

**Product Outcomes:**

Design, make and evaluate a torch.

**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:**

May have constructed a simple series electrical circuit in science, using bulbs, switches and buzzers. Cut and joined a variety of construction materials, such as wood, card, plastic, reclaimed materials and glue.

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

Designing:

- Gather information about needs and wants, and develop design criteria to inform the design of products that are fit for purpose, aimed at particular individuals or groups.
- Generate, develop, model and communicate realistic ideas through discussion and, as appropriate, annotated sketches, cross-sectional and exploded diagrams.

Making:

- Order the main stages of making.
- Select from and use tools and equipment to cut, shape, join and finish with some accuracy.
- Select from and use materials and components, including construction materials and electrical components according to their functional properties and aesthetic qualities.

Evaluating:

- Investigate and analyse a range of existing battery-powered products.
- Evaluate their ideas and products against their own design criteria and identify the strengths and areas for improvement in their work.

Technical knowledge and understanding:

- Understand and use electrical systems in their products, such as series circuits incorporating switches, bulbs and buzzers.
- Apply their understanding of computing to program and control their products.
- Know and use technical vocabulary relevant to the project.

**Sticky Knowledge for topic:**

- 'Design criteria' tells you what the purpose and function of a product is.
- Designs should be based on the design criteria.
- How to make an electrical circuit?

- How to draw an electrical circuit?
- How a switch is used in a circuit?
- How to combine components together to make a torch?
- Evaluation means to test your product to see if it is effective and meets the design criteria.
- Evaluate means to think what you would do differently next time to make your product even better.
- Evaluating includes thinking about how well you have applied the making skills.

**Vocabulary:**

switch, battery holder, crocodile clip

**Sequence:**

Investigate and evaluate:

- Which toys are powered by batteries?
- What are the key features of a torch?

Design:

- How do designers know what will appeal to their audience?
- How can my research help me?

Make:

- How can I make a battery powered torch?

Evaluate:

- Does my product meet my design criteria?

**Thinking Deeper:** What type of toy might a designer aim to create next? Consider gaps in the market and current/upcoming trends.

**Possible books/resources:**

- Electrical equipment
- Had shadows activity book??

**Links:**

**Subject Specific links** – discuss the properties and suitability of materials for particular purposes.  
**Mathematics** – compare and sort common 2-D and 3-D shapes in everyday objects. Recognise 3-D shapes in different orientations and describe them. **Spoken language** – ask relevant questions to extend knowledge and understanding. Build their technical vocabulary.

**Personal development** – resilience when problem solving.

**SMSC** – social – working with younger children during the design process.

**Cultural Capital** – working with younger children during the design process.

**Careers** – market research, designers

**British Values** – mutual respect when evaluating products created.

**Equality** – considering marketing to an inclusive audience.

**Independence** – further research into historical scientists?

**Community** – What was West Hesterton like without street lights?

**Outdoor learning** – Forest schools, village walks.

**Product Outcomes:**

Design, make and evaluate a torch

**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:**

Constructed a simple series electrical circuit in science, using bulbs, switches and buzzers. Cut and joined a variety of construction materials, such as wood, card, plastic, reclaimed materials and glue.

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

Designing:

- Gather information about needs and wants, and develop design criteria to inform the design of products that are fit for purpose, aimed at particular individuals or groups.
- Generate, develop, model and communicate realistic ideas through discussion and, as appropriate, annotated sketches, cross-sectional and exploded diagrams.

Making:

- Order the main stages of making.
- Select from and use tools and equipment to cut, shape, join and finish with some accuracy.
- Select from and use materials and components, including construction materials and electrical components according to their functional properties and aesthetic qualities.

Evaluating:

- Investigate and analyse a range of existing battery-powered products.
- Evaluate their ideas and products against their own design criteria and identify the strengths and areas for improvement in their work.

Technical knowledge and understanding:

- Understand and use electrical systems in their products, such as series circuits incorporating switches, bulbs and buzzers.
- Apply their understanding of computing to program and control their products.
- Know and use technical vocabulary relevant to the project.

