THAKEHAM PRIMARY SCHOOL

At Thakeham we CARE

CARE

courage ambition respect enjoyment

KNOWLEDGE DEVELOPMENT OVERVIEW: D&T

SUBJECT: DESIGN TECHNOLOGY (DT)

NATIONAL CURRICULUM

Purpose of study

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.

Aims

The national curriculum for design and technology aims to ensure that all pupils:

♣ develop the creative, technical and practical expertise 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

♣ understand and apply the principles of nutrition and learn how to cook.

INTENT

Our intent, when teaching Design Technology, is for pupils to design, make and evaluate products that solve real and relevant problems within a variety of contexts. We want children to be inspired by engineers, designers, chefs and architects to enable these designs. We want them to have the opportunities to make their designs using a range of structures, mechanisms, textiles, electrical systems and food products and apply a broad range of knowledge, skills, and understanding. Through evaluation of past and present Design and Technology projects, they will develop a critical understanding of its impact on daily life and the wider world.

Design and Technology at Thakeham aims to:

- develop all children's thinking, designing and making skills
- teach children the knowledge and understanding, within each child's ability, that will be required to complete the making of their product
- teach children the safe and effective use of a range of tools, materials and components
- develop children's understanding of the ways in which people have designed products in the past and present to meet their needs
- develop all children's creativity and innovation through designing and making
- develop the children's understanding of technological processes, their management and their contribution to society.

IMPLEMENTATION

Across key stage 1 and 2, we teach one DT block each term across a two year rolling programme. Each unit starts with an investigative lesson where the children evaluate a product against a set criteria. A series of lessons will then allow the children to research, design, problem solve, practice relevant skills, make, evaluate and present a product as a solution to a problem. These DT projects include structures, textiles, mechanical systems, electrical systems and cooking and nutrition.

Disadvantaged and SEND pupils are at the heart of all planning sequences in the school. Like with every other lesson, we deploy a range of scaffolds, differentiation and support strategies in order to ensure every pupil can access the learning. This is reviewed as part of the Assess, Plan, Do, Review cycle.

EYFS

Expressive Arts and Design

ELG: Creating with Materials

Children at the expected level of development will:

- Safely use and explore a variety of materials, tools and techniques, experimenting with colour, design, texture, form and function;

- Share their creations, explaining the process they have used;

- Make use of props and materials when role playing characters in narratives and stories.

At Thakeham Primary, our Early Years Foundation Stage children explore, develop, construct, evaluate and adapt their ideas purposefully using a range of media and tools. This learning forms the foundations for later work in Design and Technology. Children have daily opportunities to explore Design and Technology. We provide a range of experiences that encourage exploration, observation, problem solving, critical thinking and discussion. These activities, indoors and outdoors, attract the children's interest and curiosity.

IMPACT

Our DT Curriculum is planned to demonstrate progression and build on and embed current skills. Our children will have developed their ability to problem solve, design, make and evaluate products to solve real and relevant problems within a variety of contexts.   When transitioning to secondary school, we aspire that pupils will have gained knowledge and understanding of different skills and techniques required to problem-solve by designing and creating a variety of products using a safe approach. They will have an understanding of the cross curricular elements within the subject and the importance of skills learnt in other areas of the curriculum and how they aid the design and make process, as well as how these techniques and skills will aid them in future life and learning and be prepared to access, the KS3 curriculum.

We measure the impact of our curriculum through the following methods:

- Pupil discussions and interviewing the pupils about their learning (pupil voice).
- Governor monitoring with our subject link governor.
- Annual reporting and tracking of standards across the curriculum.
- Photo evidence of the pupils' practical learning.
- Foundation Assessments at the end of a unit of work.

National Curriculum Requirements

Early Years Statutory Framework: Expressive Arts and Design

Creating with Materials
• Safely use and explore a variety of materials, tools and techniques, experimenting with design, texture, form and function.
• Share their creations, explaining the process they have used.

Fine Motor
➢ Use a range of small tools, including scissors, paintbrushes and cutlery.
  • Begin to show accuracy and care when drawing.

