

Resistant Materials Curriculum Intent		Year 7
	The Year 7 Resistant Materials curriculum introduces pupils to the fundamental principles of designing and making within a workshop environment. For many pupils, this is their first sustained experience of working with resistant materials, tools and machinery, so the curriculum deliberately establishes secure foundations in health and safety, design communication, accurate measurement, practical manufacture and evaluation. Pupils work through the design process to produce a wooden maze game. They begin by understanding a design brief and learning how designers research and communicate ideas through mood boards. They are then introduced to workshop safety, key tools and equipment and isometric drawing, before developing practical skills in hand sawing, sanding and the safe use of machinery including the pillar drill and hobby saw. As the project develops, pupils research and refine their ideas before manufacturing their own maze game. They apply increasingly accurate cutting, shaping, assembly and finishing techniques and maintain a worklog to record the stages of the design and manufacturing process. The project concludes with presentation, evaluation and feedforward, encouraging pupils to identify both the strengths of their final product and areas for future improvement. Throughout the year, pupils are encouraged to move from heavily supported practical work towards greater independence, precision and responsibility. Health and safety is embedded throughout, ensuring pupils understand how to work confidently and responsibly when using tools, equipment and materials. This reflects the wider Design Technology curriculum aim of developing creativity, innovation, practical problem-solving and informed decision-making through the full design process. The Year 7 curriculum provides the foundation for the increasingly demanding Resistant Materials projects that follow. In Year 8, pupils build on these skills through the design and manufacture of a pull-along toy, while Year 9 develops greater understanding of material properties, prototyping, manufacturing and finishing through the production of a mobile phone holder. The Year 7 maze project therefore establishes the workshop behaviours, technical vocabulary, design thinking and practical confidence required for successful progression through Key Stage 3.	
Term 1 Enquiry		Foundation in Resistant Materials: Understanding a Design Brief and Mood Boards
	Big Picture <i>What are the main ideas and big questions in this topic?</i>	

Term 1 introduces pupils to Resistant Materials and the design process through the opening stages of the wooden maze game project. The focus is on understanding what a design brief is, identifying what a product needs to achieve and beginning to communicate ideas clearly through research and mood boards.

Pupils are introduced to the wider Design Wheel, recognising that effective products are not simply made; they are researched, planned, developed, manufactured and evaluated. This establishes the habits of thinking that pupils will use throughout the maze game project and across Resistant Materials at Key Stage 3.



Zoom In

What knowledge, skills and key vocabulary will we learn step by step?

Students begin by exploring the design brief for the wooden maze game and considering how designers gather, organise and present information before developing a final product.

Substantive Knowledge:

- Pupils understand what a design brief is and why it is used to guide the development of a product.
- They are introduced to the wooden maze game project and understand that the finished product needs to respond to the requirements of the brief.
- Pupils learn what a mood board is and how images, colours, shapes, products and other visual references can be selected and presented to inspire design ideas.
- They begin to understand the role of a target audience or user, recognising that successful product design considers who will use the product and what that person may need or want.
- They are also introduced to the idea that materials, construction methods and visual design work together to create products that are both functional and appealing.

Disciplinary Knowledge:

- Pupils interpret a design brief and identify the important information contained within it.
- They select relevant research and visual information rather than simply collecting unrelated images.
- Pupils organise and present research through a clear and purposeful mood board and begin to explain how particular images, colours, shapes or existing products could influence their own ideas.
- They begin to make connections between research, audience and design decisions, recognising that good design choices should be supported by a reason.

- They start to record their thinking within a worklog, establishing the expectation that they document planning, reflection and development throughout the project. The existing curriculum identifies the worklog as a way of documenting each stage of the design and manufacturing process.

Key Vocabulary: Resistant Materials, design brief, design process, Design Wheel, product, function, target audience, user, research, mood board, inspiration, design criteria, aesthetics, annotation, worklog, development

	Pre-Requisite Knowledge <i>What have we already learned that will help us with this topic?</i>		Pitch Up <i>How will we challenge ourselves?</i>
Some pupils enter Year 7 with prior experience of Design and Technology, while others may have had limited or no experience of the design process, Resistant Materials, tools, equipment or workshop expectations. The curriculum therefore begins by establishing a common foundation for all pupils. Pupils may already have experience from primary school of making simple products, following instructions, drawing ideas or discussing what makes an object successful. Term 1 builds on this by introducing more formal design terminology and requiring pupils to explain the reasoning behind their choices.		Pupils are challenged to move beyond simply identifying what they like and begin to explain why particular products, images or design features are appropriate. They should select relevant material for their mood board and organise it thoughtfully rather than treating research as a collection of unrelated images. More confident pupils should annotate their research using precise design terminology, identify features that could influence their own maze game and begin to consider how design choices relate to the target audience, function and appearance of the product. The highest-quality work will show clear links between the original brief, research and emerging design thinking, establishing the expectation that design decisions should be purposeful and justified.	
	Wider Framework <i>How does this learning connect to future topics and bigger goals?</i>		Curriculum Hinterland <i>What wider knowledge will deepen our understanding of this topic?</i>
This term provides the foundation for the remainder of the maze game project. Understanding the design brief and carrying out relevant research prepares pupils for Term 2, when they are introduced to workshop safety,		Pupils explore how product design and branding influence everyday objects, including board games, toys and household products. They begin to recognise that designers must balance function and appearance and that products are developed for particular users and markets.	

equipment and isometric drawing. They will then use these technical drawing skills to communicate increasingly detailed design ideas.

