Design Technology

Curriculum Overview

Masefield Primary School

Design Technology

Design Technology Careers

Interior designer, design engineer, product designer, CAD engineer, video game designer, electrical engineer, civil engineer, sound engineer, mechanical engineer, architect, robotics engineer, steel fabricator, aeronautical engineer, electrician, joiner, surveyor.

"Strive for perfection in everything you do. Take the best that exists and make it better. When it does not exist, design it."

- Sir Henry Royce

Design Technology Journey at Masefield

Lesson Sequence:

1	• Knowledge Organiser and vocabulary
2	• Research the Engineer
3/4	• Design the Product
5	• Make the Product
6	• Evaluate the Product

Design Technology National Curriculum in England

Design technology is an inspiring, rigorous and practical subject. Using creativity and imagination, pupils design and make products that solve real and relevant problems within a variety of contexts, considering their own and others' needs, wants and values. They acquire a broad range of subject knowledge and draw on disciplines such as mathematics, science, engineering, computing and art. Pupils learn how to take risks, becoming resourceful, innovative, enterprising and capable citizens. Through the evaluation of past and present design and technology, they develop a critical understanding of its impact on daily life and the wider world. High-quality design and technology education makes an essential contribution to the creativity, culture, wealth and well-being of the nation.

Aims

The national curriculum for design and technology aims to ensure that all pupils:

- 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.

Attainment targets

By the end of each key stage, pupils are expected to know, apply and understand the matters, skills and processes specified in the relevant programme of study. Schools are not required by law to teach the example content in [square brackets].

Subject content

Key stage 1

Through a variety of creative and practical activities, pupils should be taught the knowledge, understanding and skills needed to engage in an iterative process of designing and making. They should work in a range of relevant contexts [for example, the home and school, gardens and playgrounds, the local community, industry and the wider environment].

When designing and making, pupils should be taught to:

Design

- 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

Make

- 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

Evaluate

- explore and evaluate a range of existing products
- evaluate their ideas and products against design criteria

Technical knowledge

- 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.

Key stage 2

Through a variety of creative and practical activities, pupils should be taught the knowledge, understanding and skills needed to engage in an iterative process of designing and making. They should work in a range of relevant contexts [for example, the home, school, leisure, culture, enterprise, industry and the wider environment]. When designing and making, pupils should be taught to:

Design

- use research and develop design criteria to inform the design of innovative, functional, appealing products that are fit for purpose, aimed at particular individuals or groups
- generate, develop, model and communicate their ideas through discussion, annotated sketches, cross-sectional and exploded diagrams, prototypes, pattern pieces and computer-aided design

Make

- 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

Evaluate

- investigate and analyse a range of existing products
- evaluate their ideas and products against their own design criteria and consider the views of others to improve their work
- understand how key events and individuals in design and technology have helped shape the world

Technical knowledge

- apply their understanding of how to strengthen, stiffen and reinforce more complex structures
- understand and use mechanical systems in their products [for example, gears, pulleys, cams, levers and linkages]
- understand and use electrical systems in their products [for example, series circuits incorporating switches, bulbs, buzzers and motors]
- apply their understanding of computing to program, monitor and control their products.

Statement of Intent for Design Technology

Design Technology embodies some of the highest forms of human creativity and technological advancement and we believe that it is our duty to develop cultural appreciation of designers, engineers, textile artists and chefs, and to develop knowledge of key individuals and their contributions in this field. It is through these key principles that we engage, inspire and challenge pupils whilst equipping them with knowledge and skills to explore, invent and create their own works of design and innovation.

At Masefield, Design Technology is taught as a discrete subject in order that the development of knowledge and skills is taught meaningfully and explicitly. Naturally, links are made to other areas of the curriculum but this does not dilute the quality and entitlement of high quality Design Technology teaching.

The school's long term plan for Design Technology sets out the content of teaching within in each year group. This is supported by the school's Design Technology progression document which demonstrates learning outcomes within each strand of development within a Design Technology unit. Short term planning details how this content is developed over a series of lessons within the unit of work. The organisation of the Design Technology curriculum provides structured opportunities for pupils to:

- record responses, including observations of the natural and made environment;
- gather resources and materials, using them to stimulate and develop ideas;
- explore and use two and three-dimensional media, working on a variety of scales;
- review and modify their work as it progresses;
- develop understanding of the work of designers, engineers, chefs, artists and craftspeople, from a range of times and cultures, applying knowledge to their own work;
- respond to and evaluate design and technology including their own and others' work;
- show development in their ability to create designs and products;
- understand and apply the basic principles of design and technology including: mechanisms, textiles, food, structures and electrical systems;
- realise their ideas and sustain a level of working from start to the completion of a project or a piece of work.

Knowing More and Remembering More in Design Technology

At Masefield, we recognise the importance of retrieval practice in making learning more efficient. Retrieval practice allows our teachers to identify and address gaps in knowledge and check for misunderstandings, whilst simultaneously allowing children to make and strengthen connections between their knowledge and providing firmer foundations for future learning. In Design Technology, all teachers follow these agreed procedures to support the consolidation of prior learning and the incremental development of new learning:

The beginning of every unit

In order to assess prior knowledge, the teacher will present the children with the previous years' LbQ question set for that topic where applicable.

This low stakes quiz allows children the opportunity to recall and strengthen relevant prior knowledge which then can be built upon over the upcoming lessons. This also allows teachers the opportunity to identify and address any gaps in prior knowledge or misconceptions so that they can accurately adapt their teaching to ensure that children build a strong knowledge of the required content.

The beginning of every lesson

At the beginning of every lesson, the teacher will refer back to the previous lessons within the sequence of learning. This provides children the opportunity to recall prior knowledge and make connections between this and the new learning in the current lesson.

The end of each unit

At the end of each unit, the teacher will present the children with the LbQ question set for that unit. This is a low stakes quiz which will assess the children's knowledge of the required content in each unit.

This allows children yet another opportunity to recall and strengthen their learning from this unit. It also provides teachers with a clear picture of children's understanding, which will inform their summative assessments for the unit. This allows the teacher another opportunity to address gaps in knowledge or misconceptions.

Friday Flashbacks

Through Friday Flashbacks, the teacher will present the children with the LbQ question sets for all the units taught so far that year. These are low stakes quizzes will assess the children's knowledge of the required content in each unit.

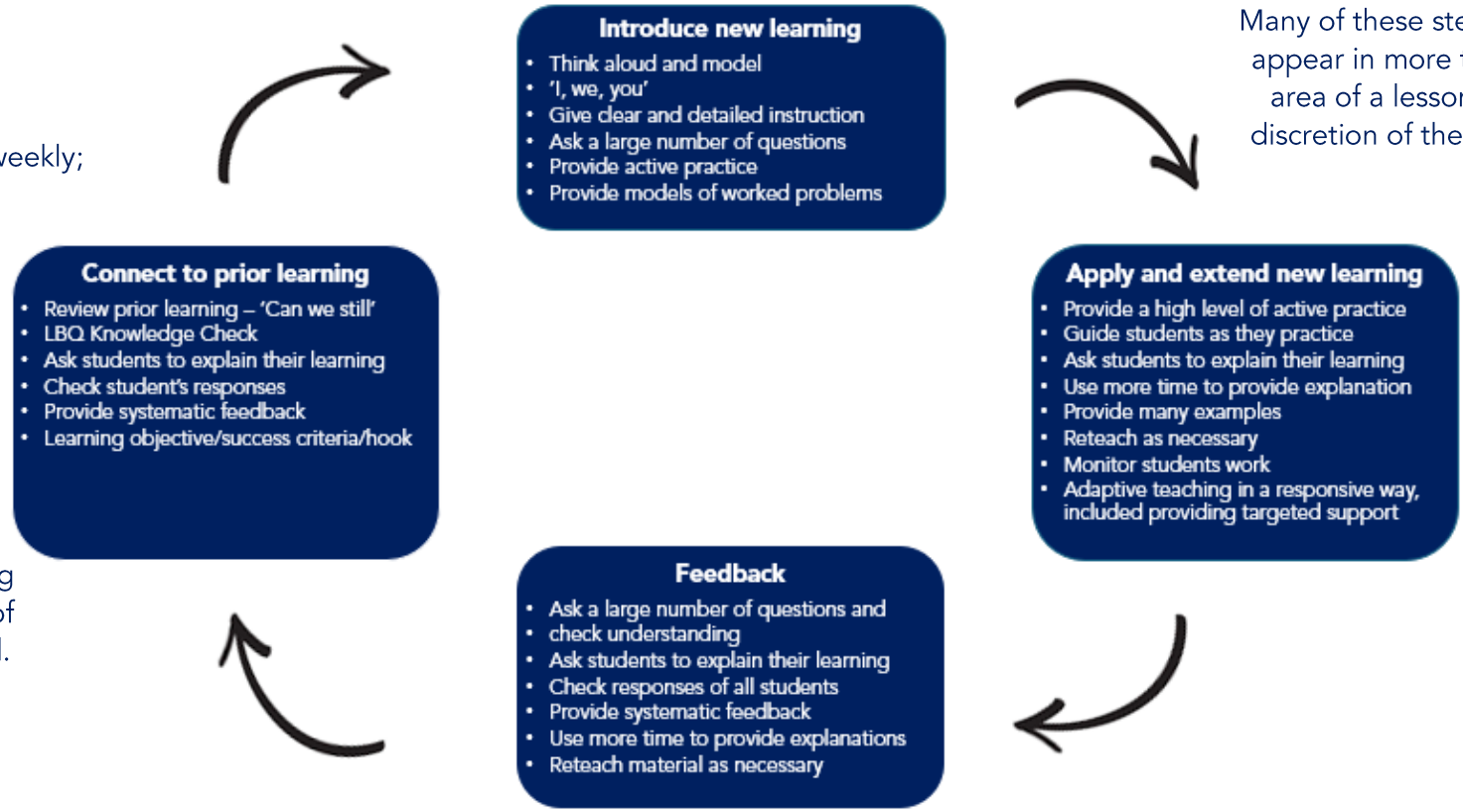
This allows children multiple further opportunities to recall and strengthen their learning from previous units. It also provides teachers with a clear picture of children's understanding and how their knowledge and skills are developing incrementally. It allows them multiple further opportunities to address gaps in knowledge or misconceptions.

