

Resistant Materials Curriculum Intent			Year 9
Term 1 Enquiry		Research and Design Development for a Mobile Phone Holder	
	Big Picture <i>What are the main ideas and big questions in this topic?</i>		
During Term 1, pupils begin the Year 9 Resistant Materials project by responding to a design brief to create a wooden mobile phone holder. This term brings together the research and design skills developed in Years 7 and 8, but pupils are now expected to apply them with greater independence. They investigate existing products, create mood boards and sketches, and begin to develop design ideas that respond clearly to the brief The Year 9 curriculum states that pupils begin by researching existing products and creating sketches and mood boards to generate and develop creative ideas.			
	Zoom In <i>What knowledge, skills and key vocabulary will we learn step by step?</i>		
Substantive Knowledge Pupils understand the purpose of product research and how it contributes to successful design development. They develop knowledge of the features that need to be considered when designing a mobile phone holder, including: • function • stability • size and proportion • intended user • positioning of the phone			

- accessibility
- materials
- construction
- aesthetics
- quality of finish

Pupils revisit the role of a design brief, mood board and design sheet, recognising how each contributes differently to the development of a final product. They understand that existing products can be analysed to identify useful features, strengths, weaknesses and possible inspiration. They also begin to consider why different materials, tools and manufacturing methods are selected for particular products, an area explicitly identified within the Year 9 curriculum hinterland.

Disciplinary Knowledge

Pupils interpret the project brief and identify its key requirements. They select relevant examples of existing mobile phone holders and analyse features such as form, function, construction and appearance. Pupils create purposeful mood boards that communicate a clear design direction. They generate a range of initial sketches rather than moving immediately to one final solution.

They annotate their ideas to explain:

- how the holder will function
- how the phone will be supported
- which materials may be appropriate
- how the design responds to the brief
- how research has influenced the idea

Pupils compare and begin to refine ideas in preparation for developing a final design in Term 2.

Key Vocabulary: design brief, research, existing product, product analysis, mood board, design sheet, target user, function, stability, aesthetics, material, construction, design idea, annotation, development, refinement, manufacture



Pre-Requisite Knowledge

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



Pitch Up

How will we challenge ourselves?

Pupils build on the design and practical experience developed throughout Years 7 and 8. They should already be familiar with basic workshop safety, accurate measuring and marking out, and the safe use of hand tools and equipment. They also have prior experience of designing products, shaping materials, constructing models and applying finishing techniques. From Year 7, pupils bring experience of using research and mood boards to develop the maze game. From Year 8, they bring more developed experience of responding to a brief, using a product specification, carrying out ICT-based research and using a prototype to refine a product. In Year 9, these skills are combined and applied with a greater expectation of independence and purposeful design decision making.	Pupils are challenged to ensure that research directly influences their design work rather than existing as a separate task. They should explain what they have learned from existing products and how this has influenced their own ideas. More confident pupils should analyse products rather than simply describe them, considering why particular materials, shapes or construction methods may have been chosen. Design ideas should demonstrate clear differences and development rather than minor variations of the same concept. The strongest work will show a clear progression of: brief → research → analysis → mood board → initial ideas → design development with detailed annotation explaining the reasoning behind decisions.
 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>
Term 1 prepares pupils directly for Term 2, where the Head of Art's sequence moves to final designs and the production of a prototype. The research and initial ideas developed this term therefore need to give pupils enough information to make a justified final design decision. This also represents an important stage in preparing pupils for Key Stage 4, where independent research, idea generation and design development become increasingly important within creative and technical courses. The Year 9 curriculum identifies this Resistant Materials project as providing a strong foundation for future Design Technology and related KS4 study.	Pupils explore how everyday products such as phone holders are developed in response to real needs. They consider how designers and engineers balance function and appearance, while selecting suitable materials and manufacturing processes. The wider Year 9 curriculum encourages pupils to consider how products are manufactured on an industrial scale and how manufacturing decisions can affect society and the environment. This helps pupils recognise that even a relatively simple product involves a series of deliberate design decisions.
 Authentic connections <i>How does this topic connect to real life, careers, other subjects and important values?</i>	

Spiritual development is supported through creative exploration and personal expression as pupils develop individual responses to the same product brief. Moral development is developed through consideration of responsible material use, sustainability and the impact of manufacturing choices. The wider Year 9 curriculum explicitly encourages pupils to consider ethical issues, sustainability and waste within product manufacture. Social development is strengthened through discussing ideas, sharing research and responding constructively to peer and teacher feedback. Cultural development is supported through exploring different product styles and recognising how design can reflect changing technology, lifestyles and consumer preferences.