The research and planning habits introduced here will continue throughout Key Stage 3, with pupils responding to increasingly complex briefs in Year 8 and Year 9.

The wider curriculum introduces pupils to the idea that professional designers develop ideas, create prototypes and manufacture products, allowing pupils to connect the maze game project with the wider fields of industrial and product design.



Authentic connections

How does this topic connect to real life, careers, other subjects and important values?

Spiritual development is supported through opportunities for creativity and personal expression. Pupils make individual choices about imagery, colour, style and inspiration and begin to develop confidence in expressing their own design preferences. Moral development begins through considering responsibility within design. Pupils recognise that designers should respond appropriately to the needs of users and begin to consider that the manufacture of products can involve wider issues such as sustainability, sourcing and waste. Social development is strengthened through discussion, peer feedback and sharing ideas. Pupils learn to respect different design preferences and explain their own choices clearly. Cultural development is supported through exploring products and design influences from different contexts and recognising that culture can influence appearance, function and consumer preference.

There are also connections with Art and Design through composition, colour and visual presentation; English through annotation and explanation; and Digital Literacy where pupils use digital research and presentation techniques.

Career Links

- A Product Designer researches user needs and develops ideas for functional products, making this particularly relevant to understanding and responding to a design brief.
- An Industrial Designer develops products intended for manufacture, balancing appearance, function, materials and the needs of the user.
- A Model Maker produces physical models and prototypes that allow designers to test and communicate ideas before full manufacture.

The main Skills Builder focus for this term is Creativity, Listening and Speaking.

- Creativity is developed as pupils gather inspiration and begin to generate ideas in response to the maze game brief.
- Listening is developed through interpreting the requirements of a brief, following teacher modelling and responding constructively to feedback.
- Speaking is developed as pupils explain their research choices and communicate why particular visual ideas could influence their product.



	Resources <i>What books, websites, videos and materials will support our learning?</i>		Assessment <i>How will we show what we know, remember and can apply?</i>
- Pupils use the maze game design brief, Design Wheel, example products, mood-board exemplars, images of existing maze games and product-design examples to support their work. - The Year 7 curriculum also identifies a range of video resources for further study within Resistant Materials and Graphics.		Assessment in Term 1 begins with the Baseline Assessment – Prior Knowledge and Skills Development. This is linked to the project theme and combines knowledge-based questions connected to prior learning with skills-based activities, allowing teachers to identify pupils’ starting points and areas for development. Approximately 60% of assessment focuses on substantive knowledge and 40% on disciplinary knowledge. The 60% substantive knowledge includes understanding the design brief, Design Wheel, purpose of research, mood boards, target audience, function and key design vocabulary. The 40% disciplinary knowledge assesses pupils’ ability to interpret a brief, select relevant research, create and present a purposeful mood board and begin to explain how research can influence design decisions. High expectations are established from the outset: pupils should not simply collect information but should select, organise, explain and make purposeful links between research and the design brief.	
Term 2 Enquiry		Workshop Safety, Equipment and Isometric Drawing	
	Big Picture <i>What are the main ideas and big questions in this topic?</i>		

During Term 2, pupils build on their introduction to Resistant Materials by developing a secure understanding of workshop safety, key equipment and technical drawing. Pupils are introduced to the expectations of working safely and responsibly within a Resistant Materials workshop and begin to understand why safe working practices are essential when using tools, equipment and machinery. Alongside this, they learn how isometric drawing can be used to communicate three-dimensional design ideas clearly and accurately.

This term prepares pupils for the practical manufacturing work that follows by establishing the correct behaviours, technical language and drawing skills needed to work confidently and safely.



Zoom In

What knowledge, skills and key vocabulary will we learn step by step?

Students develop knowledge of workshop routines, tools and equipment while beginning to communicate product ideas using technical drawing.

Substantive Knowledge:

- Pupils understand the importance of health and safety within a Resistant Materials workshop and recognise that different tools and machines present different risks.
- They learn the correct names and functions of key workshop tools and equipment and begin to understand why each is selected for a particular task.
- Pupils are introduced to isometric drawing as a method of representing three-dimensional objects on a two-dimensional page.
- They learn that accurate technical drawings help designers communicate the size, shape and form of an intended product before it is made.
- This builds directly towards the wider Year 7 project, in which pupils will use technical drawing, workshop tools and manufacturing processes to design and manufacture their wooden maze game.

Disciplinary Knowledge:

- Pupils identify hazards and explain how risks can be reduced through appropriate behaviour and safe working practices.
- They select appropriate tools and equipment for simple workshop tasks and explain their intended use.
- Students follow safety instructions accurately and begin to demonstrate responsibility for their own working environment.
- They construct simple isometric drawings, using appropriate conventions to communicate three-dimensional form.
- Pupils begin to connect drawing with manufacture, recognising that a clear design should provide useful information before practical construction begins.

