DESIGN AND TECHNOLOGY PROGRESSION DOCUMENT

Design and Technology

Intent

At Ayresome, we provide all children with a broad and balanced curriculum that capatilises on the rich engineering that has happened around Middlesbrough. Our design and technology curriculum encourages children to use their creativity and imagination to design and make products that solve real and relevant problems, with a variety of contexts, considering their own and others' needs, wants and values. Children are taught to combine their designing and making skills with knowledge and understanding in order to design and make purposeful products. Evaluating is a fundamental part of the design process which is embedded throughout the process - before designing and making a product, children evaluate existing products and evaluate their own at the end, allowing children to adapt and improve their product, a key skill which they will need throughout their life. Design and Technology allows children to apply knowledge and skills learned in other subjects, particularly Maths, Science, Art and History, which we aim to link, wherever possible. Our curriculum encourages children to work as individuals and as part of a team. Our ambition in providing a high-quality design and technology curriculum makes an essential contribution to the creativity, culture, wealth and well-being of our children and their families.

Implementation

Our Design and Technology Curriculum is high quality, well thought out and is planned to demonstrate progression year on year, giving pupils the skills and knowledge and vocabulary that they need to move forward in their learning, alongside opportunities to apply their knowledge to different situations.

The teaching of D.T follows the design, make and evaluate cycle. The design process is rooted in real life, relevant contexts to give meaning to learning. While making, children are given choice and a range of tools to choose freely from. When evaluating, children evaluate existing products and evaluate their own products against a design criteria at the end of the process, using this to adapt and improve their product. Each of the stages are given equal weight.
Our design and technology curriculum aims to ensure that all pupils:

- develop the creative, technical and practical skills 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

Key skills we teach are:

- Use of materials and equipment
- CAD
- Sewing and textiles
- Cooking and nutrition
- Electrical and mechanical components

Impact

By the time children leave our school they will have:

- The ability to use time efficiently and work constructively and productively with others.

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- The ability to carry out thorough research, show initiative and ask questions to develop an exceptionally detailed knowledge of users' needs.
- The ability to act as responsible designers and makers, working ethically, using finite materials carefully and working safely.
- A thorough knowledge of which tools, equipment and materials to use to make their products.
- The ability to apply mathematical knowledge and skills accurately.
- The ability to manage risks exceptionally well to manufacture products safely and hygienically.
- A passion for the subject.

We assess the impact of our curriculum through sharing class/pupil work and carry out regular pupil discussions where they talk about their learning; which includes discussion of their thoughts, ideas, processing and evaluations of work.

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Design and Technology in EYFS

	Design	Make	Evaluate	Technical knowledge:	Technical knowledge: food and nutrition
EYFS	Work within different contexts such as story based, home, school, playground. Generate ideas from existing examples. Begin to talk about their designs.	Shows some planning skills by suggesting what to do next. Begins to follow safety procedures. Selects from a range of materials and components.	Being to talk about their design ideas and what they are making. Thank about how to make their products better. Begin to explore what products are, who they are for, how they are used, where they are from.	Children recognise that a range of technology is used in places such as homes and schools. They select and use technology for particular purposes. They show an interest in toys with buttons and mechanisms. Being to know about the simple working characteristics of materials and components. Being to understand the movement of simple mechanisms such as levers, sliders and wheels	Begin to recognise that food comes from plants or animals. Food is farmed, grown elsewhere or caught. Being to name and sort foods into the five food groups. Begin to recognise that everyone should eat at least five portions of fruit and vegetables every day. Use techniques such as cutting, peeling and grating.
Small steps:	2 year old provision: Begin to understand the importance of exercise and make healthy choices when selecting snack food. Explore and find out about the world around them. Explore and play with a wide range of media and materials.	Nursery: I can hold a chunky crayon, pencil, pen or paint brush and makes lines that go across, up and down or round and round. Know that tools like scissors, spoons and hammers can be used to do different things. Use all sorts of building toys and empty cardboard boxes to make things. Understand the importance of being careful when using children's scissors to snip or a knife to spread jam. Make lines and piles of blocks, joining the pieces together to make things. Hold a spoon to pick up food and put it into mouth to self feed. Able to wash and dry own hands. Hold a small jug and pour own drink. Make toys move or the sound or picture images on toys work by pressing switches or touching the screen. Make toys, such as a wind-up toy, move.	Reception: Develop own ideas through selecting and using materials and working on processes of interest. Show and talk about using things like scissors, hammers and saws safely. Use different things like scissors, paintbrushes, pens, hammers or bricks to make things. Use different things like scissors, masking tape, sticky tape, hole punches and string to join and fix things together. Handle equipment and tools effectively, Talk about the ideas and processes which have led to designs, images or products. Talk about features of own and others' work, recognising the differences between them and the strengths of others. Through explorations, find out and make decisions about how media and materials can be combined and changed. Know the importance for good health of physical exercise, and a healthy diet and talk about ways to keep healthy and safe. Manage own basic hygiene and personal needs successfully.	

