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| **DT Year 4 Structures Block D** |
| **National Curriculum - Key Stage 2**Through a variety of creative and practical activities, pupils should be taught the knowledge, understanding and skills needed to engage in an iterative process of designing and making. They should work in a range of relevant contexts [for example, the home, school, leisure, culture, enterprise, industry and the wider environment]. When designing and making, pupils should be taught to: * **Design** use research and develop design criteria to inform the design of innovative, functional, appealing products that are fit for purpose, aimed at particular individuals or groups generate, develop, model and communicate their ideas through discussion, annotated sketches, cross-sectional and exploded diagrams, prototypes, pattern pieces and computer-aided design
* **Make** select from and use a wider range of tools and equipment to perform practical tasks [for example, cutting, shaping, joining and finishing], accurately select from and use a wider range of materials and components, including construction materials, textiles and ingredients, according to their functional properties and aesthetic qualities
* **Evaluate** investigate and analyse a range of existing products evaluate their ideas and products against their own design criteria and consider the views of others to improve their work understand how key events and individuals in design and technology have helped shape the world
* **Technical knowledge** apply their understanding of how to strengthen, stiffen and reinforce more complex structures understand and use mechanical systems in their products [for example, gears, pulleys, cams, levers and linkages] understand and use electrical systems in their products [for example, series circuits incorporating switches, bulbs, buzzers and motors] apply their understanding of computing to program, monitor and control their products.
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|  | Lesson 1 | Lesson 2 | Lesson 3 |
| **Learning intention** | Which shapes will give a structure stability? | Which shapes will give a structure stability? | Which shapes will give a structure stability? |
| **Skills taught** | Conduct investigations to discover the load bearing properties of cylinders made from a sheet of paper compared with cylindrical forms constructed from a series of smaller cylinders | Can construct a range of geometric shapes Can devise and conduct a strength test | Can listen to others and share ideas effectively Can work collaboratively on a design and identify where changes need to be made to improve the stability of a structure Can negotiate with others and reach a compromise when opposing views are shared  |
| **Recall and retrieval** | Paper can be made stronger by changing its shape | A column is strong because all parts of the cylinder share the load A series of cylinders is stronger than one Cylinders are regularly used in structures | Triangles are strong and stable shapes Triangles joined together have stability and create a rigid structure  |
| **Sequence of knowledge throughout the lesson** | **Key knowledge**Can give a simple explanation of compression Can explain the roles of engineers and architects Can conduct a simple investigation, record and compare results and draw reasonable conclusions Can identify which cylinder was strongest and why cylinders are used in buildings | **Key knowledge**Can summarise and draw accurate conclusions from results Can identify the triangle as a strong and stable shape used in structures such as bridges | **Key knowledge**Can identify strengths and weaknesses in the finished structure and suggest improvements |
| **Scaffolding** | Working ExamplesVisual steps to successTeacher support | Working ExamplesVisual steps to successTeacher support | Working ExamplesVisual steps to successTeacher support  |
| **Challenge** |  |  |  |
| **Key Vocabulary** | Structural EngineerGeodesicGravityCompressionTension | Structural EngineerGeodesicGravityCompressionTension | Structural EngineerGeodesicGravityCompressionTension |