

| Resistant Materials Curriculum Intent                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                                                                       | Year 8                                                                  |
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| <p>The Year 8 Resistant Materials curriculum builds directly on the foundations established in Year 7, with pupils moving towards greater independence, accuracy and confidence in both designing and manufacturing. The central project is the design and manufacture of a wooden pull-along toy, allowing pupils to revisit familiar workshop processes while applying them in a more demanding and purposeful context.</p> <p>Pupils begin by responding to a design brief and producing a product specification before presenting relevant research using ICT. They then develop and prototype ideas, applying resistant materials techniques to produce the product. Later in the year, pupils explore and apply finishing techniques before presenting and evaluating the completed pull-along toy.</p> <p>Throughout the project, pupils continue to develop their understanding of the design process, workshop safety, measuring, cutting, shaping, assembling and finishing, but with an increasing expectation that they can plan and make more independently than in Year 7. They maintain a worklog to document planning, design development and reflections on progress, while practical work develops confidence with tools including the mitre saw, pillar drill, hobby saw, hand files and sanding equipment.</p> <p>The curriculum also introduces pupils to the wider principles that underpin product design and manufacture. Through the pull-along toy, pupils develop an understanding of craftsmanship, precision and basic mechanical principles, including how wheels and axles create movement. They make connections between handmade and mass-produced products and begin to recognise how similar design and construction principles operate within professional manufacturing.</p> <p>By the end of Year 8, pupils should be increasingly confident in researching, planning, designing, prototyping, manufacturing, finishing and evaluating a resistant materials product. The project develops creativity, precision, problem solving and practical capability while preparing pupils for the greater material understanding and independence expected in the Year 9 mobile phone holder project and for more advanced design and manufacturing work at Key Stage 4.</p> |                                                                                       |                                                                         |
| <b>Term 1</b><br>Enquiry                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |    | <b>Responding to a Design Brief and Writing a Product Specification</b> |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | <b>Big Picture</b><br><i>What are the main ideas and big questions in this topic?</i> |                                                                         |
| <p>During Term 1, pupils begin the Year 8 Resistant Materials project by responding to a new design brief for a wooden pull-along toy and developing a product specification that will guide their design and manufacture. Building on their Year 7 maze game project, pupils are now expected to work with greater independence. They move beyond simply understanding a design brief and begin to extract specific requirements from it, identify the needs of the intended user and translate these into clear and measurable design criteria.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                                                                       |                                                                         |

**Zoom In**

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

Students develop their understanding of how a professional design process begins by interpreting a brief and turning broad requirements into a clear product specification.

Substantive Knowledge:

Pupils revisit what a design brief is and understand how it communicates the overall purpose of a product. They learn what a product specification is and how it provides more detailed criteria against which a design can later be judged.

Pupils understand that specifications should consider areas such as:

- Function – what the pull-along toy must do.
- Target audience – who the product is intended for.
- Safety – how the product can be designed appropriately for its user.
- Materials – what materials may be suitable.
- Size and dimensions – practical considerations for manufacture and use.
- Aesthetics – how the product should look.
- Manufacture – whether the product can realistically be produced using available tools and processes.
- Quality – the standard expected from the finished outcome.

The wider Year 8 curriculum states that pupils will design and manufacture a wooden pull-along toy, beginning with an investigation into the design brief before developing their ideas.

Disciplinary Knowledge:

- Pupils interpret a design brief and identify the key requirements contained within it.
- They distinguish between essential requirements and features that are optional or aesthetic.
- Pupils convert information from the brief into clear specification points.
- They begin to justify specification criteria, explaining why particular requirements are important for the intended product and user.
- Students use knowledge from Year 7 to consider whether proposed criteria are realistic within the available workshop environment.
- They also begin their Year 8 worklog, documenting the design process, planning and development of the project.

Key Vocabulary: design brief, product specification, design criteria, target audience, user, function, aesthetics, safety, material, manufacture, dimensions, quality, requirement, constraint, justification, worklog

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|    | <b>Pre-Requisite Knowledge</b><br><i>What have we already learned that will help us with this topic?</i>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |   | <b>Pitch Up</b><br><i>How will we challenge ourselves?</i>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
|                                                                                     | <p>Pupils build directly on their Year 7 Resistant Materials project.</p> <p>They should already understand the role of a design brief, research and mood boards and have experience of planning, technical drawing, workshop safety, measuring, cutting, shaping, assembling, finishing and evaluation.</p> <p>The Year 8 curriculum explicitly builds on this existing knowledge, with pupils further developing the design process and practical skills through increasingly independent planning and making.</p> <p>The key progression in Term 1 is from simply responding to a brief in Year 7 towards developing a more formal and detailed product specification in Year 8.</p> |                                                                                      | <p>Pupils are challenged to produce a specification that is specific, purposeful and measurable rather than a list of vague statements. For example, rather than writing that the toy should “look good”, pupils should identify what would make it visually appropriate for its target audience and explain why.</p> <p>More confident pupils should justify each specification point using evidence from the brief and their understanding of the intended user. They should begin to recognise that design requirements can sometimes conflict. A product may need to be attractive but also safe, durable and achievable within the available time and materials.</p> <p>The strongest responses will therefore demonstrate clear links between brief → user → specification → future design decisions.</p> |
|   | <b>Wider Framework</b><br><i>How does this learning connect to future topics and bigger goals?</i>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |  | <b>Curriculum Hinterland</b><br><i>What wider knowledge will deepen our understanding of this topic?</i>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
|                                                                                     | <p>The product specification created in this term becomes an important reference point throughout the entire project. In Term 2, pupils will carry out and present relevant research using ICT. That research should help them develop informed design ideas that respond directly to the specification.</p> <p>Later, the specification will also provide criteria against which pupils can evaluate their completed pull-along toy. This reflects the wider Design Technology process of researching, generating ideas, planning, making, presenting and evaluating through the Design Wheel.</p>                                                                                     |                                                                                      | <p>Pupils begin to understand how professional product designers work from briefs provided by clients, manufacturers or users. They explore the idea that a specification acts almost like a checklist or agreement describing what a finished product needs to achieve.</p> <p>They also begin to recognise that children's products require particularly careful consideration of function, safety, durability and user needs, while still needing to be visually engaging. This provides an authentic link between the classroom project and the wider world of product design, toy design and manufacturing.</p>                                                                                                                                                                                            |
|  | <b>Authentic connections</b><br><i>How does this topic connect to real life, careers, other subjects and important values?</i>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                                                                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |

