Design & Technology

WRENINGHAM VC PRIMARY - CURRICULUM KNOWLEDGE AND KEY SKILLS PROGRESSION

Design & Technology

INTENT

The intent of our **Design Technology Curriculum** is to deliver a curriculum which inspires our children to be innovative, creative and flexible thinkers and designers. They will understand and appreciate the whole design cycle, through ideas and research, product creation, problem solving and evaluation.

We want to equip them with the skills and confidence to take a risk through redrafting ideas and designs, making modifications and improvements, and not being afraid to be constructively critical in their ongoing and final evaluations of both their own and their peer's work. They will learn and develop building and construction skills using a range of tools and materials appropriate for the task and purpose of the final product, and attain an understanding of how to make a good choice in relation to these two aspects of the design process.

We aim to build an awareness of the importance and impact of design in our everyday lives, embedding skills and understanding which will may enable and encourage our children to appreciate, reflect upon and possibly contribute to, areas of design in the future.

IMPLEMENTATION

We implement a progressive design technology curriculum that builds on prior knowledge, and design and technology geographical vocabulary and skills year on year. Children have access to key knowledge, language and meanings to understand Design Technology and to use these skills across the curriculum.
In Design Technology children are asked to solve problems, and design their product to match a criteria and meet a purpose. Teachers talk collaboratively with children , using their sketch book designs, prototypes and final products to highlight, guide and encourage areas of development, insight and improvement during each project,

Design and technology lessons are taught :

- in selective terms throughout the school year as part of the ongoing weekly class teaching, with art and design being taught in the gap terms.
- through specific whole school focus curriculum days/week : e.g. design an egg carrying vehicle week

When designing and making, the children are introduced to projects involving the key areas of mechanisms, structures, fabrics, electrical systems (in KS2) and the digital world. Within these areas, the following design process of 'design', 'make', and 'evaluate' is followed:

1. Design:

- use research and develop design criteria to inform the design of innovative, functional, appealing products that are fit for purpose
- generate, develop, model and communicate their ideas through discussion, annotated sketches, diagrams and prototypes,

Design & Technology

2. Make:

• Continuous provision in Class 1 for children to choose to design, construct and experiment: Construction (e.g. lego, big bricks, polydron, Lasy)

Junk modelling- (to include junk, sticky tapes, scissors, joining materials etc.), Book-making- hole punching, connecting with string, wool, staples etc.

activities to promote cutting skills, Sculpting- sand, clay

• children are able to select from and use a wider range of tools and equipment to perform practical tasks (for example, cutting, shaping, joining and finishing, as well as chopping and slicing) accurately.

• children are able to select from and use a wide range of materials, ingredients and components, including construction materials, textiles and ingredients, according to their functional properties, aesthetic qualities and, where appropriate, taste.

3. Evaluate:

• encourage children to investigate, analyse and evaluate a range of existing products.

• ensure children evaluate their ideas and products against their own design criteria and understand that this process should be used to stimulate new ideas and improvement.

• teach and enable children to understand how key events and individuals in design and technology have helped shape the world.

• provide age/ability appropriate evaluation frames to facilitate effective, insightful evaluation (e.g. star rating, detailed written evaluation)

Technical knowledge:

• provide design projects which allow children to apply their understanding of how to strengthen, stiffen and reinforce more complex structures.

• provide opportunities to enable children understand and use mechanical systems in their products.

• provide design projects which incorporate electrical systems in the products in Key Stage 2.

• explore computing tasks where they can apply their understanding of computing to program, monitor and control their products

• provide cooking tasks which enable children to understand some of the ways that food can be processed and the effect of different cooking practices

• Key skills and key knowledge for D and T have been mapped across the school to ensure progression between year groups.

• Children learn about real life structures and the purpose of specific examples, as well as developing their skills throughout the programme of study.

Design & Technology

IMPACT

Children will have clear enjoyment and confidence in design and technology that they will then apply to other areas of the curriculum.

The final products produced will encapsulate the design process embarked upon – displaying elements of the design phase and incorporating modifications, and improvements, and be accompanied by an insightful evaluation.

