

DT Progression Map

Cycle A

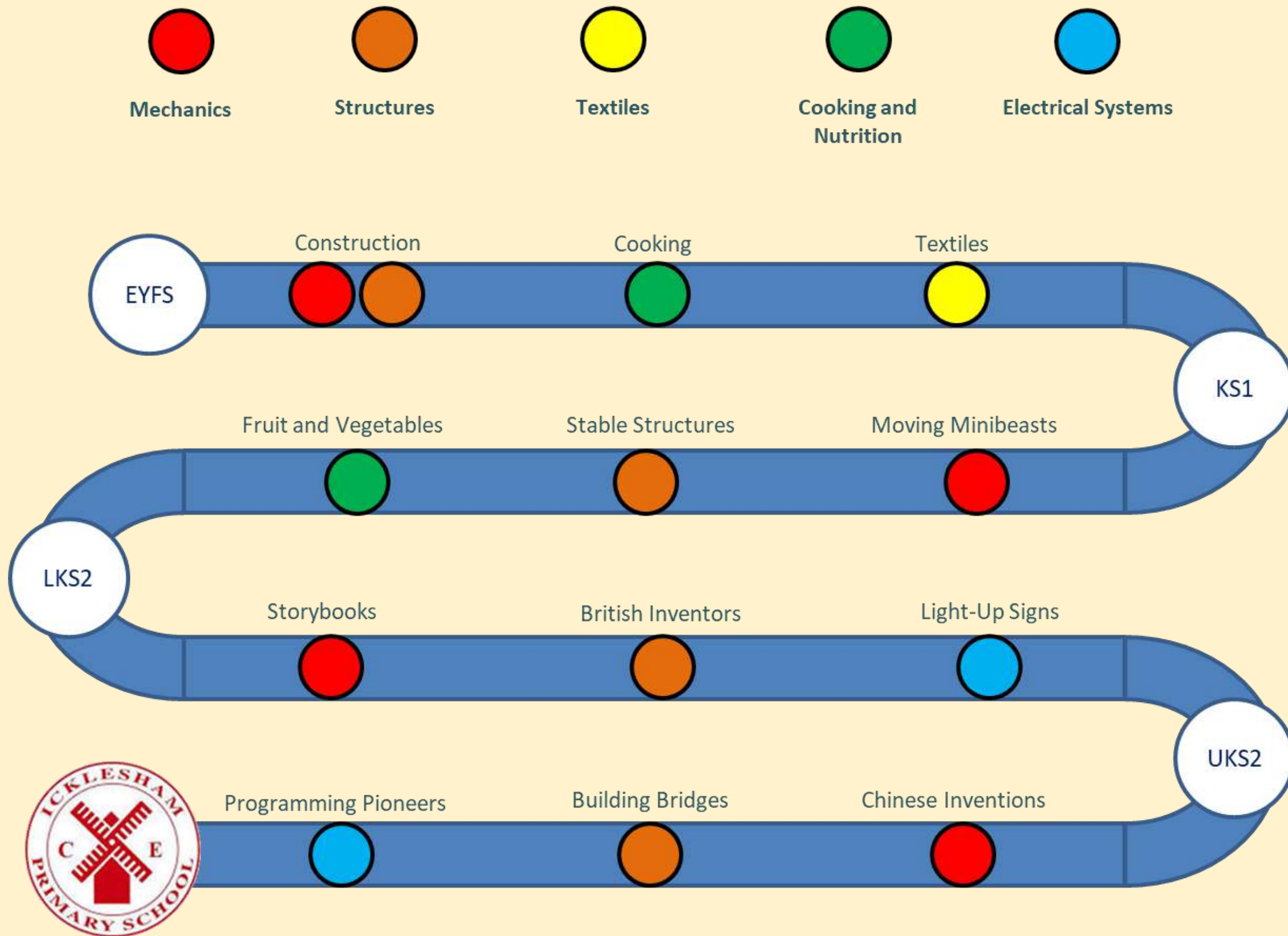
*“Design is not just what it looks like and feels like.
Design is how it works.”*

Steve Jobs



DT Curriculum Map

Cycle A



Objective
To explore a range of construction resources.

I wonder...
What shall we build?