Spiritual development is supported as pupils begin to develop their own ideas and recognise that a single design brief can lead to many different creative solutions. Moral development is strengthened through consideration of the designer's responsibility towards the intended user, particularly when designing a product for a child. Safety, suitability and responsible material choices become important considerations. Social development is developed through discussing different interpretations of the brief, sharing ideas and responding constructively to feedback. Cultural development is supported through recognising that toys, products and visual preferences can vary across different societies and groups and that designers need to understand the audience they are designing for.

The term also makes connections with English through precise specification writing and justification, Mathematics through measurable dimensions and criteria, and Art and Design through consideration of aesthetics and visual appeal.

#### Career Links:

- A Toy Designer develops products specifically for children and must balance creativity with safety, function and user needs.
- A Product Designer interprets client briefs and turns them into detailed design requirements before developing possible solutions.
- A Design Engineer considers how a product will function and be manufactured, ensuring that proposed requirements are technically achievable.

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

- Listening is developed through accurately interpreting the requirements of the design brief and responding to teacher and peer feedback.
- Planning is developed as pupils establish the criteria that will guide the whole pull-along toy project.
- Problem Solving is developed as pupils consider how different requirements such as safety, appearance, function and manufacture can be balanced within one product.



|  <b>Resources</b><br><i>What books, websites, videos and materials will support our learning?</i>                                                                                                                                                                                                                             |  <b>Assessment</b><br><i>How will we show what we know, remember and can apply?</i>                                                                                                                                                                                                               |
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| <ul style="list-style-type: none"> <li>• Pupils use the pull-along toy design brief, Design Wheel, example product specifications, existing toy examples, target-audience profiles and their Year 8 worklog.</li> <li>• Examples of commercially produced pull-along toys can also be used to help pupils recognise how function, safety, materials and aesthetics are combined within real products.</li> </ul> | <p>Assessment during Term 1 includes a baseline assessment linked to the Year 8 Resistant Materials project. The assessments are used at the beginning of each Design Technology specialism to identify pupils' starting points.</p> <p>Approximately 50% of assessment focuses on substantive knowledge and 50% on disciplinary knowledge. The 50% substantive knowledge includes</p> |

understanding design briefs, product specifications, target audiences, function, aesthetics, safety, materials and design criteria.

The 50% disciplinary knowledge assesses pupils' ability to interpret a brief, identify relevant requirements, formulate clear specification points and justify why those criteria are important. High expectations are placed on pupils to ensure their specification is not simply descriptive. It should provide a clear, useful and justified framework that can genuinely guide the development of the pull-along toy throughout the year.

## Term 2

Enquiry



### Presenting Relevant Research Using ICT



#### Big Picture

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

During Term 2, pupils build on the design brief and product specification developed in Term 1 by carrying out and presenting relevant research using ICT. The purpose of this research is not simply to collect images. Pupils investigate existing pull-along toys, materials, mechanisms, forms and visual styles so that their later design decisions are informed by evidence.



#### Zoom In

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

Students develop their ability to research purposefully, select relevant information and communicate findings clearly using digital presentation methods.

#### Substantive Knowledge

Pupils understand why research is an important part of the design process and how it can influence later design development.

They learn that useful product research may include:

- existing pull-along toys
- materials and finishes
- wheels and axle arrangements
- shapes and forms

- colours and visual styles
- target audience needs
- size and proportion
- construction methods

Pupils also understand that research should relate directly to the product specification produced in Term 1. The wider Year 8 project expects pupils to generate and develop ideas using mood boards and technical drawing, while maintaining a worklog across the design and manufacturing process.

#### Disciplinary Knowledge

- Pupils search for and select relevant examples rather than accepting the first information they find.
- They organise research clearly using appropriate ICT techniques.
- Pupils annotate images and information to explain what they have learned from them.
- They identify features of existing products that could influence their own design.
- They begin to analyse rather than merely describe, for example explaining why a particular shape, colour scheme, wheel arrangement or material might be effective for a pull-along toy.
- Students make clear links between research findings and specification criteria.

