# Design and Technology at Broomhill

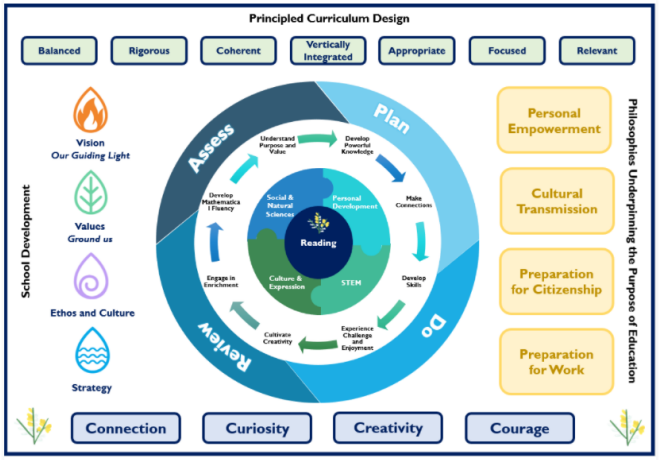
## Purpose

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

## Aims

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

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



# Designing

| | EYFS | KS1 | KS2 |
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| **Understanding contexts, users and purposes** | • Use simple tools and techniques competently and appropriately, to shape, assemble and join materials. (Moving and Handling)<br>• Adapt work where necessary (The World) | • Work confidently within a range of contexts, such as imaginary, story-based, home, school, gardens, playgrounds, local community, industry and the wider environment<br>• State what products they are designing and making<br>• Say whether their products are for themselves or other users<br>• Describe what their products are for<br>• Say how their products will work<br>• Say how they will make their products suitable for their intended users<br>• Use simple design criteria to help develop their ideas | • Work confidently within a range of contexts, such as the home, school, leisure, culture, enterprise, industry and the wider environment<br>• Describe the purpose of their products<br>• Indicate the design features of their products that will appeal to intended users<br>• Explain how particular parts of their products work<br>• Gather information about the needs and wants of particular individuals and groups<br>• Develop their own design criteria and use these to inform their ideas |
| Generating, developing, modelling and communicating ideas | • Use and explore various construction materials and other resources to construct with a purpose in mind. (The World) | • Generate ideas by drawing on their own experiences<br>• Use knowledge of existing products to help come up with ideas | • Share and clarify ideas through discussion<br>• Model their ideas using prototypes and pattern pieces |

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| | | • Develop and communicate ideas by talking and drawing<br>• Model ideas by exploring materials, components and construction kits and by making templates and mock-ups<br>• Use information and communication technology, where appropriate, to develop and communicate their ideas | • Use annotated sketches, cross-sectional drawings and exploded diagrams to develop and communicate their ideas<br>• Use computer-aided design to develop and communicate their ideas<br>• Generate realistic ideas, focusing on the needs of the user<br>• Make design decisions that take account of the availability of resources |
| Vocabulary | like<br>dislike<br>use | design<br>criteria<br>product<br>user<br>function<br>mock-up<br>model<br>template | appeal model notes cross-sections resources realistic diagram sketch criteria product drawing research annotate annotations preference prototype purpose sketches intended user parts patterns needs and wants idea decide/decision |

# Making

| | EYFS | KS1 | KS2 |
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| Planning | • Represent their own ideas, thoughts and feelings through design and technology. (Being Imaginative)<br>• Can I explain what I am making? | • Plan by suggesting what to do next<br>• Select from a range of tools and equipment, explaining their choices<br>• Select from a range of materials and components according to their characteristics | • Select tools and equipment suitable for the task<br>• Explain their choice of tools and equipment in relation to the skills and techniques they will be using<br>• Select materials and components suitable for the task<br>• Explain their choice of materials and components according to functional properties and aesthetic qualities<br>• Order the main stages of making |
| Practical skills and techniques | • Can I select tools and equipment to cut, shape, join and finish?<br>• Can I choose the right appropriate materials and explain my choices? | • Follow procedures for safety and hygiene<br>• Use a range of materials and components, including construction materials and kits, textiles, food ingredients and mechanical components | • Follow procedures for safety and hygiene<br>• Use a wider range of materials and components than KS1, including construction materials and kits, textiles, food ingredients, |