**Sticky Knowledge for topic:**

- Designers have to know where their product will be used.
- A circuit is a path through which electricity passes. A conductor is a material which allows an electric current to pass through it.
- Insulator is a material which does not easily allow electric current to pass through it.

- Prototype is a model made to test whether a design will work.
- System is a set of related parts or components that together achieve a desired outcome.
- Output devices are components that produce an outcome e.g. bulbs and buzzers.
- Input devices are components that are used to control an electrical circuit e.g. switches.
- Evaluate means to test your product to see if it works and if it fits your design criteria.
- Evaluate means to think what you would do differently next time to make your product even better.

**Vocabulary:**

Y3 - User, fault, toggle switch, insulator, conductor

Y4 - Series circuit, connection, push-to-make switch, push-to-break switch, innovative, appealing, control box, input device, output device, system

**Sequence:**

Investigate and evaluate:

- Which toys are powered by batteries?
- What are the key features of a torch?

Design:

- How do designers know what will appeal to their audience?
- How can my research help me?

Make:

- How can I make a battery powered torch?

Evaluate:

- Does my product meet my design criteria?

**Thinking Deeper:** What type of toy might a designer aim to create next? Consider gaps in the market and current/upcoming trends.

**Possible books/resources:**

- Electrical equipment
- Had shadows activity book??

**Links:**

**Subject Specific links** – discuss the properties and suitability of materials for particular purposes.

**Mathematics** – compare and sort common 2-D and 3-D shapes in everyday objects. Recognise 3-D shapes in different orientations and describe them. **Spoken language** – ask relevant questions to extend knowledge and understanding. Build their technical vocabulary.

**Personal development** – resilience when problem solving.

**SMSC** – social – working with younger children during the design process.

**Cultural Capital** – working with younger children during the design process.

**Careers** – market research, designers

**British Values** – mutual respect when evaluating products created.

**Equality** – considering marketing to an inclusive audience.

**Independence** – further research into historical scientists?

**Community** – What was West Hesterton like without street lights?

**Outdoor learning** – Forest schools, village walks.

**Product Outcomes:**

Design, make and evaluate a creature with a moving mouth

**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:**

Explored and used mechanisms such as 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 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.

Making:

- 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.

Evaluating:

- 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 and understanding:

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

**Sticky Knowledge for topic:**

- Designs identify the materials you will need to make a product and what it will look like.
- Pneumatic means filled with air.
- Air pressure can be used to produce and control movement when it is trapped within a closed system.
- A few common examples of things we use in our daily life that contain pneumatic fittings are: bicycle/ball pumps, the buttons which operate automatic doors, soft close fittings.
- Evaluate means to test your product to see if it works and if it fits your design criteria.

- Evaluate means to think what you would do differently next time to make your product even better.

**Vocabulary:**

components, fixing, attaching, tubing, syringe, plunger, split pin, paper fastener, pneumatic system.

**Sequence:**

Investigate and evaluate:

- How do pneumatic systems work?

Design:

- How might I make pneumatic systems to inform my design?
- How can my 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:**

How might the prototype mechanism be developed and applied in another situation?

**Possible books/resources:**

- Owl Babies
- 

**Links:**

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

Recognise and name common 2-D and 3-D shapes, science – think about the properties of materials that make them suitable or unsuitable for particular purposes, spoken language – ask relevant questions to extend their knowledge and understanding, build technical vocabulary.

**Personal development** – teamwork, building resilience when ideas do not work straight away.

**SMSC** – social – working with others, offering and receiving feedback on designs and products.

**Cultural Capital** – gaining knowledge of the use of pneumatics in our local area.

**Careers** – designers, engineers.

**Equality** – what different types of companies use pneumatical equipment?

**Independence** – Can I investigate mechanisms further on my own?

**Community** – is there any evidence of pneumatic mechanisms in our local community?

**Outdoor learning** – Forest schools, village walks, large scale use of pneumatic systems.

**Product Outcomes:**

Design, make and evaluate a creature with a moving mouth

**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:**

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 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.

