Design Technology

Curriculum Implementation

Through a variety of creative and practical activities, as a minimum, pupils at Green Ridge should be taught the knowledge, understanding and skills needed to engage in an iterative process of designing and making, as outlined in the National Curriculum (2014):

Key stage 1

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.

Key stage 2

Through a variety of creative and practical activities, as a minimum, pupils at Green Ridge should be taught the knowledge, understanding and skills needed to engage in an iterative process of designing and making, as outlined in the National Curriculum (2014):

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.

Cooking and nutrition

As part of their work with food, pupils should be taught how to cook and apply the principles of nutrition and healthy eating. Instilling a love of cooking in pupils will also open a door to one of the great expressions of human creativity. Learning how to cook is a crucial life skill that enables pupils to feed themselves and others affordably and well, now and in later life.

Pupils should be taught to:

Key stage 1

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

Key stage 2

- 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.

Teaching and Learning

We use a variety of teaching and learning styles in Design and Technology lessons. Teachers ensure that the children apply their knowledge and understanding when developing ideas, planning, making products and evaluating them.

We do this through a mixture of whole class teaching and individual/group activities. All children's ideas are treated with respect and they are encouraged to critically evaluate their own work and that of others. They can use a wide range of materials and resources, including ICT.

We teach Design and Technology to all pupils, whatever their ability, and provide learning opportunities that enable them to make progress. We do this by setting suitable learning challenges and respond to each child's needs. We strive to support individual needs and enable children to achieve their full potential through appropriate challenge and questioning.

Children are encouraged to think and work independently and collaboratively evaluating, extending and improving their ideas.

The Curriculum

Children are given the opportunity to work within three main areas of development during each unit of learning:

- investigative tasks including analysing existing products;
- focused practical tasks allowing children to learn, practice and develop key skills;
- design and make assignments allowing children to apply their knowledge, skills and understanding when developing their ideas and creations.

In the Early Years Foundation Stage, we develop children's skills, knowledge and understanding of the world around them as an integral part of our work. Planning relates to children's current knowledge, skills and interests and links to the objectives set out in the Early Learning Goals.

Early skills include:

- asking questions about how things work;
- investigating and using a variety of construction kits, materials, tools and products;
- developing making skills;
- handling appropriate tools and construction material safely, with increasing control.

Across Key Stages 1 and 2, we plan design and technology activities so that they build upon prior learning of the children. We give children of all abilities the opportunity to develop their skills, knowledge and understanding and ensuring progressive challenge, breadth and depth to their design and making. The units are focused on the following areas:

- cooking and nutrition;
- structures;
- mechanisms;
- textiles;
- computing and computer aided design.

The planning is completed through a cross curricular approach ensuring that design technology has a link to the unit of learning being studied.

Subjects such as English, Maths, Science and Computing are reinforced through design and technology by giving children the opportunity to:

- apply methods of calculation and measurement to real life situations;
- write plans, instructions, rationales and evaluations;
- articulate ideas and compare and contrast their views with others;
- discuss views and clarify design ideas;
- use a range of increasingly technical vocabulary;
- apply scientific knowledge to designs and inventions;
- use a range of resources including computer design.

Programme of study

At Green Ridge, we adapt and use the Reach2 Scheme of Work to outline the progression of knowledge, skills and understanding across Key Stage One and Key Stage Two. By doing so, we ensure that teachers have the necessary resources and subject knowledge to support them in their subject teaching, as well as ensuring that knowledge and skills are taught sequentially and revisited frequently.

Design Technology lessons are taught around units of learning, focussed on a particular skill, knowledge or understanding within that unit. Typically, each unit revisits and builds upon previous learning and, so that the body of knowledge and skills the children have builds over the key stage.

Each of the units listed here have corresponding teaching plans which accompany them, which outline what is to be taught within that unit, the skills and vocabulary needs and what children need to learn by the end of that unit.

Year group	Autumn Term Unit of learning	Spring Term Unit of learning	Summer Term Unit of learning
One	Drawbridges (Structures and mechanisms) *Design and build a bridge for a car.*		Super Smoothies (Cooking and Nutrition) *Design and make a healthy smoothie for a picnic.*
Two		Drawbridges (Textiles) *Design and make a bag using wool and felt.*	
Three	Ready to Pop (Mechanisms) *Design and create a pop-up book for well-being.*		You've Been Framed (Structures) *Design and build a photo frame.*
Four		Create a Buzz (Mechanical/Electrical) *Design and create a game with an electrical element.*	
Five		Pinball Wizard (Mechanical systems) *Design and create a pinball machine.*	Great British Menu (Cooking and Nutrition) *Design a menu and cook a savoury item.*
Six			Roving Robots (Computing) *Design and program a Mars Rover)*

How often is Design Technology taught?