Substantive Knowledge (Content)

- To know we can use a range of resources to create structures: natural resources, construction kits, large and small loose parts, treasure modelling: boxes (various sizes), cardboard tubes, ribbons, tissue paper, fabric, bottles, lids, corks
- To know we can combine resources to create structures
- To know we can join materials in different ways: PVA glue, pritt-stick, Sellotape, masking tape, staples.
- To know we can use a range of tools to help us to create structures, to join, combine and shape materials
- To know structures need to be stable
- To know safety needs to be considered when building with large loose parts and construction resources

Future Learning

KS1
Children will be learning how to make structures stronger.

LKS2
Children will be learning about using mechanisms as part of a product.

UKS2
Children will be learning about how bridges are made.

Skills	
Technical knowledge	Understanding how things work
Designing	A plan to make something
Making	To create or produce something
Evaluating	To study carefully and judge something
Concepts	
Responsibility	working safely, how design can solve problems, choosing the right materials, responsibilities to customers to ensure quality / reliable products, healthy eating, quality ingredients
Similarity and difference	making comparisons, noting differences and drawing conclusions
Cause and consequence	identifying how things work, how an action can cause change/movement
Significance	significant designers and designs, real world examples of effective and successful products
Written and oral expression	Using terminology, evaluating, creating accurate designs, labelling and annotating, explaining processes, presenting
Key vocabulary	
construction	The work of building or making something
loose parts	Open-ended materials that can be combined and recombined in a variety of ways
treasure modelling	Creating structures from repurposed resources
den	A rough structure, usually built outside
building	A structure with walls and a roof
vehicle	A machine, usually with wheels and an engine, used for transporting people or goods, especially on land
crate	
plank	
gutter	
brick	
block	
log	
stick	
stone	
fabric	
tarpaulin	
join	
cut	
stick	
glue, pritt-stick, Sellotape, masking tape, staples, stapler	

Assessment points

- Explore different construction resources
- Select resources to fit the purpose
- Select methods and tools to join resources
- Adapt their work where necessary, evaluating as they work

EYFS Coverage

- It is important that children have regular opportunities to engage with the arts, enabling them to explore and play with a wide range of media and materials. *Educational Programme for Expressive Arts and Design, Statutory Framework*

Minimum expectations, including for pupils with SEND

- Explore different construction resources

High prior attainment and extension opportunities, including for pupils with SEND

Follow the full design, make, evaluate process.



Objective

To use some basic cooking skills

I wonder...

What could we cook?



Substantive Knowledge (Content)

- To know we can combine ingredients to make food.
- To know ingredients may change in different ways as we cook them.
- To know we can use different tools and methods to prepare ingredients for cooking.
- To know we may not like all of the food we make, but we won't know unless we taste it!
- To know it is fine to not like all the food we make and we don't all like the same things.
- To know some foods are healthier than others and we can eat more of these.
- To know some people are allergic to some ingredients.
- To know some tools and processes need us to be extra careful to stay safe
- To know we always wash our hands before we cook to make sure our hands are clean with no germs that could go in the food.

Future Learning

KS1

Children will be learning how to design a healthy pizza.

LKS2

Children will be designing a meal using seasonal food.

UKS2

Children will be learning how to make burgers.

Skills

Technical knowledge	Understanding how things work
Designing	A plan to make something
Making	To create or produce something
Evaluating	To study carefully and judge something
Cooking and nutrition	The study of food and how it is used

Concepts

Responsibility	working safely, how design can solve problems, choosing the right materials, responsibilities to customers to ensure quality / reliable products, healthy eating, quality ingredients
Similarity and difference	making comparisons, noting differences and drawing conclusions
Cause and consequence	identifying how things work, how an action can cause change/movement
Significance	significant designers and designs, real world examples of effective and successful products
Written and oral expression	Using terminology, evaluating, creating accurate designs, labelling and annotating, explaining processes, presenting

Key vocabulary

cook	To prepare food to be eaten
bake	To cook inside an oven
ingredient	A food used with others in the preparation of a dish
flour	Powder made from grain, especially wheat
sugar	A sweet substance used to make foods sweet
butter	A pale-yellow solid food containing a lot of fat
egg	
salt	
milk	
cheese	
vegetable	
fruit	
cake	
biscuit	
dough	
wash	
stir	
scoop	
slice	
chop	
mash	
grate	
spoon	
knife	
bowl	

Assessment points

- Use different tools and methods to cook food safely
- Try new foods
- Identify healthier and less healthy foods
- Know how to use key tools and processes safely
- Know to wash hands before cooking and understand the reason for this

