| Scheme of Work | | |
|---|---|---|
| **Years:**<br>**5&6** | **Title: Materials Matter** | **Weeks:**<br>**5 weeks** |

**Rationale**

This unit develops pupils' understanding of how materials are selected, tested and used within everyday life and innovation. Pupils investigate the properties and behaviour of materials through scientific enquiry whilst considering how materials influence design, invention and technological progress.

Learning is designed to encourage curiosity, questioning and ambitious thinking through meaningful contexts and practical investigation. Pupils investigate how scientists and inventors use evidence to select materials, consider how materials influence design decisions and explore how scientific understanding continues to shape inventions and solve real-world problems.

The unit uses carefully selected Reading Spine texts including invention texts, biographies and scientific information texts to promote disciplinary reading and deepen understanding. These texts provide opportunities to explore innovation, problem-solving, perseverance and scientific discovery whilst developing vocabulary, fluency and comprehension.

**Learning experiences are designed to:**

- develop secure knowledge and understanding of material properties and changes
- build scientific enquiry, reasoning and evidence-based thinking skills
- develop curiosity through investigation, testing and experimentation
- strengthen understanding of scientific vocabulary and concepts through repeated application
- provide opportunities for retrieval, observation and interpretation
- develop confidence in communicating scientific ideas through spoken, practical and written outcomes
- create meaningful opportunities for discussion, collaboration and problem-solving
- encourage pupils to consider how scientific understanding supports inventions and technological progress
- provide opportunities to explore creativity and innovation through scientific thinking
- promote positive attitudes towards science, enquiry and lifelong learning
- support pupils to make connections across subjects and apply learning in meaningful contexts
- ensure pupils access ambitious learning through adaptive approaches without reducing curriculum expectations

By the end of the unit pupils will understand that scientific understanding develops through evidence, testing and investigation and that materials continue to shape innovation and everyday life.

**Adaptive Teaching**

This unit applies Storyybrook SEMH principles with particular emphasis on practical enquiry and collaborative investigation.

**Examples of adaptation within this unit include:**

- visual timetables and now/next supports
- vocabulary pre-teaching and rehearsal
- sentence stems and modelling
- chunked instructions and reduced cognitive load
- oral rehearsal before recording ideas
- alternative recording methods (drawing, practical outcomes, verbal responses)
- sensory and movement opportunities where needed
- emotional check-ins and regulation support

**Challenge and Greater Depth Opportunities**

Pupils demonstrating secure understanding may be challenged through:

- increasingly independent application of learning
- deeper questioning and higher-order thinking
- interpretation and evaluation of evidence
- more sophisticated use of disciplinary and subject-specific vocabulary
- extended reasoning and justification of ideas
- leadership, collaboration and peer-support opportunities
- greater complexity within written, practical and presentation outcomes
- opportunities to make connections across subjects and contexts
- design and evaluate independent investigations linked to material properties
- justify predictions and conclusions using scientific reasoning

**Hook**

Pupils enter a classroom transformed into a **Materials Investigation Laboratory and Inventors' Workshop** containing:

- mystery material boxes (wood, plastic, metal, glass, fabric, rubber, foam and unusual materials)
- mystery objects and invention artefacts for investigation
- images of famous inventions, structures and engineering designs
- material testing stations (waterproofing, strength, flexibility, magnetism and transparency challenges)
- engineering and inventor challenge cards
- magnifying glasses, measuring tools and investigation equipment
- building and design materials for experimentation and problem-solving
- mystery evidence cards linked to material properties and inventions
- short videos and images of inventions, structures and materials in everyday life
- scientist and inventor information stations
- real-life material examples and unusual objects for observation and discussion

**Opening challenge**

Can you become a scientist and inventor and discover how materials shape, change and improve the world around us?

**Writing Outcomes**

**By the end of the unit pupils will:**

- create labels, captions and annotated diagrams linked to materials, investigations and scientific observations
- compose explanation texts describing the properties and uses of materials
- write comparative responses identifying similarities and differences between materials and their suitability for different purposes
- create diary entries and first-person narratives from the perspective of scientists, inventors, engineers or designers
- write balanced arguments and persuasive responses linked to scientific questions and design choices (e.g. Which material would be best for a new invention?)
- use evidence from investigations, observations, texts and discussion to explain ideas and justify thinking
- create information texts, invention guides, presentations or scientific reports linked to materials and innovation
- compose explanations of materials and uses
- compare materials and suitability
- invention reports and persuasive responses

**Mixed-age challenge (Year 6 depth):**

- justify scientific explanations and design decisions using evidence from multiple sources
- adapt writing for different purposes including explanation, persuasion, balanced argument and scientific report writing
- evaluate evidence from investigations and justify conclusions
- compare materials and suitability for purpose

| | |
|---|---|
| | • justify material selection for inventions<br>• produce invention reports<br>• evaluate evidence from investigations independently<br>• justify material selection using scientific reasoning<br>• explain how material properties influence design decisions<br>• compare scientific explanations critically |
| **Outcomes**<br>By the end of the unit pupils produce:<br><br>• a **Materials Investigation and Innovation Showcase** shared with adults, peers or visitors demonstrating understanding of material properties and their influence on inventions and everyday life<br>• a collection of spoken, practical and written learning evidence<br>• a written explanation, balanced argument, scientific report or persuasive outcome demonstrating understanding of materials and scientific concepts<br>• annotated diagrams, investigation records and scientific representations linked to material properties and changes<br>• labelled diagrams and evidence analysis linked to investigations, inventions and material choices<br>• predictions, questions and responses linked to enquiry activities and scientific investigations<br>• a practical or creative outcome linked to learning (e.g. invention prototypes, recycled-material products, packaging designs or investigation models)<br>• vocabulary-rich classroom display work linked to scientific concepts and disciplinary vocabulary<br>• a collaborative presentation, demonstration or scientific enquiry outcome explaining learning and ideas<br>• digital or creative outcomes such as presentations, podcasts, videos or recorded explanations where appropriate<br>• investigation interpretation activities using evidence to support conclusions<br>• written reflections and evaluations linked to key enquiry questions and scientific thinking | **Success Criteria**<br>By the end of the unit most pupils will be able to:<br><br>• use topic vocabulary accurately within discussion and learning activities<br>• identify and describe key properties of materials<br>• compare and group materials according to scientific properties<br>• explain why materials are selected for particular purposes<br>• explain reversible and irreversible changes<br>• use investigations, observations and texts to retrieve and interpret information<br>• ask relevant scientific questions and discuss ideas thoughtfully using scientific vocabulary<br>• retrieve information and apply learning during discussion, investigation and reflection activities<br>• identify patterns and relationships from scientific evidence<br>• record ideas, observations and responses using appropriate vocabulary and sentence structures<br>• select and explain suitable methods for separating mixtures using scientific knowledge<br>• explain why materials are selected for particular purposes<br>• identify patterns from investigations<br>• explain reversible and irreversible changes<br>• select and explain suitable methods for separating mixtures using scientific knowledge<br><br>**Year 6 extension:**<br><br>• explain scientific understanding using increasingly precise scientific vocabulary independently<br>• interpret and evaluate evidence gathered through investigations and identify possible reliability issues<br>• justify scientific explanations using evidence from multiple sources<br>• identify connections between scientific understanding, inventions and everyday life<br>• compare and evaluate different explanations independently |

| | |
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| | • evaluate evidence from investigations and explain how material properties influence suitability and design decisions<br>• make reasoned scientific judgements supported by evidence |

**Secure End Point**

Pupils can:

- explain how the properties of materials influence their uses and behaviour
- identify and compare similarities and differences between materials and changes in materials
- use observations, investigations and evidence to explain scientific ideas and justify conclusions
- use scientific vocabulary accurately to communicate understanding and findings
- communicate scientific understanding confidently through spoken, practical and written outcomes

**Common Misconceptions**

**Pupils may think:**

- materials and objects are the same thing rather than objects being made from materials
- all materials are suitable for any purpose
- harder materials are always stronger or better materials
- larger objects are always made from stronger materials
- dissolving means a material disappears rather than forming a solution
- all materials dissolve in water
- when a material dissolves it cannot be recovered
- melting, dissolving and burning are the same type of change
- all changes can be reversed
- irreversible changes simply mean something is broken
- new materials are not formed during irreversible changes
- all metals are magnetic
- magnets attract every type of metal
- properties of materials never change
- scientists choose materials randomly rather than through testing and evidence
- inventions happen quickly without investigation, testing and adaptation
- scientific models and diagrams are exact representations rather than simplified ways to explain ideas