Key Vocabulary: research, product analysis, existing product, ICT, digital presentation, annotation, target audience, function, aesthetics, mechanism, material, construction, influence, design development, evidence

|  <b>Pre-Requisite Knowledge</b><br><i>What have we already learned that will help us with this topic?</i>                                                                                                                                                                                                                                  |  <b>Pitch Up</b><br><i>How will we challenge ourselves?</i>                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
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| <p>Pupils build directly on Term 1, where they interpreted the brief and produced a product specification for the pull-along toy.</p> <p>They should understand the intended user, purpose and main requirements of the product.</p> <p>They also draw on Year 7 experience of mood boards and product research, but in Year 8 the expectation increases: research should be more selective, analytical and purposeful.</p> | <p>Pupils are challenged to move beyond simply producing an attractive research page. They should explain why examples are relevant and identify specific features that could influence their own product.</p> <p>More confident pupils should compare existing products, identifying strengths and weaknesses in relation to function, appearance, safety and user needs. They should also begin to make judgements about which ideas are most useful to carry forward.</p> <p>The highest-quality work will show a clear relationship between specification → research → analysis → future design decisions.</p> |

|  | <b>Wider Framework</b><br><i>How does this learning connect to future topics and bigger goals?</i>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |  | <b>Curriculum Hinterland</b><br><i>What wider knowledge will deepen our understanding of this topic?</i>                                                                                                                                                                                                                                                                                                                                            |
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|                                                                                   | <p>The research produced this term directly prepares pupils for Terms 3 and 4, when they begin producing the product, including developing and using a prototype.</p> <p>Research should therefore give pupils a stronger basis for making realistic design decisions before entering manufacture.</p> <p>This develops the increasing independence expected in Year 8, where pupils are required to plan and make with less support than in Year 7.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                                                                     | <p>Pupils begin to understand how professional designers use market research, competitor analysis and visual research before developing a product.</p> <p>They also explore how pull-along toys combine aesthetic design with simple mechanical principles.</p> <p>The wider Year 8 curriculum specifically introduces pupils to how wheels and axles function, helping them recognise how movement is created in everyday engineered products.</p> |
|  | <b>Authentic connections</b><br><i>How does this topic connect to real life, careers, other subjects and important values?</i>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                                                                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
|                                                                                   | <p>Spiritual development is supported through exposure to a range of creative product designs, encouraging pupils to develop personal preferences and inspiration. Moral development is developed through considering the suitability and safety of products designed for children and recognising the responsibility designers have towards users. Social development is strengthened through discussion, comparison of products and peer feedback on research findings. Cultural development is supported through exploring how toys and product design can vary according to audience, place, trends and cultural preferences.</p> <p>There are strong connections with Digital Literacy through online research and presentation, English through annotation and analysis, and Art and Design through colour, visual style and composition.</p> <p>Career Links:</p> <ul style="list-style-type: none"> <li>• A Market Researcher gathers and analyses information about consumers and products to help companies make informed decisions.</li> <li>• A Product Researcher investigates existing products, users and materials before new designs are developed.</li> <li>• A CAD and Design Technician uses digital technology to present and develop design information clearly.</li> </ul> |                                                                                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                     |

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

- Creativity is developed as pupils gather inspiration and consider how existing products could influence their own ideas.
- Problem Solving is developed through analysing how existing products meet different functional and user requirements.
- Speaking is developed when pupils explain their findings and justify why particular examples are relevant.



### Resources

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

Pupils use computers or iPads, online product examples, images of pull-along toys, worklogs, product-analysis templates and their Term 1 specification.

Digital presentation software can be used to organise images, annotations and research findings clearly.



### Assessment

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

Assessment in Term 2 focuses on pupils' ability to research, select, analyse and present information purposefully.

Approximately 45% of assessment focuses on substantive knowledge and 55% on disciplinary knowledge. The 45% substantive knowledge includes understanding product research, existing products, target audience, function, aesthetics, materials, mechanisms and ICT presentation techniques.

The 55% disciplinary knowledge assesses pupils' ability to select relevant sources, analyse products, communicate findings digitally and make links between research and specification criteria. High expectations are placed on pupils to ensure that research genuinely informs design development, rather than becoming a decorative page of unrelated images.

## Term 3

Enquiry



## Producing the Product and Developing a Prototype



### Big Picture

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

Across Terms 3 and 4, pupils move into the main design development and production stage of the pull-along toy project. Pupils use the brief, specification and research developed during Terms 1 and 2 to refine their ideas, produce a prototype and begin manufacturing the final product. The emphasis is on applying practical techniques with greater independence, accuracy and control than in Year 7.



### **Zoom In**

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

Students develop their ability to test ideas through prototyping and then apply suitable resistant materials processes to manufacture a functional pull-along toy.

Substantive Knowledge: Pupils understand the purpose of a prototype and why designers test ideas before committing to a final manufactured product.

They develop knowledge of:

- modelling and prototyping
- measuring and marking out
- cutting and shaping
- drilling
- filing and sanding
- assembly
- wheels and axles
- basic mechanisms
- appropriate material selection
- safe use of tools and machinery

They build confidence using equipment such as the mitre saw, pillar drill, hobby saw, hand files and sanding tools, all of which are identified within the original Year 8 curriculum. Pupils also develop their understanding of the simple mechanical principle behind the pull-along toy: wheels and axles enable movement.

Disciplinary Knowledge

- Pupils translate design ideas into a physical prototype.
- They test whether their proposed form, size and construction method are practical.
- They identify weaknesses in the prototype and refine their design before manufacture.