The Natural World
➢ Explore the natural world around them, making observations and drawing pictures of animals and plants

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Key Stage 1

Pupils should be taught:
When designing and making, pupils should be taught to:

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

Pupils should be taught:
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
➢

Support

Design and Technology is a subject that when taught well can reach every child in the classroom regardless of their ability. It is a subject that needs to be tactile, experimental, engaging and enables children to take ownership over their learning.

To give our SEND children the best chance at success we plan to provide the following:

➢ Enable children to study products through videos, photographs, artefacts and real-life experiences.
➢ Support learners through word banks containing key words for that lesson so there is less reliance for children having to recall and retrieve learning in the moment.
➢ Children will take part in independent, paired and group-based collaborative projects, supporting children's social and organisational skills.
➢ Children will be able to access laptops or iPads to support children's ability to explore, research and present their ideas.

The above will not only benefit our SEND children but will benefit others in the class as well so these methods will not be solely for our SEND children but they are methods that are aims to help them access the learning successfully.

Challenge

• Children will be set real-life challenges and work within realistic concepts.
• Children will use adventurous and technical vocabulary.
• Children will gain fluency in practical techniques.
• Children will be encouraged to be reflective, adaptive and creative.
• Children will be asked to extend and promote their application of their own knowledge into a new situation, designed to promote analytical thinking, such as examining something specific.
• Teachers will focus on the children's own work and how they might change or create an outcome and justify a choice they have made which is based on their evaluation.
• Opportunities will be sought by the school to provide the children with access to places of design and technological significance and learning outside the classroom within units of work.
• The school will also seek to provide access to people with specialist design and technology skills from the local and wider community to enrich the Design and Technology curriculum

Cycle A

		EYFS	Year 1 and 2	Year 3 and 4	Year 5 and 6
	Autumn	Natural material collages Junk model homes Junk model rockets Christmas lanterns Clay diva lamps	Textiles: sewing hand puppets	Cooking and nutrition: making a seasonal themed soup	Mechanisms: cams-evolution wheel
	Spring	Making Chinese dragon masks Animal skeletons from straws Junk modelling from recycled materials	Cooking and nutrition: making ice lollies	Mechanisms: making a Roman catapult	Textiles: making an Anglo Saxon purse/bag
	Summer	Making paper aeroplanes Seed art 3D mini-beast sculptures Eric Carle mini-beast collages	Mechanisms: making animal themed pop-up cards	Structures: constructing an Egyptian tomb and pyramid	Electrical systems: lighthouse / blacked out house in WW2

Cycle B

		EYFS	Year 1 and 2	Year 3 and 4	Year 5 and 6
	Autumn	Natural material collages Junk model homes Junk model rockets Christmas lanterns Clay diva lamps		Cooking and nutrition: making a seasonal themed soup	Cooking and nutrition: cooking food for ISS / Greek traditional foods
	Spring	Making Chinese dragon masks Animal skeletons from straws Junk modelling from recycled materials		Electrical systems: making night lights	Textiles: making an artic shoe
	Summer	Making paper aeroplanes Seed art 3D mini-beast sculptures Eric Carle mini-beast collages		Textiles:	Structures: constructing a Mayan temple