Key Vocabulary:

workshop, health and safety, hazard, risk, control measure, PPE, tool, equipment, machinery, safe working practice, isometric drawing, technical drawing, three-dimensional, accuracy, measurement, line, form, manufacture.

 Pre-Requisite Knowledge <i>What have we already learned that will help us with this topic?</i>	 Pitch Up <i>How will we challenge ourselves?</i>
Pupils build directly on Term 1, where they developed an understanding of the design brief, research and mood boards. They should recognise that designers research and plan before making and that ideas need to be communicated clearly. Many pupils may still have limited experience of specialist workshop environments, tools and equipment. The Year 7 curriculum recognises that pupils enter Key Stage 3 with very different levels of previous Design Technology experience, particularly in relation to health and safety expectations and effective use of tools, equipment and technology. Term 2 therefore establishes a consistent and secure foundation before pupils progress to more independent practical work.	Pupils are challenged to move beyond simply remembering workshop rules and explain why particular safety procedures are necessary. They should identify hazards, recognise possible consequences and suggest appropriate ways of reducing risk. When completing isometric drawings, pupils should work with increasing precision, producing clean, accurate and proportionate representations rather than rough sketches. More confident pupils should begin to annotate their technical drawings and explain how the information communicated could support the manufacturing process. The highest-quality work will demonstrate both technical accuracy and responsible workshop thinking, showing that pupils understand not only what they are expected to do, but why.
 Wider Framework <i>How does this learning connect to future topics and bigger goals?</i>	 Curriculum Hinterland <i>What wider knowledge will deepen our understanding of this topic?</i>
The knowledge developed in this term is essential preparation for Term 3, when pupils begin hand sawing, sanding and using machinery including the pillar drill and hobby saw. Understanding workshop expectations before using tools and machinery ensures that practical work can become increasingly independent without compromising safety. Technical drawing will also continue to support later design development, planning and manufacture throughout Key Stage 3. The curriculum identifies technical drawing, tools and manufacturing processes as important foundations for future Resistant Materials projects and more advanced work at Key Stage 4.	Pupils begin to understand that the safety procedures used in the school workshop reflect expectations within real engineering, manufacturing and construction environments. They consider why professional designers, engineers and manufacturers need accurate drawings before products are made and how technical communication helps reduce mistakes, waste and risk. This helps pupils recognise that workshop discipline and technical drawing are not isolated classroom skills but part of wider industrial and product-design practice.



Authentic connections

How does this topic connect to real life, careers, other subjects and important values?

Spiritual development is supported through encouraging pupils to take pride in careful, accurate work and develop confidence as they master unfamiliar technical skills. Moral development is particularly strong in this term. Pupils learn that safe behaviour protects both themselves and others and that responsible use of tools and equipment is an important personal and professional responsibility. The curriculum emphasises confidence, independence and responsibility alongside managing personal safety within the workshop. Social development is strengthened as pupils learn to work safely alongside others, follow shared workshop routines and respect the working space and equipment of their peers. Cultural development is supported through recognising that technical drawing and manufacturing conventions allow designers and engineers to communicate ideas across different workplaces and contexts.

The term also connects with Mathematics through measurement, proportion, angles and spatial reasoning; Science through understanding materials and forces; and Art and Design through drawing, form and visual communication.

Career Links:

- An Engineering Technician works from technical drawings, uses specialist tools and follows strict safety procedures when producing or maintaining engineered products.
- A Carpenter or Joiner needs accurate measuring, safe tool use and a strong understanding of workshop processes when manufacturing wooden products.
- A CAD Technician produces accurate technical drawings that help designers, engineers and manufacturers communicate how products should be constructed.

The main Skills Builder focus for this term is Listening, Planning and Problem Solving.

- Listening is developed through following safety demonstrations and technical instructions accurately.
- Planning is developed as pupils consider the correct sequence for completing a task and recognise the importance of preparing before practical work begins.
- Problem Solving is developed through identifying hazards, selecting appropriate equipment and deciding how best to communicate a three-dimensional idea using isometric drawing.



Resources

What books, websites, videos and materials will support our learning?



Assessment

How will we show what we know, remember and can apply?

Pupils use workshop safety guidance, teacher demonstrations, tool and equipment exemplars, hazard-identification activities, isometric drawing grids and model technical drawings.

Resistant Materials resources and video materials can also support pupils who wish to develop their understanding further.

Assessment during Term 2 focuses on pupils' developing understanding of safe workshop practice and technical communication. Approximately 55% of assessment focuses on substantive knowledge and 45% on disciplinary knowledge. The 55% substantive knowledge includes workshop safety rules, hazards and risks, names and purposes of tools and equipment, and the principles of isometric drawing. The 45% disciplinary knowledge assesses pupils' ability to identify hazards, apply safe working expectations, select suitable equipment and produce increasingly accurate isometric drawings. This term also contributes towards the Mid-Point Practical Skills Assessment, which assesses pupils' planning, designing and making skills, including safe and effective use of tools and equipment and accurate application of practical techniques. High expectations are placed on pupils to demonstrate that they can work safely, explain their decisions and communicate technical ideas accurately rather than simply follow instructions mechanically.