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| | | • Measure, mark out, cut and shape materials and components<br>• Assemble, join and combine materials and components<br>• Use finishing techniques, including those from art and design | mechanical components and electrical components<br>• Measure, mark out, cut and shape materials and components with some accuracy<br>• Assemble, join and combine materials and components with some accuracy<br>• Apply a range of finishing techniques, including those from art and design, with some accuracy |
| Vocabulary | cut snip press fold | hygiene cutting measure folding join gluing shape tearing decorate dyeing hinges printing mark out hinges tool strengthen safety assemble finishing curling assemble drilling stitching templates shape sequins material textile properties levers wheels winding mechanism batteries fault components equipment | tools equipment materials components function mechanical electrical construction pulley finishing polishing sequins painting smoothing assemble stages of making measure mark out cutting shaping perimeter slots cut-outs mechanism levers winding varnishing sanding components construction Lego textiles ingredients suitable kits |

# Evaluate

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| Own ideas and products | • Can I talk about my own work? | • Talk about their design ideas and what they are making<br>• Make simple judgements about their products and ideas against design criteria<br>• Suggest how their products could be improved | • Identify the strengths and areas for development in their ideas and products<br>• Consider the views of others, including intended users, to improve their work<br>• Refer to their design criteria as they design and make<br>• Use their design criteria to evaluate their completed products |
| Existing products | • Can I talk about existing products and begin to suggest why some materials or features could have been used? (The World) | • What products are<br>• Who products are for<br>• What products are for<br>• How products work<br>• How products are used<br>• Where products might be used<br>• What materials products are made from<br>• What they like and dislike about products | Investigate and analyse:<br>• How well products have been designed<br>• How well products have been made<br>• Why materials have been chosen<br>• What methods of construction have been used<br>• How well products work<br>• How well products achieve their purposes<br>• How well products meet user needs and wants<br>• Who designed and made the products |

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| | | | • Where products were designed and made<br>• When products were designed and made<br>• Whether products can be recycled or reused |
| Key events and individuals | Not a requirement in EYFS | Not a requirement in KS1 | • About inventors, designers, engineers, chefs and manufacturers who have developed ground-breaking products |
| Vocabulary | join fix glue stick | design criteria improved better | criteria evaluate product purpose user needs design construction methods strengths areas for development view preference reasons improve inventor designer chef Hoover light bulb manufacturer ground-breaking products microwave inventors names |

# Technical knowledge

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| Making products work | Construction:<br>• Can I construct with a variety of materials? (The World)<br>• Can I handle equipment and tools effectively? (Moving and Handling) | • About the simple working characteristics of materials and components<br>• About the movement of simple mechanisms such as levers, sliders, wheels and axles<br>• How freestanding structures can be made stronger, stiffer and more stable<br>• That a 3-D textiles product can be assembled from two identical fabric shapes<br>• That food ingredients should be combined according to their sensory characteristics<br>• The correct technical vocabulary for the projects they are undertaking | • How to use learning from science to help design and make products that work<br>• How to use learning from mathematics to help design and make products that work<br>• That materials have both functional properties and aesthetic qualities<br>• That materials can be combined and mixed to create more useful characteristics<br>• That mechanical and electrical systems have an input, process and output<br>• The correct technical vocabulary for the projects they are undertaking<br>• How mechanical systems such as levers and linkages or pneumatic systems create movement<br>• How simple electrical circuits and components can be used to create functional products<br>• How to program a computer to control their products |