Knowledge Development

	EYFS	Year 1 and 2			Year 3 and 4		Year 5 and 6		
		Cycle A	Cycle B	End of KS expectations	Cycle A	Cycle B	Cycle A	Cycle B	End of KS expectations
Design	*Select appropriate resources *Use gestures, talking and arrangements of materials and components to show design * Use contexts set by the teacher and myself *Use language of designing and making (join, build, shape, longer, shorter, heavier etc.)	* have own ideas * explain what I want to do *explain what my product is for, and how it will work * use pictures and words to plan, begin to use models * design a product for myself following design criteria *research similar existing products	* have own ideas and plan what to do next * explain what I want to do and describe how I may do it * explain purpose of product, how it will work and how it will be suitable for the user * describe design using pictures, words, models, diagrams, begin to use ICT * design products for myself and others following design criteria * choose best tools and materials, and explain choices * use knowledge of existing products to produce ideas	*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	*begin to research others' needs * show design meets a range of requirements * describe purpose of product * follow a given design criteria * have at least one idea about how to create product * create a plan which shows order, equipment and tools *describe design using an accurately labelled sketch and words * make design decisions *explain how product will work * make a prototype * begin to use computers to show design	* use research for design ideas * show design meets a range of requirements and is fit for purpose *begin to create own design criteria *have at least one idea about how to create product and suggest improvements for design. * produce a plan and explain it to others *say how realistic plan is. *include an annotated sketch *make and explain design decisions considering availability of resources *explain how product will work * make a prototype *begin to use computers to show design.	*use internet and questionnaires for research and design ideas *take a user's view into account when designing * begin to consider needs/wants of individuals/groups when designing and ensure product is fit for purpose *create own design criteria * have a range of ideas *produce a logical, realistic plan and explain it to others. *use cross-sectional planning and annotated sketches * make design decisions considering time and resources. *clearly explain how parts of product will work. *model and refine design ideas by making prototypes and using pattern pieces. *use computer-aided designs	* draw on market research to inform design * use research of user's individual needs, wants, requirements for design * identify features of design that will appeal to the intended user * create own design criteria and specification * come up with innovative design ideas *follow and refine a logical plan. *use annotated sketches, cross-sectional planning and exploded diagrams * make design decisions, considering, resources and cost * clearly explain how parts of design will work, and how they are fit for purpose * independently model and refine design ideas by making prototypes and using pattern pieces * use computer-aided designs	*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	*Construct with a purpose, using a variety of resources *Use simple tools and techniques *Build / construct with a wide range of objects *Select tools & techniques to shape, assemble and join *Replicate structures with materials / components *Discuss how to make an activity safe and hygienic *Record experiences by drawing, writing, voice recording *Understand different media can be combined for a purpose	*explain what I'm making and why *consider what I need to do next *select tools/equipment to cut, shape, join, finish and explain choices *measure, mark out, cut and shape, with support *choose suitable materials and explain choices *try to use finishing techniques to make product look good *work in a safe and hygienic manner	*explain what I am making and why it fits the purpose *make suggestions as to what I need to do next. *join materials/components together in different ways *measure, mark out, cut and shape materials and components, with support. *describe which tools I'm using and why *choose suitable materials and explain choices depending on characteristics. *use finishing techniques to make product look good *work safely and hygienically	*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	*select suitable tools/equipment, explain choices; begin to use them accurately * select appropriate materials, fit for purpose. * work through plan in order *consider how good product will be * begin to measure, mark out, cut and shape materials/components with some accuracy * begin to assemble, join and combine materials and components with some accuracy * begin to apply a range of finishing techniques with some accuracy	* select suitable tools and equipment, explain choices in relation to required techniques and use accurately *select appropriate materials, fit for purpose; explain choices * work through plan in order. * realise if product is going to be good quality * measure, mark out, cut and shape materials/components with some accuracy *assemble, join and combine materials and components with some accuracy *apply a range of finishing techniques with some accuracy	* use selected tools/equipment with good level of precision * produce suitable lists of tools, equipment/materials needed *select appropriate materials, fit for purpose; explain choices, considering functionality * create and follow detailed step-by-step plan * explain how product will appeal to an audience * mainly accurately measure, mark out, cut and shape materials/components *mainly accurately assemble, join and combine materials/components * mainly accurately apply a range of finishing techniques * use techniques that involve a small number of steps * begin to be resourceful with practical problems	* use selected tools and equipment precisely *produce suitable lists of tools, equipment, materials needed, considering constraints * select appropriate