North Petherwin and Werrington Knowledge and Skills Organiser
Design Technology

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

At North Petherwin and Werrington Primary Schools we intend to equip the pupils with the skills and creativity to design and make products for a purpose.
Pupils will develop the creative, technical and practical expertise needed to perform everyday tasks confidently and to participate successfully in an increasingly technological world.
They will 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.
They will learn to critique, evaluate and test their ideas and products and the work of others, in addition they will learn the principles of nutrition and apply them in their cooking.

Implementation

Design and technology is taught through a three-year rolling programme and is linked to the main concept of the topic being taught. It is taught practically where pupils are encouraged to design and make products that solve real and relevant problems within a variety of contexts.
Pupils are encouraged to take risks, become resourceful, innovative, enterprising and capable members of the school and wider community.
They are encouraged to critically evaluate the impact of design and technology on daily life and the wider world.

Capabilities Curriculum
The Capabilities Curriculum is a creative curriculum which measures social and emotional capabilities which improve children's learning, valuing the development of the whole child and preparing them for the future.
An Daras Trust have chosen to adopt a curriculum framework informed by pupil's social and emotional well-being. The class capability scores are used to inform a teachers approach to the lesson, which will help growth in these valuable characteristics.
These capabilities are evidenced as being necessary for future success, and by measuring them we are placing real value on them.
There are 7 capability strands: Managing feelings, Confidence, Communication, Relationships and Leadership, Planning and Problem-Solving, Creativity, Resilience and Determination.

Visible Learning (metacognition)
Metacognition describes the processes involved when learners plan, monitor, evaluate and make changes to their own learning – the thinking about their thinking. Pupils are given opportunity to understand their own cognitive abilities, knowledge of tasks and strategies that could be used to support their learning. Pupils are also encouraged to self-reflect. The following questions will be used to deepen pupils understanding of their learning:

Visible Learning	**Surface Learning Strategies**	**Deep Learning Strategies**	**Transfer Learning Strategies**
	Do I know what I need to do to complete my task? *Can I plan and organise my learning before I start?* *Where am I with my learning?* *How well have I achieved my success criteria?* *What is my next step?* *I can seek feedback from others to help me in my next steps.*	*Can I explain my learning to someone else?* *I know and can explain what strategies I have used in my learning.* *I can make links between new content and ideas and learning I already know.* *I can share my ideas and questions to deepen my understanding.* *I know how I did at the end of my learning.* *I can explain how things link together.*	*Can I organise my knowledge to support new learning?* *I can look for and recognise similarities and differences in my tasks.* *I can organise my knowledge to support new learning.* *When have I applied my learning to another area?* *I know where I am heading in my learning.* *I understand what I am learning, where I am going and how to get there.* *I know what success looks like.*

EYFS	In the Early Years Foundation Stage, design and technology forms part of the learning children acquire under the 'Knowledge and Understanding of the World' branch of the Foundation Stage curriculum, which also covers geography, history, ICT, and science. Our pupils will learn through first-hand experiences. They will be encouraged to explore, observe, solve problems, think critically, make decisions and to talk about why they have made their decisions. The pupils will learn through: **Constructing:** Learning to construct with a purpose in mind. **Structure and joins** **Using a range of tools** **Cooking techniques** **Exploration:** Pupils will dismantle things and learn about how everyday objects work. **Discussion:** There will be opportunities to discuss reasons that make activities safe or unsafe. They will also learn to record their experiences by, for example, drawing, writing and making a tape or model. **EYFS Areas of Learning codes** PSED- Making Relationships PSED(MR) PSED- Self-Confidence and Self-Awareness PSED(SC&SA) PSED- Managing Feelings and Behaviour PSED(MF&B) CAL- Listening and Attention CAL(L&A) CAL- Understanding CAL(U) CAL- Speaking CAL(S) PD- Moving and Handling PD(M&H) PD- Health and Self-Care PD(H&SC) L-Reading L(R) L-Writing L(W) M-Numbers M(N) M-Shape, Space and Measure M(SSM) UW- People and Communities UW(P&C) UW- The World UW(TW) UW- Technology UW(T) EAD- Exploring and Using Media and Materials EAD(EUMM) EAD- Being Imaginative EAD(BI)		

