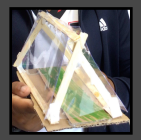
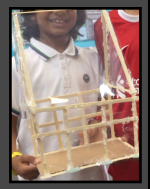
Structures

(Updated September 2023)

EYFS	KS1	LKS2	UKS2
Substantive Knowledge * Understand that building involves joining things together. * Understand that building can be done using a great range of different objects/ materials. * Understand that decoration can be used to add smaller details e.g. eyes, claws etc. * Understand and use key vocabulary (see below). **Key Skills** * Use construction kits to build e.g. Lego, wooden blocks. * Use junk modelling to create something. * Begin to add decoration e.g. wool, buttons, stickers etc.	**As EYFS plus:** **Substantive Knowledge** * Understand that paper/card can be made stronger (stiffened) e.g. overlapping, layering, rolling, folding etc. * Understand that stability can be increased or decreased e.g. rolling a piece of paper/card tighter to increase the layers etc. * Understand that paper/card can be joined in different ways. * Understand the process of creating and using a template. * Understand and explain how template help to ensure consistency and accuracy. * Begin to understand that a design brief/criteria is used in order to detail and meet the needs of the final user(s). * Understand and use key vocabulary (see below). **Disciplinary Knowledge** * Explore a variety of existing freestanding structures e.g. Burj Khalifa, bridges, other buildings etc. **Key Skills** * Investigate different techniques for stiffening a variety of materials. * Test different methods of enabling structures to remain stable. * Join appropriately for different materials and situations e.g. glue, tape. * Mark out materials to be cut using a template. * Use a glue gun with close supervision.	**As KS1 plus:** **Substantive Knowledge** * Understand that a shell/frame structure gives a building it's shape and support. * Understand that triangles are one of the strongest shapes in construction. * To understand that diagonal struts are created by forming triangles at joining points of a structure. * Understand that shell/frame structures can be strengthened using diagonal struts. * Understand that a wide base provides more stability due to the centre of gravity. * Understand how to measure, mark, strip and dowel accurately to 1cm. * Understand and use key vocabulary (see below). **Disciplinary Knowledge** * Explore a variety of existing greenhouses (different, shape, size, purpose etc.) * Respond to the work and influence of architect Norman Foster. **Key Skills** * Develop vocabulary related to the project. * Create shell or frame structures. * Strengthen frames with diagonal struts. * Make structures more stable by giving them a wide base. * Measure and mark square sections, strip and dowel accurately to 1cm.	**As LKS2 plus:** **Substantive Knowledge** * Understand that tools can be used to help mark positions for holes. * Understand how to safely use a hand drill. * Understand the process of marking, drilling and filling holes in wood. * Understand the importance of accuracy in construction and demonstrate this to 1mm accuracy. * Understand how to apply knowledge of strengthening and stiffening techniques to wood. * Understand that disciplines of D&T can be combined i.e. structures and mechanisms. * Understand a greater selection of key terminology. * Understand and use key vocabulary (see below). **Disciplinary Knowledge** * Explore existing automata, including shape, design, mechanisms, finishes etc. * Respond to the work and influence of Zaha Hadid. **Key Skills** * Use the correct terminology for tools, materials and processes. * Use bradawl to mark hole positions. * Use hand drill to drill tight and loose fit holes. * Cut strip wood, dowel, square section wood acc to 1mm. * Join materials using appropriate methods. * Build frameworks to support mechanisms. * Stiffen and reinforce complex structures.
Design * Use a range of blocks and other construction materials to support design. **Make** * Select from a range of indoor and outdoor materials to build for a purpose. **Evaluate** * Share creations (and how it was made) with others and identify similarities/differences.	**Design** • Select appropriate technique exposing: First… Next…. Last… **Make** • Explain which materials they are using and why. • Select materials from a limited range that will meet the design criteria. **Evaluate** • Explain how existing products do/do not achieve their purpose. • Say what they like and do not like about items they have made and attempt to say why. • Discuss how closely their finished product meets their design criteria and how well it meets the needs of the user.	**Design** • Propose realistic suggestions as to how they can achieve their design ideas. • Record the plan by drawing annotated sketches. **Make** • Cut slots. • Cut internal shapes. • Select from materials according to their functional properties. **Evaluate** • Draw/sketch products to help analyse and understand how products are made. • Investigate key events and individuals in design and technology.	**Design** • Use models, kits and drawings to help formulate design ideas. • Combine modelling and drawing to refine ideas. . **Make** • Make prototypes. • Cut accurately and safely to a marked line. • Select from and use a wide range of tools. **Evaluate** • Consider and explain how the finished product could be improved related to design criteria.

Key Vocabulary Build, join, decorate, detail, junk	**Key Vocabulary** **EYFS plus:** strong, stiffen, stable, overlap, layer, fold, roll, template, house, building, paper, card, material, glue gun, tape, design brief/criteria	**Key Vocabulary** **KS1 plus:** shell, frame structure, support, triangles, diagonal struts, base, gravity, stability, architect, measure, strip, dowel	**Key Vocabulary** **LKS2 plus:** automata, bradawl, hand drill, reinforce, wood
Autumn 1 & Summer 1 **Use of junk modelling and construction kits/ equipment to build imaginary worlds, dens and bug hotels, and 3D monster models.** 	**Year 1 - Spring 1** **Robots** **Build own freestanding robots from paper/card using templates, glue, tape, and explore how to keep them stable.** 	**Year 3 - Summer 2** **Growth and Change** Design and make a mini greenhouse using lolly sticks, cling film, photo frames, plastic wallets, dowel etc. by creating a shell/frame, using diagonal struts and providing a wide base.  	**Year 6 - Summer 1** **Faster, Higher, Stronger** **Build a wooden structure to house a Greek-inspired automata (with cams (mechanisms). Use a hand drill and stiffen appropriately.** 

Structures

EYFS - Children in Nursery **experiment with a range of materials in order to build 'structures'** e.g. wooden blocks, Lego etc. and **begin to use simple joining techniques** e.g. glue sticks, sellotape. Children in Reception **expand on their understanding of building to include junk modelling**. They begin to **add smaller decorations** to improve the overall look of a structure (e.g. buttons for eyes, wool for hair etc.).

KS1 - Children **continue to join materials for their structures using a greater range of techniques**, such as a glue gun, stapler etc.
New Skills - Children **learn new vocabulary** (e.g. stable) and **explore ways of strengthening and stiffening** such as folding, rolling and layering. **Using a template** is also introduced during this phase and children **use simple shapes to cut out a range of materials** e.g. paper, fabric etc. to build their own freestanding robot structure.

LKS2 - Children **expand on their understanding of 'stability'**, including how a **wide base and diagonal struts** can be effective in achieving a stable structure.
New Skills - Children will **learn about the work of architect, Norman Foster**. They will **create shell/frame structures** and **assess materials for use based on their functional properties** when designing and making their mini greenhouses. They will **measure accurately to 1cm** when cutting and stripping construction materials such as dowels. They will explore **how to use handsaws safely** in order to cut dowels.

UKS2 - Children **continue to join materials and build stable frameworks**. Children **develop their accuracy when measuring materials to 1mm**. By the end of UKS2, **children should be confident in using relevant/previous technical vocabulary** when discussing tools, materials and processes.
New Skills - Children will **use bradawl to mark hole positions** and **hand drills to drill holes**.