# Design & Technology

## Knowledge Organisers

# Year 3 Design & Technology - Autumn Term 2: Cook Well, Eat Well

**1. Safety rules** must be followed in the kitchen. This includes adult supervision, careful use of sharp utensils and caution when using electric appliances.

**2. Preparation** techniques for **savoury** dishes include peeling, chopping, deseeding, slicing, dicing, grating, mixing and skinning.

**3. Tacos** are a traditional **Mexican** street food made from wheat or corn tortillas, filled with a **meat** or **vegetarian** filling and topped with salsa, lettuce or cheese.

What makes a healthy taco?

4. A **balanced diet** includes **nutrients** from the five different food groups.

**6. Design criteria** are the exact goals a project must achieve to be successful. **Evaluating** a project reviews if they are met.

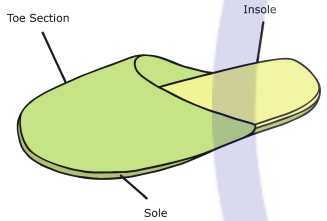
| Safety rules | Preparation | Slow cooker | Balanced diet | Tacos | Design criteria |
|---|---|---|---|---|---|
| appliances | Savoury | Healthy | Nutrients | Mexican | Evaluation |

# Year 3 Design & Technology - Spring Term I: Slipper Making

## What makes an effective slipper?

### 1. Why do we wear slippers?

**Comfort:** Slippers keep our feet warm and cozy, especially on cold floors.
**Hygiene:** They protect our feet from dirt and germs indoors.
**Relaxation:** Slippers signal a time to relax and unwind.

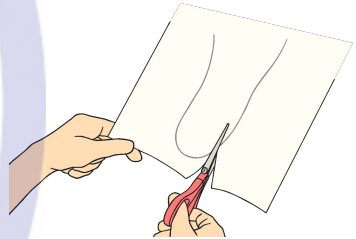



### 2. What are the design criteria for slippers?

**Comfort:** Soft materials, good fit, and cushioning.
**Warmth:** Insulation and coverage depend on the climate and personal preference. **Durability** : Sturdy seams and soles ensure the slippers last.
**Aesthetics** : Colours, patterns, and decorations can reflect personal style.

### 3. Why is it important to consider the target audience?

By considering the target audience, you can design slippers that meet their specific needs and preferences, leading to greater customer satisfaction and sales.



### 4.. How can materials be joined together?

Materials can be joined by pinning, gluing or sewing.

### 5.. What decorations improve the aesthetics of a design?

Decorations include: buttons, beads, sequins, ribbon or lace.

### 6. Why is evaluating so important?

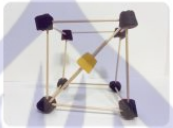
Evaluating is an opportunity to see what could be improved or what could be done differently next time.

| | | | | | |
|---|---|---|---|---|---|
| aesthetics | audience | comfort | cushioning | design criteria | durability |
| evaluating | hygiene | materials | patterns | preferences | stitch |

# Year 3 Design & Technology - Summer Term 2: Greenhouse

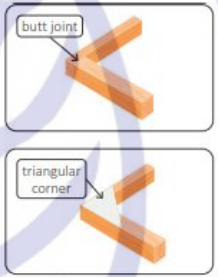
## 1. What is a greenhouse?

A **greenhouse** is a building where plants can grow in a **warm** and **protected** environment. Greenhouses let light in through **transparent** or **translucent** walls and roofs. Windows, vents or fans provide **ventilation**.



## 2. How can diagonal struts can strengthen a structure?

The struts create **triangular** shapes within a frame structure. Adding diagonal struts adds **strength** and **stability**.




## 3. What materials are suitable for making a greenhouse?

Materials, such as glass and plastic are suitable for making greenhouse roofs and walls because they are **transparent**, **waterproof** and **hardwearing**.

**What makes a successful greenhouse?**

## 4. What are design criteria?

**Design criteria** are the exact goals a project must achieve to be **successful**. These criteria might include the product's use, appearance, cost and target user.

