

# St. John The Evangelist RCP School

## Design and Technology Progression (Intent)



SEND – Ambition and Access in Design Technology	
Ambition – What are we aiming for children with SEND to achieve in this subject?	Access – What amendments are made in the teaching of DT in order to help children with SEND achieve?
<p>We are ambitious in what our SEND children can achieve.</p> <p>We want children with SEND to take ownership of their own learning.</p> <p>DT is a different way for children to think about and achieve their learning from across the curriculum without having to use it in the traditional way.</p> <p>We want our children with SEND to have the opportunity to achieve highly.</p>	<ul style="list-style-type: none"> <li>• Revisit and revise previous learning at the start of every lesson.</li> <li>• Knowledge organisers documenting key vocabulary/pictures are adapted if necessary.</li> <li>• Different sized needles – made from different materials (plastic/metal).</li> <li>• Scissors of different sizes – right/left handed scissors, scissors with 2 finger holes.</li> <li>• Pre-made nets/ pre-measured lines to support children with barriers in Maths</li> <li>• Adapted written explanations to support children with difficulties in reading using visual cues where possible.</li> <li>• The Kapow CPD for teachers offers ways to adapt teaching for individual lessons if some children need support.</li> </ul>



**St. John The Evangelist RCP School  
Year 1 Design & Technology Progression (Intent)**

	AUTUMN		SPRING		SUMMER	
<b>Topic</b>		Cooking & Nutrition "Food and vegetables" <b>4 lessons</b>	Mechanisms "Wheels and axles" <b>4 lessons</b>	Mechanisms "Moving story book" (omit lesson 4) <b>3 lessons</b>	Structures "Constructing windmills" (omit lesson 4) <b>3 lessons</b>	Textiles "Puppets" <b>4 lessons</b>
<b>Prior Knowledge and skills (EYFS)</b>	<p><b>Creating with Materials (Spring Term)</b></p> <ul style="list-style-type: none"> <li>• I can explore and learn how sounds can be changed.</li> <li>• I can understand that I can use lines to enclose a space, and then begin to use these shapes to represent objects.</li> <li>• I can show interest in and describe the texture of things.</li> <li>• I can use various construction materials.</li> <li>• I can begin to construct, stacking blocks vertically and horizontally, making enclosures and creating spaces.</li> <li>• I can join construction pieces together to build and balance.</li> <li>• I can return to and build on my previous learning, refining ideas and developing my ability to represent them.</li> <li>• I can create collaboratively sharing ideas, resources and skills</li> </ul> <p><b>Creating with Materials (Summer Term)</b> Children at the expected level of development will:</p> <ul style="list-style-type: none"> <li>- Safely use and explore a variety of materials, tools and techniques, experimenting with colour, design, texture, form and function;</li> <li>- Share their creations, explaining the process they have used;</li> </ul> <p><b>Expressive Arts and Design</b> <b>Creating with Materials ELG</b> Children at the expected level of development will:</p> <ul style="list-style-type: none"> <li>• Safely use and explore a variety of materials, tools and techniques, experimenting with colour, design, texture, form, and function;</li> <li>• Share their creations, explaining the process they have used;</li> <li>• Make use of props and materials when role playing characters in narratives and stories.</li> </ul>					
<b>Intended Vocabulary (Bold included on the knowledge organiser)</b>		<b>Blender, Carton, Fruit, Healthy, Ingredients, Peel, Peeler, Recipe, Slice, Smoothie, Stencil, Template, Vegetable</b>	<b>Axle, Axle holder, Chassis, Design, Evaluation, Fix, Mechanic, Mechanism, Model, Test, Wheel</b>	<b>Assemble, Design, Evaluation, Mechanism, Model, Sliders, Stencil, Target audience, Template, Test</b>	<b>Client, Design, Evaluation, Net, Stable, Strong, Test, Weak, Windmill</b>	<b>Decorate, Design, Fabric, Glue, Model, Hand puppet, Safety pin, Staple, Stencil, Template</b>

<b>Aims</b>	We aim to inspire pupils to be innovative and creative thinkers who have an appreciation for the product design cycle through ideation, creation, and evaluation. We want pupils to develop the confidence to take risks, through drafting design concepts, modelling, and testing and to be reflective learners who evaluate their work and the work of others. Through using the Kapow scheme of work, we aim to build an awareness of the impact of design and technology on our lives and encourage pupils to become resourceful, enterprising citizens who will have the skills to contribute to future design advancements.
<b>Statutory Requirements (NC) KS1 – Year 1</b> <i>Pupils should be taught to ...</i>	<p>DESIGN - Design purposeful, functional, appealing products for themselves and other users based on design criteria (all units except Smoothies).</p> <p>DESIGN - Generate, develop, model and communicate their ideas through talking, drawing, templates, mock- ups and, where appropriate, information and communication technology (all units).</p> <p>MAKE - Select from and use a range of tools and equipment to perform practical tasks [for example, cutting, shaping, joining and finishing].</p> <p>MAKE - Select from and use a wide range of materials and components, including construction materials, textiles and ingredients, according to their characteristics (all units).</p> <p>EVALUATE - Explore and evaluate a range of existing products (Moving story books, Windmills, Wheels and axles).</p> <p>EVALUATE - Evaluate their ideas and products against design criteria (all units).</p> <p>TECHNICAL KNOWLEDGE - Build structures, exploring how they can be made stronger, stiffer and more stable (Windmills).</p> <p>TECHNICAL KNOWLEDGE - Explore and use mechanisms [for example, levers, sliders, wheels and axles], in their products (Moving story books, Windmills, Wheels and axles).</p> <p>ADDITIONAL KNOWLEDGE - Use basic principles of a healthy and varied diet to prepare dishes (Fruit &amp; vegetable smoothies).</p> <p>ADDITIONAL KNOWLEDGE - Understand where food comes from (Fruit &amp; vegetable smoothies).</p>

**Intended Skills**

<b>DESIGN</b>		Designing smoothie carton packaging by-hand or on ICT software.	Designing a vehicle that includes wheels, axles and axle holders, that when combined, will allow the wheels to move. Creating clearly labelled drawings that illustrate movement.	Explaining how to adapt mechanisms, using bridges or guides to control the movement. Designing a moving story book for a given audience.	Learning the importance of a clear design criteria. Including individual preferences and requirements in a design.	Using a template to create a design for a puppet.
<b>MAKE</b>		Chopping fruit and vegetables safely to make a smoothie. Identifying if a food is a fruit or a vegetable. Learning where and how fruits and vegetables grow.	Adapting mechanisms, when: they do not work as they should. to fit their vehicle design. to improve how they work after testing their vehicle.	Following a design to create moving models that use levers and sliders.	Making stable structures from card, tape and glue. Learning how to turn 2D nets into 3D structures. Following instructions to cut and assemble the supporting structure of a windmill. Making functioning	Cutting fabric neatly with scissors. Using joining methods to decorate a puppet. Sequencing steps for construction.

					turbines and axles which are assembled into a main supporting structure.	
<b>EVALUATE</b>		Tasting and evaluating different food combinations. Describing appearance, smell and taste. Suggesting information to be included on packaging.	Testing wheel and axle mechanisms, identifying what stops the wheels from turning, and recognising that a wheel needs an axle in order to move.	Testing a finished product, seeing whether it moves as planned and if not, explaining why and how it can be fixed. Reviewing the success of a product by testing it with its intended audience.		Reflecting on a finished product, explaining likes and dislikes.
<b>Intended Knowledge</b>						
<b>TECHNICAL</b>			To know that wheels need to be round to rotate and move. To understand that for a wheel to move it must be attached to a rotating axle. To know that an axle moves within an axle holder which is fixed to the vehicle or toy. To know that the frame of a vehicle (chassis) needs to be balanced.	To know that a mechanism is the parts of an object that move together. To know that a slider mechanism moves an object from side to side. To know that a slider mechanism has a slider, slots , guides and an object. To know that bridges and guides are bits of card that purposefully restrict the movement of the slider.	To understand that the shape of materials can be changed to improve the strength and stiffness of structures. To understand that cylinders are a strong type of structure (e.g. the main shape used for windmills and lighthouses). To understand that axles are used in structures and mechanisms to make parts turn in a circle. To begin to understand that different structures are used for different purposes. To know that a structure is something that has been made and	To know that 'joining technique' means connecting two pieces of material together. To know that there are various temporary methods of joining fabric by using staples, glue or pins. To understand that different techniques for joining materials can be used for different purposes. To understand

					put together.	that a template (or fabric pattern) is used to cut out the same shape multiple times. To know that drawing a design idea is useful to see how an idea will look.
<b>ADDITIONAL</b>		<p>Understanding the difference between fruits and vegetables. To understand that some foods typically known as vegetables are actually fruits (e.g. cucumber).</p> <p>To know that a blender is a machine which mixes ingredients together into a smooth liquid.</p> <p>To know that a fruit has seeds and a vegetable does not.</p> <p>To know that fruits grow on trees or vines.</p> <p>To know that vegetables can grow either above or below ground.</p> <p>To know that vegetables can come from different parts of the plant (e.g. roots:</p>	To know some real-life items that use wheels such as wheelbarrows, hamster wheels and vehicles.	To know that in Design and technology we call a plan a 'design'.	<p>To know that a client is the person I am designing for.</p> <p>To know that design criteria is a list of points to ensure the product meets the clients needs and wants.</p> <p>To know that a windmill harnesses the power of wind for a purpose like grinding grain, pumping water or generating electricity.</p> <p>To know that windmill turbines use wind to turn and make the machines inside work.</p> <p>To know that a windmill is a structure with sails that are moved by the wind.</p> <p>To know the three main parts of a windmill are the turbine, axle and structure.</p>	

		potatoes, leaves: lettuce, fruit: cucumber).				
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Knowledge catcher assessment for at the start and at the end of the unit. Please complete the unit quiz as well to inform your assessment.

**Year 1 - Fruit and vegetables**

Label all of the fruit and vegetables that you can see.  
Are they a fruit or vegetable?



<b>Question</b>	How can you tell the difference between a fruit and a vegetable?
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## Food - Fruit and vegetables

Blender	A machine that mixes ingredients together into a smooth liquid.
Carton	A container made out of card which holds liquid products such as milk and orange juice.
Fruit	The part of a plant that contains seeds.
Healthy	When everything in your body and head feels good.
Ingredients	Items that make up a mixture, for example, foods that make a recipe.
Peel	The tough skin around certain fruits and vegetables, such as oranges.
Peeler	A tool which helps you to remove the tough skin off fruits and vegetables.
Recipe	A set of instructions for making or preparing a food item or dish.
Slice (verb)	To cut pieces off something with a knife.
Smoothie	A combination of fruits and vegetables blended together to make a smooth drink.
Stencil	A shape which you can draw around.
Template	A stencil which you use to help you draw a shape more easily on to different materials.
Vegetable	Parts of plants that can be eaten by people as food. The parts may be the leaves, roots or stem. Vegetables do not contain any seeds

## Key facts

Fruits	Vegetables
	
Apples	Potatoes
	
Oranges	Broccoli
	
Strawberries	Onions
	
Bananas	Carrots



You should try to eat five portions of fruit and vegetables every day!

Knowledge catcher assessment for at the start and at the end of the unit. Please complete the unit quiz as well to inform your assessment.

## Year 1 - Wheels and axles

Write and label what you know about these objects.



**Question** What do all of these objects have in common?

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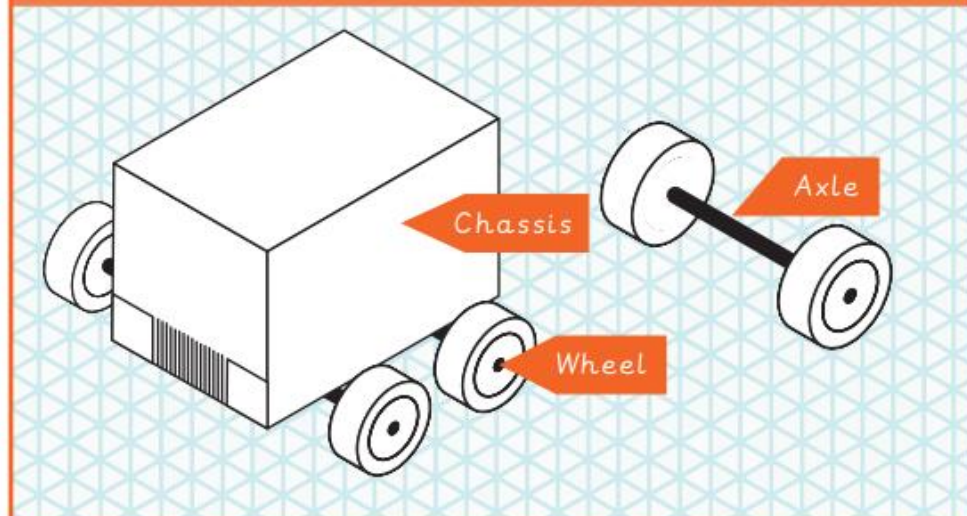
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## Mechanisms - Wheels and axles

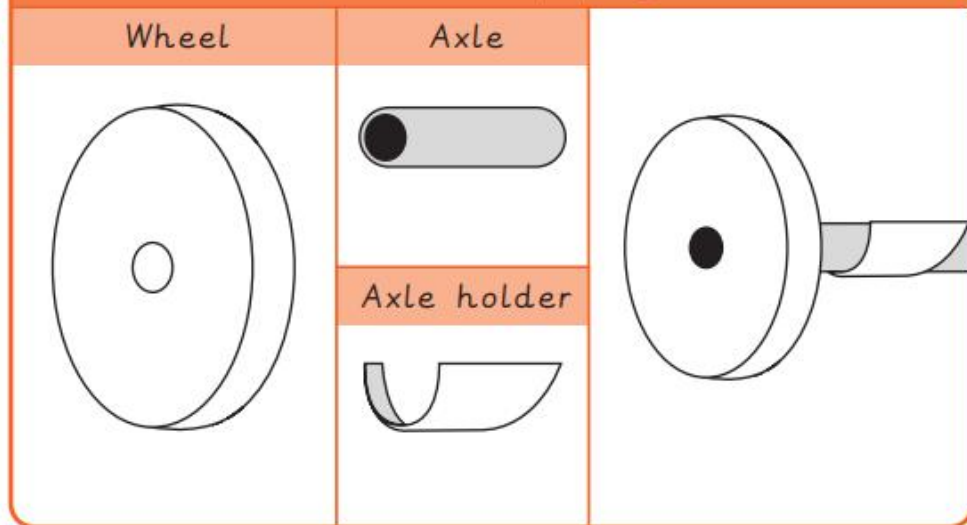
Accurate	Neat, correct shape, size and pattern with no mistakes.
Axle	A long straight rod which connects to a rotating part (e.g. the wheels of a car).
Axle holder	The part of a mechanism which holds the axle steady.
Chassis	The body of a car.
Design	To make, draw or write plans for something.
Fix	To mend something so that it will work properly again.
Mechanic	A person who can build or mend vehicles or other machines.
Mechanism	Parts of an object that move together to make something work.
Model	A practise version that lets you test out your idea and see how it will look and work.
Test	To find out whether something works as it should.
Wheel	A circular object that turns round. It can be fixed to a vehicle like a car or bicycle to allow the vehicle to move easily over the ground.

## Key facts

How do wheels move?  
The wheels need to be round and balance the body of the vehicle.



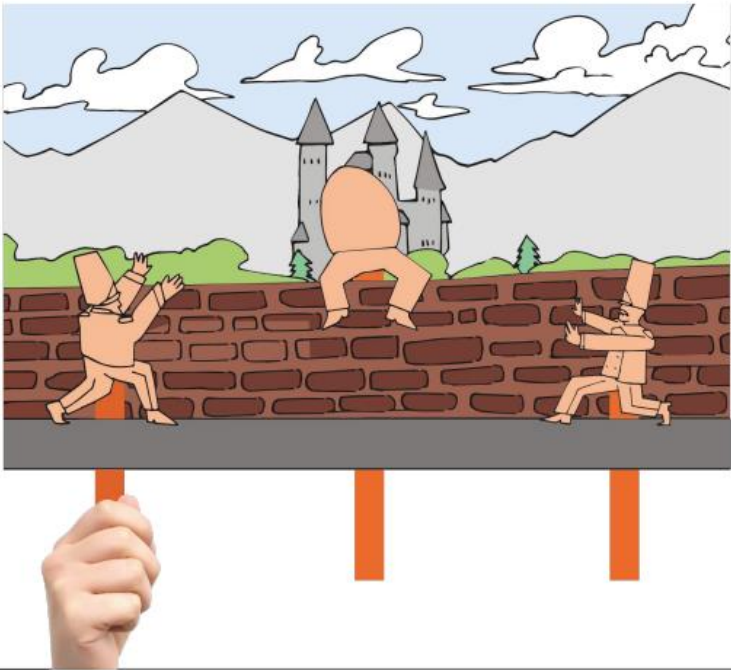
The wheels need to be attached to an axle. The axle needs to fit inside the axle holder but must not be attached to the axle holder otherwise the wheels will not turn properly.



Knowledge catcher assessment for at the start and at the end of the unit. Please complete the unit quiz as well to inform your assessment.

## Year 1 - Moving storybook

Use the image below to help you answer the question.



