Design and Technology

End of Year Expectations

	Topic	National Curriculum Objectives	Key Knowledge	Enrichment
Year 6	**Buzzer: Electrical Game** Mechanism	**Design** ➢ use research and develop design criteria to inform the design of innovative, functional, appealing products that are fit for purpose, aimed at particular individuals or groups ➢ generate, develop, model and communicate their ideas through discussion, annotated sketches, cross-sectional and exploded diagrams, prototypes, pattern pieces and computer-aided design **Make** ➢ select from and use a wider range of tools and equipment to perform practical tasks [for example, cutting, shaping, joining and finishing], accurately ➢ select from and use a wider range of materials and components, including construction materials, textiles and ingredients, according to their functional properties and aesthetic qualities **Evaluate** ➢ investigate and analyse a range of existing products ➢ evaluate their ideas and products against their own design criteria and consider the views of others to improve their work ➢ understand how key events and individuals in design and technology have helped shape the world	➢ Children know that a **buzzer** is an **electrical output device.** ➢ Children know will know how to create a **working circuit with a buzzer** using their scientific knowledge. ➢ Children know that an **electrical system** is a set of related parts that together achieve a desired outcome. ➢ Children know the difference between **output and input devices.** ➢ Children know how to select the correct **tools, techniques and materials** for their product. ➢ Children know that their product must appeal to their **target user.** ➢ Children know that they can evaluate the success of their product against the **design criteria.**	CAD Workshop
	Computer Aided Design: Shopping Bag Textiles		➢ Children know that CAD stands for **computer aided design.** ➢ Children know that a **mock-up** is quick 3D model to check proportions and scale. ➢ Children that a **pattern or template** is a shape drawn to exact shape and size. ➢ Children know that a **seam allowance** is when we leave extra fabric allowed for joining, usually 15mm. ➢ Children know that **tacking** means using large running stitches to hold pieces of fabric together temporarily. ➢ Children know that a **working drawing** is a detailed drawing containing all information needed to make the product.	

		Technical Knowledge ➢ apply their understanding of how to strengthen, stiffen and reinforce more complex structures ➢ understand and use mechanical systems in their products [for example, gears, pulleys, cams, levers and linkages] ➢ understand and use electrical systems in their products [for example, series circuits incorporating switches, bulbs, buzzers and motors] ➢ apply their understanding of computing to program, monitor and control their products.	➢ Children know that they must consider the product's **features** and create a design criteria to meet the needs of the user for the product (e.g must have strong straps to carry shopping) ➢ Children know that **researching** a strong bag will make their product better. ➢ Children know that their product must appeal to their **target user.** ➢ Children know that they can evaluate the success of their product against the **design criteria.**	
	Cultural Foods – Bread and dips Cooking	➢ understand and apply the principles of a healthy and varied diet ➢ prepare and cook a variety of predominantly savoury dishes using a range of cooking techniques ➢ understand seasonality, and know where and how a variety of ingredients are grown, reared, caught and processed.	➢ Children will understand how to plan and cook a cultural dish. ➢ Children will understand culture of foods. ➢ Children know how bread is made and what is happening. ➢ Children will understand the principles of a healthy and varied diet. ➢ Children know how to use a variety of cooking skills, appropriate to the task in hand.	
Year 5	**Cams – moving toy** Mechanism	**Design** ➢ use research and develop design criteria to inform the design of innovative, functional, appealing products that are fit for purpose, aimed at particular individuals or groups ➢ generate, develop, model and communicate their ideas through discussion, annotated sketches, cross-sectional and exploded diagrams, prototypes, pattern pieces and computer-aided design **Make**	➢ Children know that a **cam** is a mechanism that changes one sort of movement to another. ➢ Children know that a **rotary motion** is movement that goes round. ➢ Children know how the cam mechanism works to create **movement.** ➢ Children know that their product must appeal to their **target user.** ➢ Children will know that the **follower** is the device that follows the movement of the cam- a lever or slider. ➢ Children know that they can evaluate the success of their product against the **design criteria.**	