EYFS Coverage

- It is important that children have regular opportunities to engage with the arts, enabling them to explore and play with a wide range of media and materials. *Educational Programme for Expressive Arts and Design, Statutory Framework*
- Be confident to try new activities *Managing Self ELG*
- Manage their own basic hygiene and personal needs, including... understanding the importance of healthy food choices. *Managing Self ELG*

Minimum expectations, including for pupils with SEND

- Use different tools and methods to cook food safely
- Try new foods

High prior attainment and extension opportunities, including for pupils with SEND

Record simple recipes, step-by-step (e.g. with photographs and scribed by adult, to share with family).



Objective

To explore different ways of using textile resources

I wonder...

What could we do with this fabric?



Substantive Knowledge (Content)

- To know how to thread objects
- To know how to weave with textile resources
- To know fabric can be used in making products
- To know fabric can be joined to other fabrics and to other resources in different ways
- To know we can sew fabrics together
- To know we can sew designs onto fabrics
- To know sewing uses similar processes to threading and weaving.

Future Learning

KS1

Children will be learning to make puppets using different materials.

LKS2

Children will be learning how to make seasonal stockings.

UKS2

Children will be learning about fashion and textiles.

Skills

Technical knowledge	Understanding how things work
Designing	A plan to make something
Making	To create or produce something
Evaluating	To study carefully and judge something

Concepts

Responsibility	working safely, how design can solve problems, choosing the right materials, responsibilities to customers to ensure quality / reliable products, healthy eating, quality ingredients
Similarity and difference	making comparisons, noting differences and drawing conclusions
Cause and consequence	identifying how things work, how an action can cause change/movement

Key vocabulary

thread (verb)	To put e.g. string or thread through a narrow hole
bead	Small coloured piece of wood or plastic with a hole through it
weave	To make a textile piece by repeatedly passing strips of e.g. wool, fabric paper in and out through long threads
string	A piece of strong, thin rope
thread (noun)	A thin fibre
wool	Thick thread made from natural or artificial animal hair
ribbon	A long narrow strip of material
needle	A thin metal pin with a hole at one end, used for sewing
fabric	Cloth or material
sew	Use a needle and thread to join fabrics
stitch (noun)	A piece of thread sewn in cloth
staple [stapler]	Fasten using staples and stapler

Assessment points

- **Explore** different ways to work with textiles
- **Select** resources to fit the purpose
- **Select** methods and tools to join resources
- **Adapt** their work where necessary, **evaluating** as they work

EYFS Coverage

- It is important that children have regular opportunities to engage with the arts, enabling them to explore and play with a wide range of media and materials. *Educational Programme for Expressive Arts and Design, Statutory Framework*

Minimum expectations, including for pupils with SEND

- **Explore** different ways to work with textiles

High prior attainment and extension opportunities, including pupils with SEND

What will you do to extend children's learning



Objective
To be able to make a picture using moving mechanisms and parts

I wonder...
How can we move a horse?



Substantive Knowledge (Content)

- To know that a mechanism is part of a machine or system
- To know the names of some mechanisms including slider, lever and wheel
- To know that a slider is a mechanism, which makes something, move up, down, left or right.
- To know that a lever is a mechanism which makes something pivot around a point and is used to help lift heavy objects.
- To know that a wheel mechanism is a circular component, intended to rotate about an axis to facilitate or simplify movement,
- To know where a good place to use slider would be a sliding bolt on a door or a rail for a curtain lever
- To know that a good place to use a lever would be a wheelbarrow or seesaw.
- To know that a good place to use a wheel mechanism would be on a bike.
- To be able to make a slider, lever and wheel mechanisms using a range of tools and materials

Prior Learning
EYFS
Children have used a range of resources to create structures, including natural resources, construction kits, large and small loose parts and treasure modelling.

Future Learning

LKS2
Children will be learning about using mechanisms as part of a product.

UKS2
Children will be learning about different mechanisms that are used in Chinese inventions.

KS3
Children will be learning to understand how more advanced mechanical systems used in their products enable changes in movement and force.

