



SS John Fisher & Thomas More Catholic Primary School

A Voluntary Academy

"Journeying together with Jesus Christ, we learn to love and love to learn."

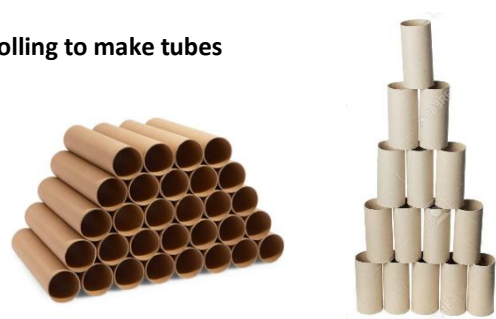


Year Group: Year 1&2	Term: Summer 2 (Cycle A)	Topic: Construction (make strong structures)
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National Curriculum Links (Ref: NC 2014)

Pupils in KS1 pupils should be able to:

- build structures, exploring how they can be made stronger, stiffer and more stable
- explore and use mechanisms [for example, levers, sliders, wheels and axles], in their products
- design purposeful, functional, appealing products for themselves and other users based on design criteria
- generate, develop, model and communicate their ideas through talking, drawing, templates, mock-ups and, where appropriate, information and communication technology
- select from and use a range of tools and equipment to perform practical tasks [for example, cutting, shaping, joining and finishing]
- select from and use a wide range of materials and components, including construction materials, textiles and ingredients, according to their characteristics
- explore and evaluate a range of existing products
- evaluate ideas and products against design criteria

Knowledge and skills objectives	Activity	Differentiation
<p><u>Lesson 1</u> I can explore how to make materials stronger, stiffer and more stable.</p> <p><u>Working technically</u> I can explore and evaluate a range of existing products.</p>	<p>Tell the children that for our D&T topic we will be focusing on construction and making strong structures. Ask parents/children/teachers to start collecting cardboard boxes at home for lesson 4 and 5 (e.g. cereal boxes, shoe boxes, egg boxes etc).</p> <p>A structure is a building or other object made from several parts. When we build structures, we always want to build the strongest structure possible so that it can do its job safely and last for a long time.</p> <p>TTYP – What strong structures have you seen around the world?</p> <p>Show images of famous churches, bridges, towers and buildings from around the world: London Eye, Tower Bridge, The Shard, Burj Khalifa, Eiffel Tower, Notre Dame, Empire State building, Great Wall of China and Great Pyramid of Giza.</p>	<p>Children work in mixed ability pairs to explore the techniques below.</p> <p>Rolling to make tubes</p>  <p>Folding paper/card multiple times</p>

Resources



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Images of famous structures around the world
Scrap paper or card
Sticky tape and glue
Two objects to suspend a piece of paper in the air and make a bridge (e.g. pencil pots/tins, toilet rolls)

Now that we have looked at some famous strong structures, we're going to explore how to make materials stronger. We can do this by changing their shape.

Rolling

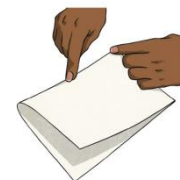
When a material is shaped into a square, triangle, u-shape or round tube, the strength of the material is increased. This tubing is often used to support large weights such as roofs. You can fix a number of tubes together to create a strong base.

Folding – Fold paper or card over and over again to make thicker, stronger layers.

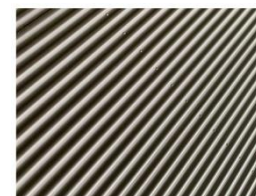
Corrugating - Corrugated card can be used for bridge structures and they can support heavier objects than a flat piece of paper.

Layering – Sticking multiple layers of paper or card on top of each other makes the material stiffer and stronger.

Allow children to explore each of the techniques above using scrap paper or card (see images for activities).



Corrugated paper/card (fold like you would to make a fan, then place between two objects and balance an object on top to test its strength).



Layering

Children stick multiple pieces of card/paper together to make the material stiffer and stronger.

