to **inspire** our designers, engineers, chefs, and architects to **challenge and develop** their understanding of products and how they can **contribute to the design industry**. Using **creativity and imagination**, pupils will design and make products that solve real and **relevant problems** within a variety of contexts, considering their own and others' needs, wants and values. We aim to provide opportunities that **harness** children's natural curiosity and creativity through **first-hand** learning. Children will develop the creative, technical and practical expertise needed to be successful in an **increasingly technological world** in unison with an increasing understanding of **sustainability** and their **environmental impact.**

Key Stage 1
Pupils should be taught:

Design

- to design purposeful, functional, appealing products for themselves and other users based on design criteria
- to generate, develop, model and communicate their ideas through talking, drawing, creating templates or mock-ups and, where appropriate, using ICT

Make

- to select from and use a range of tools and equipment to perform practical tasks [for example, cutting, shaping, joining and finishing]
- to select from and use a wide range of materials and components, including construction materials, textiles and ingredients

Evaluate

- to explore and evaluate a range of existing products
- to evaluate their ideas and products against design criteria

Technical knowledge

- to build structures, exploring how they can be made stronger, stiffer and more stable
- to explore and use mechanisms [for example, levers, sliders, wheels and axles], in their products.

Cooking and Nutrition

- to use the basic principles of a healthy and varied diet to prepare dishes
- to understand where food comes from.

Assessment
At Welton we understand the difference between knowledge which will be retained close to the point of teaching and that what has to be retained forever.
At key Stage one and key stage two the knowledge our children acquire takes full account of the national curriculum's main characteristics of:

- Designing
- Making
- Evaluating
- Using Technical Knowledge
- Food Technology

	Year 1	Year 2
Key Vocabulary: (red = universal key term)	user, purpose, planning, investigating, design, evaluate, make, ideas, product.	user, purpose, investigating, planning, design, make, evaluate, ideas, product, design **criteria, function**.
Key Individuals:	N/A	N/A
Design & Planning	• Begin to draw on their **own experiences** to generate ideas. • Conduct **basic research** into existing products (i.e., understanding what they are for/ how they work/ materials used etc). • Use a **basic design criterion** to focus their ideas (i.e., label a plan with materials used) • Identify **a purpose & intended user** for what they intend to design and make • **Explain** what they are going to do • **Create templates** and mock ups of their ideas in card and paper – selecting from a range of materials and components • Select from a range of tools and equipment, **explaining their choices**	• Start to generate ideas by drawing on their **own and other people's experiences**. • Conduct basic research into existing products (i.e., understanding what they are for/ how they work/ materials used etc) • Identify a purpose & intended user for what they intend to design and make. • Use **simple design criteria** to identify a target group for their design • Make a **simple plan** before making a product (materials used etc), labelling parts clearly • Create templates and mock ups of their ideas in card and paper or **using IT** – selecting from a range of materials and components • Select from a range of tools and equipment, explaining their choices
Evaluating	<u>Existing Products:</u> • **Explore what products are /who for / how they work / how they are used** • **Explore what materials products are made from** • **Describe what they like and dislike about products** <u>Own Products:</u> • Evaluate their own product by **discussing how well it works** • Make **simple judgements** about their products, including identifying likes and dislikes of the design/ what went well and what was difficult • Suggest **simple improvements** they might make giving a reason (because…)	<u>Existing Products:</u> • **Describe** what products are /who for / how they work / how they are used • **Describe** what materials products are made from • Describe what they like and dislike about products <u>Own Products:</u> • **Evaluate against the design criteria** • Explain whether the product made is **suitable for its intended user** giving a reason(s) • Make **judgements** about their products, including identifying likes and dislikes of the design/ what went well and what was difficult • Suggest **improvements** they might make giving a reason (because…)
Cooking and Nutrition	• **Select tools** appropriate to the task • Use **tools safely** – chopping and cutting • **Describe the basic properties** of the materials used (for example how they feel, smell, taste, texture, consistency) • **With help** measure, mark out, cut and shape a range of materials • Use **simple finishing techniques** to improve the appearance of their product	• To select tools and materials appropriate to the task, and **give reasons for their choice** • Use **hand tools** safely and appropriately • To describe the properties of materials using the **correct vocabulary** • Measure, cut and score with some **accuracy**