Term 3

Enquiry



Hand Sawing, Sanding and Introduction to Machinery



Big Picture

What are the main ideas and big questions in this topic?

During Term 3, pupils move into the practical manufacturing stage of the wooden maze game project. Building on the workshop safety knowledge established in Term 2, pupils now learn how to use a range of hand tools and machinery safely, accurately and effectively. They begin to understand that successful manufacture depends on careful measuring, controlled tool use, accuracy and patience.

This term is deliberately practical and gives pupils the opportunity to develop confidence in the workshop while beginning to apply the processes that will later be used to construct their own maze game.



Zoom In

What knowledge, skills and key vocabulary will we learn step by step?

Students develop their practical workshop skills through learning how to cut, shape and prepare resistant materials safely and accurately.

Substantive Knowledge:

- Pupils learn the purpose and correct use of key hand tools and machinery used within the maze game project.
- They develop knowledge of hand sawing techniques, including how material should be held securely and how controlled cutting helps improve accuracy and safety.
- They learn the purpose of sanding and understand how different sanding processes can be used to remove rough edges, improve accuracy and prepare surfaces for later finishing.
- Pupils are introduced to machinery used within the project, including the pillar drill and hobby saw, and understand the safety procedures required before, during and after use.
- They also continue to develop knowledge of workshop routines, safe working practices and the importance of maintaining a clean and organised workspace. The original curriculum explicitly identifies practical workshop skills and the safe and effective use of tools including the pillar drill and hand-sanding equipment as central to the maze project.

Disciplinary Knowledge:

- Pupils select and use appropriate tools for a given manufacturing task.
- They apply hand sawing and sanding techniques with increasing control and precision.
- They follow safety instructions accurately when using machinery and recognise when additional teacher supervision is required.
- Pupils measure and check their work during manufacture rather than relying on visual judgement alone.
- They begin to evaluate the quality of practical outcomes as they work, identifying when a cut, edge or surface needs refining before progressing.
- They also begin to develop the habit of reflecting on their practical progress within their worklog, linking practical decisions to the wider design and manufacturing process.

Key Vocabulary: hand saw, sawing, sanding, abrasive, pillar drill, hobby saw, machinery, tool, equipment, measurement, accuracy, control, material, cutting, shaping, surface, edge, workshop safety, PPE, manufacture, quality control

	Pre-Requisite Knowledge <i>What have we already learned that will help us with this topic?</i>		Pitch Up <i>How will we challenge ourselves?</i>
	Pupils build directly on Term 2, where they learned about workshop safety, equipment and isometric drawing.		Pupils are challenged to work with increasing independence and precision. They should be able to explain why a particular tool or machine is suitable for a given task and justify the order in which practical processes are completed. More confident pupils should demonstrate increasingly

They should understand the importance of safe behaviour, recognise basic workshop hazards and know that tools and machinery must be selected and used appropriately. They should also understand that manufacture follows a planned process and that practical work needs to relate back to the design brief and intended product. This term therefore develops the transition from knowing how to work safely to demonstrating safe and accurate practical skill.	consistent control when sawing and sanding, checking dimensions and surface quality as they work. They should recognise practical errors and attempt appropriate corrections rather than relying immediately on teacher intervention. The highest-quality practical work will show accuracy, control, safe working practice and evidence of quality checking throughout manufacture, rather than simply producing a completed piece.
 Wider Framework <i>How does this learning connect to future topics and bigger goals?</i>	 Curriculum Hinterland <i>What wider knowledge will deepen our understanding of this topic?</i>
The skills developed in this term are essential preparation for Term 4, where pupils move into more independent research and idea development before preparing to make their own maze game. Practical knowledge of cutting, shaping and machinery means pupils can make more realistic design decisions because they understand what can actually be manufactured in the workshop. These skills also provide the foundation for Year 8 and Year 9 Resistant Materials, where pupils are expected to use workshop processes with greater independence and precision.	Pupils begin to understand the role of craftsmanship and precision within product design and manufacturing. They explore how accurate cutting and surface preparation affect both the function and appearance of a finished product. They also begin to recognise how workshop tools and machinery used in school relate to larger-scale industrial manufacturing processes, helping them connect classroom practice with careers in engineering, product design, joinery and manufacturing.
 Authentic connections <i>How does this topic connect to real life, careers, other subjects and important values?</i>	
Spiritual development is supported through the satisfaction and confidence that comes from mastering practical skills and producing increasingly accurate work. Moral development is especially important in this term because pupils must take responsibility for their own safety and the safety of others when using tools and machinery. They learn that careless working can have consequences and that safe practice is a shared responsibility. Social development is strengthened through working alongside others in a practical environment, sharing equipment appropriately, respecting workspace boundaries and supporting safe workshop routines. Cultural development is developed through recognising the long tradition of making, craftsmanship and manufacturing and how practical production skills continue to shape modern industry.	

The term also links with Mathematics through measuring and accuracy, Science through materials and forces, and Art and Design through craftsmanship, form and surface quality.