Teaching and Learning Delivery Model: Building Knowledge through Challenge

Teachers	Lessons	Learning Opportunities
✓ Have high expectations for all groups of children ✓ Have strong subject knowledge ✓ Promote independence ✓ Promote confidence ✓ Offer praise and encouragement ✓ Are enthusiastic and positive about learning ✓ Model good learning ✓ Offer high quality conversation and talk	✓ Have a distinct knowledge base ✓ Are purposeful ✓ Are memorable ✓ Are active ✓ Are engaging ✓ Are focussed ✓ See children and teachers working as a learning team	✓ Increase knowledge ✓ Develop basic skills ✓ Meet children's individual learning needs ✓ Broaden and extend experiences ✓ Offer an opportunity to try new things ✓ Are cross curricular if appropriate ✓ Offer first hand experiences through trips or visitors

There shall be no bad books!

- Vocabulary lesson;
- Regular foundation lessons – weekly;
- New page for each lesson;
- Marking grid for Seesaw work.



Many of these steps would appear in more than one area of a lesson at the discretion of the teacher.

Each lesson may not be a complete cycle of the learning sequence but over a period of time all areas will be covered.

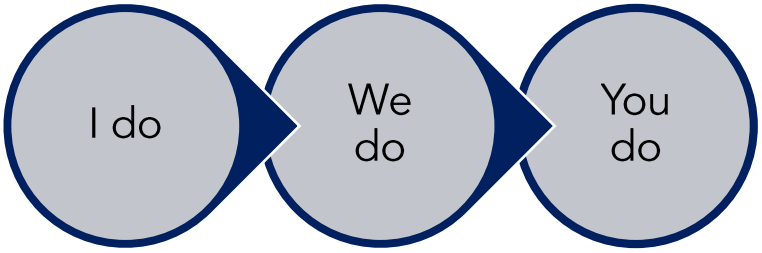
Adaptive Teaching

"We are what we repeatedly do. Excellence, then, is not an act, but a habit."

What is Adaptive Teaching and why do we do it?

With adaptive teaching, all pupils are given one explicit instructional goal. They all access the same ambitious curriculum. The teacher teaches to the top and scaffolds pupils who need support to reach that level. When not needed, the teacher removes scaffolds or fades them out.

This approach promotes high achievement for all and doesn't cap opportunities or aspirations.



Explicit Instruction	Shared Instruction	Independent Practice
Adaptive practice: Pre-teach or TA support during modelling.	Check: Use this section to check pupils' understanding. Can they do it with the structure in place?	Reflect and Respond: Allow students who have successfully completed the 'We Do' to move on independently. Group together those who are still struggling and complete work with adult support.

Before the lesson…

Lower ability pupils	Pupils with a low reading age	SEND pupils	EAL pupils
Do they need a pre-teach? Can they complete this when they arrive?	Do they need a keyword and definition list? Are they having 1:1 reading – could this be reading they will do as part of a foundation subject lesson or reading lesson?	What resources will they need to support them in successfully completing the task (task sheet, checklists, mind maps etc.)? Communicate with TA beforehand to co-ordinate effective support.	Do they need translated resources? Laptops?

During the lesson…

CHECK REFLECT RESPOND	
ENOUGH CORRECT	Practise, consolidate, move on
NOT ENOUGH CORRECT	Re-explain, more questioning, further chunking, modelling, further scaffolding, check your question then re-check for understanding.

Further support…	
	Refer to Adaptive Teaching booklet, mini-whiteboards, LBQ, targeted support, additional practice, modelling (I do, we do, you do), breakdown content (chunking).

SEND – Adaptive Teaching Strategies to support and scaffold

- Adjust the level of challenge – e.g provide sentence stems and question prompts to support thinking, allow children to present their work in different ways (mind maps, collaborative work).
- Clarify/simplify a task or provide numbered steps with visual representations (objects, pictures, signs, photos).
- Use bold essential content from curriculum document.
- Re-explain a concept or explain it in a different way.
- Give additional (or revisit) examples.
- Use peer tutoring/collaborative learning (everyone must participate – give them roles).
- Provide additional scaffolds - e.g – pre-teach vocabulary, 'I do, we do, you', chunk learning into smaller chunks and break learning down into key knowledge, provide worked examples, provide sentence starters for writing, use media (photographs, film) and hands on resources, where possible.
- Set clear targets/expectations.
- Provide prompts/sentence stems – e.g provide/develop with children steps to success for children to work from, question prompts to support with thinking and reduce cognitive overload.
- Improve accessibility (e.g. proximity to speaker, visibility of whiteboard, read a text to the pupil) – e.g – child-friendly texts/media, where possible. When researching, use child appropriate websites.
- Consider pace - (extra time for responses to questions, contributing to class discussions and to complete activities).
- Provide vocabulary with visual images – e.g - explicitly teach vocabulary at the beginning of a unit alongside a picture of the key word, use photographs to represent the word when using it during the unit.
- Check understanding and reinforcing as needed through repetition, rephrasing, explaining and demonstration – e.g use of mini-plenaries to check understanding (quick quizzes).
- Have alternative ways to record learning, e.g. oral, photographic, video, highlighting text, mind maps, etc. – e.g give children a variety of ways to record their work (recording themselves, use of technology, mind maps), allow children to be creative in the ways that they present their work – they do not all have to be the same.
- Pre-teach vocabulary, key content etc.

More Able – Adaptive Teaching Strategies to stretch and challenge

- Identify and account for prior knowledge – a child who has extensive prior knowledge could be asked to present some of the knowledge they have to the class; explain something they understand easily to a child who doesn't 'get it' so quickly – e.g – peer modelling, a more able child could present interesting facts that they already know to the children, more able children given more challenging enquiry based questions to extend their learning.
- Build on interests to extend - read widely around a subject outside of lesson time by providing them with information about suitable material, e.g. give them suitable higher-level texts to read – e.g – Use of History Pupil Leaders to develop love of History, questions to research for home learning, projects to complete for home learning.
- Depth of content - consider what you can add to create depth, e.g. digging into an area more deeply, going laterally with a concept, or asking pupils to use more complex terminology to describe abstract ideas.
- Use questioning techniques to boost thinking – ask open-ended questions which require higher-order thinking - e.g – How……..Why……..What does this source tell us?
- Consider learner roles – ensure they are appropriately challenged through the role they are given so they can make an effective contribution; argue in favour of a viewpoint that is different to their own, e.g. argue the opposite position to that which they actually hold, during a class debate, take on a more supportive 'tutor' role during group work.
- Mastery - more intensive teaching, tutoring, peer-assisted learning, small group discussions, or additional homework. e.g - analyse and interpret sources (questions – what's this? What can we say for certain? What can we infer? Does this new source strengthen, amend or completely change our thinking? What doesn't the source tell us?
- Adapted success criteria/choice of task – offer a choice of tasks with a different level of challenge.
- Feedback – framing feedback so pupils must take responsibility for improving their own learning – e.g extend more able learners through open-ended questions when providing feedback.

Learning by Questions – Using EdTech to support Teaching and Learning

What is Learning by Questions?

Pupils' use iPads and progress at their own pace and level through high quality Question Sets and receive immediate automatic feedback as they answer. Teachers receive live analysis and results are saved to support assessment and planning. Data is stored automatically to support lesson planning.

Why do we use it?

Learning by Questions (LbQ) is fully embedded into Masefield's curriculum journey. This evidence based and award winning teaching & learning tool has been fundamental in the significantly above average results at Masefield over the last few years. All teachers and pupils have accounts that allow access to all resources.

What support do I get?

- Tracked classes set up in the first week of the academic year.
- Every member of staff (teachers and TAs) will receive regular CPD on LbQ, including meeting updates, 1:1 CPD, in class coaching and observations.
- Question Sets are ready made for all subjects, including every foundation subject unit from Year 1 to Year 6.

Using LbQ in Maths

- 3 tasks completed daily as morning maths - LBQ tasks that start with 'practise'. Basic skills and previous learning only.
- Used as a teaching and learning tool – not assessment.
- Intervention screen should be used regularly to assess pupils understanding and address misconceptions immediately.
- Green button (play) should be used regularly to involve and engage all learners in the lesson.
- Pupils should not get an incorrect answer more than 3 times. The teacher or TA should intervene before this or the pupil must ask for support.
- LbQ to be used as part of the deeper learning within lessons.
- An application of the learning within the lesson must be shown in maths book (usually reasoning and problem solving).

Using LbQ in Reading

- Used for intervention sessions.
- Used as part of reading in foundation subjects.

Using LbQ in Science

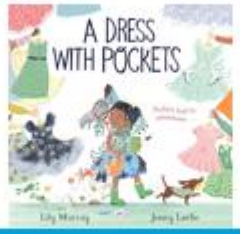
- Vocabulary question set to be completed before Science Unit.
- Previous topic (if appropriate) to be completed before Science Unit (e.g Year 4 Light question set to be completed before teaching of Year 6 Light topic).
- Investigation question set available to support teaching of fair testing.
- Knowledge Review question set to be used at end of topic – or once teaching sequence completed.

Using LbQ in Foundation Subjects

- Question Sets to be completed at the end of learning and during knowledge days.
- Refer to Knowledge Day Overview document for Question Set Record.

Design Technology Literature Spine

To support the teaching of Design Technology here at Masefield, we have developed a collection of books that all children in our school are to experience and enjoy. We aim to immerse our children in a range of texts, specifically chosen by our staff to ensure that children hear the best stories read aloud to them by their teachers for pleasure, to excite and inspire our children and support the development of knowledge and skills in Design Technology.



Year Five

Year Six

Long-term Overview for Design Technology

	Autumn 1	Autumn 2	Spring 1	Spring 2	Summer 1	Summer 2
Year One				**Textiles** Templates and Joining Techniques		**Mechanisms** Wheels and Axles
Year Two		**Mechanisms** Sliders and Levers		**Structures** Freestanding Structures		**Food** Preparing Fruit and Vegetables
Year Three		**Mechanisms** Pneumatics		**Textiles** 2D Shapes to 3D Product		**Structures** Shell Structures using CAD
Year Four		**Mechanisms** Levers and Linkages		**Food** Healthy and Varied Diet		**Structures** Shell Structures
Year Five		**Structures** Frame Structures		**Textiles** Combining Different Fabric Shapes		**Mechanisms** Pulleys and Gears
Year Six				**Electrical Systems** Complex Circuits and Switches		**Food** Celebrating Culture and Seasonality

Design Technology in the Early Years Foundation Stage

Design Technology is taught in EYFS as part of Expressive Arts and Design. Most learning will take place through continuous provision following teacher modelling.

