Firs Primary School Design and Technology Progression and Coverage 2022-2023

Early Years Foundation Stage	Design and Technology National Curriculum Key Stage 1	Design and Technology National Curriculum Key Stage 2
•	1. Design purposeful, functional, appealing products for themselves and other users based on design criteria 2. Generate, develop, model and communicate their ideas through talking, drawing, templates, mock-ups and, where appropriate, information and communication technology 3. Select from and use a range of tools and equipment to perform practical tasks [e.g. cutting, shaping, joining and finishing] 4. Select from and use a wide range of materials and components, including construction materials, textiles and ingredients, according to their characteristics 5. Explore and evaluate a range of existing products 6. Evaluate their ideas and products against design criteria 7. Build structures, exploring how they can be made stronger, stiffer and more stable 8. Explore and use mechanisms [e.g. levers, sliders, wheels and axles], in their products 9. Use the basic principles of a healthy and varied diet to prepare dishes 10. Understand where food comes from	1. 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 2. Generate, develop, model and communicate their ideas through discussion, annotated sketches, cross-sectional and exploded diagrams, prototypes, pattern pieces and computer-aided design 3. Select from and use a wider range of tools and equipment to perform practical tasks [e.g. cutting, shaping, joining and finishing], accurately 4. 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 5. Investigate and analyse a range of existing products 6. Evaluate their ideas and products against their own design criteria and consider the views of others to improve their work 7. Understand how key events and individuals in design and technology have helped shape the world 8. Apply their understanding of how to strengthen, stiffen and reinforce more complex structures 9. Understand and use mechanical systems in their products [for example, gears, pulleys, cams, levers and linkages] 10. Understand and use electrical systems in their products [e.g. series circuits incorporating switches, bulbs, buzzers and motors] 11. Apply their understanding of computing to program, monitor and control their products 12. Understand and apply the principles of a healthy and varied diet *13. Prepare and cook a variety of predominantly savoury dishes using a range of cooking techniques* 14. Understand seasonality, and know where and how a variety of ingredients are grown, reared, caught and processed

	Year 1/Year 2	Year 3/4	Year 5/6
	Cycle A	**Cycle A**	**Cycle A**
3_4 Pneumatics.pdf	**Moon Zoom** ***See Project on a Page Planner 1_2 Wheels and Axels on One Drive for full details including resources required.*** Curriculum Planning › Subject Resources and Planning Support › Design and Technology › Project on a Page planners ***NC Objectives Covered: 1, 2, 3, 4, 5, 6, 8*** **What could children design, make and evaluate?** Design, make and evaluate a moon buggy to travel around the moon for sky badger (link to Sky Badger lesson plan which forms part of our 'Protected Characteristics' through the curriculum lessons: https://skybadger.co.uk/schools-carers/sky-badger-schools/moon-village/). Prior to making this, children could explore existing products with wheels including: push/pull toys e.g. emergency service vehicle, carnival float, farm vehicle, clown's car, vehicle for imaginary/story character, shopping trolley. **Investigative and Evaluative Activities (IEAs)** • Explore and evaluate a range of wheeled products such as toys and everyday objects. Through questioning, direct children's observations e.g. the number, size, position and methods of fixing wheels and axles. *How do you think the wheels move? How do you think the wheels are fixed on? Why do you think the product has this number of wheels? Why do you think the wheels are round?* • Draw an example of a wheeled product, stating the user and purpose, and labelling the main parts e.g. body, chassis, wheels, axles and axle holders.	**Gods and Mortals** ***NC Objectives Covered: 7*** Unit focus: Understand how key events and individuals in design and technology have helped shape the world. **Lesson 1** The unit will begin with an introduction to inventing and what makes a good inventor. Teachers should use the videos below to discuss and challenge any stereotypes or misconceptions children may have about who can be an inventor. The class should also discuss the key qualities an inventor needs to be successful (e.g. observant, able to recognise problems, creative, persistent etc). https://www.bbc.co.uk/teach/class-clips-video/design-and-technology-ks2-what-is-an-inventor-like/zn2f47h https://www.bbc.co.uk/teach/class-clips-video/design-and-technology-ks2-what-makes-a-good-inventor/z79mf4j https://www.bbc.co.uk/teach/class-clips-video/design-and-technology-ks2-the-importance-of-persistence-when-inventing/zj42scw Children will then learn about key events and inventors in relation to the use of electricity over time. They will study:	**Frozen Kingdom** ***See Project on a Page Planner 5_6 Frame Structures on One Drive for full details including resources required.*** Curriculum Planning › Subject Resources and Planning Support › Design and Technology › Project on a Pa ***NC Objectives Covered: 1, 2, 3, 4, 5, 6, 7, 8*** **What could children design, make and evaluate?** It is recommended that this unit should be linked to the learning in geography about Shakleton's expedition to the Antarctic. Children could therefore work towards designing and making their own 'expedition shelters', exploring images of a range of tent types and expedition shelters, as well as exploring the structure of actual tents e.g. on the playground or in the hall. **Investigative and Evaluative Activities (IEAs)** • Children investigate and make annotated drawings of a range of portable and permanent frame structures, e.g. tents, bus shelters, umbrellas. Use photographs and web-based research to extend the range e.g. *How well does the frame structure meet users' needs and purposes? Why were materials chosen? What methods of construction have been used? How has the framework been strengthened, reinforced and stiffened? How does the shape of the framework affect its strength? How innovative is the design? When was it made? Who made it? Where was it made?*

Firs Primary School Design and Technology Progression and Coverage 2022-2023

• Walk around the school building and grounds, recording how wheels and axles are used in daily life.
• Read a story or non-fiction book that includes a wheeled product. Use this to introduce relevant vocabulary and to emphasise user and purpose.

Focused Tasks (FTs)
• Using construction kits with wheels and axles, ask children to make a product that moves.
• Demonstrate to children how wheels and axles may be assembled as either fixed axles or free axles.
• Show different ways of making axle holders and stress the importance of making sure the axles run freely within the holders.
• Ensure that children are taught how to mark out, hold, cut and join materials and components correctly.
• Using samples of materials and components they will use when designing and making, ask the children to assemble some examples of wheel, axle, axle holder combinations. Display the work completed as a reference for their DMEA.

Design, Make and Evaluate Assignment (DMEA)
• Discuss with the children what they will be designing, making and evaluating within an authentic context.
• With the children identify a user and purpose for the product and generate simple criteria.
• Ask children to generate, develop and communicate their ideas as appropriate e.g. through talk and drawing. Talk about, evaluate and share ideas with other children/adults.
• Make their wheel and axle product using their design ideas and criteria as an ongoing guide.
• Discuss how the children might add finishing techniques to their product with reference to their design ideas and criteria. Direct the children to information and communication technology opportunities such as clip art, word processing, paint or simple drawing programs.
• Ask children to evaluate their finished product, communicating how it works and how it matches their design criteria, including any changes they made.

Key Vocabulary

Tier 1	Tier 2	Tier 3
wheel car change same different	vehicle assembling cutting joining shaping fixed free moving make	axle axle holder chassis body cab finishing mechanism design evaluate purpose user criteria functional {names of tools, equipment and materials used}

Golden Nuggets:
1. **Children can identify the main components of a moving vehicle including; body, cab, chassis, wheel, axle, axle holder**
2. **Children know why an axle must be able to run freely within its holder**
3. **Children can identify the user and purpose for a variety of objects with wheels e.g. ambulance, tractor, toy car, wheel chair, mobility scooter, tricycle etc.**

Muck, Mess and Mixtures

NC Objectives Covered: 1,2,3,4,5,6,9,10

For full project guidance please see:
https://www.stem.org.uk/resources/collection/484377/year-2.

- **Lesson 2: Benjamin Franklin** – children will learn about his kite flying experiment which proved that lightening was electrical in nature (https://www.fi.edu/benjamin-franklin/kite-key-experiment). This paved the way for future inventions, such as the lightening rod.
- **Lesson 3: Nikola Tesla** – children will learn that he invented ways to move electricity over long distances and without wires (which has progressed to use of radio, phone and television!). https://kids.britannica.com/kids/article/Nikola-Tesla/608482
- **Lesson 4: William Kamkwamba** – children will learn that he overcame huge challenges to build a wind turbine from scrap, that could provide electricity and pump water for his village.

https://thekidshouldseethis.com/post/william-kamkwamba-moving-windmills

Lesson 5:
Children should reflect on their learning over the unit and put together a poster or leaflet about one of the inventors studied to show what they have learned.

Key Vocabulary

Tier 1	Tier 2	Tier 3
Radio Phone Television Wires	Inventor Invention Creative Perseverance Persistent Qualities Experiment	Turbine Windmill Electricity Waves

Golden Nuggets:
1. **Children know that Benjamin Franklin did not invent or discover electricity, but that he carried out many experiments involving electricity which paved the way for future inventions.**
2. **Children know that Nikola Tesla invented ways to move electricity over long distances and without wires – and that phones, TV and radio all rely on this.**
3. **Children know that William Kamkwamba adapted an existing invention (the windmill) to create a turbine that would provide electricity for his village.**

I am Warrior

See Project on a Page Planner 3_4 Healthy and Varied Diet on One Drive for a rough outline of the unit. In order to make links with the learning in other areas of the curriculum, children will be learning to make a simple focaccia bread (a traditional bread which Romans ate, and brought with them as their empire spread across Europe https://www.historyofthings.com/history-of-focaccia-bread)

A quick recipe for the focaccia bread can be found below, it also provides ideas for toppings that could be included. **https://family-friends-food.com/quick-focaccia-in-one-hour/**

NC Objectives Covered: 1, 2, 3, 4, 5, 6, 12, 13, 14

Investigative and Evaluative Activities (IEAs)
It is suggested that during the Investigative and Evaluative Activities (IEAs), children have the chance to taste different types of bread with fillings e.g. olive bread, fruit bread, cheese bread etc. They could also try some of the foods listed as possible toppings for focaccia in the above recipe e.g. rosemary, olives, sundried tomatoes, feta cheese, pesto etc. Children should be asked to consider the nutritional values of the foods tasted and where they fit on the Eatwell Plate.

• Children should research key events and individuals related to their study of frame structures e.g. Stephen Sauvestre – a designer of the Eiffel Tower; Thomas Farnolls Pritchard – designer of the Iron Bridge. They could also learn about locally important design and technology activity related to their project.