Plenary

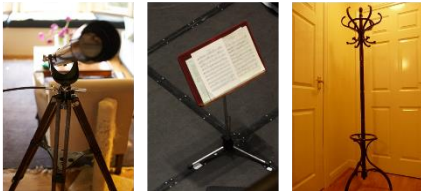


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		<p>TTYP Rolling - should we arrange the tubes horizontally (first picture) or vertically (second picture)? Why? Should we use glue or tape to join the tubes?</p> <p>Folding – How many times could you fold an A4 piece of paper?</p> <p>Corrugated paper/card – How did you make the paper into a corrugated shape? Why could it support the weight of an object better than a flat piece of paper?</p> <p>Layering – Why is PVA glue better than glue sticks? (it hardens) How many layers did you need before the paper/card was stiff enough to use for a strong structure?</p>
<p><u>Lesson 2</u> I can explore and use different attachment techniques for materials.</p> <p><u>Working technically</u> I can explore and evaluate a range of existing products. I can select from and use a wide range of materials and components.</p>	<p>Look at these everyday structures.</p>  <p>TTYP – What are they used for? Why do these objects have to be strong and stable? How are they designed to be strong and stable?</p> <p>Explain that the base is the key to a stable structure. The wider the base, the more stable the structure. The shape is also very important too.</p>	<p>Children work in mixed ability pairs. They explore each of the techniques, then evaluate which ones were the most/least effective and why.</p> <p>Plenary</p> <p>TTYP Which joining technique was best? Why?</p>



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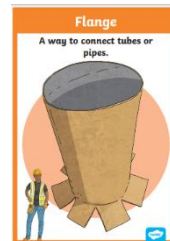
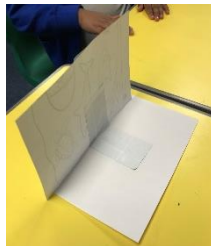
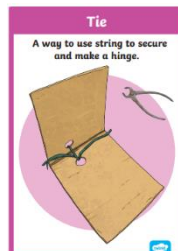
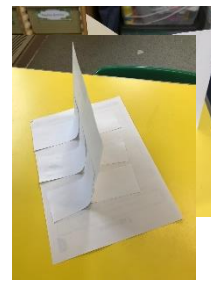
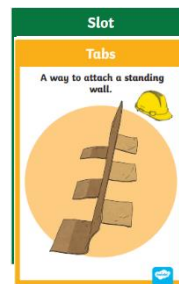
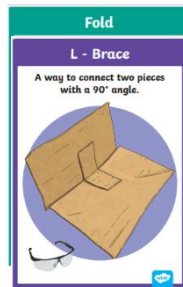


Resources

Scrap pieces of paper or card
Sticky tape and glue
Attachment techniques sheet

Last lesson we looked at how to make materials stronger by changing their shape. Today, we will look at how to make structures stronger by using different joining techniques.

Using scrap pieces of paper or card, explore the different joining techniques on the attachment techniques sheet (see images below).



Which attachment wasn't as strong as the rest? Why do you think this is?

Tell your partner which part of a building/structure you could use each joining technique for e.g. the tie for a door or window, the tabs for a wall etc.




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<p><u>Lesson 3</u> I can design a strong structure.</p> <p><u>Working technically</u> I can design a purposeful, functional, appealing product for myself and other users based on design criteria.</p> <p>I can generate, develop, model and communicate my ideas through talking, drawing, templates, mock-ups and, where appropriate, information and communication technology.</p>	<p>Starter question – What is a structure? How can we make a structure stronger, stiffer or more stable?</p> <p>Explain that we will be using junk modelling materials to create a strong structure out of cardboard and paper. Recap the four ways we can make paper stronger (lesson 1 – rolling, folding, corrugating and layering). Also recap the six joining techniques we looked at in lesson 2.</p> <p>Today we will design a structure based on the following design criteria:</p> <ul style="list-style-type: none"> - The structure is strong and fulfils its purpose (does what it's supposed to do) - It's made out of junk modelling materials - It uses a variety of joining and strengthening techniques - I attached the parts using a variety of materials (e.g. paper clips/glue/tape) <p>Children to discuss with their partner: What structure will you make? (e.g. tower, bridge, hospital, school) How will you join the pieces of cardboard/paper together? How will you decorate the structure? What features will your structure need? (e.g. a tower would need a large base and a spire, a house would need windows and a chimney)</p>	<p><u>LA/SEN</u> – Design a strong structure and label with key words. Write a simple list to show resources they will need and one sentence to say how they will make sure the structure is strong.</p> <p><u>HA/MA</u> – Draw and label their design to show different attachment techniques/strengthening techniques studied in previous lessons. Include a list of resources they will need and explain in more detail how they will make sure their structure is strong.</p>
<p>Resources</p> <p>List of design criteria</p>		<p>Plenary</p> <p>Choose two children to share their designs. What have they done well? How could they make their design even better?</p>



