

Product Outcomes:

Design, make and evaluate a product linked to the Christmas season.

National Curriculum Links:

Understand and apply the principles of nutrition and learn how to cook.

Prior Learning:

Pupils have knowledge and understanding about food hygiene, nutrition, healthy eating and a varied diet. Pupils should be able to use appropriate equipment and utensils, and apply a range of techniques for measuring out, preparing and combining ingredients.

Key Essential Skills and Knowledge for this Unit:

Designing:

- 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, 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.

Making:

- 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.

Evaluating:

- 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 and understanding:

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

Sticky Knowledge for topic:

- There are basic rules of food hygiene and other safe practices – e.g. hazards relating to ovens, knives, washing of hands, handling of different foods, use of different chopping boards, etc.
- It is important to consider allergies when cooking.
- Recognise a variety of recipes.
- The weighing of ingredients is important to the overall outcome of the product, as is the temperature and cooking timings.
- Name a variety of ingredients from all food groups (referring to the eat-well plate)
- A budget is a document that lists the money you earn and the money you spend over a particular length of time.

Vocabulary:

Y5 and Y6 - Ingredients, yeast, dough, wholemeal, unleavened, baking soda, spice, herbs, carbohydrate, sugar, fat, protein, vitamins, nutrients, gluten, allergy, intolerance, savoury, seasonality, pour, mix, kneed, whisk, beat, combine, fold, rubbing in

Sequence:

Investigate and evaluate:

- What type of recipes are popular at Christmas?

Design:

- What types of product will sell well within our school?

Make:

- How can I safely make my street food product?

Evaluate:

- How successful was my street food product?

Thinking Deeper:

How could I develop my idea to add variety to my food stall? How could my design produce greater profit?

Possible books/resources:

<https://www.foodafactoflife.org.uk/>

Links:

Subject Specific links – Mathematics – use appropriate standard and non-standard measures.

Personal development – teamwork, working with customers/public.

SMSC – social – developing social skills in order to work with people of different ages, in a range of situations.

Cultural Capital – understanding how food has derived from different cultures around the world, where food comes from

Careers – chefs, merchandisers and designers through product placement, food packaging designers and companies, dieticians.

British Values – tolerance (foods from other cultures)

Equality – Consider 'Fair Trade' principles when acquiring ingredients and products.

Independence – Use cooking equipment safely.

Community – What foods are available in our local area?

Outdoor learning – Forest schools, outdoor cooking.

Product Outcomes:

Design, make and evaluate a vehicle with moving parts

National Curriculum Links:

- 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 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.

Prior Learning:

Explored and used mechanisms such as flaps, sliders, and levers. Gained experience of basic cutting, joining, and finishing techniques with paper and card.

Key Essential Skills and Knowledge for this Unit:

Designing:

- 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.

Making:

- 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.

Evaluating:

- 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 and understanding:

- 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.

Sticky Knowledge for topic:

- A pulley helps with the lifting process, making it easier to lift an object essentially changing the direction of the pull or force applied. E.g. you pull down to make a weigh lift.
- Mechanical systems have an input, process and an output.
- Gears and pulleys can be used to speed up, slow down or change the direction of movement.
- Different mechanisms produce different types of movement.
- The choice of the correct material (its weight and properties) is vital to the end product and the movement required.

Vocabulary:

Y5 - pulley, gear, driver, follower, rotation, motor, belt, spindle, motor, circuit, switch, ratio, transmit, annotated drawings, exploded diagrams, functionality.

Y6 - transmit, annotated drawings, exploded diagrams, functionality

Sequence:

Investigate and evaluate:

- How do pulleys and gears work?

Design:

- How might I create pulleys and gears to inform my design?
- How can research help me?
- Which prototype will result in the best movement for my design?

Make:

- How can I ensure my finished product looks appealing?

Evaluate:

- Does my product meet my design criteria?

Thinking Deeper:

Explored and used mechanisms such as flaps, sliders, and levers. Gained experience of basic cutting, joining, and finishing techniques with paper and card.

Possible books/resources:

- ???????

Links:

Subject Specific links – Science

Personal development – resilience – to persevere with creation of different mechanisms

SMSC – social – Valuing others' ideas and efforts in the process

Cultural Capital – gaining an understanding into how everyday products are designed and produced

Careers – market research, designers

British Values – Tolerance of our faiths.