Focused Tasks (FTs)
• Use a construction kit consisting of plastic strips and paper fasteners to build 2-D frameworks. Compare the strength of square frameworks with triangular frameworks. Ask the children to reinforce square frameworks using diagonals to help develop an understanding of using triangulation to add strength to a structure.
• Demonstrate how paper tubes can be made from rolling sheets of newspaper diagonally around pieces of e.g. dowel. Ask children to use these tubes and masking tape or paper straws with pipe cleaners to build 3-D frameworks such as cubes, cuboids and pyramids. *How could each of the frameworks be reinforced and strengthened?*
• Demonstrate the accurate use of tools and equipment. Develop skills and techniques using junior hacksaws, G-clamps, bench hooks, square section wood, card triangles and hand drills to construct wooden frames, as appropriate.
• Demonstrate skills and techniques for accurately joining framework materials together e.g. paper straws, square sectioned wood. Ask children to practise these, mounting their joints onto card for future reference.

Below are links a number of alternative and suitable activities that would also constitute appropriate focused tasks for the unit:
- *https://www.stem.org.uk/resources/elibrary/resource/25329/bridges-and-structures*
- *https://www.stem.org.uk/resources/elibrary/resource/441088/spaghetti-structures*
- *https://www.stem.org.uk/resources/elibrary/resource/446809/stronger-structures*
- *https://www.stem.org.uk/resources/elibrary/resource/446817/super-structures*

Design, Make and Evaluate Assignment (DMEA)
• Discuss the brief of designing and making a small-scale frame structure e.g. *Who is the intended user and what is the purpose of the frame structure? Will it be permanent, or can it be easily dismantled? What materials will you use? How will it be joined? How will it be reinforced? How will it be finished?* Children should be encouraged to generate innovative ideas, drawing on their research. Ask children to develop a simple design specification to guide their thinking.
• Children should produce a detailed, step-by-step plan, listing tools and materials.
• Children's sketches should be annotated with notes to help develop and communicate their ideas.
• Encourage children to model their ideas first using materials such as paper, card and paper straws e.g. *How will you make it stable? How will it stand up? How could you make it stronger? Where are the weak points? How could you reinforce them? What tools and materials will you need? How can you improve the design?*
• Encourage children to make their products with accuracy. They should regularly evaluate their work and their completed product, drawing on their design specification, and thinking about the intended purpose and user.

Key Vocabulary

Tier 1	Tier 2	Tier 3
Shape Join	Stiffen Strengthen Reinforce Triangulation Stability Temporary Permanent Purpose User Innovation Research Functional	Frame structure Design brief Design specification Prototype Annotated sketch

Firs Primary School Design and Technology Progression and Coverage 2022-2023

All lesson plans and resources are also on the One Drive:

Curriculum Planning › Subject Resources and Planning Support › Design and Technology › Muck,Mess and Mixtures

In this unit children learn about science, D&T, maths and English as they work through a series of activities with an end goal of setting up their own pizza business. This is a cross curricular unit, and depending on time constraints teachers may decide to omit elements from other subject areas (e.g. science and maths) as these are already covered in the wider curriculum. Teachers may also wish to adapt the unit, so that instead of growing their own food for pizza toppings, children taste a variety of different, seasonal vegetables that can be grown in the UK, and then decide which to add to their pizzas. Ready made pizza dough can be bought at a variety of supermarkets, alternatively plain ready-made pizza bases could be used. If teachers prefer to make the dough with children, a simple recipe can be found at: https://quickandeasyrecipes.co.uk/kid-friendly-pizza-dough-recipe/

Session 1
Children choose a name and logo for their pizza business. They then learn where a range of food that comes from and role play simple food chains. They then build their own food chains.

Session 2
Children learn about what plants need to grow. They also find out where the ingredients to make pizza come from. They then set up an investigation to see which plants grow the fastest during 'The great ingredient race' activity.

Session 3
Children are introduced to the idea of market research as an engaging and meaningful context for Maths learning. Through this, they learn how to design a simple survey to understand their potential pizzeria customers' preferences and construct a pictogram to display their findings

Session 4
Children think about eating healthily and the nutrients included in each food group. Using this learning, they are then challenged to use a range of seasonal ingredients to design a food flag pizza that they can sell in their British pizzeria businesses.

Session 5
Children make the food flag pizza that they have designed using the ingredients that they have been growing. This is an excellent opportunity to apply maths in a real-life context.

Session 6
Children design and make takeaway packaging and promotional material for their British pizzerias. Cross-curricular English opportunities are built in when the children plan and perform their own television advertisement.

Session 7
Children set up their pizzerias and practise working with money and paying for items using different combinations of coins. To add more real-life context, this stage could be completed as an after-school event that parents could be invited to.

Key Vocabulary

Tier 1	Tier 2		Tier 3
Cut	Juicy	Flesh	Diet
Soft	Crunchy	Skin	Ingredients
hard	Sweet	Seed	Arrange
Knife	Sticky	Slice	Investigate
Spoon	Smooth	Peel	Popular
Fork	Sharp	Knead	Research
Bowl	Crisp	Healthy	Design
Apron	Sour	Unhealthy	Evaluate
Wash	Hard	Plan	Criteria
Clean	Grater	Choose	Hygiene
{Names of fruit and vegetables tasted/used}	Chopping-board	Taste	Local
Dough	Attractive	Safe	Seasonal
Pizza			Logo
Cheese			Pictogram
Topping			Customer
			Packaging

Children investigate a range of food (a selection of foods provided for them). Link to the principles of a varied and healthy diet using *The Eatwell Guide* e.g. *What ingredients have been used? Which food groups do they belong to? What substances are used in the products e.g. nutrients, water and fibre?*
• Carry out sensory evaluations on the foods tasted. Record results, for example using a table. Use appropriate words to describe the taste/smell/texture/appearance e.g. *How do the sensory characteristics affect your liking for the food?*
• Gather information about existing products available relating to your product. Visit a local supermarket and/or use the internet.
• Find out how a variety of ingredients used in products are grown and harvested, reared, caught and processed e.g. *Where and when are the ingredients grown? Where do different meats/fish/cheese/eggs come from? How and why are they processed?*

Focused Tasks (FTs)
• Learn to select and use a range of utensils and use a range of techniques as appropriate to prepare ingredients hygienically including the bridge and claw technique, grating, peeling, chopping, slicing, mixing, spreading, kneading and baking.
• Food preparation and cooking techniques could be practised by making a food product using an existing recipe (e.g. make a plain focaccia with no added toppings).
• Discuss basic food hygiene practices when handling food including the importance of following instructions to control risk e.g. *What should we do before we work with food? Why is following instructions important?*
Additional teacher guidance on safe handling of equipment:
https://www.warburtons.co.uk/wp-content/uploads/2020/11/Guide-How-to-teach-food-skills.pdf

Design, Make and Evaluate Assignment (DMEA)
Children will make their own focaccia breads, with toppings of their choice (chosen from a selection tasted during the IEA stage).
• Discuss the purpose of the products that the children will be designing, making and evaluating and who the products will be for e.g. will children make the focaccia for a Roman feast and invite parents in to eat with them? Will they visit a KS1 class to share their learning on the Romans and provide focaccia for them to taste?
• Develop and agree on design criteria with the children within a context that is authentic and meaningful. This can include criteria relating to healthy eating and a varied diet e.g. *What do you need to consider to make it part of a balanced diet? How do we select the ingredients (e.g. do you want to make sure that chosen toppings are Italian? How could we make it appealing to eat?*
• Ask children to generate a range of ideas encouraging realistic responses.
• Using discussion, annotated sketches and information and communication technology if appropriate, ask the children to develop and communicate their ideas.
• Ask children to consider the main stages in making the food product, before preparing/cooking the product including the ingredients and utensils they will need.
• Evaluate as the assignment proceeds and the final product against the intended purpose and user, reflecting on the design criteria previously agreed. Consider what others think of the product when considering how the work might be improved.

Key Vocabulary

Tier 1	Tier 2	Tier 3
{names of foods tasted and ingredients)	Texture	Seasonal
{names of equipment and utensils used}	Sweet	Harvested
Taste	Sour	healthy/varied diet
Smell	Spicy	design criteria
Cook	Appearance	user
Hot	Preference	annotated sketch
Cold	Greasy	sensory evaluations
Mix	Moist	prove
Stir	Fresh	
Bake	Savoury	
	Hygienic	
	Edible	
	Grown	

Golden Nuggets:
1. **Children understand that adding diagonals to square frameworks adds strength and that this is called triangulation.**
2. **Children can identify the weak points in a structure and suggest ways to reinforce them.**

Bloodheart

See Project on a Page Planner 3_4 Shell structures using computer-aided design (CAD) on One Drive for full details including resources required.

NC Objectives Covered: 1, 2, 3, 4, 5, 6, 8

In this unit children will design and make packaging for a healthy food product. The links below will support teachers to develop an overview of the intended learning and possible teaching sequence.

- https://www.bbc.co.uk/teach/class-clips-video/design-challenge-making-packaging-soft-fruit-2d-3d-software/zr28qp3
- http://www.mmiweb.org.uk/microsites/primaryembedding/case_studies/dt/packaging.html

As in the first video above, teachers should ensure that the children are given a real design problem to solve to provide a meaningful context for the learning e.g. the raspberries get squashed in the current packaging – how can we improve it?

Investigative and Evaluative Activities (IEAs)
• Children investigate a collection of different shell structures including packaging. Use questions to develop children's understanding e.g. *What is the purpose of the shell structure – protecting, containing, presenting? What material is it made from? How has it been constructed? Are the materials recyclable or reusable? How has it been stiffened i.e. folded, corrugated, ribbed, laminated? What size/shape/colour is it? What information does it show and why? How attractive is the design?*
• Children take a small package apart identifying and discussing parts of a net including the tabs e.g. *How are different faces of the package arranged? How are the tabs used to join the 'free' edges of the net?*
• Evaluate existing products to determine which designs children think are the most effective. Provide opportunities for the children to judge the suitability of the shell structures for their intended users and purposes. Discuss graphics including colours/impact of style/logo/size of font e.g. *What do you prefer and why? What style of graphics and lettering might we want to include in our product to meet users' preferences and its intended purpose? Which packaging might be the best for…?*

Focused Tasks (FTs)
• Demonstrate simple drawing software such as Techsoft 2D Primary or Microsoft Word. Ask children to explore the interface and drawing tools to practise drawing and manipulating shapes such as rectangles, squares, ellipses, trapezoids and triangles.
• Ask children to use the software to open existing drawings including nets and to draw nets of their own,
using gridlines and pre-shaped tools.
• Let the children explore and be guided to try out different fill and font tools to become familiar with the graphic design aspects of the available software to achieve the desired appearance of their products.
• Practise making nets out of card, joining flat faces with masking tape to create 3-D shapes. Experiment with assembling pre-drawn nets in numerous ways using scoring, cutting and assembling techniques. Allow children to construct a simple box and show how a window can be cut out and acetate sheet added.