materials, fit for purpose; explain choices, considering functionality and aesthetics * create, follow, and adapt detailed step-by-step plans *explain how product will appeal to audience; make changes to improve quality * accurately measure, mark out, cut and shape materials/components * accurately assemble, join and combine materials/components * accurately apply a range of finishing techniques * use techniques that involve a number of steps * be resourceful with practical problems	*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	*Adapt work if necessary *Dismantle, examine, talk about existing objects/structures *Consider and manage some risks *Practise some appropriate safety measures independently *Talk about how things work *Look at similarities and differences between existing objects / materials / tools *Show an interest in technological toys *Describe textures	*talk about my work, linking it to what I was asked to do * talk about existing products considering: use, materials, how they work, audience, where they might be used *talk about existing products, and say what is and isn't good * talk about things that other people have made *begin to talk about what could make product better	* describe what went well, thinking about design criteria * talk about existing products considering: use, materials, how they work, audience, where they might be used; express personal opinion *evaluate how good existing products are *talk about what I would do differently if I were to do it again and why	*Explore and evaluate a range of existing products *Evaluate their ideas and products against design criteria	* look at design criteria while designing and making *use design criteria to evaluate finished product * say what I would change to make design better *begin to evaluate existing products, considering: how well they have been made, materials, whether they work, how they have been made, fit for purpose * begin to understand by whom, when and where products were designed * learn about some inventors/designers/ engineers/chefs/ manufacturers of ground-breaking products	*refer to design criteria while designing and making *use criteria to evaluate product * begin to explain how I could improve original design *evaluate existing products, considering: how well they've been made, materials, whether they work, how they have been made, fit for purpose * discuss by whom, when and where products were designed * research whether products can be recycled or reused * know about some inventors/designers/ engineers/chefs/manufacturers of ground-breaking products	*evaluate quality of design while designing and making *evaluate ideas and finished product against specification, considering purpose and appearance. *test and evaluate final product * evaluate and discuss existing products, considering: how well they've been made, materials, whether they work, how they have been made, fit for purpose * begin to evaluate how much products cost to make and how innovative they are *research how sustainable materials are *talk about some key inventors/designers/ engineers/ chefs/manufacturers of ground-breaking products	*evaluate quality of design while designing and making; is it fit for purpose? * keep checking design is best it can be. *evaluate ideas and finished product against specification, stating if it's fit for purpose *test and evaluate final product; explain what would improve it and the effect different resources may have had *do thorough evaluations of existing products considering: how well they've been made, materials, whether they work, how they've been made, fit for purpose *evaluate how much products cost to make and how innovative they are *research and discuss how sustainable materials are *consider the impact of products beyond their intended purpose *discuss some key inventors/designers/ engineers/ chefs/manufacturers of ground-breaking products	*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 – Materials/structures		*begin to measure and join materials, with some support *describe differences in materials *suggest ways to make material/product stronger	*measure materials *describe some different characteristics of materials *join materials in different ways *use joining, rolling or folding to make it stronger *use own ideas to try to make product stronger	*Build structures, exploring how they can be made stronger, stiffer and more stable	*use appropriate materials *work accurately to make cuts and holes * join materials *begin to make strong structures	*measure carefully to avoid mistakes *attempt to make product strong *continue working on product even if original didn't work *make a strong, stiff structure	*select materials carefully, considering intended use of product and appearance *explain how product meets design criteria *measure accurately enough to ensure precision *ensure product is strong and fit for purpose *begin to reinforce and strengthen a 3D frame	*select materials carefully, considering intended use of the product, the aesthetics and functionality. *explain how product meets design criteria * reinforce and strengthen a 3D frame	*Apply their understanding of how to strengthen, stiffen and reinforce more complex structures
Technical knowledge - Mechanisms		*begin to use levers or slides	*use levers or slides *begin to understand how to use wheels and axles	*Explore and use mechanisms [for example, levers, sliders, wheels and axles], in their products.	*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	*select most appropriate tools / techniques *explain alterations to product after checking it *grow in confidence about trying new / different ideas. *use levers and linkages to create movement *use pneumatics to create movement	*refine product after testing *grow in confidence about trying new / different ideas *begin to use cams, pulleys or gears to create movement	*refine product after testing, considering aesthetics, functionality and purpose *incorporate hydraulics and pneumatics *be confident to try new / different ideas *use cams, pulleys and gears to create movement	*Understand and use mechanical systems in their products [for example, gears, pulleys, cams, levers and linkages]

