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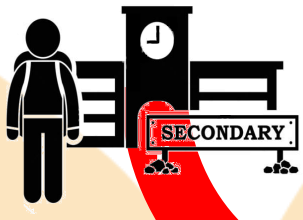

Y6

- Food and nutrition: Eating on a budget
- Electrical Systems: Complex switches and circuits
- Textiles: Sustainable materials

Y5

- Mechanisms: Pulleys and gears
- Structures: Stability in structures
- Food and nutrition: eating seasonally

Y4

- Food and nutrition: Dietary requirements
- Electrical systems: Circuits and switches
- Textiles: Fixtures and fastenings

Y3

- Structures: Developing strength in structures.
- Mechanisms: Levers and linkages
- Food and nutrition: A balanced and varied diet

Y2

- Food and nutrition: Fruit and vegetables
- Understanding materials: Manipulating materials
- Textiles: Exploring shape and texture

Y1

- Structures: Free standing structures
- Food and nutrition: Preparing fruit and vegetables
- Mechanisms: Sliders and levers

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- Expressive arts and designs: Creating with materials

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- Expressive arts and designs: Creating with materials

Subject Rationale: Design Technology

At Harpfield Primary Academy, Design and Technology is part of a broad and balanced curriculum which involves applying knowledge and skills when designing, making and evaluating products. Activities in Design and Technology in our school provide opportunities to use a range of materials, and develop processes which help pupils to improve their understanding of the world around them - their cultural capital. They should develop understanding of food and nutrition and to work independently or as part of a team. We use CUSP curriculum materials to ensure that there is progression, coverage and sequencing. These teaching resources also enable our teachers to have strong subject knowledge and therefore are able to deliver high-quality lessons.

In EYFS, skills in construction and investigating materials are taught mainly through Expressive Arts and Design. In addition to this, there are many opportunities for skills in Design and Technology to be developed which are provided through a range of teacher led and child initiated activities.

The essential skills builder framework is also woven into the existing DT curriculum for the whole school.

Year 6	Electrical systems (link with computing)	To understand and use electrical systems in their products, such as series circuits incorporating switches, bulbs, buzzers and motors. To select from and use a wider range of tools and equipment to perform practical tasks, such as cutting, shaping, joining and finishing, accurately. To apply understanding of computing to programme, monitor and control their products.
	Food and nutrition: Eating on a budget	To select from and use a wider range of materials and components, including ingredients, according to their functional properties and aesthetic qualities. To evaluate their ideas and products against their own design criteria and consider the views of others to improve their work.
	Textiles: Sustainable materials	To use research and develop design criteria to inform the design on innovative, functional appealing products aimed at particular individuals or groups. To select from and use a wider range of materials including textiles to create their own design and investigate the use of pattern pieces.
Year 5	Structures: Stability in structures	To generate, develop, model and communicate their ideas through discussion, annotated sketches and in a step by step plan. To evaluate their ideas and products. To apply their understanding of how to strengthen , stiffen and reinforce more complex structures.
	Food and nutrition: Eating seasonally	To know how to prepare a surface so that it is hygienic and safe. To explore food from different cultures. To think how to present food. To understand and apply the principles of a healthy and varied diet.
	Mechanisms: Pulleys and gears	To use research and develop design criteria to inform the design on innovative, functional appealing products aimed at particular individuals or groups. To understand and use mechanical systems in their products such as gears and pulleys. To use exploded diagrams and protypes when designing an idea.
Year 4	Food and nutrition: Understanding dietary requirements	To know how to prepare a surface so that it is hygienic and safe. To explore food from different cultures. To understand and apply the principles of a healthy and varied diet.
	Circuits and switches	To generate, develop, model and communicate their ideas through discussion, annotated sketches, cross sectional and exploded diagrams. To understand and use electrical systems in their products, such as series circuits incorporating switches, bulbs, buzzers, motors. To apply understanding of computing to programme, monitor and control their products.
	Textiles: Fixings and fastenings	To select from and use a wider range of materials including textiles to create their own design and investigate the use of pattern pieces.
Year 3	Food and nutrition: Balanced and varied diet.	To prepare and cook a variety of savoury dishes using a range of cooking techniques. To understand seasonality, and know where and how a variety of ingredients are grown, reared, caught and processed.
	Mechanisms: Levers and linkages	To use research and develop design criteria to inform the design on innovative, functional appealing products aimed at particular individuals or groups. To understand and use mechanical systems in their products such as levers and linkages.
	Structures: Strength in structures.	To apply their understanding of how to strengthen , stiffen and reinforce more complex structures.