Career Links:

- A Joiner uses accurate cutting, shaping and finishing techniques to manufacture wooden products and structures.
- A Workshop Technician supports the safe use and maintenance of tools, machinery and specialist equipment within practical environments.
- A Manufacturing Engineer considers how products can be made accurately, safely and efficiently using appropriate processes and machinery.

The main Skills Builder focus for this term is Planning, Adapting and Problem Solving.

- Planning is developed as pupils organise the sequence of practical tasks and select the correct tool or process before beginning.
- Adapting is developed when pupils respond to practical difficulties, refine their technique and make adjustments where an outcome is not as accurate as intended.
- Problem Solving is developed as pupils identify errors, consider how they can be corrected and make decisions about the most suitable method for completing a task.



 Resources What books, websites, videos and materials will support our learning?	 Assessment How will we show what we know, remember and can apply?
Pupils use teacher demonstrations, workshop safety guidance, tool and machinery exemplars, practice materials, measuring equipment, saws, sanding equipment, the pillar drill and hobby saw. The existing Year 7 curriculum also provides video resources for Resistant Materials and Graphics that can be used to reinforce workshop processes and technical understanding.	Assessment during Term 3 focuses strongly on pupils' developing practical capability. Approximately 45% of assessment focuses on substantive knowledge and 55% on disciplinary knowledge. The 45% substantive knowledge includes the names, purposes and safe use of hand tools and machinery, alongside knowledge of sawing, sanding, measurement and workshop safety. The 55% disciplinary knowledge assesses pupils' ability to apply those techniques accurately, select suitable tools, work safely, check the quality of their work and respond to practical problems. This term contributes directly to the Mid-Point Practical Skills Assessment, which assesses safe and effective use of tools and equipment, accurate application of techniques and production of a practical outcome linked to the project brief.

High expectations are placed on pupils to demonstrate safe, controlled and increasingly independent practical work, with accuracy and quality valued as much as completion.

Term 4

Enquiry



Research and Idea Development for the Maze Game



Big Picture

What are the main ideas and big questions in this topic?

During Term 4, pupils return to the research and design development stage of the maze game project. Pupils build on the design brief, mood board work and workshop knowledge developed earlier in the year. They now use this prior learning to generate, develop and refine their own maze game ideas so that they are realistic, purposeful and suitable for manufacture.

The key expectation is that pupils move from broad inspiration towards a clear final design that can actually be made, supported by research, annotations and increasingly considered design decisions.



Zoom In

What knowledge, skills and key vocabulary will we learn step by step?

Students develop their ability to turn research into a workable design, making purposeful links between the brief, target audience, aesthetics, function and the practical processes available to them.

Substantive Knowledge:

- Pupils understand the role of research and idea development within the design process.
- They revisit the design brief and recognise that successful ideas must respond to the intended purpose and user.
- Pupils understand that designers generate more than one idea before refining a final solution.
- They develop knowledge of how features such as shape, layout, colour, decoration, materials and construction methods can affect both the appearance and function of a product.
- They also begin to recognise that a successful final design must be realistic in relation to the tools, materials and manufacturing processes available within the workshop.

Disciplinary Knowledge:

- Pupils select and use relevant research to influence their own maze game ideas.

- They generate a range of possible solutions rather than moving immediately to a single idea.
- Pupils annotate designs to explain their thinking and make links to the brief, target audience, function and appearance of the product.
- They compare ideas and identify strengths and weaknesses before selecting and refining a final design.
- Students use their practical experience from Term 3 to judge whether their ideas can be manufactured successfully.
- They also continue to document their thinking through the worklog, reflecting on decisions and developments as the project progresses.

Key Vocabulary: research, idea development, design idea, annotation, refinement, final design, design brief, target audience, function, aesthetics, manufacture, feasibility, material, construction, specification, development, evaluation, worklog

 Pre-Requisite Knowledge <i>What have we already learned that will help us with this topic?</i>	 Pitch Up <i>How will we challenge ourselves?</i>
Pupils build on all of their previous learning from Terms 1–3. They should understand the design brief and mood boards, recognise the importance of workshop safety and technical drawing, and have practical experience of sawing, sanding and basic machinery. This means pupils are now able to make more informed design decisions because they understand not only what a product might look like but also how it could be manufactured.	Pupils are challenged to produce more than one credible design idea and to show clear development between initial and final designs. They should explain the reasons behind their decisions rather than simply labelling features. More confident pupils should compare alternative ideas against the design brief and target audience, identifying which features are most successful and why. They should also use their practical workshop knowledge to identify possible manufacturing challenges and modify their designs accordingly. The highest-quality work will show a clear journey from research → initial ideas → refinement → justified final design, with thoughtful annotations demonstrating that decisions are purposeful rather than decorative.
 Wider Framework <i>How does this learning connect to future topics and bigger goals?</i>	 Curriculum Hinterland <i>What wider knowledge will deepen our understanding of this topic?</i>
This term directly prepares pupils for Term 5, when they will construct their maze game and apply finishing techniques. A well-developed final design gives pupils a clear plan to follow during manufacture and reduces the likelihood of unnecessary errors or wasted materials.	Pupils deepen their understanding of how professional designers rarely move directly from an initial idea to a finished product. They begin to understand the importance of iteration, where designs are tested, reviewed and improved before manufacture.