	• **Understand where foods** come from • Name and sort **some fruit and vegetables** • Sort **healthy and unhealthy** foods • Use a mixing bowl to prepare a mixture • Know to **wash hands and keep work surfaces clean** when preparing food	• Use appropriate finishing techniques, taking care with **the presentation of the final product** • Name and sort foods into the 5 groups in the Eat Well Guide • Know that everyone should eat at least 5 portions of fruit and vegetables every day • Describe **the properties** of food ingredients (taste, smell, texture and consistency) • Prepare simple dishes hygienically and safely (by selecting and using appropriate **fruit and vegetables/ weigh or measure ingredients accurately**, using cups or electronic scales/ **cut, grate or peel** ingredients safely) • Prepare food **safely and hygienically** and describe what this means • Discuss how **best store the product** for long-life and hygiene
	Current project: • **Healthy packed lunch for Amy Johnson**	**Current project:** • **Island Survival Meal**
Textiles	• Choose tools appropriate to the task • Use tools (e.g. scissors and a hole punch) safely – *(e.g. cut paper, fabric, card)* • **Describe the basic properties** of the materials used (for example how they feel) • **With help** measure, mark out, cut and shape a range of materials • Use **simple finishing techniques** to improve the appearance of their product • Join two pieces of material together using a running stitch • Describe textiles by the way they feel • Know how textiles can be used to make products. • Measure, mark out and cut fabric • Be able to join fabrics using glue • Alter a textile to make it stronger	• To select tools and materials appropriate to the task, and **give reasons for their choice** • Use **hand tools** safely and appropriately • To describe the properties of materials using the **correct vocabulary** • Measure, cut and score with some **accuracy** • Use appropriate finishing techniques, taking care with **the presentation of the final product.** Add details or **design to the product using art skills** (dyeing/ adding sequins/ printing etc) • To be able to join two pieces of material together using a running stich and back tack • To be able to use a template • Be able to shape textiles using templates • Cut, shape and join fabric to make a simple garment, using basic sewing techniques (e.g. running stitch & back tack) • Be able to colour and decorate textiles using a number of techniques (such as dyeing, adding sequins or printing) • Be able to explain why specific textiles have been chosen • To be able to add appropriate finishing touches to a textile product to enhance its appearance
	Current project: • **WWI postcard home**	**Current project:** • **African Embroidery**

Construction	• Choose tools appropriate to the task • Use tools (e.g., scissors and a hole punch) safely – *(e.g., cut paper, fabric, card)* • **Describe the basic properties** of the materials used (for example how they feel) • **With help** measure, mark out, cut and shape a range of materials • Use **simple finishing techniques** to improve the appearance of their product • Build structures, exploring how they can be made stronger, stiffer and more stable • Make a strong and stable structure • Be able to practise gluing materials to make and strengthen products • Be able to use materials and join them so they are strong • Be able to cut and shape materials safely using tools provided • Be able to create a basic mechanism (lever/slider/ hinge) • Be able to use glue and other joining techniques to combine materials • Know how to make materials for a structure stronger by folding, joining or rolling • Be able to make my model stronger	• To select tools and materials appropriate to the task, and **give reasons for their choice** • Use **hand tools** safely and appropriately • To describe the properties of materials using the **correct vocabulary** • Measure, cut and score with some **accuracy** • **Build structures**, exploring how they can be made **stronger, stiffer and more stable** • Use appropriate finishing techniques, taking care with **the presentation of the final product.** Add details or **design to the product using art skills** (dyeing/ adding sequins/ printing etc) • Explore and use products that move by using a mechanism (wheels/ axles/ turning mechanisms/ hinges / levers) • Explore how moving objects work • Examine wheels, axles, turning mechanisms, revisit hinges and simple levers • Make a product that moves using a turning mechanism (e.g., wheels, winding) or a lever or a hinge (to make a movement) • Assemble, join and combine materials (using different ways) in order to make a product. • Use safe ways of cutting materials, including using a junior hacksaw • Choose materials suitable for the job to ensure the product works well • Measure and mark out materials with care • Use appropriate finishing techniques, taking care with the presentation of the final product.
	Current project: • **Design and create Space Vehicle**	**Current project:** • **Victorian moving toy**