	Food and nutrition: Following a recipe	To select from and use a range of tools and equipment to perform practical tasks such as cutting and shaping, To evaluate their ideas and products.
Year 2	Textiles: Exploring shape and texture	To select from and use a wide range of materials and textiles according to their characteristics. To evaluate their ideas and products against design criteria.
	Understanding materials: Manipulating materials	To design purposeful, functional, appealing products for themselves and other users based on design criteria. To select from and use a wide range of materials according to their characteristics.
Year 1	Mechanisms: Sliders and levers	To explore and use mechanisms, such as levers, sliders, wheels and axles, in their products.
	Food and nutrition: Preparing fruit and vegetables	To select from and use a range of tools and equipment to perform practical tasks such as cutting and shaping, To evaluate their ideas and products.
	Structures: Free-standing structures	To use and select from a range of tools and equipment to perform practical tasks (for example cutting, shaping, joining and finishing). To build structures, exploring how they can be made stronger, stiffer and more stable.
Reception	Expressive arts and designs: Creating with materials	Return to and build on previous learning, refining ideas and developing their ability to represent them.
	Expressive arts and designs: Creating with materials	Create collaboratively sharing ideas, resources and skills.
	Expressive arts and designs: Creating with materials	Early learning goal: Safely use and explore a variety of materials, tools and techniques, experimenting with colour, design, texture, form and function.
Nursery	Expressive arts and designs: Creating with materials	Birth to 3 years: Explore different materials, using all their senses to investigate them. Manipulate and play with different materials. Make simple models which express their ideas.
	Expressive arts and designs: Creating with materials	3-4 years: Explore different materials freely, in order to develop their ideas about how to use them and what to make.
	Expressive arts and designs: Creating with materials	3-4 years: Develop their own ideas and then decide which materials to use to express them. Join different materials and explore different textures.

		Substantive Knowledge	Working like a designer	Vocabulary
Year 6	Electrical systems: Complex switches and circuits	To know how to build circuits according to specific criteria, using a range of components. To know how to draw circuit diagrams to represent a circuit including a bulb or buzzer and a switch. To define the term simultaneous. To identify the circuits required for everyday appliances. To identify the difference between series and parallel circuits. To apply knowledge of circuits and switches to design and make a product to fulfil a design brief.	Can they recall key vocabulary and concepts relating to electricity? Can they draw a circuit diagram using recognised symbols ? Can they describe different types of switches and identify their functions ? Can they draw series and parallel circuit diagrams ? Can they draw a diagram to represent the electrical circuit for a specified appliance ? Can they apply knowledge of circuits and switches to build a simple multifunction product ? Can they explain how they have made the torch and fan work simultaneously, independently or both ? Can they identify the advantages and disadvantages of different models ?	switch, parallel circuit, sreies circuit, component, functionality, multi function, brief, simultaneous
	Food and nutrition: Eating on a budget	To know the difference between slow release and quick release carbohydrates. To know how food can improve their mood and energy levels. To be able to dice, slice, peel, grate and cook a range of vegetables. To be make a sauce and a stock. To use height and colour to improve the visual appeal of food. (Pupils will learn how to cook foods that are often pre-made and processed. They will learn and apply techniques to make dishes designed to help improve energy levels, mood and future health).	Can they explain the necessity of carbohydrates and the difference between simple and complex carbohydrates? Can they use the claw method to dice vegetables safely and efficiently? Can they use relevant vocabulary to describe flavours and make suggestions about how flavours can be adjusted Can they cut, peel, grate and dice vegetables accurately and safely? Can they explain the choices they have made, evaluate their success and suggest improvements?	Carbohydratyes. staple, nutrients, saute, translucent, dice
	Textiles: Sustainable materials	To know that plastic waste can be recycled and repurposed into practical, useful items. To be able to make a crochet hook out of a chopstick. To be able to use plastic bags and snack packets to create practical items. (In this topic, pupils will learn how they can reduce waste by recycling and repurposing snack packets and plastic bags into useful items).	Can they use the crochet technique correctly? Can identify the properties of T-shirt fabric? Can they identify the properties of plastic and why it is harmful to the environment? Can they crochet a simple bag and make a record of the processes involved? Can they explain how plastic waste affects the planet? Can they design and make a bag from recycled materials, explaining reasons for choices and how the bag is made? Can they make suggestions for improvements?	recycle, repurpose, reduce, chain, seal, skein

