Developing an approach to teaching and learning in Design Technology

Design and technology is an inspiring, rigorous and practical subject. Using creativity and imagination, pupils design and make products that solve real and relevant problems within a variety of contexts, considering their own and others' needs, wants and values. They acquire a broad range of subject knowledge and draw on disciplines such as mathematics, science, engineering, computing and art. Pupils learn how to take risks, becoming resourceful, innovative, enterprising and capable citizens. Through the evaluation of past and present design and technology, they develop a critical understanding of its impact on daily life and the wider world. High-quality design and technology education makes an essential contribution to the creativity, culture, wealth and well-being of the nation NC 2014

Expressive Arts and Design in the Early Years

Exploring and using media and materials: *Children sing songs, make music and dance, and experiment with ways of changing them. They safely use and explore a variety of materials, tools and techniques, experimenting with colour, design, texture, form and function. ELG 16*

Being imaginative: *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, art, music, dance, role play and stories. ELG 17*

"*The nature of design and technology is such that it should provide opportunities for pupils to engage in activities that are challenging, relevant and motivating. This should give pupils enjoyment, satisfaction and a sense of purpose.*"

(DATA Primary Guidance, p4)

Teaching and learning in **Design Technology** at Wormley Primary School aims to:

- develop the creative, technical and practical expertise of children needed to perform everyday tasks confidently and to participate successfully in an increasingly technological world
- support children to 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
- support children to critique, evaluate and test their ideas and products and the work of others
  help children understand and apply the principles of nutrition and learn how to cook
- develop a love of design

We encourage children to notice carefully and deeply, and demonstrate their learning in a variety of ways: designs, models, drawings, fact files etc. During their time at this school, they will make products and learn how to use a variety of tools, equipment, materials and components. Learning can be recorded in the children's creative logs, class topic books, a class folder etc.

DEVELOPING SKILLS

There are key skills for pupils as designers:

Curiosity	Be curious about the world. Ask questions and wonder why
Active Listening	Give your full attention to what different people say, taking time to understand the points being made and asking questions as appropriate
Critical Thinking	Use logic and reasoning to identify the strengths and weaknesses of alternative ideas, conclusions or approaches to problems
Active Learning	Investigate ways to find out information from different sources to help with problem-solving and decision-making
Judgment and Decision Making	Have respect for alternative perspectives that may be different from our own. Take on advice from others
Collaboration	Work with others to learn from them and achieve more
Writing	Communicate effectively in writing for the needs of the audience.
Speaking	Talk clearly to others to convey information effectively.
Social Awareness	Recognise that people see things in different ways. Appreciate difference.
Persuasion	Persuade others to change their minds or behaviour based on your evidence

Through a variety of creative and practical activities, children should be taught the knowledge, understanding and skills needed to engage in an iterative process of designing and making. They should work in a range of relevant contexts.

MASTERY IN DT

We want children to achieve mastery of the primary DT curriculum by being able to solve problems by planning, designing and making items, and fulfilling given criteria, in different contexts. This will require a good level of technical skill with a broad range of tools and use of innovative ways to enhance the outcome of an item. As our scheme of learning is a spiral curriculum, children revisit previous learning – skills and knowledge - and can improve over time.

INCLUSION

We believe that inclusive education means supporting all pupils to learn, contribute and participate in all aspects of school life alongside their peers. Our curriculum includes, not only the formal requirements of the National Curriculum, but also a range of additional opportunities to enrich the experiences of our children. Our curriculum also includes the social aspects that are for life-long learning, personal growth and development of independence.
Some of the actions we may take to achieve this are:

- Help all pupils achieve the best of their abilities, despite any special educational need or disability they may have.
- Ensure that staff are aware of and sensitive to the needs of individual pupils and that teaching is appropriate to meet those needs.
- Make suitable adaptations to the curriculum for children with SEND to fully develop their abilities, interests and aptitudes and gain maximum access to the curriculum.