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Key Stage 2

Pupils should be taught:

Design

- to 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
- to generate, develop, model and communicate their ideas through discussion, annotated sketches, cross-sectional and exploded diagrams, prototypes, pattern pieces and computer-aided design

Make

- to select from and use a wider range of tools and equipment to perform practical tasks [for example, cutting, shaping, joining and finishing], accurately
- to select from and use a wider range of materials and components, including construction materials, textiles and ingredients, according to their functional properties and aesthetic qualities

Evaluate

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

Technical knowledge

- to apply their understanding of how to strengthen, stiffen and reinforce more complex structures
- to understand and use mechanical systems in their products [for example, gears, pulleys, cams, levers and linkages]
- to understand and use electrical systems in their products [for example, series circuits incorporating switches, bulbs, buzzers and motors]
- to apply their understanding of computing to program, monitor and control their products.

Cooking and Nutrition

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

	Year 3	Year 4	Year 5	Year 6
Key DT Vocabulary (red = universal key term)	user, purpose, design decisions, functional, model, evaluate, **annotated sketch**, investigate, planning, design criteria, appealing.	user, purpose, design decisions, functional, innovative, model, evaluate, annotated sketch, investigate, planning, design criteria, appealing, **aesthetics, research, cross-sectional**	user, purpose, design decisions, functional, innovative, authenticity, model, evaluate, annotated sketch, investigate, planning, design criteria, appealing, aesthetics, research, cross-sectional, **mock-up, step-by-step, computer aided design (CAD), prototype.**	user, purpose, design decisions, functional, innovative, authenticity, model, evaluate, annotated sketch, investigate, planning, design criteria, appealing, aesthetics, research, cross-sectional, **mock-up, step-by-step, computer aided design (CAD), prototype.**
Key Individuals	Textiles: Thomas Blanquette Construction:	Textiles: Daisy Taugelchee Construction: tbc (Rachel Kyte)	Textiles: Lenore Tawney Construction: Archimedes	Textiles: Construction: Ada Lovelace
Design & Planning	• **Gather relevant information** (use research) before producing designs • Evaluate existing products and **understand how products** have been made, what materials have been used and the construction technique • **Learn about inventors**, designers, engineers, chefs and manufacturers etc. • **Generate ideas** for a design considering its purpose and the users. • Identify a purpose and **establish criteria** for a successful product. • **Design 2 possibilities** and then choose which design to make • Produce a **labelled design** indicating materials to be used and measurements required • **Order the main stages** of making • **Explain** their choice of tools and equipment in relation to the skills and techniques they will be using • **Modify final** design with **annotations** explaining changes made	• **Conduct research** to contribute to the development of design/ design criteria • Evaluate existing products and identify criteria that can be used for their **own designs** • **Generate ideas**, considering the purposes for which they are designing and the views of others. • Make **labelled drawings** showing specific features (**cross-sectional**) • Design 2 possibilities and then choose which design to make • **Develop a clear idea, and explain,** of what must be done, planning how to use materials, equipment and processes. • **Explain** their choice of tools and equipment in relation to the skills and techniques they will be using	• **Produce realistic designs** based on own research (using results of investigations and information • Evaluate existing products and identify criteria that will support an **innovative design.** • Develop a clear idea of what has to be done and **suggesting alternative methods of making** if the first attempts fail • Draw and label **detailed step by step plans** • Use **cross-sectional** diagrams to design **at least** 2 possibilities. • Use an **IT program** within the design process (e.g., Paintbox app) • **Produce a list of tools**, equipment and materials in relation to the skills and techniques they will be using	• **Conduct market research** to develop own design criteria which takes into account; culture and society/ restraints such as time, resources and cost. • Evaluate existing products and identify criteria that will support an **innovative design.** • Use **exploded diagrams** and **computer-aided diagrams** to produce **at least** 2 design possibilities • **Develop a design specification** indicating materials, tools, methods and measurements • **Justify designs** and plans in a convincing way to others. • **Formulate step-by-step** plans as a guide to making. • **Produce a list of tools**, equipment and materials in relation to the skills and techniques they will be using