## 5. What tools can be used for cutting?

Specific **tools** can be used for cutting, such as **saws**. Wood can be joined using glue, nails, staples, or a combination of these. Safety rules must be followed to prevent injury from sharp blades.

| | | | | | |
|---|---|---|---|---|---|
| **Greenhouse** | **Translucent** | **Diagonal struts** | **Waterproof** | **Evaluate** | **Saws** |
| **Transparent** | **Ventilation** | **Design criteria** | **Hardwearing** | **Tools** | **Glue guns** |

# Year 4 Design & Technology - Autumn Term 1: Fresh Food, Good Food

## 1. How can you stop food decaying?

Food decays due to the growth of microorganisms. Inventions such refrigeration have been beneficial in helping to reduce food decay. Other ways include: drying, salting, pickling, canning, pasteurising or freezing the food.

## 2. Why is food packaging important?

Food packaging is important because it helps to preserve and protect food. A balance needs to be found between keeping food fresh and cutting down on non-recyclable materials.


**How do you design and create a healthy snack?**

## 3. What is a prototype?

A prototype is a mock-up of a design that will look like the finished product but may not be full size or made of the same materials.

## 4. What is a healthy snack?

Healthy snacks include fresh or dried fruit and vegetables, nuts and seeds, homemade popcorn or chopped vegetables with hummus.

## 5. How do you design a healthy snack?

It is important to select the correct material and ingredients for the specific purpose, depending on the design criteria.

## 6. Does my healthy snack fit the success criteria?

Evaluation can be done by considering whether the product does what it was designed to do, whether it has an attractive appearance, what changes were made during the making process and why. It also includes suggesting improvements and explaining why they should be made.

| | | | | | |
|---|---|---|---|---|---|
| Decay | Preserve | Net | Prototype | refrigerating | Vegetables |
| Microorganisms | Food Packaging | Protect | Healthy | Sustainable | Fruit |

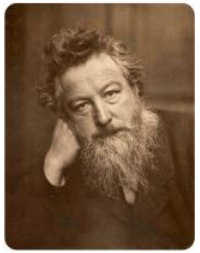
# Year 4 Design & Technology - Spring Term I: Functional and Fancy Fabrics

## 1. What are the properties of fabrics?

Fabrics can be natural or synthetic. Natural fabrics include cotton, silk and wool. Synthetic fabrics include Lycra, polyester and nylon.

## 2. Who is William Morris and why is he significant?

William Morris was a British textile designer, artist and socialist activist associated with the British Arts and Crafts Movement. He was a significant contributor to the revival of traditional British textile arts and methods of production.



## 3. What inspired William Morris' motifs?

William Morris' motifs consisted mainly of leaves, flowers, fruits and birds.

How do you make a William Morris inspired fabric?

## 4. What is screen printing and why is it used?

Screen printing is a process where ink is forced through a mesh screen onto a surface. This technique can be used to create decorative, repeated patterns on fabrics.

## 5. How do you sew a hem?

A hem runs along the edge of a piece of cloth or clothing. It is made by turning under a raw edge and sewing to give a neat and quality finish. Stitches include running stitch, cross stitch and blanket stitch.

## 6. What is an evaluation?

Evaluating is where you consider whether the product does what it was designed to do, whether it has an attractive appearance, and what changes were made during the making process.

| | | | | | |
|---|---|---|---|---|---|
| Fabric | Polyester | William Morris | Screen Printing | Hem | Running Stitch |
| Cotton | Wool | Motifs | Embellishment | Patten | Nature |

# Year 4 Design & Technology - Spring Term 2: Tomb Builders

## 1. What is a simple machine?

Simple machines make physical jobs easier by changing the strength or direction of a force. There are six simple machines: pulley; lever; wheel and axle; wedge; inclined plane; and screw.

