

Design Technology Curriculum

Year 1 to Year 6

Spring 1

Design Technology Overview

| | Autumn 1 | Autumn 2 | Spring 1 | Spring 2 | Summer 1 | Summer 2 |
|--|--------------------------------|--------------------|-----------------------------|--------------|-------------------------------|--------------------|
| EYFS (Expressive Arts) | Junk Modelling | | Bookmarks | | Design & Make A Rainbow Salad | |
| Year 1 | Eat More Fruits and Vegetables | | Stable Structures | | | Moving Mini Beasts |
| Year 2 | Puppets | | Vehicles | | | Perfect Pizzas |
| Year 3 | | Story books | | Pencil Cases | | sMini Castles |
| Year 4 | | Seasonal Stockings | | Torches | | Seasonal Food |
| Year 5 | Building Bridges | | Fashion and textiles (bags) | | Slingshot Car | |
| Year 6 | Programming Pioneers | | Birdhouse Builders | | Burgers | |
| Cookery Textiles Structures Electronics Mechanisms | | | | | | |

The Aims of the National Curriculum for Design and Technology

- develop the creative, technical and practical expertise needed to perform everyday tasks confidently and to participate successfully in an increasingly technological world
- build and apply a repertoire of knowledge, understanding and skills in order to design and make high-quality prototypes and products for a wide range of users
- critique, evaluate and test their ideas and products and the work of others
- understand and apply the principles of nutrition and learn how to cook.

Intent

Through high-quality design and technology teaching, our pupils will acquire a broad range of subject knowledge, which is developed each year from Reception through to Year 6. Our pupils will be inspired to use their creativity and imagination to design, make and evaluate within a variety of contexts. Through disciplines such as mathematics, science, engineering, computing and art, our pupils will solve real and relevant problems whilst taking risks and being resourceful. Our innovative projects will ensure that our pupils become citizens capable of contributing to the creativity, culture, wealth and well-being of the nation, whilst displaying a critical understanding of design and technology through history to the present day.

Implementation

The St.Luke's Design and Technology curriculum takes influences from planning provided by Plan Bee and Kapow as this serves to support non-specialists while providing the backbone to an ambitious curriculum. We have taken the planning to form the basis of a curriculum which has been uniquely developed for us. Each year our pupils will refine the necessary skills to become capable citizens in design and technology, carefully developing these skills each year as they progress through school. In order to develop a critical understanding of the history of the subject, our curriculum has incorporated the teaching of some of the world's most influential people, as well as including some individuals from closer to home.

Reception

For further information about the knowledge content taught in Reception please refer to the separate EYFS curriculum document.

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| Spring 1 Year 1 | Focus of Study: Structures: Stable Structures |
| NC Objectives | Key Knowledge and Vocabulary |
| <p><i>Designing</i></p> <ul style="list-style-type: none"> design purposeful and appealing products for themselves and other users based on design criteria <p><i>Making</i></p> <ul style="list-style-type: none"> select from and use a range of tools and equipment to perform practical tasks safely (cutting and joining) select from a range of materials, including construction materials. <p><i>Evaluating</i></p> <ul style="list-style-type: none"> evaluate a range of existing products evaluate their own products against design criteria <p><i>Technical knowledge and understanding</i></p> <ul style="list-style-type: none"> build structures, exploring how they can be made stronger, stiffer and more stable | <p>Context for study:</p> <p>This unit is the precursor to learning in Year 3, where the children will make a free-standing structure of a mini castle. Their knowledge of structures will be further developed in Year 5 through a unit of learning on designing and making bridges.</p> <p>Knowledge Content:</p> <p>To evaluate existing products.</p> <p>To design as a whole class using a criteria.</p> <p>To identify appropriate materials to make a structure more stable.</p> <p>To use joins effectively to attach and strengthen.</p> <p>Technical knowledge</p> <p>We use free standing structures for lots of different things. This could be as large as a carpark or house, or as small as a pet house. A stable object or structure is one that isn't likely to fall over. Use the following images to explain the purposes of some of the structures. Can the children think of any of their own examples?</p> |



Why are some structures raised off the ground on legs?