		➢ select from and use a wider range of tools and equipment to perform practical tasks [for example, cutting, shaping, joining and finishing], accurately ➢ select from and use a wider range of materials and components, including construction materials, textiles and ingredients, according to their functional properties and aesthetic qualities **Evaluate** ➢ investigate and analyse a range of existing products ➢ evaluate their ideas and products against their own design criteria and consider the views of others to improve their work ➢ understand how key events and individuals in design and technology have helped shape the world **Technical knowledge** ➢ apply their understanding of how to strengthen, stiffen and reinforce more complex structures ➢ understand and use mechanical systems in their products [for example, gears, pulleys, cams, levers and linkages] ➢ understand and use electrical systems in their products [for example, series circuits incorporating switches, bulbs, buzzers and motors] ➢ apply their understanding of computing to program, monitor and control their products.		
	Pulleys – model machine Mechanism		➢ Children know that a mechanical system is a set or parts used to **create movement.** ➢ Children know that a pulley is a **mechanical system.** ➢ Children know that a **pulley** is a grooved wheel over which a drive belt can run. ➢ Children know that the **drive belt** is the part which connects and transfers movement between two pulleys. ➢ Children know that the **driver** is the pulley that provides the **input** movement. ➢ Children know that the **follower** is the pulley that provides the **output** movement. ➢ Children know that the **motor spindle is** the rod on the end of the motor onto which a gear or pulley is attached. ➢ Children know that their product must appeal to their **target user.** ➢ Children know that they can evaluate the success of their product against the **design criteria.**	
	Seasonal Tartlets Cooking	➢ Understand and apply the principles of a healthy and varied diet ➢ Prepare and cook a variety of predominantly savoury dishes using a range of cooking techniques	➢ Children will understand how to plan and cook a dish, thinking about combination flavours. ➢ Children will understand seasonality of foods. ➢ Children will understand the principles of a healthy and varied diet.	

		➢ Understand seasonality, and know where and how a variety of ingredients are grown, reared, caught and processed.	➢ Children know how to combine bridge and claw method. ➢ Children know how to peel. ➢ Children know how to grate finer ingredients ➢ Children know how to handle, roll and cut puff pastry. ➢ Children know how to glaze pastry.	
Year 4	**Gears – Moving Puzzle** Mechanism	**Design** ➢ use research and develop design criteria to inform the design of innovative, functional, appealing products that are fit for purpose, aimed at particular individuals or groups ➢ generate, develop, model and communicate their ideas through discussion, annotated sketches, cross-sectional and exploded diagrams, prototypes, pattern pieces and computer-aided design **Make** ➢ select from and use a wider range of tools and equipment to perform practical tasks [for example, cutting, shaping, joining and finishing], accurately ➢ select from and use a wider range of materials and components, including construction materials, textiles and ingredients, according to their functional properties and aesthetic qualities **Evaluate** ➢ investigate and analyse a range of existing products ➢ evaluate their ideas and products against their own design criteria and consider the views of others to improve their work	➢ Children know that a **gear** is a wheel with teeth around its circumference. ➢ Children know that a gear is part of a **mechanical system** with parts to create movement. ➢ Children know that the **driver gear** provides the input movement to the system (starting point). ➢ Children know that the **follower gear** provides the output movement to the system. ➢ Children know that the **mesh** is the point where two gears join together & transfer movement. ➢ Children know that the speed of movement is changed when we **gear up or down.** ➢ Children know that their product must appeal to their **target user.** ➢ Children know that they can evaluate the success of their product against the **design criteria.**	Bike workshop for gears Smoothie bike