Making:

- 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.

Evaluating:

- 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 and understanding:

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

**Sticky Knowledge for topic:**

- Designers have to know where their product will be used.
- Everyday objects that use air include inflatable toys, whistles, foot pumps, and party blowers.
- Air can be controlled to create a push force that makes objects move.
- Pneumatic systems use air pressure to create mechanical movement.
- "Input" is the air pressure, and "output" is the resulting movement or action.
- A pneumatic system includes an airtight container, air flow control, and a mechanism for converting air pressure to motion.
- Air pressure can be adjusted to control the speed and force of movement.
- Pneumatic systems can be used to make various parts of a toy move.

- Pneumatic components must be securely integrated into the toy's structure so that they work reliably and safely.
- Precise assembly is vital for pneumatic systems to ensure that air flows as intended for controlled movements.
- Gathering feedback helps in improving pneumatic toys for the future.
- Evaluate means to test your product to see if it works and if it fits your design criteria.
- Evaluate means to think what you would do differently next time to make your product even better.

**Vocabulary:**

Y3 – input movement, process, output movement, control, compression, pressure, inflate, deflate, pump, seal, air-tight

Y4 - linear, rotary, oscillating, reciprocating

**Sequence:**

Investigate and evaluate:

- How do pneumatic systems work?

Design:

- How might I make pneumatic systems to inform my design?
- How can my 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:**

How might the prototype mechanism be developed and applied in another situation?

**Possible books/resources:**

- Hydraulics for kids

**Links:**

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

Recognise and name common 2-D and 3-D shapes, science – think about the properties of materials that make them suitable or unsuitable for particular purposes, spoken language – ask relevant questions to extend their knowledge and understanding, build technical vocabulary.

**Personal development** – teamwork, building resilience when ideas do not work straight away.

**SMSC** – social – working with others, offering and receiving feedback on designs and products.

**Cultural Capital** – gaining knowledge of the use of pneumatics in our local area.

**Careers** – designers, engineers.

**Equality** – what different types of companies use pneumatical equipment?

**Independence** – Can I investigate mechanisms further on my own?

**Community** – is there any evidence of pneumatic mechanisms in our local community?

**Outdoor learning** – Forest schools, village walks, large scale use of pneumatic systems.



**Product Outcomes:**

Design, make and evaluate a bread-based snack.

**National Curriculum Links:**

To 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.

**Prior Learning:**

Experience of common fruit and vegetables, undertaking sensory activities i.e. appearance taste and smell. Experience of cutting soft fruit and vegetables using appropriate utensils.

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

Designing:

- 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.

Making:

- 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.

Evaluating:

- 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.

Technical knowledge and understanding:

- 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.

**Sticky Knowledge for topic:**

- 'Design criteria' tells you what the purpose and function of a product is.
- Designs should be based on the design criteria.
- A healthy diet has lots of carbohydrate and fruit & veg, some protein, dairy and a smaller amount of fat and sugar.
- Aim to eat at least 5 portions of fruit & vegetables a day.
- Aim to drink 6-8 glasses of water a day.
- Wash your hands before handling food.
- Food can be farmed, caught or grown.
- Wash hands before handling food and ensure the workspace is hygienic.
- Chop – Cut something into pieces. Grip the food with your fingers and cut down through the food. Keep your fingers away from the blade.
- Core – to take out the middle that contains the seeds. Cut the fruit into sections first or use a coring tool.
- Grate - to rub something against a grating machine to make it into small pieces. Push the food away from you along the grating blade.
- The senses should be used to evaluate food.

**Vocabulary:**

Name of products, names of equipment, utensils, techniques, ingredients, texture, taste, sweet, sour, hot, spicy, appearance, chop, core, grate.

**Sequence:**

Investigate and evaluate:

- What is a balanced diet? How essential is it?
- How appealing are existing products?

Design:

- What ingredients could my design contain? How will I make sure it looks appealing as well as tastes and smells good?
- Can a design criterion be generated?
- Can I design a healthy bread-based snack?

