Biscovey Academy

Design and Technology Curriculum

'WE ARE CURRENTLY PREPARING STUDENTS FOR JOBS THAT DON'T YET EXIST…USING TECHNOLOGIES THAT HAVEN'T BEEN INVENTED… IN ORDER TO SOLVE PROBLEMS WE DON'T EVEN KNOW ARE PROBLEMS YET.' (The National College)

Design and Technology National Curriculum Requirements

KS1

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.

Cooking and Nutrition

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

KS2

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

- 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.

Biscovey Academy Design and Technology Sequence of Learning
Year 3- Year 6

LKS2

Cycle A Autumn 1	Cycle A Spring 2	Cycle A Summer 2
Structures	**Electrical Systems**	**Food/ Cooking and Nutrition**
Topic: You Are What You Eat **Skills:** **Design:** To design a working model of the digestive system. Developing design criteria from a design brief. I can state what I intend to make and why – identifying the purpose. I can use basic drawing skills to communicate ideas. **Make:** • I can select from a choice of materials , cutting evenly and carefully. • I can explain my choice of materials based on my experiences. • I can use scissors / a craft knife safely to cut neatly and accurately. • I can make evenly spaced cuts. • I can make stable structures from card. **Evaluate:** · Using the views of others to improve designs. · Testing and modifying the outcome, suggesting improvements. · can say what I like about my product and how it could be improved. **Knowledge:** • I know that structures are built for a purpose. • I know that some tools are sharp like scissors and knives. • I know the importance of strength and stiffness in structures. • I know that different glue can be used to join different things. • I know that some products will be better than others.	**Topic: The Roman Empire** **Skills:** **Design:** To design a torch, giving consideration to the target audience and creating both design and success criteria focusing on features of individual design ideas. **Make:** · Making a torch with a working electrical circuit and switch. · Using appropriate equipment to cut and attach materials. · Assembling a torch according to the design and success criteria. **Evaluate:** · To evaluate electrical products. · Testing and evaluating the success of a final product. **Knowledge:** · To understand that electrical conductors are materials which electricity can pass through. · To understand that electrical insulators are materials which electricity cannot pass through. · To know that a battery contains stored electricity that can be used to power products. · To know that an electrical circuit must be complete for electricity to flow. · To know that a switch can be used to complete and break an electrical circuit. · To know the features of a torch: case, contacts, batteries, switch, reflector, lamp, lens. · To know facts from the history and invention of the electric light bulb(s) - by Sir Joseph Swan and Thomas Edison.	**Topic: Exciting Egyptians** **Skills:** **Design:** To design a recipe for a flatbread. **Make:** · Following the instructions within a recipe. · Tasting seasonal ingredients. · Selecting seasonal ingredients. · Peeling ingredients safely. · Cutting safely with a vegetable knife. **Evaluate:** · Establishing and using design criteria to help test and review dishes. · Describing the benefits of seasonal fruits and vegetables and the impact on the environment. · Suggesting points for improvement when making a seasonal tart. **Knowledge:** · To know that not all fruits and vegetables can be grown in the UK. · To know that climate affects food growth. · To know that vegetables and fruit grow in certain seasons. · To know that cooking instructions are known as a 'recipe'. · To know that imported food is food which has been brought into the country. · To know that exported food is food which has been sent to another country. · To know that eating seasonal foods can have a positive impact on the environment.

• I know that my ideas or products can be made better.		• To know that similar coloured fruits and vegetables often have similar nutritional benefits. • To know that the appearance of food is as important as taste.
Core Facts • I know that structures are built for a purpose. • I know the importance of strength and stiffness in structures. • I know the main body parts associated with the digestive system. • I know what happens when humans eat and how.	**Core Facts** • I know that electrical conductors are materials which electricity can pass through. • I know that electrical insulators are materials which electricity cannot pass through. • I know that an electrical circuit must be complete for electricity to flow. • I know that a switch can be used to complete and break an electrical circuit.	**Core Facts** • I know that not all fruits and vegetables can be grown in the UK. • I know that climate affects growth. • I know that vegetables and fruit grow in certain seasons. • I know that cooking instructions are known as a 'recipe'.