**Sticky Knowledge (Non-negotiable Learning)**

**By the end of this unit pupils will know:**

- objects are made from different materials and materials have different properties
- materials are selected according to their properties and suitability for a specific purpose
- materials can be compared and grouped according to properties such as hardness, transparency, conductivity, solubility, magnetism and flexibility
- some materials dissolve in liquids to form solutions
- dissolving does not mean a material disappears and dissolved materials can sometimes be recovered
- mixtures can be separated using processes such as filtering, sieving and evaporation
- some changes are reversible and materials can return to their original state
- some changes are irreversible and create new materials
- scientists use observation, testing and evidence to investigate and explain ideas
- fair testing helps scientists identify patterns and relationships
- evidence gathered from investigations helps scientists justify conclusions
- inventors, engineers and designers select materials according to function and purpose
- scientific understanding of materials has influenced inventions and technological development
- scientific vocabulary supports accurate explanation and communication of ideas

| | |
|---|---|
| | • mixtures can be separated using methods such as filtering, sieving and evaporation depending on the properties of materials involved |

**Science Core Learning and Wider Application**

Core taught content within this unit:

- identify material properties and uses
- explain reversible and irreversible changes
- investigate how materials respond to different conditions

Wider application and retrieval opportunities:

- predict outcomes and investigate ideas
- use observations and evidence to draw conclusions
- apply vocabulary through explanation and discussion

**Retrieval Opportunities**

**Week 1 – Materials Around Us**
Prior knowledge discussion linked to previously studied scientific learning, everyday materials and investigation skills; discuss existing knowledge and misconceptions about materials and their uses

**Week 2 – Properties and Testing**
Recall key vocabulary linked to materials, properties and testing through discussion, observation and oral rehearsal

**Week 3 – Dissolving and Separating**
Retrieve and apply understanding linked to solutions, dissolving and separation processes through investigation and scientific discussion

**Week 4 – Reversible and Irreversible Changes**
Retrieve and apply learning linked to changes in materials through prediction, observation and scientific explanation

**Week 5 – Materials, Innovation and Invention**
Explain and communicate learning about materials, inventions and scientific understanding using key vocabulary, evidence and enquiry outcomes

**Retrieval methods used throughout the unit:**

- vocabulary retrieval
- retrieval grids
- discussion prompts
- sequencing activities
- picture retrieval tasks
- oral rehearsal and low-stakes quizzes
- quick-fire recall questions
- partner discussion and talk tasks
- classification and sorting activities
- practical investigation retrieval activities
- retrieval linked to texts, diagrams and scientific evidence

- prediction and enquiry questions
- revisit prior learning through practical activities and collaborative challenges
- compare and justify activities linked to materials and their properties

**Prior Learning**

**Pupils may already:**

**Reading**

- retrieve information from fiction and non-fiction texts
- identify key information from scientific texts, diagrams, images and information sources
- discuss themes, viewpoints and key ideas within texts
- make predictions and inferences using evidence from texts
- explain ideas using evidence from reading and discussion
- discuss similarities and differences between materials, objects and everyday experiences

**Reading Retrieval Opportunities**

- retrieval of scientific vocabulary and material properties concepts
- flashback questions linked to previous scientific learning and investigations
- recall of sticky knowledge through classification, comparison and practical activities
- retrieval through reading, discussion and evidence-based scientific enquiry

**Writing**

- orally rehearse ideas before recording them
- write descriptions, explanations and information texts
- write diary entries and first-person narratives
- organise ideas into linked paragraphs
- communicate ideas through spoken and written outcomes
- use evidence to support explanations and responses

**Grammar and Punctuation**

- use expanded noun phrases and ambitious vocabulary to add detail
- use conjunctions to extend and explain ideas
- use fronted adverbials and adverbial phrases
- organise writing into paragraphs around a theme
- use commas for clarity and expanded sentence structures
- use speech punctuation accurately where appropriate

**Spoken Language / Oracy**

- ask and answer questions linked to learning experiences
- explain opinions and ideas clearly during discussion
- participate in collaborative learning and group discussion
- build upon and respond appropriately to the ideas of others
- justify ideas using evidence and reasoning

**Science and Wider Curriculum**

- identify and describe properties of everyday materials
- compare and group materials according to simple properties

- recognise that some materials are more suitable for particular purposes than others
- use observations and simple tests to investigate and compare materials
- recognise that scientists use evidence and investigation to answer questions
- ask questions and investigate information through practical enquiry
- recognise that materials and inventions affect everyday life
- record and organise information using diagrams, tables and observations

**Spelling**

**Pupils apply:**

- spelling patterns and rules taught through the school spelling programme and English curriculum
- previously taught Year 3 and Year 4 statutory spelling expectations
- prefixes and suffixes taught previously
- topic vocabulary linked to scientific learning
- increasingly ambitious vocabulary within written outcomes

**Building on Prior Learning**

Pupils build upon previous experiences of scientific enquiry, observation and evidence gathering developed through earlier science units. Prior understanding of forces, investigations and scientific thinking supports pupils in testing materials, recognising patterns and making evidence-based decisions.

**Pupils may already:**

- plan and carry out simple investigations developed through previous science learning
- use evidence from observations and investigations to explain ideas
- recognise that forces affect movement and objects behave differently in different situations
- identify patterns and relationships from previous scientific enquiries

**Future learning prepares pupils to:**

- investigate properties and changes in greater depth
- evaluate evidence and justify conclusions independently
- understand how scientific knowledge influences design and technology
- apply scientific understanding to solve real-world problems

**Spelling**

**Pupils apply:**

- spelling patterns and rules taught through the school spelling programme and English curriculum
- Year 5 and Year 6 statutory spelling expectations
- prefixes and suffixes including **inter-, sub-, super-, anti- and auto-**
- words containing silent letters
- words ending in **-cial, -tial, -cially and -tially**
- words ending **-ent, -ence, -ency, -ant, -ance and -ancy**
- words with **ie** and **ei** patterns
- use of hyphens where appropriate

**Grammar and Punctuation Focus**

**Pupils develop:**

- use of expanded noun phrases to add detail and precision
- use of relative clauses beginning with **who, which, where, when, whose** or **that**
- use of modal verbs to indicate possibility or certainty (**could, would, should, might, must**)
- use of adverbials and fronted adverbials to develop cohesion and sequence within explanations and scientific writing
- use of parenthesis through brackets, commas and dashes to add information
- use of commas to clarify meaning and avoid ambiguity

- ambitious topic vocabulary linked to scientific learning
- accurate spelling of increasingly complex subject-specific vocabulary within written outcomes

**Spelling application opportunities throughout the unit:**

- vocabulary pre-teaching and oral rehearsal
- explicit morphology and word meaning exploration
- etymology links (scientific vocabulary and word origins where appropriate)
- retrieval of previously taught statutory words
- sentence-level application in scientific writing
- editing and proofreading activities
- independent application within extended writing outcomes
- exploration of scientific vocabulary linked to materials, properties and inventions (e.g. conductivity, transparency, solubility, irreversible, innovation)
- discussion of prefixes, suffixes and root words within scientific and technical vocabulary

- use of cohesive devices within and across paragraphs (**for example: however, therefore, meanwhile, consequently, in contrast**)
- use of organisational devices including headings, subheadings, bullet points and underlining where appropriate
- use of direct and reported speech where appropriate
- use of active and passive voice to change emphasis and effect within scientific explanations
- use of formal and informal language appropriately according to audience and purpose
- use of colons to introduce lists and explanations
- use of semi-colons to mark relationships between closely related clauses
- use of hyphens to avoid ambiguity where appropriate
- use of punctuation including commas, apostrophes, brackets, dashes, colons and semi-colons accurately within writing
- organise ideas into coherent paragraphs and increasingly sustained pieces of writing
- edit and improve grammar and punctuation through discussion, peer support and adult guidance