Examples include:

· Construction Area e.g building chairs for Baby Bear following the story of Goldilocks, building houses for the three little pigs, building shelters for animals due to hibernate, building structures linked to countries/capital cities, building buildings from the local area

· Food – linked to festival and calendar events throughout the year – examples include chocolate sparklers, witches hats, jam sandwiches, fruit salad,

· Food Hygiene – children are taught to wash their hands before and after preparing food and why, children are taught to wash fruit and veg before it is cut/cooked, children are taught to clean the area being used for food preparation before and after use

· Structures – using tape and glue to build, building structures linked to countries/cities, using clay and playdough as a base for a lollipop stick/matchstick structure

· Junk Modelling – children have continuous access to junk modelling resources – paper, card, boxes, tubs, tubes, pipe cleaners, lollipop sticks, glue, sellotape, masking tape, scissors. Challenges are set for children to complete within this area of the classroom.






Three- and Four-Year-Olds

Physical Development

- Know the names of key tools and resources, e.g. glue and scissors, and what they are used for.
- Know the correct grip to use when holding scissors, pencils and other one-handed tools.

Expressive Arts and Design

- Have a knowledge of natural, made and imaginative environments and use this knowledge to inspire their own ideas, in small world play, such as a city with different buildings and a park.
- Know how to connect pieces together such as Lego or bricks.
- Know the names of some different materials, including food, and their basic properties, i.e. what they would be good for.
- Know what they want to and could make, and which materials would work well.
- Know what some different shapes look like and how to create them, in order to create drawings to record their design ideas.

Reception

Physical Development

- Know techniques to help them move carefully and with control.
- Know the names of a range of tools.
- Know how to hold and use a range of tools for a desired outcome, e.g. tape and glue used to build a structure.
- Know the safety rules when using certain tools, resources and equipment.

Expressive Arts and Design

- Know the names of different feelings.
- Know that art and design can inspire feelings and emotions, and vice versa.
- Know the names of a range of artistic effects, e.g. colouring, collage, etc. and what these look like. Know that these effects can be used to improve the appearance of something.
- Know that they can return to and build on their previous learning, and know who to ask for help when needed.
- Know that it is okay to make mistakes, and have some techniques for using these situations as opportunities to build their own resilience.
- Know techniques for working collaboratively with adults and other children, sharing ideas, resources and skills.

Early Learning Goal

Physical Development

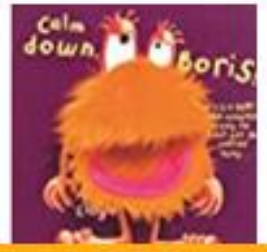
- Know how to use a range of small tools, including scissors, paintbrushes and cutlery.

Expressive Arts and Design

- Know how to safely use and explore a variety of materials, tools and techniques, experimenting with colour, design, texture, form and function.
- Know that they can share their creations, explaining the process they have used.

Year One Overview

	Autumn 1	Autumn 2	Spring 1	Spring 2	Summer 1	Summer 2
Topic				**Textiles:** Templates and Joining Techniques		**Mechanisms:** Wheels and Axles
LBQ Assessment				Y1 Textiles LBQ Question Set		Y1 Mechanisms LBQ Question Set



Year One

Year One – Spring 2

Textiles: Templates and Joining techniques

Engineer Focus:

James Fox

Vocabulary for this unit:

Design: to generate, develop and communicate ideas for a product.
Embroider: to decorate fabric with stitches.
Evaluate: to judge how a product meets chosen criteria.
Fray: to unravel or become worn at the edge.
Glove puppet: a glove puppet fits over the hand, and the fingers operate its head and arms.
Mock-up: a model which allows children to try out ideas using cheaper materials and temporary joints.
Seam: a row of stitches joining two pieces of fabric.
Sew: to join pieces of fabric with stitches.
Template: a shape drawn to assist in cutting out shapes.

National Curriculum objectives:

Design

- Design a functional and appealing product for a chosen user and purpose based on simple design criteria.
- Generate, develop, model and communicate their ideas as appropriate through talking, drawing, templates, mock-ups and information and communication technology.

Make

- Select from and use a range of tools and equipment to perform practical tasks such as marking out, cutting, joining and finishing.
- Select from and use textiles according to their characteristics.

Evaluate

- Explore and evaluate a range of existing products
- Evaluate their ideas and products against design criteria

Technical Knowledge

- Understand how simple 3-D textile products are made, using a template to create two identical shapes.
- Understand how to join fabrics using different techniques e.g. running stitch, glue, over stitch, stapling.
- Explore different finishing techniques e.g. using painting, fabric crayons, stitching, sequins, buttons and ribbons.
- Know and use technical vocabulary relevant to the project.

Context for Study:

This unit follows on from Reception where children had experiences of threading beads and laces. This unit is a pre-cursor of Textiles in Year 3 where children will practise cutting fabric, seam allowance and a range of stitches. Also, in Year 5, children will be creating a pencil case with a fastening and will learn more complex stitches.

Sequence of Learning

Step 1

Retrieval of previous learning

- Introduce and explore knowledge organiser.
- Teach new Vocabulary.
- Retrieval of previous learning

Step 2

Research the Engineer

Pupils should be taught that:

- James Fox works with machine embroidery.
- His works are shown in Manchester and Preston.
- His works look at modern life issues such as politics, gender, work and culture.

Step 3

Design the Product

Pupils should be taught to:

- Use different joining techniques to join fabrics together. Practise gluing, stapling and stitching fabric together using a running stitch. Children should discuss which they think would be the best joining technique to use when creating their puppet.
- Know what the terms join and fasten mean. What can we use to fasten materials together? Discuss the use of zips, buttons and Velcro and their purpose.

Sequence of Learning

Step 4

Design the Product

Pupils should be taught to:

- Design a functional and appealing hand puppet for a chosen user and purpose based on simple design criteria.
- Generate, develop, model and communicate their ideas as appropriate through talking, drawing, templates, and mock-ups.

Step 5

Make the Product

Pupils should be taught to:

- Thread a metal needle and to tie a knot.
- Complete a running stitch.
- Attach two pieces of material using a simple running stitch.
- Know how to finish a row of stitches with a knot.

Step 6

Evaluate the Product

Pupils should be taught to:

- Evaluate ongoing work and the final products against the intended purpose and with the intended user, drawing on the design criteria previously agreed.

Step 7

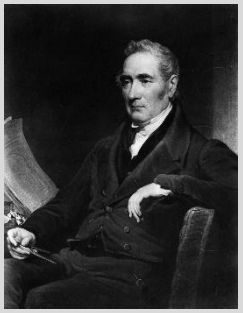
Assessment

- End of Unit Outcome: To join two pieces of material together to create a hand puppet.
- LBQ Question Set.

Year One – Summer 2

Mechanisms: Wheels and Axles

Engineer Focus:



George Stephenson

Vocabulary for this unit:

Axle: a rod on which one or more wheels can rotate, either freely or be fixed to and turn with the axle.
Axle holder: the component through which an axle fits and rotates.
Chassis: the frame or base on which a vehicle is built.
Friction: resistance which is encountered when two things rub together.
Dowel: wooden rods used for making axles to hold wheels.

National Curriculum objectives:

Design

- Design a functional and appealing product for a chosen user and purpose based on simple design criteria.
- Generate, develop, model and communicate their ideas as appropriate through talking, drawing, templates, mock-ups and information and communication technology.

Make

- Select from and use a range of tools and equipment to perform practical tasks such as marking out, cutting, joining and finishing.
- Select from and use textiles according to their characteristics.

Evaluate

- Explore and evaluate a range of existing products
- Evaluate their ideas and products against design criteria

Technical Knowledge

- Explore and use wheels, axles and axle holders.
- Distinguish between fixed and freely moving axles.
- Know and use technical vocabulary relevant to the project.

Context for Study:

This unit follows on from Reception where children will have experience using scissors, crayons, pencils and paper and will have explored moving vehicles through play. This unit is a pre-cursor of Mechanisms in Year 2 where children will begin to use sliders and levers to allow an object to move in a single direction. Also, in Year 4 and Year 5, children will use linkages, pulleys and gears in order to create moving characters and moving models.

Sequence of Learning

Step 1

Retrieval of previous learning

- Introduce and explore knowledge organiser.
- Teach new Vocabulary.
- Retrieval of previous learning.

Step 2

Research the Engineer

Pupils should be taught that:

- George Stephenson is known as the 'Father of the Railways'.
- He played a key role in developing the railways system in Britain.
- The train helped people move around the country.

Step 3

Design the Product

Pupils should be taught to:

- Explore and evaluate a range of wheeled products such as toys and everyday objects.
- Record how wheels and axles are used in daily life around the school grounds.
- Make observations through relevant questioning e.g. How do you think the wheels move? How do you think the wheels are fixed on? Why do you think the product has this number of wheels? Why do you think the wheels are round?

Sequence of Learning

Step 4

Design the Product

Pupils should be taught to:

- Design a functional and appealing moving vehicle for a chosen user and purpose based on simple design criteria.
- Generate, develop, model and communicate their ideas as appropriate through talking, drawing, templates, and mock-ups.

Step 5

Make the Product

Pupils should be taught to:

- Make a product that moves by using construction kits with wheels and axles, ask children to make a product that moves.
- Make an axle holder and recognise the importance of making sure the axles run freely within the holders.
- To mark out, hold, cut and join materials and components correctly.

Step 6

Evaluate the Product

Pupils should be taught:

- To evaluate ongoing work and the final products against the intended purpose and with the intended user, drawing on the design criteria previously agreed.

Step 7

Assessment

- End of Unit Outcome: To make a moving vehicle.
- LBQ Question Set.

Year Two Overview

	Autumn 1	Autumn 2	Spring 1	Spring 2	Summer 1	Summer 2
Topic		**Mechanisms:** Sliders and Levers		**Structures:** Freestanding Structures		**Food:** Preparing Fruit and Vegetables
LBQ Assessment		Y2 Mechanisms LBQ Question Set		Y2 Structures LBQ Question Set		Y2 Food LBQ Question Set

Year Two

Year Two – Autumn 2

Mechanisms: Sliders and Levers

Engineer Focus:

Robert Sabuda

Vocabulary for this unit:

Mechanism: a device used to create movement in a product.
Lever: a rigid bar which moves around a pivot. Levers are used in many everyday products. In this project children will use card strips for levers and paper fasteners for pivots.
Pivot: a central point on which a mechanism turns.
Slider: a rigid bar which moves backwards and forwards along a straight line. Unlike a lever, a slider does not have a pivot point.
Slot: the hole through which a lever or slider is placed to enable part of a picture to move.
Guide or bridge: a short card strip used to keep sliders in place and control movement.

