





Structures	<u>Design brief and explore existing products</u>	<u>Explore and practise techniques (prototype)</u>	<u>Design a product</u>	<u>Make lesson:</u>	<u>Evaluate:</u>
<p>Year 1: (Refer to CUSP Y1 structures)</p> <p>ASK FOR LOTS OF CARDBOARD FROM PARENTS</p>	<p>Introduce a design brief to make a simple structure. Look at existing structures such as the Tower of Pisa.</p> <p>Look at different examples of existing structures- what is it that stops them falling down?</p> <p>Children to explore and experimenting making towers using different resources: Wooden blocks Cardboard boxes Interlocking bricks</p> <p>Why did it fall down? Challenge: Give children a limited amount of blocks and see how tall they can make the towers.</p> <p>Take photographs as all can be used in books for children to annotate.</p>	<p>Children to experiment creating different joins types using cardboard and small pieces of tape so they do not rely on the tape for stability: -flange and tabs</p>  <p>-foot</p>  <p>-slot</p>  <p>-hinge</p>  <p>-wrap</p>	<p>Children to work in groups of 3 to design their own structure using cardboard and tape. Children to decide which joins they are going to use and why.</p> <p>Share the design brief and children will need to consider the following: -wide base? -create balance?</p> <p>Copy the designs so each child has a record of this in their books.</p>	<p>Children to build a tower using cardboard and tape. Avoid wrapping tape and using long pieces to join.</p> <p>-is their design perpendicular? Use a measuring stick to check -do they need to make any modifications?</p>	<p>Take photograph of end product. Peer evaluation, children can share feedback. Children can reflect on the making process e.g. what was easy, what was difficult?</p> <p>Use Task 2 CUSP to evaluate the product and use question prompts.</p>



Vocabulary:

Core Knowledge	Explanation	Vocabulary	Definition
tower	A tower is a tall, narrow building or part of a building.		a layer of stone or concrete etc. that forms the solid underground base of a building
topple	To topple means to become unsteady and fall.		the ability to keep steady with an equal amount of weight on each side of the body or structure
lean	To lean means to bend or move from a straight position to a sloping position.	ar	forming an angle of 90° with another line or surface

Year 4:

Introduce a design brief to make a simple structure. Look at existing structures such as the shard and Gherkin. Introduce Roma Agrawal (structural engineer for The Shard).

Explore forces the structural engineers have to consider and be aware of:

- *Compression (hands on head and push down) force that moves downwards.
- *Tension (Clasp hands together and then try to pull them away) moves sideways
- *Gravity

Cylinder structure- 2 large cylinders:

Children to make different structures using match sticks, lollypop sticks. Test using different forces.



Children identify the strong shapes they can make and then explore by joining more of these strong shapes together.



Working in pairs children are going to design a structure using their knowledge from the explore stage to choose the correct shape to ensure that their structure will be able to withstand forces such as compressions, tension and gravity.

Copy so each child has one for reference in their book.

Share the design brief and children

Children to make their structure using pieces of dowel and elastic bands.

Allow children to make modifications to their design as they are making as this can happen in everyday life.

Take photograph of end product and label.

Refer to task 2 on CUSP unit to provide prompts for children to evaluate their structure.

Suggest ways the product can be improved. Children to explain how they met the design brief and begin to identify areas they didn't meet. Children to identify a new skill they have learnt.



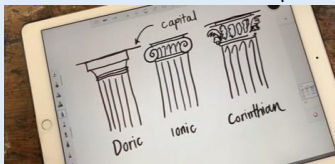
Smaller cylinders connected together:



Children may find by using more cylinders they can distribute the weight evenly.

Children to record notes about what happened and why.

Explore the different types of columns that many structures have today:

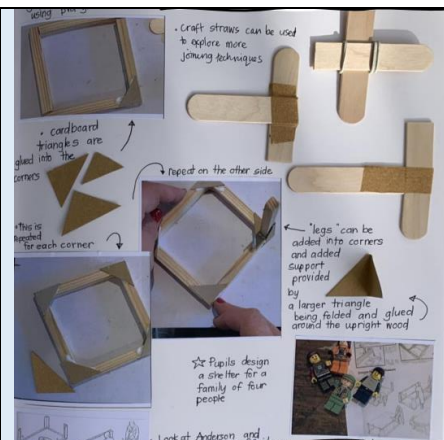
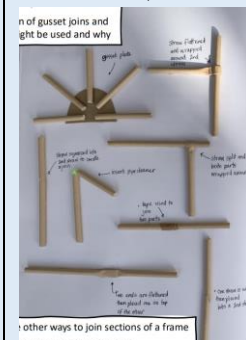


will need to consider the following:

- shapes they use
- how they can ensure their structure can withstand forces
- size and length etc.

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Year 5:	Introduce a design brief to make a simple bridge structure. Look at existing bridge structures such as the Iron Bridge. Introduce Abraham Darby III (English Architect)	Introduce and model how to use a hacksaw and block correctly.	Children to work with a partner to design a bridge that is able to hold the weight specified in the design brief.	Children to make their bridges.	Children to test their bridges to see how much weight they can hold (refer to the forces).									
	Children to move around the room to identify how a product has been joined together to improve stability (beams, braces to support, footings)	Children to cut a number of short pieces of wood (lollypops so can be stuck in book, square wood for thickness- take photographs) for the next activity (4 pieces).												
	Children to make some examples of different joins using straws and PVA glue.	Children to join these together to make a frame. (ensure sawdust is not blown!)												
	Children to explore and find different ways they can	Children to explore how they can join their pieces of wood.												
			Allow children to make modifications to their design as they are making as this can happen in everyday life.	Children record their results and evaluate their bridge.	Take photograph of end product and label. Suggest ways the bag can be improved. Children to explain how they met the design									

join the straws together,
like beams, trusses



Children can stick in photographs
and annotate.

brief and identify
areas that were
not successful
and make
suggestions on
what they would
do next time.
Children to
identify a new
skill they have
learnt

Vocabulary:

Core Knowledge	Explanation
frame	A frame is the supporting structure of a piece of furniture, a building, a vehicle etc. that gives it its shape.
I-beam	An I-beam is a girder which has the shape of an I when viewed in section.
struts	Struts are rods or bars forming part of a framework and designed to resist compression.

Technical Vocabulary	Definition
brace	a device fitted to something to give support
mitre	a joint made between two pieces of wood or other material at an angle of 90°, such that the line of junction bisects this angle
gussets	brackets used to strengthen the joins of a structure