**Mixed-age challenge (Year 6 depth):**

- select and manipulate grammatical structures deliberately to create clarity and effect
- use active and passive voice purposefully according to audience and purpose
- use formal language and subject-specific vocabulary consistently within scientific explanations and arguments
- use a wider range of cohesive devices to link ideas within and across paragraphs
- sustain control of sentence structure and punctuation across extended writing
- use parenthesis, colons, semi-colons and dashes accurately and independently
- adapt sentence structures appropriately across explanation texts, balanced arguments and scientific reports
- edit and refine grammar and punctuation independently to improve precision and effectiveness

**Computing Integration**

**Pupils learn to:**

- use search technologies effectively to locate information linked to materials, inventions and scientific discoveries

- select and retrieve information from a range of digital sources
- recognise that information found online may vary in reliability and accuracy
- compare and evaluate information from different sources and identify evidence to support ideas
- use digital tools to organise and present scientific learning and research
- create digital presentations, fact files, investigation records, diagrams or reports linked to materials and innovation
- use multimedia elements such as images, audio, diagrams and text to communicate understanding
- develop keyboard, editing and formatting skills when producing written outcomes
- use technology safely, respectfully and responsibly when researching and presenting information
- understand the importance of evaluating sources and considering reliability when accessing information online
- record, organise and present scientific findings using tables, charts and digital tools where appropriate
- use digital simulations, images and models to support understanding of materials and scientific concepts
- communicate and collaborate appropriately through digital activities where relevant

**Computational Thinking and Digital Creation**

- collect, organise and interpret information about materials and their properties using digital tools and present findings appropriately

**Independence**

**Pupils move from:**

- identifying simple information from sources and observations with adult support
- using scientific vocabulary with prompts and scaffolds
- recording ideas through supported discussion and structured activities
- asking simple questions about scientific learning and investigations
- making observations and interpreting evidence with adult guidance
- relying on models, sentence stems and visual prompts to organise ideas
- participating in collaborative activities with adult support

**To:**

- independently retrieving and selecting relevant information from a range of scientific sources and investigations
- using increasingly precise scientific and disciplinary vocabulary independently
- asking scientifically relevant questions and exploring ideas thoughtfully
- interpreting evidence and making reasoned conclusions using scientific understanding
- organising and communicating ideas confidently through spoken, practical and written outcomes
- selecting appropriate methods to record, investigate and present learning independently

**Thinking**

**This unit develops:**

- scientific enquiry and investigation skills
- observation and comparison skills
- interpretation and evaluation of evidence
- comparison and connection-making between materials, inventions and everyday life
- reasoning and justification using evidence
- questioning, discussion and reflective thinking
- critical thinking through analysis of scientific ideas and outcomes
- communication and explanation using increasingly precise scientific vocabulary
- curiosity, independence and problem-solving
- creativity and innovation through design and investigation opportunities

**Cognitive Progression**

**Pupils progress from:**

- identifying and recalling simple scientific facts
- asking and answering straightforward questions
- recognising similarities and differences between materials and objects
- making simple observations from investigations and experiences
- explaining ideas with adult support

**Towards:**

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- working collaboratively whilst taking increasing ownership of learning and decision making

**By the end of the unit pupils can:**

- independently retrieve and apply learning from scientific sources, investigations and prior knowledge
- communicate understanding using scientific vocabulary accurately and appropriately
- ask and answer scientific questions using evidence to justify thinking
- organise ideas into coherent spoken and written outcomes with increasing independence
- interpret and discuss information from investigations and different sources with growing confidence
- make comparisons and identify connections between material properties, inventions and everyday life
- select appropriate strategies, resources and methods to support learning independently
- reflect on learning and explain understanding with increasing confidence and accuracy
- use evidence gathered through practical enquiry to explain ideas and justify conclusions

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- asking scientifically relevant questions independently
- interpreting evidence and identifying important information
- making connections between properties, materials and their uses
- comparing scientific ideas and considering different explanations
- justifying ideas and conclusions using evidence
- evaluating the reliability and usefulness of evidence and investigations
- applying prior knowledge to new contexts and enquiries
- communicating increasingly sophisticated explanations and scientific conclusions
- using evidence gathered through investigations to solve problems and support decision-making

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**<u>Lead Subjects National Curriculum Links</u>**

**Science**

**Pupils learn to:**

- compare and group together everyday materials on the basis of their properties
- know that some materials dissolve in liquid to form a solution and describe how to recover a substance from a solution
- use knowledge of solids, liquids and gases to decide how mixtures might be separated
- give reasons, based on evidence from comparative and fair tests, for the particular uses of everyday materials
- demonstrate that dissolving, mixing and changes of state are reversible changes
- explain that some changes result in the formation of new materials and are usually irreversible

**Year 5:**

- compare and group materials according to properties and uses
- carry out comparative and fair tests linked to materials and their properties
- identify and explain reversible and irreversible changes
- use evidence gathered from investigations to explain findings

**Year 6 extension:**

- evaluate evidence gathered through scientific enquiry and identify reliability and limitations
- justify scientific conclusions using evidence from multiple sources
- explain how scientific understanding of materials influences innovation and design

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- analyse and evaluate how material choices affect function and effectiveness

**Disciplinary Knowledge:**

Pupils learn to think as scientists by:

- asking scientifically relevant questions
- planning fair tests and recognising variables
- planning and carrying out investigations
- observing, measuring and recording findings accurately
- interpreting and evaluating evidence
- recognising patterns and relationships
- using evidence to justify conclusions and explanations

**Progression:**
question → predict → investigate → observe → analyse → conclude → justify → evaluate

**Working Scientifically Focus**

Pupils will develop scientific enquiry skills by:

- asking questions
- making predictions
- carrying out observations and investigations
- recording findings
- identifying patterns
- drawing conclusions using evidence
- evaluating outcomes where appropriate

**Working Scientifically Focus**

Pupils will:

- compare and classify materials
- ask testable questions
- plan investigations
- identify variables affecting results
- record observations systematically
- analyse findings and justify conclusions

**Secure End Point:**

**By the end of the unit pupils can:**

- explain key properties of materials and their uses
- compare and group materials according to scientific properties
- explain reversible and irreversible changes
- use evidence gathered from investigations to justify explanations and conclusions
- apply understanding of materials, evidence and scientific enquiry to increasingly abstract scientific concepts and investigations in Key Stage 3

**English**

**Pupils learn to:**

- read and discuss a broad range of fiction and non-fiction texts
- retrieve, record and present information from texts
- write for a range of audiences and purposes
- participate in discussion, debate and presentations

**Year 5:**

- retrieve information and justify responses using evidence
- write explanations, reports and comparative responses
- discuss themes, ideas and author choices within texts

**Year 6 extension:**

- evaluate author choices and viewpoints
- sustain writing for different purposes and audiences
- use increasingly sophisticated vocabulary and grammatical structures independently

**Disciplinary Knowledge:**

Pupils learn to think as readers and writers by:

- retrieving and interpreting information
- identifying themes and viewpoints
- evaluating language choices
- organising and communicating ideas effectively

**Secure End Point:**

**By the end of the unit pupils can:**

- communicate understanding through spoken and written outcomes
- justify ideas using evidence from reading and discussion
- write coherent scientific outcomes for different audiences and purposes

| Genre | Coverage |
|---|---|
| Narrative | Writing diary entries and first-person narratives from the perspective of scientists, inventors, engineers or designers; creating invention stories and recounts using descriptive and scientific language |
| Explanation | Writing explanation texts describing properties of materials, investigations, reversible and irreversible changes and scientific understanding |
| Information | Producing information texts, scientific reports, fact files and research outcomes using information gathered from investigations and texts |
| Persuasion | Writing persuasive responses and arguments linked to material choices and invention design questions (e.g. Which material would be best for a new invention?) |
| Comparison | Writing comparative responses identifying similarities and differences between materials, properties and their suitability for different purposes |
| Spoken presentation | Participating in debates, presentations, collaborative investigation discussions and invention showcase presentations; presenting ideas clearly using evidence and scientific vocabulary |

**Design and Technology / Computing**

**Pupils learn to:**

- generate, develop and communicate design ideas
- select and use appropriate tools, materials and equipment
- investigate and evaluate products and designs
- use digital tools to research, organise and present information
- use technology safely and responsibly

**Year 5:**

- research inventions and material uses using digital tools
- create purposeful products and outcomes using materials
- organise and present information effectively