Reception	**Physical Development**	Progress towards a more fluent style of moving, with developing control and grace Develop small motor skills so they can use a range of tools competently, safely and confidently Use core muscle strength to achieve good posture when sitting at a table or on the floor	
	Expressive Arts and Design	Explore, use and refine a variety of artistic effects to express their ideas and feelings Return to and build on their previous learning, refining ideas and developing their ability to represent them Create collaboratively, sharing ideas, resources and skills	
Early Learning Goals	**Physical Development**	**Fine Motor Skills**	Use a range of small tools, including scissors, paintbrushes and cutlery Begin to show care and accuracy when drawing
	Expressive Art and Design	**Creating with Materials**	Safely use and explore a variety of materials, tools and techniques, experimenting with colour, design, texture, form and function Share their creations, explaining the processes they have used.

Metacognition	**Planning**	**Monitoring**	**Evaluation**
	What resources do I need to carry out my task? *Can I describe what I am going to do?* *How can I link my learning with my own experiences to help me?*	*Am I doing well?*	*How did I do?* *Am I able to re-tell stories and link them to other areas of learning?*

Year A 1,2,3	**Autumn**	**Spring**	**Summer**
Knowledge	**Movable Mechanisms** **Christmas Card with Moving Part** To be able to select from a range of tools and materials when designing and making a Christmas card with the characters having moving parts including sliders and leavers. To understand how to generate, develop, model and communicate their ideas through talking, drawing, templates, mock-ups and, where appropriate, information and communication technology. Explore and use mechanisms, in their products.	**Construction** **Plant Waterer** To know how to select from a range of tools and equipment to design and make an automatic plant waterer. To know how to select from a range of materials and components to perform the practical tasks. To understand how different materials and components can create different outcomes.	**Food** **Cornish Picnic** Understand where food comes from. Know that all food comes from plants or animals Know that food has to be farmed, grown elsewhere (e.g., home) or caught Know some fruit and vegetables grow above and below ground Know that food can be sorted into food groups

			Understand the need for a balanced diet
Skills	Use levers or sliders Select from a range of tools and equipment, explaining their choices Use materials and components, including construction materials and kits, Measure, mark out, cut and shape materials and components Use finishing techniques, including those from art and design Describe differences in materials Suggest ways to make material/product stronger Choose suitable materials and explain choices Work in a safe manner	Select from a range of tools and equipment, explaining their choices Use materials and components, including construction materials and kits, Measure, mark out, cut and shape materials and components Join materials in different ways Use joining, rolling or folding to make it stronger Use finishing techniques, including those from art and design Use materials to practice drilling and glue gunning materials to make and strengthen products Measure materials Describe some different characteristics of materials	Follow procedures for safety and hygiene. Use materials and components, including food ingredients. Peel, cut, grate and mould food (supervision). Measure or weigh using measuring cups Assemble ingredients. Pour liquid ingredients accurately Know the origins of milk, beef, pork and lamb. Be able to name and sort foods into the five groups in the eat-well plate and know that all food groups should be consumed in moderation.