Skills

Technical knowledge	Understanding how things work
Designing	A plan to make something
Making	To create or produce something
Evaluating	To study carefully and judge something

Concepts

Responsibility	working safely, how design can solve problems, choosing the right materials, responsibilities to customers to ensure quality / reliable products, healthy eating, quality ingredients
Similarity and difference	making comparisons, noting differences and drawing conclusions
Cause and consequence	identifying how things work, how an action can cause change/movement
Significance	significant designers and designs, real world examples of effective and successful products
Written and oral expression	Using terminology, evaluating, creating accurate designs, labelling and annotating, explaining processes, presenting

Key vocabulary

mechanism	Part of a machine or system
lever	A long object resting on a point
sliding	A side-to-side movement
axle	A rod that goes through a wheel
wheel	A circular object that moves around an axle
fastener	
join	
minibeast	

Assessment points

- Know** what a mechanism is
- Know** the names of some mechanisms
- Know** how some mechanisms work
- Know** why we use mechanisms
- Know** where is a good place to put mechanisms
- Know** how to make a mechanism using a range of tools and materials
- Know** how to design a picture with moving parts
- Design** a picture with moving parts
- Make** a picture with moving parts that are secure
- Evaluate** the effectiveness of each mechanism used

National Curriculum Coverage

- Generate, develop, model and communicate their ideas through talking, drawing, templates and mock-ups
- Select from and use a range of tools and equipment to perform practical tasks
- Select from and use a wide range of materials and components, including construction materials, textiles and ingredients, according to their characteristics
- Explore and use mechanisms [for example, levers, sliders, wheels and axles], in their products

Minimum expectations, including pupils with SEND
Children will design a picture with moving parts. With support, children will make a picture that includes moving parts.

High prior attainment and extension opportunities, including pupils with SEND
Children to think about, discuss and reason how they could use the mechanisms to make something else.



Objective
To be able to design and make a product with a stable structure

I wonder...
How can we stop a house falling down?


Substantive Knowledge (Content)

- To know what the words stable, stiff, strong and suitability mean
- To know how to design a structure that is stable
- To know how to make a stable structure using a plan
- To know which tools can be used to make the structure
- To know how to test the suitability of materials
- To know why their structure was or wasn't successful

Prior Learning

EYFS
Children have used a range of resources to create structures, including natural resources, construction kits, large and small loose parts and treasure modelling.

Future Learning

LKS2
Children will be learning about British inventions.

UKS2
Children will be learning about how bridges are made.

KS3
Children will be learning to understand and use the properties of materials and the performance of structural elements to achieve functioning solutions.

Skills

Technical knowledge	Understanding how things work
Designing	A plan to make something
Making	To create or produce something
Evaluating	To study carefully and judge something

Concepts

Responsibility	working safely, how design can solve problems, choosing the right materials, responsibilities to customers to ensure quality / reliable products, healthy eating, quality ingredients
Similarity and difference	making comparisons, noting differences and drawing conclusions
Cause and consequence	identifying how things work, how an action can cause change/movement
Significance	significant designers and designs, real world examples of effective and successful products
Written and oral expression	Using terminology, evaluating, creating accurate designs, labelling and annotating, explaining processes, presenting

Key vocabulary

stable	Something that is not likely to break or move
structure	An object made of different parts
stiff	Can't bend easily
strong	Power to withstand force
suitability	Is it right for something
collapse	
criteria	
material	
properties	

Assessment points

- Know** what stable, stiff, strong and suitability mean
- Know** which tools and materials to use for a stable structure
- Know** where to test a structure
- Know** how to design a stable structure
- Design** a structure that is stable
- Make** a stable structure based on their own design
- Evaluate** the suitability of a range of existing products

National Curriculum Coverage

- 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 and mock-ups
- Select from and use a range of tools and equipment to perform practical tasks
- Select from and use a wide range of materials and components, including construction materials, textiles and ingredients, according to their characteristics
- Evaluate their ideas and products against design criteria
- Build structures, exploring how they can be made stronger, stiffer and more stable

Minimum expectations, including pupils with SEND
Children will have some ideas about how to make a structure more stable. With support, can make a stable structure.

High prior attainment and extension opportunities, including pupils with SEND
Children to think about, discuss and reason the best materials to use when building based on their properties.



