Year 5/6 Curriculum Cycle A Autumn 2023
Design Brief: How can I create a strong, durable bridge?

4 lessons over 5 days (make/create lesson may take 2 days)

Key Learning Skills

Prior learning
• Experience of using measuring, marking out, cutting, joining, shaping and finishing techniques with construction materials.
Basic understanding of what structures are and how they can be made stronger, stiffer and more stable.

Research:: Investigate and Evaluative Activities (IEAs)
Children investigate a range of bridge structures. 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?*
Children could research key individuals related to their study of frame structures e.g. Isambard Kingdom Brunel, 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.

Designing: Design, Make and Evaluate Assignment (DMEA)
Develop a simple design specification to guide the development of their ideas and products, taking account of constraints including time, resources and cost.
Generate, develop and model innovative ideas, through discussion, prototypes and annotated sketches.
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?*

Making: Focussed Tasks
Formulate a clear plan, including a step-by-step list of what needs to be done and lists of resources to be used.
Competently select from and use appropriate tools to accurately measure, mark out, cut, shape and join construction materials to make frameworks.
Use finishing and decorative techniques suitable for the product they are designing and making.
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.

Evaluating: Design, Make and Evaluate Assignment (DMEA)
• Investigate and evaluate a range of existing frame structures.
• Critically evaluate their products against their design specification, intended user and purpose, identifying strengths and areas for development, and carrying out appropriate tests.
Research key events and individuals relevant to frame structures.
Children should regularly evaluate their work and their completed product, drawing on their design specification, and thinking about the intended purpose and user.

Technical knowledge and understanding
Understand how to strengthen, stiffen and reinforce 3-D frameworks.
now and use technical vocabulary relevant to the project.

Lesson 1:
Children develop their understanding of structures by investigating how different shapes affect their strength.

Learning Objectives:
To explore how to reinforce a beam (structure) to improve its strength
I can identify beam and arch bridges
I can create a range of beam and arch bridge designs
I can identify stronger and weaker structures
I can find different ways to reinforce structures

Lesson 2
Children create spaghetti truss bridges, learning how different shapes can improve the strength of a structure.

Learning Objectives:
To build a spaghetti truss bridge
I can identify arch, beam and truss bridges
I can use triangles to create truss bridges and test them
I understand how triangles can be used to reinforce bridges

Lesson 3
Children learn about material properties and why they are important. They learn to use tools including saws to build a wooden bridge.

Learning Objectives:
To build a wooden truss bridge.
I can measure and mark out accurately on wood
I can select appropriate tools and equipment for particular tasks
I can follow health and safety rules
I can explain why selecting appropriating materials is an important part of the design process

Lesson 4
Pupils continue to build their truss bridges, reinforce and evaluate them.

Learning Objectives:
To complete, reinforce and evaluate my truss bridge.
I can complete my wooden truss bridge
I can identify points of weakness and reinforce them as necessary following testing
I can evaluate my truss bridge against a specification

Key Vocabulary

Tier 1: fold, roll, glue, cut, hold, weight, mark, shape,

Tier 2: structure, shape, reinforce, accurate,

Tier 3: struts, beam bridge, suspension bridge, truss bridge

Year 5/6 Curriculum Cycle A Spring 2024
Design Brief: How can I make a pop-up book
Aspect of DT - Mechanisms Focus - sliders

Key Learning Skills
Prior learning
Experience of cutting, gluing, using rulers, group work, accurately measuring,

Research:
Use research and develop design criteria to inform the design of innovative, functional, appealing products that are fit for purpose, aimed at particular individuals or groups
Generate, develop, model and communicate their ideas through discussion, annotated sketches, cross-sectional and exploded diagrams, prototypes, pattern pieces and computer-aided design

Designing: Design, Make and Evaluate Assignment (DMEA)
Generate, develop, model and communicate their ideas through discussion, annotated sketches, cross-sectional and exploded diagrams, prototypes, pattern pieces and computer-aided design

Making: focussed tasks
Select from and use a wider range of tools and equipment to perform practical tasks [for example, cutting, shaping, joining and finishing], accurately
Select from and use a wider range of materials and components, including construction materials, textiles and ingredients, according to their functional properties and aesthetic qualities

Evaluating
Investigate and analyse a range of existing products
Evaluate their ideas and products against their own design criteria and consider the views of others to improve their work

Technical knowledge and understanding
Apply their understanding of how to strengthen, stiffen and reinforce more complex structures
Understand and use mechanical systems in their products [for example, gears, pulleys, cams, levers and linkages]

Lesson 1
Designing a pop-up book for younger children. After choosing an appropriate story to base their pop-up book on, children draw out the pages, write the captions and specify the mechanisms they will use and the resulting movement they envisage
I can remember that:
an input is the motion used to start a mechanism
- an output is the motion that happens as a result of starting the input

I know that structures use the movement of the pages to work
I know that mechanisms control movement
I can design a book made up of a front cover and four pages and include a mixture of structures and mechanisms within it

Lesson 2
Children create the structure of their books, including the pop-up features, and begin to make their mechanisms.
I can use paper, card and glue to make my book structure
I can make mechanisms and/or structures as detailed in my design template by using sliders, pivots and folds to produce movement

Lesson 3
Children secure their mechanisms onto the pages and give their books a professional finish, using layers and spacers to hide the mechanisms
I can complete the mechanisms and structures as detailed in my design template
I can make my book look neater and more attractive by using layers using spacers to hide relevant parts of my mechanisms.