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YEAR 1

	Design	Make	Evaluate	Technical knowledge: Materials/Structure	Technical knowledge: Mechanisms	Technical Knowledge: Textiles	Technical knowledge: Electrical systems	Technical knowledge: food and nutrition
Year 1:	Design bird box Design pop-up puppets Christmas project – joining materials	Bird box Pop-up puppets Christmas project – joining materials	Evaluate an existing bird box Evaluate existing toys	Describe differences in materials Suggest ways to make material/product stronger	Explore and use mechanisms in their products. Levers and sliders Christmas project – joining materials			Picnic
Year 2:	Design using criteria given - Rag dolls Christmas project – tree decoration (sewing)	Moving vehicle Rag dolls Christmas project – tree decoration (sewing)	Evaluate moving vehicle Evaluate existing Rag dolls and their own Christmas project – tree decoration (sewing)	To make structures stiffer/stronger To measure, shape, cut and join materials. To make materials stronger and more stable.	Explore and use mechanisms in their products. Make pulley with wheel and axel	To describe differences in materials and say which are more suitable and why. To measure, shape, cut and join materials. To make materials stronger and more stable. I can measure, cut and shape textiles using templates. I can thread a needle. I can join materials and components using running stitch.		Identify and make healthy, nutritious dishes. Frittata

Year 3:	Lego Catapults Bridges Christmas project – moving elf	Lego Catapults Bridges A savoury dish Christmas project – moving elf	Lego Catapults Bridges Christmas project – moving elf	Use appropriate materials Join materials Begin to make strong structures	Select appropriate tools / techniques Alter product after checking, to make it better Begin to try new/different ideas Use simple lever and linkages to create movement	Lego Catapult – levers and linkages		Begin to use some of the following techniques: peeling, chopping, slicing, grating, mixing and spreading.
Year 4:	Lego structure to control water Purse Christmas project – wooden calendar	Lego structure to control water Anglo-Saxon Purse Viking Stew Christmas project – wooden calendar	Lego structure to control water Anglo-Saxon Purse Viking Stew Christmas project – wooden calendar	Measure carefully to avoid mistakes Continue working on product even if original didn't work	Begin to use gears to control movement.	Begin to devise a template Explain how to join things in a different way Understand that a simple fabric shape can be used to make a 3D textiles project Use running stitch and back stitch Knot and thread material.		Grow in confidence using some of the following techniques: peeling, chopping, slicing, grating, mixing, spreading, kneading and baking

Year 5:	Christmas Project – Tinkercad computer aided design Makers of Machines	Designers of machines Bread	Chocolate bar Bread	Measure accurately enough to ensure precision Ensure product is strong and fit for purpose Begin to reinforce and strengthen a 3D frame	**R**efine product after testing. Grow in confidence about trying new/ different ideas. Begin to use cams, pulleys or gears to create movement Christmas Project – Tinkercad computer aided design		Rationing related food (routine vs VE Day celebrations) Controllable vehicle Christmas project – card with electric element	Understand how to be safe / hygienic Understand how recipes can be adapted to change appearance, taste, texture, aroma Use a range of techniques such as kneading and baking.
Year 6:	Rationing related food (routine vs VE Day celebrations) Controllable vehicle Christmas project – card with electric element	Rationing related food (routine vs VE Day celebrations) Controllable vehicle Christmas project – card with electric element	Rationing related food (routine vs VE Day celebrations) Controllable vehicle Christmas project – card with electric element	Select materials carefully, considering intended use of the product, the aesthetics and functionality. Reinforce and strengthen a 3D frame	Be confident to try new / different ideas Use cams, pulleys and gears to create movement		Rationing related food (routine vs VE Day celebrations) Controllable vehicle Christmas project – card with electric element	Use a range of techniques confidently such as peeling, chopping, slicing, grating, mixing, spreading and baking.