Some houses are raised off the ground to ensure that they do not flood. In hotter countries they are raised off the ground to allow better ventilation and to keep them cool. It also protects the houses from pests like insects and rats. Some structural designs are raised off the ground to allow the space underneath to be used e.g. car parking or for roaming space with pet houses.



How many materials can the children name? Have examples of the following materials: wood, rock, cardboard, rubber, fabric, plastic, glass, wool, metal, leather, sand and paper.

Explain that one of the images that you looked at was of a plastic carpark. What do the children know about plastic?

Explain that one of the images that you looked at was of a wooden carpark. What do the children know about wood?

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| Plastic characteristics: |
| Can be lightweight |
| Can have very bright colours |
| Can be stiff and strong e.g. used for slides |
| Can be flexible e.g. used for balloons |
| Can be broken easily and difficult to repair |
| Plastic takes a long time to decompose so it stays around for a very long time |

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| Wood characteristics: |
| Can be heavy |
| Can be painted but its natural colour is brown |

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| Is usually stiff and strong e.g. used for toys to ride on |
| Can be weak but repaired with glue |
| Is a natural material and only takes a few years to decompose |

Evaluating products:

Use the above images of the toy car park and toy service station:

- What are they made from?
- What works well?
- What could be improved?
- What is the same/ what is different about the toy structures?

Once the children have made their structures, use the following criteria to evaluate their products:

- Does the structure stay standing?
- Is it able to hold the weight of a small pet toy?
- Does it have a safe route in and out for the pet toy?

Vocabulary (Know and understand the meaning of these words and how to use them).

Wood: a hard material which forms the main part of a tree.

Plastic: a material that can be moulded into shape while soft and then is rigid once set.

Decompose: to break down, become rotten or decay.

Strong: Is able to withstand force or pressure.

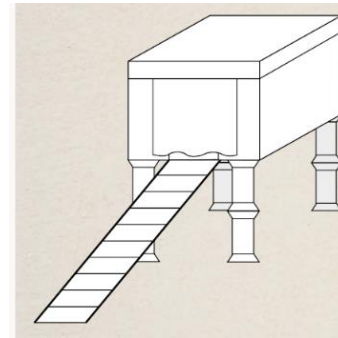
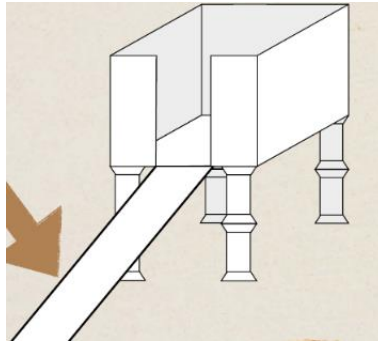
Weak: Is likely to break under pressure and is easily damaged.

Designing:

As a class, look at the plan for the stable structure. Discuss what the structure could be used for. What information can the class see from the plan? Why might the ramp need to have raised sides? Explain that the plan could be used as a car park and that the sides would stop the cars from falling off the ramps. What other possible ideas can the class come up with?

Explain that in groups, they are going to make the plan of the stable structure. It will be the home for a toy pet. What details could be added to the plan to make it more suitable? Ideas could include a roof, raised steps on the ramp and a curtain for a door.

We are going to make our structures using cardboard, wood and paper. What do the children know about cardboard? Which material would be best for the legs/ ramp/ sides? Why?



Model to the children how layering cardboard makes it stronger. Laying paper straws vertically on the ramp can create sides. Laying them horizontally can create steps.

Making:

1. To identify suitable materials that can be used to create the structure (cardboard, wooden reels and fabric for the curtain).
2. To know how to make a structure more secure (glue straws and paper to the ramp to create sides and/or steps).

Health and Safety:

The pupils must be taught to work safely.

- Ensure scissors are handled and used correctly.
- Children to be supervised when cutting the cardboard box for the entrance to their structure.

Other tips:

For children who are struggling to cut cardboard/ strips of paper, have pre-cut pieces ready to use. Some groups may require support cutting the entrance to their structure.