**Question** How will each of the characters move?

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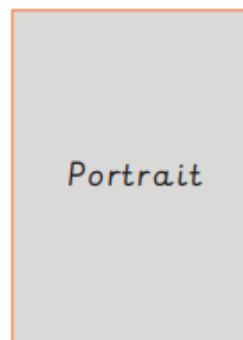
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## Mechanisms - Making a moving story book

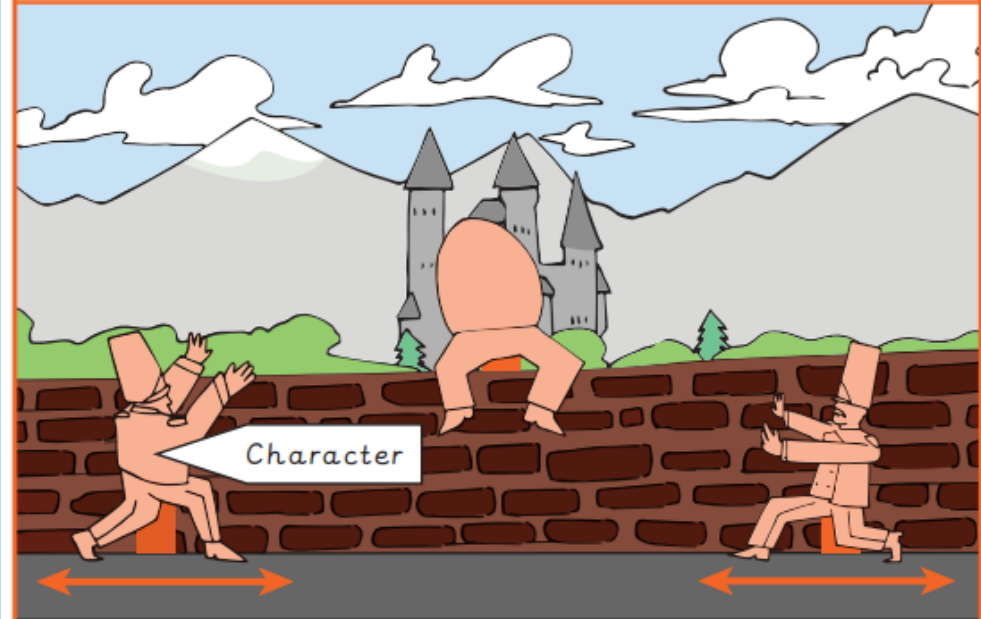
Assemble	To fix all parts together.
Design	To make, draw or write plans for something.
Design criteria	A set of rules to help you with your ideas and test the success of them.
Evaluation	When you look at the good and bad points about something, then think about how you could improve it.
Mechanism	A system of parts working together.
Model	A practise version, often on a smaller scale, that lets you test out your idea and see how it will look and work.
Sliders	Something that can move from side to side or up and down.
Stencil	A shape which you can draw around.
Target audience	A person or particular group of people at whom a product is aimed.
Template	A stencil which you use to help you draw a shape more easily on to different materials.
Test	To find out whether something works as it should.

Page orientation. Which way around is your page?



## Key facts

Moving story books allow you to move characters across different backgrounds.



Slider

Remember the key words for describing movement!



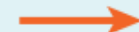
Up



Down



Left

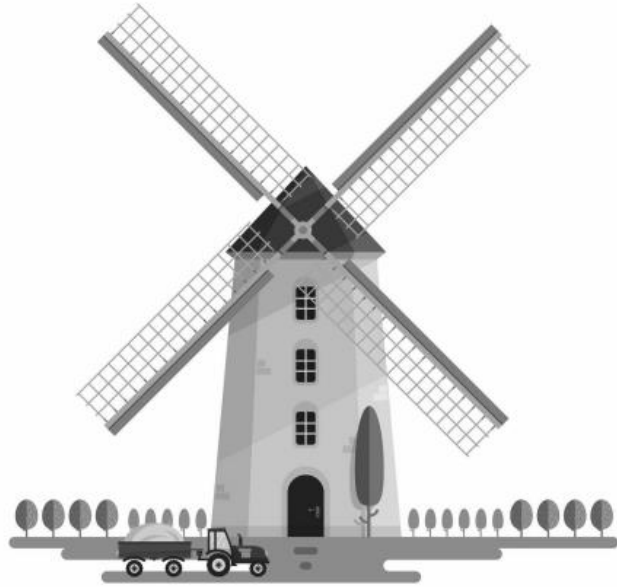


Right

Knowledge catcher assessment for at the start and at the end of the unit. Please complete the unit quiz as well to inform your assessment.

## Year 1 - Windmills

What different types of windmill can you think of?



**Question** How do the sails (turbine) of the windmill move?

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## Structures - Constructing a windmill

Client	The person who you are designing something for.
Design	To make, draw or write plans for something.
Design criteria	A set of rules to help you with your ideas and test the success of them.
Evaluation	When you look at the good and bad points about something, then think about how you could improve it.
Net	A flat 2D shape, that can become a 3D shape once assembled.
Stable	Object does not easily topple over.
Strong	It doesn't break easily.
Structure	Something that has been made and put together. For example, a building, bridge, chair, table.
Test	To find out whether something works as it should.
Weak	It breaks easily.
Windmill	A structure with sails that are moved by wind.
Windmill axle	The point from which the turbine or sails move.
Windmill structure	The part that makes the windmill stand up.
Windmill turbine	The parts that move in the wind.

There are lots of different types of windmill around Britain.

Have you seen any of these before?

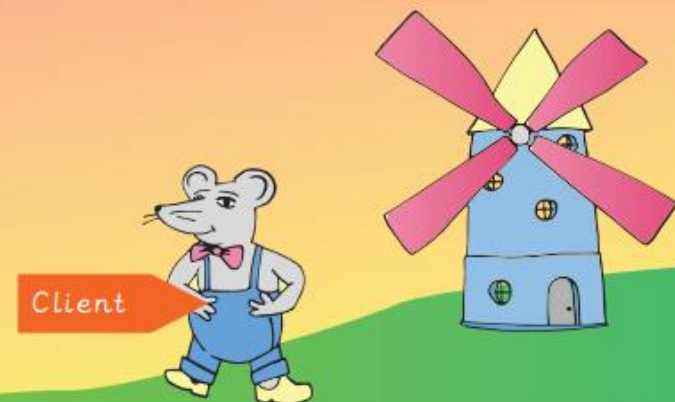


## Key facts

The three main parts of a windmill:



Remember to think about what your client, the mouse, will like! He will be living in the windmill and will need to be happy.



Knowledge catcher assessment for at the start and at the end of the unit. Please complete the unit quiz as well to inform your assessment.

## Year 1 - Puppets

Use the image below to help you answer the question.



Question

What are the good and bad points about using safety pins to join fabric?

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## Textiles - Puppets

Decorate	To add details to a design to improve its appearance.
Design	To make, draw or write plans for something.
Fabric	A natural or man-made woven or knitted material that is made from plant fibres, animal fur or synthetic material.
Glue	A sticky liquid that can join two things together.
Model	A practise version, often on a smaller scale, that lets you test out your idea and see how it will look and work.
Hand puppet	A toy that you can make move by putting your hand inside it
Safety pin	A 'U' shaped pin with a cap where the needle slots in securely after fastening.
Stencil	A shape that you can draw around.
Technique	A way of doing something to complete a task.
Template	A stencil which you use to help you draw a shape more easily on to different materials.

## Did you know?

Puppets were first invented over 3,000 years ago in Egypt.

They were made out of clay.



## Key facts

You will use a variety of techniques to create your puppet including cutting, gluing, stapling and pinning.



What colour fabric will you choose for your puppet?  
What colour hair will your puppet have?  
What kind of eyes, nose and ears will your puppet have?



Unit	Lesson name	Lesson No.	Working towards/Learning intention (WT)	Secure understanding (SU)	Greater depth (GD)
<b>Food: Fruit and Vegetables</b>	Fruit or Vegetable?	1	Learning how to determine if a food is a fruit	Naming fruits and vegetables and	Naming fruits and vegetables and
	Where Fruit and	2	Learning that fruits and vegetables grow in	Explaining a range of places that fruits and	Explaining that vegetables primarily grow
	Smoothie Tasting	3	Tasting and comparing fruits and	Describing basic characteristics of fruits	Describing basic characteristics of fruits
	Smoothie Making	4	Making a fruit and vegetable smoothie,	Preparing fruits and vegetables to make a	Preparing carefully selected fruits and
<b>Mechanisms: Making a Moving Story Book</b>	Exploring Sliders and	1	Exploring mechanisms, learning that levers	Identifying whether a mechanism is a lever	Identifying if a mechanism is a lever or
	Design	2	Designing a moving story book, drawing	Clearly labelling drawings to show which	Clearly labelling the moving parts and
	Construction	3	Constructing a moving picture by: drawing a	Creating a picture which meets the design	Creating a finished product with multiple
	Testing and	4	Evaluating a finished product by reviewing	Evaluating the main strengths and	Evaluating the main strengths and
<b>Structures: Constructing a Windmill</b>	Designing the	1	Describing the purpose of a given structure	Identifying and articulating some features	Identifying a greater range of features that
	Assembling the	2	Making a stable structure - following	Making stable structures from card, tape	Cutting and sticking with accuracy to create
	Assembling the	3	Cutting and assembling the turbine	Articulating historical and contemporary	Explaining the function of windmills in
	Testing and	4	Evaluating the windmill according to the	Making functioning turbines and axles	Creating more sophisticated products
<b>Mechanisms: Wheels and Axles</b>	How do Wheels	1	Understanding how wheels move,	Explaining that wheels move because they	Explaining how an axle can be used to make
	Fixing Broken Wheels	2	Identifying what stops wheels from turning.	Identifying the problem with each of the	Using technical language to explain why the
	Designing a Vehicle	3	Designing a moving vehicle and labelling	Designing a vehicle that includes wheels,	Including measurements within the designs
	Wacky Races	4	Building a moving vehicle, featuring a wheel	Making a moving vehicle which works	Explaining how the model works and how it
<b>Textiles: Puppets</b>	Joining Fabrics	1	Joining fabrics together using different	Joining fabrics together using staples, pins	Joining fabrics together using staples, pins
	Designing my Puppet	2	Using a template to design a puppet	Designing a puppet and using a template.	Designing a puppet that reflects a chosen
	Making and Joining	3	Joining two fabrics together accurately	Joining the two puppets' faces together as	Accurately and neatly joining the two
	Decorating my Puppet	4	To embellish a design using joining methods	Decorating a puppet to match a design using	Adapting a design to decorate a puppet so



**St. John The Evangelist RCP School**  
**Year 2 Design & Technology Progression (Intent)**

	AUTUMN		SPRING		SUMMER
<b>Topic</b>	Mechanisms "Fairground wheel" <b>4 lessons</b>	Food "A balanced diet" <b>4 lessons</b>	Structures "Baby bear's chair" (omit lesson 1) <b>3 lessons</b>	Textiles "Pouches" (omit lesson 4) <b>3 lessons</b>	Mechanisms "Moving monsters" <b>4 lessons</b>
<b>Prior Knowledge and skills</b>	<i>See Year 1 for prior knowledge and skills</i>				
<b>Intended Vocabulary</b>  ( <b>Bold included on the knowledge organiser</b> )	<b>Axle, Decorate, Evaluation, Ferris wheel, Mechanism, Stable, Strong, Test, Waterproof, Weak</b>	<b>Alternative, Diet, Balanced diet, Evaluation, Expensive, Healthy, Ingredients, Nutrients, Packaging, Refrigerator, Sugar, Substitute</b>	<b>Function, Man-made, Mould, Natural, Stable, Stiff, Strong, Structure, Test, Weak</b>	<b>Accurate, Fabric, Knot, Pouch, Running-stitch, Sew, Shape, Stencil, Template, Thimble</b>	<b>Evaluation, Input, Lever, Linear motion, Linkage, Mechanical, Mechanism, Motion, Oscillating motion, Output, Pivot, Reciprocating motion, Rotary motion, Survey</b>
<b>Aims</b>	We aim to inspire pupils to be innovative and creative thinkers who have an appreciation for the product design cycle through ideation, creation, and evaluation. We want pupils to develop the confidence to take risks, through drafting design concepts, modelling, and testing and to be reflective learners who evaluate their work and the work of others. Through using the Kapow scheme of work, we aim to build an awareness of the impact of design and technology on our lives and encourage pupils to become resourceful, enterprising citizens who will have the skills to contribute to future design advancements.				
<b>Statutory Requirements (NC) KS1 – Year 2</b> <i><b>Pupils should be taught to ...</b></i>	<p>DESIGN - Design purposeful, functional, appealing products for themselves and other users based on design criteria (all units).</p> <p>DESIGN - Generate, develop, model and communicate their ideas through talking, drawing, templates, mock- ups and, where appropriate, information and communication technology (all units except "A balanced diet").</p> <p>MAKE - Select from and use a range of tools and equipment to perform practical tasks [for example, cutting, shaping, joining and finishing].</p> <p>MAKE - Select from and use a wide range of materials and components, including construction materials, textiles and ingredients, according to their characteristics (all units except A balanced diet).</p> <p>EVALUATE - Explore and evaluate a range of existing products (All units except Baby Bear's chair).</p> <p>EVALUATE - Evaluate their ideas and products against design criteria (all units).</p> <p>TECHNICAL KNOWLEDGE - Build structures, exploring how they can be made stronger, stiffer and more stable (Baby Bear's chair and Ferris wheel).</p> <p>TECHNICAL KNOWLEDGE - Explore and use mechanisms [for example, levers, sliders, wheels and axles], in their products (Moving monsters and Ferris wheel).</p> <p>ADDITIONAL KNOWLEDGE - Use basic principles of a healthy and varied diet to prepare dishes (A balanced diet).</p> <p>ADDITIONAL KNOWLEDGE - Understand where food comes from (A balanced diet).</p>				

**Intended Skills**

<b>DESIGN</b>	Selecting a suitable linkage system to produce the desired motion. Designing a wheel.	Designing a healthy wrap based on a food combination which works well together.	Generating and communicating ideas using sketching and modelling.	Designing a pouch.		Creating a class design criteria for a moving monster. Designing a moving monster for a specific audience in accordance with a design criteria.
<b>MAKE</b>	Selecting materials according to their characteristics. Following a design brief.	Slicing food safely using the bridge or claw grip. Constructing a wrap that meets a design brief.	Making a structure according to design criteria. Creating joints and structures from paper/card and tape. Building a strong and stiff structure by folding paper.	Selecting and cutting fabrics for sewing. Decorating a pouch using fabric glue or running stitch. Threading a needle. Sewing running stitch, with evenly spaced, neat, even stitches to join fabric. Neatly pinning and cutting fabric using a template.		Making linkages using card for levers and split pins for pivots. Experimenting with linkages adjusting the widths, lengths and thicknesses of card used. Cutting and assembling components neatly.
<b>EVALUATE</b>	Evaluating different designs. Testing and adapting a design.	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 which grip was most effective.	Testing the strength of own structure. Identifying the weakest part of a structure. Evaluating the strength, stiffness and stability of own structure.	Troubleshooting scenarios posed by teacher. Evaluating the quality of the stitching on others' work. Discussing as a class, the success of their stitching against the success criteria. Identifying aspects of their peers' work that they particularly like and why.		Evaluating own designs against design criteria. Using peer feedback to modify a final design.

**Intended Knowledge**

**TECHNICAL**

To know that different materials have different properties and are therefore suitable for different uses.

To know that 'diet' means the food and drink that a person or animal usually eats.  
 To understand what makes a balanced diet.  
 To know where to find the nutritional information on packaging.  
 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.  
 To know that nutrients are substances in food that all living things need to make energy, grow and develop.  
 To know that 'ingredients' means the items in a mixture or recipe.  
 To know that I

To know that materials can be manipulated to improve strength and stiffness.  
 To know that a structure is something which has been formed or made from parts.  
 To know that a 'stable' structure is one which is firmly fixed and unlikely to change or move.  
 To know that a 'strong' structure is one which does not break easily.  
 To know that a 'stiff' structure or material is one which does not bend easily.

To know that sewing is a method of joining fabric.  
 To know that different stitches can be used when sewing.  
 To understand the importance of tying a knot after sewing the final stitch.  
 To know that a thimble can be used to protect my fingers when sewing.

To know that mechanisms are a collection of moving parts that work together as a machine to produce movement.  
 To know that there is always an input and output in a mechanism.  
 To know that an input is the energy that is used to start something working.  
 To know that an output is the movement that happens as a result of the input.  
 To know that a lever is something that turns on a pivot.  
 To know that a linkage mechanism is made up of a series of levers.

		<p>should only have a maximum of five teaspoons of sugar a day to stay healthy. To know that many food and drinks we do not expect to contain sugar do; we call these 'hidden sugars'.</p>				
<b>ADDITIONAL</b>	<p>To know the features of a ferris wheel include the wheel, frame, pods, a base an axle and an axle holder. To know that it is important to test my design as I go along so that I can solve any problems that may occur.</p>					<p>To know some real-life objects that Contain mechanisms.</p>

Knowledge catcher assessment for at the start and at the end of the unit. Please complete the unit quiz as well to inform your assessment.

## Year 2 - Fairground wheel

Use the image below to help you answer the question.



**Question** How does a fairground wheel work?

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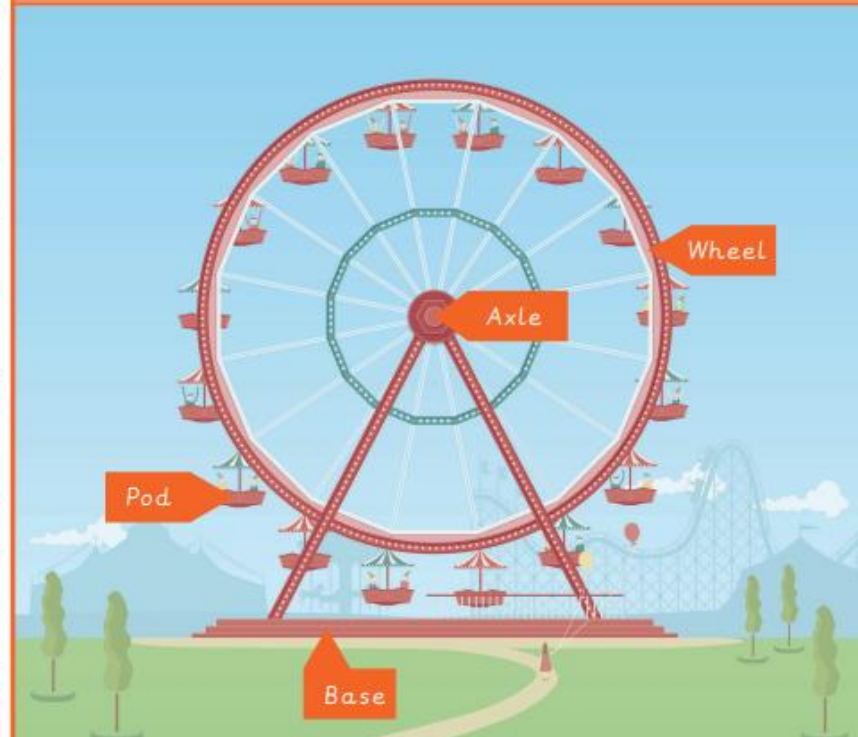
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## Mechanisms - Fairground wheel

Axle	A long straight piece of material which connects to a rotating component (e.g. the wheels of a car).
Decorate	To add details to a design to improve its appearance.
Evaluation	When you look at the good and bad points about something, then think about how you could improve it.
Ferris wheel	A ride at a fairground which carries passengers around a large vertical wheel.
Ferris wheel pod	The container which carries passengers around the ferris wheel.
Mechanism	The parts of an object that move together as part of a machine.
Stable	Object does not easily topple over.
Strong	Something that is not easily broken (e.g. wood, brick, building).
Test	To find out whether something works as it should.
Waterproof	Material that does not allow water pass through it.
Weak	Something that is easily broken (e.g. eggshells).