Design, Make and Evaluate Assignment (DMEA)
• Develop a design brief with the children within a context which is authentic and meaningful.

Cheese Buy Sell			

Golden Nuggets:

1. **Children can name the 5 sections of the 'Eatwell Plate' and give examples of foods in each section that they have used in their pizza recipe e.g. cheese - dairy, dough – carbohydrate.**
2. **Children know that they should eat AT LEAST five portions of fruit and vegetables each day, can identify a variety of vegetables they have used within the unit, and name some vegetables which grow in the UK.**
3. **Children know how to be safe and hygienic when preparing food e.g. washing hands and being careful with sharp kitchen equipment e.g. knives and graters.**

Street Detective

Note: Children will need to have experience of using a simple paint program on the computer for this unit. They should have had the opportunity to 'create digital paintings' in the computing unit for the Rio de Vida topic.

NC Objectives Covered: 1, 2, 5, 6

This unit links to the learning in geography and the 'Our Area Litter Investigation' in this topic. There is no 'Project on a Page Planner' for this unit.

What could children design, make and evaluate?

- Children should design a poster or street sign to encourage people to either bin their litter or take it home or to encourage them to pick up their dog's mess. They should use a simple computer drawing program which enables them to combine text and pictures e.g. 2Simple, Tux Paint. (If curriculum budget allows perhaps a winning design could be printed onto weatherproof vinyl for display outside school? E.g. https://www.vistaprint.co.uk/signs-posters/banners/vinyl-banners)

Investigative and Evaluative Activities (IEAs)

- Children should explore a range of existing street signs (including some relating to dog mess/litter - many examples online, but some may also be seen during 'Our Area' fieldtrip – these should be photographed).
- Use questions to develop the children's understanding of what makes the poster effective e.g. bright colours, simple pictures, some use humour, other explain the dangers of littering/dog mess.
- Who are the posters/sign aimed at? Who is the audience? Adults? Children? Teenagers?
- Talk about the text – what makes it stand out? Is there a lot of writing or a little bit? Introduce and develop vocabulary including font, text, size, bold.
- Consider materials of signs intended to be used outside – what makes them weather proof? E.g. vinyl, laminated, printed on metal. Discuss effectiveness of laminating paper posters for outside.

Focused Tasks (FTs)

- Demonstrate how to use the chosen drawing program including drawing outlines, adding and changing text, using colour fill and pattern. Give the children time to explore the program, challenging them to use different features. With support older children may be able to import images from the Internet.

Design, Make and Evaluate Assignment (DMEA)

• Discuss with the children what they will be designing, making and evaluating e.g. *Who will your product be for? Who is it aimed at? What will be its purpose (e.g.litter prevention or dog mess?*
• Generate simple design criteria with the children e.g. the poster needs to be attractive and eye catching, it needs to persuade e.g. with humour or by showing consequences, it should have text and pictures, it needs to be clear and simple.
• Encourage the children to develop their ideas through talking, drawing and making mock-ups of their ideas with paper and coloured pencils.
• Ask children to evaluate their developing ideas and final products against the original design criteria.

Tier 1	Tier 2	Tier 3
	Reared Caught Frozen Tinned Planning Purpose Knead Rise Grease	

Golden Nuggets:

1. **Children can recall the ingredients used to make a simple focaccia, and say where they sit on the Eatwell plate.**
2. **Children can say how to be hygienic and safe when preparing food including; washing hands before cooking and after handling raw meats and eggs, tying hair back, using bridge or claw techniques when cutting food**

Playlist

See Project on a Page Planner 3_4 Levers and Linkages on One Drive for full details including resources required.

NC Objectives Covered: 1, 2, 3, 4, 5, 6, 7, 9

Inventor focus:

In this unit children will start by learning about Alexander Graham Bell and how he invented the telephone with support from Lewis Latimer **(one lesson).**

- https://www.bbc.co.uk/bitesize/topics/zxwxvcw/articles/z4vp7nb
- https://www.soci.org/blog/2021/10/black-history-month-lewis-howard-latimer#:~:text=Lewis%20Latimer%20was%20instrumental%20in,his%20place%20in%20science%20history.

What could children design, make and evaluate?
Moving information poster linked to learning about the inventors studied or learning in other subjects in this topic.

Investigative and Evaluative Activities (IEAs)
• Children investigate, analyse and evaluate books and, where available, other products which have a range of lever and linkage mechanisms.
• Use questions to develop children's understanding e.g. *Who might it be for? What is its purpose? What do you think will move? How will you make it move? What part moved and how did it move? How do you think the mechanism works? What materials have been used? How effective do you think it is and why? What else could move?*

Focused Tasks (FTs)
• Demonstrate a range of lever and linkage mechanisms to the children using prepared teaching aids.
• Use questions to develop children's understanding e.g. *Which card strip is the lever? Which card strip is acting as the linkage? Which part of the system is the input and which part the output? What does the type of movement remind you of? Which are the fixed pivots and which are the loose pivots?*
• Demonstrate the correct and accurate use of measuring, marking out, cutting, joining and finishing skills and techniques.
• Children should develop their knowledge and skills by replicating one or more of the teaching aids.

Design, Make and Evaluate Assignment (DMEA)
• Develop a design brief with the children within a context which is authentic and meaningful (e.g. the children will make a moving information poster to teach KS1 about Alexander Graham Bell and the invention of the telephone, or to reflect their

• Discuss the uses and purposes of their shell structure e.g. *What does the product need to do? Who is it aimed at? How will the purpose and user affect your design decisions?* Agree on design criteria that can be used to guide the development and evaluation of children's products *e.g. How will we know that we have designed and made successful products?*
• Ask the children to develop a design using computer-aided design (CAD) software to create nets, addressing the needs of the user and the purpose.
• Using computer-aided design (CAD) software ask the children to print out their nets to develop prototypes in order to evaluate and refine their ideas e.g. *What will you need to include in your design? How can you improve it? What materials will you use? How will you make sure your product works well and has the right appearance?*
• Ask children to identify the main stages of making and the appropriate tools and skills they learnt through focused tasks. Encourage the children to work with accuracy, using their computer-aided design (CAD) skills as appropriate.
• Evaluate throughout and the final products against the intended purpose and with the intended user, where safe and practical, drawing on the design criteria previously agreed.

Key Vocabulary

Tier 1	Tier 2	Tier 3
Length width stiff strong	Breadth capacity shaping joining assemble accuracy material reduce reuse decision evaluating innovative	shell structure three-dimensional (3-D) shape net cube cuboid prism vertex edge face marking out scoring tabs adhesives recycle corrugating ribbing laminating font lettering text graphics design brief design criteria prototype

Golden Nuggets:

1. **Children can create a net and assemble it to make their intended packaging shape.**
2. **They can use a simple CAD program to create a design for their packaging, including text and graphics**

Darwin's Delights

NC Objectives Covered: 1, 2, 3, 4, 5, 6, 8, 9

In this unit children will create their own 'moving mouth' model animals. This could be linked to learning in other subjects in the topic, for example making models of endangered animals, or creatures that live in or near rivers.

Full guidance for the unit can be found at the website below, and has also been saved in the Design and Technology folder on the One Drive, 'Moving animal project'.

Curriculum Planning › Subject Resources and Planning Support › Design and Technology › Darwin's Delights

card paper metal plastic poster sign	bright attractive bold persuade	design make evaluate user purpose audience design criteria product function text graphics

Golden Nuggets:

1. **Children can use ICT to create a persuasive poster including both text and graphics.**
2. **Children can identify the audience (e.g. drivers, dog walkers, parents, adults, children, pedestrians etc) and purpose (e.g. to persuade, to warn, to inform) of a number of street signs.**

Land Ahoy

See Project on a Page Planner 1_2 Sliders and Levers on One Drive for full details including resources required.

Curriculum Planning › Subject Resources and Planning Support › Design and Technology › Project on a Page planners

NC Objectives Covered: 1,2,3,4,5,6,8

What could children design, make and evaluate?

- Children should make a page for a class, group or individual story book linked to a key or model text in English (e.g. The Story of Pirate Tom, Lighthouse Keeper's Lunch, Baby on Board). The picture should include a moving element incorporating levers and/or sliders.

Investigative and Evaluative Activities (IEAs)

• Children explore and evaluate a collection of books and everyday products that have moving parts, including those with levers and sliders. e.g. *What is it? Who is it for? What is it for?*
• Use questions to develop children's understanding e.g. *What do you think will move? How will you make it move? What part of the product moved and how did it move? How do you think the mechanism works? What else could move in the product? How well does it work?*
• Introduce and develop vocabulary e.g. lever, pivot, slider, left, right, push, pull, up, down, forwards, backwards, in, out.

Focused Tasks (FTs)

• Demonstrate simple levers and sliders to the children using prepared teaching aids. It is helpful if these are also used in context e.g. the slider is used to show a snail appearing from behind a stone, the lever is used to show a butterfly flying to a flower.
• Use questions to develop children's understanding e.g. *How does the slider move? How does the lever move? Which part of the mechanism is the pivot? What does the movement of the slider and lever remind you of?*
• Following teacher demonstration of the correct use of tools and materials, children should develop their knowledge and skills by replicating the slider and lever teaching aids. Encourage children to add pictures to their mechanisms.