The term also connects with Art and Design through visual research and sketching, English through annotation and justification, and Digital Literacy through researching and presenting information.

Career Links:

- A Product Designer researches user needs and existing products before developing new design solutions.
- A Furniture Designer/Maker combines function, aesthetics and practical construction when developing products for everyday use.
- A Model Maker translates design ideas into physical models so that form, size and construction can be tested. All three career areas link directly to the Resistant Materials pathways identified in the Year 9 curriculum.



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

- Creativity is developed through generating a range of possible design solutions.
- Planning is developed as pupils organise research and design development in preparation for the final product.
- Problem Solving is developed through analysing how a phone holder can successfully combine stability, function, appearance and manufacturability.



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 mobile phone holder project brief, examples of existing products, research and product-analysis materials, mood board templates, sketching equipment and design sheets.

The Year 9 curriculum also provides existing Resistant Materials and Graphics video resources to support further subject knowledge.

Term 1 includes the baseline assessment for Year 9 Resistant Materials. The existing curriculum states that baseline assessments combine knowledge questions linked to prior learning with practical skills-based tasks, allowing teachers to identify pupils' starting points and areas for further development.

Approximately 45% of assessment focuses on substantive knowledge and 55% on disciplinary knowledge. The 45% substantive knowledge includes understanding design briefs, research, existing products, mood boards, function, materials, construction and key design terminology.

The 55% disciplinary knowledge assesses pupils' ability to analyse products, select relevant research, generate and annotate design ideas and make purposeful links between the brief, research and their own developing solution.

High expectations are placed on pupils to demonstrate greater independence than in Years 7 and 8, producing research and design work that clearly prepares them for a justified final design and prototype in Term 2.

Term 2

Enquiry



Final Design and Prototyping



Big Picture

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

During Term 2, pupils develop their research and initial ideas into a final design for the mobile phone holder and then produce a prototype to test the design before manufacture. This term builds directly on the research, mood boards and design sheets completed in Term 1. Pupils are expected to make more independent and informed decisions, selecting and refining the most successful features from their earlier work.

The emphasis is on ensuring that the final design is functional, realistic and suitable for manufacture, rather than simply visually appealing.



Zoom In

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

Substantive Knowledge

Pupils understand the purpose of a final design and recognise that it should bring together the strongest elements from their research and earlier ideas.

They develop knowledge of:

- design refinement
- proportion and dimensions
- function
- stability
- material choice
- construction
- accuracy
- annotation
- modelling and prototyping

Pupils understand the purpose of a prototype as a way of testing a design before producing the final product. They recognise that a prototype can help identify problems with size, shape, stability, construction and functionality. The Year 9 curriculum expects pupils to work through the design process from research and planning through to making and evaluation, with an increasing focus on accuracy, functionality and quality.

Disciplinary Knowledge

Pupils review their Term 1 design ideas and select the most successful features.

They refine these ideas into a clear final design.

Pupils annotate the final design to explain:

- dimensions
- intended function
- material choices
- construction ideas
- key design features
- how the design responds to the brief

They create a prototype to explore the form and function of the mobile phone holder. Pupils test the prototype and identify strengths, weaknesses and possible improvements. They use their findings to refine the final design before manufacture begins.