Children will build, year by year upon their design and technical skills, and the ability to make good choices and changes to their design.

Children will ultimately know more, remember more and understand more about Design Technology, demonstrating this knowledge when using tools or skills in other areas of the curriculum and in opportunities out of school.

The large majority of children will achieve age related expectations in Design Technology.

As designers children will develop skills and attributes they can use beyond school and into adulthood.

Design & Technology

	Early Years Foundation Stage	Topics
Year R	ELG 16 Exploring and using media and materials: -Children safely use and explore a variety of materials, tools and techniques, experimenting with colour, design, texture, form and function ELG 17 Being imaginative: -Children use what they have learnt about media and materials in original ways, thinking about uses and purposes **By the end of the EYFS, most children should be able to:** -Construct with a purpose in mind, using a variety of resources -Use simple tools and techniques competently and appropriately -Build and construct with a wide range of objects, selecting appropriate resources and adapting their work when necessary -Select the tools and techniques they need to shape, assemble and join materials they are using	1. Structures/Textiles: Junk Modelling 2. Mechanical: Moving Pictures – Super Heroes 3. Structures: Bridge for billy goat gruff 4. Structures: Christmas Candle Holder

	National Curriculum Statutory requirements	Topics
Key Stage 1 - Year 1/2	When designing and making, pupils should be taught to: **Design** -design purposeful, functional, appealing products for themselves and other users based on design criteria -generate, develop, model and communicate their ideas through talking, drawing, templates, mock-ups and, where appropriate, information and communication technology **Make** -select from and use a range of tools and equipment to perform practical tasks [for example, cutting, shaping, joining and finishing] -select from and use a wide range of materials and components, including construction materials, textiles and ingredients, according to their characteristics **Evaluate** -explore and evaluate a range of existing products -evaluate their ideas and products against design criteria **Technical knowledge** -build structures, exploring how they can be made stronger, stiffer and more stable -explore and use mechanisms [for example, levers, sliders, wheels and axles], in their products. **<u>Cooking and Nutrition</u>** -use the basic principles of a healthy and varied diet to prepare dishes -understand where food comes from	1. Structures/Textiles: Junk Modelling 2. Mechanical: Moving Pictures – Super Heroes 3. Structures: Bridge for billy goat gruff 4. Structures: Christmas Candle Holder 5. Mechanical: Make a Pop-up Book 6. Food: Healthy Meals on a Budget

Design & Technology

	National Curriculum Statutory requirements	Topics
Key stage 2 – Year 3/4 & Year 5/6	When designing and making, pupils should be taught to: **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 and components, including construction 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 program, monitor and control their products. **<u>Cooking and Nutrition</u>** -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.	1. Food: Y5/6 Creating a seasonal food product along with appropriate packaging. 2. Mechanical Systems: Y5/6 Designing and creating a mechanical automata toy 3. Structures/Digital World: Y5/6 Designing a bridge for strength 4. Food: Y5/6 Cooking a savoury/non-savoury, seasonal, healthy food 5. Structural/Textiles/Electrical Systems: Y5/6 Designing an effective teaching model 6. Food: Y5/6 Creating a healthy, effective sports snack using seasonal food. 7. Textiles: Y5/6 Designing a costume accessory with fabric 8. Mechanical/Electrical Systems: Y5/6 Create a Xmas Card 9. Mechanical: Y5/6 Create a History Pop-up teaching book 10. Structural: Y5/6 Design and Build a Refugee Shelter 11. Textiles: Y5/6 Design a WWII patchwork quilt 12. Food/Structure: Y5/6 Bake a healthy biscuit under the sea