Lesson 4
Children add the finishing touches to their books, adding illustrations, colour and writing captions
I can complete the surface decoration of my pop-up book by adding the story through:
Pictures
Captions
I know that I need to consider the preferences and needs of the user
I know that good quality making should be neat, accurate and securely assembled

Key Vocabulary
Tier 1 measure, glue, cut, scissors,

Tier 2 mechanism, design brief, input, output, aesthetic

Tier 3: CAD, prototype, linkage, pivots, exploded diagram, caption, slider,

Year 5/6 Curriculum Cycle A Spring 2024

On going Year 5 - How does the changing seasons influence the food we eat?

Aspect of DT - Food Focus - Celebrating seasonality– Hot Cross Buns

Key Learning Skills

Prior learning

- Have knowledge and understanding about food hygiene, nutrition, healthy eating and a varied diet.
- Be able to use appropriate equipment and utensils, and apply a range of techniques for measuring out, preparing and combining ingredients.

Designing

- Generate innovative ideas through research and discussion with peers and adults to develop a design brief and criteria for a design specification.
- Explore a range of initial ideas, and make design decisions to develop a final product linked to user and purpose.
- Use words, annotated sketches and information and communication technology as appropriate to develop and communicate ideas.

Making

- Write a step-by-step recipe, including a list of ingredients, equipment and utensils
- Select and use appropriate utensils and equipment accurately to measure and combine appropriate ingredients.
- Make, decorate and present the food product appropriately for the intended user and purpose.

Evaluating

- Carry out sensory evaluations of a range of relevant products and ingredients. Record the evaluations using e.g. tables/graphs/charts such as star diagrams.
- Evaluate the final product with reference back to the design brief and design specification, taking into account the views of others when identifying improvements.
- Understand how key chefs have influenced eating habits to promote varied and healthy diets.

Technical knowledge and understanding

- Know how to use utensils and equipment including heat sources to prepare and cook food.
- Understand about seasonality in relation to food products and the source of different food products.
- Know and use relevant technical and sensory vocabulary

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.

Focused Tasks

- 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.
- When using a basic dough recipe, explore making different shapes to change the appearance of the food product e.g. *Which shape is most appealing and why?*

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: mix, pour, fold, roll-out, shape,

Tier 2 ingredients, fat, research, innovate, evaluate, combine,

Tier 3: gluten, savoury, protein, vitamins, dough, yeast, knead, carbohydrate

Year 5/6 Curriculum Cycle A Summer 2024

Design Brief - How can I make a toy for a younger relative?

Aspect of DT - Textiles Focus - soft toys

Key Learning Skills

Prior learning

Experience of stitching, joining and finishing techniques in textiles.

Experience of making and using textiles pattern pieces.

Experience of simple computer-aided design applications.

Research: Investigative and Evaluative Activities (IEAs)

Children investigate and evaluate a range of existing textiles products and how they have been constructed using disassembly, and evaluate what the fabric shapes look like, how the parts have been joined, how the product has been strengthened and stiffened, what fastenings have been used and why.

Investigate work by designers and their impact on fabrics and products. Use questions to develop 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? How has it been made? What has been used to enhance the appearance? Is the design innovative?*

Children investigate properties of textiles through investigation e.g. exploring insulating properties, water resistance, wear and strength of textiles.

Designing: Design, Make and Evaluate Assignment (DMEA)

Generate innovative ideas through research including surveys, interviews and questionnaires.

Develop, model and communicate ideas through talking, drawing, templates, mock-ups and prototypes

Design purposeful, functional, appealing products for the intended user that are fit for purpose based on a simple design specification.

Set an authentic and meaningful design brief. Children generate ideas by carrying out research using surveys, interviews, questionnaires and the internet. Develop a design specification for their product.

• Communicate ideas through detailed, annotated drawings from different perspectives. Drawings should indicate the design decisions made, 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.

Making (Focused Tasks)

Produce detailed lists of equipment and fabrics relevant to their tasks.

Formulate step-by-step plans and, if appropriate, allocate tasks within a team.

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. Use a range of techniques to ensure a well-finished final product that matches the intended user and purpose.

Develop skills of threading needles and joining textiles using a range of stitches, building 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.

Evaluating

Investigate and analyse textile products linked to their final product.

Compare the final product to the original design specification.

Test products with intended user, where safe and practical, and critically evaluate the quality of the design, manufacture, functionality and fitness for purpose.

Consider the views of others to improve their work.

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.

Technical knowledge and understanding

• A 3-D textile product can be made from a combination of accurately made pattern pieces, fabric shapes and different fabrics.

• Fabrics can be strengthened, stiffened and reinforced where appropriate. •

Lesson 1
Children decide upon a simple shape on which to base their stuffed toys and record the materials that they will use to create it

- I know how to ensure that my template is proportional
- I can make a paper template

Lesson 2
Children are introduced to and practise blanket stitch

- I can cut neatly and accurately
- I can thread a needle
- I can use a blanket stitch to join two pieces of fabric

Lesson 3
Pupils add any extra items, appendages and decorative stitches before assembling their stuffed toys

- I can create strong and secure stitches (blanket, running, cross stitch)
- I can use appliqué to attach pieces of fabric decoration
- I can use stitches to decorate fabric.

Lesson 4
Using a blanket stitch, children stuff and sew their toys to complete them.

- I can use a blanket stitch to join two pieces of fabric
- I can stuff my toy carefully, repairing any holes or gaps.
- I can evaluate my stuffed toy

Key Vocabulary

Tier 1: right side, wrong side, pattern, thread, pins, copy, repeat, flip, user, flip, toy

Tier 2: modify, font, fastening, iron, transfer, annotate, evaluate, innovation, authentic, purpose, graphics, scale, menu, appendage

Tier 3: wadding, success criteria, textiles, needle, seam allowance, font, pinking shears, hem, blanket stitch, appliqué