		Substantive Knowledge	Working like a designer	Vocabulary
Year 5	Structures: Stability in structures	To know that triangles are used in construction to provide stability. To know that engineers use a range of methods to strengthen and reinforce structures. To be able to identify and describe ways that frames are strengthened and reinforced. (In this unit, pupils will look at a range of ways that frames are reinforced to make them stable. They will identify joins and supports and create a model shelter based on what they have learnt).	Can they identify ways in which framed structures have been reinforced and use technical vocabulary to describe these methods? Can use modelling materials confidently to create examples of secure joins? Can they judge the success of their joins and give reasons why some methods are less effective than others? Can they cut four pieces of wood to a specified length to form a frame? Can they construct a frame using triangles acting as gussets and braces? Can they explain what they have done verbally and in writing using technical vocabulary? Can they identify weaknesses and strengths of a structure and suggest modifications?	frame, I beam, struts, brace, mitre, gussets
	Food and nutrition: Eating seasonally	To explore the varieties of bread from around the world To explain how flatbreads differ, in terms of the ingredients and cooking methods used, from traditional breads To explain the differences and similarities between the Danish and UK diet To explore and explain the nutritional value, taste and texture of rye bread To investigate ways of combining a range of ingredients to create an open sandwich that is visually appealing To make simple yoghurt based dressings using a range of flavours To explain the nutritional value of ingredients such as yoghurt and chickpeas To evaluate outcomes	Can they identify foods that originate from different countries? Can they explain the term unleavened and give examples of unleavened breads? Can they explain how the method for making flatbread differs from the method for making bread with yeast ? Can they suggest ways in which they might adapt a recipe and adjust flavours? Can they show precision and creativity in their arrangement of ingredients ?Can they select and arrange colours and textures in a visually attractive way ? Can explain the health benefits of eating chickpeas and yoghurt ? Can they use a range of techniques accurately and confidently to prepare a range of vegetables ? Can explain the choices they have made, evaluate their results and suggest improvements ?	culture, presentation variety, smorrebrod, flatbread, mezze, fibre, bread, unleavened
	Mechanisms: Pulleys and gears	To know types of gears and terminology relating to gears. To know common uses of pulleys and gears. To know how pulleys and gears can change the direction of movement. To be able to	Can they name different types of gear systems and identify everyday objects that use these mechanisms? Can they explain that gears and pulleys are used to transfer rotational movement? Can they explain how a simple pulley system works? Can they create a design that considers the constraints of a design brief and the purpose of the structure? Can they apply knowledge of pulleys to build a structure for a specific purpose? Can they make suggestions about how a structure can be reinforced by adding a triangular frame or side supports? Can they use basic tools and materials safely and with control and accuracy? Can they make decisions about how to construct a model from limited materials and apply skills of cutting, joining and measuring? Can they identify strengths and weaknesses of a design and structure and make reasonable suggestions about modifications?	gear, pulley, mechanism, gear train, drive gear, idler