	Understanding contexts, users and purposes: To design a product that has a purpose Plan designs before making Make changes to a design as work progresses Be able to deconstruct boxes and tubes **Generating, developing, modelling and communicating ideas:** Use knowledge of existing products to help come up with ideas Develop and communicate ideas by talking and drawing **Planning:** Explain what I'm making and why Consider what I need to do next **Own ideas and products:** Make simple judgements about their products and ideas against design criteria **Existing products:** Explain what products are Describe who and what the products are for Suggest how products work and how they are used Explain what materials products are made from Explain what they like and dislike about products		
Vocabulary	Design Structure Material Equipment Evaluate Construct Investigate Lever Slider Peeling Cutting Grating Eat-Well plate		
Year B 1,2,3	**Autumn**	**Spring**	**Summer**
Knowledge	**Textiles** **Hand Puppet**	**Movable Mechanics** **Aeroplane**	**Construction** **Animal Habitat** To know how to select from a range of tools and equipment

	Understand how simple 3-D textile products are made, using a template to create two identical shapes to make a hand puppet. Understand how to join fabrics using different techniques Explore different finishing techniques Know and use technical vocabulary relevant to the project.	To be able to select from a range of tools and materials when designing and making an aeroplane with propeller and wheels. To understand how to generate, develop, model and communicate their ideas through talking, drawing, templates, mock-ups and, where appropriate, information and communication technology. Explore and use mechanisms, in their products.	to design and make an animal habitat To know how to select from a range of materials and components to perform the practical tasks. To understand how different materials and components can create different outcomes.
Skills	Assemble a 3-D textile from two identical fabric shapes. Measure, cut and join textiles to make a product with some support Be able to choose suitable textiles Cut, then join textiles using a simple running stitch or over sewing. Decorate using a range of items including buttons, sequins, beads and ribbons.	Use materials and components, including construction materials and kits, Measure, mark out, cut and shape materials and components Assemble, join and combine materials and components Use finishing techniques, including those from art and design Use materials to practice drilling and glue gunning materials to make and strengthen products - use joining, rolling or folding to make it stronger Measure materials Describe some different characteristics of materials	Select from a range of tools and equipment, explaining their choices Use materials and components, including construction materials and kits, Measure, mark out, cut and shape materials and components Assemble, join and combine materials and components Use finishing techniques, including those from art and design Use materials to practice drilling and glue gunning materials to make and strengthen products - use joining, rolling or folding to make it stronger Measure materials

			Describe some different characteristics of materials
	Understanding contexts, users and purposes: To design a product that has a purpose Plan designs before making Make changes to a design as work progresses Be able to deconstruct boxes and tubes **Generating, developing, modelling and communicating ideas:** Use knowledge of existing products to help come up with ideas Develop and communicate ideas by talking and drawing **Planning:** Explain what I am making and why it fits the purpose Make suggestions as to what I need to do next. Choose suitable materials and explain choices depending on characteristics. **Own ideas and products:** Make simple judgements about their products and ideas against design criteria **Existing products:** Explain what products are Describe who and what the products are for Suggest how products work and how they are used Explain what materials products are made from Explain what they like and dislike about products		
Vocabulary	Mechanism Properties Function Method Template Technique Sequence Strengthen	Levers Sliders Wheel Axle Eat-Well Plate	

Metacognition	**Planning**	**Monitoring**	**Evaluation**
	What resources do I need to carry out my task? *Have I done anything like this before?* *How can I link my learning with my own experiences to help me?*	*Am I doing well?* *Do I need any different techniques to improve my learning/task?*	*Am I able to re-tell stories and link them to other areas of learning?* *How did I do in my task?*
Year A 4,5,6	**Autumn**	**Spring**	**Summer**
Knowledge	**Programming and Electronics** **Light Up Sign** Recall how to create a simple electrical circuit to make a Sign that Lights up. To understand how LEDs can be used instead of traditional bulbs. Identify distinguishing features of illuminated signs. Identify products which contain micro-controllers inside their designs To write and edit programmes.	**Construction** **Garden Bird House** Apply their understanding of how to strengthen, stiffen and reinforce more complex structures to make a garden bird house	**Textiles** **Reusable Beach Bag** To know that a 3D textiles product can be made from a combination of fabric shapes. Research fabric that may be used for their product and will evaluate their final product against their plan
Skills	Incorporate switch into product Incorporate a micro-controller into a design Incorporate a LED into a design Using a PC to programme 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	To 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 Refine product after testing Grow in confidence about trying new / different ideas	Think about user and aesthetics when choosing textiles Be able to design and 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.