		➢ understand how key events and individuals in design and technology have helped shape the world **Technical knowledge** ➢ apply their understanding of how to strengthen, stiffen and reinforce more complex structures ➢ understand and use mechanical systems in their products [for example, gears, pulleys, cams, levers and linkages] ➢ understand and use electrical systems in their products [for example, series circuits incorporating switches, bulbs, buzzers and motors] ➢ apply their understanding of computing to program, monitor and control their products.		
	Electrical Systems – Night Light Mechanism	**Design** ➢ generate, develop, model and communicate their ideas through discussion, annotated sketches, cross-sectional and exploded diagrams, prototypes, pattern pieces and computer-aided design **Make** ➢ select from and use a wider range of tools and equipment to perform practical tasks [for example, cutting, shaping, joining and finishing], accurately **Evaluate** ➢ investigate and analyse a range of existing products **Technical knowledge** ➢ apply their understanding of how to strengthen, stiffen and reinforce more complex structures	➢ Children know that a **circuit** is a path through which electricity passes. ➢ Children know that a **conductor** is a material which allows an electric current to pass through it. ➢ Children know that an **insulator** is a material which does not allow electric to pass through it. ➢ Children know will know how to create a **working circuit** using their scientific knowledge. ➢ Children know that an **electrical system** is a set of related parts that together achieve a desired outcome. ➢ Children know the difference between **output and input devices.** ➢ Children know that their product must appeal to their **target user.** ➢ Children know that they can evaluate the success of their product against the **design criteria.**	

		➢ understand and use mechanical systems in their products [for example, gears, pulleys, cams, levers and linkages] ➢ understand and use electrical systems in their products [for example, series circuits incorporating switches, bulbs, buzzers and motors]		
	Pizza, Sauce and Toppings Cooking	➢ understand and apply the principles of a healthy and varied diet ➢ prepare and cook a variety of predominantly savoury dishes using a range of cooking techniques ➢ understand seasonality, and know where and how a variety of ingredients are grown, reared, caught and processed.	➢ To know some Italian cuisines such as pizza and pasta ➢ To know that seasoning means to add salt or herbs to enhance the flavour of a dish ➢ To know how to make the basics of a pizza (dough base, tomato sauce and cheese. Toppings can be added)	
	Angel Decoration Textiles	➢ 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	➢ To know how to **thread** a smaller needle and thread using the eye of the needle ➢ To know how to **tack** 2 pieces of material together ➢ Children that a **pattern or template** is a shape drawn to exact shape and size. ➢ To know how to **stitch** around the edges of two pieces of fabric using a running stitch	
Year 3	**Pneumatics – Creature in a box** Mechanism	**Design** ➢ use research and develop design criteria to inform the design of innovative, functional, appealing products that are fit for purpose, aimed at particular individuals or groups ➢ generate, develop, model and communicate their ideas through discussion, annotated sketches, cross-sectional and exploded diagrams, prototypes, pattern pieces and computer-aided design **Make**	➢ To know that the force, air, can make things move when compressed. ➢ To know that compressed means when something is squashed such as air in a tube. ➢ To know a pneumatic system works using gases (air). ➢ To know a system has an input, process and output. ➢ To know a pneumatic system has an input movement (where the user pushes or pulls a syringe or pump), the process of air being compressed and an output movement (where the object at the end of the tube moves).	

		➢ select from and use a wider range of tools and equipment to perform practical tasks [for example, cutting, shaping, joining and finishing], accurately ➢ select from and use a wider range of materials and components, including construction materials, textiles and ingredients, according to their functional properties and aesthetic qualities **Evaluate** ➢ investigate and analyse a range of existing products ➢ evaluate their ideas and products against their own design criteria and consider the views of others to improve their work ➢ understand how key events and individuals in design and technology have helped shape the world **Technical knowledge** ➢ apply their understanding of how to strengthen, stiffen and reinforce more complex structures ➢ understand and use mechanical systems in their products [for example, gears, pulleys, cams, levers and linkages] ➢ understand and use electrical systems in their products [for example, series circuits incorporating switches, bulbs, buzzers and motors] ➢ apply their understanding of computing to program, monitor and control their products.	➢ To know their design must be attractive so the user finds it appealing. ➢ To know the joins of their pneumatic system must be tightly sealed so that the air cannot escape (air-tight). ➢ To know the pneumatic system works when the creature in the box moves (output movement) after an input movement is given. ➢ To know they can evaluate the success of their product against the design criteria.	
	Levers and Linkages – Interactive Poster Mechanism		➢ To know that interactive means the user can use the product in more than one way to keep them interested. ➢ To know a lever is a rigid bar which moves around a pivot. Levers are used in many everyday products. ➢ To know linkages is where there are card strips which join one or more levers to product the type of movement required. The term 'linkage' is also used to describe the lever and linkage mechanism as a whole. ➢ To know a loose pivot is where the paper fastener joins card stirps together. ➢ To know a fixed pivot is where the paper fastener joins the card strips to the backing card. ➢ To be able to use the words linear, reciprocating, rotary and oscillating to describe their mechanisms movement.	
	Healthy Lunch Cooking	➢ Understand and apply the principles of a healthy and varied diet ➢ Prepare and cook a variety of predominantly savoury dishes using a range of cooking techniques	➢ To know that a balanced meal means there must be different food groups on the plate ➢ To know that some ingredients go better together than others ➢ To know the claw method is a cutting method.	