National Curriculum objectives:

Design

- Generate ideas based on simple design criteria and their own experiences, explaining what they could make.
- Develop, model and communicate their ideas through drawings and mock-ups with card and paper.

Make

- Select and use tools, explaining their choices, to cut, shape and join paper and card.
- Use simple finishing techniques suitable for the product they are creating.

Evaluate

- Explore a range of existing books and everyday products that use simple sliders and levers.
- Evaluate their product by discussing how well it works in relation to the purpose and the user and whether it meets design criteria.

Technical Knowledge

- Explore and use sliders and levers.
- Understand that different mechanisms produce different types of movement.
- Know and use technical vocabulary relevant to the project.

Context for Study:

This unit follows on from learning in Reception and Year 1 where children will have had experiences of working with paper and card to makes flaps. This unit is the precursor to work studied in Year 3 where children will develop their understanding of pneumatics. They will look closely at forces and look at how mechanical systems work.

Sequence of Learning

Step 1

Retrieval of previous learning

- Introduce and explore knowledge organiser.
- Teach new Vocabulary (inc LBQ vocabulary question set where appropriate).
- Retrieval of previous learning

Step 2

Research the Engineer

Pupils should be taught that:

- Robert Sabuda is an artist from Michigan.
- He started his career as an illustrator before writing children's books.
- In 1994, he published his first pop-up book "The Mummy's Tomb".
- He is known worldwide for his pop-up paper engineering.
- Many of his books are based on traditional stories.

Step 3

Design the Product

Pupils should be taught to:

- Explore moving parts by looking at books or cards that make use of sliders and levers.
- Practise making a mock-up of a simple slider they could use in their design.

Sequence of Learning

Step 4

Design the Product

Pupils should be taught to:

- Generate ideas for a Christmas card based on simple design criteria and their own experiences, explaining what they could make.
- Develop, model and communicate their ideas through drawings and mock-ups with card and paper.

Step 5

Make the Product

Pupils should be taught to:

- Recognise the tools they will need to create their product.
- Draw their Christmas design.
- Develop their knowledge and skills by replicating the slider and lever teaching.

Step 6

Evaluate the Product

Pupils should be taught to:

- Evaluate their product by discussing how well it works in relation to the purpose and the user and whether it meets design criteria.

Step 7

Assessment

- End of Unit Outcome: To make a moving Christmas card with sliders and levers.
- LBQ Question Set.

Year Two – Spring 2

Structures: Freestanding Structures

Engineer Focus:

Isambard Brunel

Vocabulary for this unit:

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.
Mock-up: 3-D representation of a product.

National Curriculum objectives:

Design

- Generate ideas based on simple design criteria.
- Develop, model and communicate their ideas through talking and drawings.

Make

- Plan by suggesting what to do next.
- Select and use tools, skills and techniques, explaining their choices.
- Select new and reclaimed materials to build their structures.
- Use simple finishing techniques suitable for the structure they are creating.

Evaluate

- Explore a range of existing freestanding structures.
- Evaluate their product by discussing how well it works in relation to the purpose, the user and whether it meets the original design criteria.

Technical Knowledge

- Know how to make a freestanding structure stronger, stiffer and more stable.
- Know and use the technical vocabulary relevant to the project.

Context for Study:

This unit follows on from learning in Reception where children will experience using construction kits to build walls, towers and frameworks. They will explore how to create a small, strong freestanding structure. This unit is the precursor to the Structures units studied in Key Stage 2, where children will further explore how to create three-dimensional structures which stand freely for a range of different purposes and using a range of materials.

Sequence of Learning

Step 1

Retrieval of previous learning

- Introduce and explore knowledge organiser.
- Teach new Vocabulary (inc LBQ vocabulary question set where appropriate).
- Retrieval of previous learning

Step 2

Research the Engineer

Pupils should be taught that:

- Isambard Kingdom Brunel was born on 9th April 1806.
- He was a Victorian engineer who was one of the main architects during Britain's industrial revolution.
- One of his most famous designs was the Clifton Suspension Bridge which he designed at age 24.
- The bridge is still seen as one of the most important structures to be built in the Victorian era.

Step 3

Design the Product

Pupils should be taught to:

- Understand a product needs to meet criteria (in this case hedgehogs need a warm dry environment and needs to be big enough for a hedgehog to fit inside).
- Explore a range of materials that are suitable for the project, e.g. waterproof, stable, strong.
- Make structures strong and stable.

Sequence of Learning

Step 4

Design the Product

Pupils should be taught to:

- Know how to use drawings to show their ideas.
- Plan in small groups the method in which the structures will be made.

Step 5

Make the Product

Pupils should be taught to:

- Join materials together to create the structure.
- Know how to make a strong and stable structure that meets the design criteria.
- Use a structure added to a wall, tower or framework to make it more stable and/or reinforce it.

Step 6

Evaluate the Product

Pupils should be taught to:

- To know how to evaluate and test the strength of their structure.
- To discuss if their structure meets their design requirements e.g. did it stand freely? Is it waterproof? Is it stable?

Step 7

Assessment

- End of Unit Outcome: To make a home for a hedgehog.
- LBQ Question Set.

Year Two – Summer 2

Food: Preparing Fruit and Vegetables

Engineer Focus:

Jamie Oliver

Vocabulary for this unit:

Fruit: plant or tree edible seed with envelope.
Vegetable: plant used for food.
Nutrients: all the things in food that the body needs to remain healthy.
Pith: the soft white lining inside fruit such as oranges.
Salad: a cold dish of fresh and/or cooked vegetables or fruit.
Sensory evaluation: subjective testing of foods where senses are used to evaluate qualities such as appearance, smell, taste, texture (mouth feel).
Kebab: cooked and/or fresh ingredients on a skewer.

National Curriculum objectives:

<u>Design</u>

- Design appealing products for a particular user based on simple design criteria.
- Generate initial ideas and design criteria through investigating a variety of fruit and vegetables.
- Communicate these ideas through talk and drawings.

<u>Make</u>

- Use simple utensils and equipment to e.g. peel, cut, slice, squeeze, grate and chop safely.
- Select from a range of fruit and vegetables according to their characteristics e.g. colour, texture and taste to create a chosen product.

<u>Evaluate</u>

- Taste and evaluate a range of fruit and vegetables to determine the intended user's preferences.
- Evaluate ideas and finished products against design criteria, including intended user and purpose.

<u>Technical Knowledge</u>

- Understand where a range of fruit and vegetables come from e.g. farmed or grown at home.
- Understand and use basic principles of a healthy and varied diet to prepare dishes, including how fruit and vegetables are part of the Eatwell Plate.
- Know and use technical and sensory vocabulary relevant to the project.

Context for Study:

This unit follows on from learning in Reception where children will have experience of naming common fruit and vegetables. They will have undertaken sensory activities to discuss the appearance, taste and smell of fruit and vegetables. This unit is a precursor to work studied in Year 4 where children will develop their understanding of preparing food hygienically and use a wider range of utensils. In Year 6, children will use a heated appliance (an oven) and develop their knowledge of food groups further, as well as exploring culture and seasonality.

Sequence of Learning

Step 1

Retrieval of previous learning

- Introduce and explore knowledge organiser.
- Teach new Vocabulary (inc LBQ vocabulary question set where appropriate).
- Retrieval of previous learning

Step 2

Research the Engineer

Pupils should be taught that:

- Jamie Oliver MBE (James Trevor Oliver) was born 27th May 1975.
- He is an English celebrity chef, restaurateur, and media personality.
- He is known for his television shows, cookbooks and restaurants.
- He has highlighted the need for improved cooking in schools and hospitals.

Step 3

Design the Product

Pupils should be taught to:

- Generate initial ideas and design criteria through investigating a variety of fruit and vegetables.
- Know where certain fruits and vegetables are grown e.g. oranges/apples/bananas grow on trees; blueberries grow on shrubs; carrots/onions/beetroots grow underground; lettuces/broccoli grow above ground.
- Know the parts of different fruits and the parts we eat. E.g Skin/Seeds/stalk
- Know that we must have a balanced diet and that fruit and vegetables are part of a food group.
- Know that as part of a healthy diet, we need 5 portions of fruit and vegetables a day.

Sequence of Learning

Step 4

Design the Product

Pupils should be taught to:

- Design appealing products for a particular user based on simple design criteria.
- Decide what to include in the fruit salad.
- Communicate these ideas through talk and drawings.

Step 5

Make the Product

Pupils should be taught to:

- Know basic food hygiene practices when handling food.
- Select from a range of fruit according to their characteristics e.g. colour, texture and taste to create a chosen product.
- Use simple utensils and equipment to e.g. peel, cut, slice, squeeze, grate and chop safely.
- Know how to prepare a fruit salad.

Step 6

Evaluate the Product

Pupils should be taught to:

- Evaluate ideas and finished products against design criteria, including intended user and purpose.

Step 7

Assessment

- End of Unit Outcome: To make a fruit salad.
- LBQ Question Set.

Year Three Overview

	Autumn 1	Autumn 2	Spring 1	Spring 2	Summer 1	Summer 2
Topic		**Mechanisms:** Pneumatics		**Textiles:** 2D Shapes to 3D Product		**Structures:** Shell Structures using CAD
LBQ Assessment		Y3 Mechanisms LBQ Question Set		Y3 Textiles LBQ Question Set		Y3 Structures LBQ Question Set

Year Three

Year Three – Autumn 2

Mechanisms: Pneumatics

Engineer Focus:

Richard Arkwright

Vocabulary for this unit:

Compressed: something that is squashed, such as air in a tube.
Input: what goes into a system.
Output: what comes out of a system.
Pivot: a point about which a lever turns.
Lever: a beam which turns about a point.
Pneumatic: a system that works using gases (air).
Hydraulic: a system that works using liquids (water).
Pressure: the force used on an object or surface.
Inflate: fill something with air or a gas to make it swell up.
Deflate: remove the pressurised air to allow an object like a balloon to shrink.
Syringe: a tube with a nozzle and plunger for sucking and blowing air or liquids.
System: a set of related parts or components used to create an outcome.

National Curriculum objectives:

Design

- Generate realistic and appropriate ideas and their own design criteria through discussion, focusing on the needs of the user.
- Use annotated sketches and prototypes to develop, model and communicate ideas.