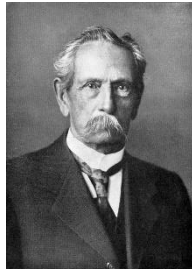
Resources needed:

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| | <p>Cardboard boxes (printer paper boxes would be ideal with the lids), cardboard strips for the ramp, wooden reels, paper, art straws, PVA glue and small pieces of fabric to create a curtain.</p> <p>Outcome:</p> <p>To be able to make a stable structure for a toy pet.</p> <p>To know how a structure can be adapted for different purposes.</p> <p>To be able to identify suitable materials.</p> |
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| Spring 1 – Year 2 | Focus of Study: Mechanisms: Vehicle |
| NC Objectives | Key Knowledge and Vocabulary |
| <p><i>Designing</i></p> <ul style="list-style-type: none"> design purposeful and appealing products for themselves and other users based on design criteria generate, develop, model and communicate their ideas through talking. <p><i>Making</i></p> <ul style="list-style-type: none"> select from and use a range of tools and equipment to perform practical tasks safely (cutting and joining) | <p>Context for study:</p> <p>This unit is the precursor to learning in Year 3, where the children will make pop-up story books and further their knowledge of how to create moving mechanisms. The children will have already studied the ‘Moving Mini Beasts’ unit in Year 1, where they will have learnt how to use a sliding mechanism, lever and pivot.</p> <p>Knowledge Content:</p> <p>To design individually using a design criteria.</p> |

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| <ul style="list-style-type: none">• select from a range of materials, including construction materials. <p><i>Evaluating</i></p> <ul style="list-style-type: none">• evaluate their own products against design criteria <p><i>Technical knowledge and understanding</i></p> <ul style="list-style-type: none">• explore and use mechanisms (wheels, axles and chassis) in their products | <p>To identify appropriate mechanisms and how to join them in order to make a moving vehicle.</p> <p>To evaluate their own designs and finished vehicles.</p> <p>Technical knowledge</p> <p>What is a vehicle?</p> <p>A vehicle is something with wheels that transports people or objects e.g. a car, truck or cart. How many different types of vehicles can the children think of? Give examples of different vehicles e.g. an ambulance and ask what they are used for. Can a shopping trolley or babies pram be classed as a vehicle? Why?</p> <p>Look at different parts of a vehicle.</p> <p>Display an image of an ambulance. Can the children identify different parts e.g. windows, wheels, headlights and windscreen? Are there other parts which the children can identify?</p> <p>History of vehicles</p> |
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In 1885, Karl Benz invented the world's first car in Germany. It was the very first to have an built in engine that ran on gas fuel.



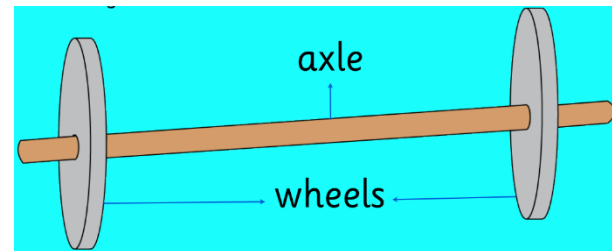
Frederick William Bremer, a plumber and gas fitter, built the first British four-wheeled petrol-engine motor car. Starting work in 1892 when he was 20, it first ran on a public highway in December 1894.



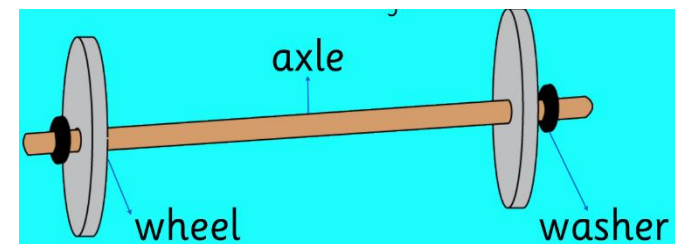
Construction of vehicles

Vehicles have wheels that make them move. Wheels are attached by axles. Axles work in two ways:

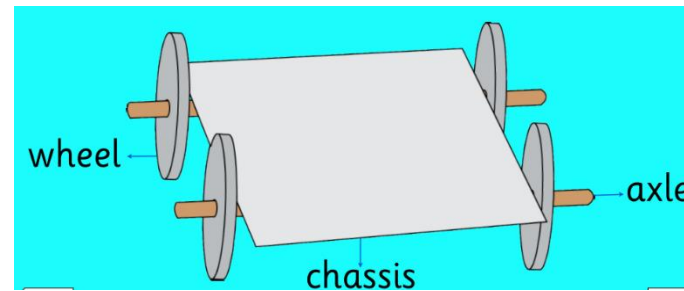
1. They can be firmly attached to the wheels so the axle rotates and the wheels turn.
2. Wheels can be placed loosely on the axle so that the wheels turn around the axle.