*To overcome potential barriers to learning in **design and technology,** some pupils may need:*

- *help in managing tools for design and technology − such as jumbo pencils if hand control is weak, non-slip mats (dycem) to hold papers, books and equipment in place, BluTac to hold small items or as a temporary fixing (eg for rulers when drawing) and specialist aids − eg talking weighing scales, patterns, ready-made parts*
- *Help in the planning/evaluation stage - using visual prompts, images, photos or symbols showing the order to carry out a sequence of activities for a particular process, task planners allowing pupils to see what they have completed, what to do next and where to finish.*
- *To use digital cameras to record each stage of designing and making, then sequencing the photos. This can be a useful tool to aid pupils' memory of the stages of completing the work.*
- *help in managing the written communication of planning, evaluation and assessment - such as annotations of their design - through scribes / key vocabulary/word grids / signs and symbols*

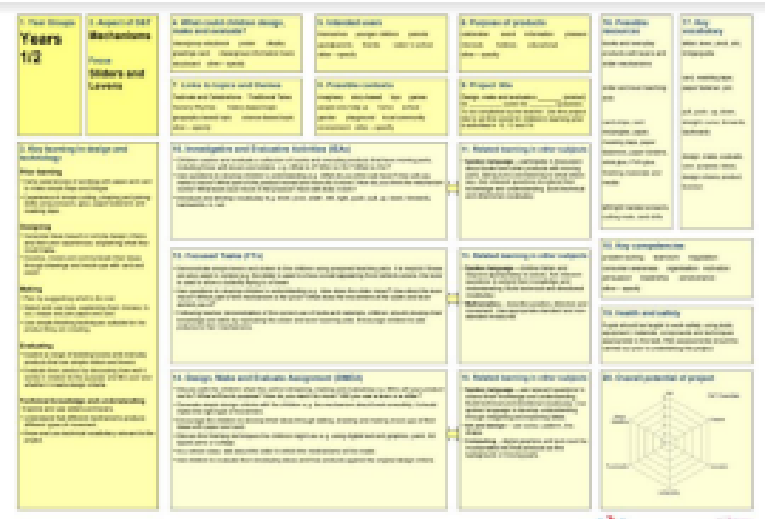
4 KEY PRINCIPLES AND PROGRESSION IN DT (split into KS1/KS2)
The following principles are taught and assessed:

Design KS1	● 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
KS2	● 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 KS1	● 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

KS2	• 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 KS1	• explore and evaluate a range of existing products • evaluate their ideas and products against design criteria
KS2	• 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 KS1	• 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
KS2	• 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

PROJECTS ON A PAGE

At Wormley Church of England Primary School, we chose to adopt *The Projects on a Page* scheme of learning, designed by the Design and Technology Association. It offers an excellent structure for primary school teachers who are non-specialists to teach the National Curriculum for D&T in an imaginative way. It is based on universal principles of effective teaching and learning in D&T. Each DT plan has 20-step planning guidance and accompanying teacher tips, a glossary, an example of iterative design appropriate to the project, and practical advice on using resources. Side 1 of the plan is supplied as an editable digital version that can be adapted and printed.



OVERVIEW

Year 1		
DESIGNER / INVENTOR Jim Henson (creator of puppets for Sesame Street and The Muppets) The history of puppets (V&A Museum)	**DESIGNER / INVENTOR** Usborne Books using levers to entertain	**DESIGNER / INVENTOR** Jamie Oliver
PROJECT ON A PAGE Textiles Templates and joining techniques (A Hand Puppet / Christmas Stocking)	**PROJECT ON A PAGE** Mechanisms Sliders and Levers (Create a story book for Jack and the Beanstalk)	**PROJECT ON A PAGE** Food Preparing fruits and vegetables (including cooking and nutrition requirements) (fruit salad / fruit kebab / fruit smoothies)

Year 2		
DESIGNER / INVENTOR Russell Brown / Marcello Tully	**DESIGNER / INVENTOR** Sir Horace Jones - Tower Bridge	**DESIGNER / INVENTOR** Sir Alexander Arnold Constantine Issigonis - the mini
PROJECT ON A PAGE Food Preparing fruit and vegetables. (Making bread / root vegetable loaf / fruit loaf)	**PROJECT ON A PAGE** Structures Investigating freestanding structures Eg. a bridge for a knight to cross the moat on his horse?	**PROJECT ON A PAGE** Mechanisms Wheels and axles (push/pull toy, vehicle)