Make:

- Can I follow my design and make my product?

Evaluate:

- Has the snack met the needs of the user and achieved its purpose?

**Thinking Deeper:** What might a designer aim to create next? Consider what people like most.

**Possible books/resources:**

- A fruit is a suitcase for seeds - Jean Richards
- Ella's Kitchen
- The Big Baking Book

**Links:**

**Subject Specific links** – Science – food and nutrition

**Personal development** – Know maintaining a healthy balanced diet contributes to wellbeing.

**SMSC** – social – Show that they have worked safely and hygienically in their preparation and finishing to ensure a quality product.

**Cultural Capital** – The food we eat reflects the diversity of the population. Multicultural influences have changed the supply and demand of foodstuffs home grown and imported into the UK.

**Careers** – Understand food production involves chefs, dietitians, quality control.

**British Values** – Respecting others healthy choices

**Equality** – Everyone should pursue healthy diets.

**Independence** – Use of skills at home

**Community** – What food options are there in West Heslerton? Link to farming.

**Outdoor learning** – Forest schools – outdoor cooking on the campfire.

**Product Outcomes:**

Design, make and evaluate a bread-based snack.

**National Curriculum Links:**

To understand and apply the principles of nutrition and learn how to cook.

**Prior Learning:**

Know some ways to prepare ingredients safely and hygienically. Have some basic knowledge and understanding about healthy eating and 'The Eatwell' plate. Have used some equipment and utensils and prepared and combined ingredients to make a product.

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

Designing:

- 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.

Making:

- 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.

Evaluating:

- 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.

Technical knowledge and understanding:

- 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.

**Sticky Knowledge for topic: (from fellside)**

- Designers have to know what the purpose for their design is and know who the end user will be.
- Appearance is how the food looks to the eye.
- Texture is how the product feels in the mouth.
- Sensory evaluation is evaluating food products in terms of the taste, smell, texture, and appearance.
- Preference test is 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.

- Design criteria must contain foods from at least 3 of the foods groups referring to the Eat well plate. Challenge the children to design a sandwich which had foods from four groups.
- State the importance of hygienic food preparation and storage.
- Describe why and how tools can be used safely and effectively.
- Explain why combinations of ingredients, preparation and cooking can affect the product.

**Vocabulary:**

Y3 - Texture, taste, appearance, preference, greasy, moist, fresh, savoury.

Y4 - hygienic, edible, grown, reared, caught, frozen, tinned, processed, seasonal, harvested.

**Sequence:**

Investigate and evaluate:

- What is a balanced diet? How essential is it?
- How appealing are existing products?

Design:

- What ingredients could my design contain? How will I make sure it looks appealing as well as tastes and smells good?
- Can a design criterion be generated?
- Can I design a healthy bread-based snack?

Make:

- Can I follow my design and make my product?

Evaluate:

- Has the snack met the needs of the user and achieved its purpose?

**Thinking Deeper:**

How might a designer aim to create next? Consider what people like most.

**Possible books/resources:**

- Ella's Kitchen
- The Big Baking Book

**Links:**

**Subject Specific links** – Science – food and nutrition

**Personal development** – Know maintaining a healthy balanced diet contributes to wellbeing.

**SMSC** – social – Show that they have worked safely and hygienically in their preparation and finishing to ensure a quality product.

**Cultural Capital** – The food we eat reflects the diversity of the population. Multicultural influences have changed the supply and demand of foodstuffs home grown and imported into the UK.

**Careers** – Understand food production involves chefs, dietitians, quality control.

**British Values** – Respecting others healthy choices

**Equality** – Everyone should pursue healthy diets.

**Independence** – Use of skills at home

**Community** – What food options are there in West Heslerton? Link to farming.

**Outdoor learning** – Forest schools – outdoor cooking on the campfire.

**Product Outcomes:**

Design, make and evaluate a building that is earthquake proof.