Evaluating	Existing Products: • Investigate and analyse a range of existing products for: How well designed How well made Why materials chosen What methods How well they work How they achieve their purpose How they meet user needs • **Investigate who** designed and made the product • **Where & when** products where designed and made • Whether products can be **recycled or reused** Own Products: • Evaluate their product against **original design criteria** e.g., how well it meets its intended **purpose**/ how well it meets the **needs of the user** • **Give improvements** to make the product better giving a **reason** (because...)	Existing Products: • Investigate and analyse a range of existing products for: How well designed How well made Why materials chosen What methods How well they work How they achieve their purpose How they meet user needs • **Investigate who** designed and made the product • **Where & when** products where designed and made • Whether products can be **recycled or reused** Own Products: • Evaluate their product against **original design criteria** e.g., how well it meets its intended **purpose**/ how well it meets the **needs of the user** • Evaluate their product **both during** and **at the end** of the assignment (referring to the design criteria) by **annotating final designs** with modifications made. • **Explain challenges they overcame** • **Explain improvements** they would make to make the product better giving **reasons** (because...)	Existing Products: • Investigate and analyse a range of existing products for: How well designed How well made Why materials chosen What methods How well they work How they achieve their purpose How they meet user needs • **How much** products cost to make • **How innovative** products are • **How sustainable** the materials in the products are • **What impact** products have beyond their intended purpose Own Products: • Evaluate their product against **original design criteria** e.g. how well it meets its intended **purpose**/ how well it meets the **needs of the user** • Evaluate their product **both during** and **at the end** of the assignment (referring to the design criteria) by **annotating final designs** with modifications made. • **Consider the views of others** when evaluating their product • Explain challenges they overcame and how that **contributed to the final product** • **Reason and rationalise** any improvements they would make and what aspects they would keep	Existing Products: • Investigate and analyse a range of existing products for: How well designed How well made Why materials chosen What methods How well they work How they achieve their purpose How they meet user needs • **How much** products cost to make • **How innovative** products are • **How sustainable** the materials in the products are • **What impact** products have beyond their intended purpose Own Products: • **Critically** evaluate their product against **original design criteria** e.g. how well it meets its intended **purpose**/ how well it meets the **needs of the user/ fitness for purpose** • Evaluate their product **both during** and **at the end** of the assignment (referring to the design criteria) by **annotating final designs** with modifications made • **Consider the views of others** when evaluating their product • Explain challenges they overcame and how that **contributed to the final product** • **Reason and rationalise** any improvements they would make and what aspects they would keep