Year 3		
DESIGNER / INVENTOR John Montagu, the 4th Earl of Sandwich - inventor of the sandwich	**DESIGNER / INVENTOR** Samuel Parkinson - designed the first modern day purse	**DESIGNER / INVENTOR** Robert Gair - invented the pre-cut cardboard box in 1890 – flat pieces manufactured in bulk that folded into shape
PROJECT ON A PAGE Food Health and varied diet (including cooking and nutrition requirements) (toasties/sandwiches)	**PROJECT ON A PAGE** Textiles 2D and 3D product (pencil case /purse / fashion accessory)	**PROJECT ON A PAGE** Structures Shell structures (including computer aided design) (gift box / desk tidy / party box)

Year 4		
DESIGNER / INVENTOR Thomas Edison- Inventor of the light bulb	**DESIGNER / INVENTOR** The Bedouins are thought to be the first people who made pitta bread	**DESIGNER / INVENTOR** Archimedes(c. 287-212 B.C.E.) - The lever was first described in 260 B.C.E. by Archimedes
PROJECT ON A PAGE Electrical systems Simple circuits and systems (including programming and control) (nightlights) (story book/information book, moving story)	**PROJECT ON A PAGE** Food Health and varied diet (including cooking and nutrition requirements) (wrap/pitta pocket / rice cakes)	**PROJECT ON A PAGE** Mechanical systems Levers and linkages (story book/information book, moving story)

Year 5		
DESIGNER / INVENTOR Dr John T Dorrance invented condensed soup. This innovation revolutionised the soup industry - The Campbell Soup Company is famous for its high quality products.	**DESIGNER / INVENTOR** Sergio Boldrin, born in Venice in 1957, and currently living and working there, is a master mask maker	**DESIGNER / INVENTOR** Europe's Neolithic long house--a long, narrow timber dwelling built in 6000 BC-- is an excellent example of a timber structure / house
PROJECT ON A PAGE Food (Celebrating culture and seasonality including cooking and nutrition requirements) (Superfood salad / soup)	**PROJECT ON A PAGE** Textiles Combining different fabric shapes (masks / slippers / hat / phone cases)	**PROJECT ON A PAGE** Structures Frame structures (including computer aided design) (kite / bird hide)

Year 6		
DESIGNER / INVENTOR Yu Suzuki (born June 10, 1958) is a Japanese game designer, producer, programmer, and engineer, who headed Sega's AM2 team for 18 years.	**DESIGNER / INVENTOR** The earliest evidence of pulleys dates back to Ancient Egypt in the Twelfth Dynasty (1991-1802 BCE) and Mesopotamia in the early 2nd millennium BCE. In Roman Egypt, Hero of Alexandria (c. 10-70 CE) identified the pulley as one of six simple machines used to lift weights. Gears were invented by the Greek mechanics of Alexandria in the third century B.C., were considerably developed by the great Archimedes, and saw wide use in the Roman world.	**DESIGNER / INVENTOR** Baker Raffaele Esposito from Naples is often given credit for making the first such pizza pie. Historians note, however, that street vendors in Naples sold flatbreads with toppings for many years before then.
PROJECT ON A PAGE Electrical systems More complex switches and systems (including programming and control) (electrical board game /alarm for an artefact / quiz boards)	**PROJECT ON A PAGE** Mechanical systems Pulleys and gears (Lift kits / Electric powered cars)	**PROJECT ON A PAGE** Food Celebrating culture and seasonality including cooking and nutrition requirements (Pizza)

PROGRESSION FRAMEWORK

The detailed progression Framework is linked to each phase/key stage and can be found via this link

EVALUATION

We encourage the children to evaluate their project:

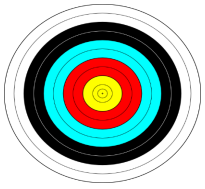
- What are you proud of?
- What would you like to change next time?
- What skill have you learned / developed?

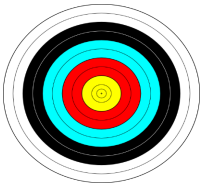
We also encourage children to think about their skills, attitude and self-efficacy in respect of the design and technology project using a target board.

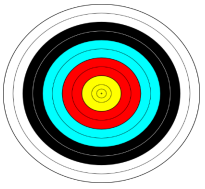
They place themselves on the board before the project and then again at the end of the project to see if their opinion has changed.

E.g. We are sewing fabric to make a puppet

How good are you at sewing? Do you enjoy designing a product? How good are you at puppet making?







ASSESSMENT
Teachers assess pupil progress against the school's assessment criteria in the progression framework at the end of a unit/project.