## Key facts

The features of a ferris wheel.



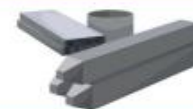
Materials have different properties. Your **ferris wheel** design will need to be **stable** and **strong**. Which materials could you use?



Bricks are made from clay. They are stiff and **strong**.



Wood comes from trees. It is **strong** and flexible.



Metal comes from ore, that is mined underground. It is **strong** and hard.

## Did you know?

The first **ferris wheel** to be built was called the Chicago wheel, in 1893 over 100 years ago!

It was over 80 metres tall.





## Food - A balanced diet

Alternative	Changing an ingredient to something different. For example using diet cola instead of full sugar cola or eating a piece of fruit instead of a bag of crisps.
Diet	The food and drink that a person or animal usually eats.
Balanced diet	Eating a variety of foods from all five different food groups.
Evaluation	When you look at the good and bad points about something, then think about how you could improve it.
Expensive	Something that costs a lot of money.
Healthy	When everything in your body and head feels good.
Ingredients	Items that make up a mixture e.g. foods that make a recipe.
Nutrients	Substances in food that all living things need to make energy, grow and develop.
Packaging	The packet or container, which holds a product safe, ready to be sold. It has information on about the product.
Refrigerator	A large kitchen appliance that keeps food and drink cold so that it will keep fresh for longer.
Sugar	An ingredient which is used to make food taste sweet. It comes from the sugar cane plant or from sugar beet.

## Key facts

The five different food groups are:

1. Carbohydrates
2. Fruits and vegetables
3. Protein
4. Dairy
5. Foods high in fat and sugar



**Hidden sugars:** Many unexpected food products can have high amounts of **sugar** such as pasta sauces and fizzy pop.

A jar of tomato pasta sauce	One plain white bagel	One granola bar	Fruit fromage frais pot
  <p>20 grams</p>	  <p>6 grams</p>	  <p>8 grams</p>	  <p>10 grams</p>

Knowledge catcher assessment for at the start and at the end of the unit. Please complete the unit quiz as well to inform your assessment.

## Year 2 - Baby Bear's chair

Look at the images below to help you answer the question.



**Question** Which seat is the most **stable** for Baby bear and why?

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## Structures - Baby bear's chair

Function	How something works.
Man-made	Made by people.
Mould	To form different shapes out of soft, squishy materials.
Natural	Found in nature e.g. spider's web, sheep's wool.
Stable	Object does not easily topple over.
Stiff	A material or object that does not bend easily (e.g. wood).
Strong	Something that is not easily broken (e.g. wood, brick, building).
Structure	Something that has been made and put together and can usually stand on its own (e.g. a building, a bridge, a chair).
Test	To find out whether something works as it should.
Weak	Something that is easily broken (e.g. paper, egg shells).

## Key facts

Often **structures** have a certain **function**, they are made to do something. e.g. Chairs are for sitting on.



They should be **stable**, **strong** and comfortable.  
Was baby bear's chair **stable** and **strong**?

Natural Objects



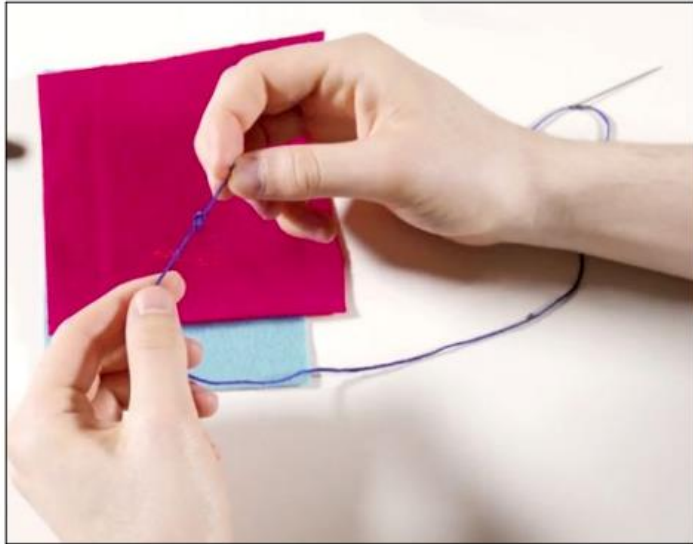
Man-made Objects



Knowledge catcher assessment for at the start and at the end of the unit. Please complete the unit quiz as well to inform your assessment.

## Year 2 - Pouches

Look at the image to help you answer the question.



**Question** Why is it important to tie a knot at the end of your thread before sewing?

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## Textiles - Pouches

Accurate	Neat, correct shape, size and pattern with no mistakes.
Fabric	A natural or man-made woven or knitted material that is made from plant fibres, animal fur or synthetic material.
Knot	A join made by tying two pieces of string or rope together.
Pouch	A small bag made to keep objects safe and to be carried easily.
Running-stitch	A simple style of sewing in a straight line with no overlapping.
Sew	To join or fasten by stitches made using a needle and thread.
Shape	The form of an object.
Stencil	A shape that you can draw around.
Template	A stencil which you use to help you draw a shape more easily on to different materials.
Thimble	A small metal cap to cover and protect your finger when sewing.

Here are some examples of sewn products:



## Key facts

Remember to plan where your stitches will go on the pouch **template**.



When cutting the **template** out, be careful and as **accurate** as possible.



Eye of the needle



Remember to tie a knot at the other end of your thread before sewing. Ask an adult if you are stuck.

Knowledge catcher assessment for at the start and at the end of the unit. Please complete the unit quiz as well to inform your assessment.

## Year 2 - Moving monsters

Label the pivot on this seesaw.



**Question** How does a seesaw work?

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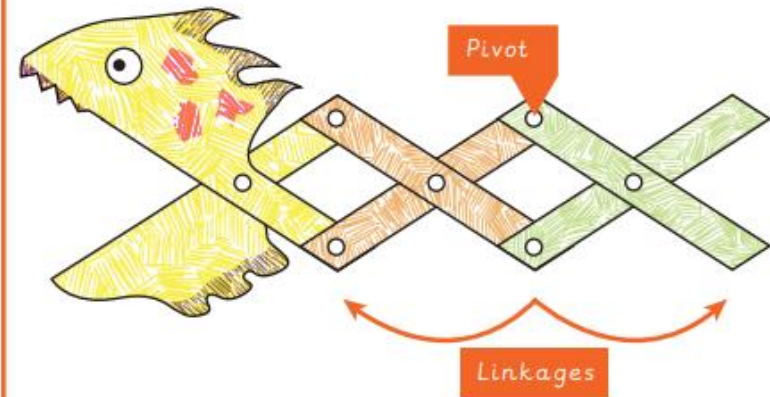
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## Mechanisms - Making a moving monster

Design criteria	A set of rules to help designers focus their ideas and test the success of them.
Evaluation	When you look at the good and bad points about something, then think about how you could improve it.
Input	The energy that is used to start something working.
Linkage	Lengths of material (for example, metal or card) that are joined together by pivots, so that the links can move as part of a mechanism.
Mechanical	Something that can move because several pieces work together like a machine.
Mechanism	A collection of parts that work together to create a movement, eg: a bicycle.
Output	Output is the motion that happens as a result of starting the input.
Pivot	The central point, pin, or shaft on which a mechanism turns or swings.
Survey	To ask a group of people questions about something and to use their answers to make improvements.

## Key facts

Moving monster



What materials could you use to represent fur, scales and claws?

## The four types of motion:



**Linear motion**  
Movement in a straight line in any one direction.



**Reciprocating motion**  
Movement in a straight line, back and forth, in any direction.



**Rotary motion**  
Movement in a circular motion.



**Oscillating motion**  
Movement in a curve, back and forth.

Unit	Lesson name	Lesson No.	Working towards/Learning intention (WT)	Secure understanding (SU)	Greater depth (GD)
<b>Food: A Balanced Diet</b>	Hidden Sugars in	1	Learning what makes a balanced diet and	Naming the four main food groups and	Secure knowledge of the four main food
	Taste Testing	2	Taste testing food combinations.	Identifying the correct food group of a given	Carefully considering why flavour
	Design	3	Remembering which food combinations	The ability to think of four different wrap	Carefully considering combinations that
	Making and	4	Making a healthy wrap, preparing the food	Constructing a wrap that meets the design	Constructing a wrap that meets the design
<b>Mechanisms: Making a Moving Monster</b>	Pivots, Levers and	1	Understanding that mechanisms are a	Using key terms accurately. Identifying the	Applying technical knowledge to more
	Designing my Monster	2	Learning that linkages use levers and pivots	Designing monsters suitable for children,	Producing more sophisticated and suitable
	Making Linkages	3	Learning that linkages use levers and pivots	Creating functional linkages that produce	Creating imaginative and functional
	Making my Monster	4	Creating a moving monster, making linkages	Selecting and assembling materials to	Selecting, assembling and using materials
<b>Structures: Baby Bear's Chair</b>	Exploring Stability	1	Comparing the stability of different shapes,	Identifying man-made/natural structures.	Ability to explore a wider range of structural
	Strengthening	2	Exploring strength in different structures,	Explaining the definition of strength.	Accurately distinguishing between strength
	Making Baby Bear's	3	Making a structure according to design	Working independently to use the materials	Working independently to produce a more
	Fixing and Testing	4	Producing a finished strong, stuff and stable	Producing a model that satisfies the given	Producing a model that satisfies the given
<b>Textiles: Pouches</b>	Running Stitch	1	Threading a needle and sewing a running	Sewing a running stitch with regular sized	Threading a needle, sewing a straight
	Using a Template	2	Cutting fabric using a template	Preparing and cutting the fabric, pinning the	Preparing and neatly cutting the fabric,
	Making a Pouch	3	Joining fabrics using a running stitch,	Sewing a running stitch to join the two	Sewing a running stitch using a uniform and
	Decorating a Pouch	4	Joining items using fabric glue or stitching,	Decorating the pouch using the materials	Decorating the pouch using the materials
<b>Mechanisms: Fairground Wheel</b>	Design a Ferris Wheel	1	Exploring wheel mechanisms, learning that	Designing and labelling a wheel,	Explaining the function of each part of a
	Planning the Build	2	Selecting appropriate materials based on	Considering the materials, shape,	Selecting appropriate materials for each
	Building the Frame	3	Building and testing a moving wheel,	Building a stable structure with a rotating	Making predictions based on evidence and
	Adding Pods and	4	Making and evaluating a structure with a	Following a design plan to make a	Producing a high quality working model of
					Percentage of lessons child is working at GD
					Percentage of lessons child is working at SU
					Percentage of lessons child is working



**St. John The Evangelist RCP School**  
**Year 3 Design & Technology Progression (Intent)**

	AUTUMN		SPRING		SUMMER	
<b>Topic</b>		Digital world "Electronic charms" <b>4 lessons</b>	Structures "Constructing a castle" (omit lesson 1) <b>3 lessons</b>	Mechanical systems "Pneumatic toys" (omit lesson 1) <b>3 lessons</b>	Textiles: cross stitch "Egyptian collars" <b>4 lessons</b>	Food "Eating seasonally" <b>4 lessons</b>
<b>Prior Knowledge and skills</b>	<i>See Year 2 for prior knowledge and skills</i>					
<b>Intended Vocabulary</b>  ( <b>Bold included on the knowledge organiser</b> )		Analogue, Badge, CAD, <b>Control</b> , Design requirements, Develop, Digital, Digital revolution, Digital world, Display, <b>Electronic</b> , Electronic products, Fasten, Feature, <b>Function, Initiate</b> , Key features, Layers, <b>Loops</b> , Micro: bit, <b>Monitor</b> , Net, Point of sale, Product Product design, <b>Program, Sensor, Simulator</b> , Smart wearables, Stand Technology, Template, Test, <b>User</b>	<b>2D shapes, 3D shapes, Castle, Design criteria, Evaluate, Façade, Feature, Flag, Net, Recyclable , Scoring, Stable, Strong, Structure, Tab, Weak</b>	<b>Exploded-diagram, Function, Input, Lever, Linkage, Mechanism, Motion, Net, Output, Pivot, Pneumatic system, Thumbnail sketch</b>	Accurate, <b>Applique, Cross-stitch</b> , Cushion, Decorate, Detail, Fabric, Patch, <b>Running-stitch</b> , Seam, Stencil, Stuffing, Target audience, Target customer, <b>Template</b>	<b>Climate, Dry climate, Exported, Imported, Mediterranean climate, Nationality, Nutrients, Polar climate, Recipe, Seasonal food, Seasons, Temperate climate, Tropical climate</b>
<b>Aims</b>	We aim to inspire pupils to be innovative and creative thinkers who have an appreciation for the product design cycle through ideation, creation, and evaluation. We want pupils to develop the confidence to take risks, through drafting design concepts, modelling, and testing and to be reflective learners who evaluate their work and the work of others. Through using the Kapow scheme of work, we aim to build an awareness of the impact of design and technology on our lives and encourage pupils to become resourceful, enterprising citizens who will have the skills to contribute to future design advancements.					

<p><b>Statutory Requirements (NC)</b>  <b>KS2 – Year 3</b>  <i>Pupils should be taught to ...</i></p>	<p>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.</p> <p>DESIGN – Generate, develop, model and communicate their ideas through discussion, annotated sketches, cross-sectional and exploded diagrams, prototypes, pattern pieces and computer- aided design.</p> <p>MAKE - Select from and use a wider range of tools and equipment to perform practical tasks [for example, cutting, shaping, joining and finishing], accurately.</p> <p>MAKE - Select from and use a wide range of materials and components, including construction materials, textiles and ingredients, according to their characteristics.</p> <p>EVALUATE - Investigate and analyse a range of existing products.</p> <p>EVALUATE - Evaluate their ideas and products against their own design criteria and consider the views of others to improve their work.</p> <p>EVALUATE - Understand how key events and individuals in design and technology have helped shape the world.</p> <p>TECHNICAL KNOWLEDGE - Apply their understanding of how to strengthen, stiffen and reinforce more complex structures.</p> <p>TECHNICAL KNOWLEDGE - Understand and use mechanical systems in their products [for example, gears, pulleys, cams, levers and linkages].</p> <p>TECHNICAL KNOWLEDGE – Understand and use electrical systems in their products [for example, series circuits incorporating switches, bulbs, buzzers and motors].</p> <p>TECHNICAL KNOWLEDGE - Apply their understanding of computing to program, monitor and control their products.</p> <p>ADDITIONAL KNOWLEDGE - Understand and apply principles of a healthy and varied diet.</p> <p>ADDITIONAL KNOWLEDGE - Prepare and cook variety of predominantly savoury dishes using a range of cooking techniques.</p> <p>ADDITIONAL KNOWLEDGE - Understand seasonality, and know where and how a variety of ingredients are grown, reared, caught and processed.</p>
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**Intended Skills**

<p><b>DESIGN</b></p>		<p>Problem solving by suggesting potential features on a Micro: bit and justifying my ideas. Developing design ideas for a technology pouch. Drawing and manipulating 2D shapes, using computer-aided design, to produce a point of sale badge.</p>	<p>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. Designing and/or decorating a castle tower on CAD software</p>	<p>Designing a toy which uses a pneumatic system. Developing design criteria from a design brief. Generating ideas using thumbnail sketches and exploded diagrams. Learning that different types of drawings are used in design to explain ideas clearly.</p>	<p>Designing and making a template from an existing cushion and applying individual design criteria.</p>	<p>Creating a healthy and nutritious recipe for a savoury tart using seasonal ingredients, considering the taste, texture, smell and appearance of the dish.</p>
<p><b>MAKE</b></p>		<p>Using a template when cutting and</p>	<p>Constructing a range of 3D geometric shapes using nets</p>	<p>Creating a pneumatic system to create a desired motion.</p>	<p>Following design criteria to create a cushion or Egyptian</p>	<p>Knowing how to prepare themselves and a work space to</p>

		<p>assembling the pouch. Following a list of design requirements. Selecting and using the appropriate tools and equipment for cutting, joining, shaping and decorating a foam pouch. Applying functional features such as using foam to create soft buttons</p>	<p>Creating special features for individual designs. Making facades from a range of recycled materials.</p>	<p>Building secure housing for a pneumatic system. Using syringes and balloons to create different types of pneumatic systems to make a functional and appealing pneumatic toy. Selecting materials due to their functional and aesthetic characteristics. Manipulating materials to create different effects by cutting, creasing, folding and weaving.</p>	<p>collar. Selecting and cutting fabrics with ease using fabric scissors. Threading needles with greater independence. Tying knots with greater independence. Sewing cross stitch to join fabric. Decorating fabric using appliqué. Completing design ideas by embellishing the collars based on design ideas (Egyptian collars).</p>	<p>cook safely in, learning the basic rules to avoid food contamination. Following the instructions within a recipe.</p>
<b>EVALUATE</b>		<p>Analysing and evaluating an existing product. Identifying the key features of a pouch.</p>	<p>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.</p>	<p>Using the views of others to improve designs. Testing and modifying the outcome, suggesting improvements. Understanding the purpose of exploded-diagrams through the eyes of a designer and their client.</p>	<p>Evaluating an end product and thinking of other ways in which to create similar items</p>	<p>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.</p>
<b>Intended Knowledge</b>						
<b>TECHNICAL</b>		<p>To understand that, in programming, a 'loop' is code that</p>	<p>To understand that wide and flat based objects are more stable.</p>	<p>To understand how pneumatic systems work. To understand that</p>	<p>To know that applique is a way of mending or decorating a textile</p>	<p>To know that not all fruits and vegetables can be grown in the UK.</p>

		<p>repeats something again and again until stopped. To know that a Micro:bit is a pocket-sized, codeable computer.</p>	<p>To understand the importance of strength and stiffness in structures.</p>	<p>pneumatic systems can be used as part of a mechanism. To know that pneumatic systems operate by drawing in, releasing and compressing air.</p>	<p>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.</p>	<p>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 understand that imported foods travel from far away and this can negatively impact the environment. To know that each fruit and vegetable gives us nutritional benefits because they contain vitamins, minerals and fibre. To understand that vitamins, minerals and fibre are important for</p>
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						<p>energy, growth and maintaining health.</p> <p>To know safety rules for using, storing and cleaning a knife safely.</p> <p>To know that similar coloured fruits and vegetables often have similar nutritional benefits</p>
<b>ADDITIONAL</b>		<p>To know what the 'Digital Revolution' is and features of some of the products that have evolved as a result.</p> <p>To know that in Design and technology the term 'smart' means a programmed product.</p> <p>To know the difference between analogue and digital technologies.</p> <p>To understand what is meant by 'point of sale display.'</p> <p>To know that CAD stands for 'Computer-aided design'</p>	<p><i>To know the following features of a castle: flags, towers, battlements, turrets, curtain walls, moat, drawbridge and gatehouse - and their purpose.</i></p> <p><i>To know that a façade is the front of a structure.</i></p> <p><i>To understand that a castle needed to be strong and stable to withstand enemy attack.</i></p> <p><i>To know that a paper net is a flat 2D shape that can become a 3D shape once assembled.</i></p> <p><i>To know that a design specification is a list of success criteria for a product.</i></p>	<p>To understand how sketches, drawings and diagrams can be used to communicate design ideas.</p> <p>To know that exploded-diagrams are used to show how different parts of a product fit together.</p> <p>To know that thumbnail sketches are small drawings to get ideas down on paper quickly.</p>		

Knowledge catcher assessment for at the start and at the end of the unit. Please complete the unit quiz as well to inform your assessment.