**Year 6 extension:**

- evaluate design choices and justify decisions using evidence
- evaluate reliability and usefulness of online information
- select tools and technologies independently according to purpose

**Disciplinary Knowledge:**

Pupils learn to think as designers and digital users by:

- exploring and investigating
- planning and creating
- testing and improving ideas
- evaluating effectiveness and suitability

**Secure End Point:**

**By the end of the unit pupils can:**

- select and justify materials according to purpose
- create and evaluate purposeful outcomes
- communicate learning through practical and digital outcomes

<u>Application Subjects</u>

**Subject: Mathematics**

**National Curriculum Links**

**Pupils learn to:**

- solve problems involving number, measurement and interpretation of data
- use mathematical reasoning to explain and justify thinking
- interpret information presented in tables, charts and graphs
- measure and compare quantities accurately
- apply mathematical understanding across the wider curriculum

**Year 5**

- measure and compare material properties during investigations
- record findings using tables, charts and diagrams

- identify patterns and relationships within results
- use mathematical language to explain findings and observations

**Year 6 Extension**

- interpret patterns and relationships within scientific data independently
- compare and analyse results using evidence
- explain mathematical reasoning linked to scientific investigations
- present findings using increasingly sophisticated charts and representations where appropriate

**Disciplinary Knowledge**

**Pupils work as mathematicians by:**

- measuring and calculating
- organising information
- identifying patterns
- comparing findings
- reasoning mathematically
- explaining ideas using evidence

**Disciplinary Progression**

measure → record → compare → identify patterns → interpret → explain

**Secure End Point**

Pupils independently apply mathematical skills to organise and interpret scientific findings and explain patterns confidently.

**Subject: Computing**

**National Curriculum Links**

**Pupils learn to:**

- use search technologies effectively
- select, use and combine software to create outcomes
- understand how information found online may vary in reliability
- use technology safely, respectfully and responsibly
- use digital tools to organise and communicate information

**Year 5**

- use digital tools to research materials and inventions
- create presentations and digital outcomes linked to scientific learning
- communicate ideas using technology
- use technology safely and appropriately

**Year 6 Extension**

- select appropriate digital tools independently
- organise and present information clearly for an audience
- evaluate reliability and usefulness of online sources

- communicate information confidently through a range of media

**Disciplinary Knowledge**

**Pupils work as digital creators by:**

- finding information
- organising ideas
- creating outcomes
- communicating information
- evaluating effectiveness

**Disciplinary Progression**

find → organise → create → communicate → evaluate

**Secure End Point**

Pupils independently use technology to research, create and communicate purposeful outcomes linked to scientific enquiry and understanding.

**Subject: Art and Design**

**National Curriculum Links**

**Pupils learn to:**

- create sketchbooks to record observations and develop ideas
- improve mastery of art and design techniques
- investigate and evaluate creative work
- develop understanding of artistic techniques and materials
- use a range of materials creatively to develop ideas and outcomes

**Year 5**

- identify features and properties of materials used within art and design
- explore texture, pattern and form through creative activities
- create artwork using a range of materials and techniques
- discuss artistic choices and techniques

**Year 6 Extension**

- compare artistic styles and material choices independently
- evaluate techniques and refine outcomes
- explain artistic decisions using appropriate vocabulary
- create increasingly detailed and purposeful outcomes

**Disciplinary Knowledge**

**Pupils work as artists by:**

- observing
- exploring
- designing

- creating
- evaluating
- improving

**Disciplinary Progression**

observe → explore → plan → create → evaluate → improve

**Secure End Point**

Pupils independently apply artistic techniques and material understanding to create purposeful outcomes.

**Subject: Design and Technology**

**National Curriculum Links**

**Pupils learn to:**

- generate, develop and communicate design ideas
- investigate and evaluate existing products
- select and use appropriate materials and tools safely
- evaluate and improve products against design criteria
- apply understanding of structures and material suitability

**Year 5**

- investigate and evaluate products linked to materials and inventions
- generate and communicate design ideas through labelled sketches and plans
- select and use appropriate materials and tools safely
- create purposeful products using selected materials

**Year 6 Extension**

- refine and adapt designs independently
- justify design choices using technical vocabulary
- evaluate effectiveness against design criteria
- improve outcomes through testing and modification

**Disciplinary Knowledge**

**Pupils work as designers by:**

- investigating
- designing
- planning
- creating
- testing
- evaluating

**Disciplinary Progression**

investigate → design → create → test → evaluate

**Secure End Point**

Pupils independently design, create and evaluate purposeful outcomes using knowledge of materials and their properties.

**Subject: Music**

**National Curriculum Links**

**Pupils learn to:**

- play and perform in solo and ensemble contexts using voice and instruments
- improvise and compose music for different purposes using the inter-related dimensions of music
- listen with attention to detail and recall sounds with increasing aural memory
- use and understand musical elements including pitch, duration, dynamics, tempo, timbre, texture and structure
- appreciate and understand a range of musical traditions and styles
- develop understanding of how sound, materials and vibration influence musical outcomes

**Year 5**

- investigate how different materials influence sound production and vibration
- identify patterns in pitch, volume and timbre when using different materials and instruments
- explore rhythm and sound through practical musical investigations
- use voice, percussion and found materials to communicate scientific ideas and observations

**Year 6 Extension**

- evaluate how material properties influence sound quality and musical outcomes independently
- create increasingly purposeful compositions using a range of materials and sound sources
- justify musical decisions using increasingly precise musical vocabulary
- compare and evaluate how materials affect sound production and performance outcomes
- refine and improve compositions and performances following evaluation and feedback independently

**Disciplinary Knowledge**

**Pupils work as musicians by:**

- listening carefully
- investigating sound and vibration
- exploring rhythm and musical patterns
- composing musical ideas
- performing collaboratively
- evaluating effectiveness
- improving outcomes

**Disciplinary Progression**

listen → investigate → explore → compose → perform → evaluate → improve

**Musical Understanding and Performance**

- investigate how sounds can be created using different materials and explain how materials affect sound quality

**Secure End Point**

Pupils independently use sound, rhythm and performance to communicate understanding of materials, vibration and scientific concepts whilst explaining and evaluating musical choices confidently.

**English Progression and National Curriculum Links**

**Reading**

**Pupils develop:**

- increasing fluency and stamina when reading a range of increasingly complex texts
- retrieval, inference and prediction skills using evidence from texts
- understanding and discussion of themes, vocabulary and author choices
- comparison of ideas, viewpoints and information across texts
- disciplinary reading skills through scientific texts, invention texts and information sources
- confidence in discussing and justifying opinions using evidence

**Writing**

**Pupils develop:**

- planning and organising ideas for different audiences and purposes
- writing narratives, explanations, information texts, persuasive writing and comparative responses
- selecting vocabulary and grammatical structures appropriate for purpose
- using evidence to support explanations and ideas
- drafting, editing and improving writing independently

**Spelling**

**Pupils develop:**

- application of Year 5 and Year 6 statutory spelling expectations
- accurate use of topic vocabulary within spoken and written outcomes
- understanding of spelling patterns, prefixes and suffixes
- independent editing and proofreading skills

**Grammar and Punctuation**

**Pupils develop:**

- use of relative clauses and expanded noun phrases
- use of cohesive devices across paragraphs
- use of modal verbs and adverbials
- use of active and passive voice
- use of formal and informal language appropriately
- use of punctuation including brackets, commas, colons, semi-colons and dashes accurately

**Spoken Language / Oracy**

**Pupils develop:**

- discussion and debate skills
- asking and responding to questions thoughtfully
- presenting information confidently
- justifying opinions using evidence

- adapting language and vocabulary for audience and purpose
- developing fluency, expression and confidence through oral rehearsal and presentation opportunities

**Progression**

retrieve → infer → interpret → justify → evaluate → communicate independently

**Secure End Point**

Pupils independently communicate understanding through a range of spoken and written outcomes using evidence, ambitious vocabulary and increasingly sophisticated language structures.