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| | | | • How to make strong, stiff shell structures<br>• That a single fabric shape can be used to make a 3D textiles product<br>• That food ingredients can be fresh, pre-cooked and processed |
| Vocabulary | bumpy smooth soft shiny rough hard | lever slider wheel axel mechanism stable stronger stiffer | lever systems structure pulleys shell join gears monitor adapt strong stiff reinforce levers linkages pneumatic systems movement force pulleys cams circuit component series parallel switches clips bulbs buzzers motors wires lights complete circuit |

# Cooking and Nutrition

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| Where food comes from | • Can I say where some common foods come from? | • That all food comes from plants or animals<br>• That food has to be farmed, grown elsewhere (e.g. home) or caught | • That food is grown (such as tomatoes, wheat and potatoes), reared (such as pigs, chickens and cattle) and caught (such as fish) in the UK, Europe and the wider world |
| Food preparation, cooking and nutrition | • Demonstrate the importance of a healthy diet? (Health and Selfcare)<br>• Demonstrate an understanding of keeping safe, e.g. by washing hands and cleaning surfaces or avoiding proximity to an oven? (Health and Self-care)<br>• Describe the texture and taste of some foods?<br>• Wash my hands and make sure that surfaces are clean? (Health and Self-care)<br>• Suggest some healthy foods are? | • How to name and sort foods into the five groups in The eatwell plate<br>• That everyone should eat at least five portions of fruit and vegetables every day<br>• How to prepare simple dishes safely and hygienically, without using a heat source<br>• How to use techniques such as cutting, peeling and grating | • How to prepare and cook a variety of predominantly savoury dishes safely and hygienically including, where appropriate, the use of a heat source<br>• How to use a range of techniques such as peeling, chopping, slicing, grating, mixing, spreading, kneading and baking<br>• That a healthy diet is made up from a variety and balance of different food and drink, as depicted in The eatwell plate<br>• That to be active and healthy, food and drink are needed to provide energy for the body |
| Vocabulary | fruit and vegetables healthy/unhealthy eat different food | portion fruit and vegetables proteins- beans, pulses, fish, eggs, meat dairy/alternatives- cheese, milk, yoghurt carbohydrates- potatoes, bread, rice, pasta hygiene peeling grating cutting healthy/unhealthy farming fishing plants animals | processed peel chop slice grate mix fresh spread knead bake healthy diet varied organic savoury sweet recipe appearance peeling chopping grating mixing spreading kneading baking prepare temperature taste texture hygiene safety measure gram kilogram heat/hot oven hob cook utensils grown reared caught fishing seasonal ingredients |

# Teaching Design and Technology at Broomhill First School- where does it fit?

## Cycle 1

| | Autumn Term | | Spring Term | | Summer Term | |
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| EYFS | Clay faces on trees | | Design and Build: Build bridges for the 3 Billy Goats Gruff .<br>Design and Build: Build homes for 3 little pigs<br>Build dragons | | Design and Build: Transport Sculptures . | |
| Year 1/2 | | | Materials and Mechanisms Create a moon buggy/ Mars rover | | Moving Mechanisms | |
| Year 3/4 | Food Technology – Baking Bread | Electrical Signals | Structures Can we make a Greek vase that can hold oil? | | | |

## Cycle 2

| | Autumn Term | | Spring Term | | Summer Term | |
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| EYFS | Design and Build:<br>Cogs and Gears Kits | | Design and Build:<br>Moving Part Dinosaurs | | Design and Build: Ships<br>Design and Build: Sand Castles | |
| Year 1/2 | | Materials – Building structures | | Food technology and textile design | | Teddy Bear's Picnic – Cooking and nutrition |
| Year 3/4 | Mechanisms<br>Can you make a lever to lift the blocks? | Mechanisms<br>Can you stop the spread? | | | Structures<br>Can you design a building that can withstand a flood? | Create a monster that can open it's mouth? |