### Year 3 - Electronic charm

Look at the image to help you answer the question 1.



1 How have mobile phones developed over time?

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2 Name an electronic device that we use in school and explain how it is useful?

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## Year 3 - Digital world: Electronic charm

Control	To command something to change, such as the direction in which something moves.
Electronic	Devices that have some decision-making capabilities that require a processor.
Function	How an object or product operates or works.
Initiate	To start.
Programming loop	A piece of code that repeats until instructed to stop.
Monitor	To observe and record something over time.
Program	A series of code which instructs an electronic device to perform specific tasks.
Sensor	A tool or device that is designed to monitor, detect and respond to changes.
Simulator	Computer generated imitation of something such as a program test or product prototype.
User	A person that uses something.

### Digital revolution

Since the 1980s, as scientific discoveries come about, technology has continued to develop, becoming more advanced and making everyday tasks easier. This included analogue to digital technologies. It's sometimes known as the Third Industrial Revolution and is still happening today.



Analogue



Digital

## Key facts

### Smart wearables

A combination of electronics and items that you can wear to help you with day-to-day activities such as purchasing goods.



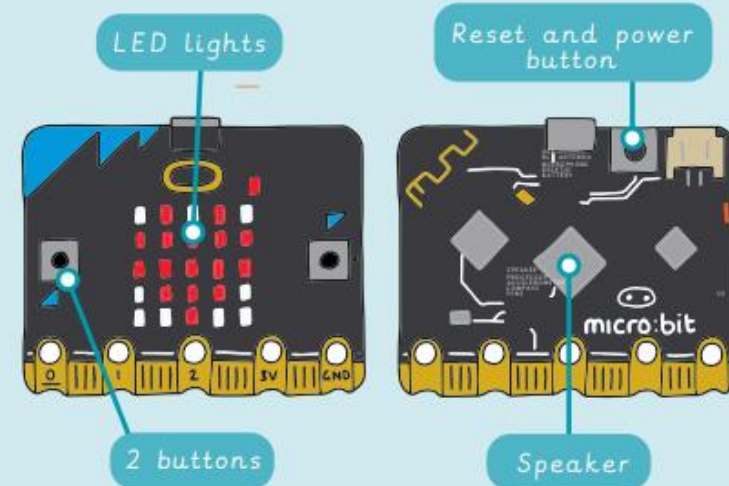
VR Goggles



Smart watch

### What is a Micro:bit?

A programmable electronic device, that can be coded to carry out certain functions.



Knowledge catcher assessment for at the start and at the end of the unit. Please complete the unit quiz as well to inform your assessment.

### Year 3 - Egyptian collars

What can you label on the picture below?



1 What is a template and why are they helpful?

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2 Why are material properties useful to know when designing a product?

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## Textiles - Egyptian collars

Ancient Egypt was a civilisation that existed between 3100 BC - 30 BC.



An Egyptian collar, called usekh or wesekh, was a personal decoration that lay around and over a person's neck and shoulders.

cotton -

A fabric made from cotton plant fibres.



silk -

A fabric made from the cocoons of silkworms.



polyester felt -

A fabric made from synthetic plastic fibres.



Appliqué



A form of textiles work where small pieces of cloth are sewn or stuck onto a larger piece.

Cross-stitch



A two-stitch style of sewing that forms a cross pattern. Used to add decorative features to fabric.

Running-stitch



A simple sewing style in a straight line without overlapping. Often used to attach or join fabric.

Embellish



Add decorative details or features to something. For example, to add sequins, buttons or beads.

Pinking



To use pinking shears to cut a zig-zag or scalloped decorative edge.

Template



A stencil made used to make many copies of a shape or help cut material accurately (e.g. biscuit cutter).

### Did you know?

Appliqué dates back to the Ancient Egyptians and was found across various archaeological sites. Appliqué was even discovered in the tomb of the Ancient Egyptian pharaoh, Tutankhamun.

Knowledge catcher assessment for at the start and at the end of the unit. Please complete the unit quiz as well to inform your assessment.

### Year 3 - Pneumatic toys

Look at the image below to help you answer the question 2.



1 Is electricity the only energy used to make things work?

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2 When a car or bike tyres are pumped up, what is happening?

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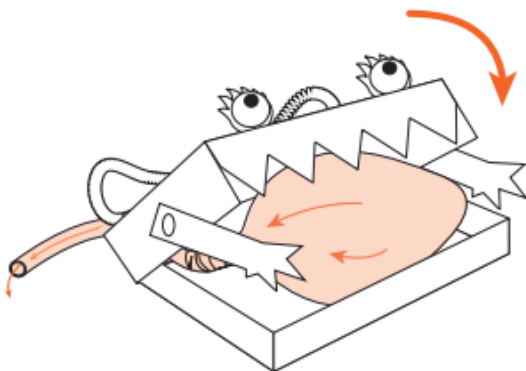
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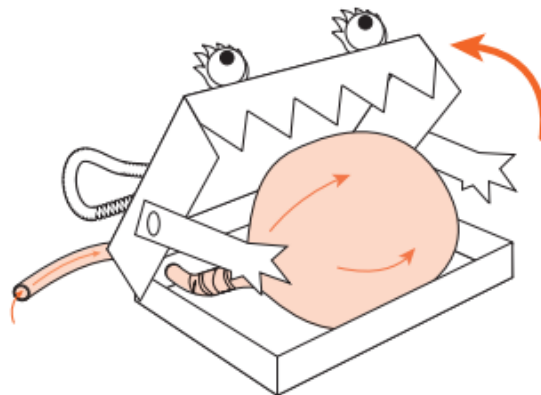
## Mechanical systems - Pneumatic toys

<b>Exploded-diagram</b>	A diagram which shows all of the parts of a product, including the internal and external parts.
<b>Function</b>	How something works.
<b>Input</b>	Input is the motion used to start a mechanism.
<b>Linkage</b>	Lengths of material (for example, metal or card) that are joined together by pivots, so that the links can move as part of a mechanism.
<b>Mechanism</b>	The parts of an object that move together as part of a machine.
<b>Motion</b>	The movement an object makes when controlled by an input or output (e.g. left, right, up, down).
<b>Net</b>	A 2D flat shape, that can become a 3D shape once assembled.
<b>Output</b>	Output is the motion that happens as a result of starting the input.
<b>Pivot</b>	The central point, pin, or shaft on which a mechanism turns or swings.
<b>Pneumatic system</b>	A mechanism that runs on air or compressed gas.
<b>Thumbnail sketch</b>	Small drawings to get ideas down on paper quickly.

When air exits the balloon, the monster's mouth closes.

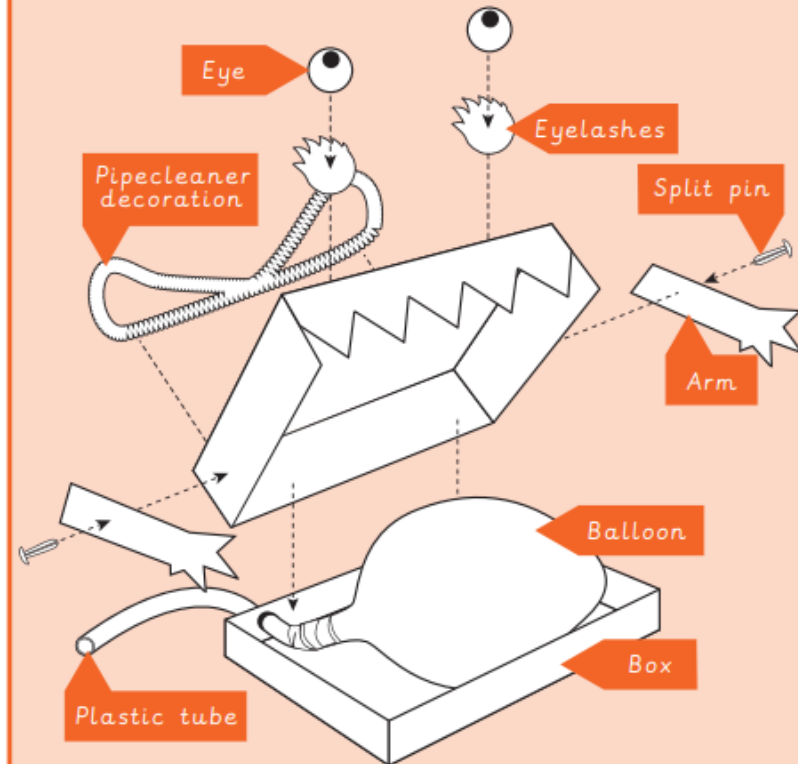


When air enters the balloon, the monster's mouth opens.



## Key facts

**Exploded-diagrams** allow us to see how a product is put together and the different components inside.



You will need:



Tie a pipecleaner into a bow



Knowledge catcher assessment for at the start and at the end of the unit. Please complete the unit quiz as well to inform your assessment.

## Year 3 - Castles

Look at the image to help you answer the questions.



1 List features of a castle below:

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2 How can paper be used to create a model castle?

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## Structures - Constructing a castle

2D shapes	Flat objects with 2-dimensions, such as square, rectangle and circle.
3D shapes	Solid objects with 3-dimensions, such as cube, oblong and sphere.
Castle	A type of building that used to be built hundreds of years ago to defend land and be a home for Kings and Queens and other very rich people.
Design criteria	A set of rules to help designers focus their ideas and test the success of them.
Evaluation	When you look at the good and bad points about something, then think about how you could improve it.
Façade	The front of a structure.
Feature	A specific part of something.
Flag	A piece of cloth used as a decoration or to represent a country or symbol.
Net	A 2D flat shape, that can become a 3D shape once assembled.
Recyclable	Material or an object that, when no longer wanted or needed, can be made into something else new.
Scoring	Scratching a line with a sharp object into card to make the card easier to bend.
Stable	Object does not easily topple over.
Strong	It doesn't break easily.
Structure	Something which stands, usually on its own.
Tab	The small tabs on the net template that are bent and glued down to hold the shape together.
Weak	It breaks easily.

### Basic 3D Shapes



## Key facts

**Castles** can have lots of **features** such as towers, turrets, battlements, moats, gatehouses, curtain walls, drawbridges and flags.



### Did you know?

Windsor Castle is the largest castle in England.

It is one of the three homes owned by Queen Elizabeth II.



Knowledge catcher assessment for at the start and at the end of the unit. Please complete the unit quiz as well to inform your assessment.

### Year 3 - Eating seasonally

Look at the image below to help you answer the questions.



1 What **seasonal foods** do we see in the shops during British summer time?

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2 How does the climate affect what we can grow?

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## Food - Eating seasonally

Climate	The weather and temperature in each country in the world, depends on which climate group that country is located. There are five climate groups: polar, temperate, dry, tropical and mediterranean.
Dry climate	Less than 250mm of rain, fog, sleet or snow in total across a whole year.
Exported	When products or produce, such as fruit and vegetables, are sent to another country.
Imported	When products or produce, such as fruit and vegetables, are brought into a country.
Mediterranean climate	Hot dry summers and cooler wetter winters.
Nationality	Belonging to a particular country (e.g. a person with Italian nationality comes from Italy).
Nutrients	Substances in food that all living things need to make energy, grow and develop.
Polar climate	Long periods of extreme cold.
Recipe	A set of instructions for making or preparing a food item or dish.
Seasonal food	Food that can be harvested and is ready to eat in a particular season.
Seasons	The seasons of the year are spring, summer, autumn and winter.
Temperate climate	Mild temperatures, where the summers are not too hot and the winters are not too cold.
Tropical climate	High temperatures and a lot of rain. This is where you will find the world's rainforests.

Fruits and vegetables are full of vitamins, minerals and fibre. These **nutrients** help us to grow, heal, give us energy and keep us healthy.



## Key facts

Kapow  
Primary

Not all fruits and vegetables can be grown in Britain. Many foods are **imported** from all across the globe. Here are some examples:



Unit	Lesson name	Lesson No.	Working towards/Learning intention (WT)	Secure understanding (SU)	Greater depth (GD)
<b>Food: Eating Seasonally</b>	Where in the World?	1	Learning that climate affects food growth	Explaining that fruits and vegetables grow	Explaining the features of the various
	British Seasonal	2	Understanding that we import food from	Understanding that 'seasonal' fruits and	Understanding that a country's climate will
	Rainbow Food	3	Creating a healthy and nutritious recipe	Designing a recipe using seasonal	Designing a recipe using seasonal
	Making Tarts	4	Safely following a recipe, knowing how to	Understanding the basic rules of hygiene	A thorough understanding of a how to work
<b>Mechanical Systems: Pneumatic Toys</b>	Exploring Pneumatics	1	Learning how pneumatic systems work.	Drawing accurate diagrams with correct	Identifying and explaining how objects and
	Designing a	2	Designing a toy from recycled materials	Identifying five appropriate design criteria,	Producing accurate and detailed designs
	Making Pneumatic	3	Creating a pneumatic system to achieve a	Selecting appropriate equipment and	Creating a more complex system of
	Decorating and	4	Selecting materials due to their functional	Creating a finished pneumatic toy that	Creating a sophisticated pneumatic systems
<b>Structures: Constructing a Castle</b>	Features of a Castle	1	Identifying the features of a castle	Drawing a simple castle that includes the	Drawing a more comprehensive castle with
	Designing a Castle	2	Designing a castle, drawing the design of the	Designing a castle with key features which	Identifying specific details of the design, eg:
	Nets and Structures	3	Knowing that a net is what a 3D shape	Constructing a range of 3D geometric	Working creatively and accurately to make
	Building a Castle	4	Constructing a castle to meet the	Building a complex structure from simple	Building a complex structure from simple
<b>Textiles: Cross-stitch and appliqué Cushions option</b>	Cross Stitch and	1	Sewing cross stitch and appliqué	Using cross stitch to join two pieces of	Using a neat and considered cross stitch to
	Cushion Design	2	Design a cushion, using a paper template	Designing and cutting the template for a	Designing a cushion, considering how the
	Decorating my	3	Decorating fabric using appliqué and cross	Using cross stitch and appliqué to decorate	Sewing cross stitch neatly, with consistently
	Assembling my	4	Assembling the cushion, using stitches to	Making a cushion that includes appliqué	Making a cushion that includes appliqué
<b>Textiles: Cross-stitch and appliqué Egyptian collars option</b>	Cross Stitch and	1	Sewing cross stitch and appliqué	Using cross stitch to join two pieces of	Using a neat and considered cross stitch to
	Egyptian collars	2	Cutting a template with support.	Designing and cutting their template for an	considering how the different elements will
	Developing the	3	Cutting the fabric with paperweights for	Cutting and shaping fabric to complete the	Cutting and shaping fabric and attach a
	Finishing their collars	4	Attaching appliqué using stitching and	Using cross-stitch and appliqué to decorate	Sewing neatly, using cross-stitch, consistent
<b>Electrical Systems: Electric poster</b>	Information design	1	Knowing an example of information design	Explaining what 'information design' is,	Explaining what 'information design' is in
	Topic research	2	Completing the design criteria appropriately	Completing the design criteria, with points	Completing the design criteria, with points
	Design development	3	Using traffic lights to evaluate their own or	Reviewing their initial ideas against the	Reviewing their initial ideas against the
	Electric poster	4	Assembling the electric poster with support	Following a demonstration, assembling the	With greater independence, following a
<b>Digital world: Electronic charm</b>	Smart wearables	1	Understanding that there have been	Stating a product that has developed over	Stating and describing how a product(s) has
	Programming an	2	Adapting a given program that initiates a	Writing a program that initiates a flashing	Testing their program using debugging skills
	eCharm pouches	3	Suggesting key features for a pouch. Using a	Suggesting and identifying key features for a	Suggesting, identifying and expressing the
	Point of sale displays	4	Giving an example of a 'point of sale'	Describing what is meant by 'point of sale'	Describing and explaining what a point of
					Percentage of lessons child is working at GD
					Percentage of lessons child is working at SU