		Substantive Knowledge	Working like a designer	Vocabulary
Year 4	Food and nutrition:	To know that cheap processed food often contains additives, salt and sugar, which makes it less healthy than unprocessed food. To be able to peel, grate and chop vegetables to make economical, tasty and healthy food. (In this topic, pupils will learn how to make healthy food from low-cost ingredients. They will start to consider how cheap processed foods will affect their diet and health in later life).	Can they identify a variety of root vegetables? Can they peel and grate vegetables safely? Can they explain what fusion means? Can they identify ways in which a recipe could be changed to reflect the cuisine of other countries? Can they explain the advantages of making a curry rather than buying a pre-prepared one? Can they use a range of techniques to prepare and cook vegetables with accuracy and confidence? Can they suggest ways in which their curry could be adapted, such as by using different vegetables, increasing the quantities of specific spices or using natural yoghurt for its cooling effect?	cheap, fusion, texture, shallow fry, shortening, fragrant,
	Electrical systems: Switches and circuits	To know that some switches can vary the speed, volume or degree of light provided by appliances To build simple circuits to include a switch To draw a simple circuit diagram for an electrical appliance To explain the different purposes of switches: efficiency, safety and functionality To explore types of switches in a range of toys and games To know how to make simple games that incorporate an interruption to an electrical current	Can they give examples of appliances that have switches ? Can they explain how a switch works ? Can they build a simple circuit with a switch ? Can they identify appliances that use switches for efficiency, those that have switches for safety reasons, and those that have switches to perform functions other than purely turning an appliance on or off ? Can draw a simple circuit for an appliance such as a torch ? Can they explain how a simple electrical game works ? Can they create their own game based on the model provided ?	switch, circuit, component, current, interruption, unbroken, conductor, multi purpose
	Textiles: Fixings and fastenings	To know fastenings have different functions. To know that a shank provides a small amount of space between the button and fabric. To be able to select appropriate fastenings and attach them to fabric. To be able to make a shank for a button. To use a running stitch to stitch two pieces of fabric together. (In this topic, pupils will learn how to sew a button onto fabric. They will identify the different functions of fastenings and reflect on the advantages or disadvantages of using certain fasteners. They will also create a solution to the problem of a towel slipping off a hook).	Can they name a range of fasteners and their component parts? Can they identify the advantages and disadvantages of using each type of fastener? Can they use a range of sewing techniques accurately and effectively? Can they use running stitch accurately to attach pieces of fabric securely? Can they explain a process and identify strengths and areas for development in their own work?	shank, burr, hook and loop, buckle, fastener, raw edges