Key Vocabulary: final design, prototype, model, refinement, development, dimensions, scale, proportion, stability, function, construction, material, annotation, testing, modification, accuracy, 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. They should already have: • interpreted the project brief • researched existing mobile phone holders • created mood boards • produced initial sketches • analysed relevant products • begun developing design ideas They also draw on their Year 8 experience of prototyping within the pull-along toy project. The Year 9 curriculum expects pupils to build on earlier experience of designing products, shaping materials, constructing models and applying finishing techniques, but with increasing independence.	Pupils are challenged to make clear and justified design decisions rather than simply choosing their favourite initial idea. They should explain why particular features have been selected and how these respond to the project brief. More confident pupils should use accurate dimensions and detailed annotations to show that their design is ready for manufacture. The prototype should be used as a genuine testing tool. Pupils should identify what it reveals about the design and make purposeful modifications as a result. The strongest work will demonstrate a clear process of: initial ideas → selection → refinement → final design → prototype → testing → modification
 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>
Term 2 prepares pupils directly for Terms 3 and 4, where the curriculum focuses on learning about the properties of different materials, including woods and plastics, and constructing the phone holder. A successful final design and prototype should therefore give pupils a clear and realistic plan for manufacture.	Pupils develop a greater understanding of the importance of prototyping within professional design and engineering. They recognise that designers rarely manufacture a final product without first testing dimensions, form and function. Pupils also begin to understand how modelling can reduce wasted materials, prevent manufacturing errors and improve the quality of a finished product.

This stage also develops skills that become increasingly important at Key Stage 4, where pupils may be required to demonstrate a clear journey from research and idea development through to refinement and final production.	This links to the wider Year 9 curriculum focus on how designers and engineers solve problems to create products that are both functional and appealing.
 Authentic connections <i>How does this topic connect to real life, careers, other subjects and important values?</i>	
Spiritual development is supported through refining and developing an individual design idea and taking pride in improving it. Moral development is developed through considering responsible use of materials and recognising that prototyping can reduce unnecessary waste during manufacture. Social development is strengthened through peer critique and feedback, with pupils learning to listen to alternative viewpoints and make informed decisions about whether to adapt their work. Cultural development is supported through recognising how changing lifestyles and technologies influence the design of everyday products such as mobile phone accessories. The term also connects strongly with Mathematics through dimensions, scale and proportion, Art and Design through drawing and visual development, and Science through consideration of stability and material suitability. Career Links: • A Prototype Designer produces and tests early models so that design problems can be identified before manufacture. • A Design Engineer develops technical solutions and refines products to ensure they function effectively. • A Model Maker creates accurate physical models for design, engineering and manufacturing, one of the Resistant Materials careers identified within the Year 9 curriculum. The main Skills Builder focus for this term is Adapting, Creativity and Problem Solving. • Adapting is developed as pupils respond to prototype testing and alter designs where necessary. • Creativity is developed through refining ideas and combining successful design features. • Problem Solving is developed as pupils identify issues with stability, size, construction or function and develop appropriate solutions.   	
 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 Term 1 research, mood boards, design sheets, project brief and initial ideas, alongside drawing equipment and suitable modelling materials for prototype construction.	Assessment in Term 2 focuses on pupils' ability to develop, justify, model and refine a design solution. Approximately 40% of assessment focuses on substantive knowledge and 60% on disciplinary knowledge.

Teacher exemplars and prototype examples can be used to demonstrate how testing should inform design refinement.

The 40% substantive knowledge includes understanding final designs, dimensions, modelling, prototyping, function, stability and construction. The 60% disciplinary knowledge assesses pupils' ability to refine initial ideas, produce an appropriate final design, create a prototype, test its effectiveness and make justified modifications.

This contributes to the Year 9 Mid-Point Practical Skills Assessment, which assesses planning, designing and making, including the accurate application of practical techniques and production of an outcome linked to the project brief. High expectations are placed on pupils to show that their final design has been developed and tested, rather than simply selected, and that the prototype genuinely informs the next stage of manufacture.

Term 3

Enquiry



Properties of Woods and Plastics and Beginning Manufacture



Big Picture

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

During Term 3, pupils move from design development into the materials and manufacturing stage of the mobile phone holder project. Term 3 therefore focuses particularly on developing pupils' understanding of material properties and material selection, before applying this knowledge as they begin constructing their phone holder. This represents an important progression from Years 7 and 8. Pupils are no longer simply using materials provided for a project; they are beginning to understand why particular materials are chosen for particular purposes.