Design, Make and Evaluate Assignment (DMEA)

• Discuss with the children what they will be designing, making and evaluating e.g. *Who will your product be for? What will be its purpose? How do you want it to move? Will you use a lever or a slider?*
• Generate simple design criteria with the children e.g. the mechanism should work smoothly, it should make the right type of movement.
• Encourage the children to develop their ideas through talking, drawing and making mock-ups of their ideas with paper and card.
learning in another subject during the topic, for instance about noise pollution or how sound travels).
• Discuss with children the purpose of the products they will be designing and making and who the products will be for. Ask the children to generate a range of ideas, encouraging creative responses. Agree on design criteria that can be used to guide the development and evaluation of the children's products.
• Using annotated sketches and prototypes, ask the children to develop, model and communicate their ideas.
• Ask the children to consider the main stages in making before assembling high quality products, drawing on the knowledge, understanding and skills learnt through IEAs and FTs.
• Evaluate the final products against the intended purpose and with the intended user, drawing on the design criteria previously agreed.

Key Vocabulary

Tier 1	Tier 2	Tier 3
	slot process purpose	mechanism lever linkage pivot bridge guide system input output linear rotary oscillating reciprocating user function prototype design criteria innovative appealing design brief

Golden Nuggets:

1. **Children can identify the parts of a lever/linkage mechanism including: input/output, lever, linkage, fixed pivot, loose pivot, bridge.**
2. **Children can accurately measure and mark out materials before joining them.**

https://www.stem.org.uk/resources/elibrary/resource/25895/how-will-your-beast-open-its-mouth

Lesson 1
Drawing animals.

Lesson 2
Drawing a comic strip to show mouth movement.

Lesson 3
Exploring animal shape and colour, making simple nets.

Lesson 4
Exploring ways to make movement; cranks, cams and levers.

Lesson 5 and Lesson 6
The big task: designing and making your moving animal.

Additional guidance on DT Projects with cams can be found in the Project on a Page Planner document **5_6 *Cams*** on the One Drive.

Curriculum Planning › Subject Resources and Planning Support › Design and Technology › Project on a Page planners

Key Vocabulary

Tier 1	Tier 2	Tier 3
Open Close Up Down Shape Length Width Handle {names of animals made/studied}	Movement Component Mechanical Mechanism Decorative Measurement Measure Accurate Channel Slot Evaluate Proportions Detail Realism Design Optimum Form	Cranks Cams Levers Net 3D 2D Follow Slider Surface pattern {names of tools and equipment used}

Golden Nuggets:

1. **Children can identify different components in a mechanical toy including; crank, cam, lever, slider, channel, handle.**
2. **Children can create a net and assemble it to make their desired shape.**
3. **Children can assemble components, including cams and cranks, to make a mechanical toy with a moving mouth.**

• Discuss the finishing techniques the children might use e.g. using digital text and graphics, paint, felt tipped pens or collage.
• As a whole class, talk about the order in which the mechanisms will be made.
• Ask children to evaluate their developing ideas and final products against the original design criteria.

Key Vocabulary

Tier 1	Tier 2	Tier 3
card	slot	slider
masking tape	straight	lever
paper	curve	pivot
join	ideas	bridge/guide
pull	left	fastener
push	right	straight
up		curve
down		design
forwards		make
backwards		evaluate
in		user
out		purpose
		design criteria
		product
		function

Golden Nuggets:

1. **Children can identify the main components of a moving picture including lever, slider, pivot, bridge/guide.**
2. **Children know that a lever has a pivot, whereas a slider requires a bridge/guide**

Cycle B	Cycle B	Cycle B
Superheroes ***See Project on a Page Planner 1_2 Templates and Joining on One Drive for full details including resources required.*** Curriculum Planning › Subject Resources and Planning Support › Design and Technology › Project on a Page planners ***Please also see Textiles progression guidance on the Art and Design Progression and Coverage Document.*** ***NC Objectives Covered: 1,2,3,4,5,6*** **What could children design, make and evaluate?** Glove puppet, finger puppet, clothes for teddy/soft toy/class doll, fabric placemat **Investigative and Evaluative Activities (IEAs)** • Children investigate and evaluate existing products linked to the chosen project. Explore and compare e.g. fabrics, joining techniques, finishing techniques and fastenings used. • Use questions to develop children's understanding e.g. *How many parts is it made from? What is it joined with? How is it finished? Why do you think these joining techniques have been chosen? How is it fastened? Who might use it and why?* • Make drawings of existing products, stating the user and purpose. Identify and label, if appropriate, the fabrics, fastenings and techniques used. **Focused Tasks (FTs)** • Investigate fabrics to determine which is best for the purpose of the product they are creating.	**Heroes and Villains** ***See Project on a Page Planner 3_4 Simple Circuits and Switches on One Drive for full details including resources required.*** Curriculum Planning › Subject Resources and Planning Support › Design and Technology › Project on a Page planners ***NC Objectives Covered: 1, 2, 3, 4, 5, 6, 10*** **What could children design, make and evaluate?** Torches **Investigative and Evaluative Activities (IEAs)** • Discuss, investigate and, where practical, disassemble different examples of relevant battery-powered products, including those which are commercially available e.g. *Where and why they are used? How does the product work? What are its key features and components? How does the switch work? Is the product manually controlled or controlled by a computer? What materials have been used and why? How is it suited to its intended user and purpose?* • Ask children to investigate examples of switches, including those which are commercially available, which work in different ways e.g. push-to-make, push-to-break, toggle switch. Let the children use them in simple circuits e.g. *How might different types of switches be useful in different types of products?* • Remind children about the dangers of mains electricity. **Focused Tasks (FTs)**	**Off with Her Head** ***See Project on a Page Planner 5_6 Celebrating Culture and Seasonality on One Drive for full details including resources required.*** Curriculum Planning › Subject Resources and Planning Support › Design and Technology › Project on a Page planner ***NC Objectives Covered: 1, 2, 3, 4, 5, 6, 7, 12, 13, 14*** **What could children design, make and evaluate?** Tudor soup (simple recipe at: https://sarahkennedybooks.com/recipes-from-tudor-england/soups-and-stews/vegetable-pottage-from-tudor-england/ **OR** If this topic is taught in the Summer term, teachers may alternatively wish to make a Romani Celebration soup to coincide with Gypsy, Roma and Traveller History month in June. https://thegypsychef.com/romani-celebration-soup/ https://thegypsychef.com/about-the-project/ The focus for the Design. Make and Evaluate aspect of the unit should be to ***ensure that children are choosing seasonal vegetables that can be grown locally*** (ie from the UK).

Firs Primary School Design and Technology Progression and Coverage 2022-2023

• Using prepared teaching aids, demonstrate the use of a template or simple paper pattern. Children could make their own templates or paper patterns. If necessary, they can use ones provided by the teacher.
• Using prepared teaching aids, demonstrate the correct use of appropriate tools to mark out, tape or pin the fabric to the templates or paper patterns and cut out the relevant fabric pieces for the product.
• Using prepared teaching aids, demonstrate appropriate examples of joining techniques for children to practise in guided groups e.g. running stitch including threading own needle, stapling, lacing and gluing. Talk about the advantages and disadvantages of each technique.
• Using prepared teaching aids, demonstrate examples of finishing techniques for children to practise in guided groups e.g. sewing buttons, 3-D fabric paint, gluing sequins, printing.

Design, Make and Evaluate Assignment (DMEA)
• Provide the children with a context that is authentic. Discuss with children the purpose and user of the products they will be designing, making and evaluating. Design criteria developed with the teacher should be used to guide the development and evaluation of the children's products.
• Ask the children to generate a range of ideas e.g. *What parts will the product need to have and what will it be made from? What size will it be? How will it be joined and finished?*
• Through talk, drawings and mock-ups, ask the children to develop and communicate their ideas. Information and communication technology could be used for symmetry and pattern ideas. Choose one idea to follow through.
• Talk with the children about the stages in making before assembling quality products, applying the knowledge, understanding and skills learnt through the IEAs and FTs.
• Evaluate ongoing work and the final products against the intended purpose and with the intended user, drawing on the design criteria previously agreed.

Key Vocabulary:

Tier 1	Tier 2	Tier 3
Join Make	Pattern mark out decorate finish features suitable quality,	Fabric Stitch Thread Sew Needle Running stitch Template Symmetry Fastening Finishing Design Evaluate Pattern pieces mock-up design brief design criteria evaluate user purpose function {names of existing products, joining and finishing techniques, tools, fabrics and components}

Golden Nuggets:
1. **Children can thread their own needle and use a simple running stitch to join two pieces of fabric**
2. **Children can use a template to mark and cut out a simple pattern**
3. **Children can identify different types of fastenings on existing fabric products including; zip, velcro, poppers, buttons, laces**

Scented Garden

• Recap with the children how to make manually controlled, simple series circuits with batteries and different types of switches, bulbs and buzzers. Discuss which of the components in the circuit are input devices e.g. switches, and which are output devices e.g. bulbs and buzzers.
• Demonstrate how to find a fault in a simple circuit and correct it, giving pupils opportunities to practise.
• Use a simple computer control program with an interface box or standalone control box to physically control output devices e.g. bulbs and buzzers.
• Ask the children to make a variety of switches by using simple classroom materials e.g. card, corrugated plastic, aluminium foil, paper fasteners and paper clips. Encourage children to make switches that operate in different ways e.g. when you press them, when you turn them, when you push them from side to side. Ask the children to test their switches in a simple series circuit.
• Teach children how to avoid making short circuits.

Design, Make and Evaluate Assignment (DMEA)
• Develop a design brief with the children within a context which is authentic and meaningful.
• Discuss with children the purpose of the battery-powered products that they will be designing and making and who they will be for. Ask the children to generate a range of ideas, encouraging realistic responses. Agree on design criteria that can be used to guide the development and evaluation of the children's products, including safety features.
• Using annotated sketches, cross-sectional and exploded diagrams, as appropriate, ask the children to develop, model and communicate their ideas.
• Ask the children to consider the main stages in making and testing before assembling high quality products, drawing on the knowledge, understanding and skills learnt through IEAs and FTs.
• Evaluate throughout and the final products against the intended purpose and with the intended user, drawing on the design criteria previously agreed.