**St. John The Evangelist RCP School**  
**Year 4 Design & Technology Progression (Intent)**

	AUTUMN		SPRING		SUMMER	
<b>Topic</b>	Electrical systems "Torches" (omit lesson 1) <b>3 lessons</b>	Structures "Pavillions" <b>4 lessons</b>	Mechanical systems "Making a slingshot car" <b>4 lessons</b>		Textiles "Fastenings" (omit lesson 1) <b>3 lessons</b>	Food "Adapting a recipe" <b>4 lessons</b>
<b>Prior Knowledge and skills</b>	<i>See Year 3 for prior knowledge and skills</i>					
<b>Intended Vocabulary</b>  ( <b>Bold included on the knowledge organiser</b> )	<b>Battery, Bulb, Buzzer, Cell, Component, Conductor, Copper, Design criteria, Electrical item, Electricity, Electronic item, Function, Insulator, Series circuit, Switch, Test, Torch, Wire</b>	<b>Aesthetic, Cladding, Design criteria, Evaluation, Frame structure, Function, Inspiration, Pavilion, Reinforce, Stable, Structure, Target audience, Target customer, Texture, Theme</b>	<b>Aesthetic, Air resistance, Chassis, Design, Design criteria, Function, Graphics, Kinetic energy, Mechanism, Net, Structure</b>		<b>Aesthetic, Assemble, Book sleeve, Design criteria, Evaluation, Fabric, Fastening, Mock-up, Net, Running-stitch, Stencil, Target audience, Target customer, Template</b>	<b>Adapt, Budget, Cooling rack, Creaming, Equipment, Evaluation, Flavour, Ingredients, Method, Net, Packaging, Prototype, Quantity, Recipe, Rubbing, Sieving, Target audience, Unit of measurement, Utilities</b>
<b>Aims</b>	We aim to inspire pupils to be innovative and creative thinkers who have an appreciation for the product design cycle through ideation, creation, and evaluation. We want pupils to develop the confidence to take risks, through drafting design concepts, modelling, and testing and to be reflective learners who evaluate their work and the work of others. Through using the Kapow scheme of work, we aim to build an awareness of the impact of design and technology on our lives and encourage pupils to become resourceful, enterprising citizens who will have the skills to contribute to future design advancements.					
<b>Statutory Requirements (NC) KS2 – Year 4 Pupils should be taught to ...</b>	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 (covered in all units). DESIGN - Generate, develop, model and communicate their ideas through discussion, annotated sketches, cross-sectional and exploded diagrams, prototypes, pattern pieces and computer-aided design (covered in all units) MAKE - Select from and use a wider range of tools and equipment to perform practical tasks [for example, cutting, shaping, joining and finishing], accurately. MAKE - Select from and use a wide range of materials and components, including construction materials, textiles and ingredients, according to their characteristics. EVALUATE - Investigate and analyse a range of existing products.					

	<p>EVALUATE - Evaluate their ideas and products against their own design criteria and consider the views of others to improve their work.</p> <p>EVALUATE - Understand how key events and individuals in design and technology have helped shape the world (Slingshot cars and Torches).</p> <p>TECHNICAL KNOWLEDGE - Apply their understanding of how to strengthen, stiffen and reinforce more complex structures (Pavilions).</p> <p>TECHNICAL KNOWLEDGE - Understand and use mechanical systems in their products [for example, gears, pulleys, cams, levers and linkages] (Slingshot cars).</p> <p>TECHNICAL KNOWLEDGE - Understand and use electrical systems in their products [for example, series circuits incorporating switches, bulbs, buzzers and motors] (Torches).</p> <p>ADDITIONAL KNOWLEDGE - Prepare and cook variety of predominantly savoury dishes using a range of cooking techniques (Adapting a recipe).</p>
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**Intended Skills**

<b>DESIGN</b>	<p>Designing a torch, giving consideration to the target audience and creating both design and success criteria focusing on features of individual design ideas.</p>	<p>Designing a stable pavilion structure that is aesthetically pleasing and selecting materials to create a desired effect.</p> <p>Building frame structures designed to support weight.</p>	<p>Designing a shape that reduces air resistance.</p> <p>Drawing a net to create a structure from.</p> <p>Choosing shapes that increase or decrease speed as a result of air resistance.</p> <p>Personalising a design.</p>		<p>Writing design criteria for a product, articulating decisions made.</p> <p>Designing a personalised book sleeve.</p>	<p>Designing a biscuit within a given budget, drawing upon previous taste testing judgements.</p>
<b>MAKE</b>	<p>Making a torch with a working electrical circuit and switch.</p> <p>Using appropriate equipment to cut and attach materials.</p> <p>Assembling a torch according to the design and success criteria.</p>	<p>Creating a range of different shaped frame structures.</p> <p>Making a variety of free standing frame structures of different shapes and sizes.</p> <p>Selecting appropriate materials to build a strong structure and cladding.</p> <p>Reinforcing corners to strengthen a structure.</p>	<p>Measuring, marking, cutting and assembling with increasing accuracy.</p> <p>Making a model based on a chosen design.</p>		<p>Making and testing a paper template with accuracy and in keeping with the design criteria.</p> <p>Measuring, marking and cutting fabric using a paper template.</p> <p>Selecting a stitch style to join fabric, working neatly by sewing small, straight stitches.</p> <p>Incorporating fastening to a</p>	<p>Following a baking recipe, from start to finish, including the preparation of ingredients.</p> <p>Cooking safely, following basic hygiene rules.</p> <p>Adapting a recipe to improve it or change it to meet new criteria (e.g. from savoury to sweet)</p>

		Creating a design in accordance with a plan. Learning to create different textural effects with materials			design.	
<b>EVALUATE</b>	Evaluating electrical products. Testing and evaluating the success of a final product.	Evaluating structures made by the class. Describing what characteristics of a design and construction made it the most effective. Considering effective and ineffective designs.	Evaluating the speed of a final product based on: the effect of shape on speed and the accuracy of workmanship on performance.		Testing and evaluating an end product against the original design criteria. Deciding how many of the criteria should be met for the product to be considered successful. Suggesting modifications for improvement. Articulating the advantages and disadvantages of different fastening types.	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).
<b>Intended Knowledge</b>						
<b>TECHNICAL</b>	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 understand what a frame structure is. To know that a 'free-standing' structure is one which can stand on its own.	To know that air resistance is the level of drag on an object as it is forced through the air. To understand that the shape of a moving object will affect how it moves due to air resistance.			

<p><b>ADDITIONAL</b></p>	<p>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.</p>	<p>To know that a pavilion is a decorative building or structure for leisure activities. To know that cladding can be applied to structures for different effects. To know that aesthetics are how a product looks. To know that a product's function means its purpose. To understand that the target audience means the person or group of people a product is designed for. To know that architects consider light, shadow and patterns when designing.</p>	<p>To know that aesthetics means how an object or product looks in design and technology. To know that a template is a stencil you can use to help you draw the same shape accurately. To know that a birds-eye view means a view from a high angle (as if a bird in flight). To know that graphics are images which are designed to explain or advertise something. To know that it is important to assess and evaluate design ideas and models against a list of design criteria.</p>		<p>To know that a fastening is something which holds two pieces of material together for example a zipper, toggle, button, press stud and velcro. To know that different fastening types are useful for different purposes. To know that creating a mock up (prototype) of their design is useful for checking ideas and proportions.</p>	<p>To know that the amount of an ingredient in a recipe is known as the 'quantity.' To know that it is important to use oven gloves when removing hot food from an oven. To know the following cooking techniques: sieving, creaming, rubbing method, cooling. To understand the importance of budgeting while planning ingredients for biscuits</p>
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Knowledge catcher assessment for at the start and at the end of the unit. Please complete the unit quiz as well to inform your assessment.

## Year 4 - Torches

Use the image to help you answer the questions.



1 Before electricity, what was used to light up the streets of London?

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2 What did both Sir Joseph Swan and Thomas Edison invent?

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## Electrical Systems - Torches

Battery	Two or more cells put together to provide electrical energy to power a circuit.
Bulb	A circuit part, made from glass or plastic, which gives out light when electricity passes through it.
Buzzer	A circuit part which will make a buzzing noise when electricity is passed through it.
Cell	A single unit that provides electrical energy to power a circuit.
Conductor	A material that allows electricity to flow through it. e.g. metal.
Copper	A reddish metal material that is good at letting heat and electricity flow through it. It is often used to make wires and pipes.
Design criteria	A set of rules to help designers focus their ideas and test the success of them.
Electrical item	Objects that need electricity to work such as hair dryers, toasters and kettles.
Electricity	A type of energy, that is usually invisible, that can be made or stored and used to make objects work (for example to move things or to heat them up).
Electronic item	Electrical items that have an element of computer processing in them such as mobile phones and laptops.
Insulator	A material that does not allow electricity to flow through it. e.g. plastic.
Series circuit	A closed circuit where the current follows one path.
Switch	A circuit part that you can open or close to allow electricity to flow through or to stop it flowing through. (For example, in a house, an electric light switch lets you turn the lights on or turn the lights off.)
Test	To find out whether something works as it should.
Torch	A battery-powered electric lamp.
Wire	A thin piece of copper thread which conducts electricity to connect circuit components together.

## Key facts

Many products use **batteries!**



## Did you know?



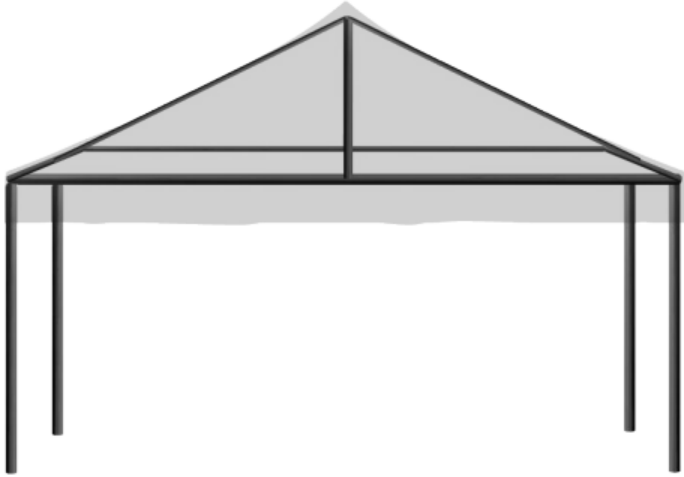
Once upon a time, there were no **electrical items** to use!

They had not been invented.  
How would life be different for you without **electrical items**?

Knowledge catcher assessment for at the start and at the end of the unit. Please complete the unit quiz as well to inform your assessment.

## Year 4 - Pavilions

Use the image to help you answer the questions.



1 What is a **frame structure**?

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2 Describe ways in which you could create different textures with cladding.

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## Structure - Pavilions

Aesthetic	How an object or product looks.
Cladding	A material put on top of another material or on a structure as protection or to improve appearance.
Design criteria	A set of rules to help designers focus their ideas and test the success of them.
Evaluation	When you look at the good and bad points about something, then think about how you could improve it.
Frame structure	A way of building something so that the inside supports are built first and the outside covering is added afterwards as cladding.
Function	The purpose of an object (for example a chair needs to hold a person when sitting down); or how the product works (for example a torch needs to provide light in a dark space).
Inspiration	To gain ideas from different sources such as the internet, magazines and books.
Pavilion	A decorative building or structure for leisure activities.
Reinforce	To make a structure or material stronger, especially by adding another material or element to it.
Stable	Object does not easily topple over.
Structure	Something that has been made and put together and can usually stand on its own (e.g. a building, a bridge, a chair).
Target audience	A person or particular group of people at whom a product is aimed.
Target customer	A person or particular group of people who you expect to buy the product.
Texture	The way that something feels when you touch it (e.g. soft, rough, smooth).
Theme	An idea or specific design that your product or structure is based on (e.g. space-themed).

You can create all sorts of **textures** for your **cladding** designs using different materials and techniques.

Weave



Concertina fold



Cut-outs

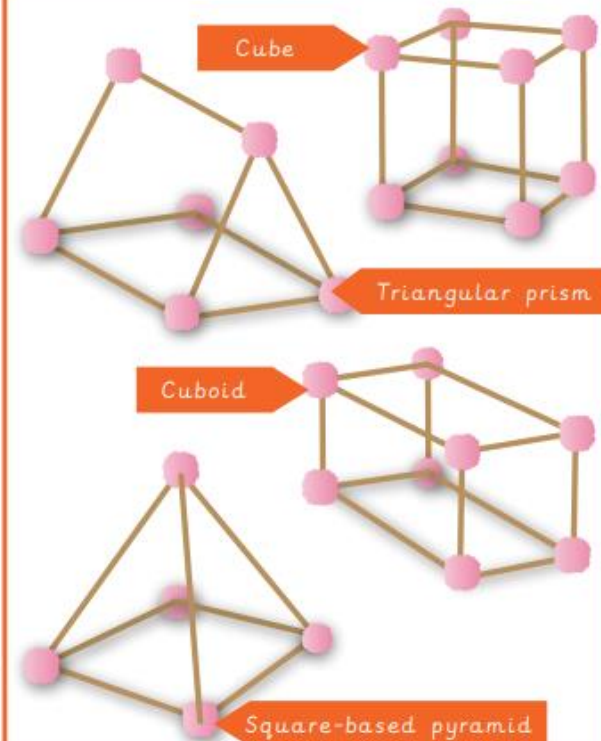


## Key facts

Kapow  
Primary



There are variety of ways to assemble a **frame structure**.



What materials and equipment could you use to make your **structure**?

Knowledge catcher assessment for at the start and at the end of the unit. Please complete the unit quiz as well to inform your assessment.

### Year 4 - Slingshot car

Use the image to help you answer the questions.



1 Name and describe an early form of the transport before engines?

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2 Why do lorries move more slowly through the air than cars?

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## Mechanical Systems - Slingshot car

Aesthetic	How an object or product looks.
Air resistance	The level of drag on an object as it is forced through the air.
Chassis	The body of a car.
Design	To make, draw or write plans for something.
Design criteria	A set of rules to help designers focus their ideas and test the success of them.
Function	The purpose of an object (for example a chair needs to hold a person when sitting down); or how the product works (for example a torch needs to provide light in a dark space).
Graphics	Images which are designed to explain or advertise something.
Kinetic energy	The energy that causes an object to move.
Mechanism	The parts of an object that move together as part of a machine.
Net	A flat 2D shape, that can become a 3D shape once assembled.
Structure	Something that has been made and put together and can usually stand on its own (eg a building, a bridge, a chair).

### Did you know?



Some of the first toy cars were made in 1901, that's over 100 years ago!

Which vehicle has the least air resistance?



### Key facts

Kapow  
Primary

Front view



Bird's-eye view



Side view



Knowledge catcher assessment for at the start and at the end of the unit. Please complete the unit quiz as well to inform your assessment.

## Year 4 - Fastenings

Use the image to help you answer the questions.



1 What is your opinion of the aesthetics of this bag?

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2 If you could choose the fastenings for securing the pockets on this bag what would they be and why?

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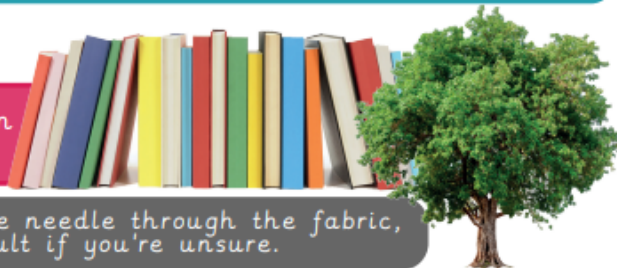
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## Textiles - Fastenings

Aesthetic	How an object or product looks.
Assemble	To put parts together.
Book sleeve	A protective cover for a book to keep it from getting damaged.
Design criteria	To help designers focus their ideas and test the success of them.
Evaluation	When you look at the good and bad points about something, then think about how you could improve it.
Fabric	A natural or man-made woven or knitted material that is made from plant fibres, animal fur or synthetic material.
Fastening	Something that holds two pieces of material together securely or shuts something, such as buttons, zips and press-studs.
Prototype	A simple model that lets you test out your idea, how it will look and work.
Net	A flat 2D shape, that can become a 3D shape once assembled.
Running-stitch	A simple style of sewing in a straight line with no overlapping.
Stencil	A shape that you can draw around.
Target audience	A person or particular group of people at whom a product is aimed.
Target customer	A person or particular group of people who you expect to buy the product.
Template	A stencil you use to help you draw the same shape more easily on to different materials.

### Did you know?

Up to fifty books can be made from the pulp harvested from one tree!



Be very careful when threading the needle through the fabric, watch your fingers and ask an adult if you're unsure.

## Key facts

Kapow  
Primary

There are a number of **fastenings** that you can use to bring two pieces of **fabric** together.

Zipper



Velcro



Press stud



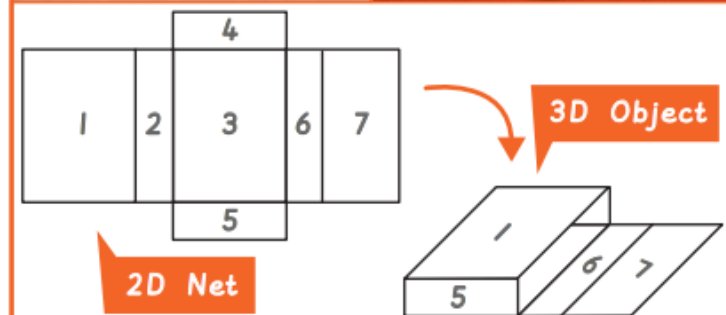
Buckle



Button



Toggle



A **2D net** made from card can be created to check the size for the book sleeve, before using **fabric**.

When folded into a **3D shape**, we can test if it needs to be made bigger or smaller. This **2D net** has seven faces.

Knowledge catcher assessment for at the start and at the end of the unit. Please complete the unit quiz as well to inform your assessment.

## Year 4 - Adapting a recipe

Use the image below to answer question 1.



1 What is this technique called?

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2 Why is it better to use your hands, rather than using a utensil to combine the flour and butter?