Zoom In

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

Substantive Knowledge

Pupils develop their knowledge of a range of woods and plastics that can be used within product design and manufacture. They understand that materials have different properties and that these properties influence how suitable they are for a particular product. Pupils consider properties such as:

- strength
- durability

- rigidity
- flexibility
- surface quality
- appearance
- ease of shaping
- ease of finishing
- suitability for manufacture

They learn that material selection should be linked to the function and intended appearance of the product rather than simply personal preference. Pupils also revisit their knowledge of workshop tools and manufacturing processes in preparation for constructing the phone holder. The Year 9 curriculum explicitly expects pupils to consider why different materials, tools and manufacturing methods are chosen for particular purposes.

Disciplinary Knowledge

Pupils compare materials and identify differences in their properties. They select appropriate materials for components of the phone holder and explain why those materials are suitable.

They make links between:

material property → product requirement → manufacturing process

Pupils begin translating their final design into a manufactured product. They measure and mark out materials accurately and begin shaping components using appropriate workshop tools and equipment. They apply the design refinements identified through their Term 2 prototype. Pupils begin checking the quality and accuracy of their work throughout manufacture rather than waiting until the product is completed.

Key Vocabulary: material, material property, wood, plastic, strength, durability, rigidity, flexibility, hardwood, softwood, manufactured board, polymer, suitability, manufacture, measure, mark out, shape, accuracy, 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 produced a final design and prototype for their mobile phone holder. They should already understand:	Pupils are challenged to move beyond identifying a material by name and instead explain why its properties make it appropriate for a particular purpose.

• the requirements of the project brief • their intended final design • dimensions and proportions • how the phone will be supported • the purpose of prototyping • any modifications required following testing Pupils also draw on workshop knowledge developed throughout Years 7 and 8. The Year 9 curriculum states that pupils should already be familiar with basic workshop safety, accurate measuring and marking out and the safe use of hand tools and equipment.	For example, rather than stating “wood is strong”, pupils should explain why strength, rigidity or surface quality would be useful within a particular component of their phone holder. More confident pupils should compare different materials and justify why one would be more suitable than another. During manufacture, pupils should work with increasing independence and precision, making informed decisions about tools and processes. The strongest work will demonstrate clear links between: product requirement → material property → material choice → manufacturing decision
 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>
Term 3 begins the main manufacturing stage of the project and prepares pupils directly for Term 4, where they continue constructing and assembling the phone holder. The practical knowledge developed this term supports the Year 9 curriculum aim of improving pupils’ ability to use tools, equipment and materials safely and accurately, while strengthening independent working and problem-solving. Understanding material properties also provides important preparation for Key Stage 4 Design Technology and Creative Design and Production, where material selection must increasingly be justified rather than assumed.	Pupils explore why manufacturers and designers select particular materials for everyday products. They begin to understand that material choice involves balancing several factors, including function, appearance, durability, manufacturing method and cost. The Year 9 curriculum also introduces pupils to the idea that products are manufactured on a larger industrial scale and that the choice of materials and manufacturing processes can have wider impacts on society and the environment. This helps pupils recognise that material selection is both a technical and a design decision.
 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 seeing a developed design begin to become a physical product and developing pride in increasingly precise practical work. Moral development is strengthened through consideration of responsible material use, waste and the wider environmental impact of manufacturing. The Year 9 curriculum explicitly includes sustainability and waste management within its moral development. Social development is developed through responsible use of a shared workshop, equipment and materials and through supporting safe working routines. Cultural development is supported through recognising how materials and manufacturing methods have developed over time and how modern products may combine traditional and contemporary materials.

There are particularly strong links with Science through material properties, Mathematics through accurate measurement and dimensions, and Geography through consideration of resources, manufacturing and environmental impacts.

Career Links:

- A Materials Technician investigates the properties of materials and helps determine which are suitable for particular applications.
- A Product Designer selects materials based on the function, appearance and manufacturing requirements of a product.
- A Cabinet Maker / Joiner uses detailed knowledge of wood and its properties to manufacture accurate, high-quality products

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

- Problem Solving is developed as pupils compare materials and decide which properties are most important for the product they are producing.
- Planning is developed through organising the initial stages of manufacture and selecting suitable materials and processes.
- Listening is developed through following increasingly technical demonstrations and applying workshop instructions safely and accurately.