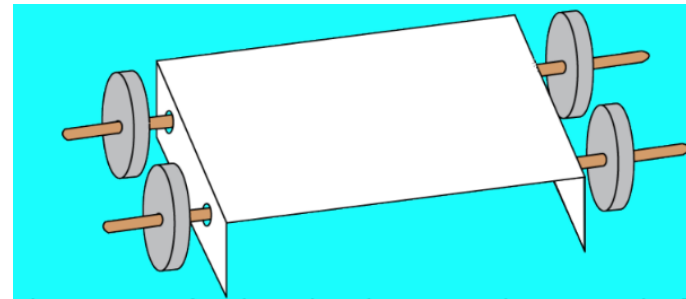
If wheels are not attached to the axles, you need something to stop the wheels from falling off. A bolt or washer can be placed on the axle to stop the wheel from coming off.



Axles are then attached to a chassis. The chassis is the framework of the vehicle and attached the axles to the body of the vehicle. If axles are attached to the chassis from underneath, then the axle cannot turn around. The wheels are placed over the axles but not attached so that the wheels can rotate around the axle.



Axles not fixed to the chassis are put through holes in the chassis so that the axle can turn around. The wheels are firmly attached to the axle so they turn when the axle turns.



Evaluating products:

Once the children have made their structures, use the following criteria to evaluate their products:

- Which vehicles catch your eye? Why?
- How do other vehicles compare to yours?
- Do the vehicles move well?
- What was your favourite part of making the vehicle?
- What was the most difficult part about making your vehicle?

Vocabulary (Know and understand the meaning of these words and how to use them).

Vehicle: A vehicle is something with wheels that transports people or objects.

Wheels: A circular object that revolves on an axle and is fixed below a vehicle.

Axle: A rod passing through the centre of a wheel.

Chassis: The base frame of a wheeled vehicle.

Designing:

The children should be given the following criteria before planning their vehicle:

- Your vehicle must have wheels to make it move.
- It must have axles.
- Your vehicle must have a body on a chassis.

The children should be able to describe the design process e.g. what they will need to do first, how they will put the wheels and axles together, how they will attach the axles to the chassis and how their vehicle will be decorated. This could be displayed as a flow chart or set of instructions.

Making:

1. To know what components make a vehicle.
2. To know how to suitably attach the components to one another to be able to make a vehicle.



Health and Safety:

The pupils must be taught to work safely.

- Ensure scissors are handled and used correctly.
- Children to be supervised when cutting.

Other tips:

Children may need support creating holes in their chassis if they have chosen to secure their axles to their chassis using this technique.

Resources needed:

Wheels, axles, chassis (card), a selection of coloured cards to create the body of the vehicle.

Outcome:

To be able to create a moving vehicle.

To be able to name the parts of a moving vehicle and explain how they are put together.

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| Spring 1 Year 5 | Focus of Study: Textiles: Bags |
| NC Objectives | Key Knowledge and Vocabulary |
| <p><i>Design</i></p> <ul style="list-style-type: none"> generate, develop, model and communicate their ideas through discussion, annotated sketches, cross-sectional and exploded diagrams and pattern-pieces <p><i>Making</i></p> <ul style="list-style-type: none"> select from and use a range of tools and equipment to perform practical tasks (joining and finishing) select from and use a wider range of materials according to their functional properties and aesthetic qualities <p><i>Evaluating</i></p> <ul style="list-style-type: none"> understand how key events in design and technology have helped shape the world evaluate their ideas and products against their own design criteria and | <p>Context for study:</p> <p>This is the third textiles unit of work. The children will have already completed textiles units in Year 2 (Puppets) and Year 4 (Seasonal Stockings). The children will have already practised and applied skills including a simple running stitch, over stitch and appliqueing a simple shape onto a fabric. In this unit the children will advance their skills to include a back stitch and embroidery. The children will also create their own template.</p> <p>Knowledge Content:</p> <p>To design and use a pattern to create a functional item- bag.</p> <p>Technical knowledge</p> |

consider the views of others to improve their work

Clothes did not have pockets until the 17th century, so men and women alike carried bags. While some bags were appropriate for the working class (like messenger bags), others were specifically styled for the elite. Secret compartments and highly designed bags were ultimately prized and considered to be a high-status symbol.