Design & Technology

Knowledge & Understanding			
Year R	**Continuous Provision:** Construction (e.g. lego, big bricks, polydron, Lasy) Junk modelling- (to include junk, sticky tapes, scissors, joining materials etc.) Book-making- hole punching, connecting with string, wool, staples etc. Activities to promote cutting skills. Sculpting- sand, clay Art focus DT Junk modelling- e.g. building rockets/space crafts	**Continuous Provision:** Construction (e.g. lego, big bricks, polydron, Lasy) Junk modelling- (to include junk, sticky tapes, scissors, joining materials etc) Book-making- hole punching, connecting with string, wool, staples etc. Activities to promote cutting skills. Sculpting- sand, clay **Mechanical:** **Moving pictures- super heroes flying through the sky.** Big Idea: We can make something useful or entertaining out of something simple by folding, cutting or attaching it. KQ: How can I join paper together and still allow the two pieces to move? Look at/compare moving pictures and mechanisms. Learn how to make them- have a go at making a variety. Design own moving picture involving super hero Make- choose and use appropriate resources Evaluate- circle time- talk about how move and offer feedback to one another. **Structure:** **Structures: Bridge for billy goat gruff** Big Idea: How we fit materials together can decide how strong they are. KQ: How will I decide if my design is more successful than another **OUTSIDE WEEK- with class 2** Look at a variety of bridges. Look at structure. What does a bridge do? Properties of a good bridge. Introduce problem- need a new bridge. Design: Describe their design by using pictures, diagrams, and words. What materials- card, blocks, bricks Make- select appropriate materials and tools, experiment and use appropriate joins/mechanisms Evaluate- peer/partner feedback. Which group made the most successful bridge? How can we tell? What criteria are we judging it on? Write an evaluation to include how to make it better next time.	**Continuous Provision:** Construction (eg lego, big bricks, polydron, Lasy) Junk modelling- (to include junk, sticky tapes, scissors, joining materials etc) Book making- hole punching, connecting with string, wool, staples etc Activities to promote cutting skills. Sculpting- sand, clay Art Focus this term OUTSIDE WEEK- Natural art/sculpture
	Structure: **Christmas DT project- candle holder.** Big Idea: We can show other people our ideas by creating simple sketches with labels KQ: What would help me create something in the real world which was once just an imaginative idea in my head	Art focus this term	Art focus this term

Design & Technology

	Design- compare holders, look at structure, joins, designs Sketch and label design. What materials will need? Make it. Evaluate- discuss with peers, listen to and give feedback. How would do it different next time.		

Year 1/2	**Structure/Textiles:** **Junk Modelling** Big Idea: Materials and objects can be shaped, cut and joined to make something else KQ: What features of something in the real world must I look at so I can make a model of the real thing space landing- spacecrafts, first plane ride- aeroplanes, great fire of London- Tudor houses Look at a variety of spacecrafts/aeroplanes/buildings Compare and contrast. Look at properties and discuss. Design own e.g. spacecraft, aeroplane, Tudor house etc. Describe their design by using pictures, diagrams, and words. Make- select appropriate materials and tools, experiment and use appropriate joins/mechanisms Evaluate- peer/partner feedback. Write an evaluation to include how to make it better next time.	**Mechanical:** **Moving Pictures** Big Idea: : People design and make things that meet specific rules we call criteria KQ: Which parts of your pictures should move? - super heroes flying through the sky. Look at/compare moving pictures and mechanisms. Learn how to make them- have a go at making a variety. Design own moving picture involving space/rockets. Describe their design by using pictures, diagrams, and words. Make- select appropriate materials and tools, experiment and use appropriate joins/mechanisms Evaluate- peer/partner feedback. Write an evaluation to include how to make it better next time. **Structure:** **Structures: Bridge for billy goat gruff** Big Idea: How we fit materials together can decide how strong they are. KQ: How will I decide if my design is more successful than another **<u>OUTSIDE WEEK</u>- with class 1** Look at a variety of bridges. Look at structure. What does a bridge do? Properties of a good bridge. Introduce problem- need a new bridge. Design: Describe their design by using pictures, diagrams, and words. What materials- card, blocks, bricks Make- select appropriate materials and tools, experiment and use appropriate joins/mechanisms Evaluate- peer/partner feedback. Which group made the most successful bridge? How can we tell? What criteria are we judging it on? Write an evaluation to include how to make it better next time.	Art focus this term