Cycle B Autumn 1	***Cycle B Spring 1***	***Cycle B Summer 2***
Food/ Cooking and Nutrition	***Structures***	***Mechanisms***
Topic: Predator **Skills:** **Design:** To design a healthy wrap based on a food combination that works well together. **Make:** • Chopping foods safely to make a wrap. • Constructing a wrap that meets a design brief. • Grating foods to make a wrap. • Snipping smaller foods instead of cutting. **Evaluate:** • Describing the taste, texture and smell of fruit and vegetables. • Taste testing food combinations and final products. • Describing the information that should be included on a label. • Evaluating food by giving a score **Knowledge:** • Know that 'diet' means the food and drink that a person or animal usually eats. • To understand what makes a balanced diet. • To know that the five main food groups are: Carbohydrates, fruits and vegetables, protein, dairy and foods high in fat and sugar. • To understand that I should eat a range of different foods from each food group, and roughly how much of each food group.	**Topic: Tribal Tales** **Skills:** **Design:** Designing a castle with key features to appeal to a specific person/purpose. Drawing and labelling a castle design using 2D shapes, labelling: -the 3D shapes that will create the features – materials needed and colours. **Make:** • Constructing a range of 3D geometric shapes using nets. • Creating special features for individual designs. • Making facades from a range of recycled materials. **Evaluate:** • Evaluating own work and the work of others based on the aesthetic of the finished product and in comparison to the original design. • Suggesting points for modification of the individual designs. **Knowledge:** • To know the following features of a castle: flags, towers, battlements, turrets, curtain walls, moat, drawbridge and gatehouse – and their purpose. • To know that a façade is the front of a structure. • To understand that a castle needed to be strong and stable to withstand enemy attack.	**Topic: We Are Warriors** **Skills:** **Design:** Designing a catapult. • I can look at a range of catapults and evaluate their designs. • I can explain the basic mechanics of a catapult. • I can design my own catapult that meets the design criteria. • I can use studied catapults to inform my own design and produce labelled sketches. **Make:** • I know the features that make a good Roman catapult which inform my design criteria. • I can perform basic woodwork techniques such as measuring and sawing. • I can reinforce joints using cardboard triangles. • I know how to make a simple catapult design and test it safely. • I know how to work in a safe manner and use tools such as saws and glue guns safely. **Evaluate:** • I can evaluate my own work by considering good points and areas for improvement. • I can evaluate the work of others and provide constructive feedback. **Knowledge:**

• To know that 'ingredients' means the items in a mixture or recipe.	• To know that a paper net is a flat 2D shape that can become a 3D shape once assembled. • To know that a design specification is a list of success criteria for a product.	• I know what a catapult is and how they were used by the Romans. • To know that a design specification is a list of success criteria for a product. • I know how to make a simple catapult design and test it safely. • I know how to work in a safe manner and use tools such as saws and glue guns safely. • I know the features that make a good Roman catapult which inform my design criteria. • I know how to evaluate my work against the design criteria.

Key skills from KS1- What do children know when they join Biscovey Academy?

- How to select from and use a range of tools and equipment to perform practical tasks: for example, cutting, shaping, joining and finishing.
- How to select from and use a wide range of materials and components, including construction materials, textiles and cooking ingredients, according to their characteristics.

Core Facts • I know that 'diet' means the food and drink that a person or animal usually eats. • I know that the five main food groups are: carbohydrates, fruits and vegetables, protein, dairy and oils and spreads • I know that I shoujld eat a range of diffrerent foods from each food group, and know roughly how much of each. • I know that 'ingredients' means the items in a mixture or recipe.	**Core Facts** • I know that wide and flat based objects are more stable. • I know how important strength and stiffness is in structures. • I know the following features of a castle: flags, towers, battlements, turrets, curtain walls, moat, drawbridge and gatehouse-and their purpose. • I know that a façade is the front of a structure.	**Core Facts** • I know that mechanisms control movement. • I know that all moving things have kinetic energy. • I know that kinetic energy is the energy that something (object/person) has by being in motion. • I know that air resistance is the level of drag on an object as it is forced through the air.