Key Vocabulary

Tier 1	Tier 2	Tier 3
	Switch Fault Connection Process Purpose Function Innovative Appealing	series circuit toggle switch push-to-make switch push-to-break switch battery battery holder bulb bulb holder wire insulator conductor crocodile clip control program system input device output device user prototype design criteria design brief

Golden Nuggets:
1. **Children can identify different types of switches including: 'push to make', 'push to break' and toggle switches.**
2. **Children can make a simple series circuit and understand how to avoid creating a short circuit.**

Mighty Metals

Investigative and Evaluative Activities (IEAs)
• Children use first hand and secondary sources to carry out relevant research into existing products to include personal/cultural preferences, ensuring a healthy diet, meeting dietary needs and the availability of locally sourced/seasonal/organic ingredients. This could include a visit to a local bakery, farm, farm shop or supermarket e.g. *What ingredients are sourced locally/in the UK/from overseas? What are the key ingredients needed to make a particular product? How have ingredients been processed? What is the nutritional value of a product?*
• Children carry out sensory evaluations of a variety of existing food products and ingredients relating to the project. The ingredients could include those that could be added to a basic recipe such as herbs, spices, vegetables or cheese. These could be locally sourced, seasonal, Fair Trade or organic. Present results in e.g. tables/graphs/charts and by using evaluative writing.
• Use a range of questions to support children's ability to evaluate food ingredients and products e.g. *What ingredients help to make the product spicy/crisp/crunchy etc? What is the impact of added ingredients/finishes/shapes on the finished product?*
• Research key chefs and how they have promoted seasonality, local produce and healthy eating. This could be expanded to looking at how different chefs promote sustainable food use e.g. https://www.globalcitizen.org/en/content/chefs-food-world-hunger-malnutrition-efficiency/

Seasonal food info: https://www.bbc.co.uk/bitesize/topics/zjr8mp3/articles/zb23p4j

Focused Tasks (FTs)
• Demonstrate how to measure out, cut, shape and combine e.g. knead, beat, rub and mix ingredients.
• Demonstrate how to use appropriate utensils and equipment that the children may use safely and hygienically.
• Techniques could be practised following a basic recipe to prepare and cook a savoury food product.
• Ask questions about which ingredients could be changed or added in a basic recipe such as types of flour, seeds, garlic, vegetables. Consider texture, taste, appearance and smell.

Design, Make and Evaluate Assignment (DMEA)
• Develop a design brief and simple design specification with the children within a context that is authentic and meaningful. This can include design criteria relating to nutrition and healthy eating.
• Discuss the purpose of the products that the children will be designing, making and evaluating and who the products will be for.
• Ask children to generate a range of ideas encouraging innovative responses. Agree on design criteria that can be used to guide the development and evaluation of the children's product.
• Using annotated sketches, discussion and information and communication technology if appropriate, ask children to develop and communicate their ideas.
• Ask children to record the steps, equipment, utensils and ingredients for making the food product drawing on the knowledge, understanding and skills learnt through IEAs and FTs.
• Evaluate the work as it progresses and the final product against the intended purpose and user reflecting on the design specification previously agreed.

Key Vocabulary

Tier 1	Tier 2	Tier 3
Stir Pour Mix Chop Slice Grate Boil Hot Cold {Names of utensils used} {Names of ingredients used}	Intolerance Savoury Ingredients Healthy Source Innovative Research Evaluate Varied	carbohydrate protein vitamins nutrients nutrition gluten dairy allergy seasonality design specification design brief

Firs Primary School Design and Technology Progression and Coverage 2022-2023

See Project on a Page Planner 1_2 Preparing Fruit and Vegetables on One Drive for full details including resources required.

Curriculum Planning › Subject Resources and Planning Support › Design and Technology › Project on a Page planners

NC Objectives Covered: 1,3,4,5,6,9

What could children design, make and evaluate?
Fruit salads, fruit yogurt, fruit drinks, fruit jelly, fruit smoothies, vegetable salads, fruit and vegetable kebabs

Investigative and Evaluative Activities (IEAs)
• Children examine a range of fruit/vegetables. Use questions to develop children's understanding e.g. *What is this called? Who has eaten this fruit/vegetable before? Where is it grown? When can it be harvested? What are its taste, smell, texture and appearance? What will it look like if we peel it or cut it in half? What are the different parts called?*
• Provide opportunities for children to handle, smell and taste fruit and vegetables in order to describe them through talking and drawing. e.g. *What words can we use to describe the shape, colour, feel, taste?*
• Evaluate existing products to determine what the children like best; provide opportunities for the children to investigate preferences of their intended users/suitability for intended purposes e.g. *What do you prefer and why? What might we want to include in our product to meet our user's preferences? Which fruit/vegetables might be the best for our product to match the occasion/purpose?*

Focused Tasks (FTs)
• Discuss basic food hygiene practices when handling food including the importance of following instructions to control risk e.g. *What should we do before we work with food? Why is following instructions important?*
• Demonstrate how to use simple utensils and provide opportunities for the children to practise food-processing skills such as washing, grating, peeling, slicing, squeezing e.g. *Do we eat the whole fruit? Why or why not? Which parts do we eat? What might we have to do before eating this? Why do we cut, grate, peel and slice in this way?* Discuss different effects achieved by different processes.
• Discuss healthy eating advice, including eating more fruit and vegetables; using *The Eatwell Guide* model talk about the importance of fruit and vegetables in our balanced diet e.g. *Why is it good to eat fruit and vegetables? How many pieces of fruit/vegetables do you eat per day? Why is it important to wash fruit/vegetables before we eat them?*

Design, Make and Evaluate Assignment (DMEA)
• Set a context for designing and making which is authentic and meaningful.
• Discuss with the children the possible products that they might want to design, make and evaluate and who the products will be for. Agree on design criteria that can be used to guide the development and evaluation of children's products e.g. *Who/what is the product for? What will make our product unique/different? How will we know that we designed and made a successful product?*
• Use talk and drawings when planning for a product; ask the children to develop, model and communicate their ideas e.g. *What will you need? What fruit/vegetable will you need? How much will you need? How will you present the product?*
• Talk to the children about the main stages in making, considering appropriate utensils and food processes they learnt about through IEAs and FTs.
• Evaluate as the children work through the project and the final products against the intended purpose and with the intended user, drawing on the design criteria previously agreed.

Key Vocabulary:

Tier 1	Tier 2		Tier 3
Cut	Juicy	Flesh	Diet
Soft	Crunchy	Skin	Ingredients
hard	Sweet	Seed	Arrange
Knife	Sticky	Pip	Investigate
Spoon	Smooth	Core	Popular
Fork	Sharp	Slice	Design
Bowl	Crisp	Peel	Evaluate
Jug	Sour	Squeeze	Criteria
Apron	Hard	Healthy	Hygiene
Wash	Grater	Unhealthy	Skewer
Clean		Plan	
Spice			
Herbs			
Fat			
Sugar			

Note: For this topic, children will need to have some basic computer programming skills e.g. creating a sprite on Scratch. They should have chance to develop these skills in the computing unit for this topic.

See Project on a Page Planner 3_4 Simple Programming and Control on One Drive for full details including resources required.

Curriculum Planning › Subject Resources and Planning Support › Design and Technology › Project on a Page planners

NC Objectives Covered: 1, 2, 3, 4, 5, 6, 7, 10, 11

Inventor Focus:
Ada Lovelace, the 'first computer programmer'
https://www.bbc.co.uk/newsround/49960544
https://www.natgeokids.com/uk/primary-resource/ada-lovelace-primary-resource/
https://kids.nationalgeographic.com/history/article/ada-lovelace

What could children design, make and evaluate?
Programmable illuminated sign or electronic/moving story pages linked to topic.

Investigative and Evaluative Activities (IEAs)
• Discuss, investigate and, where practical and safe, disassemble different examples of relevant battery-powered products, including some programmable and programmed commercially available products e.g. *Where and why the products are used? How do they work? What are the key features and components? How does the switch work? Is the product manually controlled or controlled by a computer? If it is controlled by a computer how does that improve the way the product works? What materials have been used and why? How is it suited to its intended user and purpose?*
• Ask children to investigate examples of switches, including those which are commercially available, which work in different ways e.g. push-to-make, push-to-break, toggle switch. Let the children use them in simple circuits e.g. *How might different types of switches be useful in different types of products? How might different output devices be used?*
• Remind children about the dangers of mains electricity.

Focused Tasks (FTs)
• Recap with the children how to make manually controlled, simple series circuits with batteries and different types of switches, bulbs, motors and buzzers. Discuss which of the components in the circuit are input devices e.g. switches, and which are output devices e.g. bulbs, motors and buzzers.
• Demonstrate how to find a fault in a simple circuit and correct it, giving pupils opportunities to practise.
• Demonstrate and ask children to practise the use of a simple computer control program using an interface box, microcontroller or standalone control box to control output devices, e.g. bulbs and buzzers, using a repeating sequence of instructions.
• Ask the children to make a variety of switches by using simple classroom materials e.g. card, corrugated plastic, aluminium foil, paper fasteners and paper clips. Encourage children to make switches that operate in different ways e.g. when you press them, when you turn them, when you push them from side to side. Ask the children to test their switches in a simple series circuit.
• Teach children how to avoid making short circuits.

Design, Make and Evaluate Assignment (DMEA)
• Develop a design brief with the children within a context which is authentic and meaningful.
• Discuss with children the purpose of the battery-powered, programmable products that they will be designing and making and how they will work more effectively for the intended user than those that are manually controlled. Consider who they will be for and how they address a problem or need.
• Ask the children to generate a range of ideas, encouraging realistic responses. Agree on design criteria that can be used to guide the development and evaluation of the children's products, including safety features.

Golden Nuggets:
1. **Children can name some fruit/vegetables that are 'in season' ie best eaten, in each of the four seasons.**
2. **Children can describe three advantages of seasonal food:**
- Food **tastes much better** when its grown in its natural season.
- Tasty fresh food grown locally in season is **cheaper** to buy.
- Seasonal food is **better for the environment**.
3. **Children can identify some of the nutritional content of the key ingredients used e.g. spinach is high in iron, peas and potatoes also contain protein etc.**

Pharaohs

Note: Children will need to know how to make their own electrical circuit for this unit. These skills should have been covered in LKS2 in the Gods and Mortals and Heroes and Villains topics. Additional focused tasks may be required for new children or those that have not embedded this learning.

See Project on a Page Planner 5_6 More Complex Switches and Circuits on One Drive for full details including resources required.