- Pupils measure and mark out accurately, select appropriate tools and processes, and follow workshop safety expectations with increasing independence.
- They manufacture and assemble components carefully, checking dimensions and fit throughout the process.
- Students solve practical problems as they arise and make justified adjustments where the original design needs to change.
- They continue to record planning, design development and reflections within their worklog.

Key Vocabulary: prototype, model, manufacture, construction, mechanism, wheel, axle, component, assembly, measure, mark out, cut, drill, file, sand, accuracy, tolerance, refinement, testing, quality control, worklog

|  <b>Pre-Requisite Knowledge</b><br><i>What have we already learned that will help us with this topic?</i>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |  <b>Pitch Up</b><br><i>How will we challenge ourselves?</i>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
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| <p>Pupils draw directly on the work completed in Terms 1 and 2.</p> <p>They should have:</p> <ul style="list-style-type: none"> <li>• interpreted the design brief</li> <li>• written a product specification</li> <li>• identified the target audience</li> <li>• carried out relevant research</li> <li>• analysed existing products</li> <li>• considered suitable materials and forms</li> </ul> <p>They also build on Year 7 practical experience in workshop safety, measuring, cutting, shaping and finishing.</p> <p>The original curriculum makes this progression explicit, stating that Year 8 develops the tools, equipment and practical skills gained in Year 7 through increasingly independent planning and making.</p> | <p>Pupils are challenged to treat the prototype as a genuine testing and development tool, rather than simply a smaller or rougher version of the final product. They should identify what the prototype has revealed about the design and explain what needs to be changed before manufacture.</p> <p>More confident pupils should make clear links between prototype testing and later design decisions. During practical work, pupils should demonstrate increased accuracy, independence and control when selecting and using tools.</p> <p>They should also check their work throughout manufacture rather than relying on a final inspection. The strongest work will demonstrate a clear cycle of design → prototype → test → refine → manufacture.</p> |
|  <b>Wider Framework</b><br><i>How does this learning connect to future topics and bigger goals?</i>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |  <b>Curriculum Hinterland</b><br><i>What wider knowledge will deepen our understanding of this topic?</i>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| <p>These two terms form the central practical stage of the Year 8 project.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | <p>Pupils explore the wider role of prototyping within professional product design and engineering. They begin to understand that prototypes allow designers to test dimensions, mechanisms, ergonomics and construction methods before mass production begins.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |

The manufactured product will then move into Term 5, where pupils explore Resistant Materials finishing techniques and apply them to the pull-along toy.

The skills developed here also prepare pupils for Year 9, where they are expected to work with a broader understanding of material properties and increasingly independent manufacture.

The project also introduces pupils to basic mechanical systems through wheels and axles and helps them understand how movement is created in many engineered products.

Pupils also consider the relationship between handmade and mass-produced products, recognising that both rely on similar principles of accuracy, construction and quality.



### Authentic connections

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

Spiritual development is supported through the satisfaction of turning a two-dimensional design into a functioning physical product and seeing ideas develop through practical experimentation. Moral development is strengthened through responsible use of tools, machinery and materials, alongside consideration of safe design for the intended user. Social development is developed through working responsibly within a shared workshop, giving and responding to feedback, and helping maintain safe practical routines. Cultural development is supported through exploring the history and continuing importance of traditional woodworking and toy manufacture. The original curriculum specifically links the project to craftsmanship and the development of toy design over time.

There are strong links with Mathematics through measurement and accuracy, Science through materials and mechanisms, and Art and Design through shape, form and product aesthetics.

### Career Links:

- A Prototype Engineer develops and tests early versions of products before they move into full production.
- A Mechanical Design Technician works with components and mechanisms such as wheels, axles and moving parts to help develop functional products.
- A Model Maker creates accurate physical models and prototypes for design, engineering, architecture and manufacturing.

The main Skills Builder focus for these terms is Problem Solving, Adapting and Planning.

- Problem Solving is developed as pupils identify practical issues with prototypes and manufacturing processes.
- Adapting is developed when pupils refine designs or change practical approaches in response to testing and manufacturing difficulties.
- Planning is developed through sequencing processes, organising materials and ensuring that manufacture is completed safely and efficiently.



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|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | <b>Resources</b><br><i>What books, websites, videos and materials will support our learning?</i> |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | <b>Assessment</b><br><i>How will we show what we know, remember and can apply?</i> |
| <p>Pupils use their design brief, specification, research, worklog and developed design ideas, alongside prototype materials and workshop equipment.</p> <p>Practical resources include the mitre saw, pillar drill, hobby saw, hand files, sanding tools and appropriate resistant materials identified in the original curriculum.</p>                                                                                                                                                                                                                                                                                              |                                                                                                  | <p>Assessment across Terms 3 and 4 focuses predominantly on pupils’ ability to apply design and manufacturing knowledge in practice. Approximately 40% of assessment focuses on substantive knowledge and 60% on disciplinary knowledge. The 40% substantive knowledge includes understanding prototyping, wheels and axles, workshop processes, tools, machinery, materials and construction methods. The 60% disciplinary knowledge assesses pupils’ ability to prototype, test, refine, measure accurately, select appropriate processes, manufacture safely and solve practical problems.</p> <p>The Year 8 assessment approach includes both theoretical and practical understanding, including knowledge questions, safe use of tools and equipment, application of design skills and practical outcomes.</p> <p>High expectations are placed on pupils to demonstrate independent decision making, accurate manufacture and evidence that their prototype has genuinely informed the final product.</p> |                                                                                    |
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| <b>Term 4</b><br>Enquiry                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |               | <b>Producing the Pull-Along Toy: Manufacture and Refinement</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                                                                    |
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| <p>Term 4 continues the work begun in Term 3. For Term 4, the emphasis is therefore on progressing from prototyping and early manufacture towards the construction and refinement of the final pull-along toy. Pupils apply their existing design and workshop knowledge with increasing independence, accuracy and attention to craftsmanship.</p> <p>The original Year 8 curriculum identifies the use of tools including the mitre saw, pillar drill, hobby saw, hand files and sanding tools, with pupils shaping, assembling and finishing their product while focusing on accuracy, craftsmanship, safety and presentation.</p> |                                                                                                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                                                                    |