		Substantive Knowledge	Working like a designer	Vocabulary
Year 3	Food and nutrition: Balanced and varied diet.	To explain that to have a balanced diet we should eat healthy foods regularly and less healthy foods in moderation To explore how seasonality affects our diet To show examples of different methods of preserving fruit To explore the difference in ingredients between processed and homemade popcorn To know about the origin of popcorn and the plant it comes from To explain and demonstrate how to make popcorn To explore the nutritional value of potatoes and the importance of starch	Can they distinguish between healthy and unhealthy foods ? Can they identify some foods that should be eaten in moderation ?Can they name different methods of preserving fruit ? Can they show an understanding of moderation by adding small amounts of salt or sugar to popcorn flavourings ? Can show creativity in their exploration of ingredients and flavour combinations ? Can they explain that potatoes provide carbohydrates and that this nutrient is essential for energy	seasonal, balance, preserve, stew, pressure, seasoning
	Mechanisms: Levers and linkages	To know types of levers and linkages. To know key terminology relating to levers and linkages. To know how levers and linkages can change the direction of movement. To be able to design and make simplistic lever and linkage products To be able to evaluate the success of their outcomes and recommend improvements. (In this topic, pupils will investigate various linkages and levers to design and make their own linkages and levers product. Pupils will select and use a variety of modelling materials to create their final outcomes).	Can they identify the parts of a lever and explain how a lever works and how it provides a mechanical advantage? Can they describe the difference between the input force and movement and output force and movement? Can they design a simple toy that uses a linkage mechanism, explaining how it will work and reasons for selecting a specific linkage? Can they use modelling skills to construct a simple linkage mechanism? Can they explain how their system works, the changes in movement and force achieved, and make suggestions for improvements?	lever, linkage, mechanism, force, load, effort
	Structures: Strength in structures	To know that bridges are structures that allow people and vehicles to cross over an open space. To know that towers, piers and arches provide strength to a bridge. To be able to design and build a beam bridge that can hold the weight of 100 pennies. To be able to identify and name parts of a bridge. (In this block, pupils will investigate how the shape and features of a bridge can affect how strong it is. They will also identify types of bridges and the structural changes that engineers and architects make to increase the stability of structures).	Can they identify the key features of a bridge and explain their purpose? Can they identify features that are used to give a bridge strength and stability? Can they use specified materials to build a simple bridge structure, showing an understanding that using weights as a counterbalance gives the bridge added stability? Can they identify ways in which a paper bridge can be supported, using arches, piers or counterweights? Can they identify strengths and weaknesses in their completed bridge and suggest which features have affected the strength of their bridge? Can they use construction materials to make three dimensional shapes with secure joins? Can generate ideas about how to modify a design to increase the strength and stability of a free-standing structure?	gap, deck, pier, suspension, arch, bascule.

		Substantive Knowledge	Working like a designer	Vocabulary
Year 2	Food and nutrition: Fruit and vegetables	To know the difference between fresh food and ultra-processed foods. To be able to shape and form ingredients to make delicious food. To be able to use a range of culinary techniques. (Pupils will learn how foods that are pre-made and processed can often be unhealthy. This unit lets pupils practise skills and make food that will help improve their energy, mood and future health).	Can they identify some examples of types of food that are processed or ultra-processed? Can they explain why ultra-processed food is unhealthy? Can they use the bridge and claw techniques to cut and chop food safely? Can they identify potato products that have undergone several processes? Can they identify healthy ways of preparing potatoes? Can they use a grater and peeler safely and with accuracy? Can they use knife skills with accuracy? Can they use the correct terminology when describing methods, stating preferences and making suggestions for changes?	Ingredients, fibre, protein, processed, vitamins, starch
	Textiles: Exploring shape and texture	To know how to use cut out shapes as a template. To know how to use an running stitch. To be able to use a template to transfer a pattern. To be able to cut out and join fabric shapes using a template. (In this topic, pupils will learn how to use a template to create a simple 3D product. They will develop their skills using a needle and thread to create small, even stitches).	Can they use appropriate vocabulary to describe the properties of fabrics? Can they use a template to draw and cut shapes accurately? (challenge) Can they thread a needle independently? Can they use a running stitch to attach shapes to join two pieces of fabric securely and neatly? Can they suggest ways in which their work could be improved?	Running stitch, patchwork, template, applique, quilt
	Understanding materials: Manipulating materials	To know that materials can be modified to become waterproof. To know that Origami comes from the Japanese words: ori - folding and kami -paper. To be able to make paper waterproof. To be able to transform flat paper by folding and creasing to form a hat.	Can they identify features and materials that make clothing suitable for wet weather? Can they sort clothing according to their suitability for bad weather? Can they explain and demonstrate a fair test? Can they interpret results, draw conclusions and explain reasoning? Can they explain the importance of waterproofing? Can they identify features that make boots fit for purpose? Can they conduct a fair test systematically? Can they explain reasoning for conclusions drawn? Can they explain how the properties of paper change when it is folded? Can they carry out a fair test and draw conclusions from the results? Can they apply what they have learned to a design brief? Can they identify necessary modifications?	Manipulate, flexible, barrier, waterproof, resist, absorbent