Design & Technology

	Mechanical: **Making a pop-up book** Big Idea: We can make something useful or entertaining out of something simple by folding, cutting or attaching it. KQ: How can I join paper together and still allow the two pieces to move? Plan, design and make a book and evaluate it **Structure:** **Christmas DT project- candle holder** Big Idea: We can show other people our ideas by creating simple sketches with labels KQ: What would help me create something in the real world which was once just an imaginative idea in my head Design- compare holders, look at structure, joins, aesthetic design. Describe their design by using pictures, diagrams, and words. Make it: select appropriate materials and tools, experiment and use appropriate joins e.g. handles Make a structure/model using different materials Evaluate- discuss with peers, listen to and give feedback. How would we do it differently next time? Write about how we would do it differently next time	**Food:** **Healthy eating- to a budget.** Big Idea: There are good choices and poor choices when creating a healthy meal KQ: Are heathier foods more expensive than unhealthy food? Look at healthy/unhealthy foods Properties of a healthy salad. Design – maths focus- sharing, counting, measure- money, weight, capacity etc.) Evaluate- How much did it cost? Was it within budget? Who made the cheapest? How successful? Taste, presentation, etc. Improvements Technical – use of knives, peeler, scales **Link to Maths**	Art focus this term

Design & Technology

Year 3/4	**Mechanical/Electrical Systems:** **Create Xmas Card** Plan, design, create and evaluate a Christmas card that will contain -a simple electrical circuit -a mechanical component	Art focus this term	**Food:** **Create a Biscuit** Design, bake and evaluate an 'Under the Sea' themed healthy biscuit - investigate ingredients and health/nutrional value -develop a biscuit: shape, ingredients, aesthetics -bake two: one to eat and one to use to help in designing the packaging **Structure:** **Packaging:** -investigate a range of commercially made packaging and recognise that many examples are created from nets -make a paper model (mock-ups/prototype) of their ideas -then measure, mark out, cut and assembly with accuracy -evaluate their packaging against their original design criteria -produce packaging that is visually attractive, accurately made and appropriate for its purpose
	Mechanical: **Pop-up Books** Design a 3-4 page pop-up book for Class 2 (y1/y2) based on a history work (non-fiction) -learn about pop-up books and why they are so popular -discover how different card mechanisms create different sorts of movement -know how to accurately cut, score, fold and join to produce working, reliable card mechanism -to develop different graphic styles and match these to the needs of their chosen audience -to match card mechanisms to the movements they want to achieve in their book **Link to History Topic**	**Textiles:** **Fabric Design - Sewing** -WW2 Day: Make do and mend session -using a simple stitch, join together 2-4 pieces of material for a patchwork quilt **Structure:** **How Hill Residential** -thatched roof building Develop understanding how how materials can be fitted together for a purpose – e.g. strong and waterproof	**Structure:** **Designing and making a shelter for a purposes** -identify and discuss the features of an Anderson Shelter -plan and design a structure to provide shelter and safety to refugees in harsh conditions around the world today. Set different criteria – e,g., heat/cold/risk of flood/earthquake -choose the most appropriate materials for their design -measure, cut and assemble their design with increasing accuracy throughout the building process - evaluate functionality **Link to History – World War 2**

Year 5/6	**Food/Structure:** **Creating a Xmas product and packaging it to meet a criteria** Big Idea: Designing an effective product requires development and modification	**Mechanical:** **Cams and machines and how they operate** Big Idea: Shape and position can affect how elements of a machine affect movement	**Structure/Digital World:** **Brunel Bridges Design** Big Idea: Good bridge design is related to a good understanding of how forces work