**Zoom In**

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

**Substantive Knowledge**

Pupils continue to develop their understanding of the manufacturing processes required to produce the pull-along toy.

They understand how individual components must be accurately produced before they can be assembled into a functioning product.

Pupils develop their knowledge of:

- measuring and marking out
- cutting and shaping
- drilling
- filing and sanding
- assembly
- wheels and axles
- safe use of workshop tools and machinery
- accuracy and craftsmanship
- quality during manufacture

They reinforce their understanding of how wheels and axles create movement, connecting the practical product with simple mechanical principles.

**Disciplinary Knowledge**

- Pupils apply the decisions made during the prototyping stage to the manufacture of their final product.
- They measure, mark out and manufacture components with increasing accuracy.
- They select and use appropriate workshop tools safely and with greater independence.
- Pupils assemble components carefully, checking that parts fit correctly and that the wheel and axle system allows the product to function as intended.
- They use files and sanding tools to refine components and improve the quality of the manufactured outcome.
- Pupils identify practical problems during manufacture and make appropriate adjustments while recording progress and decisions within their worklog.

Key Vocabulary: manufacture, component, prototype, refinement, assembly, wheel, axle, mechanism, measure, mark out, drill, cut, shape, file, sand, accuracy, craftsmanship, quality control, function, worklog

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|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | <b>Pre-Requisite Knowledge</b><br><i>What have we already learned that will help us with this topic?</i>                       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | <b>Pitch Up</b><br><i>How will we challenge ourselves?</i>                                               |
| <p>Pupils build directly on Term 3.</p> <p>They should already understand the purpose of prototyping and have begun to translate their design into a physical outcome.</p> <p>They also draw on their Year 7 workshop experience and earlier Year 8 work on the design brief, product specification and relevant research.</p> <p>The Year 8 curriculum explicitly expects pupils to build on Year 7 knowledge of workshop safety, measuring, cutting, shaping and assembling while becoming increasingly independent.</p> |                                                                                                                                | <p>Pupils are challenged to move from simply following instructions towards making increasingly independent manufacturing decisions. They should check accuracy throughout the process rather than waiting until the product is assembled.</p> <p>More confident pupils should identify where components need refining and select suitable techniques to improve them. They should also explain how manufacturing accuracy affects the final function of the toy, particularly the movement of the wheels and axles.</p> <p>The strongest pupils will demonstrate accuracy, craftsmanship, problem solving and attention to detail, producing work that closely reflects the intentions of their design.</p> |                                                                                                          |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | <b>Wider Framework</b><br><i>How does this learning connect to future topics and bigger goals?</i>                             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | <b>Curriculum Hinterland</b><br><i>What wider knowledge will deepen our understanding of this topic?</i> |
| <p>Term 4 completes the main construction stage of the pull-along toy and prepares pupils for Term 5, where the curriculum moves specifically to exploring Resistant Materials finishing techniques and applying them to the made product.</p> <p>The manufacturing experience gained also prepares pupils for Year 9, where they will work with a wider understanding of material properties and construct a mobile phone holder with greater independence.</p>                                                           |                                                                                                                                | <p>Pupils explore the importance of craftsmanship, accuracy and safe tool use within both traditional woodworking and modern manufacturing.</p> <p>The original curriculum makes connections between the pull-along toy project and the wider history of woodworking and toy manufacture, while also showing pupils that handmade and mass-produced products share common principles of design and construction.</p> <p>They begin to understand that manufacturing is not simply about producing components: professional makers continually check dimensions, fit and function as work progresses.</p>                                                                                                     |                                                                                                          |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | <b>Authentic connections</b><br><i>How does this topic connect to real life, careers, other subjects and important values?</i> |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                                                                                          |
| <p>Spiritual development is supported through the sense of achievement pupils gain from seeing their design develop into a functioning physical product. Moral development is developed through responsible and safe use of tools, machinery and materials. Pupils understand that their actions within a workshop can affect the safety of themselves and others. Social development is strengthened through working responsibly within a shared workshop,</p>                                                            |                                                                                                                                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                                                                                          |

respecting equipment and the work of others and responding constructively to feedback. Cultural development is supported through exploring woodworking and toy-making traditions and recognising the continuing role of craftsmanship within modern manufacturing.

The term also connects strongly with Mathematics through accurate measurement, Science through mechanisms and movement, and Art and Design through form and craftsmanship.

#### Career Links:

- A Manufacturing Technician uses tools, machinery and production processes to manufacture components accurately and safely.
- A Toy Maker combines practical construction skills with an understanding of movement, function and visual appeal.
- A Cabinet Maker / Joiner uses precision woodworking techniques to manufacture high-quality products, one of the Resistant Materials careers identified in the existing Year 8 curriculum.