Equality – considering marketing to an inclusive audience. We are making Easter cards, but these can be secular in nature.

Independence – To ask and answer questions about gears and pulleys.

Community – Where can we find gears and pulleys in use in our local community?

Outdoor learning – Forest schools.

Product Outcomes:

Design, make and evaluate an electrical board game or vehicle.

National Curriculum Links:

- 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.

Prior Learning:

Understanding of the essential characteristics of a series circuit and experience of creating a battery powered, functional, electrical product, initial experience of using computer control software and an interface box or a standalone box, e.g. writing and modifying a program to make a light flash on and off.

Key Essential Skills and Knowledge for this Unit:

Designing:

- 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.

Making:

- 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.

Evaluating:

- 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.

Technical knowledge and understanding:

- 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.

Sticky Knowledge for topic:

- An open switch is when a switch is positioned such that electricity cannot flow through it.
- A closed switch is when a switch is positioned such that electricity can flow through it.
- An output device is a component that produces an outcome e.g. bulb or buzzer.
- An input device is a component that is used to control an electrical circuit e.g. switches or sensors.
- Push-to-break switch is a switch turned off by pressing it.
- Push-to-make switch is a switch turned on by pressing it.

Vocabulary:

Y5 - Parallel circuit, light emitting diode, monitor, flowchart, design specification, reed switch, tilt switch.

Y6 - Light dependent resistor, interface control, micro switch, latching switch.

Sequence:

Investigate and evaluate:

- What are electrical systems and how do they work in toy cars or board games?

Design:

- What components are appropriate for the purpose of my product?

Make:

- Which tools and equipment are necessary to make my design?

Evaluate:

- How effective is my product?

Thinking Deeper:

How/why have toys/games developed to include electrical components?

Possible books/resources:

- ??????

Links:

Subject Specific links – science – electricity, Maths – 3D shapes

Personal development – problem solving, resilience.

SMSC – social – working with others to overcome problems, giving and receiving constructive criticism.

Cultural Capital – how properties have been protected over the years.

Careers – electricians

British Values – Law

Equality – everybody has the right to be safe and secure.

Independence – I can ask and answer questions about electrical systems.

Community – What electrical systems are there in our local community?

Outdoor learning – Forest schools, village walks.

Product Outcomes:

Design, make and evaluate a tapestry that tells a story

National Curriculum Links:

- 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.

Prior Learning:

Running stitch, blanket stitch and decorative stitch patterns

Key Essential Skills and Knowledge for this Unit:

Designing:

- Generate innovative ideas through research including surveys, interviews and questionnaires.
- Develop, model and communicate ideas through talking, drawing, templates, mock-ups and prototypes including using computer-aided design.
- Design purposeful, functional, appealing products for the intended user that are fit for purpose based on a simple design specification.

Making:

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

Evaluating:

- Investigate and analyse textile products linked to their final product.
- Compare the final product to the original design specification.
- Test products with intended user, where safe and practical, and critically evaluate the quality of the design, manufacture, functionality and fitness for purpose.
- Consider the views of others to improve their work.

Technical knowledge and understanding:

- A 3-D textile product can be made from a combination of accurately made pattern pieces, fabric shapes and different fabrics.
- Fabrics can be strengthened, stiffened and reinforced where appropriate.

Sticky Knowledge for topic:

- There are a variety of stitches for embroidery including cross, chain, blanket, etc.
- Stitches create different effects for their sewing, texture and overall effect.
- The aesthetic qualities of a design improve the overall finished product.
- When evaluating a product, identify its strengths and areas for development and improvement,

- A 3D textile product can be made from a combination of accurately made pattern pieces, fabric shapes and different fabrics.
- Fabrics can be strengthened, stiffened and reinforced where appropriate.
- What CAD is

Vocabulary:

Y5 - Specification, tacking, working drawing, clasp, pinking shears, design criteria, hem, reinforce, stem stitch, satin stitch, tie dye.

Y6 - Applique, annotate, evaluate, innovation, functionality, renewable, authentic, chain stitch.

Sequence:

Investigate and evaluate:

- What makes a good tapestry?

Design:

- How can make my design appealing?
- Can using computer aided design software help imagine my design?