**Future Learning (English)**

This unit prepares pupils for future learning by supporting them to:

- read increasingly challenging fiction, non-fiction and disciplinary texts confidently
- interpret themes, viewpoints and evidence across a wider range of texts
- write for increasingly sophisticated purposes and audiences
- organise and sustain extended writing independently
- evaluate language, author choices and viewpoints critically
- communicate ideas confidently through discussion, debate and presentation
- apply reading and writing skills across the wider curriculum
- access secondary curriculum demands requiring independent reading, analysis and communication
- develop confidence as fluent readers, writers and communicators across subject
- communicate scientific understanding accurately through explanation, evaluation and evidence-based discussion

**Curriculum Progression and National Curriculum Links**

**Lead Subject: Science**

**National Curriculum Links**

**Pupils learn to:**

- compare and group together everyday materials on the basis of their properties
- know that some materials dissolve in liquid to form a solution and describe how to recover a substance from a solution
- use knowledge of solids, liquids and gases to decide how mixtures might be separated
- give reasons, based on evidence from comparative and fair tests, for particular uses of everyday materials
- demonstrate that dissolving, mixing and changes of state are reversible changes
- explain that some changes result in the formation of new materials and these are usually irreversible

**Year 5**

- compare and group materials according to properties and uses
- carry out comparative and fair tests linked to materials and their properties
- identify and explain reversible and irreversible changes
- use evidence gathered from investigations to explain findings
- identify and compare properties of materials
- **use knowledge of solids, liquids and gases to decide how mixtures might be separated including filtering, sieving and evaporating**

- explain reversible and irreversible changes

**Year 6 Extension**

- evaluate evidence gathered through scientific enquiry and identify reliability and limitations
- justify scientific conclusions using evidence from multiple sources
- explain how scientific understanding of materials influences innovation and design
- analyse and evaluate how material choices affect function and effectiveness

**Curriculum Progression**

identify → observe → investigate → compare → interpret → evaluate → justify

**Secure End Point**

Pupils independently explain the properties and uses of materials and use scientific evidence confidently to justify conclusions and explanations.

**Lead Subject: English**

**National Curriculum Links**

**Pupils learn to:**

- read and discuss a broad range of fiction and non-fiction texts
- retrieve, record and present information from reading
- write for a range of purposes and audiences
- participate in discussions, presentations and debate

**Year 5**

- retrieve and justify responses using evidence from texts
- write explanations, narratives and comparative responses
- discuss themes, vocabulary and author choices
- organise writing into coherent paragraphs

**Year 6 Extension**

- evaluate author choices and viewpoints independently
- sustain writing for different audiences and purposes
- use increasingly sophisticated vocabulary and grammatical structures
- justify opinions and interpretations using evidence confidently

**Curriculum Progression**

retrieve → infer → interpret → justify → evaluate → communicate independently

**Secure End Point**

Pupils independently communicate understanding through increasingly sophisticated spoken and written outcomes using evidence and ambitious vocabulary.

**Lead Subject: Computing**

**National Curriculum Links**

**Pupils learn to:**

- use search technologies effectively
- select, use and combine software to create digital outcomes
- understand how information online may vary in reliability
- use technology safely, respectfully and responsibly

**Year 5**

- use digital tools to research materials, inventions and scientific discoveries
- create presentations and digital outcomes
- organise information effectively
- use technology safely and appropriately

**Year 6 Extension**

- evaluate the reliability and usefulness of online sources
- select digital tools independently according to purpose
- communicate information effectively through a range of medi
- evaluate and improve digital outcomes independently

**Curriculum Progression**

find → organise → create → communicate → evaluate

**Secure End Point**

Pupils independently use technology to research, create and communicate purposeful outcomes linked to scientific enquiry and understanding.

**<u>Application Subject Progression and National Curriculum Links</u>**

**Subject: Mathematics**

**National Curriculum Links**

**Pupils learn to:**

- solve problems involving number, measurement and interpretation of data
- use mathematical reasoning to explain and justify thinking
- interpret information presented in tables, charts and diagrams
- use mathematical knowledge to support learning across the curriculum

**Year 5**

- measure and compare properties of materials during investigations
- record findings using tables, charts and diagrams
- identify patterns and relationships within results
- use mathematical language to discuss findings and observations

**Year 6 Extension**

- analyse and interpret patterns within scientific data independently
- compare findings and justify conclusions using evidence
- explain mathematical reasoning linked to scientific investigations
- present findings using increasingly sophisticated representations

**Disciplinary Knowledge**

Pupils work as mathematicians by:

- measuring and calculating
- organising findings
- identifying patterns
- comparing information
- reasoning mathematically
- explaining conclusions

**Disciplinary Progression**

measure → record → compare → identify patterns → interpret → explain

**Secure End Point**

Pupils independently apply mathematical skills to organise and interpret scientific findings and explain patterns confidently.

**Subject: Computing**

**National Curriculum Links**

**Pupils learn to:**

- use search technologies effectively
- select, use and combine software to create outcomes
- understand how information found online may vary in reliability
- use technology safely, respectfully and responsibly

**Year 5**

- use digital tools to research materials and inventions
- organise and present information digitally
- create purposeful presentations and outcomes
- communicate ideas using technology

**Year 6 Extension**

- evaluate reliability and usefulness of online sources independently
- select appropriate digital tools according to purpose
- communicate information effectively through a range of media
- evaluate and improve digital outcomes

**Disciplinary Knowledge**

Pupils work as digital creators by:

- finding information

- organising ideas
- creating outcomes
- communicating information
- evaluating effectiveness

**Disciplinary Progression**

find → organise → create → communicate → evaluate

**Secure End Point**

Pupils independently use technology to research, create and communicate purposeful outcomes linked to scientific enquiry and understanding.

**Subject: Art and Design / Design Technology**

**National Curriculum Links**

**Pupils learn to:**

- create sketchbooks to record observations and develop ideas
- improve mastery of art and design techniques
- investigate and evaluate products and designs
- generate, develop and communicate design ideas
- select and use appropriate materials and tools

**Year 5**

- identify properties and characteristics of materials used within art and design
- explore texture, pattern, form and structure through creative design activities
- generate ideas through sketches and planning
- create outcomes using selected materials and techniques

**Year 6 Extension**

- evaluate artistic techniques and design choices independently
- justify decisions using appropriate artistic and technical vocabulary
- refine and improve designs following evaluation
- create increasingly detailed and purposeful outcomes

**Disciplinary Knowledge**

Pupils work as artists and designers by:

- observing
- exploring
- planning
- designing
- creating
- evaluating

**Disciplinary Progression**

observe → explore → plan → design → create → evaluate

**Secure End Point**

Pupils independently apply artistic and design skills to create purposeful outcomes using understanding of materials, properties and design principles.

**Subject: Music**

**National Curriculum Links**

**Pupils learn to:**

- play and perform in solo and ensemble contexts using voice and instruments
- improvise and compose music for different purposes using the inter-related dimensions of music
- listen with attention to detail and recall sounds with increasing aural memory
- use and understand musical elements including pitch, duration, dynamics, tempo, timbre, texture and structure
- appreciate and understand a range of musical traditions and styles
- develop understanding of how music communicates ideas, emotions and meaning

**Year 5**

- investigate how different materials influence sound production and vibration
- identify rhythm, pulse and patterns within musical activities and sound investigations
- explore how materials and instruments create different sounds and effects
- use voice, percussion and found materials to communicate scientific ideas and observations

**Year 6 Extension**

- evaluate how material properties influence sound quality and musical outcomes independently
- create increasingly purposeful compositions using a range of materials and sound sources
- justify musical decisions using increasingly precise musical vocabulary
- compare and evaluate how materials affect sound production and performance outcomes
- refine and improve compositions and performances following evaluation and feedback independently

**Disciplinary Knowledge**

**Pupils work as musicians by:**

- listening carefully
- investigating sound and vibration
- exploring rhythm and musical patterns
- composing musical ideas
- performing collaboratively
- evaluating effectiveness
- improving outcomes

**Disciplinary Progression**

listen → investigate → explore → compose → perform → evaluate → improve

**Secure End Point**

Pupils independently use sound, rhythm and performance to communicate understanding of materials, vibration and scientific concepts whilst explaining and evaluating musical choices confidently.