Curriculum Planning › Subject Resources and Planning Support › Design and Technology › Project on a Page planners

NC Objectives Covered: 1, 2, 3, 4, 5, 6, 7, 10

What could children design, make and evaluate?
Electrical board game

Investigative and Evaluative Activities (IEAs)
• Using research, discuss a range of relevant products that respond to changes in the environment using a computer control program such as automatic nightlights, alarm systems, security lighting e.g. *Who have the products been designed for and for what purpose? How and why is a computer control program used to operate the products? What input devices, e.g. switches, and output devices, e.g. bulbs, have been used?*
• Investigate electrical sensors such as light dependent resistors (LDRs) and a range of switches such as push-to-make switches, push-to-break switches, toggle switches, micro switches and reed switches. To gain an understanding of how they are operated by the user and how they work, ask the children to use each component to control a bulb in a simple circuit. Remind children about the dangers of mains electricity.
• Children should research famous inventors related to the project e.g. Thomas Edison (with support from Lewis Latimer: https://www.youtube.com/watch?v=vnehQD9NCrE) – light bulb. This would be an ideal video to link to learning in Black History Month if the topic is taught at this time. Teachers should ensure they reiterate the protected characteristic of race in relation to the treatment of Latimer's father as a 'runaway slave'. Latimer is also taught in LKS2 in the Playlist topic in relation to his support with the invention of the telephone.

Focused Tasks (FTs)
• Through teacher demonstration and explanation, recap measuring, marking out, cutting and joining skills with construction materials that children will need to create their electrical products.
• Demonstrate and enable children to practise methods for making secure electrical connections e.g. using automatic wire strippers, twist and tape electrical connections, screw connections and connecting blocks.

{Names of fruit and vegetables tasted/used}	Chopping-board	Choose Taste Safe	

Golden Nuggets:

4. **Children can name the 5 sections of the 'Eatwell Plate' and give examples of foods in each section.**
5. **Children know that they should eat AT LEAST five portions of fruit and vegetables each day and can identify a variety of fruit and vegetables they have used within the unit.**
6. **Children know how to be safe and hygienic when preparing food e.g. washing hands and being careful with sharp kitchen equipment e.g. knives and graters.**

Towers, Tunnels and Turrets

See Project on a Page Planner 1_2 Freestanding Structures on One Drive for full details including resources required.

Curriculum Planning › Subject Resources and Planning Support › Design and Technology › Project on a Page planners

NC Objectives Covered: 1,2,3,4,5,6,7

What could children design, make and evaluate?
Children should design, make and evaluate a freestanding structure linked to a key or model text in English e.g. The Paperbag Princess – children could make furniture (e.g. throne) to replace the Princess's belongings destroyed by the dragon in the story or a bridge to help her get to the dragon's cave etc.

Investigative and Evaluative Activities (IEAs)
Link to Geography Fieldtrip to Crich Tramway Museum
• Go on a walk and/or look at photographs of the local area to explore structures such as playground equipment, street furniture, walls, towers and bridges e.g. *What are the structures called and what is their purpose? Who might use them? What materials have been used? Why have these been chosen? How have the parts been joined together? How have the structures been made strong enough? How have they been made stable?*
•**A**sk the children to draw or photograph the structures they have been exploring and label with the correct technical vocabulary in relation to the structure, materials used and shapes e.g. wall, tower, framework, base, joint, metal, wood, plastic, brick, triangle, square, rectangle, cuboid, cube. (this could be done from photographs of structures observed during the fieldtrip e.g. playground equipment, bridges, benches etc)

Focused Tasks (FTs)
• Demonstrate measuring, marking out, cutting, shaping, joining and finishing techniques with a range of tools and new and reclaimed materials that children are likely to use to make their structures. Discuss the suitability of materials for their products according to their characteristics.
• Ask the children to build and explore a variety of freestanding structures using construction kits, such as wooden blocks, interconnecting plastic bricks and those that make frameworks e.g. *How can you stop your structures from falling over? How they can be made stronger and stiffer in order to carry a load?* Children could make models of the structures they have seen in school and the local area.
• Ask children to fold paper or card in different ways to make freestanding structures, using masking tape where necessary to make joins. Encourage them to think about how folding materials can make them stronger, stiffer, stand up and be more stable e.g. *Can they support an object on top of their structures without it falling over or breaking?*

Design, Make and Evaluate Assignment (DMEA)
• Using annotated sketches, cross-sectional and exploded diagrams, as appropriate, ask the children to develop, model and communicate their ideas.
• Ask the children to consider the main stages in making and testing before assembling high quality products, drawing on the knowledge, understanding and skills learnt through IEAs and FTs.
• Have the children write, test and debug programs that will control the electrical product they have made for a clearly defined purpose e.g. bulb on a nightlight switching off after a period of time when the user has gone to sleep or LEDs flashing on and off to illuminate a sign in a shop window.
• Evaluate throughout and the final products against the intended purpose and, where safe and practical, with the intended user, drawing on the design criteria previously agreed.

Key Vocabulary

Tier 1	Tier 2	Tier 3
	Switch Fault Connection Process Purpose Function Innovative Appealing	series circuit toggle push-to-make switch push-to-break switch battery battery holder light emitting diode (LED) bulb bulb holder USB cable Wire Insulator Conductor crocodile clip control program system input device output device user prototype design criteria design brief

Golden Nuggets:

1. **Children can identify and label components in a circuit including; batteries, switches, bulbs, motors, buzzers and wires and can say which components are input or output devices.**
2. **Children know how to find a fault in a simple series circuit and correct it.**
3. **Children know that Ada Lovelace's notes were inspiration for the first 'modern' computer and that she is known as the 'first computer programmer'.**

Burps, Bottoms and Bile

See Project on a Page Planner 3_4 Healthy and Varied Diet on One Drive for full details including resources required.

NC Objectives Covered: 1, 2, 3, 4, 5, 6, 12, 13, 14

What could children design, make and evaluate?
Sandwiches, wraps, rolls, pitta pockets, blinis, rice cakes, toasties, snack bar, salad snacks

Investigative and Evaluative Activities (IEAs)
• Drawing on science understanding, ask the children to explore a range of electrical systems that could be used to control their products, including a simple series circuit where a single output device is controlled, a series circuit where two output devices are controlled by one switch and, where appropriate, parallel circuits where two output devices are controlled independently by two separate switches.
• Drawing on related computing activities, ensure that children can write computer control programs that include inputs, outputs and decision making. Test out the programs using electrical components connected to interface boxes or standalone boxes.
• Teach children how to avoid making short circuits.

Design, Make and Evaluate Assignment (DMEA)
• Develop an authentic and meaningful design brief with the children.
• Ask the children generate innovative ideas by drawing on research and develop a design specification for their product, carefully considering the purpose and needs of the intended user.
• Communicate ideas through annotated sketches, pictorial representations of electrical circuits or circuit diagrams. Drawings should indicate the design decisions made, including the location of the electrical components and how they work as a system with an input, process and output.
• Produce detailed step-by-step plans and lists of tools, equipment and materials needed. If appropriate, allocate tasks within a team.
• Make high quality products, applying knowledge, understanding and skills from IEAs and FTs. Create and modify a computer control program to enable the product to work automatically in response to changes in the environment.
• Critically evaluate throughout and the final product, comparing it to the original design specification. Test the system to demonstrate its effectiveness for the intended user and purpose.

Key Vocabulary

Tier 1	Tier 2	Tier 3
Bulb On Off	Switch system monitor control program function innovative user purpose inventor connection	series circuit parallel circuit short circuit {names of switches and components} input device output device flowchart design specification design brief patent

Golden Nuggets:

1. **Children can identify whether a circuit is series or parallel and can make both a series circuit and a parallel circuit.**
2. **Children know that Thomas Edison invented the first lightbulb, but also that he was only able to do so with the help of Lewis Latimer.**
3. **Children can write a simple computer program to control inputs, outputs and decision making, and use this to control their final electrical product.**

Time Traveller

See Project on a Page Planner 5_6 Combining Different Fabric Shapes on One Drive for full details including resources required.

Curriculum Planning › Subject Resources and Planning Support › Design and Technology › Project on a Page planners

Please also see Textiles progression guidance on the Art and Design Progression and Coverage Document.

Firs Primary School Design and Technology Progression and Coverage 2022-2023

• Discuss with the children what structure they will be designing, making and evaluating e.g. *Who will your product be for? What will be its purpose? What materials will you use? How will you make it strong and stable?*
• Generate some simple design criteria with the children e.g. the structure should stand up on its own, it should be strong enough to carry Teddy.
• Encourage the children to develop their ideas through talking, drawing and making mock-ups of their ideas with construction kits and other materials.
• As a whole class, plan the order in which the structures will be made. Children could make their final products from construction kits, new and reclaimed materials or any combination of these, according to their characteristics.
• Ask children to evaluate their developing ideas and final products against original design criteria.

Key Vocabulary:

Tier 1	Tier 2	Tier 3
Cut	Fold	Design
Join	Fix	Evaluate
make	Structure	User
Wall	Framework	Purpose
Tower	Base	Ideas
Weak	Underneath	Design criteria
Strong	Surface	Product
Side	Point	Function
Edge	Straight	Metal
Corner	Curved	Wood
Thinner		Plastic
Thicker		Circle
Top		Triangle
		Square
		Rectangle
		Cuboid
		Cube
		Cylinder

Golden Nuggets:

1. **Children can identify and label parts of a structure including; material used, framework, base and joint**
2. **Children can identify the user and purpose of a variety of structures e.g. bench, slide, bridge etc**
3. **Children can identify a number of ways to stop a structure from falling over e.g. wider base, make it thicker, fold card to make it stronger etc**

• Children investigate a range of food products e.g. the content of their lunchboxes over a week, a selection of foods provided for them, food from a visit to a local shop. Link to the principles of a varied and healthy diet using *The Eatwell Guide* e.g. *What ingredients have been used? Which food groups do they belong to? What substances are used in the products e.g. nutrients, water and fibre?*
• Carry out sensory evaluations on the contents of the food from e.g. a variety of bought food products such as a range of wraps or sandwiches. Record results, for example using a table. Use appropriate words to describe the taste/smell/texture/appearance e.g. *How do the sensory characteristics affect your liking for the food?*
• Gather information about existing products available relating to your product. Visit a local supermarket and/or use the internet.
• Find out how a variety of ingredients used in products are grown and harvested, reared, caught and processed e.g. *Where and when are the ingredients grown? Where do different meats/fish/cheese/eggs come from? How and why are they processed?*

Focused Tasks (FTs)
• Learn to select and use a range of utensils and use a range of techniques as appropriate to prepare ingredients hygienically including the bridge and claw technique, grating, peeling, chopping, slicing, mixing, spreading, kneading and baking.
• Food preparation and cooking techniques could be practised by making a food product using an existing recipe.
• Discuss basic food hygiene practices when handling food including the importance of following instructions to control risk e.g. *What should we do before we work with food? Why is following instructions important?*

Additional teacher guidance on safe handling of equipment:
https://www.warburtons.co.uk/wp-content/uploads/2020/11/Guide-How-to-teach-food-skills.pdf

Design, Make and Evaluate Assignment (DMEA)
• Discuss the purpose of the products that the children will be designing, making and evaluating and who the products will be for.
• Develop and agree on design criteria with the children within a context that is authentic and meaningful. This can include criteria relating to healthy eating and a varied diet e.g. *What do you need to consider to make it part of a balanced diet? How do we select the ingredients? How could we make it appealing to eat?*
• Ask children to generate a range of ideas encouraging realistic responses.
• Using discussion, annotated sketches and information and communication technology if appropriate, ask the children to develop and communicate their ideas.
• Ask children to consider the main stages in making the food product, before preparing/cooking the product including the ingredients and utensils they will need.
• Evaluate as the assignment proceeds and the final product against the intended purpose and user, reflecting on the design criteria previously agreed. Consider what others think of the product when considering how the work might be improved.