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## Food - Adapting a recipe

Adapt	To change or alter something to fit a given purpose, or to improve it.
Budget	To set an amount of money that can be used for something or for a project and then making sure that you record what you spend and don't spend more than the amount that you set.
Building hire	To pay to use a particular building such as a factory or a professional kitchen for its facilities.
Equipment	Items and objects which are needed to complete a task.
Evaluation	When you look at the good and bad points about something, then think about how you could improve it.
Flavour	How food or drink tastes (for example, sour, sweet, bitter, salty).
Ingredients	Items that make up a mixture, for example foods that make a recipe.
Method	Following a process or list of instructions.
Net	A flat 2D shape, that can become a 3D shape once assembled.
Packaging	The packet or container that holds a product safe, ready to be sold and has information on about the product.
Prototype	A simple model that lets you test out your idea, showing how it will look and work.
Quantity	An amount of an item.
Recipe	A set of instructions for making or preparing a food item or dish.
Target audience	A person or particular group of people at whom a product is aimed.
Unit of measurement	The unit which you use to measure a quantity. (for example, grams, centimeters, litres).
Utilities	Services such as water, electricity, gas and internet.

## Key facts

There are many different **ingredients** to think about, each one can change the **flavour** of the plain biscuit recipe.



## Did you know?



There are five different tastes our tongues can detect.

1. Sweet (fruits, honey, cupcakes)
2. Bitter (olives, dark chocolate, spinach)
3. Sour (lemon, lime, vinegar)
4. Salty (hard cheese, anchovies)
5. Umami (tomatoes, miso, seaweed)

Unit	Lesson name	Lesson No.	Working towards/Learning intention (WT)	Secure understanding (SU)	Greater depth (GD)
Electrical Systems: Torch	Electrical Products	1	Identifying electrical products, learning	Identifying electrical products and	Identifying the features of electrical
	Evaluating Torches	2	Identifying the features of a torch and	Identifying the features of a torch, how	Explaining what features are important
	Torch Design	3	Designing a torch, giving consideration	Creating suitable designs which fit both	Applying the outcome of the evaluation
	Torch Assembly	4	Making a torch with a working circuit	Creating a functioning torch with a	Creating a torch with special features to
Food: Adapting a Recipe	Following a Recipe	1	Evaluating a product, giving	Following a recipe with some support.	Following a recipe and measuring
	Testing Ingredients	2	Cooking a recipe safely, following basic	Adapting a recipe by adding extra	Adapting a recipe and explaining the
	Final Design and	3	Working within a group to design a	Planning a biscuit within budget	Planning a well thought out biscuit,
	Biscuit Bake Off	4	Making a biscuit that meets a given	Making a biscuit from an adapted	Making a biscuit that has a clear target
Mechanical Systems: Making a Slingshot Car	Chassis and Launch	1	Learning that all moving things have	Working independently to produce an	Making a high quality and functioning
	Designing the Car	2	Designing a car body to cover the	Designing a shape that is suitable for	Designing a shape that is sophisticated
	Making the Car	3	Making the body of the car, measuring,	Producing panels that will fit the	Producing panels that will fit the
	Assembly and	4	Assembling the panels of the body to	Constructing the car bodies effectively.	Constructing the car bodies
Structure	Exploring Frame	1	Understanding the purpose of world	Producing a range of free standing	Experimenting with more abstract
	Designing a	2	Knowing that different materials can	Designing a pavilion that is strong,	Designing an aesthetically pleasing
	Pavilion Frame	3	Building a frame structure, selecting	Selecting appropriate materials and	Experimenting with a wide range of
	Pavilion Cladding	4	Adding cladding to a frame structure,	Selecting appropriate materials and	Experimenting with a wide range of
Textiles: Fastenings	Evaluating	1	Identifying and evaluating different	Identifying the features, benefits and	Identifying the features, benefits and
	Designing my Book	2	Designing a product to meet a design	Writing design criteria and designing a	Using a design criteria to design a
	Paper Mock-up and	3	Making and testing a paper template	Making a template for the book sleeve	Drawing a template with accurate
	Assembling my	4	To assemble the book jacket, joining	Assembling the case, sewing with a	Assembling the case, sewing with a
Digital world: Mindful moments timer	Mindfulness and	1	Discuss the advantages and	Stating and/or describing the	Analysing and evaluating the
	Programming timers	2	Using visual support to write a program	Writing a program that displays a timer	Writing a program that displays a timer
	Prototypes	3	Working with others to cut out and	Cutting out the Activity: Box net.	Cutting out more complex nets and, or
	Brand identity	4	Knowing what a logo is and explaining	Explaining the need for a company to	Explaining and justifying the need for a
					Percentage of lessons child is working
					Percentage of lessons child is working
					Percentage of lessons child is working



**St. John The Evangelist RCP School**  
**Year 5 Design & Technology Progression (Intent)**

	AUTUMN		SPRING		SUMMER	
<b>Topic</b>	Food "What could be healthier?" <b>4 lessons</b>	Mechanical systems "Making a pop up book" (omit lesson 4 and use the Jack & Jill book and moving parts template in lesson 2 to save time) <b>3 lessons</b>		Structures "Bridges" <b>4 lessons</b>	Digital world "Monitoring devices" <b>4 lessons</b>	Electrical systems Doodlers (omit lesson 4) <b>3 lessons</b>
<b>Prior Knowledge and skills</b>	<i>See Year 4 for prior knowledge and skills</i>					
<b>Intended Vocabulary</b>  ( <b>Bold included on the knowledge organiser</b> )	<b>Beef, Cross-contamination, Diet</b> Ethical issues, <b>Farm,</b> Healthy, Ingredients, <b>Method,</b> Nutrients, <b>Packaging,</b> Reared, Recipe, <b>Research,</b> Substitute, Supermarket, Vegan, Vegetarian, <b>Welfare</b>	<b>Aesthetic, Computer-aided design (CAD), Caption, Design, Design brief, Design criteria, Exploded-diagram, Function, Input, Linkage, Mechanism, Motion, Output, Pivot, Prototype, Slider, Structure, Template</b>		Abutment, <b>Accurate, Arched bridge, Beam bridge, Coping saw, Evaluation, File, Mark out</b> , Material properties, Measure, Predict, <b>Reinforce,</b> Research, <b>Sandpaper, Set square, Suspension bridge, Tenon saw, Test, Truss bridge, Wood</b>	Alert, Ambient, <b>Boolean,</b> Consumables, Decompose, Development, <b>Device,</b> Duplicate, <b>Durable,</b> Electronic, Inventor, Lightweight, Man-made, Manipulate, Manoeuvre, Microplastics, Model, Monitor, <b>Monitoring device, Moulded, Plastic, Plastic pollution, Programming Comment, Programming loop, Reformed, Replica, Research, Sensor, Strong, Sustainability, Synthetic, Thermometer, Thermoscope, Value, Variable, Versatile, Water-resistant, Workplane</b>	<b>Circuit component, Configuration, Current, Develop, DIY, Investigate, Motor, Motorised, Problem solve, Product analysis, Series circuit, Stable, Target user</b>

<b>Aims</b>	We aim to inspire pupils to be innovative and creative thinkers who have an appreciation for the product design cycle through ideation, creation, and evaluation. We want pupils to develop the confidence to take risks, through drafting design concepts, modelling, and testing and to be reflective learners who evaluate their work and the work of others. Through using the Kapow scheme of work, we aim to build an awareness of the impact of design and technology on our lives and encourage pupils to become resourceful, enterprising citizens who will have the skills to contribute to future design advancements.
<b>Statutory Requirements (NC) KS2 – Year 5</b> <i>Pupils should be taught to ...</i>	<p>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. (All units)</p> <p>DESIGN - Generate, develop, model and communicate their ideas through discussion, annotated sketches, cross-sectional and exploded diagrams, prototypes, pattern pieces and computer- aided design. (All units except Doodlers)</p> <p>MAKE - Select from and use a wider range of tools and equipment to perform practical tasks [for example, cutting, shaping, joining and finishing], accurately.(All units except Monitoring devices)</p> <p>MAKE - 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.(Pop up books and Bridges)</p> <p>EVALUATE - Investigate and analyse a range of existing products.(All units except Monitoring devices)</p> <p>EVALUATE - Evaluate their ideas and products against their own design criteria and consider the views of others to improve their work. (All units)</p> <p>EVALUATE - Understand how key events and individuals in design and technology have helped shape the world. (What could be healthier and Monitoring devices)</p> <p>TECHNICAL KNOWLEDGE - Apply their understanding of how to strengthen, stiffen and reinforce more complex structures. (Doodlers, Bridges, Monitoring Devices)</p> <p>TECHNICAL KNOWLEDGE - Understand and use mechanical systems in their products [for example, gears, pulleys, cams, levers and linkages]. (Pop up books)</p> <p>TECHNICAL KNOWLEDGE - Understand and use electrical systems in their products [for example, series circuits incorporating switches, bulbs, buzzers and motors]. (Doodlers)</p> <p>TECHNICAL KNOWLEDGE - Apply their understanding of computing to program, monitor and control their products.(What could be healthier?)</p> <p>ADDITIONAL KNOWLEDGE - Understand and apply principles of a healthy and varied diet. Prepare and cook 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.</p>

**Intended Skills**

<b>DESIGN</b>	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	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.		Designing a stable structure that is able to support weight. Creating a frame structure with a focus on triangulation.	Researching (books, internet) for a particular (user’s) animal’s needs. Developing design criteria based on research. Generating multiple housing ideas using building bricks. Understanding what a virtual model is and the	Identifying factors that could be changed on existing products and explaining how these would alter the form and function of the product. Developing design
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	<p>relevant changes to ingredients.</p> <ul style="list-style-type: none"> <li>• Designing appealing packaging to reflect a recipe</li> </ul>				<p>pros and cons of traditional and CAD modelling.</p> <p>Placing and manoeuvring 3D objects, using CAD.</p> <p>Changing the properties of, or combining one or more 3D objects, using CAD.</p>	<p>criteria based on findings from investigating existing products.</p> <p>Developing design criteria that clarifies the target user.</p>
<b>MAKE</b>	<p>Cutting and preparing vegetables safely.</p> <p>Using equipment safely, including knives, hot pans and hobs.</p> <p>Knowing how to avoid cross-contamination.</p> <p>Following a step by step method carefully to make a recipe.</p>	<p>Following a design brief to make a pop up book, neatly and with focus on accuracy.</p> <p>Making mechanisms and/or structures using sliders, pivots and folds to produce movement.</p> <p>Using layers and spacers to hide the workings of mechanical parts for an aesthetically pleasing result.</p>		<p>Making a range of different shaped beam bridges.</p> <p>Using triangles to create truss bridges that span a given distance and support a load.</p> <p>Building a wooden bridge structure.</p> <p>Independently measuring and marking wood accurately.</p> <p>Selecting appropriate tools and equipment for particular tasks.</p> <p>Using the correct techniques to saws safely.</p> <p>Identifying where a structure needs reinforcement and using card corners for support.</p> <p>Explaining why selecting appropriating materials is an</p>	<p>Understanding the functional and aesthetic properties of plastics.</p> <p>Programming to monitor the ambient temperature and coding an (audible or visual) alert when the temperature rises above or falls below a specified range.</p>	<p>Altering a product's form and function by tinkering with its configuration.</p> <p>Making a functional series circuit, incorporating a motor.</p> <p>Constructing a product with consideration for the design criteria.</p>

				important part of the design process. Understanding basic wood functional properties.		
<b>EVALUATE</b>	Identifying the nutritional differences between different products and recipes. identifying and describing healthy benefits of food groups.			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	Stating an event or fact from the last 100 years of plastic history. Explaining how plastic is affecting planet Earth and suggesting ways to make more sustainable choices. Explaining key functions in my program (audible alert, visuals). Explaining how my product would be useful for an animal carer including programmed features.	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.

**Intended Knowledge**

<b>TECHNICAL</b>		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 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 know that a 'device' means equipment created for a certain purpose or job and that monitoring devices observe and record. To know that a sensor is a tool or device that is designed to monitor, detect and respond to changes for a purpose. To understand that conditional statements (and, or, if booleans) in programming are a set of	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
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				To understand the material (functional and aesthetic) properties of wood.	rules which are followed if certain conditions are met.	the motor's axle to spin. To know a motorised product is one which uses a motor to function.
<b>ADDITIONAL</b>	<p>To understand where meat comes from - learning that beef is from cattle and how beef is reared and processed, including key welfare issues.</p> <p>To know that I can adapt a recipe to make it healthier by substituting ingredients.</p> <p>To know that I can use a nutritional calculator to see how healthy a food option is.</p> <p>To understand that 'crosscontamination' 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.</p>	<p>To know that a design brief is a description of what I am going to design and make.</p> <p>To know that designers often want to hide mechanisms to make a product more aesthetically pleasing.</p>		<p>To understand the difference between arch, beam, truss and suspension bridges.</p> <p>To understand how to carry and use a saw safely.</p>	<p>To understand key developments in thermometer history.</p> <p>To know events or facts that took place over the last 100 years in the history of plastic, and how this is changing our outlook on the future.</p> <p>To know the 6Rs of sustainability.</p> <p>To understand what a virtual model is and the pros and cons of traditional vs CAD modelling</p>	<p>To know that product analysis is critiquing the strengths and weaknesses of a product.</p> <p>To know that 'configuration' means how the parts of a product are arranged.</p>

Knowledge catcher assessment for at the start and at the end of the unit. Please complete the unit quiz as well to inform your assessment.

### Year 5 - What could be healthier?



**1** Complete the sentence.

A healthy meal should \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

**2** Can you give an example of a healthy meal? Why is it healthy?

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

## Food - What could be healthier?

Beef	Meat that comes from a cow.
Cross-contamination	Cross-contamination is how bacteria can spread. It happens when liquid from raw meats or germs from unclean objects touch cooked or ready-to-eat foods.
Farm	Land or water used to produce crops or raise animals for food.
Method	Following a process or list of instructions.
Packaging	The packet which holds a product safe, ready to be sold and has information on about the product.
Research	The collecting of information about a subject.
Welfare	The health and happiness of a person or animal.

### Key facts

A balanced diet consists of measured amounts of different foods to keep us healthy. Use the [NHS Eatwell Guide](#) to see how much you should eat from each food group.

The different food groups are **dairy**, **fruits** and **vegetables**, **protein**, **carbohydrates**, **fats** and **sugars**.

Eating the right mix of nutrients will help your body grow and develop, many foods have labels which tell you the amount of each nutrient it has.

It is important to know how to avoid cross-contamination to keep safe when preparing and cooking different foods.

In farming, it is important that the animals are cared for properly during their lifetime. There are ethical rules which ensure that the animals receive a good level of welfare.

## The Farm to Fork Process



Always ask an adult's permission before cooking in the kitchen. Remember to wear an apron and wash your hands.

Knowledge catcher assessment for at the start and at the end of the unit. Please complete the unit quiz as well to inform your assessment.

## Year 5 - Pop-up book

Use the image to help you answer the questions.



1 Why place spacers on either side of a slider?

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2 How can you hide a slider or pivot mechanism in a pop-up book?

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## Mechanical Systems - Pop-up book

Aesthetic	How an object or product looks.
CAD	Computer-aided-design. To use the computer to design a product, diagram or drawing.
Caption	A short piece of writing under a picture that describes or explains the picture.
Design	To make, draw or write plans for something.
Design brief	A description of what you are going to design and make and how it will work.
Design criteria	To help designers focus their ideas and test the success of them.
Exploded-diagram	A diagram which shows all of the parts of a product, including the internal and external parts.
Function	How an object or product operates or works.
Input	Input is the motion used to start a mechanism.
Linkage	A set of bars linked together to form a mechanism.
Mechanism	A system of parts working together.
Motion	The movement an object makes when controlled by an input or output (e.g. left, right, up, down).
Output	Output is the motion that happens as a result of starting the input.
Pivots	A shaft or pin on which something turns.
Prototype	A simple model that lets you test out your idea, showing how it will look and work.
Sliders	A part of a mechanism which allows an object to move from side-to-side (e.g. left-to-right).
Structure	Something which stands, usually on its own.
Template	A stencil made of metal, plastic, or paper, used for making many copies of a shape or to help cut material accurately (e.g. biscuit cutter).

## Key fact

**Input** is the **motion** used to start a **mechanism**. **Output** is the **motion** that happens as a result of the **input**.



Think of a see-saw, when you sit on your side of the see-saw (**input**) your friend goes up on the other side. (**output**)

## Did you know?



Did you know that the first children's pop-up books were invented in the 1700s? That's over 300 years ago! Lothar Meggendorfer was a well-known pop-up author in the 1800s.

Knowledge catcher assessment for at the start and at the end of the unit. Please complete the unit quiz as well to inform your assessment.

## Year 5 - Bridges

Use the image to help you answer the questions.



1 Describe the difference between a **beam** and an **arch** bridge.

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2 What features of a bridge could we change to increase its strength and stability?

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## Structures - Bridges

Accurate	Neat, correct shape, size and pattern with no mistakes.
Arch bridge	A bridge which is built with a curved arch.
Beam bridge	A bridge which is built with horizontal beams and vertical pillars.
Bench hook	A tool which hooks onto the edge of the workbench. It's used to hold woodwork still when sawing.
Compression	A squashing force caused when parts of a structure are pushed together.
Coping saw	A saw with a narrow D-shaped metal blade, used for cutting curves in wood.
File	A tool used to smooth down rough edges on wood or metal materials.
Mark out	To measure and mark where a piece of material needs to be cut or shaped.
Reinforce	To make a structure or material stronger, especially by adding another material or element to it.
Sand paper	Strong paper with sand on one side to smooth or polish woodwork.
Set square or Try square	A right-angle triangular plate, wood or metal tool used for drawing lines at 90°, 45°, 60°, or 30°.
Shape	The form of an object.
Structure	Something which stands, usually on its own.
Suspension bridge	A bridge which is supported by vertical cables and suspended by cables which run between pillars that are connected onto either end of the bridge.
Tenon saw	A saw with a flat blade, used for cutting wood in straight lines or angles.
Tension	A stretching force caused by two parts of a structure being pulled apart.
Truss bridge	A bridge which is built from a series of triangular beams.

## Key facts

Kapow  
Primary

**Forces** can change the **shape** of objects, they can also make objects begin to move, speed up or slow down.



Pulls and pushes are both forces.