Make

- Order the main stages of making.
- Select from and use appropriate tools with some accuracy to cut and join materials and components such as tubing, syringes and balloons.
- Select from and use finishing techniques suitable for the product they are creating.

Evaluate

- Investigate and analyse books, videos and products with pneumatic mechanisms.
- Evaluate their own products and ideas against criteria and user needs, as they design and make.

Technical Knowledge

- Technical knowledge and understanding
- Understand and use pneumatic mechanisms.
- Know and use technical vocabulary relevant to the project.

Context for Study:

This unit follows on from learning in Year 1 and Year 2 where children will have explored simple mechanisms, such as sliders and levers, and simple structures. Children will also have learnt how materials can be joined in order to allow movement. This unit is the precursor to work studied in Year 5 where children will make a 3D construction frame with wood and will look at triangulation.

Sequence of Learning

Step 1

Retrieval of previous learning

- Introduce and explore knowledge organiser.
- Teach new Vocabulary (inc LBQ vocabulary question set where appropriate).
- Retrieval of previous learning

Step 2

Research the Engineer

Pupils should be taught that:

- Richard Arkwright was born in Preston, England on 23 December 1732.
- In 1769 Richard Arkwright patented the spinning frame (later called the water frame), a machine to produce inexpensive spun cotton.
- In 1771, Arkwright and his business partners built the first water powered cotton mill at Cromford in Derbyshire.

Step 3

Design the Product

Pupils should be taught to:

- Know what a pneumatic system is.
- Explore existing products that use a pneumatic system to work, such as a tyre pump or a water gun. From this, explain how pneumatic systems work to perform a function.

Sequence of Learning

Step 4

Design the Product

Pupils should be taught to:

- Generate realistic and appropriate ideas and their own design criteria for their moving toy through discussion, focusing on the needs of the user.
- Use annotated sketches and prototypes to develop, model and communicate ideas.

Step 5

Make the Product

Pupils should be taught to:

- Know the difference between an input and an output movement.
- Use two syringes that push air through a tube to operate the toy.
- Add levers and linkages to their design to make more complex mechanical systems

Step 6

Evaluate the Product

Pupils should be taught to:

- Evaluate the final products against the intended purpose and with the intended user, where safe and practical, drawing on the design criteria previously agreed.

Step 7

Assessment

- End of Unit Outcome: To make a moving toy.
- LBQ Question Set

Year Three – Spring 2

Textiles: 2D Shapes to 3D Product

Engineer Focus:

Coco Chanel

Vocabulary for this unit:

Appliqué: means 'applied' -describes method of stitching/gluing patches onto fabric (originally to mend holes in worn clothes) to provide decoration.
Pattern/Template: a shape drawn to exact shape and size and used to assist cutting out.
Seam: a line of stitching that joins pieces of fabrics together.
Seam Allowance: extra fabric allowed for joining together - usually 1.5cm.
Prototype: a model that is made to test whether a design will work.
Aesthetics: the way in which the product looks with the nature and expression of beauty.

National Curriculum objectives:

Design
- Generate realistic ideas through discussion and design criteria for an appealing, functional product fit for purpose and specific user.
- Produce annotated sketches, final product sketches and pattern pieces.

Make
- Plan the main stages of making.
- Select and use a range of appropriate tools with some accuracy e.g. cutting, joining and finishing.

Evaluate
- Investigate a range of existing products.
- Test their product against the original design criteria and with the intended user.

Technical Knowledge
- Know how to strengthen, stiffen and reinforce existing fabrics.
- Understand how to securely join two pieces of fabric together
- Understand the need for patterns and seam allowance.
- Know and use technical vocabulary relevant to the project.

Context for Study:

This unit follows on from learning in Year 1 where children will have experience of completing a simple running stitch on binca and felt with pre-made holes. The children will have attempted to tie knots and thread large eye needles. They will have created a simple, flat 3D product without needing to think about seam allowance. This unit is the precursor of the textiles unit in Year 5 in which children will move onto more complex stitches and create a product with fastenings.

Sequence of Learning

Step 1

Retrieval of previous learning

- Introduce and explore knowledge organiser.
- Teach new Vocabulary (inc LBQ vocabulary question set where appropriate).
- Retrieval of previous learning

Step 2

Research the Engineer

Pupils should be taught that:

- Gabrielle Chanel (her real name) was born in 1883 in a poor family to a market trader.
- Coco Chanel started her fashion career by designing hats. With the help of one of her male admirers, she opened her first shop in Paris in 1913. As it became more popular, she started selling clothes as well.
- In 1921, she created her first perfume, Chanel No 5.
- Coco Chanel's revolutionary designs were elegant but also comfortable and practical, as they freed women from wearing corsets

Step 3

Design the Product

Pupils should be taught to:

- Explore and evaluate a variety of materials and types of stitches (running stitch or back stitch), deciding which will be the most appropriate to use when making the product and explaining why in relation to the design brief.

Sequence of Learning

Step 4

Design the Product

Pupils should be taught to:

- Sketch and annotate possible ideas, choosing one as a final choice and explaining why.
- Add labels to their chosen design, detailing the materials and stitches used.
- Plan the main stages of making, e.g. create a flowchart.

Step 5

Make the Product

Pupils should be taught to:

- Produce a template of their final design.
- Use this template to cut the material they will use to make their product.
- Understand seam allowance.
- Glue any decorative patterns onto the front panel.
- Know how to join 2D pieces of felt with a running stitch or backstitch.
- Strengthen and reinforce stitches.

Step 6

Evaluate the Product

Pupils should be taught to:

- Evaluate the product against user, purpose and design criteria.
- Evaluate the joining of the fabric.

Step 7

Assessment

- End of Unit Outcome: To securely join two pieces of fabric together to create a phone pouch.
- LBQ Question Set

Year Three – Summer 2

Structures: Shell Structures using CAD

Engineer Focus:

Gustave Eiffel

Vocabulary for this unit:

CAD: computer-aided design.
Shell structure: a hollow structure with a thin outer covering.
Edge: where two surfaces meet at an angle.
Face: a surface of a geometric shape.
Vertex: the corners of a geometric shape where edges meet.
Font: a printer's term meaning the style of lettering being used.
Net: the flat or opened-out shape of an object such as a box.
Cuboid: a solid body with rectangular sides.
Prism: a solid geometric shape with ends that are similar, equal and parallel.

National Curriculum objectives:

Design

- Generate realistic ideas and design criteria collaboratively through discussion, focusing on the needs of the user and the functional and aesthetic purposes of the product.
- Develop ideas through the analysis of existing shell structures and use computer-aided design to model and communicate ideas.

Make

- Plan the order of the main stages of making.
- Select and use appropriate tools and software to measure, mark out, cut, score, shape and assemble with some accuracy.
- Explain their choice of materials according to functional properties and aesthetic qualities.
- Use computer-generated finishing techniques suitable for the product they are creating.

Evaluate

- Investigate and evaluate a range of shell structures including the materials, components and techniques that have been used.
- Test and evaluate their own products against design criteria and the intended user and purpose.

Technical Knowledge

- Develop and use knowledge of nets of cubes and cuboids and, where appropriate, more complex 3D shapes.
- Develop and use knowledge of how to construct strong, stiff shell structures.
- Know and use technical vocabulary relevant to the project.
- Understand the need for patterns and seam allowance.
- Know and use technical vocabulary relevant to the project.

Context for Study:

This unit follows on from learning in Year 1 and Year 2 where children will have had experience of using different joining, cutting and finishing techniques with paper and card and a basic understanding of 2-D and 3-D shapes in mathematics. This unit is a precursor of the structures units in Year 4 which involve designing a 2D net in order to construct a 3D shell structure.

Sequence of Learning

Step 1

Retrieval of previous learning

- Introduce and explore knowledge organiser.
- Teach new Vocabulary (inc LBQ vocabulary question set where appropriate).
- Retrieval of previous learning

Step 2

Research the Engineer

Pupils should be taught that:

- Gustave Eiffel was a French structural engineer and architect.
- He is known for designing the Eiffel Tower.
- He also designed the armature (supporting framework) for the Statue of Liberty, New York Harbour, United States.

Step 3

Design the Product

Pupils should be taught to:

- Develop a design brief with the children within a context which is authentic and meaningful.
- Discuss the uses and purposes of their shell structure e.g. *What does the product need to do? Who is it aimed at? How will the purpose and user affect your design decisions?*
- Agree on design criteria that can be used to guide the development and evaluation of their product *e.g. How will we know that we have designed and made successful products?*

Sequence of Learning

Step 4

Design the Product

Pupils should be taught to:

- Sketch and annotate possible ideas, choosing one as a final choice and explaining why.
- Add labels to their chosen design, detailing the materials used and design elements.
- Plan the main stages of making, e.g. create a flowchart.

Step 5

Make the Product

Pupils should be taught to:

- Use simple drawing software such as 2Design and Make (PurpleMash) to explore the interface and drawing tools to practise drawing and manipulating shapes such as rectangles, squares and triangles.
- Use the software to open existing drawings including nets and to draw nets of their own, using gridlines and pre-shaped tools.
- Explore a range of fill and font tools and to become familiar with the graphic design aspects within the software to achieve the desired appearance of their products.

Step 6

Evaluate the Product

Pupils should be taught to:

- To evaluate throughout and the final products against the intended purpose and with the intended user, where safe and practical, drawing on the design criteria previously agreed.
- To discuss possible improvements.

Step 7

Assessment

- End of Unit Outcome: Use CAD to design and build a net of a 3D shape to create a gift box.
- LBQ Question Set

Year Four Overview

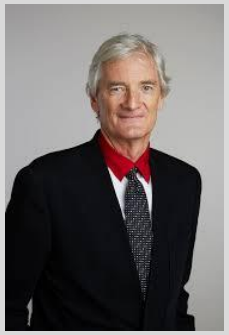
	Autumn 1	Autumn 2	Spring 1	Spring 2	Summer 1	Summer 2
Topic		**Mechanisms:** Levers and Linkages		**Food Technology:** Healthy and Varied Diets		**Structures:** Shell Structures
LBQ Assessment		Y4 Mechanisms LBQ Question Set		Y4 Food LBQ Question Set		Y4 Structures LBQ Question Set

Year Four

Year Four – Autumn 2

Mechanisms: Levers and Linkages

Engineer Focus:



James Dyson

Vocabulary for this unit:

Mechanism: a device used to create movement in a product.
Lever: a rigid bar which moves around a pivot. Levers are used in many everyday products. In this project children will use card strips for levers and paper fasteners for pivots.
Linkage: the card strips joining one or more levers to produce the type of movement required. The term 'linkage' is also used to describe the lever and linkage mechanism as a whole.
Slot: the hole through which a lever is placed to enable part of a picture to move.
Guide or bridge: a short card strip used to keep lever and linkage mechanisms in place and control movement.
Loose pivot: a paper fastener that joins card strips together.
Fixed pivot: a paper fastener that joins card strips to the backing card.
System: a set of related parts or components used to create an outcome. Systems have an input, process and an output. In a lever and linkage mechanism, the 'input movement' is where the user pushes or pulls a card strip. The 'output movement' is where one or more parts of the picture move.

