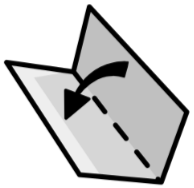
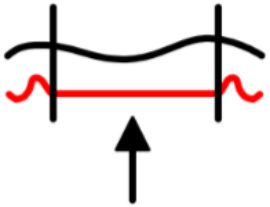
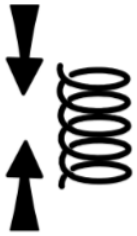
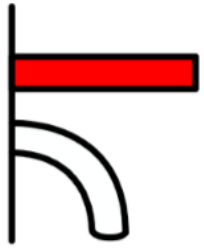
Year 6: DT – Construction - Bridges

Vocabulary

Truss Bridge	A bridge which uses triangles to add strength to it's beam	
Arch Bridge	A Bridge which contains an arch and abutments, which is based on compression and tension	
Suspension Bridge	A bridge whose deck is supported by suspended wires	
Dead Load	The amount of weight that a bridge holds from it's deck. This doesn't change.	
Live Load	The amount of weight that is added to the deck from all the objects which pass on top of it.	
Abutments	A structure built to support the lateral pressure of an arch or span, e.g. at the ends of a bridge	

Bailey-Bridge	A portable truss bridge used in WW2 to help large vehicles over gaps or obstacles	
Vertical Supports	Supports for bridges which run up and down	
Load Bearing	The amount of gravity acting upon the mass of a bridge	
Hinge	A fold	

Corrugation	A line or fold on the surface of something	
Transversal	A line that crosses two other lines	
Longitudinal	Longitudinal lines run from north to south.	
Tension	A pull force which can make things longer	
Compression	A push force which can make things shorter	
Rigid	Stiff	

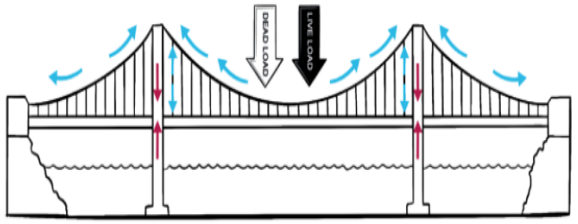
Year 6: DT – Construction: Bridges	
Knowledge	

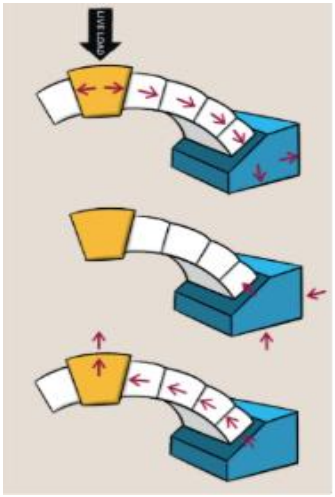
• To understand that there are different types of bridges
  ○ Beam Bridge (load-bearing consists of a beam)
  ○ Truss Bridge (load-bearing consisting of a series of triangles)
  ○ Arch Bridge (load bearing consisting of an arch underneath)
  ○ Suspension Bridge (Loadbearing supported by wires to share weight)
 	
• To understand that if too much weight is put onto the load-bearing part of the bridge (deck) – the bridge will collapse.
• To understand that when a bridge can hold its own weight it is called the dead load. This is because the load is the same and does not move.
• To understand that additional weight from people, cars, lorries etc is called the live load and changes all the time.
• To understand that corrugation can be ether transversal (parallel to the abutments) or Longitudinal (perpendicular to the abutments)
• To understand that an arch and beam combined can strengthen a bridge.
• To understand that when the live load is too great, a bridge can 'fold' in and collapse this is called a hinge
	• To understand that tension is a force which always tries to make things longer
	• To understand that compression is a force which always tries to make things shorter.
	• To understand that the 'Bailey Bridge' was a type of portable truss bridge designed in 1940-1941 to help large and heavy machinery avoid overcome obstacles
	• To understand that a Truss bridge uses triangles to strengthen it
	• To understand that a triangle is the strongest shape as the downward forces push towards the ground and the base force pushes towards the corners.
	• To understand that Beam bridge is good over short distances, but is weaker over longer distances.
	• To understand that by using truss' to change a beam bridge to a truss bridge, we strengthen the bridge and allow it to cover longer distances.
	• Understand that creating an arch on a bridge is another way of strengthening the structure.
	• Understand that this means that the live load will be increased in comparison to a beam bridge.
	• Understand that the main force on an arch-bridge is compression
	• Understand that the load in an arch bridge is carried along the curve of the arch to the strong supports (abutments) at each end. These then push the force back up towards the deck.

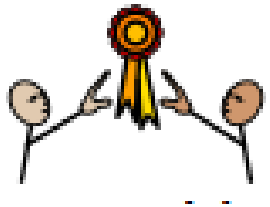
Year 6 DT - Construction: Bridges

Knowledge

- To understand that adding vertical supports to an arch bridge will strengthen it.
- To understand that adding vertical supports to an arch bridge will increase the live load.
- To understand that the greater the number of vertical supports, the greater the strength of the bridge
- To understand that each vertical support distributes the load from the deck down into the arch – the greater the number of vertical supports, the smaller each individual load on each support on the arch is, so it is spread out more. This is then dispersed into the abutments more effectively.
- I understand that a suspension bridge is a type of bridge in which the deck is hung from main cables on vertical hangers.
- I understand that the suspension bridge was developed by engineers to cross long distances without needing extra piers, such as a beam bridge would require





Quizzing		Quiz at home
Ask your partner the questions below. Can they find the correct answer on the right-hand side?		Ask your adult to look at the KO. Quiz them using the vocabulary and knowledge section or the quiz questions. •Can they beat your score? •Can they score more than 5? 10? •Compete with your adult in the elimination quiz. Take it in turn to ask each other questions. The first person to get a question wrong is out.
What is the main force acting upon bridges?	Live Load	
What shape gives the truss bridge its additional strength?	Compression	
Which 'load' changes on a bridge?	Gravity	
Which 'load' does not change on a bridge?	Bailey	
What happens if the load on a bridge is too great for the support given?	Additional wires	
What was the name of the type of bridge used in WW2? A portable type of Truss bridge?	The bridge will collapse	
This force is trying to make objects shorter?	Triangle	
This force is trying to make objects longer?	Tension	
What can be used to make a suspension bridge able to carry more load?	Dead Load	
BIG Questions	**Beat Your Adult**	
1. What are the disadvantages of a beam bridge? 2. What are the different ways in which different types of bridges are strengthened? 3. Why are abutments so important to arch bridges? 4. Why are triangles the strongest shape?	Your teacher can give **10 facts** in **1 minute** about this topic. How many can you give to your partner? 	 

Word scramble		Tasks	Creative Task
Unscramble the key vocabulary from this topic below. You can create your own at the bottom		1. Investigate the most famous types of bridges: • Suspension Bridges • Arch Bridges • Beam Bridges Create a fact-file for each one 2. Investigate how bridges are designed to withstand earthquakes in different part of the world.	1. Using only 5 pieces of A4 paper and cellotape, can you design a bridge that will hold: • 1 Book • 2 Books • 3 Books • 5 Books • 10 Books 2. Using K'Nex / Lego / Meccano create a bridge that can span 30cm 3. Write a story where the there is a problem involving a bridge.
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