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

- Adapting is developed when pupils modify components or practical techniques in response to problems encountered during manufacture.
- Problem Solving is developed as pupils identify why components may not fit or function correctly and select suitable solutions.
- Planning is developed through sequencing manufacturing tasks and managing practical time and resources effectively.



|  <b>Resources</b><br><i>What books, websites, videos and materials will support our learning?</i>                                                                                                                                      |  <b>Assessment</b><br><i>How will we show what we know, remember and can apply?</i>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
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| <p>Pupils use their prototype, final design, specification, worklog and research alongside workshop tools, equipment and resistant materials.</p> <p>The original curriculum specifically identifies the mitre saw, pillar drill, hobby saw, hand files and sanding tools within the Year 8 pull-along toy project.</p> | <p>Assessment in Term 4 focuses primarily 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 knowledge of tools, machinery, wheels and axles, construction processes, workshop safety and manufacturing terminology.</p> <p>The 65% disciplinary knowledge assesses pupils' ability to manufacture components accurately, assemble the product, apply tools safely, solve practical problems and refine their work. This reflects the Year 8 assessment approach, where pupils are assessed throughout the design and making process on both theoretical understanding and practical skills,</p> |

including the safe and effective use of tools and equipment and the production of practical outcomes.

High expectations are placed on pupils to produce a pull-along toy that demonstrates increasing independence, accuracy, craftsmanship and functional construction.

## Term 5

Enquiry



## Exploring and Applying Finishing Techniques



### Big Picture

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

During Term 5, pupils focus on finishing techniques and how these can improve the appearance, durability and overall quality of their pull-along toy. Pupils build on the manufacturing work completed in Terms 3 and 4 and begin to refine the completed product through careful surface preparation, decoration and finishing. The emphasis is on producing a final outcome that is not only functional, but also well-crafted, visually engaging and appropriate for the intended user.

The original Year 8 curriculum also makes clear that pupils should apply paint and surface decoration techniques to create a high-quality product, with increasing attention to accuracy, creativity and detail.



### Zoom In

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

Substantive Knowledge

Pupils understand the purpose of finishing techniques within Resistant Materials.

They learn that finishes can be used to:

- improve appearance
- protect surfaces
- improve durability
- create a smoother and safer finish
- communicate colour, theme and visual identity

- improve the overall quality of a product

Pupils revisit the importance of surface preparation, recognising that sanding and refining the material before applying a finish affects the quality of the final outcome. They develop knowledge of appropriate decorative and finishing processes, including paint and surface decoration techniques, as identified in the original curriculum.

#### Disciplinary Knowledge

- Pupils inspect the manufactured pull-along toy and identify areas that require further preparation before finishing.
- They select suitable finishing techniques for their product and intended design.
- Pupils prepare surfaces carefully and apply finishes with increasing control and accuracy.
- They make decisions about colour and decoration that relate back to their target audience, product specification and original design intentions.
- They review the quality of the finish as they work, making adjustments where necessary.
- Pupils continue to document progress within their worklog, explaining finishing choices and reflecting on how these affect the final product.

Key Vocabulary: finish, finishing technique, surface preparation, sanding, paint, decoration, coating, protection, durability, aesthetics, craftsmanship, quality, refinement, accuracy, target audience, visual appeal

|  <b>Pre-Requisite Knowledge</b><br><i>What have we already learned that will help us with this topic?</i>                                                                                                                                                                                                                           |  <b>Pitch Up</b><br><i>How will we challenge ourselves?</i>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
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| <p>Pupils build directly on Terms 3 and 4, where they prototyped, manufactured and assembled the pull-along toy.</p> <p>They should understand:</p> <ul style="list-style-type: none"> <li>• accurate measuring and manufacture</li> <li>• cutting, shaping and drilling</li> <li>• assembly</li> <li>• wheels and axles</li> <li>• sanding</li> <li>• safe workshop practices</li> <li>• quality control</li> </ul> | <p>Pupils are challenged to select finishes because they are appropriate to the material, function and user, rather than simply choosing colours or decoration they personally prefer.</p> <p>More confident pupils should explain why particular finishes are suitable and how they improve both aesthetics and quality.</p> <p>They should demonstrate careful surface preparation and apply finishes evenly and accurately. The original curriculum sets a clear expectation that pupils work independently to manufacture and decorate their toy, demonstrating accuracy, creativity and attention to detail.</p> <p>The strongest outcomes will therefore demonstrate a clear relationship between design intention → surface preparation → finishing choice → final quality.</p> |