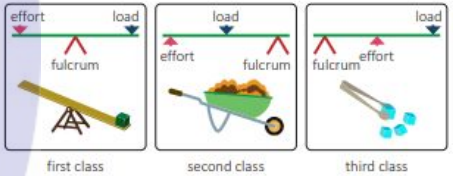
## 2. What is the role of a mechanism?

Mechanisms can be used to add functionality to a model.This can include sliders,levers,; linkages, gears and pulleys.

What do you need to consider to create a simple machine?

## 3. Why is choice of material important?

Characteristics of materials, such as rigidity, strength and smoothness will affect the success of a working model.




## 4.Which mechanism can be combined to move heavy objects?

Simple machines including pulleys, levers, wheels and axles and inclined planes can be combined to make a machine that can move heavy objects.

## 5. Why is an evaluation important?

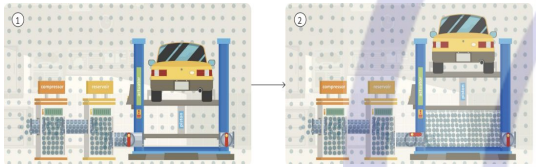
Evaluation of a machine includes suggesting improvements and explaining why they should be made. It also shows if the machine is fit for purpose.

| | | | | | |
|---|---|---|---|---|---|
| Force | Machine | Pulley | Lever | Incline | Material |
| Rigidity | Strength | Evaluation | Axles | Sliders | Linkages |

# Year 5 Design & Technology - Autumn Term I: Moving Mechanisms

## 1. What is a pneumatic system?

Pneumatic systems use energy that is stored in compressed air to do work, such as inflating a balloon to open a model monster's mouth. These effects can be achieved using syringes and plastic tubing. A pneumatic system uses air to exert a force.



## How do pneumatics help us?

## 2.. Why is it important to test products?

Testing a product against the design criteria will highlight anything that needs improvement or redesign. Changes are often made to a design during manufacture.

## 3. Why does a machine need to be strong and stable?

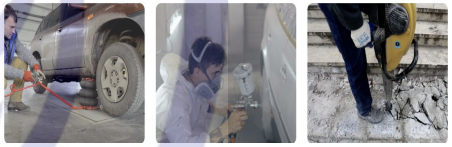
Different mechanisms and systems can work together to perform a function. A strong and stable structure is necessary to support different mechanisms in a machine.

## 4. Why are safety features included in product design?

Safety features are often incorporated into products that might cause harm. Some examples include the child-safety caps on medicine bottles, seatbelts in cars, covers for electrical sockets and finger guards on doors.

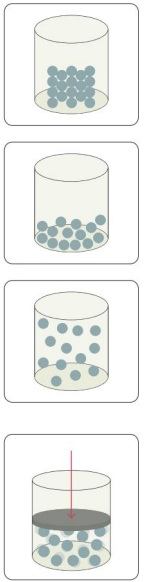
## 5. What does iterative mean?

Design is an iterative process, meaning that once an initial prototype has been designed it is continually tested and improved until the final product is deployed.



## 6. How can questioning help evaluate a product?

Evaluations can be made by asking product users a selection of questions to obtain data on how the product has met its design criteria.



| | | | | | |
|---|---|---|---|---|---|
| pneumatics | stable | product | compressed air | cross braces | iterative |
| structure | manufacture | mechanisms | systems | support | syringe |

# Year 5 Design & Technology - Spring Term I: Eat The Seasons


**1. What is seasonality?**
Seasonality is the time of year when the harvest or flavour of a type of food is at its best.

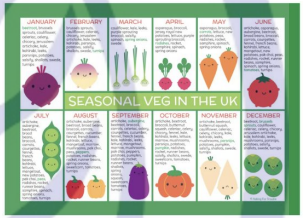
**2. What is a balanced diet?**
A balanced diet gives your body all the nutrients it needs to function correctly. This means eating a wide variety of foods in the correct proportions.

**3. Why is food hygiene important?**
Food hygiene is important to prevent the spread of disease-causing microorganisms.

**4. Why is a blanched diet important?**
A balanced diet gives your body all the nutrients it needs to function correctly. This means eating a wide variety of foods in the correct proportions.