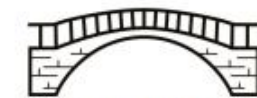
Truss bridge



Suspension bridge



Beam bridge



Arch bridge

Gravity is a force which pulls everything towards the centre of the Earth. The weight of something is the force that the Earth's gravity is having on it.



Knowledge catcher assessment for at the start and at the end of the unit. Please complete the unit quiz as well to inform your assessment.

## Year 5 - Monitoring devices

Use the image to help you answer the questions.



1 What is a monitoring device? Include an example and explain how it works

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2 How have thermometers evolved since 1709?

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## Year 5 - Digital world: Monitoring devices

Boolean	A form of data, which consists of (true) 1s and (false) 0s values.
Device	Equipment created for a certain purpose or job.
Durable	Lasts a long time with prolonged use without deteriorating very easily.
Monitoring device	An electronic device that observes and records something over time using data retrieved from one or more sensors.
Sensor	A tool or device that is designed to monitor, detect and respond to changes.
Synthetic	Something artificial. Made with substances that do not occur naturally.
Variable	This could be a number or text, that can change each time the program is run and often in combination with selection to change the end result of the program.
Versatile	Can be used in a number of ways, or has a variety of functions.
Water-resistant	Repels water from entering or absorbing something.
Workplane (CAD)	A virtual mat to place and manipulate objects in CAD, to build 3D models.

### Monitoring devices:



Security alarm systems use motion detectors to sense movement in an unwarranted place.



Fire alarms can detect smoke and some can also detect abnormally high temperatures.

## Key facts



### Daniel Gabriel Fahrenheit

Daniel Gabriel Fahrenheit developed the world's first truly accurate thermometer in 1709, using a numerical scale he proudly called the 'Fahrenheit' scale (°F).

### Anders Celcius

Later in 1742, inventor Anders Celsius developed the 'Celsius' or 'Centigrade' scale (°C) that we know and use in the UK today. It is based on the 0°C freezing point to 100°C boiling point of water.



Today we have a range of safe non-toxic, smart and digital thermometers:



Built in oven thermometer



Infrared thermometer

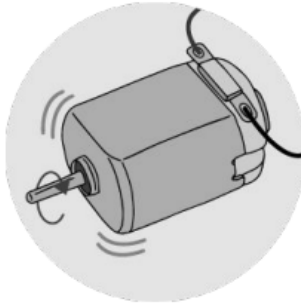


Probe thermometer

Knowledge catcher assessment for at the start and at the end of the unit. Please complete the unit quiz as well to inform your assessment.

## Year 5 - Doodlers

What do you know about the circuit component below?  
Add labels and annotations.



1 What is the name of the the circuit component above?

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2 What is the purpose of this circuit component?

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3 Give an example of a product that uses this component and explain how you know:

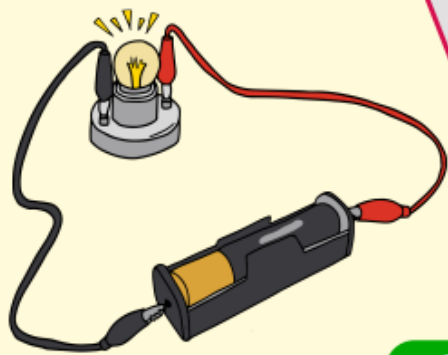
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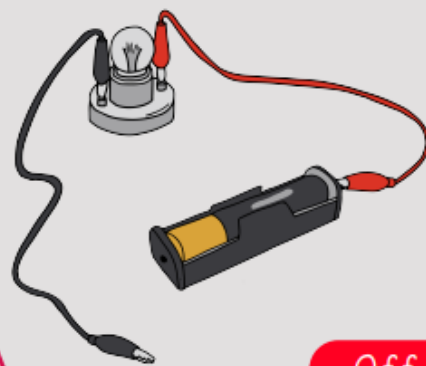
## Year 5 - Doodlers

Circuit	A collection of components that make an electrical system.
Circuit component	One of several parts that complete a circuit (e.g. bulb).
Configuration	How different parts are put together to form an object.
Current	The flow of electricity.
Develop	Continue to work on something to make progress or improve it.
DIY	The acronym means 'Do it yourself' and represents various activities that someone chooses to do themselves at home, rather than through a service or professional.
Investigate	Research something by looking at it in greater detail.
Problem-solve	Develop and test solutions to an issue.
Product analysis	To look at an object and evaluate it based on certain criteria (e.g. function).
Stable	Object does not easily topple over.
Target user	A particular person at whom the product is aimed.

Series circuits only have one path for the electrical current to flow.



On



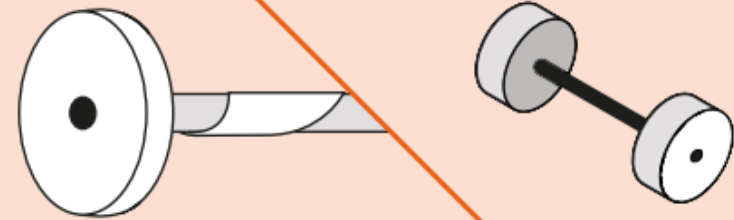
Off

If there is a break in a series circuit, the electrical current will be cut and all the components will stop working. Causing a break in a series circuit can act as a switch to turn the circuit off.

## Key facts

Kapow  
Primary

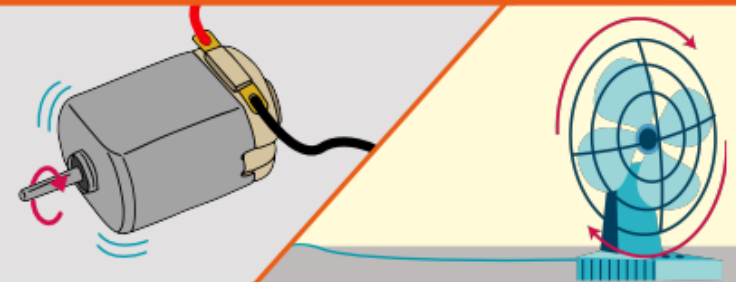
Axles form part of the wheel mechanism in wheeled products such as toy cars, wheelbarrows and bicycles.



For a bicycle to function we need to use our legs and feet to push the pedals that rotate the axle and spin the wheels.



An electric motor converts electrical energy into rotational movement, causing the motor's axle to spin. Motors use electricity instead of human force to move the axle.



A motorised product is an object that uses a motor to function.

Unit	Lesson name	Lesson No.	Working towards/Learning intention (WT)	Secure understanding (SU)	Greater depth (GD)
<b>Food: What Could be Healthier?</b>	From Farm to Fork	1	Understanding where food comes from,	Understanding how beef gets from the	Considering, in depth, the ethical
	What does Healthy	2	Understanding what constitutes a	Contributing ideas as to what a 'healthy	Explaining that we can interpret the
	Adapting and	3	Knowing that the nutritional value of a	Recognising nutritional differences	Explaining why two similar recipes have
	Mamma Mia! What	4	Following a recipe to make a	Following a recipe to produce a healthy	Chopping an onion as shown, helping
<b>Mechanical systems: Making a Pop-up Book</b>	Pop-up Book Page	1	Designing a pop up book which	Producing a suitable plan for each	Producing a suitable plan for each
	Making my Pop-up Book	2	Following a design brief to make a pop up book, making mechanisms and/or structures by using sliders, pivots and folds to produce movement	Producing the structure of the book and beginning to draw and assemble the components necessary for the first structures/mechanisms	Using more demanding mechanisms/structures. Producing a product of exceptionally high quality – neatly and accurately cut and assembled
	Using Layers and	3	Using layers and spacers to cover the	Assembling the components for all the	Assembling the components for all the
	Writing and	4	Completing the surface decoration of	Using a range of mechanisms and	Including a wider range of more
<b>Structures: Bridges</b>	Arch and Beam	1	Identifying arch and beam bridges and	Articulating the definition of 'tension	Articulating the definition of 'tension
	Spaghetti Truss	2	Building a spaghetti truss bridge	Identifying suspension and truss	Articulating the difference between
	Building Bridges	3	Building a wooden bridge structure,	Independently measuring and marking	Independently creating accurate, neat
	Finalising Bridges	4	Improving and reinforcing a bridge	Evaluating the success of the bridge,	Independently building the bridge
<b>Textiles</b>	Designing a Stuffed	1	Designing a stuffed toy, making a	Designing a stuffed toy considering the	Creating a detailed and complex design
	Blanket Stitch	2	Using a blanket stitch to join two pieces	Joining two pieces of fabric using	Confidently joining two pieces of fabric
	Details and	3	Creating and adding decorations to	Using appliqué or decorative stitching	Using neat, small stitches to attach
	Assembly	4	Using a blanket stitch to assemble the	Using blanket stitch to assemble the	Creating a stuffed toy with different
<b>Electrical Systems: Doodlers</b>	Electrical systems	1	Understanding that circuits are made	Identifying simple circuit components	Identifying simple circuit components
	Meet the Doodlers	2	Working with support from their	Carrying out their duty by removing and	Carrying out their duty by disassembling
	Doodler design and	3	Being able to discuss the design	Developing design criteria that clarifies	Developing design criteria that clarifies
	Doodler DIY kits	4	Listing the equipment needed to build	Identifying and listing each of the	Identifying and listing each of the
<b>Digital world: Monitoring devices</b>	Monitoring devices	1	Naming some common monitoring	Describing what is meant by monitoring	Describing what is meant by monitoring
	Programming an	2	Writing a program that monitors the	Writing a program that monitors the	Writing a program that monitors the
	Plastic	3	Understanding that plastic is affecting	Stating one or two facts about the	Explaining how the history of plastic
	CAD skills	4	Understanding the difference between	Explaining key pros and cons of virtual	Explaining and justifying the need for a
					Percentage of lessons child is working
					Percentage of lessons child is working



**St. John The Evangelist RCP School**  
**Year 6 Design & Technology Progression (Intent)**

	AUTUMN		SPRING		SUMMER	
<b>Topic</b>		Structures “Playgrounds” (omit lesson 4) <b>3 lessons</b>	Digital world “Navigating the world” <b>5 lessons</b>	Food “Come dine with me” <b>4 lessons</b>	Electrical systems “Steady hand game” (omit lesson 1) <b>3 lessons</b>	Mechanical systems “Automata toys” <b>4 lessons</b>
<b>Prior Knowledge and skills</b>	See Year 5 for prior knowledge and skills					
<b>Intended Vocabulary</b>  ( <b>Bold included on the knowledge organiser</b> )		Adapt, <b>Apparatus</b> , <b>Bench hook</b> , Cladding <b>Coping saw</b> , Design, Dowel, Evaluation Feedback, Idea <b>Jelutong</b> , Landscape, <b>Mark out</b> , Measure, <b>Modify</b> , <b>Natural materials</b> , <b>Plan view</b> , <b>Playground</b> , <b>Prototype</b> <b>Reinforce</b> , Sketch, Strong, <b>Structure</b> , <b>Tenon saw</b> , Texture <b>User</b> , <b>Vice</b> , Weak	3D CAD, Application (apps), <b>Biodegradable</b> <b>Boolean</b> , Cardinal compass, Client, Compass, Concept, Convince, Corrode, Duplicate, <b>Environmentally friendly</b> , Equipment, Feature, <b>Finite</b> , Function, Functional GPS tracker, <b>If statement</b> , Infinite, Investment, Lightweight, Loop, Manufacture, Materials, <b>Mouldable</b> Navigation, Non-recyclable, <b>Product lifecycle</b> , <b>Product lifespan</b> , Program, Recyclable, <b>Smart</b> , <b>Sustainable</b> , Sustainable design, Unsustainable, Design, Variable, workplane	<b>Accompaniment</b> Collaboration <b>Cookbook</b> <b>Cross-contamination</b> <b>Equipment</b> , <b>Farm Flavour</b> , Illustration <b>Imperative-verb</b> <b>Ingredients</b> , <b>Method</b> <b>Nationality</b> <b>Preparation</b> <b>Processed</b> , <b>Reared</b> <b>Recipe</b> , <b>Research</b> Storyboard, <b>Target audience</b> , Top tips Unit of measurement	Assemble, <b>Battery</b> Battery pack, Benefit <b>Bulb</b> , Bulb holder <b>Buzzer</b> , <b>Circuit</b> Circuit symbol Component, <b>Conductor</b> , <b>Copper</b> Design, Design criteria, Evaluation Fine motor skills Fit for purpose Form , <b>Function</b> Gross motor skills <b>Insulator</b> , <b>LED</b> , User	<b>Accurate</b> , <b>Assembly-diagram</b> , <b>Automata</b> <b>Axle</b> , <b>Bench hook</b> <b>Cam</b> , <b>Clamp</b> <b>Component</b> , <b>Cutting list</b> , Diagram, <b>Dowel</b> Drill bits, <b>Exploded-diagram</b> , <b>Finish</b> <b>Follower</b> , <b>Frame</b> <b>Function</b> , <b>Hand drill</b> <b>Jelutong</b> , <b>Linkage</b> <b>Mark out</b> , Measure Mechanism, Model Research, Right-angle , <b>Set square</b> <b>Tenon saw</b>
<b>Aims</b>	We aim to inspire pupils to be innovative and creative thinkers who have an appreciation for the product design cycle through ideation, creation, and evaluation. We want pupils to develop the confidence to take risks, through drafting design concepts, modelling, and testing and to be					

	reflective learners who evaluate their work and the work of others. Through using the Kapow scheme of work, we aim to build an awareness of the impact of design and technology on our lives and encourage pupils to become resourceful, enterprising citizens who will have the skills to contribute to future design advancements.					
<b>Statutory Requirements (NC)</b> <b>KS2 – Year</b> <b><i>Pupils should be taught to ...</i></b>	<p>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 (all units)</p> <p>DESIGN - Generate, develop, model and communicate their ideas through discussion, annotated sketches, cross-sectional and exploded diagrams, prototypes, pattern pieces and computer- aided design. (all units)</p> <p>MAKE - Select from and use a wider range of tools and equipment to perform practical tasks [for example, cutting, shaping, joining and finishing], accurately. (all units)</p> <p>MAKE -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. (all units except Automata toys and Digital world)</p> <p>EVALUATE - Investigate and analyse a range of existing products. (all units except Come dine with me and Navigating the world)</p> <p>EVALUATE - Evaluate their ideas and products against their own design criteria and consider the views of others to improve their work. (all units)</p> <p>EVALUATE - Understand how key events and individuals in design and technology have helped shape the world. (Automata toys and Steady hand games)</p> <p>TECHNICAL KNOWLEDGE - Apply their understanding of how to strengthen, stiffen and reinforce more complex structures. (Playgrounds)</p> <p>TECHNICAL KNOWLEDGE - Understand and use mechanical systems in their products [for example, gears, pulleys, cams, levers and linkages] (Automata toys)</p> <p>TECHNICAL KNOWLEDGE - Understand and use electrical systems in their products [for example, series circuits incorporating switches, bulbs, buzzers and motors] (Steady handgames)</p> <p>TECHNICAL KNOWLEDGE - Apply their understanding of computing to program, monitor and control their products.(Navigating the world)</p> <p>ADDITIONAL KNOWLEDGE - Understand and apply principles of a healthy and varied diet. Prepare and cook 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. (Come and dine with me)</p>					
<b>Intended Skills</b>						
<b>DESIGN</b>		Designing a playground featuring a variety of different structures, giving careful consideration to how the structures will be used, considering effective and ineffective designs.	Writing a design brief from information submitted by a client. Developing design criteria to fulfil the client’s request. Considering and suggesting additional functions for my navigation tool. Developing a product idea through annotated sketches.	Writing a recipe, explaining the key steps, method and ingredients. Including facts and drawings from research undertaken.	Designing a steady hand game - identifying and naming the components required. Drawing a design from three different perspectives. Generating ideas through sketching and discussion. Modelling ideas	Experimenting with a range of cams, creating a design for an automata toy based on a choice of cam to create a desired movement. Understanding how linkages change the direction of a force. Making things move at the same time. Understanding and

			Placing and manoeuvring 3D objects, using CAD. Changing the properties of, or combining one or more 3D objects, using CAD.		through prototypes.	drawing cross-sectional diagrams to show the inner-workings of my design.
<b>MAKE</b>		Building a range of play apparatus structures drawing upon new and prior knowledge of structures. Measuring, marking and cutting wood to create a range of structures. Using a range of materials to reinforce and add decoration to structures.	Considering materials and their functional properties, especially those that are sustainable and recyclable (for example, cork and bamboo). Explaining material choices and why they were chosen as part of a product concept. Programming an N,E, S, W cardinal compass.	Following a recipe, including using the correct quantities of each ingredient. Adapting a recipe based on research. Working to a given timescale. Working safely and hygienically with independence.	Constructing a stable base for a game. Accurately cutting, folding and assembling a net. Decorating the base of the game to a high quality finish. Making and testing a circuit. Incorporating a circuit into a base.	Measuring, marking and checking the accuracy of the jelutong and dowel pieces required. Measuring, marking and cutting components accurately using a ruler and scissors. Assembling components accurately to make a stable frame. Understanding that for the frame to function effectively the components must be cut accurately and the joints of the frame secured at right angles. Selecting appropriate materials based on the materials being joined and the speed at which the glue needs to dry/set.