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| They also revisit the product specification and target audience established at the beginning of the project so that finishing choices are purposeful rather than purely decorative.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
|  <b>Wider Framework</b><br><i>How does this learning connect to future topics and bigger goals?</i>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |  <b>Curriculum Hinterland</b><br><i>What wider knowledge will deepen our understanding of this topic?</i>                                                                                                                                                                                                                                                                                                 |
| <p>Term 5 prepares pupils for Term 6, where they will present and evaluate the completed pull-along toy.</p> <p>The quality of the finish becomes part of the evidence pupils use when judging how successfully their product meets the original design brief and specification.</p> <p>These skills also prepare pupils for future Resistant Materials projects, where they will need to select and apply finishing processes with greater independence.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | <p>Pupils develop a wider understanding of the importance of finishing within commercial manufacturing and craftsmanship.</p> <p>They recognise that the final stages of manufacture can significantly affect how consumers judge the quality and value of a product.</p> <p>The Year 8 curriculum makes broader links to traditional woodworking, craftsmanship and precision, showing pupils why high-quality finishing remains important in both handmade and mass-produced products.</p> |
|  <b>Authentic connections</b><br><i>How does this topic connect to real life, careers, other subjects and important values?</i>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| <p>Spiritual development is supported through creative decision making and the satisfaction of refining a product into a high-quality final outcome. Moral development is developed through responsible use of materials and finishes, careful management of waste and safe working practices. Social development is strengthened as pupils share workshop resources responsibly, discuss finishing decisions and respond constructively to feedback. Cultural development is supported through recognising how colour, decoration and product appearance can be influenced by different audiences, styles and cultural preferences.</p> <p>The term also connects strongly with Art and Design through colour, surface and visual composition, Science through the properties and protective functions of finishes, and English through explaining and justifying design decisions.</p> <p>Career Links:</p> <ul style="list-style-type: none"> <li>• A Furniture Finisher prepares surfaces and applies finishes to improve the appearance and durability of manufactured products.</li> <li>• A Product Finishing Technician applies coatings, treatments and decorative finishes to manufactured items.</li> <li>• A Furniture Designer/Maker combines construction and finishing techniques to create high-quality products, a career already identified within the Year 8 Resistant Materials curriculum.</li> </ul> <p>The main Skills Builder focus for this term is Creativity, Adapting and Planning.</p> |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |



- Creativity is developed through selecting and applying appropriate colours, decorative features and surface treatments.
- Adapting is developed when pupils respond to imperfections and refine their approach to improve the quality of the finish.
- Planning is developed through sequencing surface preparation and finishing processes carefully.

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|                                                                                                                                                                                                                                                                                                                            | <b>Resources</b><br><i>What books, websites, videos and materials will support our learning?</i> |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | <b>Assessment</b><br><i>How will we show what we know, remember and can apply?</i> |
| <p>Pupils use their completed manufactured product, original designs, product specification and worklog, alongside sanding equipment, paint and suitable surface decoration materials.</p> <p>Teacher demonstrations and exemplar products are used to model effective surface preparation and high-quality finishing.</p> |                                                                                                  | <p>Assessment in Term 5 focuses on pupils' ability to select, apply and evaluate finishing techniques. Approximately 35% of assessment focuses on substantive knowledge and 65% on disciplinary knowledge.</p> <p>The 35% substantive knowledge includes understanding surface preparation, finishing processes, durability, aesthetics and the purpose of different finishing techniques. The 65% disciplinary knowledge assesses pupils' ability to prepare surfaces, select suitable finishes, apply them accurately and refine the quality of the final product.</p> <p>This continues the Year 8 approach of assessing pupils throughout the design and making process on both theoretical understanding and practical application. High expectations are placed on pupils to demonstrate careful preparation, precise application and a finish that clearly enhances the quality and visual appeal of the pull-along toy.</p> |                                                                                    |
|                                                                                                                                                                                                                                                                                                                            |                                                                                                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                                                                    |
| <b>Term 6</b><br>Enquiry                                                                                                                                                                                                                                                                                                   |                                                                                                  | <b>Presenting and Evaluating the Pull-Along Toy</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                                                                    |
|                                                                                                                                                                                                                                                                                                                            | <b>Big Picture</b><br><i>What are the main ideas and big questions in this topic?</i>            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                                                                    |

## Presenting and Evaluating the Pull-Along Toy

During Term 6, pupils complete the Year 8 Resistant Materials project by presenting and evaluating their finished pull-along toy. This term gives pupils the opportunity to bring together the full design and manufacture process, from the original brief and specification through to research, prototyping, manufacture and finishing. The emphasis is on pupils making clear, evidence-based judgements about the success of their final product and identifying how their work could be improved.

The original Year 8 curriculum confirms that the project concludes with pupils evaluating their completed pull-along toy and reflecting on the practical skills, knowledge and understanding developed throughout the process.



### **Zoom In**

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

#### **Substantive Knowledge**

Pupils understand the purpose of presentation and evaluation within the design process.

#### **They revisit:**

- the original design brief
- the product specification
- target audience
- function
- aesthetics
- materials
- construction
- finish
- quality
- safety
- movement through wheels and axles

Pupils understand that an evaluation should measure the success of the final outcome against the original intentions of the project. They recognise the difference between simply describing a product and making a supported judgement about its effectiveness. They also understand that professional designers use evaluation and feedback to improve future products and manufacturing decisions.

#### **Disciplinary Knowledge**

Pupils present their final pull-along toy clearly and explain the main design and manufacturing decisions they made. They evaluate the completed product against the original design brief and specification. Pupils identify specific strengths and weaknesses in areas such as:

- function
- movement
- construction
- accuracy
- craftsmanship
- aesthetics
- finishing
- suitability for the target audience

They use evidence from the product, worklog and design process to justify their judgements. Pupils suggest realistic improvements and explain how these would make the product more successful. They also reflect on their own practical development and identify areas they would approach differently in future Resistant Materials projects.