**5. What is the difference between sweet and savoury tastes?**
Sweet dishes are usually desserts, such as cakes, fruit pies and trifles. Savoury dishes usually have a salty or spicy flavour rather than a sweet one.

Why is it beneficial to eat seasonal food?






**6. Why is it important to evaluate our cooking?**
Tasting,evaluating and providing feedback is important to ensure our recipes and cooking improves and continues to develop.

| | | | | | |
|---|---|---|---|---|---|
| seasonality | Food hygiene | Balanced diet | nutrients | microorganisms | savoury |
| sweet | Proportions | Food groups | Carbon footprint | evaluating | recipe |

# Year 5 Design & Technology - Summer Term 2: Architecture

## 1. How has architecture developed over time?

Architecture is defined by different styles often linked to particular periods of time. Each period uses visual elements to create its own style.

**Prehistoric**
c10,000–c2500 BC

Stonehenge, England

**Ancient Egyptian**
c3100–c30 BC

Great Pyramid of Giza, Egypt

**Classical c850**
BC–cAD 470

Parthenon, Greece

**Gothic**
1100–1500

Notre Dame Cathedral, France

**Renaissance**
1400–1600

Villa la Rotonda, Italy

**Baroque**
1600–1830

Palace of Versailles, France

**Early industrial**
1700–1850

Ironbridge, England

**Modernist**
1920–1970

De La Warr Pavilion, England

**Postmodern**
1960–1990

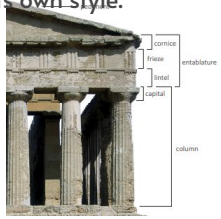
Dancing House, Czech Republic

**Sustainable**
1980–present day

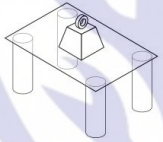
Bosco Verticale tower, Italy

## 2. What was Greek architecture like?

The ancient Greeks developed the Classical form of architecture that has been copied for thousands of years.




**What is needed to design and make a building?**



## 3. Which column shape supports the most weight?

Support, stiffness and stability can be created by using triangular shapes to create strong frameworks, columns to support roofs and overlapping brickwork patterns.

## 4. What is CAD?

Computer-aided design (CAD) is the use of specialised computer software to design objects. CAD can help designers to create better quality, clearer designs and make changes easily. CAD designs can also be made into objects using 3-D printers.

## 5.What methods can be used to support a framework?

Various methods can be used to support a framework. These include cross braces, guy ropes and diagonal struts. Frameworks can be built using lolly sticks, skewers and bamboo canes.

| | | | | | |
|---|---|---|---|---|---|
| architecture | Classical | Computer-aided design | Corinthian | Doric | entablature |
| frieze | Ionic | stability | stiffness | support | triangular |

# Year 6 Design & Technology - Autumn Term I: Food For Life

### 1. What are the pros and cons of processed food?

A **processed** food is changed during preparation and includes processes. Pros of processed foods include **convenience** and **availability.** Cons include a lack of **nutrients** and unhealthy ingredients.

### 2. What is the nutritional content of pizza dough?

Shop bought pizza dough is processed. It can contain many more **ingredients** than homemade dough, including **preservatives** and artificial ingredients.

### 3. What is a recipe?

A **recipe** provides information to prepare a dish, including ingredients, quantities and a method. They may also contain **nutritional** information.

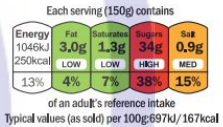
### 4. What constitutes a balanced diet?

Eating a balanced **diet** is a positive lifestyle choice that should be **sustained** over time. Food that is high in fat, salt or sugar can still be eaten occasionally as part of a **balanced** diet.

## How can food choices help us to sustain healthy lifestyles?

### 5. What different food preparation techniques are there?

Food **preparation** techniques include: chopping, slicing, dicing, kneading and mashing, and cooking techniques, such as boiling, roasting, frying and baking.