 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, prototype and project brief, alongside samples of suitable woods and plastics for comparison. Practical work uses appropriate workshop tools and equipment. The Year 9 curriculum specifically identifies the mitre saw, pillar drill and hand-sanding equipment as tools pupils develop confidence in using safely and accurately.	Assessment during Term 3 focuses on pupils' understanding of material properties and their ability to apply that knowledge during the early stages of manufacture. Approximately 45% of assessment focuses on substantive knowledge and 55% on disciplinary knowledge. The 45% substantive knowledge includes knowledge of woods, plastics, material properties, workshop tools and manufacturing processes.

Material-property information, teacher demonstrations and example manufactured products can also support pupils in making informed choices.

The 55% disciplinary knowledge assesses pupils' ability to compare materials, justify material choices, measure and mark out accurately, select appropriate processes and begin manufacture safely.

This links directly to the Year 9 Mid-Point Practical Skills Assessment, which includes demonstrating 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 demonstrate that they understand why materials are suitable, as well as showing increasing accuracy, independence and control during the manufacture of the phone holder.

Term 4

Enquiry



Constructing the Mobile Phone Holder



Big Picture

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

Term 4 continues the work begun in Term 3. In this term, the emphasis shifts more strongly towards manufacture, assembly and refinement. Pupils apply their knowledge of materials, tools and workshop processes to construct the final phone holder with increasing independence, accuracy and attention to quality.

The Year 9 curriculum states that pupils should measure, shape and assemble materials safely and accurately, before applying finishing techniques later in the project.



Zoom In

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

Substantive Knowledge

Pupils develop their understanding of the sequence required to construct the mobile phone holder. They revisit knowledge of:

- measuring and marking out
- cutting and shaping
- drilling

- sanding
- assembly
- material properties
- accuracy
- workshop safety
- quality control
- function and stability

Pupils understand that the quality of the final product depends on the accuracy of each stage of manufacture. They also continue to develop confidence in using workshop tools and equipment, including the mitre saw, pillar drill and hand-sanding equipment, as identified in the Year 9 curriculum.

Disciplinary Knowledge

- Pupils use their final design and prototype to guide construction.
- They measure and mark out materials accurately before cutting or shaping.
- They select and use appropriate tools and equipment safely.
- Pupils assemble the different parts of the phone holder, checking that the product is stable and supports a phone effectively.
- They test fit and function throughout manufacture rather than waiting until the end.
- Pupils identify inaccuracies or construction problems and make appropriate adjustments.
- They refine surfaces through filing or sanding where necessary in preparation for the finishing stage.

Key Vocabulary: construction, manufacture, assembly, component, measure, mark out, cut, shape, drill, sand, accuracy, stability, function, quality control, refinement, material, tolerance, craftsmanship

 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 3, where they learned about the properties of woods and plastics and began the early stages of manufacture. They should understand: • why different materials have different properties	Pupils are challenged to work with greater independence than in Years 7 and 8. They should be able to select appropriate tools and processes with less teacher direction and explain why those choices are suitable.

• how material choice affects product function • safe workshop routines • how to measure and mark out accurately • how to select appropriate tools and processes They also draw on their prototype and final design from Term 2. The Year 9 curriculum expects pupils to build on prior experience of shaping materials, constructing models and improving the quality and accuracy of their work.	More confident pupils should check dimensions and fit at each stage, anticipating problems before they affect the final outcome. They should also be able to explain how inaccuracies in cutting, drilling or assembly could affect the stability and function of the phone holder. The strongest practical work will demonstrate accuracy, independence, careful sequencing and continuous quality control.
 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>
Term 4 completes the main construction stage of the mobile phone holder. It prepares pupils for Term 5, where the Head of Art's sequence moves to learning about different finishing techniques and applying these to the phone holder product. The practical skills developed also strengthen the Year 9 curriculum aim of preparing pupils for more advanced creative and technical study at Key Stage 4.	Pupils deepen their understanding of how products are manufactured in both small-scale workshop settings and larger industrial environments. They recognise that professional manufacture relies on accurate measurement, repeatable processes, suitable tools and quality checking. The Year 9 curriculum also encourages pupils to consider why different tools and manufacturing methods are chosen for particular purposes and how designers and engineers solve practical problems to create products that are functional and appealing.
 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 turning a developed design into a functional physical product. Moral development is strengthened through responsible use of tools, equipment and materials, and through considering waste and safe working. Social development is developed through working responsibly in a shared workshop, respecting the safety of others and responding constructively to feedback. Cultural development is supported through recognising the continuing importance of craftsmanship and manufacturing skills within modern society. The term also connects strongly with Mathematics through measurement and dimensions, Science through materials and forces, and Art and Design through shape, form and craftsmanship. Career Links:	

