

## Summer 1 OVERVIEW YEAR 3/4 – DT

Summer 1 Book - The Iron Man – Technology in Action		
Topic(s) - Structures		Guide Time = 3 lessons
<b>Assessment:</b>	As well as work scrutiny, teachers are to make judgements based upon students' ability to recall VIPs, and key knowledge.	<b>Very Important Points (VIPs):</b>  - A scaffold is a temporary supporting structure traditionally made of wood but in modern times made of metal. - Paper can be strengthened by folding, tubing or rolling. - Shapes can be strong or weak. Some shapes can bear more weight than others. -Structures can be manipulated to bear more weight. -Braces can be used to reinforce structures. -We design and invent new structures to solve problems. -Designs must be tested to determine whether they meet the design criteria. -We evaluate our designs so that we can improve them.  <b>Fat Questions: As well as manipulating materials to make them stronger, what else do humans manipulate in the world around us? How would our lives be different if we could not manipulate materials to create stable structures?</b>
<b>Links to prior learning (sequencing) and canon book</b>	<u>The Iron Man</u> Students will build on their KS1 and LKS2 knowledge around structures and how they are strengthened. They will also develop their design process skills (designing, planning, making, testing, evaluating). In Autumn 2, children had already been exposed to structures when creating a sledge linked to the reading canon book 'The Lion, the Witch and the Wardrobe.' Children will be able to build on these existing skills and improving them when designing their new structure. It will also allow them to use a design criteria to work against and revisit structures and shapes that did not previously work.	
<b>Links to other learning (cross fertilisation)</b>	<u>Art:</u> Using sketching techniques in the design process.  <u>Maths:</u> Strengths and weaknesses of different shapes. Measurement of elements of their designed structures.  <u>Science:</u> Investigating/experimenting with different strengthening techniques. Suitable materials to use in the construction and joining of structures. What materials are usually used in construction/scaffolding?  <u>English:</u> Evaluating designs using appropriate technical language.	

	<p><u>Geography:</u> Discussing how manmade structures have changed the Earth's landscape.</p>	
<p><b>Links to future learning</b></p>	<p>This material will support children as they transition into UKS2. Explicit links are made with the DT topic 'Designing Shelters'. It will support children in understanding how structures are strengthened and how we use stable structures in our society.</p>	
<p><b>Character/Wider Development ('50 things', cultural capital, skills)</b></p>	<p>To create a structure (scaffold) for The Iron Man.</p> <p><b><u>Thematic questions:</u></b></p> <p><u>The world beyond us</u></p> <p>How have scaffolds advanced space exploration?</p> <p><u>Modern Britain</u></p> <p>How could we make scaffolds and structures environmentally friendly?</p> <p><u>Healthy body, Healthy minds</u></p> <p>How could structures encourage us to stay physically healthy?</p> <p><u>The world around us</u></p> <p>Where in nature can we see examples of weak or strong shapes?</p> <p>How were famous structures such as the Eiffel Tower designed and built?</p> <p><u>Culture</u></p> <p>Are the same shapes common in structures from all cultures?</p>	

Techology in action

Have structures changed in the past 100 years? Will they change in the next 100 years?

## OVERVIEW OF TEACHING SEQUENCE

Sequence	Learning Focus or Key Question	Learning Outcomes (NC)	Key Words/ Vocabulary	Greater Depth/SEND	Misconceptions	Activities and Resources
Lesson 1	<p>To investigate which shape can hold the most weight.</p> <p>To investigate how to strengthen paper.</p>	<p>To develop their understanding of how to strengthen, stiffen and reinforce more complex structures.</p> <p>To generate, develop, model and communicate their ideas through discussion and annotated sketches.</p>	<p>Scaffolding, construction, stable, structure, weight, weight-bearing, distribution, strength.</p>	<p><u>Year 3:</u></p> <p>GD – To understand how materials can be manipulated to bear more weight. Students will independently manipulate the paper, observe the results and write a paragraph reflecting on their observations.</p> <p>SEND- To know that some shapes are stronger than others. Students can be assisted in manipulating the paper into the relevant shape so that they can conduct the investigation.</p> <p><u>Year 4:</u></p>	<p>Squares are the strongest shape because they have more corners/sides.</p> <p>Paper is too thin/weak to bear any weight.</p> <p>A single piece of paper will never be stronger than several pieces together.</p>	<p>Paper (enough for 3 pieces each), tape, books (to place on structures).</p> <p>Students will investigate 3 paper strengthening techniques (folding, tubing and rolling). First, the idea of folding will be introduced and then students will test this in small groups. Then, tubing will be introduced and tested, and finally rolling. After conducting the investigations, students will reflect on what they observed by completing the following tasks.</p> <p><u>Year 3 tasks:</u></p> <p>SEND- Students will sketch the 3 techniques investigated and complete the sentence stating which they liked the most.</p>