Key Vocabulary

Tier 1	Tier 2	Tier 3
{names of foods tasted and ingredients)	Texture	Seasonal
{names of equipment and utensils used}	Sweet	Harvested
Taste	Sour	healthy/varied diet
Smell	Spicy	design criteria
Cook	Appearance	user
Hot	Preference	annotated sketch
Cold	Greasy	sensory evaluations
Mix	Moist	
Stir	Fresh	
Bake	Savoury	
	Hygienic	
	Edible	
	Grown	
	Reared	
	Caught	

NC Objectives Covered: 1, 2, 3, 4, 5, 6, 7

What could children design, make and evaluate?
tablet case mobile phone carrier shopping bag insulating bag hat/cap garden tool belt slippers sandals fabric advent calendar fabric door stop other – specify

Investigative and Evaluative Activities (IEAs)
• Children investigate, analyse and evaluate a range of existing products which have been produced by combining fabric shapes.
Children Investigate work by designers and their impact on fabrics and products ***e.g. Laura Ashley*** ***https://www.bbc.co.uk/programmes/p00s7qf4*** . Use questions to develop children's understanding e.g. *Is the product functional or decorative? Who would use this product? What is its purpose? What design decisions have been made? Do the textiles used match the intended purpose? What components have been used to enhance the appearance? To what extent is the design innovative?*
• Children investigate and analyse how existing products have been constructed. Children disassemble a product and evaluate what the fabric shapes look like, how the parts have been joined, how the product has been strengthen and stiffened, what fastenings have been used and why.
• Children investigate properties of textiles through investigation e.g. exploring insulating properties, water resistance, wear and strength of textiles.

Focused Tasks (FTs)
• Develop skills of threading needles and joining textiles using a range of stitches. This activity must build upon children's earlier experiences of stitches e.g. improving appearance and consistency of stitches and introducing new stitches. If available, demonstrate and allow children to use sewing machines to join fabric with close adult supervision.
• Develop skills of sewing textiles by joining right side together and making seams. Children should investigate how to sew and shape curved edges by snipping seams, how to tack or attach wadding or stiffening and learn how to start and finish off a row of stitches.
• Develop skills of 2-D paper pattern making using grid or tracing paper to create a 3-D dipryl mock-up of a chosen product. Remind/teach how to pin a pattern on to fabric ensuring limited wastage, how to leave a seam allowance and different cutting techniques.
• Develop skills of computer-aided design (CAD) by using on-line pattern making software to generate pattern pieces. Investigate using art packages on the computer to design prints that can be applied to textiles using iron transfer paper.
(For a list of free pattern making software please see:
https://silverbobbin.com/best-free-pattern-making-software/)

Additional information for teachers for the FTs:
Basic stitches to be taught and practiced by the children:

https://www.pixiefaire.com/blogs/sewing-tips-resources/14211157-how-to-do-four-basic-hand-stitches

http://www.holiday-crafts-and-creations.com/how-to-do-blanket-stitch.html

	Frozen Tinned Planning Purpose	

Golden Nuggets:

1. **Children can identify whether foods used during the unit are fresh, frozen or processed.**
2. **Children can identify whether food is grown, reared or caught.**
3. **Children can say how to be hygienic and safe when preparing food including; washing hands before cooking and after handling raw meats and eggs, tying hair back, using bridge or claw techniques when cutting food**

Blue Abyss

See Project on a Page Planner 3_4 2D Shape to 3D Product on One Drive for full details including resources required.

Curriculum Planning › Subject Resources and Planning Support › Design and Technology › Project on a Pag

Please also see Textiles progression guidance on the Art and Design Progression and Coverage Document.

NC Objectives Covered: 1, 2, 3, 4, 5, 6

What could children design, make and evaluate?
Children should design, make and evaluate a textiles product linked to a key text or model text in English e.g. a sack for the Tear Thief to carry her tears in, or a bag to use as a story sack for the text.

Investigative and Evaluative Activities (IEAs)
• Children investigate a range of textile products that have a selection of stitches, joins, fabrics, finishing techniques, fastenings and purposes, linked to the product they will design, make and evaluate. Think about products from the past and what changes have been made in textile production and products e.g. the invention of zips and Velcro.
• Give children the opportunity to disassemble appropriate textiles products to gain an understanding of 3-D shape, patterns and seam allowances.
• Use questioning to develop understanding e.g. *What is its purpose? Which one is most suited to its purpose? What properties/characteristics does the fabric have? Why has this fabric been chosen? How has the fabric been joined together? How effective are its fastenings? How has it been decorated? Does its decoration have a purpose? What would the 2-D pattern piece look like? What are its measurements? How might you change the product?*

Focused Tasks (FTs)
• Demonstrate a range of stitching techniques and allow children to practise sewing two small pieces of fabric together, demonstrating the use of, and need for, seam allowances.
• Allow children to use a textile product they have taken apart to create a paper pattern using 2-D shapes.
• Provide a range of fabrics – children to consider whether fabrics are suitable for the chosen purpose and user. The fabrics also can be used for demonstrating and testing out a range of decorative finishing techniques e.g. appliqué, embroidery, fabric pens/paints, printing.
• Use questioning to develop understanding e.g. *Which joining technique makes the strongest seam? Why? Which stitch is appropriate for the purpose? Which joining techniques are suitable for the fabric and purpose? How can you stiffen your fabric? What is the purpose of the fastenings? Which one is most suited to the purpose and user? What decorative techniques have been used? What effect do they have?*

Additional information for teachers for the FTs:

Design, Make and Evaluate Assignment (DMEA)
• Set an authentic and meaningful design brief. Children generate ideas by carrying out research using e.g. surveys, interviews, questionnaires and the web. Children develop a simple design specification for their product.
• Communicate ideas through detailed, annotated drawings from different perspectives and/or computer- aided design. Drawings should indicate design decisions made, the methods of strengthening, the type of fabrics to be used and the types of stitching that will be incorporated.
• Produce step-by-step plans, lists of tools equipment, fabrics and components needed. Allocate tasks within a team if appropriate.
• Make high quality products applying knowledge, understanding and skills from IEAs and FTs. Incorporate simple computer-aided manufacture (CAM) if appropriate e.g. printing on fabric. Children use a range of decorating techniques to ensure a well-finished final product that matches the intended user and purpose.
• Evaluate both as the children proceed with their work and the final product in use, comparing the final product to the original design specification. Critically evaluate the quality of the design, the manufacture, functionality, innovation shown and fitness for intended user and purpose, considering others' opinions. Communicate the evaluation in various forms e.g. writing for a particular purpose, giving a well-structured oral evaluation, speaking clearly and fluently.

Key Vocabulary

Tier 1	Tier 2	Tier 3
Pins Needles Thread Fabric Sew Join Pin	Decoration Annotate Functionality Innovation Purpose Evaluate Authentic user	Seam seam allowance wadding reinforce right side wrong side hem template pattern pieces {name of textiles and fastenings used} pinking shears fastenings iron transfer paper design criteria design decisions mock-up prototype running stitch blanket stitch back stitch whip stitch slip stitch over sewing tack

Golden Nuggets:

1. Children can identify and use 5 stitch types: blanket stitch, slip stitch, back stitch, whip stitch, running stitch, threading their own needles.
2. Children can use pattern pieces to mark out and cut out a pattern, leaving a seam allowance.
3. Children can use a sewing machine, with supervision, to join two pieces of fabric together.

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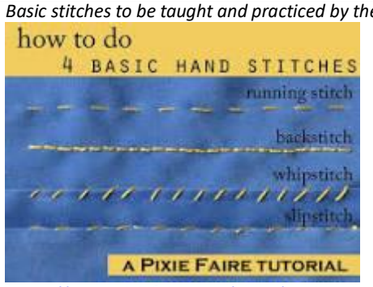
Basic stitches to be taught and practiced by the children:



https://www.pixiefaire.com/blogs/sewing-tips-resources/14211157-how-to-do-four-basic-hand-stitches

Design, Make and Evaluate Assignment (DMEA)

• Children to create a design brief, supported by the teacher, set within a context which is authentic and meaningful. Discuss the intended user, purpose and appeal of their product. Create a set of design criteria.
• Ask children to sketch and annotate a range of possible ideas, constantly encouraging creative thinking. Produce mock-ups and prototypes of their chosen product.
• Plan the main stages of making e.g. using a flowchart or storyboard.
• Children to assemble their product using their existing knowledge, skills and understanding from IEAs and FTs. Encourage children to think about the aesthetics and quality finish of their product.
• Evaluate as the process is undertaken and the final product in relation to the design brief and criteria. The product should be tested by the intended user and for its purpose and others' views sought to help with identifying possible improvements.