| Year | Topic/Learning | Knowledge/Skills taught | Assessment tasks |
|---|---|---|---|
| EYFS | Design and Build: Build bridges for the 3 Billy Goats Gruff .<br>Design and Build: Build homes for 3 little pigs Build dragons Cycle 1 Spring | I can talk about my own work<br>I can represent their own ideas, thoughts and feelings through design and technology.<br>I can select tools and equipment to cut, shape, join and finish<br>I can choose the right appropriate materials and explain my choices<br>I can explain what I am making<br>I can use simple tools and techniques competently and appropriately, to shape, assemble and join materials.<br>I can adapt work where necessary | Assessment task<br>Create a bridge for the Billy goats gruff<br>Build a strong house for the 3 little pigs |
| | Design and Build: Transport Cycle 1 Summer | I can talk about existing products and begin to suggest why some materials or features could have been used<br>I can talk about my own work<br>I can select tools and equipment to cut, shape, join and finish<br>I can choose the right appropriate materials and explain my choices | Assessment task<br>Plan and build transport to move a given object |
| | Design and Build: Cogs and Gears Kits Cycle 2 Autumn | I can talk about my own work<br>I can represent their own ideas, thoughts and feelings through design and technology.<br>I can explain what I am making | Assessment task<br>Use cogs and gears following a plan |
| | Design and Build: Moving Part Dinosaurs Cycle 2 Spring | I can talk about my own work<br>I can select tools and equipment to cut, shape, join and finish<br>I can choose the right appropriate materials and explain my choices<br>I can use and explore various construction materials and other resources to construct with a purpose in mind.<br>I can select tools and equipment to cut, shape, join and finish<br>I can choose the right appropriate materials and explain my choices | Assessment task<br>Plan and create a dinosaur that can move a mouth or a tail |
| | Design and Build: Ships<br>Design and Build: Sand Castles<br>Cycle 2 Summer | I can use and explore various construction materials and other resources to construct with a purpose in mind.<br>I can talk about existing products and begin to suggest why some materials or features could have been used<br>I can talk about my own work | Assessment task<br>Plan and build ships and sandcastles using a range of materials |
| Year 1 / 2 | Materials and Mechanisms Create a moon buggy/ Mars rover Cycle 1 Spring | I can start to generate ideas by drawing on my own and other people's experiences.<br>I can look at a range of existing products and explain what I like and dislike about products and why.<br>I can begin to develop my design ideas through discussion, observation, drawing (labelling) and modelling.<br>I can make templates and mock-ups of my ideas in card and paper or using ICT.<br>I can begin to select tools and materials; use correct vocabulary to name and describe them.<br>I can, with help, measure, cut and score with some accuracy. I can learn to use hand tools safely and appropriately.<br>I can join and combine materials to make a product.<br>I can start to choose and use appropriate finishing techniques based on my own ideas.<br>I can evaluate my work against my design criteria. | Assessment Task<br>Create a moon buggy<br>Insight assessment<br>Generate ideas based on a design brief<br>Research products from engineers<br>Measure, mark out, cut and shape a range of materials<br>Explore and use mechanisms in the product<br>Evaluate the product based on the design brief. |