The first known bag dates back to between 3400 and 3100 BCE. It is the oldest preserved bag belonging to a man nicknamed 'the Tyrolean Iceman' found on the Similaun mountain on the border between Austria and Italy.



Bags were also depicted in Egyptian hieroglyphics as waist pouches, which were carried around on the hip. The Bible specifically identifies Judas Iscariot as a 'purse carrier'. These were constructed out of durable leather or precious cloth and overall, the pouch stored valuables such as coins.

In the 14th and 15th centuries, bags were called 'purses.' A purse was attached to a girdle belt and it dangled from the waist. Some of the purses were drawstring and on a long cord. During the Medieval ages curious designs appeared on purses, associated with marriage and betrothal. They commonly showed love stories embroidered onto the fabrics.



hung from the girdle

Fashion dramatically changed in the 16th and 17th century. Women began to wear their girdle under their skirts, most notably in the Elizabethan era when women's skirts expanded

to enormous proportions. Consequently, the pouch was inevitably getting lost and had to make a definitive move. Women began wearing long embroidered purses under their skirts and breeches. Similarly, men began to wear leather pockets inside their breeches, which they called bagges. It is thought these fashions contributed to the invention of pockets in clothing.

The 18th century had an acquired taste for more slender and narrower dresses. This



meant that pockets were discarded and the handbag sprung forth again coined the 'indispensables.'



The bag has always found a way to remain relevant. With this in mind, by 1843 Great Britain had 2,000 miles of railway lines and the traditional purse had to adapt to become helpful to commuters. The bag now needed the capacity to hold larger items. Some of today's most notably designers started out as luggage manufacturers in the 18th century, including Thierry Hermes- a harness and saddle maker.



In the 21st century, both men and women alike strap or sling hands-free, genderless bags over themselves every day. Conscious designers now design bags that are waterproof, made of faux reptile skins and vegan leathers.

Making Part 1: Practise

- To practise a backstitch. Explain that a backstitch gives you a continuous stitch with no gaps (best for hand sewing)

(To be practised on a piece of scrap fabric. Thread a needle and tie a knot in the end of the thread. Draw a pencil line on your fabric if needed to mark your backstitch line. Poke the needle up from beneath the fabric at one end of the line. Then, push the needle back down through the fabric roughly 1cm away. Come back up through the fabric another 1cm away in distance, but this time go backwards and through the fabric at the end of your first stitch. Come back up one stitch away and then back through at the base of the previous stitch.

- To practise embroidering a design onto fabric.

Explain that the definition of embroidery is the process of forming a decorative designs with hand or machine needlework. Explain to the children that their drawstring bag will have to have an element of embroidery using a running stitch. They will have used a running stitch in their Year 2 and Year 4 units of work on textiles. The design should be simple e.g. a swirling pattern, flower or basic shape.

- To draw a final design and add labels (cutting lines, stitch lines, front/back, seam allowance and fold lines). You may wish to have the children draw a cross sectional diagram so that the drawstring element is clearer.

Making Part 2: The drawstring bag

Explain the design brief to the children:

- You must create a purposeful bag with a fastening (drawstring).