Make:

- Can I sew a functional fastening?

Evaluate:

- Does my design meet the criteria?

Thinking Deeper:

Explore the use of textiles – Ancient Egypt to now

Possible books/resources:

- www.wildginger.com/products/wildthings.htm
- www.techsoft.co.uk
- Bayeaux tapestry

Links:

Subject Specific links – Maths - measuring, Computing – design, History, RE

Personal development – resilience (designs not always working out the way we had planned)

SMSC – designing a project aimed to be inclusive of all children.

Cultural Capital – to explore other pencil case containers from other periods of time.

Careers – sewing machinists, designers.

British Values – mutual respect when evaluating products designed.

Equality – designing with consideration of disabilities.

Independence – ask and answer questions about CAD

Community – what in our locality could have been designed with the help of CAD

Outdoor learning – Forest schools

Product Outcomes:

Design, make and evaluate a soft toy.

National Curriculum Links:

- 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.

Prior Learning:

Pupils should be able to read and follow simple instructions, pupils should be able to use a knife/scissors to safely cut materials

Key Essential Skills and Knowledge for this Unit:

Designing:

- Generate innovative ideas by carrying out research including surveys, interviews and questionnaires.
- Develop, model and communicate ideas through talking, drawing, templates, mock-ups and prototypes and, where appropriate, computer-aided design.
- Design purposeful, functional, appealing products for the intended user that are fit for purpose based on a simple design specification.

Making:

- Produce detailed lists of equipment and fabrics relevant to their tasks.
- 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 are accurately assembled and well finished. Work within the constraints of time, resources and cost.

Evaluating:

- 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.
- Consider the views of others to improve their work.

Technical knowledge and understanding:

- A 3-D textile product can be made from a combination of accurately made pattern pieces, fabric shapes and different fabrics.
- Fabrics can be strengthened, stiffened and reinforced where appropriate.

Sticky Knowledge for topic:

- A cross stitch pattern must be done on squared paper as a guide.
- Fabrics have different properties, making them good for different purposes.
- Some materials are eco-friendly
- Items need to be pinned before sewing together
- There are 5 basic stitch types, some are functional and some for decoration
- Sharp scissors are needed to cut fabric.

Vocabulary:

Y5 - Specification, tacking, working drawing, clasp, pinking shears, design criteria, hem, reinforce, stem stitch, satin stitch, tie dye.

Y6 - Applique, annotate, evaluate, innovation, functionality, renewable, authentic, chain stitch.

Sequence:

Investigate and evaluate:

- What makes a good soft toy?

Design:

- How can I design a soft toy that is appropriate to my audience?

Make:

- How can I make a prototype that include various stitching?

Evaluate:

- How effective was my finished product?

Thinking Deeper:

What other products could make by joining fabrics together?

Possible books/resources:

- ????

Links:

Subject Specific links – Maths – measuring.

Personal development – careers/entrepreneur.

SMSC – social – re-using.

Cultural Capital – gain understanding into the ways in which everyday clothes are made and mended

Careers – Sewing, clothing/fashion design.

British Values – British fashion designers.

Equality – who can be a designer?

Independence – ask and answer questions about fashion design

Community – can our designs be influenced by the local community?

Outdoor learning – Forest schools, can the outdoors influence out design ideas?

Product Outcomes:

Design, make and evaluate a bird hide

National Curriculum Links:

- 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.

Prior Learning:

Experience of using measuring, marking out, cutting, joining, shaping and finishing techniques with construction materials. Basic understanding of what structures are and how they can be made stronger, stiffer and more stable.

Key Essential Skills and Knowledge for this Unit: (from front page)

Designing:

- Carry out research into user needs and existing products, using surveys, interviews, questionnaires and web-based resources.
- 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, through discussion, prototypes and annotated sketches.

Making:

- Formulate a clear plan, including a step-by-step list of what needs to be done and lists of resources to be used.
- Competently select from and use appropriate tools to accurately measure, mark out, cut, shape and join construction materials to make frameworks.
- Use finishing and decorative techniques suitable for the product they are designing and making.

Evaluating:

- Investigate and evaluate a range of existing frame structures.
- Critically evaluate their products against their design specification, intended user and purpose, identifying strengths and areas for development, and carrying out appropriate tests.
- Research key events and individuals relevant to frame structures.