UKS2

Year 5 Autumn 2	*Year 5 Spring 1*	*Year 5 Summer 1*
Food/ Cooking and Nutrition	***Structure***	***Textiles***
Topic: Mexico City **Skills:** **Design:** To design a biscuit within a given budget, drawing upon previous taste testing judgements. To design packaging for a biscuit that targets a specific group. **Make:**	**Topic: Island Invaders- Anglo Saxons** **Skills:** **Design:** To design a stable structure that is able to support weight. To create a frame structure with a focus on triangulation. **Make:** • Making a range of different shaped beam bridges.	**Topic: Victorians** **Skills:** **Design:** To design and make a template from an existing cushion and applying individual design criteria. **Make:** • Following design criteria to create a cushion. • Selecting and cutting fabrics with ease using fabric scissors. • Threading needles with greater independence.

• Following a baking recipe, including the preparation of ingredients. • Cooking safely, following basic hygiene rules. • Adapting a recipe to meet the requirements of a target audience. • Using a cuboid net to create packaging. **Evaluate:** • Evaluating a recipe, considering: taste, smell, texture and appearance. • Describing the impact of the budget on the selection of ingredients. • Evaluating and comparing a range of food products. • Suggesting modifications to a recipe (e.g. This biscuit has too many raisins, and it is falling apart, so next time I will use less raisins) **Knowledge:** • To know that the amount of an ingredient in a recipe is known as the 'quantity.' • To know that safety and hygiene are important when cooking. • To know the following cooking techniques: sieving, measuring, stirring, cutting out and shaping. • To understand the importance of budgeting while planning ingredients for biscuits. • To know that products often have a target audience.	• Using triangles to create truss bridges that span a given distance and support a load. • Building a wooden bridge structure. • Independently measuring and marking wood accurately. • Selecting appropriate tools and equipment for particular tasks. • Using the correct techniques to saws safely. • Identifying where a structure needs reinforcement and using card corners for support. • Explaining why selecting appropriating materials is an important part of the design process. • Understanding basic wood functional properties. **Evaluate:** • Adapting and improving own bridge structure by identifying points of weakness and reinforcing them as necessary. • Suggesting points for improvements for own bridges and those designed by others. **Knowledge:** • Understand some different ways to reinforce structures. • To understand how triangles can be used to reinforce bridges. • To know that properties are words that describe the form and function of materials. • To understand why material selection is important based on properties. • To understand the material (functional and aesthetic) properties of wood. • To understand the difference between arch, beam, truss and suspension bridges. • To understand how to carry and use a saw safely.	• Tying knots with greater independence. • Sewing cross stitch to join fabric. • Decorating fabric using appliqué. • Completing design ideas with stuffing and sewing the edges **Evaluate:** Evaluating an end product and thinking of other ways in which to create similar items. **Knowledge:** • To know that applique is a way of mending or decorating a textile by applying smaller pieces of fabric to larger pieces. • To know that when two edges of fabric have been joined together it is called a seam. • To know that it is important to leave space on the fabric for the seam. • To understand that some products are turned inside out after sewing so the stitching is hidden.
Core Facts • I know that the amount of an ingredient in a recipe is known as the 'quantity'. • I know that the safety and hygiene are important when cooking. • I know how to: sieve, measure, mix/stir, cut-out and shape. • I know the importance of budgeting while planning ingredients for a recipe.	**Core Facts** • I know how triangles can be used to reinforce bridges. • I know that properties are words that describe the form and function of materials. • I know why material selection is important based on their properties. • I know the material (functional and aesthetic) properties of wood.	**Core Facts** • I know that applique is a way of mending or decorating a textile by applying smaller pieces of fabric to larger pieces. • I know that when two edges of fabric have been joined together it is called a seam. • I know that it is important to leave space on the fabric for the seam. • I know and understand that some products are turned inside out after sewing so the stitching is hidden.

