



Subject: DT
 Year group: 1
 Term: Spring
 Unit name: Freestanding Structures

Prior Knowledge - • Experience of using construction kits to build walls, towers and frameworks. • Experience of using of basic tools e.g. scissors or hole punches with construction materials e.g. plastic, card. • Experience of different methods of joining card and paper.

Assessment for learning

Recapping prior knowledge- beginning of unit- what do children already know?

Beginning of each lesson- focus on recall of previous learning (quick quizzes)

Key Vocabulary

cut, fold, join, fix structure, wall, tower, framework, weak, strong, base, top, underneath, side, edge, surface, thinner, thicker, corner, point, straight, curved metal, wood, plastic circle, triangle, square, rectangle, cuboid, cube, cylinder, design, make, evaluate, user, purpose, ideas, design criteria, product, function

- National curriculum:**
- 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 their ideas and products against design criteria
 - 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.

<u>Design Process</u>
Investigative and Evaluative Activities (IEAs)
Focused Tasks (FTs)
Design, Make and Evaluate Assignment (DMEA)



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End points (what pupils MUST know and remember)

- Children can design a structure and can explain the user and purpose. For example: an animal enclosure for people to visit.
- Children can draw an annotated sketch of their free-standing structure and can label it with materials.
- Children can select from PVA glue, glue sticks and scissors to cut and join materials (card and cardboard).
- Children can name free-standing structures: Eiffel tower (European. More familiar example) and The Burj Khalifa in Dubai (tallest example)
- Children can discuss the different types of animal enclosures – penguins have to have water to swim in and land, lions need high fences so they don't jump out, giraffes need trees to eat from.
- Children can state if their structure is suitable for the intended user and purpose. They can offer a way to improve their structure with some guidance.

Children can strengthen a structure using stronger materials, like card instead of paper or lolly pop sticks instead of cardboard.

Years 1/2

Structures
Freestanding structures

Instant CPD



Tips for teachers

- ✓ Create a PowerPoint or range of pictures showing a variety of freestanding structures relevant to the product the children are designing and making.
- ✓ Exploring structures in the local area provides a good opportunity to develop children's observational drawing.
- ✓ Create and display a word bank of relevant technical vocabulary in the classroom.
- ✓ Ensure that work with construction kits and materials builds on children's prior experience in the Early Years Foundation Stage (EYFS).
- ✓ Ensure that different types of construction kits are available for children to explore through focused tasks.
- ✓ It is perfectly acceptable for children's final products to include both construction kits and consumable materials.
- ✓ Demonstrate measuring, marking out, cutting, joining and strengthening techniques and provide help sheets showing instructions for the children to practise independently.
- ✓ Prior to producing their designs, have a range of materials available for children to access and create models.

Useful resources at www.data.org.uk:

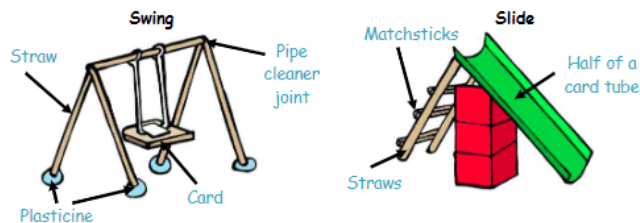
- CPD Resources Primary Inset Guides

D&T Association publications:

- Primary Helpsheets - Unit 1B Playgrounds and Unit 1D Homes
- Primary Lesson Plans - Unit 1B Playgrounds and Unit 1D Homes

Please note that these publications are based on previous National Curricula.

Techniques for assembling freestanding structures

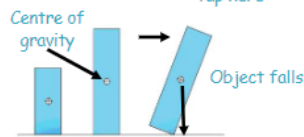
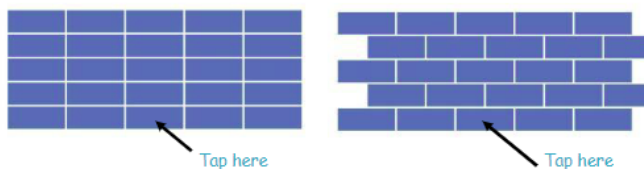


Show children how to join sheet materials and reclaimed boxes together using different tapes and glues.



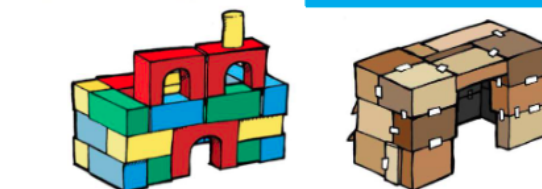
Technical knowledge and understanding

Build walls with these different patterns. Tap away the centre brick in the bottom row of each wall in turn. What happens? Which wall is the strongest?



As a freestanding structure becomes taller its centre of gravity rises. Stability in a structure can generally be increased by making the base wider, making the base heavier or adding buttresses.

Ask the children to build and explore a variety of freestanding structures through focused tasks. Use a range of construction kits.



Designing, making and evaluating a strong chair for Baby Bear

An iterative process is the relationship between a pupil's ideas and how they are communicated and clarified through activity. This is one example of how the iterative design and make process *might* be experienced by an individual pupil during this project:

THOUGHT	ACTION
What sort of chair shall I make? Who is it for and what is it for?	Choose an appropriate soft toy Generating ideas through talking and drawing based on own experiences
How can I make sure it is strong, stiff and stable?	Developing ideas using construction kits to create mock-ups
Which joining techniques will work best for the chair?	Exploring and evaluating joining techniques
What media, materials and kits will I use?	Exploring and evaluating construction kits, new and reclaimed materials
What shall I do first? What tools and techniques will I use? What materials shall I use?	Selecting from a range of tools, techniques and materials Explaining choices
More thoughts... judging, planning, generating new ideas	More actions... making, testing, modifying
Will the chair meet the needs of the user and achieve its purpose?	Evaluating the chair with a soft toy and against design criteria

Glossary

- **Freestanding structure** - a structure that stands on its own foundation or base without attachment to anything else.
- **Frame structure** - a structure made from thin components e.g. tent frame.
- **Shell structure** - a hollow structure with a thin outer covering.
- **Stability** - in relation to a freestanding structure, the extent to which it is likely to fall over if a force is applied.
- **Buttress** - a structure added to a wall, tower or framework to make it more stable and/or reinforce it.
- **Brick bonding** - arranging bricks in a wall to improve the performance of the structure or improve its appearance.
- **Mock-up** - 3-D representation of a product.