*Owls Year 4/5*
*Autumn 2 (A)*

# Design and Technology – Structure
# Bridges

**What I should already know:** Shapes and structures with wide, flat bases or legs are the most stable. The shape of a structure affects its strength. Materials can be manipulated to improve strength and stiffness. A structure is something which has been formed or made from parts. A 'stable' structure is one which is firmly fixed and unlikely to change or move. A 'strong' structure is one which does not break easily. A 'stiff' structure or material is one which does not bend easily. Natural structures are those found in nature. Man-made structures are those made by people.

**Enquiry Questions**

- How can we reinforce a beam to improve its strength?
- Can we build a spaghetti truss bridge?
- Can we build a wooden truss bridge?
- Can we complete, reinforce and evaluate our truss bridges?

**Key Vocabulary**

**Accurate –** Neat, correct shape, size and pattern with no mistakes.
**Arch bridge –** A bridge which is built with a curved arch.
**Beam bridge –** A bridge which is built with horizontal beams and vertical pillars.
**Bench hook –** A tool which hooks onto the edge of the workbench. It's used to hold woodwork still when sawing.
**Compression –** A squashing force caused when parts of a structure are pushed together.
**Coping saw –** A saw with a narrow D-shaped metal blade, used for cutting curves in wood.
**File –** A tool used to smooth down rough edges on wood or metal materials.
**Mark out –** To measure and mark where a piece of material needs to be cut or shaped.
**Reinforce –** To make a structure or material stronger, especially by adding another material or element to it.
**Sand paper –** Strong paper with sand on one side to smooth or polish woodwork.
**Set square or try square –** A right-angle triangular plate, wood or metal tool used for drawing lines at 90 °, 45°, 60°, or 30°.
**Shape –** The form of an object.
**Structure –** Something which stands, usually on its own.
**Suspension bridge –** A bridge which is supported by vertical cables and suspended by cables which run between pillars that are connected onto either end of the bridge.
**Tenon saw –** A saw with a flat blade, used for cutting

**Design and Technology Skills and Knowledge**

Pupils will:

Skill – Design

- Design a stable structure that is able to support weight.
- Create a frame structure with focus on triangulation.

Skill- Make

- Make a range of different shaped beam bridges.
- Use triangles to create truss bridges that span a given distance and support a load.
- Build a wooden bridge structure.
- Independently measure and mark wood accurately.
- Select appropriate tools and equipment for particular tasks.
- Use the correct techniques to saw safely.
- Identify where a structure needs reinforcement and use card corners for support.
- Explain why selecting appropriate materials is an important part of the design process.
- Understand basic wood functional properties.

Skill – Evaluate

- Adapt and improve own bridge structure by identifying points of weakness and reinforcing them as necessary.
- Suggesting points for improvements for own bridges and those designed by others.

Knowledge- Structures

- Understand some different ways to reinforce structures.
- Understand how triangles can be used to reinforce bridges.
- Know that properties are words to describe the form and function of materials.
- Understand why material selection is important based on their properties.
- Understand the material (functional and aesthetic)

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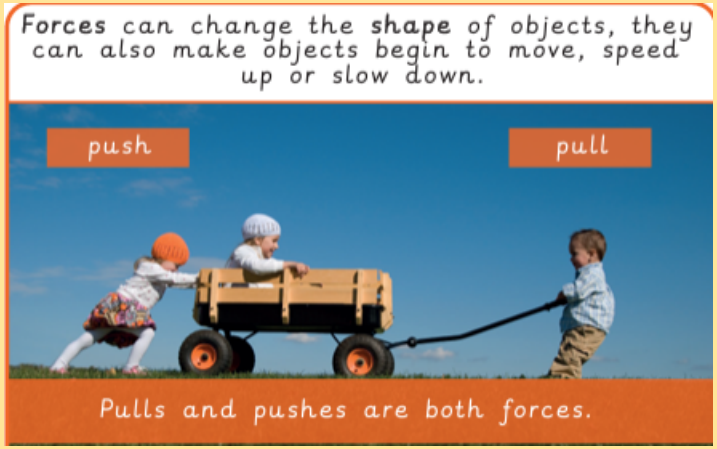
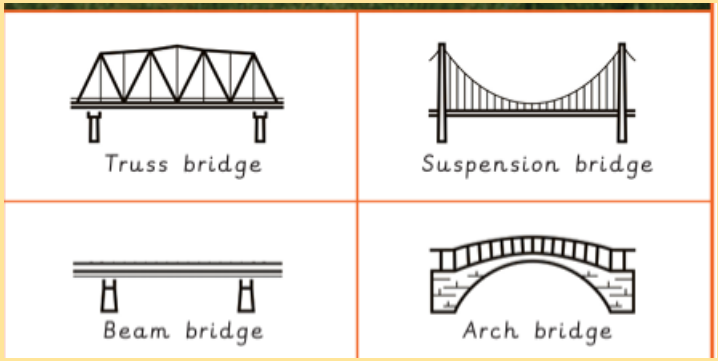
| | wood in straight lines or angles.<br>**Tension –** A stretching force caused by two parts of a structure being pulled apart.<br>**Truss bridge –** A bridge which is built from a series of triangular beams. | properties of wood. |

**Useful Images/ Information**





**Links to other curriculum areas:** Science Properties and Changes in Materials, Forces