- A Manufacturing Technician produces and assembles components accurately using workshop tools and machinery.
- A Workshop Technician supports safe and effective use of equipment and manufacturing processes.
- A Furniture Designer/Maker combines practical construction with design knowledge to create functional products

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

- Planning is developed through organising the order of manufacturing processes and managing time effectively.
- Problem Solving is developed as pupils identify and resolve practical construction issues.
- Adapting is developed when pupils refine components or alter processes in response to inaccuracies or testing.



 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, prototype, material samples and project brief, alongside appropriate workshop tools and resistant materials. The Year 9 curriculum specifically identifies the mitre saw, pillar drill and hand-sanding equipment within the project. Teacher demonstrations and exemplar products are used to reinforce accurate manufacture, safe practice and high-quality construction.	Assessment in Term 4 focuses strongly on pupils' ability to apply practical knowledge during manufacture. Approximately 35% of assessment focuses on substantive knowledge and 65% on disciplinary knowledge. The 35% substantive knowledge includes understanding material properties, tools, equipment, construction processes, workshop safety and quality control. The 65% disciplinary knowledge assesses pupils' ability to measure accurately, select suitable tools, construct and assemble components, solve practical problems and check the quality and function of their work. This directly reflects the Year 9 practical assessment approach, 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 demonstrate increasing independence, accuracy and craftsmanship, producing a phone holder that is structurally sound, stable and ready for finishing.

Term 5 Enquiry		Finishing Techniques for the Mobile Phone Holder
	Big Picture <i>What are the main ideas and big questions in this topic?</i>	
During Term 5, pupils focus on learning about different finishing techniques and applying these to the mobile phone holder. Having completed the main construction of the product in Term 4, pupils now concentrate on the quality, appearance and final refinement of the phone holder. They learn that finishing is not simply decorative: it can also improve surface quality, durability and the overall professional standard of a product. The Year 9 curriculum emphasises that pupils should focus on accuracy, quality of finish and functionality when producing the completed outcome.		
	Zoom In <i>What knowledge, skills and key vocabulary will we learn step by step?</i>	
Substantive Knowledge Pupils develop their understanding of the purpose of finishing techniques within Resistant Materials. They learn that finishes can be used to: • improve appearance • protect the material • improve durability • smooth and refine surfaces • enhance the quality of manufacture • personalise a product • make a product more suitable for its intended user Pupils revisit the importance of surface preparation, particularly sanding, before a finish is applied. They develop knowledge of a range of appropriate finishing approaches and understand that the suitability of a finish depends on the material, intended use and desired appearance of the product. The Year 9 curriculum also states that pupils may personalise the phone holder with decorative details and creative enhancements once they are confident in the practical processes. Disciplinary Knowledge • Pupils inspect the constructed phone holder and identify areas that require further refinement.		

- They prepare surfaces carefully before applying a finish.
- Pupils select an appropriate finishing technique based on the material and intended outcome.
- They apply finishes accurately and with control.
- They check the quality of the finish as they work and make adjustments where necessary.
- Pupils make purposeful decisions about decoration and personalisation so that these enhance rather than undermine the function and quality of the product.
- They also evaluate whether the chosen finish improves the overall appearance and durability of the phone holder.

Key Vocabulary: finish, finishing technique, surface preparation, sanding, coating, decoration, durability, protection, aesthetics, refinement, quality, craftsmanship, material, application, personalisation, accuracy

 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 4, where they completed the main construction and assembly of the mobile phone holder. They should understand: • the material used • the properties of that material • how the product was constructed • safe workshop routines • sanding and surface preparation • accuracy and quality control • the intended function and appearance of the product They also draw on earlier finishing experience from Year 7 and Year 8, but are now expected to make more independent choices.	Pupils are challenged to select a finish for a clear technical and aesthetic reason, rather than simply choosing one they like. They should explain why the finish is suitable for the material and how it improves the final product. More confident pupils should compare alternative finishing techniques and justify their choice. They should also show greater control over surface preparation and application, recognising that the quality of the finish depends heavily on the quality of preparation. The strongest work will show a clear relationship between: material → surface preparation → finishing choice → application → final quality
 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>
Term 5 prepares pupils for Term 6, where they will present and evaluate the completed phone holder.	Pupils deepen their understanding of how finishing processes are used within professional product design and manufacturing. They consider how the surface quality of a product can affect: • customer perception

The quality of the finish becomes an important part of the evidence used when judging how successfully the final product responds to the original brief.