				<p>GD – To understand how materials can be manipulated to bear more weight. Students will independently manipulate the paper, observe the results and critically reflect on the strengths and weaknesses of each technique.</p> <p>SEND- To know that some shapes are stronger than others. Students can be assisted in manipulating the paper into the relevant shape so that they can conduct the investigation.</p>	<p>Red- Students will sketch the 3 techniques investigated and state which was the most effective and why.</p> <p>Blue- Students will sketch the 3 techniques investigated and state which was the most effective and which they would like to use in their design next time.</p> <p>Gold- Students will sketch the 3 techniques investigated and write a paragraph explaining what they learnt, which was the most effective and which they would like to try in their design next time.</p> <p><u>Year 4 tasks:</u> SEND- Students will sketch the 3 techniques investigated and complete the sentence stating which they liked the most.</p> <p>Red- Students will sketch the 3 techniques investigated and state which was the most effective and which they would like to use in their design next time.</p> <p>Blue- Students will sketch the 3 techniques investigated and write a paragraph explaining what they learnt, which was the most effective and which they would like to try in their design next time.</p> <p>Gold- Students use bullet points to state the strengths and weaknesses of each design. Then they will write a paragraph explaining what they learnt, which was</p>
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						<p>the most effective and which they would like to try in their design next time.</p> <p><u>Deepen the Moment</u></p> <p>Year 3- Where have you seen folding, tubing or rolling used before? Which strengthening technique do you think is most common?</p> <p>Year 4- Any material can be strengthened using these techniques. Do you agree or disagree? Explain your reasoning.</p>
Lesson 2	To design a structure (scaffold) for the Iron Man.	<p>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.</p> <p>Apply their understanding of how to strengthen, stiffen and reinforce more complex structures.</p>	Build, measure, manipulate, join, layer, fold, reinforce.	<p><u>Year 3:</u></p> <p>GD- To design a structure including labels, materials, equipment and instructions on how the design will be built.</p> <p>SEND- To design a structure for the Iron Man applying their knowledge of strong shapes.</p> <p><u>Year 4:</u></p> <p>GD- To design a structure including labels, materials, equipment and instructions on how the design will be built. Students will also incorporate measurements into the design process.</p> <p>SEND- To design a structure for the Iron Man</p>	<p>Measurements/labels are not necessary.</p> <p>A design is simply a picture.</p> <p>Designs are for fun, not to address a problem.</p>	<p>VIPs will be reviewed, especially the strengthening techniques introduced in Lesson 1. The design criteria will then be introduced and finally, students will design and plan a structure for the Iron Man.</p> <p><u>Year 3 tasks:</u></p> <p>SEND- students will sketch their design.</p> <p>Red- students will sketch their design and add labels.</p> <p>Blue- students will sketch their design, add labels and list the equipment needed.</p> <p>Gold- students will sketch their design, add labels, list the equipment needed and outline the steps they will take to build the design.</p> <p><u>Year 4 tasks:</u></p> <p>SEND- students will sketch their design and add labels.</p>

				<p>applying their knowledge of strong shapes. Students will label materials within their diagram, with support when needed.</p>		<p>Red- students will sketch their design, add labels and list the equipment needed.</p> <p>Blue- students will sketch their design, add labels, list the equipment needed and outline the steps they will take to build the design.</p> <p>Gold- students will sketch their design, add labels, outline the steps they will take to build the design and add measurements to their diagram.</p> <p><u>Deepen the Moment:</u></p> <p>Year 3- Triangles are the strongest shapes. What structures have you seen or used that are strengthened by triangles?</p> <p>Year 4- Where have you seen braces used? Can they be made of any material?</p>
Lesson 3	To build, test and evaluate the structure against the design criteria.	<p>Select from and use a wider range of tools and equipment to perform practical tasks accurately.</p> <p>Evaluate their ideas and products against their own design criteria and consider the views of others to improve their work.</p>	Test, evaluate, adapt.	<p><u>Year 3:</u>          GD- To independently use their design plans to build their structure. Students will then test their own design against the design criteria and critically evaluate by reflecting on the strengths and weaknesses.</p> <p>SEND- To build their design, test it and suggest one improvement that could be made. Students</p>	<p>The design plan is not needed when building.</p> <p>The final product is the end point in the design process.</p> <p>The final product cannot be adapted once it is finished.</p>	<p>Paper, newspaper, cardboard rolls, tape, string. Any other materials appropriate for building a paper structure.</p> <p>VIPs from Lesson 1 and 2 will be reviewed, especially paper strengthening techniques and the design criteria. Students will use their design plans to build their design within an allocated time. Students will then test their designs in groups and evaluate the success using the following tasks.</p> <p><u>Year 3 tasks:</u></p>