The ability to research, develop and refine ideas becomes increasingly important in Year 8 and Year 9, where pupils respond to more demanding design briefs and are expected to work with greater independence.

They also explore how product designers consider the relationship between function, aesthetics, users, materials and manufacturing processes when developing commercially successful products.

This supports the wider curriculum aim of connecting classroom design work with real-world product and industrial design. The existing Year 7 curriculum specifically highlights product design, prototypes and manufacture as important real-world connections.



Authentic connections

How does this topic connect to real life, careers, other subjects and important values?

Spiritual development is supported through creativity, imagination and personal expression as pupils develop their own individual maze game concepts. Moral development is strengthened as pupils begin to consider responsible design decisions, including material use, waste and the needs of the intended user. Social development is developed through peer feedback and discussion, where pupils learn to explain their own design choices while respecting different creative solutions. Cultural development is supported through recognising that products are influenced by the tastes, interests and expectations of different users and communities.

The term also makes strong connections with Art and Design through visual development and composition, English through annotation and justification, and Mathematics through proportion, dimensions and spatial planning.

Career Links:

- A Product Development Designer takes early ideas and develops them into realistic products that can be manufactured.
- An Industrial Designer balances function, appearance, user needs and manufacturing constraints when developing products.
- A Prototype Technician helps turn design ideas into physical models so that products can be tested and improved before full manufacture.

The main Skills Builder focus for this term is Creativity, Planning and Adapting.

- Creativity is developed through generating a range of original maze game ideas and exploring different possible solutions.
- Planning is developed as pupils organise their ideas and prepare a final design that can guide manufacture.
- Adapting is developed as pupils respond to feedback, recognise weaknesses and refine their designs before making.



Resources

What books, websites, videos and materials will support our learning?



Assessment

How will we show what we know, remember and can apply?

Pupils use the original maze game design brief, mood boards, existing product examples, worklogs, drawing equipment, model design sheets and examples of professional product-development work.

Their earlier workshop practice also becomes an important resource, because practical experience helps pupils judge which design ideas are realistic and achievable.

Assessment during Term 4 focuses increasingly on design development and decision making. Approximately 40% of assessment focuses on substantive knowledge and 60% on disciplinary knowledge. The 40% substantive knowledge includes knowledge of the design process, research, idea development, target audience, function, aesthetics, materials and manufacturing considerations.

The 60% disciplinary knowledge assesses pupils' ability to generate ideas, annotate effectively, compare and refine designs, apply research and justify a final solution. High expectations are placed on pupils to demonstrate that their final design is developed rather than simply drawn, showing clear evidence of research, reasoning, refinement and preparation for manufacture.

Term 5

Enquiry



Making and Finishing the Maze Game



Big Picture

What are the main ideas and big questions in this topic?

During Term 5, pupils move into the main manufacturing stage of the wooden maze game project. Pupils apply the design, workshop and practical skills developed across the previous terms to manufacture their own product with increasing independence. The focus is on accuracy, control, quality and safe working, rather than simply completing the product.

They also begin to understand the importance of finishing techniques in improving both the appearance and overall quality of a manufactured product.



Zoom In

What knowledge, skills and key vocabulary will we learn step by step?

Students apply their knowledge of tools, materials and processes to construct the maze game and produce a carefully finished outcome.

Substantive Knowledge:

- Pupils understand the sequence of processes required to manufacture their maze game from their final design.

- They revisit knowledge of measuring, marking out, cutting, shaping, sanding and assembling and understand how these processes contribute to the quality of the final product.
- Pupils develop knowledge of finishing techniques and understand why surfaces and edges need to be prepared carefully before a finish is applied.
- They recognise that a finish can improve the appearance, feel and durability of a product.

Disciplinary Knowledge:

- Pupils follow their final design and manufacturing plan to construct their maze game.
- They measure and mark materials accurately before cutting or drilling.
- Pupils use tools and equipment safely and select appropriate processes for each stage of manufacture.
- They regularly check the quality of their work and make adjustments where necessary.
- Students apply appropriate sanding and finishing techniques to improve the appearance and quality of the final outcome.
- They continue to document their progress in their worklog, recording practical decisions, problems encountered and how these have been resolved.

Key Vocabulary: manufacture, construction, measure, mark out, cut, shape, assemble, sanding, finishing technique, surface finish, accuracy, tolerance, quality control, durability, aesthetics, function, worklog, refinement

 Pre-Requisite Knowledge <i>What have we already learned that will help us with this topic?</i>	 Pitch Up <i>How will we challenge ourselves?</i>
Pupils now draw together the knowledge and skills developed throughout Terms 1–4. They should understand the original design brief, have produced research and a developed final design, know the key workshop safety procedures and have practical experience of sawing, sanding and using machinery. Term 5 therefore requires pupils to apply prior knowledge independently, following their design while making appropriate decisions during manufacture.	Pupils are challenged to manufacture with increasing accuracy, independence and attention to quality. They should check measurements before cutting, identify errors during manufacture and make sensible adjustments rather than continuing with an inaccurate component. More confident pupils should demonstrate a high level of control when using tools and machinery and make thoughtful decisions about finishing techniques. Pupils should also be able to explain why particular processes have been used and how they contribute to the function and appearance of the finished maze game. The highest-quality work will demonstrate precision, careful finishing and consistent quality control throughout the manufacturing process.