Technical knowledge - Textiles		*measure, cut and join textiles to make a product, with some support *choose suitable textiles	*measure textiles *join textiles together to make a product, and explain how I did it *carefully cut textiles to produce accurate pieces *explain choices of textile *understand that a 3D textile structure can be made from two identical fabric shapes.		*join different textiles in different ways *choose textiles considering appearance and functionality *begin to understand that a simple fabric shape can be used to make a 3D textiles project	*think about user when choosing textiles *think about how to make product strong * 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	*think about user and aesthetics when choosing textiles *use own template * think about how to make product strong and look better *think of a range of ways to join things *begin to understand that a single 3D textiles project can be made from a combination of fabric shapes.	*think about user's wants/needs and aesthetics when choosing textiles *make product attractive and strong *make a prototype *use a range of joining techniques *think about how product might be sold *think carefully about what would improve product *understand that a single 3D textiles project can be made from a combination of fabric shapes.	
Technical knowledge – Food and nutrition	*Begin to understand some food preparation tools, techniques and processes *Practise stirring, mixing, pouring, blending *Discuss how to make an activity safe and hygienic *Discuss use of senses *Understand need for variety in food *Begin to understand that eating well contributes to good health	*describe textures *wash hands & clean surfaces *think of interesting ways to decorate food *say where some foods come from, (i.e. plant or animal) *describe differences between some food groups (i.e. sweet, vegetable etc.) *discuss how fruit and vegetables are healthy *cut, peel and grate safely, with support	*explain hygiene and keep a hygienic kitchen *describe properties of ingredients and importance of varied diet *say where food comes from (animal, underground etc.) *describe how food is farmed, home-grown, caught *draw eat well plate; explain there are groups of food *describe "five a day" *cut, peel and grate with increasing confidence	*Use the basic principles of a healthy and varied diet to prepare dishes *Understand where food comes from.	*carefully select ingredients *use equipment safely *make product look attractive *think about how to grow plants to use in cooking *begin to understand food comes from UK and wider world *describe how healthy diet= variety/balance of food/drinks *explain how food and drink are needed for active/healthy bodies. *prepare and cook some dishes safely and hygienically *grow in confidence using some of the following techniques: peeling, chopping, slicing, grating, mixing, spreading, kneading and baking	*explain how to be safe/hygienic *think about presenting product in interesting/ attractive ways *understand ingredients can be fresh, pre-cooked or processed *begin to understand about food being grown, reared or caught in the UK or wider world *describe eat well plate and how a healthy diet=variety / balance of food and drinks *explain importance of food and drink for active, healthy bodies *prepare and cook some dishes safely and hygienically *use some of the following techniques: peeling, chopping, slicing, grating, mixing, spreading, kneading and baking	*explain how to be safe / hygienic and follow own guidelines *present product well - interesting, attractive, fit for purpose *begin to understand seasonality of foods *understand food can be grown, reared or caught in the UK and the wider world *describe how recipes can be adapted to change appearance, taste, texture, aroma *explain how there are different substances in food / drink needed for health *prepare and cook some savoury dishes safely and hygienically including, where appropriate, use of heat source * use range of techniques such as peeling, chopping, slicing, grating, mixing, spreading, kneading and baking.	*understand a recipe can be adapted by adding / substituting ingredients *explain seasonality of foods *learn about food processing methods *name some types of food that are grown, reared or caught in the UK or wider world *adapt recipes to change appearance, taste, texture or aroma. *describe some of the different substances in food and drink, and how they can affect health *prepare and cook a variety of savoury dishes safely and hygienically including, where appropriate, the use of heat source. *use a range of techniques confidently such as peeling, chopping, slicing, grating, mixing, spreading, kneading and baking.	*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.
Technical knowledge – Electrical systems Computer control and					*use simple circuit in product *learn about how to program a computer to control product. *use number of components in circuit *program a computer to control product	*incorporate switch into product *confidently use number of components in circuit *begin to be able to program a computer to monitor changes in environment and control product	*use different types of circuit in product * think of ways in which adding a circuit would improve product * program a computer to monitor changes in environment and control product		*Understand and use electrical systems in their products [for example, series circuits

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