**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 construction kits to build walls, towers and frameworks. Experience of using of basic tools e.g. scissors or hole punches with construction materials e.g. plastic, card. Experience of different methods of joining card and paper

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

Designing:

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

Making:

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

Evaluating:

- Explore a range of existing freestanding structures in the school and local environment e.g. everyday products and buildings.
- 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 and understanding:

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

**Sticky Knowledge for topic:**

- 'Design criteria' tells you what the purpose and function of a product is.
- Designs should be based on the design criteria.
- Know that shell structures have a solid outer surface and a hollow inner area and I can give examples of shell structures.
- I know shell structures need to be stiffened
- I know that shell structures have different purposes.
- I know some examples of shell structures.
- I know how to make a shell structure to protect a product.
- Evaluation means to test your product to see if it is effective and meets the design criteria.
- Evaluate means to think what you would do differently next time to make your product even better.
- Evaluating includes thinking about how well you have applied the making skills.

**Vocabulary:**

Shell, structure, net, marking out, material, joining, three dimensional, stiff.

**Sequence:**

Investigate and evaluate:

- How do we make buildings earthquake proof?
- How can we strengthen a structure?

Design:

- How can we integrate strengthening techniques into a building?

Make:

- How can I make a strengthened building?

Evaluate:

- Does my product meet my design criteria?

**Thinking Deeper:** Would it be possible to create a building which is volcano-proof?

**Possible books/resources:**

- Owl Babies
- 

**Links:**

**Subject Specific links** – Science – discuss the properties and suitability of materials for particular purposes. Mathematics – compare and sort common 2-D and 3-D shapes in everyday objects. Recognise 3-D shapes in different orientations and describe them. Spoken language – ask relevant questions to extend knowledge and understanding. Build their technical vocabulary.

**Personal development** – resilience

**SMSC** – cultural – learning about the culture of communities at risk of earthquake damage.

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

**Careers** – architects.

**British Values** – tolerance for different cultures

**Equality** – considering equality of access.

**Independence** – What research can I carry out about earthquakes?

**Community** – Do we have earthquakes in the UK?

**Outdoor learning** – Forest schools.

**Product Outcomes:**

Design, make and evaluate a building that is earthquake proof.

**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 different joining, cutting and finishing techniques with paper and card. A basic understanding of 2-D and 3-D shapes in mathematics and the physical properties and everyday uses of materials in science.

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

Designing:

- 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.

Making:

- 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.

Evaluating:

- 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.

Technical knowledge and understanding:

- 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.



**Sticky Knowledge for topic:**

- Designs identify the materials you will need to make a product and what it will look like.
- A shell structure is a hollow structure with a thin outer layer.
- Name at least 3 famous shell structures in the UK.
- Know how to reinforce structures using corrugating, ribbing and laminating.
- Evaluate means to test your product to see if it works and if it fits your design criteria.
- Evaluate means to think what you would do differently next time to make your product even better.

**Vocabulary:**

Y3 - Assemble, prism, vertex, breadth, capacity, scoring.

Y4 - marking out, scoring, shaping, tabs, adhesives.

**Sequence:**

Investigate and evaluate:

- How do we make buildings earthquake proof?
- How can we strengthen a structure?

Design:

- How can we integrate strengthening techniques into a building?

Make:

- How can I make a strengthened building?

Evaluate:

- Does my product meet my design criteria?

**Thinking Deeper:** Would it be possible to create a building which is volcano-proof?

**Possible books/resources:**

- Owl Babies

**Links:**

**Subject Specific links** – Science – discuss the properties and suitability of materials for particular purposes. Mathematics – compare and sort common 2-D and 3-D shapes in everyday objects. Recognise 3-D shapes in different orientations and describe them. Spoken language – ask relevant questions to extend knowledge and understanding. Build their technical vocabulary.

**Personal development** – resilience

**SMSC** – cultural – learning about the culture of communities at risk of earthquake damage.

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

**Careers** – architects.

**British Values** – tolerance for different cultures

**Equality** – considering equality of access.

**Independence** – What research can I carry out about earthquakes?

**Community** – Do we have earthquakes in the UK?

**Outdoor learning** – Forest schools.