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**Cross-curricular links**

| Subject | Cross-curricular links within this unit |
|---|---|
| **English** | Reading scientific texts, invention texts and information sources linked to materials and innovation; writing explanation texts, scientific reports, diary entries, balanced arguments and persuasive responses |
| **Mathematics** | Measuring, comparing and recording material properties; organising information through charts, tables and graphs; identifying patterns and relationships within investigations |
| **Computing** | Researching materials, inventions and scientific discoveries using digital tools; creating presentations, investigation records and digital outcomes; evaluating online information and source reliability |
| **Art and Design** | Exploring texture, colour, pattern and form through a range of materials; creating artwork inspired by materials, inventions and design processes |
| **Design and Technology** | Designing and creating models, structures and purposeful products; selecting materials according to properties and function; planning, creating and evaluating outcomes |
| **Geography** | Exploring where materials come from; identifying natural resources and how materials are used within different environments and locations |
| **PSHE** | Exploring problem-solving, teamwork, resilience and decision-making; considering sustainability, responsibility and the impact of choices on people and the environment |
| **Spoken Language / Oracy** | Participating in discussion, presentations, investigations, collaborative challenges and scientific enquiry activities; justifying opinions and communicating ideas clearly |
| **Reading Across the Curriculum** | Developing disciplinary reading skills through scientific texts, biographies, invention stories, investigation materials and non-fiction texts |

**Substantive Knowledge Sequence**

| Week | Substantive Knowledge Sequence |
|---|---|
| **Week 1 - Materials Around Us** | Pupils learn that objects are made from materials, materials have different properties, materials are selected according to purpose and function and scientific vocabulary helps us describe and compare materials accurately. |
| **Week 2 - Properties and Testing** | Pupils learn that materials have measurable properties including hardness, transparency, conductivity, flexibility, solubility and magnetism and scientists use comparative and fair tests to investigate and compare materials. |
| **Week 3 - Dissolving and Separating Materials** | Pupils learn that some materials dissolve in liquids to form solutions, dissolving does not mean disappearing, mixtures can be separated using scientific processes and evidence gathered through investigation helps explain observations. |
| **Week 4 - Reversible and Irreversible Changes** | Pupils learn that some changes can be reversed and materials can return to their original state, some changes create new materials and cannot easily be reversed and scientific understanding helps explain changes and outcomes. |
| **Week 5 - Materials, Innovation and Design** | Pupils learn that inventors, scientists and designers select materials according to purpose, properties influence how materials are used, scientific understanding supports innovation and evidence helps people make informed decisions about design and materials. |

**National Curriculum Coverage Audit**

| Subject | National Curriculum Coverage within this Unit |
|---|---|
| **Science** | compare and group materials according to properties; know that some materials dissolve to form solutions; describe how substances can be recovered from solutions; use knowledge of solids, liquids and gases to separate mixtures; give reasons based on comparative and fair tests for uses of materials; explain reversible and irreversible changes; plan investigations and report findings using evidence |
| **English** | develop positive attitudes to reading and understanding increasingly challenging texts; discuss words and phrases that capture meaning; identify themes and conventions across a range of texts; draw inferences and justify responses using evidence; organise ideas into paragraphs around a theme; use increasingly varied vocabulary and sentence structures; participate in discussions, presentations and debate |
| **Art and Design** | create sketchbooks to record observations and develop ideas; improve mastery of artistic techniques; use texture, pattern, form and materials purposefully; evaluate and discuss creative work and outcomes using different materials |
| **Design and Technology** | generate, develop and communicate ideas through discussion and design criteria; investigate and evaluate products; select and use materials and tools appropriately; evaluate and improve designs and outcomes |
| **Mathematics** | measure, compare and interpret information; identify patterns and relationships; apply mathematical reasoning and problem-solving skills through investigations, measuring, recording and interpretation of scientific findings |
| **Computing** | use technology purposefully to create, organise and present information; develop understanding of digital communication; select and use software effectively; understand how information found online may vary in reliability; use technology safely and responsibly |
| **Geography** | identify where materials and natural resources originate; use maps, atlases and digital mapping where appropriate; understand how environments and locations influence availability and use of materials |
| **Personal Development and Learning** | develop self-awareness and emotional understanding; build positive relationships and communication skills; develop resilience, teamwork and problem-solving skills; reflect on sustainability, responsibility and decision-making; consider different viewpoints and perspectives linked to inventions and material use |

**Reading Spine**

**Anchor Texts:**

- Genius! The Most Astonishing Inventions of all Time
- The Way Things Work Now

**Supporting texts/recommended reads:**

- What's it Made Of?
- How to Build a Home
- Science Makes Art Materials
- Ada's Violin
- Real Life Mysteries
- Iggy Peck Architect

**Reading Focus:**

- scientific enquiry and interpretation
- evidence and source evaluation
- explanatory and information texts
- comparison of scientific ideas, inventions and viewpoints
- disciplinary reading as scientists
- inference from scientific texts and investigations
- ambitious scientific vocabulary
- author viewpoint and reliability
- interpreting diagrams, models and scientific representations
- using evidence from texts to explain and justify ideas
- comparing information from multiple sources
- identifying how scientific understanding and inventions have developed over time

**Disciplinary Reading Opportunities**

- scientific information texts

- invention and engineering texts
- biographies of significant scientists, inventors and engineers
- scientific diagrams, models and labelled illustrations
- investigation records and evidence tables
- instructions and explanation texts
- scientific viewpoints and real-world applications of materials
- scientific reports and technological developments

**Genre Coverage**

| Genre | Coverage |
|---|---|
| Narrative | Exploring invention stories, scientific discoveries and first-person perspectives linked to scientists, inventors and engineers |
| Information texts | Reading scientific non-fiction texts, fact files, reports and reference materials linked to materials and inventions |
| Explanation texts | Understanding and creating texts explaining material properties, scientific investigations and changes in materials |
| Persuasive texts | Exploring and creating persuasive responses and arguments linked to scientific questions and design choices |
| Balanced argument / Discussion texts | Considering different perspectives and evaluating questions such as *Which material would be best for a new invention?* |
| Biography | Reading biographies and information about significant scientists, inventors, engineers and innovators |
| Poetry | Exploring science-inspired poetry and performance opportunities where appropriate |
| Scientific sources / Disciplinary reading | Interpreting diagrams, investigation evidence, scientific models and source materials to support scientific enquiry |
| Spoken presentation | Debate, presentations, invention showcases, demonstrations and collaborative discussion activities |

**Reading Progression Audit**

| Area | Progression within this Unit |
|---|---|
| Vocabulary development | Pupils progress from understanding and using familiar scientific vocabulary to applying increasingly ambitious disciplinary language including conductivity, transparency, solubility, reversible, irreversible, innovation and investigation independently |

| | |
|---|---|
| Fluency and stamina | Pupils develop increasing fluency and confidence when reading longer and more complex scientific texts, invention texts and information sources; sustained reading opportunities support increasing reading stamina |
| Retrieval | Pupils progress from locating explicit information to independently retrieving and selecting relevant evidence from a range of texts and scientific sources |
| Inference | Pupils progress from making simple inferences to justifying ideas and scientific explanations using evidence from texts, investigations and discussion |
| Author intent and viewpoint | Pupils develop understanding that texts and sources may present different viewpoints and explanations and begin to evaluate author choices and perspectives |
| Scientific disciplinary reading | Pupils work increasingly as scientists by interpreting diagrams, investigations, scientific models and evidence to construct understanding |
| Comparison across texts | Pupils compare themes, ideas, viewpoints and information across invention texts, information texts and scientific sources |
| Discussion and response | Pupils progress from supported responses to independently discussing, questioning and justifying opinions using evidence |
| Reading across genres | Pupils access increasingly varied genres including biographies, information texts, explanation texts, scientific reports and source materials |
| Reading for purpose | Pupils increasingly understand that reading supports enquiry, knowledge-building and scientific understanding across the wider curriculum |

**Reading Spine Links**

**Reading Spine Unit:** Materials Matter (UKS2)

**Reading focus areas:**

- scientific enquiry and interpretation
- invention and technological development
- retrieval and interpretation from scientific and non-fiction texts
- comparison of viewpoints and evidence
- ambitious scientific and disciplinary vocabulary
- discussion, questioning and scientific reasoning

**Fluency approaches:**

- reader's theatre
- performance reading
- oral rehearsal before writing
- guided group reading aloud
- choral reading of scientific explanations and invention texts
- echo reading for scientific vocabulary

- storytelling and role-play
- debate and collaborative discussion
- partner explanation and discussion

**Retrieval focus:**

- recalling key vocabulary and scientific concepts
- retrieving information from fiction, non-fiction and scientific texts
- identifying evidence from investigations, diagrams and images
- using evidence to explain ideas and scientific understanding
- comparing materials, inventions and scientific viewpoints

**Reading Spine Impact**

**The Reading Spine is intentionally designed to ensure pupils experience:**

- scientific information texts, biographies and invention-focused texts
- increasingly ambitious scientific and disciplinary vocabulary
- opportunities for retrieval, inference and interpretation
- exposure to scientific evidence and discussion-based learning
- opportunities to compare viewpoints and justify ideas using evidence
- increasingly sophisticated reading, discussion and critical thinking skills
- meaningful opportunities to develop fluency, comprehension and scientific understanding through reading across the curriculum

**Vocabulary Development**

Key vocabulary is revisited through oral rehearsal, discussion, retrieval practice and repeated shared reading experiences.