		➢ Understand seasonality, and know where and how a variety of ingredients are grown, reared, caught and processed.		
Year 2	**Wheels and Axles- Toy car/train** Mechanism	**<u>Design:</u>** ➢ Design purposeful, functional, appealing products for themselves and other users based on design criteria. ➢ Generate, develop, model and communicate their ideas through talking, drawing, templates, mock-ups and, where appropriate, information and communication technology. **<u>Make:</u>**	➢ To know that replica toy cars are used to play with ➢ To know similar toys are used over time but the material used to make them may be different ➢ To know toys move to make them more engaging to play with and to be more similar to the real item. ➢ To know an axle is a rod passing through wheels. ➢ To know a wheel is a circular object which rotates on an axle. ➢ To know the design criteria for this project. ➢ To know a successful product in this unit will have a working axle and wheels which can rotate.	Lego STEM Workshop
	Winding Mechanism – Well Mechanism	➢ Select from and use a range of tools and equipment to perform practical tasks [for example, cutting, shaping, joining and finishing. ➢ Select from and use a wide range of materials and components, including construction materials, textiles and ingredients, according to their characteristics. **<u>Evaluate:</u>** ➢ Explore and evaluate a range of existing products ➢ Evaluate their ideas and products against design criteria **<u>Technical Knowledge:</u>** ➢ Build structures, exploring how they can be made stronger, stiffer and more stable. ➢ Explore and use mechanisms [for example, levers, sliders, wheels and axles], in their products.	➢ To know that a winding mechanism has an axle that turns and a handle for the user to turn it with. ➢ To know that string or rope is used to lift something with a winding mechanism ➢ To know that their winding mechanism must be designed in the style of a well ➢ To know there must be a container at the end of the string to 'collect' water for the user.	

	Fruit Kebab Cooking	➢ Use the basic principles of a healthy and varied diet to prepare dishes ➢ Understand where food comes from.	➢ To know some words to describe fruit ➢ To know some fruit flavours work better together than others ➢ To know 'the bridge' is a cutting technique ➢ To know when something is 'kebab' it is assembled on a stick.	Fruit Shack selling fruit kebabs
Year 1	**Freestanding Structure** Mechanism	<u>Design:</u> ➢ Design purposeful, functional, appealing products for themselves and other users based on design criteria. ➢ Generate, develop, model and communicate their ideas through talking, drawing, templates, mock-ups and, where appropriate, information and communication technology. <u>Make:</u> ➢ Select from and use a range of tools and equipment to perform practical tasks [for example, cutting, shaping, joining and finishing. ➢ Select from and use a wide range of materials and components, including construction materials, textiles and ingredients, according to their characteristics. <u>Evaluate:</u> ➢ Explore and evaluate a range of existing products ➢ Evaluate their ideas and products against design criteria	➢ To know that a freestanding structure is an object which can stand up on its own. ➢ To be able to explain what strong, stiff and stable mean. ➢ To use Science knowledge about materials to explain which materials are going to be stronger to make a freestanding structure strong, stiff and stable (e.g. plastic, metal, wood) ➢ To know that objects they are familiar with such as playground equipment are freestanding structures. ➢ To test and refine by using different materials provided to them (see resources) to try and make an object freestanding. ➢ To know that a freestanding structure needs to have good joining to a base in order to be strong, stiff and stable. ➢ To know that a good joining technique will be secured at different parts using glue or cellotape. ➢ To know that they must test their product by sitting baby bear on the chair; if the chair collapses then the chair isn't strong enough to be freestanding and they will have to consider what could make their product stronger, stiffer and more stable. ➢ To know that they may not have the completed product but good designers spend time testing and evaluating to consider what they can improve on.	