Design & Technology

	KQ: How can I meet a design criteria with the design choices I make? Traditional cooking – create Christmas peppermints; hygiene in the kitchen Designing a functional presentation box to hold the mints securely, re-sealable – reflecting a high quality product. On a shop shelf – Explore the elements behind this (design, colour, lettering) - Investigate packaging Evaluating the design in functional and aesthetic terms. **Link to Computing/Literacy - Choosing fonts for purpose**	KQ: How can I affect a range of multiple movements with one initial movement on my machine? Cams and machines – design the movement of a mechanical automata time machine toy linked to reading of H.G Wells; incorporate an electronic element – lights/buzzers – operated through the movement of the mechanics Evaluating the design in functional and aesthetic terms. **Link to Literacy – H.G. Wells 'The Time Machine'** **Link to Science – Changing Circuits**	KQ: What are the design features of a strong bridge? Designing a Bridge like Brunel: Using Brunel's designs as inspiration, design a functional bridge to span a given gap, fulfilling aesthetic and load bearing criteria. Using CAD to create design. Evaluating the design in functional and aesthetic terms. **Textiles:** **Costume and Set Design for Class 4 Play – including weekend workshop session.** Costume design – pattern cutting and sewing skills Design and make a costume accessory for a specific character **Link to Art and Design – relating to paper sculpture and mini set design** **Link to History – Victorian Ideas topic** **Link to Science - Forces**
	Structure: **Creating a Functional Product** Big Idea: An effective design must be aesthetically pleasing and functional KQ: How do I evaluate the success of my design? Design two-tier 'cake' stand to serve a savoury and sweet dish for a Christmas afternoon tea given functional and aesthetic criteria.	**Structure/Textiles:** **An Effective Teaching Model** Big Idea: Good design meets a purpose effectively KQ: How to I design a hands-on product which will be resilient? Design a geographical teaching model to represent the Mount St. Helens eruption before and after, along with the workings of the internal volcano which can be used as a tactile teaching aid using a variety of materials. **Link to Geography – Volcanoes** **Link to Science – Changing Circuits**	**Food:** **Designing a light, healthy, energy giving snack for a summer sports event, using seasonal vegetables.** Big Idea: Certain food provide energy while still being considered healthy. KQ: Can a snack be tasty, and healthy and practical to eat during an event? **Textiles:** **Costume and Set Design for Class 4 Play – including weekend workshop session.** Costume design – pattern cutting and sewing skills Design and make a costume accessory for a specific character

Key Knowledge & Skills				
	Year R	Year 1/2	Year 3/4	Year 5/6

Design & Technology

Designing **Developing, planning and communicating ideas**	**Can pupils…** -Selects tools and techniques needed to shape, assemble and join materials they are using.	**Can pupils…** Year 1 -Identify the key features of an existing product -Think of some ideas of their own -Plan an outcome through pictures with labels -Explain their ideas orally Year 2 -Generate ideas through comparing existing products -Plan an innovative product -Choose the most appropriate tools and materials and explain their choices -Describe their design by using pictures, diagrams, and words?	**Can pupils…** Year 3 -Plan their design, using accurate diagrams and labels -Plan the equipment/ tools needed and give reasons why -Start to order the main stages of making their product -Identify a design criteria and establish a purpose/ audience for their product How realistic are the plans? E.g. tools, equipment, materials, components? Year 4 -Create a final design for their product based on initial ideas and revisions, based on existing ideas -Create a detailed plan considering their target audience, design criteria and intended purpose	**Can pupils…** Year 5 -Take a user's view into account when designing -Produce a detailed step-by-step plan for their design method -Suggest some alternative designs and compare the benefits and drawbacks to inform the design process and outcome Year 6 -Use a range of information to inform their design -Use research to inform plans -Work within constraints - Justify their plan to someone else -Consider culture and society in their designs -Consider the use of the product when selecting materials -Think about how their product could be marketed through packaging and advertising