### 6. Why is evaluation an important aspect of design?

**Evaluating** a product while it's being manufactured, and explaining these evaluations to others, can help to refine it.

| availability | balanced | convenience | diet | evaluating | ingredients |
|---|---|---|---|---|---|
| nutrients | nutritional | preparation | preservatives | processed | sustained |

# Year 6 Design & Technology – Spring Term 2: Engineer

## 1. How and why have bridge structures changed over time?

Bridge **structures** have changed over time due to technology, design innovation and new and better access to materials. Significant **engineers** have improved safety, people's lives and trade through their **constructions.** Significant bridges include: the Menai Bridge, Clifton Suspension Bridge and Forth Bridge.

## 2. What are the features of bridges?

The four main bridge types are the **beam bridge, arch bridge, truss bridge** and **suspension bridge.** They each spread forces in different ways to remain strong and stable.

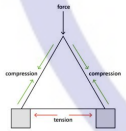
## 3. How can bridges be strengthened?

Strength can be added to a **framework** by using multiple layers or changing its shape.

## What is needed to build a bridge?

## 4. Why are triangles used in architecture?

Triangles do not collapse or **distort** easily and so are used in architecture to provide **support** and **stability.**

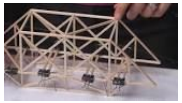



## 5. What are design criteria?

**Design criteria** should cover the intended use of the product, age range targeted and final appearance. Ideas can be communicated in a range of ways.

## 6. What materials are best for building a bridge prototype?

It is important to understand the characteristics of different **materials** to select the most appropriate material for a purpose. This might include flexibility, waterproofing, texture, colour, cost and availability.



| | | | | | |
|---|---|---|---|---|---|
| arch bridge | beam bridge | constructions | design criteria | distort | engineers |
| framework | stability | structures | support | suspension bridge | truss bridge |

# Year 6 Design & Technology - Summer Term 2: Make Do And Mend

### 1. What was the Make Do and Mend campaign?

Make Do and Mend was a campaign run by the Ministry of Information during the Second World War to encourage people to recycle and repurpose their old clothes rather than buy new.

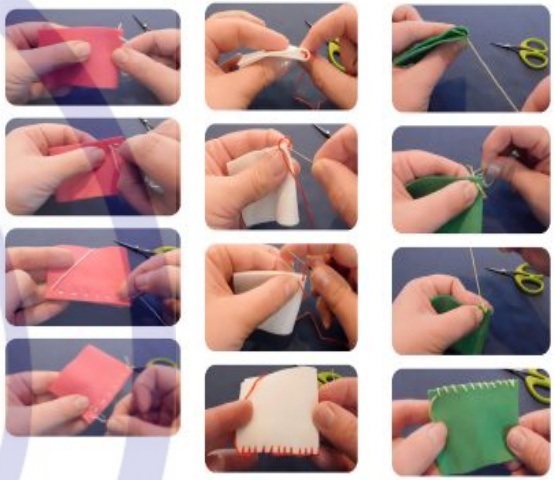

### 2. What is meant by deconstruction?

Deconstructing garments identifies how they were made, the materials used and their properties.

**How do you repair and join fabric together?**

### 3. What different types of hand stitch are there?

Hand stitches include running stitch, blanket stitch and whip stitch.



### 4. How does pinning and tacking help you when repairing fabric?

Pinning with dressmaker pins and tacking with quick, temporary stitches holds fabric together in preparation for and during sewing.

### 5. What is the job of fastenings?

Fastenings hold a piece of clothing together. Types of fastenings include zips, press studs, Velcro and buttons.

### 6. How can products be compared?

Products and inventions can be compared using a range of criteria, such as the impact on society, ease of use, appearance and value for money.

| | | | | | |
|---|---|---|---|---|---|
| Running stitch | Blanket stitch | Whip stitch | garment | precision | deconstruct |
| pinning | tacking | Fastening | Rationing | Hand stitch | Machine Stitch |