- You must include a decorative element (embroidery).
- You must ensure that your bag is aesthetically pleasing e.g. your sewing is neat and there are no gaps in your stitches.
- On your tracing paper you are going to make a pattern template for your drawstring bag. You will need to draw a rectangle that is 10" x 13" and cut this out.
- Use tailors chalk to draw around the pattern onto your fabric. You will need to do this twice so that you have two pieces of fabric that are 10" x 13".
- Cut out both pieces using pinking shears.
- With the reverse of the fabric facing up, fold over the top edges roughly 1cm and iron in down.
- Place both pieces of fabric together (right side of fabric facing inwards).
- From the top, measure 2" down and pin on both sides.
- From the measured 2" point, sew around the edge of the bag (1.5cm in) using a backstitch. A backstitch will mean that there are no gaps in the sewing.
- Sew seam allowances open (optional for a better finish).
- The 2" at the top of the back on either side should now be folded over and sewn using a backstitch again.
- The 2" at the top of the bag which was pinned will now be folded down approx. 1" on either side. Pin these in place and sew along the casing using a backstitch.
- The hems can be trimmed using the pinking shears to avoid excess fraying. Be careful not to cut into the sewing.
- Turn the bag the right way round and insert ribbon into the drawstring casement from one side all the way around until it comes out on the same side. Repeat with another piece of ribbon travelling the other way from the other side.
- Tie the ends of the ribbons in knots to stop them fraying.
- You will now be able to pull the drawstrings to close the bag.
- Decide which piece of fabric is to be the front and embroider (using a running stitch) your chosen basic pattern or shape onto the front.

Evaluating products:

- To evaluate against the design criteria: evaluate the stitches and the decorative element.

Other:

- Use water to help wet the ends of the thread before threading the needle.
- An adult should complete the ironing elements of the making.
- It may be useful to attach a safety pin to the ribbon whilst feeding through the drawstring casement.

Key Vocabulary:

Needle, thread, knot, seam, fabric, backstitch, drawstring

Resources needed:

Two pieces of fabric (cotton will work best) 10" x 13"

Two 24" pieces of ribbon

Pins to hold fabric together

Tailors chalk

Tracing paper

Pinking shears

Sewing thread

Sewing needles

An iron

Video links:

[Backstitch How To - Basic Sewing \(Embroidery & Hand Sewing\) - YouTube](#)

[Learn to Sew a Drawstring Bag - Beginner Sewing Project - YouTube](#)

Outcome:

To create a purposeful bag with a drawstring element.

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| Spring 1 Year 6 | Focus of Study: Structures: Birdhouses |
| NC Objectives | Key Knowledge and Vocabulary |
| <p><i>Designing</i></p> <ul style="list-style-type: none"> generate, develop, model and communicate their ideas through discussion, annotated sketches, cross-sectional and exploded diagrams, prototypes, pattern pieces and CAD <p><i>Making</i></p> <ul style="list-style-type: none"> select from and use a wider range of tools and equipment to perform practical tasks [for example, cutting, shaping, joining and finishing], accurately select from and use a wider range of materials and components, including construction materials, textiles and ingredients, according to their functional properties and aesthetic qualities <p><i>Evaluating</i></p> <ul style="list-style-type: none"> investigate and analyse a range of existing products | <p>Context for study:</p> <p>This unit is the final unit of structures, building on learnt skills from Y1, Y3 and Yr5. Most recently, the children will have studied the unit 'building bridges' in Yr5 where they will have learnt how to make structures stronger and improve joins.</p> <p>Knowledge Content:</p> <p>To evaluate existing products.</p> <p>To design individually using a criteria.</p> <p>To identify appropriate joins to attach and strengthen.</p> <p>Technical knowledge</p> <p>While we normally think of birdhouses as a way to protect nature and increase the amount of birds in our area, that was not always the case. Birdhouses in some places in Europe were used initially as a trap to capture eggs and even birds. These birdhouses were typically made of clay and were built like a vase; however, in most cases birdhouses have been used to protect wild birds from harsh weather and predators as well as a location to live.</p> |

- evaluate their ideas and products against their own design criteria and consider the views of others to improve their work

Technical knowledge and understanding

- apply their understanding of how to strengthen, stiffen and reinforce more complex structures

Why do birds use birdhouses?

Some birds are not capable of creating their own nesting because their beaks are specialised for hunting insects or gathering seeds. Some birds have to rely on using tree cavities which have been created by other birds, such as woodpeckers.

Nowadays, forest land has greatly decreased because of agriculture and urbanisation. Many trees that were once suitable for nesting are now not structurally stable. Birdhouses have been used as a solution to the lack of natural cavities.

Finding birdhouses designed specifically for the favoured bird is key to their use and success. Bird species prefer different nesting conditions, whether it is the size of the entrance hole or the height the birdhouse is placed off the ground. Often, birds will use a birdhouse to shelter from harsh weathers.

Different birds require birdhouses of different designs. The three most common birds in Greater Manchester are the House Sparrow, Starling and Blue Tit. All three of these birds require birdhouses with different designs.