Skills

Technical knowledge	Understanding how things work
Designing	A plan to make something
Making	To create or produce something
Evaluating	To study carefully and judge something
Cooking and nutrition	The study of food and how it is used

Concepts

Responsibility	working safely, how design can solve problems, choosing the right materials, responsibilities to customers to ensure quality / reliable products, healthy eating, quality ingredients
Similarity and difference	making comparisons, noting differences and drawing conclusions
Cause and consequence	identifying how things work, how an action can cause change/movement
Significance	significant designers and designs, real world examples of effective and successful products
Written and oral expression	Using terminology, evaluating, creating accurate designs, labelling and annotating, explaining processes, presenting

Key vocabulary

- | | |
|------------------|--|
| menu | The food available at a restaurant |
| hygiene | Keeping things clean, safe and healthy |
| diet | The food and drink we have |
| healthy | Being strong and well |
| prepare | To get something ready |
| farm | |
| fruit | |
| knife | |
| vegetable | |

National Curriculum Coverage

- Use the basic principles of a healthy and varied diet to prepare dishes
- Understand where food comes from
- Design purposeful, functional, appealing products for themselves and other users based on design criteria
- Select from and use a range of tools and equipment to perform practical tasks
- Explore and evaluate a range of existing products
- Evaluate their ideas and products against design criteria

Minimum expectations, including pupils with SEND

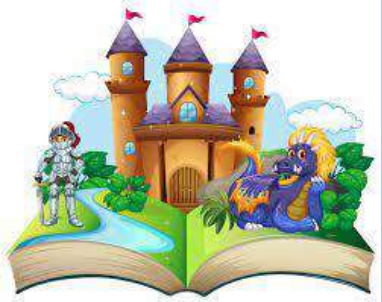
High prior attainment and extension opportunities, including pupils with SEND

Children to think about and discuss how a healthy snack in the summer might be different to one in the winter.



Objective
To be able to make a product with a mechanism

I wonder...
Can DT make a story more exciting?



Substantive Knowledge (Content)

- To know that books use mechanisms such as sliders, levers and pop ups to make parts move
- To know that a linkage system is a name for the mechanism
- To know how linkage systems are designed and used in books
- To know how to make a moving mechanism
- To know that a font is a way of writing letters and words
- To know which fonts are good for a story book
- To know how to plan and design a story book
- To know how to make a story book
- To know how to evaluate a finished product

Prior Learning

EYFS
Children have used a range of resources to create structures, including natural resources, construction kits, large and small loose parts and treasure modelling.

KS1
Children have learnt about basic mechanisms.

Future Learning

UKS2
Children will be learning about different mechanisms that are used in Chinese inventions.

KS3
Children will be learning to understand how more advanced mechanical systems used in their products enable changes in movement and force.

Skills	
Technical knowledge	Understanding how things work
Designing	A plan to make something
Making	To create or produce something
Evaluating	To study carefully and judge something

Concepts	
Responsibility	working safely, how design can solve problems, choosing the right materials, responsibilities to customers to ensure quality / reliable products, healthy eating, quality ingredients
Similarity and difference	making comparisons, noting differences and drawing conclusions
Cause and consequence	identifying how things work, how an action can cause change/movement
Significance	significant designers and designs, real world examples of effective and successful products
Written and oral expression	Using terminology, evaluating, creating accurate designs, labelling and annotating, explaining processes, presenting

Key vocabulary	
mechanism	Part of a machine or system
lever	A long object resting on a point
linkage system	a collection of parts joined together to change or help movement
font	A set of letters, numbers and symbols that can have varied sizes, colours, or designs
moving part	Something that moves
appropriate	
card	
joining materials	
story book	
design	
evaluate	

Assessment points

- Know** what mechanisms are used in books
- Know** how some mechanisms work
- Know** how to make a moving mechanism
- Know** what a font is
- Design** a mechanism to use in a story book
- Design** a story book using an appropriate font
- Make** a moving mechanism for a story book
- Make** a story book with a mechanism
- Make** a story book with an appropriate font
- Evaluate** a range of existing mechanisms
- Evaluate** a mechanism in a story book
- Evaluate** the font used in a story book

National Curriculum Coverage

- 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
- Select from and use a wider range of tools and equipment to perform practical tasks
- Investigate and analyse a range of existing products
- Understand and use mechanical systems in their products

Minimum expectations, including pupils with SEND
Children to identify mechanisms and understand how they work. With support, children can make a mechanism that moves.

High prior attainment and extension opportunities, including pupils with SEND
Children to think about, discuss and reason if mechanisms make a book more exciting.



Objective
To reflect on the impact of British inventions

I wonder...
What is the greatest British invention?