Year 6 Autumn 1	Year 6 Spring 1	Year 6 Summer 2
Mechanical Systems	**Electrical Systems**	**Food/ Cooking and Nutrition**
Topic: Benin **Skills:** **Design:** • Designing a pop-up book which uses a mixture of structures and mechanisms. • Naming each mechanism, input and output accurately. • Storyboarding ideas for a book. **Make:** • Following a design brief to make a pop up book, neatly and with focus on accuracy. • Making mechanisms and/or structures using sliders, pivots and folds to produce movement. • Using layers and spacers to hide the workings of mechanical parts for an aesthetically pleasing result. • **Evaluate:** • Evaluating the work of others and receiving feedback on own work. • Suggesting points for improvement. **Knowledge:** • To know that mechanisms control movement. • To understand that mechanisms can be used to change one kind of motion into another. • To understand how to use sliders, pivots and folds to create paper-based mechanisms. • To know that a design brief is a description of what I am going to design and make. • To know that designers often want to hide mechanisms to make a product more aesthetically pleasing.	**Topic: Under the Canopy** **Skills:** **Design:** • Identifying factors that could be changed on existing products and explaining how these would alter the form and function of the product. • Developing design criteria based on findings from investigating existing products. • Developing design criteria that clarifies the target user. **Make:** • Altering a product's form and function by tinkering with its configuration. • Making a functional series circuit, incorporating a motor. • Constructing a product with consideration for the design criteria. • Breaking down the construction process into steps so that others can make the product. **Evaluate:** • Carry out a product analysis to look at the purpose of a product along with its strengths and weaknesses. • Determining which parts of a product affect its function and which parts affect its form. • Analysing whether changes in configuration positively or negatively affect an existing product. • Peer evaluating a set of instructions to build a product **Knowledge:** • To know that series circuits only have one direction for the electricity to flow. • To know when there is a break in a series circuit, all components turn off. • To know that an electric motor converts electrical energy into rotational movement, causing the motor's axle to spin. • To know a motorised product is one which uses a motor to function. • To know that product analysis is critiquing the strengths and weaknesses of a product.	**Topic: Who am I?** **Skills:** **Design:** • Adapting a traditional recipe, understanding that the nutritional value of a recipe alters if you remove, substitute or add additional ingredients. • Writing an amended method for a recipe to incorporate the relevant changes to ingredients. • Designing appealing packaging to reflect a recipe. • Researching existing recipes to inform ingredient choices. **Make:** • Cutting and preparing vegetables safely. • Using equipment safely, including knives, hot pans and hobs. • Knowing how to avoid cross-contamination. • Following a step by step method carefully to make a recipe. **Evaluate:** • Identifying the nutritional differences between different products and recipes. • Identifying and describing healthy benefits of food groups. **Knowledge:** • To understand where meat comes from – learning that beef is from cattle and how beef is reared and processed. • To know that recipes can be adapted to suit nutritional needs and dietary requirements. • To know that I can use a nutritional calculator to see how healthy a food option is. • To understand that 'cross-contamination' means bacteria and germs have been passed onto ready-to-eat foods and it happens when these foods mix with raw meat or unclean objects. • To know that coloured chopping boards can prevent cross-contamination.

	• To know that 'configuration' means how the parts of a product are arranged.	• To know that nutritional information is found on food packaging. • To know that food packaging serves many purposes.
Core Facts • I know that mechanisms control movement. • I know that mechanisms can be used to change one kind of motion into another. • I know how to used sliders, pivots and folds to create paper-based mechanisms. • I know that a design brief is a description of what I am going to design and make.	**Core Facts** • I know what a series circuit is and that electricity only flows in one direction. • I know when there is a break in a series circuit, all components turn off. • I know that an electric motor converts electrical energy into rotational movement, causing the motor's axle to spin. • I know a motorised product is one which uses a motor to function.	**Core Facts** • I know that recipes can be adapted to suit nutritional needs and dietary requirements. • I know that nutritional information is found on food packaging. • I know that coloured chopping boards can prevent cross-contamination. • I know that food packaging serves many purposes.