Cooking and Nutrition	• Name different foods that belong to each of the 5 groups from the Eat Well Guide • Describe the food product in terms of taste, texture, flavour and relate this to the intended purpose of the food. • Understand principles of a healthy and varied diet (nutrition) • Select ingredients for a food-based product • Know how to be hygienic and safe when using food	• Prepare and create (hygienically and safely) a dish following a given recipe – including measuring out ingredients • Practice skills of kneading and baking • Present the finished food product to impress the user • Demonstrate hygienic food preparation and storage	• Weigh and measure accurately (time, dry ingredients, liquids) • Apply the rules for basic food hygiene and other safe practices e.g. hazards relating to the use of ovens • Chop and slice, adapting the size of the pieces • Use a selection of ingredients to meet an identified need (e.g. healthy sandwich/ snack/ low gluten) • Present and package a food product • Measure accurately using various scales • Know that people have allergies	• Create and refine recipes including ingredients, cooking times and temperatures • Measure accurately and calculate ratios of ingredients to scale up or down • Explain how products should be stored and give reasons why • Take into account consumer needs (cost) and health implications
	Current project • **TBC**	**Current project** • **Bread product (Science)**	**Current project** • **Meal for celiac**	**Current project** • **Fair trade/carbon efficient meal**
Textiles	• Select appropriate materials, techniques and tools for making their product, explain reasons why • Work safely and accurately with a range of simple tools • Measure, mark out, cut, score and assemble components with more accuracy • Measure, tape or pin, cut and join fabric (including cross-stitch and running stitch) with some accuracy	• Select appropriate tools and techniques and show knowledge of handling the tool/ completing the technique • Work accurately to measure, make cuts and holes • Measure, mark out, cut and shape a range of materials, using appropriate tools, equipment and techniques • Apply a range of ideas from art and design to products ensuring quality and a high standard of finish • Identify viable solutions to problems as they happen • Join and combine materials and components accurately in temporary and permanent ways • Sew using a range of different stitches (e.g., backstitch, weave and knit)	• Join two pieces of material together using the blanket stitch • Use structural changes (such as plaiting or weaving) to create new products such as rope belts or bracelets) • Make a prototype prior to making a final product • Select appropriate materials, tools and techniques • Measure and mark out accurately • Use skills in using different tools and equipment safely and accurately • Make cuts (scissors, snips, saw) and holes (punch, drill) accurately and reject pieces that are not accurate	• Select appropriate tools, materials, components and techniques and justify choices made • Rigorously follow procedures for safety • Very careful and precise measurements • Construct products using permanent joining techniques • Make modifications as they go along • Experiment with a range of materials to find the right mix of affordability, appeal and appropriateness for the job • Make a product that has a high degree of precision and does the intended job • Hide joins for aesthetic effect • Use a combination of stitches to create the desired product (including choosing the most appropriate stitches, embroidery or plaiting)

				• Use the qualities of materials to create suitable visual and tactile effects in the decoration of textiles (e.g., a soft decoration for comfort on a cushion)
	Current project • **Whole class blanket (own square symbolises themselves) – Community project**	**Current project** • **Weaving based on Anglo-Saxons (History)**	**Current project** • **Weaving based on Mayans (History)**	**Current project** • **Weaved phone case – with stitching to join the two together**
Construction	• Start to understand that mechanical and electrical systems have an input and output • Start to understand how mechanical systems such as levers and linkages or pneumatic systems create movement. • Know how to make structures stronger by folding, joining or by shape (columns/triangles) • Use finishing techniques to strengthen and improve the appearance of their product (using a range of equipment, including ICT)	• Make a product that uses mechanical components to create movement (e.g. cams/pulleys/gears) • Know that mechanical and electrical systems have an input and output • Understand and use electrical systems in their products • Know how mechanical systems such as levers and linkages or pneumatic systems create movement.	• Make a prototype prior to making a final product • Select appropriate materials, tools and techniques • Measure and mark out accurately • Use skills in using different tools and equipment safely and accurately • Make cuts (scissors, snips, saw) and holes (punch, drill) accurately and reject pieces that are not accurate • Apply a high-quality finish (e.g., carving, paint, glaze, varnish or other finishes) • Apply suitable mechanical systems to create movements (levers/linkages/pneumatic systems/ cams/pulleys or gears) • Explore mechanical moment using hydraulics and pneumatics	• Select appropriate tools, materials, components and techniques and justify choices made • Rigorously follow procedures for safety • Very careful and precise measurements • Construct products using permanent joining techniques • Make modifications as they go along • Experiment with a range of materials to find the right mix of affordability, appeal and appropriateness for the job • Make a product that has a high degree of precision and does the intended job • Hide joins for aesthetic effect • Choose components that can be controlled by switches or by ICT equipment • Use science skills (resistance, batteries in series or parallel, variable resistance to dim lights or control speed) to alter the way electrical products behave • Use DT to create housings for electrical components

				• Know how to program a computer and control their products, e.g., to monitor changes in the environment
	Current project • **Battering rams – Roman legacy (History)**	**Current project** • **Humber Ports product (Geography?)**	**Current project** • **Heron of Alexandria – Ancient Greece gears project (History)**	**Current project** • **Blitz affected house with lights/electrical components**