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| | | I can explain what went well with my work and what could be better | |
| | Moving Mechanisms Cycle 1 Summer 1 | I can start to generate ideas by drawing on my own and other people's experiences.<br>I can look at a range of existing products and explain what I like and dislike about products and why.<br>I can begin to develop my design ideas through discussion, observation, drawing (labelling) and modelling.<br>I can make templates and mock-ups of my ideas in card and paper or using ICT.<br>I can begin to select tools and materials; use correct vocabulary to name and describe them.<br>I can, with help, measure, cut and score with some accuracy. I can learn to use hand tools safely and appropriately.<br>I can join and combine materials to make a product.<br>I can start to choose and use appropriate finishing techniques based on my own ideas. I can evaluate my work against my design criteria.<br>I can explain what went well with my work and what could be better | Insight assessment<br>Generate ideas based on a design brief<br>Research products from engineers<br>Measure, mark out, cut and shape a range of materials<br>Explore and use mechanisms in the product<br>Evaluate the product based on the design brief. |
| | Materials – Building structures Cycle 2 Autumn 2 | I can start to generate ideas by drawing on my own and other people's experiences.<br>I can look at a range of existing products and explain what I like and dislike about products and why.<br>I can begin to develop my design ideas through discussion, observation, drawing and modelling.<br>I can begin to select tools and materials; use correct vocabulary to name and describe them.<br>I can build structures, exploring how they can be made stronger, stiffer and more stable.<br>I can, with help, measure, cut and score with some accuracy. I can learn to use hand tools safely and appropriately.<br>I can join and combine materials to make a product.<br>I can explain what went well with my work and what could be better | Insight Assessment<br>Design purposeful, functional, appealing products for themselves and other users based on design criteria<br>Select from and use a range of tools and equipment to perform practical tasks<br>Evaluate their ideas and products against design criteria<br>Building structures, exploring how they can be made stronger, stiffer and more stable |
| | Food technology and textile design Cycle 2 Spring 2 | I can understand that all food comes from plants or animals. I know that food has to be farmed, grown elsewhere (e.g. home) or caught.<br>I can understand how to name and sort foods into the five groups in 'The Eat well plate'<br>I know that everyone should eat at least five portions of fruit and vegetables every day.<br>I can describe the ingredients I am using | Insight Assessment<br>Understand the basic principles of healthy and varied diet to prepare dishes<br>Understand where food comes from |
| | Teddy Bear's Picnic – Cooking and nutrition Cycle 2 Summer 2 | I know how to prepare simple dishes safely and hygienically, without using a heat source<br>I know how to use techniques such as cutting, peeling and grating<br>I can follow instructions for making food. | Insight Assessment<br>Understand the basic principles of healthy and varied diet to prepare dishes<br>Understand where food comes from |
| Year 3 / 4 | Food Technology – Baking Bread | I can develop a clear idea of what has to be done, planning how to use materials, equipment and processes, and suggesting alternative methods of making, if the first attempts fail.<br>I can start to generate ideas, considering the purposes for which I am designing. | Assessment task<br>Prepare bread in 2 different ways<br>Insight assessment |

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| | | I can understand that food is grown (such as tomatoes, wheat and potatoes), reared (such as pigs, chickens and cattle) and caught (such as fish) in the UK, Europe and the wider world.<br>I can understand how to prepare and cook savoury dishes safely and hygienically including, where appropriate, the use of a heat source.<br>I know how to use a range of techniques such as peeling, chopping, slicing, grating, mixing, spreading, kneading and baking.<br>I know that a healthy diet is made up from a variety and balance of different food and drink, as depicted in 'The Eat well plate'<br>I can select a wider range of tools and techniques for making my product safely.<br>I can evaluate my products carrying out appropriate tests. | Know that food is caught, reared and grown<br>Understand a healthy diet<br>Use a range of cooking techniques and tools |
| | Electrical Signals | I can start to generate ideas, considering the purposes for which I am designing.<br>I can make labelled drawings from different views, highlighting specific features.<br>I can develop a clear idea of what has to be done, planning how to use materials, equipment and processes, and suggesting alternative methods of making, if the first attempts fail.<br>I can research inventors who have developed ground-breaking products.<br>I can explain my choice of materials and components according to function and aesthetics.<br>I understand how more complex electrical circuits and components can be used to create functional products.<br>I can start to join and combine materials and components accurately in temporary and permanent ways.<br>I can select a wider range of tools and techniques for making my product safely.<br>I know how to measure, mark out, cut and shape a range of materials, using appropriate tools, equipment and techniques.<br>I understand that electrical systems have an input, process and output | Insight Assessment<br>Generate ideas based on the design brief<br>Evaluate existing products<br>Explain why certain materials have been selected<br>Use electrical circuits to fulfil brief. |
| | Structures Can we make a Greek vase that can hold oil? | I can start to join and combine materials and components accurately in temporary and permanent ways.<br>I can select a wider range of tools and techniques for making my product safely.<br>I know how to measure, mark out, cut and shape a range of materials, using appropriate tools, equipment and techniques.<br>I know how to use learning from mathematics to help design and make products that work<br>I know that materials can be combined and mixed to create more useful characteristics<br>identify the strengths and areas for development in their ideas and products<br>I can refer to their design criteria as they design and make<br>I can use their design criteria to evaluate their completed products | Assessment task<br>Can oil be poured from the vase?<br>Insight assessment<br>Design purposeful, functional, appealing products based on the design criteria<br>Select from and use a range of tools and equipment to perform practical tasks<br>Evaluate their ideas and products against the design criteria<br>Build structures, exploring how they can be made stronger, stiffer and more stable |
| | Mechanisms<br>Can you stop the spread? | I can start to generate ideas, considering the purposes for which I am designing.<br>I can make labelled drawings from different views, highlighting specific features.<br>I can develop a clear idea of what has to be done, planning how to use materials, equipment and processes, and suggesting alternative methods of making, if the first attempts fail.<br>I research engineers/civilizations who have developed ground-breaking products. | Insight assessment<br>Generate ideas based on a design brief<br>Research products from engineers |