Substantive Knowledge (Content)

- To know that an invention is a new thing that someone has made
- To know that we have inventions to solve problems or make our lives easier
- To know and find out about the British inventors Alexander Graham Bell, Tim Berners-Lee and W B Wilkinson
- To know and find out about some British inventions include the telephone, the World Wide Web, reinforced concrete and the mackintosh.
- To be able to evaluate what makes a good invention
- To know how inventions have changed the world
- To evaluate which inventions have changed the world for the better and worse

Prior Learning

EYFS
Children have used a range of resources to create structures, including natural resources, construction kits, large and small loose parts and treasure modelling.

KS1
Children have learnt about how structures can be made stronger.

Future Learning

UKS2
Children will be learning about some major Chinese inventions.

KS3
Children will be learning to understand developments in design and technology, its impact on individuals, society and the environment, and the responsibilities of designers, engineers and technologists.

Skills

Technical knowledge	Understanding how things work
Evaluating	To study carefully and judge something

Concepts

Responsibility	working safely, how design can solve problems, choosing the right materials, responsibilities to customers to ensure quality / reliable products, healthy eating, quality ingredients
Similarity and difference	making comparisons, noting differences and drawing conclusions
Cause and consequence	identifying how things work, how an action can cause change/movement
Significance	significant designers and designs, real world examples of effective and successful products
Written and oral expression	Using terminology, evaluating, creating accurate designs, labelling and annotating, explaining processes, presenting

Key vocabulary

invention	A new thing that someone has made
inventor	A person who makes new inventions
British	Something from Great Britain
properties	A quality of something like strength, stretchiness or absorbency
impact	How something has been affected
telephone	
Alexander Graham Bell	
World Wide Web	
Tim Berners-Lee	
reinforced concrete	
W B Wilkinson	
mackintosh	
waterproof	

Assessment points

- Know** what an invention is
- Know** why we have inventions
- Know** who some British inventors are
- Know** some British inventions
- Know** what makes a good invention
- Evaluate** a range of British inventions
- Evaluate** the effect inventions have had on the world

National Curriculum Coverage

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

Minimum expectations, including pupils with SEND
Children to know why we have inventions. With support, children can identify some British inventors and inventions.

High prior attainment and extension opportunities, including pupils with SEND
Children to think about and discuss which is the greatest British invention.



Objective
To be able to make a product with an electrical system

I wonder...
How can we escape a dark room?



Substantive Knowledge (Content)

- To know that an electrical system consists of all of the elements needed to distribute electrical power, including overhead and underground lines, poles, transformers, and other equipment
- To know how an electrical system works
- To know that LEDs are semiconductor devices that emit infrared or visible light when charged with an electric current
- To know how to design a product with an electrical system
- To decide what tools and equipment to use
- To know how to construct a working circuit
- To know how to use a computers to control lights

Prior Learning

EYFS
Children have used a range of resources to create structures, including natural resources, construction kits, large and small loose parts and treasure modelling.

KS1
Children have learnt about how moving parts can have an impact on how something operates.

Future Learning

UKS2
Children will be learning about computer-controlled systems.

KS3
Children will be learning to apply computing and use electronics to embed intelligence in products that respond to inputs, and control outputs using programmable components.

Skills	
Technical knowledge	Understanding how things work
Designing	A plan to make something
Making	To create or produce something
Evaluating	To study carefully and judge something
Concepts	
Responsibility	working safely, how design can solve problems, choosing the right materials, responsibilities to customers to ensure quality / reliable products, healthy eating, quality ingredients
Similarity and difference	making comparisons, noting differences and drawing conclusions
Cause and consequence	identifying how things work, how an action can cause change/movement
Significance	significant designers and designs, real world examples of effective and successful products
Written and oral expression	Using terminology, evaluating, creating accurate designs, labelling and annotating, explaining processes, presenting
Key vocabulary	
electrical system	A circuit made up of a power supply, conductor, load, and switch.
circuit	A complete path around which electricity can flow
light bulb	A simple apparatus that converts electric energy into light energy
LED	A semiconductor device that produces light from electricity
component	A part or element of something
sign	
illuminated	
bulb	
wire	
battery	
materials	
test	
product	
coding	