House Sparrow: The birdhouse should be placed in a leafy area with lots of shrubbery and trees nearby. The birdhouse should be placed 5 to 15ft off the ground with a 32mm entrance hole.

Starling: Requires a birdhouse that is attached to your home or mature tree. It should be placed 10ft off the ground with an entrance hole of 45mm.

Blue Tit: Requires a birdhouse to be placed in a shaded area 6 to 13ft off the ground with a 25mm hole.

Having an entrance hole that is too big or too small will result in attracting the wrong kind of bird to your birdhouse.

Evaluating products:

Evaluate the birdhouses in the images based on these questions:

- What are they made from?
- What works well?
- What could be improved?

- Does the birdhouse look suitable to house a bird? Why/why not?



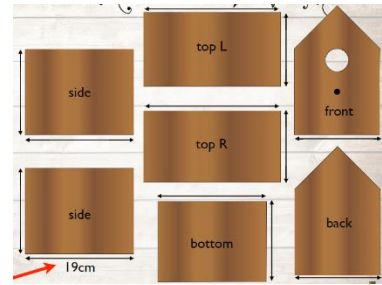
Vocabulary (Know and understand the meaning of these words and how to use them).

Flat pack diagram, 3-D Diagram, Exploded diagram, flush

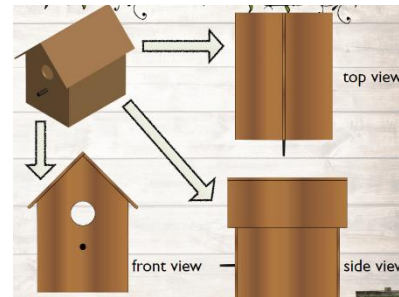
Designing:

Before a birdhouse is constructed, a diagram needs to be drawn and a plan written to ensure the dimensions of the wood are correct and will fit together accurately. We are going to learn how to draw three types of diagrams:

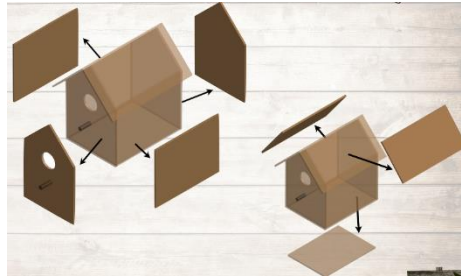
Flat pack diagram: Shows you all the pieces and dimensions needed to make a birdhouse. Lines are also drawn to show length and width measurements of sides.



3-D diagram: This type of diagram shows you a different view- the front, side and top views.



Exploded diagram: They show a 3-D object with the parts pulled apart. The parts fit back together accurately if the measurements are correct.



Explain to the class that this is the birdhouse that they are going to be making (show image below). Their task is to complete diagrams in all 3 styles (flat pack, 3-D and exploded) for this birdhouse. The packs should be available for the children to access the pieces and provide



🔗 measurements. The children could measure the entrance hole to determine which type of bird will use the birdhouse.

Making:

Model making the joins:

Using glue: Explain to the children that all of the joins can first of all be glued. This only needs to be a thin layer of glue that will hold provisionally until you nail your joins in place.

Using nails: Model holding the two pieces of wood that need joining in place. You may need to use the edge of the table to hold angles in place. First hold the nail in place to ensure it stays at a 90 degree angle to the wood and then use the hammer for the first few hits until it is held in place. The first few hammerings of the nail should be lighter as your fingers are close by. Explain to children that their precision is very important to that they do not hit their fingers with the hammer. Once the nail is held in place, move fingers away and hammer the nail down so that it is flush with the wood. **Explain that in carpentry, flush means perfectly flat.**

Health and Safety:

- The class should always be supervised whilst using nails and hammers.
- Support your partner by holding joins in place whilst they hammer.
- Only hold the nail for the first light hammerings to keep the nail in place. Fingers should be moved well away once you begin hammering harder.

Other tips:

- Pre glue the joins so that they are held together before you begin hammering nails into the joins. This will make it easier to hold in place.

Resources needed:

- Pre packed birdhouse boxes to make (with glue, hammers and nails inside).

Outcome:

- To make a suitable and safe house for a bird in the local environment.