Technical knowledge and understanding:

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

Sticky Knowledge for topic:

- Knows that tension pulls of a frame or structure.
- The use of triangular shapes can strengthen a structure.
- A frame structure is made from thin components e.g. a tent frame

Vocabulary:

Y5 - Reinforce, triangulation, stability, temporary, permanent.

Y6 - prototype, innovation, functional, design brief.

Sequence:

Investigate and evaluate:

- What does free standing mean?

Design:

- How can free-standing structures be strengthened?
- How do designers know what will appeal to their audience?
- How can my research help me?

Make:

- How can I make my finished product look appealing?

Evaluate:

- Does my product meet my design criteria?

Thinking Deeper: Which professionals would be involved in the real-life building of this project? If my design was built now, would it still be standing in 10 years' time? (think not only about durability but also about its appeal to the audience)

Possible books/resources:

- ?????

Links:

Subject Specific links – Mathematics – measures, Reading, Art,

Personal development – resilience (designs not always working out they way we had planned)

SMSC – designing a project aimed to be inclusive of all children

Cultural Capital – explore outdoor equipment from different cultures

Careers – market research, designers,

British Values – consider Health and Safety Laws needed to ensure suitability of playground equipment.

Equality – designing with consideration of disabilities

Independence – What play equipment is my favourite – which equipment am I confident using?

Community – Is there any play equipment in our local area?

Outdoor learning – Forest schools, use of outdoor play equipment

Product Outcomes:

Design, make and evaluate an intruder alarm/night-light

National Curriculum Links:

- 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.

Prior Learning:

Initial experience of using computer control software and an interface box, a standalone box or microcontroller, e.g. Crumble. Some experience of writing and modifying a program to make a light turn on or flash on and off. Understanding of the essential characteristics of a series circuit and experience of creating a battery - powered, functional, electrical product.

Key Essential Skills and Knowledge for this Unit:**Designing:**

- Develop a design specification for a functional product that responds automatically to changes in the environment.
- Generate, develop and communicate ideas through discussion, annotated sketches and pictorial representations of electrical circuits or circuit diagrams.

Making:

- 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 their electrical product to respond to changes in the environment.

Evaluating:

- 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.

Technical knowledge and understanding:

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

Sticky Knowledge for topic:

- Name key circuit components used to create a functioning circuit.
- Know that the legs of the LED need to be the correct way round for the circuit to work.
- Map out where different components of the circuit will go.
- An output device is a component that produces an outcome e.g. bulb or buzzer.

- An input device is a component that is used to control an electrical circuit e.g. switches or sensors.

Vocabulary:

Y5 - Parallel circuit, light emitting diode, monitor, flowchart, design specification, reed switch, tilt switch.

Y6 - light dependent resistor, interface control, micro switch, latching switch.

Sequence:

Investigate and evaluate:

- What are alarm systems and how do they work?

Design:

- What components are appropriate for the purpose of my alarm?

Make:

- Which tools and equipment are necessary to make my design?

Evaluate:

- How effective is my product?

Thinking Deeper:

How has property been protected over the years?

Possible books/resources:

- ???

Links:

Subject Specific links – science – electricity, Maths – 3D shapes

Personal development – problem solving, resilienc.e

SMSC – social – working with others to overcome problems, giving and receiving constructive criticism.

Cultural Capital – how properties have been protected over the years.

Careers – electricians

British Values – law

Equality – everybody has the right to be safe and secure.

Independence – can I make another system?

Community – Do properties have alarms in our community?

Outdoor learning – Forest schools – how do we keep secure?

Product Outcomes:

Design, make and evaluate a product to sell at an international café.

National Curriculum Links:

Understand and apply the principles of nutrition and learn how to cook.

Prior Learning:

Pupils have knowledge and understanding about food hygiene, nutrition, healthy eating and a varied diet. Pupils should be able to use appropriate equipment and utensils, and apply a range of techniques for measuring out, preparing and combining ingredients.

Key Essential Skills and Knowledge for this Unit: (from front page)**Designing:**

- 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, 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.

Making:

- 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.