National Curriculum objectives:

Design
- Generate realistic ideas and their own design criteria through discussion, focusing on the needs of the user.
- Use annotated sketches and prototypes to develop, model and communicate ideas.

Make
- Order the main stages of making.
- Select from and use appropriate tools with some accuracy to cut, shape and join paper and card.
- Select from and use finishing techniques suitable for the product they are creating.

Evaluate
- Investigate and analyse books and, where available, other products with lever and linkage mechanisms.
- Evaluate their own products and ideas against criteria and user needs, as they design and make

Technical Knowledge
- Understand and use lever and linkage mechanisms.
- Distinguish between fixed and loose pivots.
- Know and use technical vocabulary relevant to the project.

Context for Study:

This unit follows on from learning in Year 2 in which children will have explored and used mechanisms such as flaps, sliders and levers. Children will also have gained experience of basic cutting, joining and finishing techniques with paper and card. This unit is a precursor to the mechanisms unit in Year 5 in which children will utilise their understanding of electrical circuits, simple switches and components, their ability to strengthen and stiffen structures and their experience of cutting and joining a range of materials in order to create a 3D object that includes gears, pulleys and levers.

Sequence of Learning

Step 1

Retrieval of previous learning

- Introduce and explore knowledge organiser.
- Teach new Vocabulary (inc LBQ vocabulary question set where appropriate).
- Retrieval of previous learning

Step 2

Research the Engineer

Pupils should be taught that:

- James Dyson is a British designer and inventor. He founded the Dyson Company and is best known for devising and promoting the Dyson Dual Cyclone bagless vacuum cleaner.
- Dyson experimented with a bagless vacuum cleaner design during the 1970s. He also devised the idea of using a ball instead of wheels, allowing the machine to turn more easily.
- The James Dyson Foundation was set up in 2002 to encourage education in design and engineering.

Step 3

Design the Product

Pupils should be taught to:

- Explore moving parts by looking at books or cards that make use of levers and linkages.
- Practise making a mock-up of a lever they could use in their design.

Sequence of Learning

Step 4

Design the Product

Pupils should be taught that:

- Generate realistic ideas for their Christmas card and their own design criteria through discussion, focusing on the needs of the user.
- Use annotated sketches and prototypes to develop, model and communicate ideas.

Step 5

Make the Product

Pupils should be taught:

- To demonstrate a range of lever and linkage mechanisms using prepared teaching aids.
- To develop their understanding of levers and linkages. E.g. *Which card strip is the lever? Which card strip is acting as the linkage? Which part of the system is the input and which part the output? What does the type of movement remind you of? Which are the fixed pivots and which are the loose pivots?*
- To demonstrate the correct and accurate use of measuring, marking out, cutting, joining and finishing skills and techniques.

Step 6

Evaluate the Product

Pupils should be taught:

- To evaluate the final products against the intended purpose and with the intended user, drawing on the design criteria previously agreed.

Step 7

Assessment

- End of Unit Outcome: To make a moving Christmas card with levers and linkages.
- LBQ Question Set

Year Four – Spring 2

Food: Healthy and Varied Diets

Engineer Focus:

Heston Blumenthal

Vocabulary for this unit:

Appearance: how the food looks to the eye.
Texture: how the product feels in the mouth.
Sensory evaluation: evaluating food products in terms of the taste, smell, texture and appearance.
Preference test: trying different foods and deciding which you like best.
Processed food: ingredients that have been changed in some way to enable them to be eaten or used in food preparation and cooking.

National Curriculum objectives:

<u>Design</u>

- Generate and clarify ideas through discussion with peers and adults to develop design criteria including appearance, taste, texture and aroma for an appealing product for a particular user and purpose.
- Use annotated sketches and appropriate information and communication technology, such as web-based recipes, to develop and communicate ideas.

<u>Make</u>

- Plan the main stages of a recipe, listing ingredients, utensils and equipment.
- Select and use appropriate utensils and equipment to prepare and combine ingredients.
- Select from a range of ingredients to make appropriate food products, thinking about sensory characteristics.

<u>Evaluate</u>

- Carry out sensory evaluations of a variety of ingredients and products. Record the evaluations using e.g. tables and simple graphs.
- Evaluate the ongoing work and the final product with reference to the design criteria and the views of others.

<u>Technical Knowledge</u>

- Know how to use appropriate equipment and utensils to prepare and combine food.
- Know about a range of fresh and processed ingredients appropriate for their product, and whether they are grown, reared or caught.
- Know and use relevant technical and sensory vocabulary appropriately.

Context for Study:

This unit follows on from learning in Reception and Year 2 where children have explored where a range of fruit and vegetables come from e.g. farmed or grown at home. Children will also have an understanding of the basic principles of a healthy and varied diet, including how fruit and vegetables are part of the Eatwell Plate. This unit is a precursor to work studied in Year 6 where children will further develop their understanding of food groups and will use a wider range of utensils, including a heated appliance (an oven).

Sequence of Learning

Step 1

Retrieval of previous learning

- Introduce and explore knowledge organiser.
- Teach new Vocabulary (inc LBQ vocabulary question set where appropriate).
- Retrieval of previous learning

Step 2

Research the Engineer

Pupils should be taught that:

- Heston is an English celebrity chef well known for his innovative spins on classic British foods.
- His restaurant, The Fat Duck, received a rating of three Michelin stars and was voted the #1 restaurant in the world in 2005.
- He received no formal culinary training.

Step 3

Design the Product

Pupils should be taught to:

- Investigate a range of food products.
- Make links to the principles of a varied and healthy diet using the Eatwell Plate e.g. *What ingredients have been used? Which food groups do they belong to? What substances are used in the products e.g. nutrients, water and fibre?*
- Gather information about existing products available relating to their product.
- Find out how a variety of ingredients used in products are grown and harvested, reared, caught and processed e.g. *Where and when are the ingredients grown? Where do different meats/fish/cheese/eggs come from? How and why are they processed?*

Sequence of Learning

Step 4

Design the Product

Pupils should be taught to:

- Sketch and annotate possible ideas, choosing one as a final choice and explaining why.
- Add labels to their chosen design, detailing the ingredients used and design elements.
- Plan the main stages of making, e.g. create a flowchart.

Step 5

Make the Product

Pupils should be taught to:

- Learn to select and use a range of utensils and use a range of techniques as appropriate to prepare ingredients hygienically including the bridge and claw technique, grating, peeling, chopping, slicing, mixing and spreading.
- Practise food preparation and cooking techniques by making a food product using an existing recipe.
- Discuss basic food hygiene practices when handling food including the importance of following instructions to control risk e.g. *What should we do before we work with food? Why is following instructions important?*

Step 6

Evaluate the Product

Pupils should be taught to:

- To evaluate the final product against the intended purpose and user, reflecting on the design criteria previously agreed.
- To consider what others think of the product when considering how the work might be improved.

Step 7

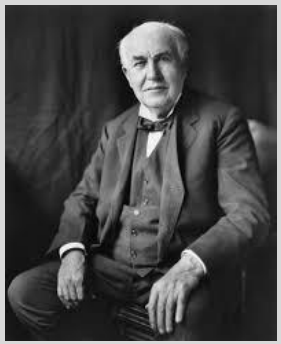
Assessment

- End of Unit Outcome: To make a healthy sandwich or wrap.
- LBQ Question Set

Year Four – Summer 2

Structures: Shell Structures

Engineer Focus:



Thomas Edison

Vocabulary for this unit:

Cuboid: a solid body with rectangular sides.
Edge: where two surfaces meet at an angle.
Face: a surface of a geometric shape.
Font: a printer's term meaning the style of lettering being used.
Net: the flat or opened-out shape of an object such as a box.
Prism: a solid geometric shape with ends that are similar, equal and parallel.
Scoring: cutting a line or mark into sheet material to make it easier to fold.
Shell structure: a hollow structure with a thin outer covering.
Vertex: used to refer to the corners of a solid geometric shape, where edges meet.

National Curriculum objectives:

<u>Design</u>

- Generate realistic ideas and design criteria collaboratively through discussion, focusing on the needs of the user and purpose of the product.
- Develop ideas through the analysis of existing products and use annotated sketches and prototypes to model and communicate ideas.

<u>Make</u>

- Order the main stages of making.
- Select and use appropriate tools to measure, mark out, cut, score, shape and assemble with some accuracy.
- Explain their choice of materials according to functional properties and aesthetic qualities.
- Use finishing techniques suitable for the product they are creating.

<u>Evaluate</u>

- Investigate and evaluate a range of existing shell structures including the materials, components and techniques that have been used.
- Test and evaluate their own products against design criteria and the intended user and purpose.

<u>Technical Knowledge</u>

- Develop and use knowledge of how to construct strong, stiff shell structures.
- Develop and use knowledge of nets of cubes and cuboids and, where appropriate, more complex 3D shapes.
- Know and use technical vocabulary relevant to the project.

Context for Study:

This unit follows on from learning in Year 2 and Year 3 where children have experienced how to construct and strengthen a freestanding structure, assembling 3D nets and using computer aided design in order to create 3D products. This unit is a precursor to the Year 5 structures unit in which children will assemble a frame structure using wood and will look at triangulation.

Sequence of Learning

Step 1

Retrieval of previous learning

- Introduce and explore knowledge organiser.
- Teach new Vocabulary (inc LBQ vocabulary question set where appropriate).
- Retrieval of previous learning

Step 2

Research the Engineer

Pupils should be taught that:

- Thomas Edison was born on 11th February 1847 in America.
- He is known for creating the first working lightbulb.
- He created The Phonograph – the first machine that was able to record and playback sound

Step 3

Design the Product

Pupils should be taught to:

- Develop a design brief with the children within a context which is authentic and meaningful.
- Discuss with the children the uses and purposes of their shell structures e.g. *What does the product need to do? Who is it aimed at? How will the purpose and user affect your design decisions?*

Sequence of Learning

Step 4

Design the Product

Pupils should be taught to:

- Use annotated sketches and prototypes to develop, model and communicate their ideas for the product e.g. *What will you need to include in your design? How can you improve it? What materials will you use? How will you make sure your product works well and has the right appearance?*
- Practise making nets out of card, joining flat faces with masking tape to create 3-D shapes.