 Wider Framework <i>How does this learning connect to future topics and bigger goals?</i>	 Curriculum Hinterland <i>What wider knowledge will deepen our understanding of this topic?</i>
This term represents the culmination of the practical skills developed throughout the Year 7 project. The completed maze game provides the basis for Term 6, when pupils will present and evaluate their product and reflect on the skills and techniques they have developed. The practical experience gained through the project also provides a strong foundation for later Resistant Materials work. The original curriculum states that experience with workshop tools and manufacturing processes prepares pupils for increasingly advanced practical and design-based work at Key Stage 3 and Key Stage 4.	Pupils deepen their understanding of craftsmanship and manufacturing quality, recognising that professional products need to be accurate, functional and visually appealing. They begin to appreciate how finishing techniques can add value to a product and how manufacturers use quality control throughout production rather than waiting until the product is complete. Pupils also make connections between the tools and processes used in the school workshop and the larger-scale manufacturing methods used within the design and engineering industries.
 Authentic connections <i>How does this topic connect to real life, careers, other subjects and important values?</i>	
Spiritual development is supported through the satisfaction of creating a physical product from an original idea and taking pride in increasingly skilful practical work. Moral development is developed through responsible use of materials, tools and machinery. Pupils consider waste, safe working and the importance of producing work carefully rather than using resources unnecessarily. Social development is strengthened through sharing workshop spaces and equipment responsibly, respecting other pupils' work and supporting safe practical routines. Cultural development is supported through recognising the importance of craftsmanship and manufactured products within different societies and industries. There are strong connections with Mathematics through accurate measuring, dimensions and proportion; Science through material properties; and Art and Design through surface quality, colour and visual finish. Career Links: • A Furniture Maker uses measuring, cutting, joining and finishing techniques to produce accurate and high-quality products. • A Production Technician works within manufacturing environments, following specifications and checking that products meet required quality standards. • A Quality Control Inspector checks manufactured products for accuracy, consistency and defects and helps ensure that finished products meet expected standards. The main Skills Builder focus for this term is Planning, Problem Solving and Adapting. • Planning is developed through following the correct sequence of manufacturing processes and organising practical work effectively.	



- Problem Solving is developed when pupils identify manufacturing errors or difficulties and decide how best to resolve them.
- Adapting is developed as pupils modify their approach where practical outcomes differ from the original plan.

	Resources <i>What books, websites, videos and materials will support our learning?</i>		Assessment <i>How will we show what we know, remember and can apply?</i>
Pupils use their final design sheets, worklogs, workshop tools and machinery, measuring equipment, timber and other project materials, sanding equipment and appropriate finishing materials. Teacher demonstrations and exemplars are used to reinforce safe working, accurate manufacture and high-quality finishing.		Assessment during Term 5 is strongly focused on pupils' ability to apply practical knowledge accurately and independently. Approximately 35% of assessment focuses on substantive knowledge and 65% on disciplinary knowledge. The 35% substantive knowledge includes understanding manufacturing processes, tools, equipment, measuring, assembly, sanding and finishing techniques. The 65% disciplinary knowledge assesses pupils' ability to manufacture safely, accurately follow a design, select appropriate processes, solve practical problems and apply effective quality control. This term strongly supports the practical assessment approach identified in the existing curriculum, which includes demonstrating the safe and effective use of tools and equipment, applying techniques accurately and skilfully, and producing a practical outcome linked to the project brief. High expectations are placed on pupils to produce a maze game that demonstrates care, accuracy, safe working and a high-quality finish, rather than judging success solely by whether the product has been completed.	
Term 6 Enquiry			Presentation, Evaluation and Feedforward
	Big Picture <i>What are the main ideas and big questions in this topic?</i>		

During Term 6, pupils complete the Year 7 Resistant Materials project by presenting and evaluating the wooden maze game and reflecting on the skills and techniques they have developed across the year. This term brings the full design process together. Pupils review how effectively their finished maze game responds to the original design brief, consider the quality of their manufacture and explain how their work could be improved. The emphasis is on reflection, evaluation and using evidence to make informed judgements, rather than simply stating whether they like their final product.



Zoom In

What knowledge, skills and key vocabulary will we learn step by step?

Students learn how to present a completed product professionally and evaluate it against the original intentions of the project.

Substantive Knowledge:

- Pupils understand the purpose of evaluation within the design process and recognise that professional designers review finished products to identify strengths, weaknesses and possible improvements.
- They revisit the original design brief, target audience and design intentions and use these as criteria for judging the success of the maze game.
- Pupils develop knowledge of the difference between description and evaluation, recognising that effective evaluation requires reasons and evidence.
- They also understand the purpose of feedforward, using reflection on this project to identify how they could improve their designing and making in future Resistant Materials work.