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Key stage 3

Through a variety of creative and practical activities, pupils 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 domestic and local contexts [for example, the home, health, leisure and culture], and industrial contexts [for example, engineering, manufacturing, construction, food, energy, agriculture (including horticulture) and fashion]. When designing and making, pupils should be taught to:

Design

♣ use research and exploration, such as the study of different cultures, to identify and understand user needs

♣ identify and solve their own design problems and understand how to reformulate problems given to them

♣ develop specifications to inform the design of innovative, functional, appealing products that respond to needs in a variety of situations

♣ use a variety of approaches [for example, biomimicry and user-centred design], to generate creative ideas and avoid stereotypical responses

♣ develop and communicate design ideas using annotated sketches, detailed plans, 3-D and mathematical modelling, oral and digital presentations and computer-based tools

Make

♣ select from and use specialist tools, techniques, processes, equipment and machinery precisely, including computer-aided manufacture

♣ select from and use a wider, more complex range of materials, components and ingredients, taking into account their properties

Evaluate

♣ analyse the work of past and present professionals and others to develop and broaden their understanding

♣ investigate new and emerging technologies

♣ test, evaluate and refine their ideas and products against a specification, taking into account the views of intended users and other interested groups

♣ understand developments in design and technology, its impact on individuals, society and the environment, and the responsibilities of designers, engineers and technologists Design and technology – key stage 3 3 Technical knowledge ♣ understand and use the properties of materials and the performance of structural elements to achieve functioning solutions

♣ understand how more advanced mechanical systems used in their products enable changes in movement and force

♣ understand how more advanced electrical and electronic systems can be powered and used in their products [for example, circuits with heat, light, sound and movement as inputs and outputs]

♣ apply computing and use electronics to embed intelligence in products that respond to inputs [for example, sensors], and control outputs [for example, actuators], using programmable components [for example, microcontrollers].

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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 3

♣ understand and apply the principles of nutrition and health

♣ cook a repertoire of predominantly savoury dishes so that they are able to feed themselves and others a healthy and varied diet

♣ become competent in a range of cooking techniques [for example, selecting and preparing ingredients; using utensils and electrical equipment; applying heat in different ways; using awareness of taste, texture and smell to decide how to season dishes and combine ingredients; adapting and using their own recipes]

♣ understand the source, seasonality and characteristics of a broad range of ingredients.

KS4 – GCSE Design and Technology

The study of design and technology seeks to prepare students to participate confidently and successfully in an increasingly technological world; and be aware of, and learn from, wider influences on design and technology, including historical, social/cultural, environmental and economic factors.

GCSE design and technology specifications must enable students to work creatively when designing and making and apply technical and practical expertise, in order to:

• demonstrate their understanding that all design and technological activity takes place within contexts that influence the outcomes of design practice • develop realistic design proposals as a result of the exploration of design opportunities and users' needs, wants and values

• use imagination, experimentation and combine ideas when designing

• develop the skills to critique and refine their own ideas whilst designing and making • communicate their design ideas and decisions using different media and techniques, as appropriate for different audiences at key points in their designing

• develop decision making skills, including the planning and organisation of time and resources when managing their own project work

• develop a broad knowledge of materials, components and technologies and practical skills to develop high quality, imaginative and functional prototypes

• be ambitious and open to explore and take design risks in order to stretch the development of design proposals, avoiding clichéd or stereotypical responses

• consider the costs, commercial viability and marketing of products

• demonstrate safe working practices in design and technology

• use key design and technology terminology including those related to: designing, innovation and communication; materials and technologies; making, manufacture and production; critiquing, values and ethics

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Careers requiring DT:

Graphic designer

Sculptor

Games developer

Software programmer

Network engineer

Web designer

Mechanical engineer

Product designer

Market researcher

Fashion designer

Dressmaker

Hairdresser

Tradesperson

Architect

Construction manager

Food technologist

Manufacturing engineer

Manufacturing manager