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<p>Attachment techniques word mat Design sheet template</p>	<p>Model how to complete a design sheet and ensure children can discuss the materials they need and how they will meet the design criteria.</p>	
<p><u>Lesson 4 and 5</u> I can build a strong structure.</p> <p><u>Working technically</u> I can select from and use a range of tools and equipment to perform practical tasks.</p> <p>I can select from and use a wide range of materials and components, including construction materials, according to their characteristics.</p>	<p>Explain to the children that today they are going to make their strong structure.</p> <p>Starter questions: What is a strong structure? What was your design and did it meet the design criteria?</p> <p>Model how to use the design sheet to collect resources. Ensure children use the correct materials and joining methods described.</p> <p>TTYP How will you make sure your structure is strong, stiff and stable? How will you use effective attachments for the different parts? What will you do if you come across any problems? How will you make your structure look like your design? What will happen if you want to change your mind during the making process?</p>	<p>Children make their strong structure based on their designs from last week.</p> <p>Take photos of the children's structures to evaluate next week.</p>
<p>Resources</p>	<p>Allow time for children to use their plan to make their design. Once they have made the basic structure, they decorate it with the necessary features e.g. a red cross if it's a hospital, classroom objects if it's a school.</p>	<p>Plenary</p> <p>TTYP – What went well? What did you find difficult? How could you make your structure even stronger next time?</p>
<p>Junk modelling materials (cardboard boxes etc) List of design criteria Children's individual designs from lesson 3 Sticky tape and glue</p>		



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<p><u>Lesson 6</u> I can evaluate my strong structure.</p> <p><u>Working technically</u> I can evaluate ideas and products against design criteria.</p> <p>Resources</p> <p>List of design criteria Evaluation sheet Images of strong structures made last week.</p>	<p>Print photos of the children's structures from last week.</p> <p><u>Starter questions</u> What went well and what did you enjoy? What was the most challenging part of your structure? Which attachment/strengthening techniques did you use? What have you learned?</p> <p>Explain that we need to evaluate our structure to see if we've met the design criteria and so we can make it even better next time.</p> <p>During this lesson we are going to evaluate each other's work as well as our own. It is important to be able to peer assess as well as self-assess. Peer assessment can develop your self-confidence and communication skills and we can learn a lot from other people when they suggest new ideas and ways to improve.</p> <p>Children share the images of their work from last week. Their partner says what went well and the child also says what they enjoyed and what they found difficult. Both children discuss how they could make the product even better.</p> <p>Model how to complete the evaluation sheet using some of the ideas the children have generated in their pairs.</p>	<p>LA/SEN – Children complete a simple evaluation sheet with three main questions: what went well? What was difficult? How could I make it better next time?</p> <p>HA/MA – Children answer the same three questions, but also explain how they made the structure strong and stable.</p>
<p>Applied write opportunities: Write a set of instructions for how to make a strong structure.</p>		



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Enrichment opportunities

Plan a trip to Manchester city centre to look at different structures in our local area e.g. bridges across the canal, towers and skyscrapers, Manchester library and town hall.

Key Vocabulary

Tier 2: plan, discuss, design, make, evaluate, attachments, techniques, challenge, peer assessment, self assessment, improve, discuss

Tier 3: strong, stiff, stable, design criteria, ideas, bridge, tower, building, structure