Key Knowledge & Skills				
	Year R	Year 1/2	Year 3/4	Year 5/6

Design & Technology

Making **Working with tools, equipment, materials and components to make quality products**	-Develop practical skills with a range of materials -Explore construction kits -Explore existing products •Manipulates materials to achieve a planned effect •Constructs with a purpose in mind, using a variety of resources •Uses simple tools and techniques competently and appropriately. •Create simple representations of events, people and objects. •Shows a preference for a dominant hand.	Year 1 -Explain what they are making -Select appropriate resources and tools -Explain which tools they are using and why -Use tools safely Year 2 -Join materials/ components together in different ways -Measure materials to use in a model or structure -Use joining, folding or rolling to make it stronger	Year 3 -Use equipment and tools accurately and safely -Select the most appropriate materials, tools and techniques to use -Manipulate materials using a range of tools and equipment -Measure, cut and assemble with increasing accuracy Year 4 -Use equipment and tools with increased accuracy and safety -Select the most effective materials, tools and techniques to use -Manipulate materials effectively using a range of tools and equipment -Measure, cut and assemble accurately	Year 5 -Choose appropriate tools and materials to ensure the final product will appeal to the audience -Use a range of tools and equipment with good accuracy and effectiveness, within established safety parameters Year 6 -Choose appropriate tools and materials to ensure that the final product will appeal to the audience -Use a range of tools and equipment with good accuracy and effectiveness, within established safety parameters

Key Knowledge & Skills				
	Year R	Year 1/2	Year 3/4	Year 5/6

Design & Technology

Evaluating **Evaluating processes and products**	-Selects appropriate resources and adapts work where necessary.	Year 1 - Describe how their product works -Identify success and next steps Year 2 -Assess how well their product works -Explain what they would improve if they did it again	Year 3 -Start to think about their ideas as they make progress and be willing to make changes if this helps them to improve their work -Assess how well their product works in relation to the purpose -Explain how they could change their design to make it better Year 4 -Think about their ideas as they progress and make changes to improve their work -Assess how well their product works in relation to the design criteria and the intended purpose -Explain how they could improve their design and how their improvement would affect the original outcome	Year 5 -*Continuously* check their design is effective and fit for purpose -Assess how well their product works in relation to the design criteria and the intended purpose and suggest improvements -Evaluate appearance and function against the original design criteria Year 6 -Test and evaluate their final product *(Is it fit for purpose?* *What would improve it?* *Would different resources have improved their product?)* -Does their product meet all design criteria?

Key Knowledge & Skills

Design & Technology

	Year R	Year 1/2	Year 3/4	Year 5/6
	-Understands that different media can be combined to create new effects. -Manipulates materials to achieve a planned effect -Uses simple tools and techniques competently and appropriately. -Uses simple tools to effect changes to materials -Handles tools, objects, construction and malleable materials safely and with increasing control. **Cooking & Nutrition:** Year 1: Begin to use the basic principles of a healthy and varied diet/begin to understand where food comes from	Year 1 -Make a product which moves -Cut materials using scissors -Describe the materials using different words -Say why they have chosen moving parts -Arrange pieces of the construction before building -Make a structure/model using different materials Year 2 -Measure an amount of a textile -Join textiles together to make a product, using techniques such as stitching -Cut textiles accurately -Explain why they chose a certain textile -Join materials together as part of a moving product -Explain how different parts move -Make sensible choices of which material to use for their construction -Make their structure stronger, stiffer or more stable **Cooking & Nutrition:** Year 1/2: Use the basic principles of a healthy and varied diet/understand where food comes from	Year 3 -Join textiles of different types in a range of ways -Begin to use a range of simple stitches -make a product which uses mechanical components -join materials effectively to build a product -Use a range of techniques to shape and mould materials Year 4 -Consider which materials are fit for purpose and join them appropriately -Use a simple circuit and add components to it -Make a product which uses both electrical and mechanical components -Measure accurately to build effective structures **Cooking & Nutrition:** Year 3: Begin to understand seasonality, prepare and cook mainly savoury dishes Year 4: Understand seasonality, prepare and cook mainly savoury dishes	Year 5 -Make up a prototype first -Use a range of joining techniques -Devise a template or pattern for their product -Refine their product after testing it -Measure accurately enough to ensure precision -Demonstrate their product is strong and fit for purpose -Refine and further improve their product Year 6 -Use different electronic circuits in their product to improve it -Incorporate a switch into their product -Refine their product after testing it- - Experiment with different cams for different mechanical effects -Demonstrate their product is strong and fit for purpose -Refine and further improve their product **Cooking & Nutrition:** Year 5/6: Cook savoury dishes for a healthy, varied diet, making justified choices relating to healthy food