**Year 4 Design and Technology Curriculum – Autumn Term**

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| **Theme: Strengthening a bridge structure** | | | | | | | |
| **Curriculum objectives** | | | **Vocabulary** | | | | **Links across the curriculum** |
| Investigate how to strengthen, stiffen and reinforce 3-D frameworks. • Know and use technical vocabulary relevant to the project.  . **Designing**  • Carry out research into user needs and existing products, using surveys, interviews, questionnaires and web-based resources. • 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.  **Making**  • 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.  **Evaluating**•  • 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. | | | **Keyword** | Definition | **Keyword** | Definition | Science – uses of everyday materials, materials and their properties, forces and  friction.  • History – Who was Isambard Kingdom Brunel and why is he famous?  • Art, Craft and Design – subject matter for 3D as well as 2D creative work.  . |
| Arch bridge | A bridge in which the main supporting elements are arches | Swing bridge | A bridge over water that can be rotated horizontally to allow ships through. |
| Beam bridge | A simple bridge in which a horizontal beam is supported at each end. | Isambard Kingdom Brunel | British civil and mechanical engineer of great originality. He built a number of railways, tunnels, and bridges and made outstanding contributions to marine engineering. |
| Suspension bridge | A bridge in which the weight of the deck is supported by vertical cables suspended from further cables that run between towers and are anchored in abutments at each end. | Corrugated | Shaped into a series of parallel ridges and grooves so as to give added rigidity and strength: |
| Cantilever bridge | A bridge built using structures that project horizontally into space, supported on only one end (called cantilevers) | Cylinder | A solid geometrical figure with straight parallel sides and a circular or oval cross section. |
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| **Prior knowledge:** *What specifically have pupils learned that is relevant to this unit that they are building upon?* | | | | | **Future knowledge:** *What specifically will pupils learn in the future that is relevant to this unit?* | | |
| 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. ( Year 3) | | | | | To design and make a Viking structure. (Year 5) | | |
| **Lesson Sequence** | | **Key Knowledge** | | | | **Key Skills** | |
| 1. To research different types of bridges (Canal and River trust – Explorers website) | | * Know there are different types of bridges. | | | | * Research skills | |
| 1. To investigate different types of structures/ shapes and materials to create strengthened bridges. | | * Know different thicknesses of card and different structures e.g. cylinders, corrugation, layering effects strength. | | | | * Investigation skills | |
| 1. To design a strong stable bridge to withstand a given weight (e.g 1 kg) | | * Know which materials and structure to use to give the most stability and strength. | | | | * Creative thinking. * Drawing and labelling skills | |
| 1. To make a strong stable bridge to withstand a given weight (e.g 1 kg) | | * Know the equipment needed and how to use it. | | | | * Construction skills | |
| 1. To evaluate their bridge after rigorous testing. | | * Know how effective their design was after testing. | | | | * Evaluation skills. * What went well … Even better if | |
| **Themes and links** | | | | | | | |
| **Themes** | **Where these are covered:** | | | | | | |
| **Investigate** | Lesson 1 and 2 | | | | | | |
| **Design** | * Lesson 3 | | | | | | |
| **Make** | * Lesson 4 | | | | | | |
| **Evaluate** | * Lesson 5. How effective is the product? | | | | | | |