Design Technology is taught weekly, as part of the units of learning for a term, making purposeful and cross-curricular links wherever possible, and ensuring coverage of key skills, knowledge and understanding. Over a two-year cycle (within Key Stage 1, Lower Key Stage 2 or Upper Key Stage 2), children will have the opportunity to undertake three blocks of Design Technology (alternating three Art and Design blocks of learning over the two years also). This equates to approximately 12-16 hours of Design Technology curriculum time per unit, and this is then enriched by other learning opportunities throughout the year which provide additional Design Technology learning, such as house activities and cookery days for charity.

Lesson Structure

We recognise that teachers will need to adapt the lesson structure according to the content being delivered and to suit the needs of the pupils. However, to ensure that previous content is recapped and appropriate vocabulary is taught, a typical lessons should follow the following structure:

5 Minutes	Skills based starter task (see below for details)
5 Minutes	Vocabulary teaching
10 Minutes	Teaching Input
20 Minutes	Independent learning/task
5 Minutes	Plenary

<u>The skills-based starter task</u>
Problem-solving and evaluation are key elements of Design Technology and in order to develop these skills, they should be a focus of starter tasks in lessons.

Problem-solving:
Present the children with a user who has a problem. This could be linked to the current unit of work or be independent. Example users and problems can be found below.

Evaluation:
Children can evaluate everyday objects around the classroom or a range of items linked to their topic. Children should use the FLUMPS (Function, Looks, User, Materials, Pros/Cons, Sustainability) acronym to help them evaluate a product.

Recording Learning
The children will have an Art and Design and Design Technology book that they will record their learning in over the year. Due to the practical nature of design and technology, evidence of work undertaken by children can be in the form of photographic evidence. Samples of the design process and end product are also valuable evidence. Guidance can be found on the server for the Art and Design and Design Technology books here: REAch2 Academy Trust\Green Ridge - Whole-Staff - General\Design Technology\14 Teacher Resources.

Assessment
Progress is measured through teacher unit assessment. Before planning a unit, teachers will review the skills required for the unit and use this within their knowledge organisers. Children will then be assessed within their final product that will encompass the skills built up over the course of the unit.

At the end of a unit, children review their own and each other's work, focusing upon an evaluation of the finished product and how effectively it meets the learning objective.

Health and Safety
Health and safety is important, particularly when working with tools, equipment and resources.

Children should be given suitable instruction on the operation of all equipment before being allowed to work with it. Children need to be taught how to:

- use tools and equipment correctly
- recognise hazards and risk control

Children should be:

- Strictly supervised in their use of equipment at all times.
- Taught to respect the equipment they are using and to keep it stored safely while not in use.
- Taught to recognise and consider hazards and risks and to take action to control these risks, having followed simple instructions.

Food Hygiene:

- Pupils and staff will take care to undertake appropriate hand washing and other hygiene related activities prior to preparing food.
- Pupils and staff working with food must wear aprons designated for cooking.
- Painting equipment must not be washed up or used in the sink in the kitchen areas.
- All jewellery should be removed and hair tied back.

Craft Knives:

- Key Stage 2 children may use cutting equipment under supervision, using a cutting mat and wearing safety goggles.

Sawing

- Bench hooks and clamps must be used when sawing any material.
- Safety goggles must be worn and any loose items of clothing/hair must be tucked in.

All teachers have read and signed the Design Technology Risk Assessment. A risk assessment has been completed, by the subject leader, for the use of dangerous tools. These are stored under Shared:/ Design Technology;/ Risk Assessments:/ Individual Tools. When undertaking a class activity involving these tools, it is the class teachers' responsibility to use a copy of the relevant assessment(s) to reflect their specific need and then process for signatures and filing as above. The list of generic risk assessment and their contents may be subject to change at any time, as determined by the subject leader, and should be checked every time an activity is planned.

Resources

At present, basic resources are stored in the DT Room (66). It is the subject leader's responsibility to ensure all necessary resources are available for the class teachers. It is the responsibility of the class teacher to manage the resources required during their unit and advise the subject leader if additional resources are required. It is the class teacher's responsibility to ensure that the DT Room is left in a safe and tidy manner after work has been carried out.

Safe and tidy working practices are encouraged at all times.