Key Vocabulary: presentation, evaluation, specification, design brief, target audience, function, aesthetics, mechanism, craftsmanship, accuracy, quality, strength, weakness, improvement, evidence, justification, reflection, feedforward

|  <b>Pre-Requisite Knowledge</b><br><i>What have we already learned that will help us with this topic?</i>                                                                                                                                                                                                                                                                                                                                                                                                                                              |  <b>Pitch Up</b><br><i>How will we challenge ourselves?</i>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
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| <p>Pupils draw on the complete Year 8 project.</p> <p>They should understand how to:</p> <ul style="list-style-type: none"> <li>• interpret a design brief</li> <li>• write a product specification</li> <li>• carry out and present research</li> <li>• develop and prototype ideas</li> <li>• manufacture using resistant materials techniques</li> <li>• construct wheels and axles</li> <li>• apply finishing techniques</li> <li>• use workshop tools safely and accurately</li> </ul> <p>They also use the worklog maintained throughout the project, which records planning, design development and reflections on progress.</p> | <p>Pupils are challenged to move beyond simple statements such as “it worked well” or “I would make it neater.”</p> <p>They should identify exactly what was successful, why it was successful and what evidence supports that judgement.</p> <p>More confident pupils should make detailed comparisons between the final product and the original specification, recognising where the finished outcome may have departed from the initial design. They should also consider how manufacturing decisions affected the final function and quality of the toy.</p> <p>The strongest evaluations will demonstrate a clear pattern of criterion → evidence → judgement → improvement.</p> |
|  <b>Wider Framework</b><br><i>How does this learning connect to future topics and bigger goals?</i>                                                                                                                                                                                                                                                                                                                                                                                                                                                  |  <b>Curriculum Hinterland</b><br><i>What wider knowledge will deepen our understanding of this topic?</i>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |

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| <p>Term 6 completes the Year 8 pull-along toy project and prepares pupils for the greater independence expected in Year 9 Resistant Materials.</p> <p>The wider Year 8 curriculum states that the project develops pupils' problem-solving, planning and making skills, while the worklog supports reflection, evaluation and communication. These experiences provide a foundation for more advanced Resistant Materials work at Key Stage 3 and Key Stage 4.</p> <p>In Year 9, pupils will build on these skills through the design and manufacture of a mobile phone holder, where greater emphasis is placed on material properties, independent design decisions and increasingly refined manufacture.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | <p>Pupils explore how professional designers and manufacturers evaluate products before they reach consumers.</p> <p>They begin to understand the role of product testing, quality assurance and customer feedback in deciding whether a product is successful.</p> <p>The project also reinforces the idea that both handmade and mass-produced products rely on common principles of design, construction, precision and quality.</p> <p>Pupils therefore begin to see evaluation not as the end of design, but as part of an ongoing cycle of improvement.</p> |
| <div></div> <div> <p><b>Authentic connections</b><br/><i>How does this topic connect to real life, careers, other subjects and important values?</i></p> </div>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| <p>Spiritual development is supported through reflection on personal progress, practical achievement and the satisfaction of completing a sustained design project. Moral development is developed as pupils consider whether their product is safe, suitable and responsibly made for its intended user. Social development is strengthened through presenting work, giving and receiving feedback and recognising different approaches to solving the same design problem. Cultural development is supported through considering how different users may respond to product design, aesthetics and function.</p> <p>The term also links with English through evaluative writing and justification, Mathematics through checking dimensions and accuracy, and Science through evaluating the effectiveness of the wheel and axle mechanism.</p> <p>Career Links:</p> <ul style="list-style-type: none"> <li>• A Product Tester assesses whether a product performs as intended and identifies faults or areas for improvement.</li> <li>• A Quality Assurance Technician checks products against specifications and expected standards.</li> <li>• A Product Designer evaluates products and uses evidence and feedback to improve future designs.</li> </ul> <p>The main Skills Builder focus for this term is Speaking, Listening and Adapting.</p> <ul style="list-style-type: none"> <li>• Speaking is developed as pupils present their finished product and explain their design and manufacturing decisions.</li> <li>• Listening is developed through responding to teacher and peer feedback.</li> <li>• Adapting is developed as pupils identify how future designs or practical approaches could be improved.</li> </ul> <div>    </div> |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |

|  <b>Resources</b><br><i>What books, websites, videos and materials will support our learning?</i>                                                                                                            |  <b>Assessment</b><br><i>How will we show what we know, remember and can apply?</i>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
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| <p>Pupils use their completed pull-along toy, design brief, product specification, research, prototype, design work and worklog to support presentation and evaluation.</p> <p>Peer and teacher feedback can also be used as additional evidence when judging the success of the product.</p> | <p>Term 6 includes the final assessment of the Year 8 Resistant Materials project. Approximately 35% of assessment focuses on substantive knowledge and 65% on disciplinary knowledge. The 35% substantive knowledge includes knowledge from across the project, including design briefs, specifications, research, materials, workshop processes, prototyping, wheels and axles, finishing and evaluation.</p> <p>The 65% disciplinary knowledge assesses pupils' ability to apply that knowledge by evaluating the product, supporting judgements with evidence, comparing the outcome with the specification and suggesting justified improvements.</p> <p>The Year 8 assessment takes place throughout the design, making and evaluation process, with pupils assessed on both theoretical understanding and practical skills. At the end of the project, pupils receive an ATL grade alongside a level or assessment outcome.</p> <p>High expectations are placed on pupils to demonstrate that they can reflect critically on both their final product and their own development as increasingly independent designers and makers.</p> |