	Understanding contexts, users and purposes: Evaluate the design of products so as to suggest improvements to the user experience **Generating, developing, modelling and communicating ideas:** Ensure products have a high-quality finish, using art skills where appropriate **Planning:** Work through plan in order To select suitable tools and equipment, explain choices in relation to required techniques **Existing products:** Investigate and analyse: How well products have been designed How well products have been made Why materials have been chosen What methods of construction have been used How well products work How well products achieve their purposes How well products meet user needs and wants How much products cost to make How innovative products are What impact products have beyond their intended purpose

Vocabulary	Category Precise Dynamic Qualitative		
Year B 4,5,6	**Autumn**	**Spring**	**Summer**
Knowledge	**Food Round the World Banquet** **Banquet** Understanding how climate effects what foods are grown. Know where and how a variety of ingredients are grown, reared caught and processed within the country/region	**Textiles** **Amazon Explorers Work-Belt** To design, plan and make a work-belt fit for purpose to hold tools and equipment. Research fabric to include strength and durability that may be used for their product and will evaluate their final product against their plan. Know that you can dye a material using both natural and man-made dyes. Recognise techniques that cause tie-die.	**Movable Mechanisms** **A Toy** Apply their understanding of how to strengthen, stiffen and reinforce more complex structures to make a toy move.
Skills	That seasons may affect the food available How food is processed into ingredients that can be eaten Understand the importance of correct storage and handling of ingredients (using knowledge of micro-organisms) Measure accurately and calculate ratios of ingredients to scale up or down from a recipe Know the seasonality of foods such as tomatoes and understand the role providers/supermarkets play in providing fruits 'out of season' Explain how to be safe / hygienic and follow own guidelines Present product well - interesting, attractive and fit for purpose Understand food can be grown, reared or caught in the UK and the wider world	Consider the user's wants/needs and aesthetics when choosing textiles Make product attractive and strong Make a prototype Use a range of joining techniques Consider 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.	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 Refine product after testing, considering aesthetics, functionality and purpose Incorporate hydraulics and pneumatics Use cams, pulleys and gears to create movement

	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, the use of heat source Use range of techniques such as peeling, chopping, slicing, grating, mixing, spreading, kneading, and baking.		

	Understanding contexts, users and purposes: Create innovative designs that improve upon existing products Evaluate the design of products so as to suggest improvements to the user experience **Generating, developing, modelling and communicating ideas:** Use prototypes, cross sectional diagrams and computer aided designs to represent ideas Ensure products have a high-quality finish, using art skills where appropriate **Planning:** Create, follow, and adapt detailed step-by step plans Explain how product will appeal to audience; make changes to improve quality **Own ideas and products:** Identify the strengths and areas for development in their ideas and products Consider the views of others, including intended users, to improve their work Begin to critically evaluate the quality of the design, manufacture and fitness for purpose of their products as they design and make Use their design to evaluate their ideas and products against their original design specification **Existing products:** Investigate and analyse: How well products have been designed How well products have been made Why materials have been chosen What methods of construction have been used How well products work How well products achieve their purposes How well products meet user needs and wants How much products cost to make How innovative products are How sustainable the materials in products are What impact products have beyond their intended purpose

Vocabulary	Economy Environment Sustainable Proportion Input Innovative		
Metacognition	**Planning**	**Monitoring**	**Evaluation**
	What resources do I need to carry out my task? *Where do I start and what strategies will I use?* *What type of resources and materials will I need to complete my learning?* *How can I break down the task into smaller steps?*	*Am I finding this challenging?* *Is there anything I need to stop and change to improve the understanding of my learning?* *Do I need to re-read information to make it clearer?* *Do I need to change my strategies?*	*Did I use the right strategy?* *How did the feedback I received help me?* *For future tasks, would I use another strategy?* *Did I pace myself appropriately to get the task done?*