Assessment points

- Know** what an electrical system is
- Know** how an electrical system works
- Know** what LEDs are
- Know** how to design an electrical system
- Design** an electrical system for a purpose
- Design** an illuminated sign
- Make** an electrical circuit
- Make** an illuminated sign
- Evaluate** a finished product
- Evaluate** how computers can be used in electrical systems

National Curriculum Coverage

- Generate, develop, model and communicate their ideas through discussion, annotated sketches, cross-sectional and exploded diagrams, prototypes, pattern pieces and computer-aided design
- 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
- Apply their understanding of how to strengthen, stiffen and reinforce more complex structures
- Understand and use electrical systems in their products
- Apply their understanding of computing to program, monitor and control their products

Minimum expectations, including pupils with SEND
Children to identify components in an electrical system. With support, children can make an electrical circuit.

High prior attainment and extension opportunities, including pupils with SEND
Children to think about, discuss and reason why electrical systems are an important part of our lives.



Objective
To reflect on the impact of Chinese inventions

I wonder...
What is the greatest Chinese invention?


Substantive Knowledge (Content)

- To know that China is a country in Asia
- To know some of the great Chinese inventions are the moveable printing press, the process of paper making, gunpowder and the compass
- To know how some Chinese inventions have changed the world
- To know that a machine is a physical system using power to apply forces and control movement to perform an action
- To know that gears are wheels with teeth that mesh with another gear to transfer mechanical energy
- To know that cranks are arm secured at right angle to a shaft with which it can rotate
- To know that water can be used with inventions as a source of power
- To know that a kite consists of three basic parts: the body, the line, and the bridle that attaches the line to the body
- To know how to make a kite

Prior Learning

EYFS
Children have used a range of resources to create structures, including natural resources, construction kits, large and small loose parts and treasure modelling.

KS1
Children have learnt about basic mechanisms.

LKS2
Children have learnt about some British inventions that have impacted the world.

Future Learning

KS3
Children will be learning to understand how more advanced mechanical systems used in their products enable changes in movement and force.

Skills

Technical knowledge	Understanding how things work
Designing	A plan to make something
Making	To create or produce something
Evaluating	To study carefully and judge something

Concepts

Responsibility	working safely, how design can solve problems, choosing the right materials, responsibilities to customers to ensure quality / reliable products, healthy eating, quality ingredients
Similarity and difference	making comparisons, noting differences and drawing conclusions
Cause and consequence	identifying how things work, how an action can cause change/movement
Significance	significant designers and designs, real world examples of effective and successful products
Written and oral expression	Using terminology, evaluating, creating accurate designs, labelling and annotating, explaining processes, presenting

Key vocabulary

invention	A new thing that someone has made
gear	Wheels with teeth that slot together
crank	A device that moves things in a circle
Chinese	Something from China
kite	An invention
printing press	
paper making	
gunpowder	
compass	
water clock	
water wheel	
China	
properties	
prototype	

Assessment points

- Know** where China is
- Know** what some great Chinese inventions are
- Know** how paper is made
- Know** why gunpowder and compasses are used
- Know** what a machine is
- Know** what gears and cranks are
- Know** how gears work
- Design** a mechanism that uses gears
- Design** a kite
- Make** a kite
- Evaluate** how Chinese inventions have changed the world

National Curriculum Coverage

- 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
- Select from and use a wider range of tools and equipment to perform practical tasks
- Select from and use a wider range of materials and components
- Investigate and analyse a range of existing products
- Understand how key events and individuals in design and technology have helped shape the world
- Understand and use mechanical systems in their products

Minimum expectations, including pupils with SEND
Children to know what gears and cranks are. With support, children can design a kite using annotated drawings.

High prior attainment and extension opportunities, including pupils with SEND
Children to think about, discuss and reason how great are some of the Chinese inventions.



Objective
To be able to design and make a product with a stable structure

I wonder...
How was this bridge made?



Substantive Knowledge (Content)

- To know that a bridge is a structure built to span a physical obstacle without blocking the way underneath
- To know bridges need to be stable and strong by using pillars, beams and trusses
- To know that compression is a force that squeezes something together
- To know that tension is a force that stretches something
- To know that compression and tension are forces used in bridge building
- To know different types of bridge include truss, suspension and arch
- To know that a prototype is a first version of a device or vehicle from which other forms are developed
- To be able to design a prototype for a bridge
- To be able to build a bridge
- To be able to evaluate bridges

Prior Learning

EYFS
Children have used a range of resources to create structures, including natural resources, construction kits, large and small loose parts and treasure modelling.