	Sliders and Levers Mechanism	Technical Knowledge: ➢ Build structures, exploring how they can be made stronger, stiffer and more stable. ➢ Explore and use mechanisms [for example, levers, sliders, wheels and axles], in their products.	➢ To know that a slider is a stiff bar which moves forwards and backwards along a straight line. ➢ To know that a lever is a stiff bar which rotates on a pivot. ➢ To know that a story can be more engaging when the reader interacts with the book using sliders and levers. ➢ To know a storyboard is a group of pictures or drawings in order which tell a story. ➢ To use directional vocabulary to describe how the sliders and levers move e.g. forwards, backwards, up, down, left, right ➢ To discuss the design criteria with each other ➢ To test and refine simple slider and lever designs and practise moving them so that they understand the movement of a slider and lever ➢ To use the ideas and design created by the teacher to inspire their own designs as a group. ➢ To know slits are used to thread the lever and slider bars through. ➢ To know the success of their storyboard is down to how well the slider and lever can operate. If the slider and lever can move freely in the directions previously taught, they have designed the product well. ➢ To know the evaluation of their product is also down to how interactive their storyboard is to the audience/reader.	
	Fruit Crumble Cooking	➢ use the basic principles of a healthy and varied diet to prepare dishes ➢ understand where food comes from.	➢ To know that a fruit crumble has fruit compote as the base with a crumbly mixture on top ➢ To know different fruits can make a crumble ➢ To know 'the 'bridge' is a cutting technique	
	Hand puppets Textiles	➢ select from and use a wide range of materials and components, including construction materials, textiles and	➢ Children know that sewing is the craft of attaching things together using a sewing needle and thread. ➢ Children know 'to thread' means to insert the cotton into the eye of the needle.	

		ingredients, according to their characteristics	➢ Children know to thread the needle through the ready-made holes in order to attach the pieces of fabric together. ➢ Children know to leave a gap at the bottom of the puppet so that their hand can fit inside.	
EYFS	Create an owl baby using split pins for the wings Use the owl babies to retell the story To make a habitat for a creature in the forest – Links to "Leaf" (Pentecost 1)	Safely use an explore a variety of materials tools and techniques experimenting with colour, design, texture, form, and function Share their creations and explain the processes they have used Make use of props and materials when role playing characters in narratives and stories Use a range of small tools, including scissors, paint brushes and cutlery; - begin to show accuracy and care when drawing.	➢ Children know that that scissors can be used to cut things ➢ Children know that that scissor control comes from holding the scissors pointing to the sky and moving the paper around. ➢ Children know that that a pivot is made using a split pin which allows the wings on the owl to move ➢ Children that that different media can create different effects in their creations (e.g. feathers on owl). ➢ Children know that mixed media (junk modelling) can be used to build a Leaf house and to know and experiment with different joining techniques (splayed cuts on cylindrical objects) ➢ Children know how to use a tape dispenser	
	Tony Cragg	Explore how to join the junk together. Talk about what they want to make as a sculpture by discussing what fits together and creates an interesting form / shape. Create alternating repeating patterns using the techniques learned i.e. choose two implements and create a painted pattern e.g. leaf print, fingerprint, leaf print, fingerprint. ➢ Then create another pattern using two different implements to create two different textures.		
	Cooking Unit: Chilli Making	To safely and hygienically prepare food. To safely cut using the bridge cutting technique.	➢ Children know how to prepare food hygienically. ➢ Children can hold and use a safety knife correctly.	

	(Linked to Paco and Giant Chilli Plant)	To understand and learn about different foods from around the world. To understand how different cultures enjoy different foods/meals. To understand how food grows.	➢ Children can cut using the bridge technique. ➢ Children know where food comes from. ➢ Children can try new foods.	