<p><b>EVALUATE</b></p>		<p>Improving a design plan based on peer evaluation.          Testing and adapting a design to improve it as it is developed.          Identifying what makes a successful structure.</p>	<p>Explaining how my program fits the design criteria and how it would be useful as part of a navigation tool.          Developing an awareness of sustainable design.          Identifying key industries that utilise 3D CAD modelling and explaining why.          Describing how the product concept fits the client's request and how it will benefit the customers.          Explaining the key functions in my program, including any additions.          Explaining how my program fits the design criteria and how it would be useful as part of a navigation tool.          Explaining the key functions and features of my navigation tool to the client as part of a product concept pitch.          Demonstrating a functional program as part of a product concept pitch.</p>	<p>Evaluating a recipe, considering: taste, smell, texture and origin of the food group.          Taste testing and scoring final products.          Suggesting and writing up points of improvements when scoring others' dishes, and when evaluating their own throughout the planning, preparation and cooking process.          Evaluating health and safety in production to minimise cross contamination.</p>	<p>Testing own and others finished games, identifying what went well and making suggestions for improvement.</p>	<p>Evaluating the work of others and receiving feedback on own work.          Applying points of improvement to their toys.          Describing changes they would make/do if they were to do the project again.</p>
<p><b>Intended Knowledge</b></p>						

<b>TECHNICAL</b>		To know that structures can be strengthened by manipulating materials and shapes.	To know that accelerometers can detect movement. To understand that sensors can be useful in products as they mean the product can function without human input.		To know that batteries contain acid, which can be dangerous if they leak. To know the names of the components in a basic series circuit, including a buzzer.	To understand that the mechanism in an automata uses a system of cams, axles and followers. To understand that different shaped cams produce different outputs.
<b>ADDITIONAL</b>		To understand what a 'footprint plan' is. To understand that in the real world, design , can impact users in positive and negative ways. To know that a prototype is a cheap model to test a design idea.	To know that designers write design briefs and develop design criteria to enable them to fulfil a client's request. To know that 'multifunctional' means an object or product has more than one function. To know that magnetometers are devices that measure the Earth's magnetic field to determine which direction you are facing.	To know that 'flavour' is how a food or drink tastes. To know that many countries have 'national dishes' which are recipes associated with that country. To know that 'processed food' means food that has been put through multiple changes in a factory. To understand that it is important to wash fruit and vegetables before eating to remove any dirt and insecticides. To understand what happens to a certain food before it appears on the supermarket shelf (Farm to Fork).	To understand the diagram perspectives 'top view', 'side view' and 'back'.	To know that an automata is a hand powered mechanical toy. To know that a cross-sectional diagram shows the inner workings of a product. To understand how to use a bench hook and saw safely. To know that a set square can be used to help mark 90° angles.

Knowledge catcher assessment for at the start and at the end of the unit. Please complete the unit quiz as well to inform your assessment.

## Year 6 - Playgrounds

Use the image to help you answer the questions.



1 Why is it important to consider the landscape design for outdoor spaces?

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2 How could the landscape design be improved on the playground above?

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## Structure - Playgrounds

Apparatus	Equipment designed for recreation and play, such as seesaws and swings.
Bench hook	A tool which hooks onto the edge of the workbench. It's used to hold woodwork still when sawing.
Coping saw	A saw with a narrow D-shaped metal blade, used for cutting curves in woods.
Dowel	Wood in the shape of a cylinder. Dowels come in all different sizes and thicknesses.
Jelutong	A type of softwood, it is lightweight, easy to cut and shape.
Mark out	To measure and mark where a piece of material needs to be cut or shaped.
Modify	To change something to improve or fix it.
Natural materials	Materials which come from nature. (e.g. wood comes from trees)
Plan view	A two-dimensional diagram used to describe a place or object from above with annotations and other details such as measurements.
Playground	An outdoor area for children to play in. They usually have different apparatus to play on such as climbing frames and slides.
Prototype	A simple model that lets you test out your idea and how it will look and work.
Reinforce	To make a structure or material stronger, especially by adding another material or element to it.
Structure	Something which stands, usually on its own.
Tenon saw	A saw with a flat blade, used for cutting wood in straight lines or angles.
User	A person that uses something.
Vice	A piece of equipment used to hold an object still while you work on it.

### Did you know?

The first children's playground was built in 1859 in a park in Manchester, Great Britain.



### Key facts

Kapow  
Primary



There are many types of **apparatus** in a **playground**, such as slides, swings, monkey bars, tunnels, see-saws and treehouses. Which do you like?



Remember to fix or hold your wood securely on the **bench hook** or **vice** when sawing, and keep your fingers out of the way of the blade.

Knowledge catcher assessment for at the start and at the end of the unit. Please complete the unit quiz as well to inform your assessment.

## Year 6 - Navigating the world

Use the image to help you answer the questions.



1

How could a new smart product improve the weight of a person's load for their adventure?

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2

Can you think of any existing smart products and explain their function(s)?

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## Year 6 - Digital world: Navigating the world

Biodegradable	Materials that break down and form part of the soil as part of the natural decomposition process.
Boolean	A form of data, which consists of (true) 1s and (false) 0s values.
Environmentally friendly	Does not cause harm to nature (animals, plants etc).
Finite	Limited in number, will eventually run out.
If statement	To instruct a program to respond based on two or more conditions (e.g. if it is below 10 degrees celcius turn on the heating; else switch the heating off).
Mouldable	Can be made into any shape.
Product lifecycle	How long an object is expected to last before becoming unusable.
Product lifespan	How long an object will last, before being recycled.
Smart	A device with processing capabilities.
Sustainable	Can be maintained.

Sometimes we need multiple products to help us achieve something. This can be a lot to carry especially if you are trekking.



GPS tracker



Compass



Torch or headlamp



A map



Pedometer

## Key facts



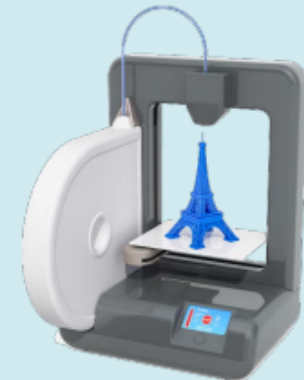
One electronic product with multiple functions could help lighten the load.

### 3D printing

A 3D printer can receive and output a 3D model file as a physical item.

It is very expensive to set up and fill with materials.

The models are restricted by the colour of the material the printer uses, but can be hand-painted after printing to add detail.



### Sustainable materials



#### Cork

Developed from living trees, without causing them harm. Cork comes from bark that regenerates.



#### Bamboo

Grows rapidly - some species will reach 3 ft in a single day.

Knowledge catcher assessment for at the start and at the end of the unit. Please complete the unit quiz as well to inform your assessment.

## Year 6 - Come dine with me



1

Write a to-do list to help someone plan a healthy three-course menu.  
For example: Think about the quantities of each ingredient you will need.

- ★ \_\_\_\_\_
- ★ \_\_\_\_\_
- ★ \_\_\_\_\_
- ★ \_\_\_\_\_
- ★ \_\_\_\_\_
- ★ \_\_\_\_\_
- ★ \_\_\_\_\_

## Food - Come dine with me

Accompaniment	Something which goes well together with other foods and drinks.
Cookbook	A book which contains recipes to make various dishes or foods.
Cross-contamination	Cross-contamination is how bacteria can spread. It happens when liquid from raw meats or germs from unclean objects touch cooked or ready-to-eat foods.
Equipment	Items and objects which are needed to complete a task.
Farm	Land or water used to produce crops or raise animals for food.
Flavour	How food or drink tastes. (e.g. sour, sweet, bitter, salty)
Imperative verb	Also known as 'bossy verbs' because they tell you what to do. You put them at the beginning of a command or action. (e.g. bake, grill, add, heat).
Ingredients	Items that make up a mixture e.g. foods that make a recipe.
Method	A way of carrying out a certain process, following a list of instructions.
Nationality	Belonging to a certain group of people in a particular country.
Preparation	The process of getting ready to make something.
Processed	When foods are passed through multiple processes in a factory to change or preserve it so it keeps for longer.
Reared	To breed and raise livestock. e.g. cows.
Recipe	A set of instructions for making or preparing a food item or dish.
Target audience	A particular group or person who a product is aimed at.
Unit of measurement	The unit which you use to measure a quantity. (e.g. litres)

### Did you know?

Hawaii produces about 1/3 of all pineapples in the world.



You cannot mix raw meat with other ingredients, it is not safe. Remember to also wash your hands after handling raw meat.

### Key facts

The five different food groups are:

1. Carbohydrates
2. Fruits and vegetables
3. Protein
4. Dairy
5. Foods high in fat and sugar



Many countries have traditional dishes. For example: India is known for hot curries, whilst England is known for the fish'n'chips which were historically served in newspaper.

Knowledge catcher assessment for at the start and at the end of the unit. Please complete the unit quiz as well to inform your assessment.

## Year 6 - Steady hand game

Use the image to help you answer the questions.



1 Why is Philippe Starck's juicy salif considered **form over function**?

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2 What is meant by **form follows function**?

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## Electrical Systems - Steady hand game

Backboard	A background designed for the steady hand game.
Battery	A cell or connected group of cells which store electrical energy.
Bulb	A component which gives light when electricity passes through it.
Buzzer	A component which makes a loud noise as electricity passes through.
Circuit	A collection of components which make an electrical system.
Conductor	A material that allows electricity to flow through it. e.g. metal.
Copper	A metal material that is one of the best conductors of heat and electricity. It is often used to make wires and pipes.
Function	How an object or product operates or works.
Insulator	A material that does not allow electricity to flow through it. e.g. plastic.
LED	A light emitting diode which lights up as electricity passes through.
Magnetic field	The area around a magnet where there is magnetic force.
Net	A 2D flat shape, that can become a 3D shape once assembled.
Pliers	A metal tool used for holding, twisting or cutting wire.
Prototype	A simple model that lets you test out your idea, how it will look and work.
Series circuit	A closed circuit where the current only follows one path.
Side view drawing	An engineering diagram which shows the dimensions (width, depth, length) of the side (left or right) of a product.
Switch	A component which opens and closes to turn the circuit on or off.
Side view drawing	An engineering diagram which shows the dimensions (width, depth, length) of the side (left or right) of a product.
Test	To find out whether something works as it should.
Top view drawing	An engineering diagram which shows the dimensions (width, depth, length) of the top of a product.

### Check it out!

Check out continuous line drawings, such as Picasso's single-line animals for inspiration!

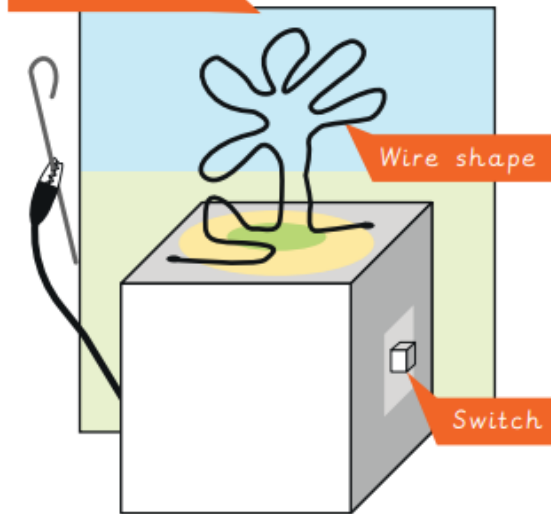


### Key facts

Kapow  
Primary

The more complex your wire shape, the harder your steady hand game will be, especially if the bends are close together.

Backboard



Circuit symbols:

wire

switch open

switch closed

battery

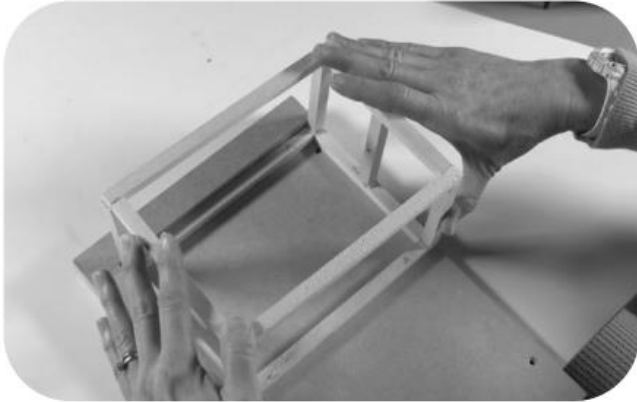
buzzer

bulb

Knowledge catcher assessment for at the start and at the end of the unit. Please complete the unit quiz as well to inform your assessment.

## Year 6 - Automata

Use the image to help you answer the questions.



1 When assembling a number of components, what can you do to ensure they are put together in the correct order?

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2 What is a **bench hook**? Why are they useful?

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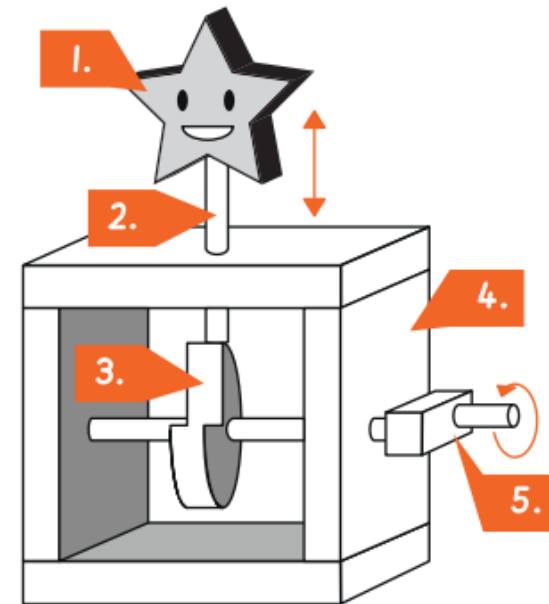
## Mechanical Systems - Automata toys

Assembly-diagram	An exploded view diagram of an object, that shows you how to construct an object or order of assembly of various parts.
Automata	Automata toys are sometimes known as mechanical toys or kinetic art. They use hand-powered mechanisms to create movement in a scene of characters.
Axle	In an Automata the axle rotates, turning the cam with it. It is attached to the handle.
Bench hook	A tool which hooks onto the edge of the workbench. It's used to hold woodwork still when sawing.
Clamp	A tool for holding objects together, such as when you are waiting for glue to dry on something that you have glued together.
Cam	A cam is a rotating or sliding piece in a mechanism. It changes rotary motion to linear motion.
Component	One of several parts of which something is made.
Cutting list	An outline drawn true to size on paper, which shows the size and how many of each piece which you need to make for the project.
Dowel	Wood in the shape of a cylinder. Dowels come in all different sizes and thicknesses.
Drill bits	The cutting tools that go in drill to make different sized holes.
Exploded-diagram	A diagram which shows all of the internal and external parts of a product.
Finish	To complete your product with a high quality appearance.
Follower	The post which traces the shape of the cam, rising and falling in a linear or reciprocating motion.
Frame	The rectangular structure which holds the Automata together.
Function	How an object or product operates or works.
Hand drill	A small portable drilling machine for making holes which is operated by hand.
Jelutong	A type of softwood, it is lightweight, easy to cut and shape.
Linkage	A set of bars linked together to form a mechanism.
Mark out	To measure and mark where a piece of material needs to be cut or shaped.
Set square or Engineer's square	A right-angle triangular plate, wood or metal tool used for drawing lines at 90°, 45°, 60°, or 30°.
Tenon saw	A saw with a flat blade, used for cutting wood in straight lines or angles.







## Key facts

Automata toy **components**:

1. Character
2. Follower
3. Cam
4. Frame
5. Axle attached to handle



## Cam shapes

Round	Snail	Ellipse
No movement	Drop and climb	Steady up and down
		
		

Changing the shape of the **cam** in your **Automata**, will create different movements.

Unit	Lesson name	Lesson No.	Working towards/Learning intention (WT)	Secure understanding (SU)	Greater depth (GD)
<b>Food: Come Dine With Me</b>	Three Ingredients; To Start...	1	Designing a three course meal,	Finding a suitable recipe for a given	Finding a suitable recipe for a given
	The Main Course	2	Safely preparing a meal following a	Following a recipe, including using the	Following a recipe, including using the
	Dessert	3	Safely preparing a meal following a	Following a recipe, including using the	Following a recipe, including using the
		4	Safely preparing a meal following a	Following a recipe, including using the	Following a recipe, including using the
<b>Mechanical Systems: Automata Toy</b>	Making the Frame	1	Measuring, marking and checking the	Cutting the jelutong pieces with	Cutting all of the jelutong pieces with
	Assembling the	2	Cutting and assembling the	Cutting all of the pieces with accuracy,	Cutting all the pieces with greater
	Experimenting with	3	Undertaking research to inform the	Experimenting with a range of cams and	Experimenting with a range of cams and
	Finishing Touches	4	Making and assembling a window	Creating the appropriate component	Applying a more in depth knowledge of
<b>Structure</b>	Design a New	1	Designing a playground with at least	Communicating five apparatus designs,	Clearly communicating a wide range of
	Building Structures	2	Building play apparatus structures	Making roughly three different	Making roughly three accurate, well
	Perfecting	3	Testing and adapting a design to	Completing their structures, improving	Completing their structures to a high
	Playground	4	Attaching the structures to a base,	Securing the apparatus to a base and	Showing imaginative use of materials
<b>Textiles</b>	Waistcoat Design	1	Designing a waistcoat to a set of design	Considering a range of factors in their	Designing a waistcoat to reflect the
	Preparing Fabric	2	Marking and cutting fabric according to	Using a template to mark and cut out	Using a template to mark and cut out
	Assembling my	3	To assemble a waistcoat using running	Using a strong running stitch to join	Using a strong running stitch to join
	Decorating my	4	Securing a fastening to the waistcoat,	Attaching a secure fastening, and	Using secure, neat stitches to attach a
<b>Electrical Systems: Steady Hand Game</b>	Homopolar Motors	1	Understanding how electromagnetic	Knowing that batteries contain acid,	Knowing that batteries contain acid,
	Game Plan	2	To design a steady hand game, creating	Identifying components in a steady	Identifying components in a steady
	Base Building	3	Cutting and assembling a net and	Creating a secure base with neat edges,	Creating a secure base with neat edges,
	Electronics and	4	Incorporating a circuit into a game	Making and testing a functioning circuit,	Creating a complex wire shape for their
<b>Digital world: Navigating the world</b>	Navigating the	1	Completing a design brief, referring to	Highlighting key information that	Highlighting key information that
	Programming a	2	With support and a visual prompt,	Writing a program that displays an	Writing a program that displays an
	Product concept	3	Offering reasons why some materials	Considering material choices carefully	Considering material choices carefully
	CAD models	4	Understanding what CAD modelling is ar	Explaining key industries that use 3D	Explaining key industries that use 3D
	Product pitch	5	Using a product pitch guided plan and	Completing a product pitch plan that	Completing a detailed product pitch
					Percentage of lessons child is working
					Percentage of lessons child is working
					Percentage of lessons child is working