



## Structures: Making Mini Greenhouses

**Purpose:** to design and create functional mini-greenhouses.  
**User:** for themselves to grow plants from seed more efficiently.

**Year:** 3

**Term:** Summer Cycle A

### Essential Prior Knowledge

- To know how to explore and evaluate existing products and how they work.
- To know how structures can be made stronger, stiffer and more stable.
- To know how to join materials effectively.
- To know how to use a range of tools and equipment to perform practical tasks (e.g. cutting, shaping, joining and finishing).
- To know how to select materials and components, including construction materials, according to their characteristics.
- To know how to draw and label a simple sketch to show my design intention.
- To know how to create a design based on existing products.
- To know how to, in discussions, suggest ideas, develop my design ideas and explain how I plan to make my product.
- To know how to design a purposeful, functional, appealing product.
- To know how to evaluate a product against set design criteria, explaining strengths and weaknesses.

### Key Knowledge (facts and skills) for unit



#### Technical Knowledge

**Strengthen and stabilise** – children to know which materials will help a structure to be stronger and more stable. They will also know techniques that they can use to strengthen and stabilise a structure, including using a wider frame, wider base, arrangement of base (e.g. legs on a chair), straight sides, flat surfaces, etc.

**Greenhouse** – children will know that a greenhouse is a transparent structure used to house plants and provide them with light and heat for growth.

**Properties of materials** – children to know properties of materials that make them suitable for different purposes. (E.g which materials are thick, thin, strong, flexible, transparent, translucent, opaque.)

**Net** – children to know that a net is a 2D pattern that you can cut and fold to form a solid 3D shape.

**Invention of the greenhouse** – children to know that the Romans are credited with the invention of the greenhouse. Emperor Tiberius liked eating cucumbers every day so to ensure that it was available to him, they were planted in carts and put in the sun in daytime and wheeled inside to keep them warm at night. They were stored under frames that were covered with thin sheets of selenite (a clear mineral).



#### Design

- To know how to use research of greenhouses to develop the design criteria
- To know how to draw and annotate sketches from different angles to show the greenhouse design.
- To know how to use TinkerCAD to create a virtual 3D model (including from different angles) to show my design intention.
- To know how to generate, develop, model and communicate ideas through discussion and annotated sketches.
- To know how to use nets to create a simple prototype.
- To know how to plan the equipment and materials needed to create the mini-greenhouse.
- To know how to design a functional mini-greenhouse that is fit for purpose.



#### Make

- To know how to select materials, components and construction materials, according to their functional properties
- To know how to follow a step-by-step plan, choosing the right equipment and materials to use.
- To use a wide range of tools and equipment to perform practical tasks (e.g. cutting, shaping, joining and finishing) accurately.



#### Evaluate

- To know how to evaluate my product against the design criteria I developed, explaining strengths and weaknesses.
- To know how to use feedback to evaluate my design before and during its creation.
- To know how key events and individuals in design and technology have helped shape the world.

### Enquiry Outcomes

KQ1: What are greenhouses and where did they originate?

Children will **research** the origins of greenhouses and understand how they have **impacted our world** today. They will know the purpose of a greenhouse to develop design criteria.

KQ2: Can I produce designs for a mini-greenhouse?

Children will use a **computer-aided design** programme to create a virtual 3D model (including from **different angles**) of their **prototype** and then use a **net** to create a prototype.

KQ3: Can I test and select appropriate materials and structures?

Children will test different nets to create 3D shapes together with **construction materials** and **evaluate** how fit they are for purpose, including **strength** and **stability**.

KQ4: Can I produce a clear step-by-step plan to make a functional greenhouse?

Children will produce a step-by-step plan for the **equipment, materials** and **techniques** they will need to create a greenhouse.

KQ5: Can I produce a mini-greenhouse that will help to grow plants?

Children will follow their plan and use a **range of tools** and **equipment** accurately to create the **final design** according to the design criteria.

KQ6: Does my greenhouse help my plants grow faster?

Children will **evaluate** their greenhouse against the design criteria they developed, and **test** by growing seeds in and outside of the mini-greenhouse.