				<p>may need support whilst building and testing the structure, and prompting questions to engage in reflection.</p> <p><u>Year 4:</u> GD: To independently build their design using the steps and measurements outlined in their design. Students will then critically evaluate their own design by reflecting on the multiple strengths and weaknesses and what they would improve. Students will also observe and select a peer's design and explain why they like it.</p> <p>SEND- To build their design, test it and suggest one improvement that could be made. Students may need support whilst building and testing the structure, and prompting questions to engage in reflection.</p>		<p>SEND- Students will draw a picture and complete a sentence to explain what they would change about their design.</p> <p>Red- Students will draw a picture and write two sentences explaining what they liked and what they would change.</p> <p>Blue- Students will use bullet points to list the strengths and weaknesses of their design, and then explain what they would do differently next time.</p> <p>Gold- Students will use bullet points to list the strengths and weaknesses of their design, and then explain what they would do differently next time and whether they were happy with their design.</p> <p><u>Year 4 tasks:</u> SEND- Students will draw a picture and write two sentences explaining what they liked and what they would change.</p> <p>Red- Students will use bullet points to list the strengths and weaknesses of their design, and then explain what they would do differently next time.</p> <p>Blue- Students will use bullet points to list the strengths and weaknesses of their design, and then explain what they would do differently next time and whether they were happy with their design</p> <p>Gold- Students will write paragraphs explaining the strengths and weaknesses of their design and what they would improve. They will then ask a classmate</p>
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						<p>about their design and explain what they can learn from their classmate's experience.</p> <p><u>Deepen the Moment:</u>          Year 3- Why is it important to adapt designs after we have tested them?          When else do we evaluate and adapt our work?</p> <p>Year 4- A design that doesn't meet the design criteria is a failed design. Do you agree or disagree? Explain your reasoning.</p>
<p><u>Context (big picture learning)</u></p> <p>Students will apply their learning linking it back to the world around us including where they have seen strengthening techniques used.</p> <p>They will understand how structures have developed over time and how they can be of benefit to humans. Students will discuss how our lives would be different if we could not build stable structures or if humans could not manipulate materials.</p> <p>Students will understand that designing new creations is in response to a problem and that the design must solve the problem by meeting design criteria.</p> <p>They will identify that prior learning plays an important role in understanding their progression of knowledge. Students will develop their understanding of why evaluating and reflecting on experiences/designs can help us move forward with our learning.</p>						



Lesson 1 L1

Lesson 2 L2

Lesson 3 L3

### What is a structure?

A structure is a building or object constructed from several parts.

# DT Knowledge Organiser

### Fat Question:

As well as manipulating materials to make them stronger, what else do humans manipulate in the world around us? How would our lives be different if we could not manipulate materials to create stable structures?

### Key vocabulary

**Scaffold**- a temporary supporting structure.

**Construction**- the action of building something.

**Stable**- firmly fixed, sturdy.

**Weight**- how much an object weighs.

**Weight-bearing**- supporting the weight of something.

**Distribution**- spreading the weight over an area.

**Strength**- how strong an object or structure is.

**Triangle**- a shape with 3 sides and 3 corners.

**Manipulate**- change or control something.

**Test**- check the quality.

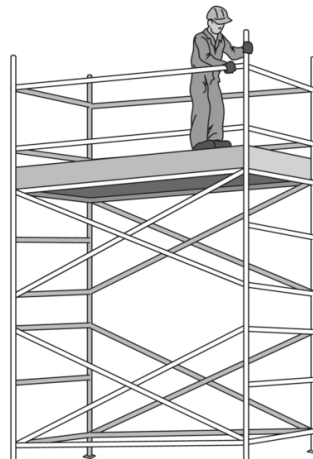
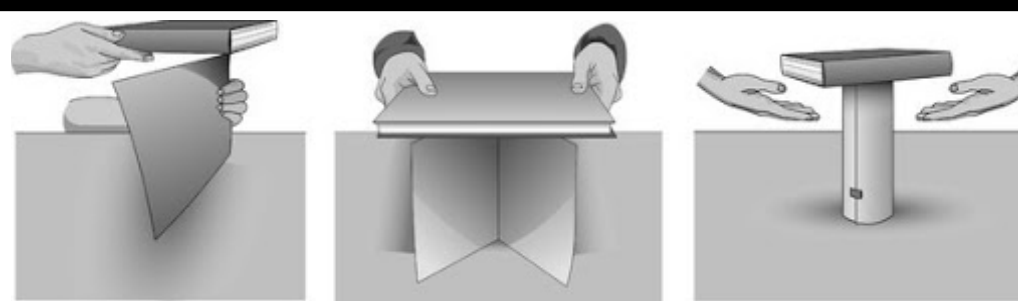
**Evaluate**- consider the strengths and weakness of a design.

**Adapt**- change to make better.

**Reinforce**- make stronger.

### Learning intent

We will explore how structures are strengthened and reinforced. We will investigate how to strengthen paper and which shapes are the strongest. We will design a structure for the Iron Man by applying our knowledge of strengthening techniques. We will test, evaluate and adapt our design.



### VIPs

- A scaffold is a temporary supporting structure traditionally made of wood but in modern times made of metal.
- Paper can be strengthened by folding, tubing or rolling.
- Shapes can be strong or weak. Some shapes can bear more weight than others.
- Structures can be manipulated to bear more weight.
- Braces can be used to reinforce structures.
- We design and invent new structures to solve problems.
- Designs must be tested to determine whether they meet the design criteria.
- We evaluate our designs so that we can improve them.