KS1
Children have learnt about how structures can be made stronger.

LKS2
Children have learnt about what makes a good invention.

Future Learning

KS3
Children will be learning to understand and use the properties of materials and the performance of structural elements to achieve functioning solutions.

Skills

Technical knowledge	Understanding how things work
Designing	A plan to make something
Making	To create or produce something
Evaluating	To study carefully and judge something

Concepts

Responsibility	working safely, how design can solve problems, choosing the right materials, responsibilities to customers to ensure quality / reliable products, healthy eating, quality ingredients
Similarity and difference	making comparisons, noting differences and drawing conclusions
Cause and consequence	identifying how things work, how an action can cause change/movement
Significance	significant designers and designs, real world examples of effective and successful products
Written and oral expression	Using terminology, evaluating, creating accurate designs, labelling and annotating, explaining processes, presenting

Key vocabulary

bridge	A structure built over something
construction	The process of erection or assembly of any building or infrastructure on a site
compression	A force that squeezes something together
tension	A force that stretches something
support	To help something
prototype	
strengthen	
constructed	
compression	
pillar	
beam	
arch	
truss	
suspension	

Assessment points

- Know** what a bridge is
- Know** the names of different types of bridge
- Know** what bridges need to make them strong
- Know** how compression and tension are used in bridge building
- Know** what a prototype is
- Know** how to build a bridge
- Design** a prototype for a bridge
- Make** an effective bridge
- Evaluate** the effectiveness of a bridge
- Evaluate** the views of others in order to improve their work

National Curriculum Coverage

- 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
- 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 their ideas and products against their own design criteria and consider the views of others to improve their work
- Apply their understanding of how to strengthen, stiffen and reinforce more complex structures

Minimum expectations, including pupils with SEND
Children to identify some components of bridge building. With support, children can design a prototype for a bridge.

High prior attainment and extension opportunities, including pupils with SEND
Children to think about, discuss and reason which is the best type of bridge.



Objective
To be able to design a product that uses programming

I wonder...
How do pelican crossings work?



Substantive Knowledge (Content)

- To know that computer programs are used in products
- To know a software engineer is someone who writes programs for computers and other electronic devices
- To know a hardware engineer is someone who designs computer parts and equipment
- To know that a pelican crossing is a type of pedestrian crossing with traffic signals for both traffic and pedestrians
- To be able to use programming to design a pelican crossing
- To name other products can be designed that use programming
- To know that a microcontroller is a computer system on a chip that performs a job
- To know that microcontrollers provide functionality and give intelligence to products and systems i.e. mobile phones
- To know how to debug programs
- To know how to design a computer-controlled system

Prior Learning

EYFS
Children have used a range of resources to create structures, including natural resources, construction kits, large and small loose parts and treasure modelling.

KS1
Children have learnt about how moving parts can have an impact on how something operates.

LKS2
Children have learnt about electrical systems.

Future Learning

KS3
Children will be learning to apply computing and use electronics to embed intelligence in products that respond to inputs, and control outputs using programmable components.

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Significance	significant designers and designs, real world examples of effective and successful products
Written and oral expression	Using terminology, evaluating, creating accurate designs, labelling and annotating, explaining processes, presenting

Key vocabulary

programming	Input instructions
hardware	The computer's physical parts
software	The programs, or instructions, that tell the hardware what to do
computer-controlled system	A system controlled by a computer
microcontroller	A computer system on a chip that does a job
coding	
debug	
pelican crossing	
engineer	
prototype	
LED	

Assessment points

- Know** how computer programs are used in products
- Know** what a software and hardware engineer is
- Know** the difference between software and hardware
- Know** what a microcontroller is
- Know** how microcontrollers work
- Know** some products that use computer-controlled systems
- Design** a prototype for a computer-controlled system
- Make** a prototype for a computer-controlled model
- Evaluate** the design of a computer-controlled system
- Evaluate** why we use computer-controlled systems

National Curriculum Coverage

- 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
- 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 and use electrical systems in their products
- Apply their understanding of computing to program, monitor and control their products

Minimum expectations, including children with SEND
Children to identify the difference between hardware and software. With support, children can use programming to make a computer-controlled system

High prior attainment and extension opportunities, including pupils with SEND
Children to think about, discuss and reason what is the most important computer-controlled system.