		Substantive Knowledge	Working like a designer	Vocabulary
Year 1	Mechanisms: Sliders and levers	To define the terms: slider, push, pull, linear and movement. To explain the movement and forces involved in sliders: push, pull, linear To use scissors and templates to make a paper weave (pattern plate) To demonstrate how to make three types of slider mechanism: 1. The slider moves through two slots 2. The slider moves under two bridges 3. The slider moves between runners, which are covered by a layer of paper to conceal the mechanism To evaluate the movement and effectiveness of each mechanism To construct a novelty toy or greetings card which has a movable image	Can they explain the way a slider moves and the direction it moves in ? Can they demonstrate a push and a pull force ? Can they use a template to cut strips of paper accurately and safely ? Can they explain what a bridge is and its purpose ? Can they follow a series of modelled steps to construct simple slider mechanisms ? Can they use simple tools and techniques to construct a novelty toy or greetings card and mechanism ?	slider, slot, bridge, push, pull, rigid
	Food and nutrition: Preparing fruit and vegetables	To know why colourful food can be healthier. To know how different foods can affect their senses. To be able to peel, chop and grate a selection of vegetables. To be able to modify food to suit their food senses. (In this topic, pupils will learn that eating is a sensory experience. They will learn about the nutritional value of vegetables and why colourful food can be better for you. They will use a range of culinary techniques to create and modify dishes that appeal to the senses).	Can they identify the five senses? Can they explain that vegetables contain vitamins and minerals that the body needs? Can they explain that cooking vegetables makes them less nutritious and eating raw vegetables is better for us? Can they use the techniques of grating and ribboning safely and with control? Can they use appropriate vocabulary to describe tastes and textures? Can they explain how marinading and caramelisation affects the texture, appearance, taste and smell of food? Can they state preferences with reasons and suggest ways their dish could be improved?	senses, vitamins, sensory, ribboning, caramelise, marinade
	Structures: Freestanding structures	To know that a freestanding structure is a structure that stands on its own foundation or base without attachment to anything else. To be able to build structures that are freestanding using a range of different materials (In this topic, pupils will investigate what needs to be in place so that a structure can remain standing on its own. They will use a range of materials to explore and reason about why some structures may fall).	Can they explain that a tower with a wide base and solid foundation will be less likely to topple? Can they use their understanding of balance to choose how to place blocks when building a tower? Can they identify ways to improve the stability of their tower? Can they manipulate, fold and cut cardboard accurately? Can they label types of join correctly? Can they explain how their tower could be made more stable such as by widening the base, securing the joins or adjusting the position of the sections of the tower?	tower, topple lean, foundation, balance, perpendicular

		EYFS area	Working like a designer
Reception		Expressive arts and designs: Creating with materials	Return to and build on previous learning, refining ideas and developing their ability to represent them. (construction and building materials/ large construction- linked to stories)
		Expressive arts and designs: Creating with materials	Create collaboratively sharing ideas, resources and skills.
		Expressive arts and designs: Creating with materials	Early learning goal: Safely use and explore a variety of materials, tools and techniques, experimenting with colour, design, texture, form and function.
Nursery		Expressive arts and designs: Creating with materials	Birth to 3 years: Explore different materials, using all their senses to investigate them. Manipulate and play with different materials. Make simple models which express their ideas. (Junk modelling/ construction materials/ playdough)
		Expressive arts and designs: Creating with materials	3-4 years: Explore different materials freely, in order to develop their ideas about how to use them and what to make. (Junk modelling-linked to stories)
		Expressive arts and designs: Creating with materials	3-4 years: Develop their own ideas and then decide which materials to use to express them. Join different materials and explore different textures. (Junk modelling- linked to stories)