The project as a whole is intended to strengthen pupils' ability to design, make and evaluate products, while improving problem-solving and independent working in preparation for Key Stage 4.

- durability
- usability
- value
- brand appeal

The wider Year 9 curriculum encourages pupils to consider why different materials and manufacturing methods are selected and how products are produced on a larger industrial scale.

This helps pupils understand that finishing is an important stage of commercial production, not an optional extra.



Authentic connections

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

Spiritual development is supported through creative personalisation and the satisfaction of refining a product to a high standard. Moral development is developed through responsible use of finishing materials, reducing waste and working safely with workshop products and equipment. Social development is strengthened through sharing resources responsibly and giving and receiving feedback on the quality of finished work. Cultural development is supported through recognising how product appearance, style and decoration can vary according to different audiences and design trends.

The term also connects with Art and Design through surface, colour and aesthetics, Science through material properties and protective coatings, and English through explaining and justifying design choices.

Career Links:

- A Furniture Finisher prepares and finishes wooden surfaces to improve appearance and durability.
- A Product Finishing Technician applies surface treatments and coatings within manufacturing.
- A Furniture Designer/Maker combines construction and finishing techniques to produce high-quality products

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

- Creativity is developed through selecting and applying finishes and decorative details.
- Adapting is developed when pupils respond to surface imperfections or adjust their finishing approach.
- Planning is developed through sequencing surface preparation and finishing processes carefully.



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 their completed phone holder, final design and project brief, alongside sanding equipment and suitable finishing materials.

Teacher demonstrations and exemplar products support pupils in recognising the difference between an unfinished, poorly finished and high-quality outcome.

Assessment in Term 5 focuses on pupils' ability to select and apply finishing techniques appropriately and accurately. Approximately 35% of assessment focuses on substantive knowledge and 65% on disciplinary knowledge.

The 35% substantive knowledge includes knowledge of finishing techniques, surface preparation, durability, protection, aesthetics and material suitability. The 65% disciplinary knowledge assesses pupils' ability to prepare surfaces, select suitable finishes, apply them accurately and refine the final product.

The Year 9 assessment model includes practical assessment of pupils' ability to use tools and equipment effectively, apply techniques skilfully and produce an outcome linked to the project brief. High expectations are placed on pupils to demonstrate careful preparation, controlled application and a high-quality finish that enhances both the appearance and functionality of the mobile phone holder.

Term 6

Enquiry



Presenting and Evaluating the Mobile Phone Holder



Big Picture

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

During Term 6, pupils complete the Year 9 Resistant Materials project by presenting and evaluating the finished mobile phone holder. This term brings together the full design process from research and design development through prototyping, material selection, construction and finishing. Pupils are expected to make increasingly independent and evidence-based judgements about the success of their final product.

The wider Year 9 curriculum states that pupils work through research, planning, making and evaluation, with a focus on accuracy, quality of finish and functionality.

**Zoom In***What knowledge, skills and key vocabulary will we learn step by step?***Substantive Knowledge**

Pupils revisit the key knowledge developed across the project, including:

- the original design brief
- research and mood boards
- final design
- prototyping
- material properties
- woods and plastics
- manufacturing processes
- workshop safety
- finishing techniques
- function
- stability
- accuracy
- quality of finish

They understand that evaluation should measure the final product against the original design intentions rather than simply describe what was made. Pupils also understand that evaluation is part of the design process because it helps designers identify how a product or manufacturing approach could be improved.