**Tiered Vocabulary:**

**Tier 1:** material, object, wood, plastic, metal, glass, fabric, hard, soft, strong, weak

**Tier 2:** property, flexibility, transparency, conductivity, dissolve, solution, evidence, investigation, invention, innovation

**Tier 3:** solubility, conductivity, magnetism, reversible, irreversible, evaporation, filtration, comparative test, fair test, engineer, scientist, innovation, suitability, thermal conductor, insulator

**Oracy & Fluency:**

- echo reading for scientific and disciplinary vocabulary
- paired reading
- oral storytelling linked to inventions, discoveries and scientific developments
- performance reading
- discussion circles
- reader's theatre
- storytelling and role-play (e.g. scientist, inventor, engineer, designer, researcher, architect, presenter)
- guided group reading aloud

**SEMH Reading Approach:**

Texts are selected to provide emotional safety, opportunities for curiosity, strong relational themes and meaningful discussion to support regulation, belonging and confidence. Scientific learning is carefully scaffolded through visual supports, explicit vocabulary teaching, repeated reading opportunities and practical experiences to reduce cognitive load and support access to ambitious learning. Reading experiences are designed to build curiosity, encourage scientific enquiry and develop confidence without reducing curriculum expectations.

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- partner explanation and evidence talk
- questioning and scientific enquiry discussion
- collaborative interpretation of scientific diagrams, investigations, models and images
- explanation and justification using scientific evidence
- debate and persuasive discussion (e.g. *Which material would be best for a new invention?* or *Should plastic always be replaced by alternative materials?*)
- presentation and invention showcase activities
- oral rehearsal before writing and discussion tasks

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**Reading experiences are designed to:**

- build curiosity through scientific enquiry, inventions, investigations and real-world problem-solving
- provide opportunities for repeated reading and oral rehearsal to strengthen fluency and confidence
- use diagrams, models, images, investigation materials and visual prompts to support understanding
- encourage discussion and exploration before recording ideas
- strengthen comprehension through retrieval, prediction, inference and interpretation of evidence
- provide structured opportunities for success and positive participation
- develop confidence in communicating ideas without reducing curriculum expectations
- promote belonging, confidence and positive reading identities through meaningful and engaging texts
- support pupils to explore different perspectives, inventions and scientific discoveries through discussion and collaborative learning
- develop curiosity, critical thinking and understanding through carefully selected texts and scientific themes
- support executive functioning through chunked information, explicit modelling and predictable learning routines
- develop confidence in using ambitious scientific and disciplinary vocabulary through repeated exposure and practical application

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**Visits and Visitors:**

**Visits and visitors are used to:**

- deepen understanding of materials, inventions and scientific concepts through first-hand and meaningful experiences
- provide opportunities for scientific enquiry and investigation
- develop curiosity through real objects, demonstrations and expert knowledge
- strengthen understanding of scientific evidence and investigation processes
- provide opportunities for discussion, questioning and collaborative learning
- develop understanding of how scientific ideas influence everyday life and innovation
- support vocabulary development and disciplinary understanding through authentic experiences
- strengthen confidence, communication and engagement through memorable learning opportunities
- create opportunities for pupils to make connections between scientific learning and the modern world
- promote belonging and positive learning experiences through engaging and accessible activities

**Possible visits and visitors may include:**

- science museums with engineering, invention or materials exhibitions

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- virtual science museum tours and STEM experiences
- scientists, engineers, architects or inventors as visitors
- design and technology workshops linked to materials and product design
- STEM ambassadors or careers visitors
- recycling and sustainability workshops
- building or construction visitors linked to materials and structures
- immersive science experiences and practical investigation workshops
- local educational visits that support scientific investigation and understanding of materials in the real world
- creative workshops exploring how materials are used within art, engineering and design

**Home Learning:**

- family discussion prompt linked to materials, inventions or everyday uses of materials (e.g. *Why are different materials used for different objects?* or *How do inventions change our lives?*)
- simple creative activity to reinforce retrieval (e.g. design an invention, create a labelled diagram of a material investigation, design packaging, create a material property poster or make a model using recycled materials)
- optional object, photograph, drawing or spoken contribution to bring back and share with the class
- short reading, storytelling or discussion activity linked to anchor or supporting texts
- comparison and observation activity (e.g. compare materials used around the home, compare old and modern inventions or compare natural and manufactured materials)
- vocabulary retrieval activities using key scientific and disciplinary vocabulary
- research task linked to a scientific question (e.g. *Why are some materials waterproof? How do scientists choose materials?* or *How have materials changed inventions and everyday life?*)

**Home Reading Opportunities:**

Families are encouraged to revisit key texts together, practise repeated reading and discuss scientific themes, vocabulary and ideas. Opportunities for discussion should support curiosity, questioning and understanding of materials, inventions and how scientific understanding influences everyday life.

**Topics for discussion may include:**

- properties of materials and why different materials are used for different purposes
- inventions and how they have changed everyday life
- similarities and differences between natural and manufactured materials
- significant scientists, inventors and engineers
- scientific evidence and investigation
- questions about how materials affect the world around us
- sustainability and how materials can impact people and the environment
- design choices and why certain materials are more suitable than others
- problem-solving and how scientific ideas help improve inventions and technology

**Assessment opportunities:**

Assessment information is used to identify barriers, inform adaptive teaching and ensure pupils receive timely support and challenge.

| Assessment Area | Assessment Opportunities within this Unit |
|---|---|
| **Scientific knowledge** | Retrieval quizzes, classification activities, vocabulary checks and discussion tasks linked to materials, properties, dissolving and changes in materials |
| **Scientific enquiry** | Observation of questioning, planning investigations, prediction activities, evidence gathering and practical enquiry tasks |
| **Reading** | Retrieval, inference and interpretation activities linked to scientific texts, invention texts and non-fiction sources |
| **Writing** | Scientific reports, explanations, diary entries, balanced arguments, persuasive writing and extended written outcomes |

| | |
|---|---|
| **Vocabulary development** | Oral rehearsal, vocabulary retrieval activities, discussion and independent application within written outcomes |
| **Spoken language / Oracy** | Discussion, debate, presentations, role-play and explanation of ideas using scientific vocabulary |
| **Scientific interpretation** | Analysis of results, comparison of findings and justification using evidence |
| **Independence** | Observation of independent application, organisation of ideas, selection of strategies and participation in enquiry tasks |
| **Final outcome** | Materials Investigation Showcase, invention presentations or enquiry outcomes demonstrating substantive knowledge and disciplinary understanding |
| **Pupil voice and reflection** | Discussion, self-reflection and evaluation of learning, understanding and confidence |

**Assessment Checkpoints**

Teachers monitor whether pupils can:

**Knowledge**

- identify material properties and changes in materials
- recall scientific vocabulary linked to materials and their uses
- explain how material properties influence purpose and function

**Disciplinary Thinking**

- ask scientific questions and investigate ideas
- identify patterns and relationships within findings
- draw conclusions using evidence

**Application**

- communicate findings through spoken, practical and written outcomes
- explain ideas using scientific vocabulary
- apply learning independently within the final outcome

**Leaders Monitor Impact Through:**

- pupil voice discussions
- work scrutiny
- retrieval quizzes
- vocabulary use in discussion and writing
- lesson visits
- assessment information
- final outcomes and presentations
- reading fluency checks
- pupil discussion linked to anchor texts
- Reading Spine progression reviews
- monitoring use of ambitious scientific and disciplinary vocabulary in reading and writing
- monitoring interpretation and use of scientific evidence within discussion and written outcomes
- monitoring application of scientific enquiry, investigation and critical thinking skills across learning outcomes
- monitoring pupils' ability to justify scientific explanations and communicate understanding using evidence