Evaluating:

- 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 and understanding:

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

Sticky Knowledge for topic:

- There are basic rules of food hygiene and other safe practices – e.g. hazards relating to ovens, knives, washing of hands, handling of different foods, use of different chopping boards, etc.
- It is important to consider allergies when cooking.
- Recognise recipes from a variety of countries.
- The weighing of ingredients is important to the overall outcome of the product, as is the temperature and cooking timings.
- Name a variety of ingredients from all food groups (referring to the eat-well plate)
- A budget is a document that lists the money you earn and the money you spend over a particular length of time.

Vocabulary:

Y5 and Y6 - Ingredients, yeast, dough, wholemeal, unleavened, baking soda, spice, herbs, carbohydrate, sugar, fat, protein, vitamins, nutrients, gluten, allergy, intolerance, savoury, seasonality, pour, mix, kneed, whisk, beat, combine, fold, rubbing in.

Sequence:

Investigate and evaluate:

- What type of recipes are popular at street food vendors?

Design:

- What types of product will sell well within our school?

Make:

- How can I safely make my street food product?

Evaluate:

- How successful was my street food product?

Thinking Deeper:

How could I develop my idea to add variety to my food stall? How could my design produce greater profit?

Possible books/resources:

<https://www.foodafactoflife.org.uk/>

Links:

Subject Specific links – Mathematics – use appropriate standard and non-standard measures.

Personal development – teamwork, working with customers/public

SMSC – social – developing social skills in order to work with people of different ages, in a range of situations.

Cultural Capital – understanding how food has derived from different cultures around the world, where food comes from

Careers – chefs, merchandisers and designers through product placement, food packaging designers and companies, dieticians.

British Values – tolerance (foods from other cultures)

Equality – Consider ‘Fair Trade’ principles when acquiring ingredients and products.

Independence – Use cooking equipment safely.

Community – What foods are available in our local area?

Outdoor learning – Forest schools, outdoor cooking.

Product Outcomes:

Design, make and evaluate a toy using a cam mechanism.

National Curriculum Links:

- 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.

Prior Learning:

Pupils have experience of axles, axle holders and wheels that are fixed or free moving. Basic understanding of different types of movement. Experience of cutting and joining techniques with a range of materials including card, plastic and wood. An understanding of how to strengthen and stiffen structures.

Key Essential Skills and Knowledge for this Unit: (from front page)**Designing:**

- 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.

Making:

- 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.

Evaluating:

- Compare the final product to the original design specification.
- Test products with the intended user, where safe and practical, 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 and understanding:

- Understand that mechanical systems have an input, process and an output.
- Understand how cams can be used to produce different types of movement and change the direction of movement.
- Know and use technical vocabulary relevant to the project.

Sticky Knowledge for topic:

- To know and name 4 parts of a cam's mechanism: follower, slider, cam and shaft.
- By offsetting the shaft on a circular cam, the follower will move up and down.
- Different shaped cams produce different movements – adopting the correct shape for the desired movement.
- Linear motion is a movement in a straight line.
- Rotary motion is a circular movement.

Vocabulary:

Y5 - cam, snail cam, off-centre cam, peg cam, pear shaped cam, follower, axle, shaft, crank, handle, housing, framework.

Y6 - rotation, rotary motion, oscillating motion, reciprocating motion, annotated sketches, exploded diagrams, mechanical system, input movement, process, output movement.

Sequence:

Investigate and evaluate:

- What is a cam mechanism?
- How can a different shaped cam affect the follower?

Design:

- How do designers know what will appeal to their audience?
- Which cam will result in the best movement for my toy?

Make:

- How can I ensure my finished product looks appealing?

Evaluate:

- Does my product meet my design criteria?

Thinking Deeper: What type of toy might a designer aim to create next? Consider other current topics regarding sustainability within our school and wider community.

Possible books/resources:

- ?????

Links:

Subject Specific links – Mathematics – measuring, Reading - research, Art.

Personal development – resilience.

SMSC – social – working children from the Eco Committee during the design process.

Cultural Capital – gaining an understanding into how everyday products are designed and produced.

Careers – market research, designers.

British Values – mutual respect when evaluating toys created.

Equality – considering marketing to an inclusive audience.

Independence – Ask and answer questions about cam systems.

Community – Are there any cam systems used in our local community?

Outdoor learning – Forest schools