Step 5

Make the Product

Pupils should be taught to:

- Use kit parts with flat faces to construct nets.
- Apply the skills and techniques of scoring, cutting out and assembling pre-drawn nets in order to construct a simple box. Show how a window could be cut out and acetate sheet added.
- Use different ways of stiffening and strengthening their shell structures e.g. folding and shaping, corrugating, ribbing, laminating.
- Discuss and explore the graphics techniques and media that could be used to achieve the desired appearance of their products.

Step 6

Evaluate the Product

Pupils should be taught to:

- To evaluate throughout and the final products against the intended purpose and with the intended user, drawing on the design criteria previously agreed.

Step 7

Assessment

- End of Unit Outcome: To create a 2D net and construct a 3D gift box.
- LBQ Question Set

Year Five Overview

	Autumn 1	Autumn 2	Spring 1	Spring 2	Summer 1	Summer 2
Topic		**Structures:** Frame Structures		**Textiles:** Combining Different Fabric Shapes		**Mechanisms:** Pulleys and Gears
LBQ Assessment		Y5 Structures LBQ Question Set		Y5 Textiles LBQ Question Set		Y5 Mechanisms LBQ Question Set

Year Five

Year Five – Autumn 2

Structures: Frame Structures

Engineer Focus:

Peter Rice

Vocabulary for this unit:

Modelling: the process of making a 3-D representation of a structure or product.
Compression: the application of pressure to squeeze an object.
Strut: a part of a structure under compression.
Tension: a force pulling on a material or structure.
Tie: a part of a structure under tension.
Diagonal: a straight line that goes from one corner to another inside a shape.
Horizontal: a line that is parallel to the ground.
Vertical: a line that is at right angles to the ground.
Triangulation: the use of triangular shapes to strengthen a structure.
Frame structure: a structure made from thin components e.g. tent frame.

National Curriculum objectives:

<u>Design</u>

- Carry out research into user needs and existing products, using surveys, interviews and questionnaires.
- Develop a simple design specification to guide the development of their ideas and products.
- Generate, develop and model innovative ideas through discussion, prototypes and annotated sketches.

<u>Make</u>

- Formulate a clear plan including a step-by-step list of what needs to be done and a list of resources needed.
- Select from and use appropriate tools to accurately measure, mark out, cut, shape and join materials to make frameworks.

<u>Evaluate</u>

- Investigate and evaluate a range of existing frame structures.
- Compare the final product to the original design specification.
- Test products with intended user and critically evaluate the quality of the design, manufacture, functionality and fitness for purpose.
- Research key events and individuals relevant to frame structures.

<u>Technical Knowledge</u>

- Understand how to strengthen, stiffen and reinforce 3D frameworks
- Know and use technical vocabulary relevant to the project.

Context for Study:

This unit follows on from learning in Year 3 and Year 4 where children will have experience of using measuring, marking out, cutting, joining, shaping and finishing techniques with construction materials. In addition, children will have a basic understanding of what structures are (freestanding, shell, frame) and how they can be made stronger, stiffer and more stable.

Sequence of Learning

Step 1

Retrieval of previous learning

- Introduce and explore knowledge organiser.
- Teach new Vocabulary (inc LBQ vocabulary question set where appropriate).
- Retrieval of previous learning

Step 2

Research the Engineer

Pupils should be taught that:

- Peter Rice was born in Dublin on 16th June 1935.
- Rice acted as Structural Engineer on three of the most important architectural works of the 20th century: the Sydney Opera House, Pompidou Centre and the Lloyd's Building.
- Rice was renowned for his innate ability to act as both engineer and designer.
- In 1992, he was the second engineer to be awarded the Royal Gold Medal for Architecture by the Royal Institute of British Architects.

Step 3

Design the Product

Pupils should be taught to:

- Research structures such as tents, bus shelters and bird hides and explore the materials/frames used. Explore how these frames are reinforced. Compare the strength of square frameworks with triangular frameworks.
- Practise how to reinforce materials, for example using thread or pipe cleaners to reinforce a frame made of construction tubes or how to reinforce wood joins using string or elastic bands.

Sequence of Learning

Step 4

Design the Product

Pupils should be taught to:

- Develop a simple design specification to guide the development of their ideas and products, taking account of constraints including time, resources and cost.
- Generate, develop and model innovative ideas for their own shelter or tent, through discussion, small-scale prototypes and annotated sketches.

Step 5

Make the Product

Pupils should be taught to:

- Construct different frames using wood and string to create a shelter.
- Accurately join framework materials together.
- Reinforce frameworks and develop an understanding of using triangulation to add strength to a structure.

Step 6

Evaluate the Product

Pupils should be taught to:

- Evaluate their work and their completed product, drawing on their design specification, and thinking about the intended purpose and user.

Step 7

Assessment

- End of Unit Outcome: To make a freestanding outdoor shelter.
- LBQ Question Set

Year Five – Spring 2

Textiles: Combining Different Fabric Shapes

Engineer Focus:

Faith Ringgold

Vocabulary for this unit:

Mock up: quick 3-D model ling using easy to work and cheaper materials and temporary joints. Useful for checking proportions and scale.
Pattern or template: a shape drawn to exact shape and size, used to assist in cutting out.
Seam allowance: extra fabric allowed for joining together - 15mm for domestic patterns.
Specification: describes what a product has to do.
Tacking: large running stitches to hold pieces of fabric together temporarily.
Working drawing: detailed drawing contains all information needed to make a product but is updated as changes are made.

National Curriculum objectives:

<u>Design</u>

- Generate innovative ideas by carrying out research of existing products.
- Develop, model and communicate ideas through drawings, templates, mock-ups and prototypes.
- Design purposeful, functional and appealing products for the intended user that are fit for purpose.

<u>Make</u>

- Produce detailed lists of equipment and fabrics relevant to their tasks.
- Formulate step-by-step plans.
- Make products that are accurately assembled and well finished.

<u>Evaluate</u>

- Investigate and analyse textile products linked to their final product.
- Compare the final product to the original design specification.
- Test products with intended user and critically evaluate the quality of the design, manufacture, functionality and fitness for purpose.

<u>Technical Knowledge</u>

- A 3D textile product can be made from a combination of accurately made pattern pieces, fabric shapes and different fabrics.

Context for Study:

This unit follows on from learning in Year 1 and Year 3 where children will have experienced completing some basic stitching techniques. They will have threaded a needle, secured thread with a knot and fastened a row of stitches with a knot. They will have cut fabric, used templates and joined two pieces of fabric together using thread.

Sequence of Learning

Step 1

Retrieval of previous learning

- Introduce and explore knowledge organiser.
- Teach new Vocabulary (inc LBQ vocabulary question set where appropriate).
- Retrieval of previous learning

Step 2

Research the Engineer

Pupils should be taught that:

- She was born on 8th October 1930 in New York.
- The works that Ringgold created in 1960s were inspired from the Impressionism, Africa art and Cubism.
- The American People Series was created in 1963. It was the first political collection of Ringgold. The works highlighted the point of view of women toward the racial interaction.
- She has also written and illustrated 11 children's books.
- Faith Ringgold has said that she uses her work to tell a story.

Step 3

Design the Product

Pupils should be taught to:

- Know the intended user and purpose.
- Know how to use a running stitch, back stitch and overhand stitch to securely sew materials together.

Sequence of Learning

Step 4

Design the Product

Pupils should be taught to:

- Sketch and annotate possible ideas, choosing one as a final choice and explaining why.
- Add labels to their chosen design e.g. seam allowance, front, back, pattern symbols.

Step 5

Make the Product

Pupils should be taught to:

- Mark out the measurements on tracing paper.
- Use this template to cut around the fabric.
- Understand seam allowance.
- Know how to finish a row of stitches with a knot.
- Know and use a range of stitches including the running stitch, back stitch and overhand stitch.
- Know how to sew two 2D pieces of fabric together.
- Glue any decorative patterns onto the front panel, allowing for the seam.
- To strengthen and reinforce fabric.

Step 6

Evaluate the Product

Pupils should be taught to:

- Evaluate the product against user, purpose and design criteria and the joining of the fabric.
- Discuss possible improvements.

Step 7

Assessment

- End of Unit Outcome: To make a pencil case that can be constructed by hand and using simple materials.
- LBQ Question Set.

Year Five – Summer 2

Mechanisms: Pulleys and Gears

Engineer Focus:

Margaret E. Knight

Vocabulary for this unit:

Pulley: a grooved wheel over which a drive belt can run.
Gear: a wheel with teeth around its circumference.
Drive belt: the belt which connects and transfers movement between two pulleys.
Gearing up or down: changing the rotational speed of a product by the use of pulleys or gears. When a small pulley or gear is used to drive a larger one the rotational speed is reduced and the product has been geared down.
Mechanical system: a set of related parts or components used to create movement.
Driver: the gear or pulley that provides the input movement to the system.
Follower: the gear or pulley that provides the output movement to the system.
Mesh: the point where two gears join together and transfer movement.
Motor spindle: the rod on the end of the motor onto which a gear or pulley is attached.

National Curriculum objectives:

Design

- Generate innovative ideas by carrying out research using surveys, interviews, questionnaires and web-based resources.
- Develop a simple design specification to guide their thinking.
- Develop and communicate ideas through discussion, annotated drawings, exploded drawings and drawings from different views.

Make

- Produce detailed lists of tools, equipment and materials. Formulate step-by-step plans and, if appropriate, allocate tasks within a team.
- Select from and use a range of tools and equipment to make products that that are accurately assembled and well finished. Work within the constraints of time, resources and cost.

Evaluate

- Compare the final product to the original design specification.
- Test products with intended user and critically evaluate the quality of the design, manufacture, functionality and fitness for purpose.
- Consider the views of others to improve their work.
- Investigate famous manufacturing and engineering companies relevant to the project.

Technical Knowledge

- Understand that mechanical and electrical systems have an input, process and an output.
- Understand how gears and pulleys can be used to speed up, slow down or change the direction of movement.
- Know and use technical vocabulary relevant to the project.