Disciplinary Knowledge:

- Pupils present their completed maze game clearly and explain the main design and manufacturing decisions they made.
- They evaluate the final outcome against the original brief and the needs of the intended user.
- Pupils identify specific strengths and weaknesses in areas such as function, appearance, accuracy, construction and finish.
- They use evidence from their completed product and worklog to support their judgements.
- Students suggest realistic improvements rather than vague changes and explain how these would make the product more successful.
- They reflect on their own practical development and identify skills they need to improve before future Resistant Materials projects.

Key Vocabulary: presentation, evaluation, feedforward, design brief, success criteria, target audience, function, aesthetics, accuracy, manufacture, finish, quality, strength, weakness, improvement, reflection, evidence, justification



Pre-Requisite Knowledge

What have we already learned that will help us with this topic?



Pitch Up

How will we challenge ourselves?

Pupils draw together the learning from the entire Year 7 maze game project. They should understand the design brief and research process, have experience of workshop safety and technical drawing, and have developed practical skills in measuring, cutting, shaping, sanding, machinery use, assembly and finishing. They should also have maintained a worklog recording stages of the design and manufacturing process. Term 6 requires pupils to use all of this information to make an informed judgement about the success of their final product.	Pupils are challenged to move beyond comments such as “it looks good” or “I would make it neater” and instead produce specific, evidence-based evaluation. They should explain exactly which aspects of the product were successful, why they were successful and how this relates to the original brief or target audience. More confident pupils should identify links between manufacturing decisions and the quality of the final outcome, for example explaining how accuracy in measuring or sanding affected function and appearance. They should also suggest realistic improvements and explain how and why those changes would improve the product. The strongest evaluations will demonstrate clear judgement, evidence, justification and feedforward.
 Wider Framework <i>How does this learning connect to future topics and bigger goals?</i>	 Curriculum Hinterland <i>What wider knowledge will deepen our understanding of this topic?</i>
This term completes the Year 7 Resistant Materials project and prepares pupils for the greater independence expected in Year 8. Evaluation and reflection become increasingly important as pupils progress because future projects require them to make more independent decisions and assess the success of increasingly complex products. In Year 8, pupils will apply these foundations when responding to a new brief to design and manufacture a pull-along toy, including producing a product specification and carrying out more developed research, prototyping, manufacture and evaluation.	Pupils deepen their understanding of how evaluation and quality assurance operate within professional design and manufacturing. They recognise that commercial products are tested and reviewed before and after manufacture and that customer feedback can influence future designs. Pupils also begin to understand that designers rarely see an initial product as completely finished; evaluation often leads to further iteration, modification and improvement.
 Authentic connections <i>How does this topic connect to real life, careers, other subjects and important values?</i>	

Spiritual development is supported through personal reflection and recognising progress in practical confidence, creativity and craftsmanship. Moral development is developed as pupils evaluate how responsibly they have worked, including safe practice, care of equipment, use of materials and consideration of waste. Social development is strengthened through presenting work, receiving feedback and responding respectfully to the opinions of others. Cultural development is supported through considering how different users may judge the function and appearance of products differently and recognising that successful design responds to the needs of its audience.

The term also connects with English through evaluation, justification and extended explanation; Mathematics through checking dimensions and accuracy; and Art and Design through judging visual quality and presentation.

Career Links:

- A Product Tester examines how successfully products work and identifies faults or improvements before they reach consumers.
- A Quality Assurance Technician checks products against specifications and quality standards during and after manufacture.
- A Design Consultant reviews products and design proposals, providing professional feedback about function, appearance, audience and possible improvements.

The main Skills Builder focus for this term is Speaking, Listening and Adapting.

- Speaking is developed as pupils present their final product and explain the reasoning behind their design and manufacturing decisions.
- Listening is developed through receiving peer and teacher feedback and identifying useful suggestions for improvement.
- Adapting is developed through recognising weaknesses, responding to feedback and identifying how future work could be changed or improved.



 Resources <i>What books, websites, videos and materials will support our learning?</i>	 Assessment <i>How will we show what we know, remember and can apply?</i>
Pupils use their completed maze game, original design brief, design sheets, mood boards and worklogs as evidence when evaluating their work. Peer feedback, teacher feedback and evaluation prompts support pupils in producing increasingly detailed and meaningful reflections.	Term 6 includes the final summative assessment for the Year 7 Resistant Materials project. Approximately 30% of assessment focuses on substantive knowledge and 70% on disciplinary knowledge. The 30% substantive knowledge includes key knowledge from across the project, including the design process, workshop safety, tools, manufacturing processes, materials, finishing and evaluation terminology.

The 70% disciplinary knowledge assesses pupils' ability to apply this knowledge by evaluating their finished product, using evidence, justifying judgements and proposing realistic improvements.

The final summative assessment focuses on the theoretical knowledge developed throughout the project, including written questions linked to key concepts, processes, materials, safety and evaluation. High expectations are placed on pupils to demonstrate that they can reflect critically on both the product and the process, clearly explaining what was successful, what could be improved and what they will do differently in future projects.