Key Vocabulary:

Tier 1	Tier 2	Tier 3
Zip	Fastening	{names of fabrics}
Button	Compartment	structure
Drawing	Label	finishing technique
	Strength	stiffening
	Weakness	templates
	Fabric	stitch
	Decoration	seam
		seam allowance
		user
		purpose
		design
		model
		evaluate
		prototype
		annotated sketch
		functional
		innovative
		investigate
		aesthetics
		function
		pattern pieces
		running stitch
		back stitch
		whip stitch
		slip stitch

Golden Nuggets:

1. **Children can identify running stitch, back stitch, whip stitch and slip stitch**
2. **Children join two pieces of fabric using at least two of the above stitches, threading their own needle and leaving a seam allowance**
3. **Children know different ways to add decoration to a fabric including embroidery, printing/painting, sewing on decorative buttons or sequins**

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Progression Guidance - Designing

Across KS1

Understanding contexts, users and purposes

PDA 1 - work confidently within a range of contexts, such as imaginary, story-based, home, school, gardens, playgrounds, local community, industry and the wider environment
PDA 2 - state what products they are designing and making
PDA 3 - say whether their products are for themselves or other users
PDA 4 - describe what their products are for
PDA 5 - say how their products will work
PDA 6 - say how they will make their products suitable for their intended users
PDA 7 - use simple design criteria to help develop their ideas

Generating, developing, modelling and communicating ideas

PDB 1 - generate ideas by drawing on their own experiences
PDB 2 - use knowledge of existing products to help come up with ideas
PDB 3 - develop and communicate ideas by talking and drawing
PDB 4 - model ideas by exploring materials, components and construction kits and by making templates and mockups
PDB 5 - use information and communication technology, where appropriate, to develop and communicate their ideas

LKS2

Understanding contexts, users and purposes

PDA 8 - gather information about the needs and wants of particular individuals and groups
PDA 9 - develop their own design criteria and use these to inform their ideas

Generating, developing, modelling and communicating ideas

PDB 6 - generate realistic ideas, focusing on the needs of the user
PDB 7 - make design decisions that take account of the availability of resources

UKS2

Understanding contexts, users and purposes

PDA 10 - carry out research, using surveys, interviews, questionnaires and web-based resources
PDA 11 - identify the needs, wants, preferences and values of particular individuals and groups
PDA 12 - develop a simple design specification to guide their thinking

Generating, developing, modelling and communicating ideas

PDB 8 - generate innovative ideas, drawing on research
PDB 9 - make design decisions, taking account of constraints such as time, resources and cost

Across KS2

Understanding contexts, users and purposes

PDA13 - work confidently within a range of contexts, such as the home, school, leisure, culture, enterprise, industry and the wider environment
PDA 14 - describe the purpose of their products
PDA 15 - indicate the design features of their products that will appeal to intended users
PDA 16 - explain how particular parts of their products work

Generating, developing, modelling and communicating ideas

PDB 8 - generate innovative ideas, drawing on research
PDB 9 - make design decisions, taking account of constraints such as time, resources and cost **PDB 10** - share and clarify ideas through discussion
PDB 11 - model their ideas using prototypes and pattern pieces
PDB 12 - use annotated sketches, cross-sectional drawings and exploded diagrams to develop and communicate their ideas
PDB 13 - use computer-aided design to develop and communicate their ideas

Progression Guidance - Making

Across KS1

Planning

PMA 1 - plan by suggesting what to do next
PMA 2 - select from a range of tools and equipment, explaining their choices
PMA 3 - select from a range of materials and components according to their characteristics

Practical skills and techniques

PMB 1 - follow procedures for safety and hygiene
PMB 2 - use a range of materials and components, including construction materials and kits, textiles, food ingredients and mechanical components
PMB 3 - measure, mark out, cut and shape materials and components

LKS2

Planning

PMA 4 - order the main stages of making

Practical skills and techniques

PMB 6 - measure, mark out, cut and shape materials and components with some accuracy
PMB 7 - assemble, join and combine materials and components with some accuracy
PMB 8 - apply a range of finishing techniques, including those from art and design, with some accuracy

UKS2

Planning

PMA 5 - produce appropriate lists of tools, equipment and materials that they need
PMA 6 - formulate step-by-step plans as a guide to making

Practical skills and techniques

PMB 9 - accurately measure, mark out, cut and shape materials and components
PMB 10 - accurately assemble, join and combine materials and components
PMB 11 - accurately apply a range of finishing techniques, including those from art and design

PMB 4 - assemble, join and combine materials and components
PMB 5 - use finishing techniques, including those from art and design

PMB 12 - use techniques that involve a number of steps
PMB 13 - demonstrate resourcefulness when tackling practical problem

Across KS2

Planning

PMA 5 - produce appropriate lists of tools, equipment and materials that they need
PMA 6 - formulate step-by-step plans as a guide to making
PMA 7 - select tools and equipment suitable for the task
PMA 8 - explain their choice of tools and equipment in relation to the skills and techniques they will be using
PMA 9 - select materials and components suitable for the task
PMA 10 - explain their choice of materials and components according to functional properties and aesthetic qualities

Practical skills and techniques

PMB 14 - follow procedures for safety and hygiene
PMB 15 - use a wider range of materials and components than KS1, including construction materials and kits, textiles, food ingredients, mechanical components and electrical components

Progression Guidance - Evaluating

Across KS1

Own ideas and products
PEA 1 - talk about their design ideas and what they are making
PEA 2- make simple judgements about their products and ideas against design criteria
PEA 3 - suggest how their products could be improved

Existing products
PEB 1 - what products are
PEB 2 - who products are for
PEB 3 - what products are for
PEB 4 - how products work
PEB 5 - how products are used
PEB 6 - where products might be used
PEB 7 - what materials products are made from
PEB 8 - what they like and dislike about products

LKS2

Own ideas and products
PEA 4 - refer to their design criteria as they design and make
PEA 5 - use their design criteria to evaluate their completed products

Existing products
PEB 9 - who designed and made the products
PEB 10 - where products were designed and made
PEB 11 - when products were designed and made
PEB 12 - whether products can be recycled or reused

UKS2

Own ideas and products
PEA 6 - critically evaluate the quality of the design, manufacture and fitness for purpose of their products as they design and make
PEA 7 - evaluate their ideas and products against their original design specification

Existing products
PEB 13 - how much products cost to make
PEB 14 - how innovative products are
PEB 15 - how sustainable the materials in products are
PEB 16 - what impact products have beyond their intended purpose

Across KS2

Own ideas and products

PEA 8 - identify the strengths and areas for development in their ideas and products
PEA 9 - consider the views of others, including intended users, to improve their work

Existing products

PEB 17 - how well products have been designed
PEB 18 - how well products have been made
PEB 19 - why materials have been chosen
PEB 20 - what methods of construction have been used
PEB 21 - how well products work
PEB 22 - how well products achieve their purposes
PEB 23 - how well products meet user needs and wants

Key events and individuals

PEC 1- about inventors, designers, engineers, chefs and manufacturers who have developed ground-breaking products

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Progression Guidance – Technical knowledge

Across KS1

PTK 1 - about the simple working characteristics of materials and components
PTK 2 - about the movement of simple mechanisms such as levers, sliders, wheels and axles
PTK 3 - how freestanding structures can be made stronger, stiffer and more stable
PTK 4 - that a 3-D textiles product can be assembled from two identical fabric shapes
PTK 5 - that food ingredients should be combined according to their sensory characteristics
PTK 6 - the correct technical vocabulary for the projects they are undertaking

LKS2

PTK 7 - how mechanical systems such as levers and linkages or pneumatic systems create movement
PTK 8 - how simple electrical circuits and components can be used to create functional products
PTK 9 - how to program a computer to control their products
PTK 10 - how to make strong, stiff shell structures
PTK 11 - that a single fabric shape can be used to make a 3D textiles product
PTK 12 - that food ingredients can be fresh, pre-cooked and processed

UKS2

PTK 13 - how mechanical systems such as cams or pulleys or gears create movement
PTK 14 - how more complex electrical circuits and components can be used to create functional products
PTK 15 - how to program a computer to monitor changes in the environment and control their products
PTK 16 - how to reinforce and strengthen a 3D framework
PTK 17 - that a 3D textiles product can be made from a combination of fabric shapes
PTK 18 - that a recipe can be adapted by adding or substituting one or more ingredients

Across KS2

PTK 19 - how to use learning from science to help design and make products that work
PTK 20 - how to use learning from mathematics to help design and make products that work
PTK 21 - that materials have both functional properties and aesthetic qualities
PTK 22 - that materials can be combined and mixed to create more useful characteristics
PTK 23 - that mechanical and electrical systems have an input, process and output
PTK 24 - the correct technical vocabulary for the projects they are undertaking

Progression Guidance – Cooking and Nutrition

Across KS1

Where food comes from
PCNA 1 - that all food comes from plants or animals
PCNA 2 - that food has to be farmed, grown elsewhere (e.g. home) or caught

Food preparation, cooking and nutrition
PCNB 1 - how to name and sort foods into the five groups in 'The Eatwell Plate'
PCNB 2 - that everyone should eat at least five portions of fruit and vegetables every day
PCNB 3 - how to prepare simple dishes safely and hygienically, without using a heat source
PCNB 4 - how to use techniques such as cutting, peeling and grating

LKS2

Food preparation, cooking and nutrition

PCNB 5 - that a healthy diet is made up from a variety and balance of different food and drink, as depicted in 'The Eatwell Plate'
PCNB 6 - that to be active and healthy, food and drink are needed to provide energy for the body

UKS2

Where food comes from
PCNA 3 - that seasons may affect the food available
PCNA 4 - how food is processed into ingredients that can be eaten or used in cooking

Food preparation, cooking and nutrition
PCNB 7 - that recipes can be adapted to change the appearance, taste, texture and aroma
PCNB 8 - that different food and drink contain different substances – nutrients, water and fibre – that are needed for health

Across KS2

Where food comes from
PCNA 5 - that food is grown (such as tomatoes, wheat and potatoes), reared (such as pigs, chickens and cattle) and caught (such as fish) in the UK, Europe and the wider world

Food preparation, cooking and nutrition
PCNB 9 - how to prepare and cook a variety of predominantly savoury dishes safely and hygienically including, where appropriate, the use of a heat source
PCNB 10 - how to use a range of techniques such as peeling, chopping, slicing, grating, mixing, spreading, kneading and baking

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