Disciplinary Knowledge

Pupils present their completed mobile phone holder clearly and explain the main design and manufacturing decisions they made. They evaluate the final product against the original design brief. Pupils judge the success of the product in relation to:

- function
- stability
- accuracy
- material choice
- construction
- quality of finish
- appearance

- overall suitability for purpose

They use evidence from the finished product and the design process to justify their judgements. Pupils identify specific strengths and weaknesses and suggest realistic improvements. They also reflect on the practical and design skills they have developed across KS3 and identify areas they would approach differently in future projects.

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

 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 draw on the complete Year 9 Resistant Materials project. They should understand how to: • research existing products • create and develop design ideas • produce a final design • prototype and refine • compare material properties • select suitable materials • measure, shape and assemble accurately • apply finishing techniques • work safely and independently They also draw on the wider experience gained across Years 7 and 8, where they completed the maze game and pull-along toy projects. The Year 9 curriculum is explicitly designed to build on those earlier experiences and further develop independence, creativity and problem-solving.	Pupils are challenged to produce evaluations that are specific, analytical and evidence-based. They should avoid vague statements such as “it went well” or “I would make it better.” Instead, pupils should explain: • what was successful • why it was successful • what evidence shows this • what could be improved • exactly how it could be improved More confident pupils should also consider whether their material choices, manufacturing decisions and finishing techniques were the most appropriate. The strongest evaluations will follow a clear pattern of: criterion → evidence → judgement → justified improvement
 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>

Term 6 completes the Year 9 Resistant Materials curriculum and therefore brings pupils to the end of their KS3 progression in this specialism. The project is intended to strengthen pupils' ability to design, make and evaluate products, while developing problem-solving and independent working skills. These experiences provide a foundation for future creative and technical study at Key Stage 4, particularly within Design Technology and related subjects. Pupils should therefore leave the project more confident in making independent design decisions, applying practical processes and evaluating the quality of their own work.	Pupils develop a wider understanding of how product evaluation, testing and quality assurance operate within professional design and manufacture. They recognise that products are rarely considered completely finished without first being tested against their intended function and quality expectations. The Year 9 curriculum also encourages pupils to consider how designers and engineers solve problems to create products that are both functional and appealing. This helps pupils understand evaluation as part of a continuing process of improvement rather than simply an end-of-project activity.
Authentic connections <i>How does this topic connect to real life, careers, other subjects and important values?</i>	
Spiritual development is supported through reflection on personal progress, independence and the satisfaction of completing a sustained design and manufacture project. Moral development is developed as pupils reflect on responsible material use, safe working, waste and the wider impact of product manufacture. Social development is strengthened through presentation, peer feedback and listening respectfully to different viewpoints about the success of a product. Cultural development is supported through considering how different audiences may value product function, appearance and design differently. The term also connects strongly with English through evaluative writing and justification, Mathematics through reviewing dimensions and accuracy, and Science through evaluating material suitability and function. Career Links • A Product Tester assesses whether products perform successfully and identifies faults or weaknesses. • A Quality Assurance Technician checks manufactured products against expected specifications and standards. • A Product Designer evaluates finished products and uses evidence to improve future designs, one of the careers explicitly identified within the Year 9 Resistant Materials curriculum. The main Skills Builder focus for this term is Speaking, Listening and Adapting. • Speaking is developed as pupils explain their design and manufacturing decisions and present their completed product.	

- Listening is developed through responding to peer and teacher feedback.
- Adapting is developed as pupils identify how future designs, material choices or practical approaches could be 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 finished mobile phone holder, original project brief, research, mood boards, final design and prototype as evidence when evaluating their work. Peer feedback and teacher feedback can also be used to support more detailed and balanced judgements.	Term 6 includes the Final Summative Written Assessment for the Year 9 Resistant Materials project. The existing curriculum states that this assessment focuses on theoretical knowledge developed throughout the project and includes written questions linked to key concepts, processes, materials, safety and evaluation. Approximately 40% of assessment focuses on substantive knowledge and 60% on disciplinary knowledge. The 40% substantive knowledge includes understanding material properties, design processes, workshop safety, manufacturing techniques, finishing and evaluation terminology. The 60% disciplinary knowledge assesses pupils' ability to apply that knowledge through justified evaluation, evidence-based judgement and realistic recommendations for improvement. High expectations are placed on pupils to demonstrate that they can evaluate both the product and the process with increasing independence, showing how their knowledge and practical skills have developed across the Year 9 project.