Context for Study:

This unit follows on from prior learning in Year 1 to Year 4 where children will have had experience of axles, axle holders and wheels that are fixed or free moving. Children will have a basic understanding of electrical circuits, simple switches and components and an understanding of how to strengthen and stiffen structures. In addition, children will have experience of cutting and joining techniques with a range of materials including card, plastic and wood.

Sequence of Learning

Step 1

Retrieval of previous learning

- Introduce and explore knowledge organiser.
- Teach new Vocabulary (inc LBQ vocabulary question set where appropriate).
- Retrieval of previous learning

Step 2

Research the Engineer

Pupils should be taught that:

- When Margaret E. Knight was twelve, she saw an accident in a cloth factory. She invented a device that would automatically stop a machine if something were caught in it. The factories began using the device soon after.
- Later, Margaret worked in a paper bag factory. At that time, paper bags weren't flat on the bottom. Margaret thought about how much easier they'd be to use if they were flat and she went to work creating a machine that would make the bags.
- Margaret is most famous for her bag machine, but she went on to make 100 inventions and receive 20 patents.

Step 3

Design the Product

Pupils should be taught to:

- Develop an authentic and meaningful design brief.
- Generate innovative ideas by carrying out research through surveys, interviews and questionnaires and develop a design specification for their product, carefully considering the purpose and intended user for their product.

Sequence of Learning

Step 4

Design the Product

Pupils should be taught to:

- Communicate ideas through detailed, annotated drawings from different views and diagrams. The drawings should indicate the design decisions made, how components work as a system with an input, process and output, and the appearance and finishing techniques for the product.
- Produce step-by-step plans and lists of tools, equipment and materials needed.

Step 5

Make the Product

Pupils should be taught to:

- Recap the difference between an input, process and output.
- Explore combinations of two different size gears meshed together.
- To investigate the direction and speed of gear rotation, focusing on how the size of the driver gear affects the speed of the follower gear.
- To develop measuring, marking, cutting, shaping and joining skills using junior hacksaws, G-clamps, bench hooks, square section wood, card triangles and hand drills to construct wooden frames, if appropriate.

Step 6

Evaluate the Product

Pupils should be taught to:

- Evaluate the final product in use, comparing it to the original design specification.
- Critically evaluate the quality of the design, the manufacture, functionality, innovation shown and fitness for the intended user and purpose.

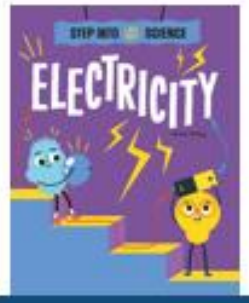
Step 7

Assessment

- End of Unit Outcome: To make a moving model using gears.
- LBQ Question Set

Year Six Overview

	Autumn 1	Autumn 2	Spring 1	Spring 2	Summer 1	Summer 2
Topic				**Electrical Systems:** Complex Circuits and Switches		**Food Technology:** Celebrating Culture and Seasonality
LBQ Assessment				Y6 Electrical Systems LBQ Question Set		Y6 Food LBQ Question Set



Year Six

Year Six – Spring 2

Electrical Systems: complex circuits and switches

Engineer Focus:

Sir Jony Ive

Vocabulary for this unit:

Modelling: to realise and manipulate ideas in a tangible form.
Open switch: when a switch is positioned such that electricity cannot flow through it.
Closed switch: when a switch is positioned such that electricity can flow through it.
Normally open: the term used to describe when a switch is in the off position, i.e. the switch is open and no electricity can flow when the button on not pressed.
Normally closed: the term used to describe when a switch is in the on position i.e. the switch is closed and electricity can flow when the button is not pressed
Output devices: components that produce an outcome e.g. bulbs and buzzers.
Input devices: components that are used to control an electrical circuit e.g. switches or sensors.

National Curriculum objectives:

<u>Design</u>

- Use research to develop a design specification for a functional product that responds automatically to changes in the environment. Take account of constraints including time, resources and cost.
- Generate and develop innovative ideas and share and clarify these through discussion.
- Communicate ideas through annotated sketches, pictorial representations of electrical circuits or circuit diagrams.

<u>Make</u>

- Formulate a step-by-step plan to guide making, listing tools, equipment, materials and components.
- Competently select and accurately assemble materials, and securely connect electrical components to produce a reliable, functional product.
- Create and modify a computer control program to enable an electrical product to work automatically in response to changes in the environment.

<u>Evaluate</u>

- Continually evaluate and modify the working features of the product to match the initial design specification.
- Test the system to demonstrate its effectiveness for the intended user and purpose.
- Investigate famous inventors who developed ground-breaking electrical systems and components.

<u>Technical Knowledge</u>

- Understand and use electrical systems in their products.
- Apply their understanding of computing to program, monitor and control their products.
- Know and use technical vocabulary relevant to the project.

Context for Study:

This unit is supported by an external ICT company to deliver the unit due to the technical element of equipment needed.

Sequence of Learning

Step 1

Retrieval of previous learning

- Introduce and explore knowledge organiser.
- Teach new Vocabulary (inc LBQ vocabulary question set where appropriate).
- Retrieval of previous learning

Step 2

Research the Engineer

Pupils should be taught that:

- Sir Jonathan Paul Ive, is a British industrial designer and Apple executive who was responsible for making design as integral to the appeal of a personal computer as its power and speed.
- He is responsible for the design of many Apple products we use today such as the iMac, iPhone, iPad and iWatch.

Step 3

Design the Product

Pupils should be taught to:

- Conduct consumer research, looking at products which use electrical systems to detect changes in the environment, such as Alexa/Ring Doorbells.
- Understand the input/output/process of an electrical system through the use of Microbits and Strawbees.

Sequence of Learning

Step

Design the Product

Pupils should be taught to:

- Develop a design specification for a functional robot that responds automatically to changes in the environment.

Step 5

Make the Product (Bolton SICT)

Pupils should be taught to:

- Practise methods for making secure electrical connections e.g. using automatic wire strippers, twist and tape electrical connections, screw connections and connecting blocks.
- Make high quality products, applying knowledge, understanding and skills from investigative and evaluative activities and focused tasks.
- Create and modify a computer control program to enable the product to work automatically in response to changes in the environment.

Step 6

Evaluate the Product

Pupils should be taught to:

- Evaluate their work and their completed product, drawing on their design specification, and thinking about the intended purpose and user.

Step 7

Assessment

- End of Unit Outcome: To make a moving robot which responds to changes within the environment.
- LBQ Question Set

Year Six – Summer 2

Food Technology: Celebrating Culture and Seasonality

Engineer Focus:

Lisa Goodwin-Allen

Vocabulary for this unit:

Finishing: related to the appearance of the product shape, decoration and colour.
Rubbing in: rubbing the dry ingredients together with the fat, lifting to put air into the mixture, so that it resembles fine breadcrumbs.
Knead: pulling and squeezing dough to make it smooth.
Bran: the hard, protective shell of a grain of wheat.
Dough: a mixture of flour, yeast and water before it is cooked.
Germ: part of the seed where the root and shoots grow from.
Yeast: a tiny plant which makes bubbles of carbon dioxide when mixed with flour and warm water.
Unleavened bread: flat bread where yeast has not been added.

National Curriculum objectives:

Design

- Generate innovative ideas through research and discussion with peers and adults to develop a design brief and criteria for a design specification.
- Explore a range of initial ideas, and make design decisions to develop a final product linked to user and purpose.
- Use words, annotated sketches and information and communication technology as appropriate to develop and communicate ideas.

Make

- Write a step-by-step recipe, including a list of ingredients, equipment and utensils
- Select and use appropriate utensils and equipment accurately to measure and combine appropriate ingredients.
- Make, decorate and present the food product appropriately for the intended user and purpose

Evaluate

- Carry out sensory evaluations of a range of relevant products and ingredients. Record the evaluations using e.g. tables/graphs/charts such as star diagrams.
- Evaluate the final product with reference back to the design brief and design specification, taking into account the views of others when identifying improvements.
- Understand how key chefs have influenced eating habits to promote varied and healthy diets.

Technical Knowledge

- Know how to use utensils and equipment including heat sources to prepare and cook food.
- Understand about seasonality and the source of different food products.
- Know and use relevant technical and sensory vocabulary.

Context for Study:

This unit follows on from learning in Year 2 and Year 4 in which children will have acquired a knowledge and understanding about food hygiene, nutrition, healthy eating and a varied diet. Children will also have h
techniq

Sequence of Learning

Step

Retrieval of previous learning

- Introduce and explore knowledge organiser.
- Teach new Vocabulary (inc LBQ vocabulary question set where appropriate).
- Retrieval of previous learning

Step 2

Research the Engineer

Pupils should be taught that:

- Lisa Goodwin-Allen (born 29 April 1981) is a British chef best known for being executive chef of the Michelin starred Northcote restaurant near Preston.
- She was also one of four winning chefs on season five of the BBC cooking show Great British Menu.
- She was placed in charge of the kitchen at Northcote aged 23.

Step 3

Design the Product

Pupils should be taught to:

- Develop a design brief and simple design specification within a context that is authentic and meaningful. This can include design criteria relating to nutrition and healthy eating.
- Discuss the purpose of the products that the children will be designing, making and evaluating and who the products will be for.
- Generate a design criteria that can be used to guide the development and evaluation of the product.

Sequence of Learning

Step 4

Design the Product

Pupils should be taught to:

- Use annotated sketches, discussion and information and communication technology if appropriate, to develop and communicate their ideas.
- Record the steps, equipment, utensils and ingredients for making the food product drawing on the knowledge, understanding and skills learnt.

Step 5

Make the Product

Pupils should be taught to:

- Measure out, cut, shape and combine e.g. knead, beat, rub and mix ingredients.
- Use appropriate utensils and equipment safely and hygienically.
- Follow a basic recipe to prepare and cook a savoury food product.
- Ask questions about which ingredients could be changed or added in a basic recipe such as types of flour, seeds, garlic, vegetables. Consider texture, taste, appearance and smell.
- When using a basic dough recipe, explore making different shapes to change the appearance of the food product e.g. *Which shape is most appealing and why?*

Step 6

Evaluate the Product

Pupils should be taught to:

- To evaluate the work as it progresses and the final product against the intended purpose and user reflecting on the design specification previously agreed.

Step 7

Assessment

- End of Unit Outcome: To make a savoury food item.
- LBQ Question Set