- monitoring understanding of material properties, changes and links between scientific concepts across learning
- monitoring pupils' ability to ask scientifically relevant questions and apply disciplinary thinking
- monitoring engagement, confidence and participation within discussion, debate and collaborative enquiry activities
- monitoring independent application of scientific knowledge and skills across outcomes
- monitoring pupils' ability to plan, carry out and evaluate investigations appropriately
- monitoring use of scientific reasoning and evidence when explaining conclusions and outcomes

**Links to Whole-School Policies**

**This unit should be delivered in line with:**

- Curriculum Policy
- Teaching and Learning Policy
- Reading Policy / Reading Spine
- Behaviour and Relationships Policy
- SEND Policy
- Assessment Policy
- Equality and Accessibility Policy
- PSHE Policy
- Safeguarding Policy

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## Appendix 1: Year 5-6 National Curriculum Progression Overview

| Area | Year 5 | Year 6 |
|---|---|---|
| Reading | Retrieve, infer and justify ideas from increasingly complex texts | Evaluate viewpoints, themes and author choices using evidence across texts |
| Vocabulary | Apply ambitious subject-specific vocabulary with support | Independently select precise disciplinary vocabulary for purpose |
| Writing | Write for a range of audiences and purposes using appropriate structures | Sustain and adapt writing independently for different audiences and purposes |
| Grammar & punctuation | Apply Y5 grammar structures appropriately | Manipulate structures purposefully for effect and precision |
| Spoken language | Participate in discussion and justify viewpoints | Lead discussion, challenge ideas respectfully and communicate confidently |
| Historical thinking | Use evidence and chronology to explain events | Evaluate interpretations and analyse reliability of evidence |
| Scientific enquiry | Plan investigations and identify patterns | Evaluate evidence, justify conclusions and explain variables |
| Geographical thinking | Use maps and evidence to explain places and environments | Evaluate relationships between people, environments and change |
| Religious / reflective thinking | Compare beliefs and viewpoints respectfully | Interpret meaning and justify perspectives using evidence |
| Computing | Select and use digital tools appropriately | Evaluate sources and select technologies purposefully |
| Creative thinking | Generate ideas and explain choices | Refine, evaluate and justify creative decisions independently |
| Independence | Select resources with support | Plan, organise and evaluate learning independently |

## Appendix 2: Year 5-6 Disciplinary Knowledge Progression

| Subject Discipline | Year 5 pupils increasingly learn to… | Year 6 pupils increasingly learn to… |
|---|---|---|
| Historian | identify evidence, chronology and cause | evaluate interpretations and justify conclusions |
| Scientist | observe, investigate and identify patterns | evaluate evidence and explain findings critically |
| Geographer | identify patterns and relationships between places | explain interdependence and evaluate geographical issues |

| | | |
|---|---|---|
| Environmental Investigator | recognise connections within ecosystems | evaluate human impact and sustainability issues |
| Reflective Thinker | compare beliefs, values and experiences | interpret viewpoints and justify perspectives |
| Reader | retrieve, infer and discuss themes | evaluate viewpoints and author intent |
| Writer | organise ideas for purpose and audience | manipulate language and structure deliberately |
| Artist / Designer | explore and create using techniques | refine and justify artistic decisions |
| Musician | create and perform using musical elements | evaluate and improve compositions independently |
| Health Investigator | identify factors affecting wellbeing | evaluate choices and explain impacts on wellbeing |
| Digital Creator | locate and organise information | evaluate reliability and create purposeful outcomes |

## Appendix 3 - Reading Spine Progression Across UKS2

**Purpose**

The Storyybrook Reading Spine is designed to ensure pupils experience a broad and ambitious range of high-quality texts that progressively develop reading fluency, vocabulary, comprehension, disciplinary thinking and understanding of the wider world. Texts are carefully selected to provide emotional safety, opportunities for discussion and increasing challenge whilst maintaining high expectations for all learners.

**The Reading Spine supports pupils to:**

- develop fluency, stamina and confidence as readers
- encounter increasingly ambitious vocabulary and language structures
- experience a wide range of authors, themes, cultures and perspectives
- strengthen retrieval, inference and interpretation skills
- develop disciplinary reading across subjects
- communicate ideas confidently through discussion and writing
- develop empathy, curiosity and understanding of the wider world
- access increasingly sophisticated texts and ideas in preparation for secondary education

**Reading Progression Across UKS2**

| Area | Year 5 | Year 6 |
|---|---|---|
| **Vocabulary development** | Understand and apply ambitious vocabulary within discussion and reading | Independently select and apply precise disciplinary and thematic vocabulary |
| **Reading fluency** | Read increasingly complex texts with developing confidence and expression | Sustain fluency, expression and stamina across extended texts |

| Area | Year 5 | Year 6 |
|---|---|---|
| **Retrieval** | Retrieve information and identify relevant evidence | Select and synthesise evidence across multiple sources |
| **Inference** | Infer meaning and justify responses using evidence | Evaluate interpretations and viewpoints critically |
| **Author intent** | Identify author choices and themes | Analyse author intent and evaluate impact |
| **Comparison across texts** | Compare themes, characters and experiences | Compare viewpoints, themes and interpretations critically |
| **Disciplinary reading** | Interpret information within subject contexts | Apply reading skills independently across subjects |
| **Discussion and response** | Explain ideas and justify opinions | Lead discussion and communicate increasingly sophisticated responses |
| **Reading for purpose** | Recognise how reading supports learning | Apply reading strategically to investigate, evaluate and communicate understanding |

**Text Progression Across UKS2**

Pupils progressively experience:

- increasingly sophisticated narratives
- biographies and significant individuals
- poetry and performance texts
- explanation and information texts
- persuasive and discussion texts
- historical, scientific and geographical source materials
- disciplinary texts linked to wider curriculum learning
- texts presenting different viewpoints and perspectives
- increasingly complex themes including identity, belonging, resilience, responsibility, community and change

**Fluency Progression Across UKS2**

Fluency approaches are consistently revisited and strengthened through:

- echo reading
- choral reading
- guided reading aloud
- partner reading
- reader's theatre
- storytelling and role-play
- oral rehearsal before writing
- discussion and debate activities
- performance opportunities

**Pupils progress from:**

supported reading and oral rehearsal
↓
increasing expression and confidence
↓
independent fluency and purposeful communication

**Disciplinary Reading Progression Across UKS2**

**Pupils increasingly learn to:**

retrieve → infer → interpret → compare → justify → evaluate → communicate independently

**Pupils move from:**

- identifying information and themes
- discussing ideas and viewpoints
- interpreting meaning using evidence

**Towards:**

- evaluating viewpoints and evidence critically
- comparing interpretations across texts and subjects
- independently applying reading skills across the wider curriculum

**Impact**

By the end of UKS2 pupils demonstrate increasing confidence as readers who can:

- read with fluency, expression and stamina
- interpret increasingly complex texts and ideas
- justify thinking using evidence
- communicate understanding confidently
- apply reading skills across subjects
- use ambitious vocabulary independently
- think critically and reflect thoughtfully
- access secondary curriculum expectations with confidence

**Appendix 4: Storyybrook Implementation Notes**

**Adults say**

**Retrieval**

- "What do you already remember?"
- "Can you tell me something from last lesson?"

**Vocabulary**

- "Can you use that word in a sentence?"
- "What does that word mean?"

**Reasoning**

- “What evidence supports your thinking?”
- “What makes you think that?”

**Reflection**

- “Has your thinking changed?”

**Adults do**

□ regulate and prepare for learning
□ explicitly model new learning
□ pre-teach vocabulary
□ use visuals and scaffolds
□ chunk instructions
□ provide oral rehearsal opportunities
□ revisit prior learning through retrieval
□ gradually remove support to build independence

**Adults look for**

**Knowledge**

□ recall of sticky knowledge
□ accurate vocabulary use
□ application of prior learning

**SEMH**

□ engagement
□ regulation
□ confidence
□ participation

**Independence**

□ reduced adult support
□ ownership of learning
□ increasing resilience