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| | | I can explain my choice of materials and components according to function and aesthetics.<br>I can select a wide range of tools and techniques for making my product safely.<br>I know how to measure, mark out, cut and shape a range of materials, using appropriate tools, equipment and techniques.<br>I can start to join and combine materials and components accurately in temporary and permanent ways.<br>I can research and explain how mechanical systems such as cams or pulleys or gears create movement.<br>I understand how to reinforce and strengthen a 3D framework.<br>I can evaluate my products, carrying out appropriate tests | Measure, mark out, cut and shape a range of materials<br>Explore and use mechanisms in the product<br>Evaluate the product based on the design brief. |
| | Structures<br>Can you design a building that can withstand a flood? | how to use learning from science to help design and make products that work<br>I know how to use learning from mathematics to help design and make products that work<br>I know that materials have both functional properties and aesthetic qualities<br>I know that materials can be combined and mixed to create more useful characteristics<br>I can use the correct technical vocabulary for the projects they are undertaking<br>I know how to make strong, stiff shell structures<br>I know that a single fabric shape can be used to make a 3D textiles product<br>I can share and clarify ideas through discussion<br>I can model their ideas using prototypes and pattern pieces<br>I can use annotated sketches, cross-sectional drawings and exploded diagrams to develop and communicate my ideas<br>I can generate realistic ideas, focusing on the needs of the user<br>I can make design decisions that take account of the availability of resources | Insight assessment<br>Design purposeful, functional, appealing products based on the design criteria<br>Select from and use a range of tools and equipment to perform practical tasks<br>Evaluate their ideas and products against the design criteria<br>Build structures, exploring how they can be made stronger, stiffer and more stable |
| | Create a monster that can open its mouth? | I can start to generate ideas, considering the purposes for which I am designing.<br>I can make labelled drawings from different views, highlighting specific features.<br>I can develop a clear idea of what has to be done, planning how to use materials, equipment and processes, and suggesting alternative methods of making, if the first attempts fail.<br>I research engineers/civilizations that have developed ground-breaking products.<br>I can explain my choice of materials and components according to function and aesthetics.<br>I can select a wide range of tools and techniques for making my product safely.<br>I know how to measure, mark out, cut and shape a range of materials, using appropriate tools, equipment and techniques.<br>I can start to join and combine materials and components accurately in temporary and permanent ways.<br>I can research and explain how mechanical systems such as cams or pulleys or gears create movement. I understand how to reinforce and strengthen a 3D framework.<br>I can evaluate my products, carrying out appropriate tests | Insight assessment<br>Generate ideas based on a design brief<br>Research products from engineers<br>Measure, mark out, cut and shape a range of materials<br>Explore and use mechanisms in the product<br>Evaluate the product based on the design brief. |