

Scheme of Work

Years:
3&4

Title:
Light and Shadows

Weeks:
5 weeks

This unit builds directly upon Key Stage 1 learning by extending pupils' scientific understanding, disciplinary thinking, vocabulary development and independence through the study of light and shadows. Pupils revisit and deepen prior learning about sources of light and darkness while developing increasingly secure understanding of how light travels, how shadows are formed and how light behaves when reflected or blocked.

Learning is carefully sequenced across five weeks so pupils progressively develop substantive scientific knowledge through practical enquiry, observation, prediction, discussion and reasoning. Pupils begin by identifying and exploring different sources of light before investigating darkness, reflection and shadow formation. They then develop understanding of how shadows change depending on the position of a light source and apply their knowledge through increasingly independent investigations and purposeful outcomes.

Through practical exploration, pupils begin to understand how scientists observe patterns, ask questions, gather evidence, test ideas and draw conclusions from evidence.

Pupils learn to:

- identify and describe natural and artificial light sources
- understand that light is needed in order to see things
- recognise that darkness is the absence of light
- investigate how light can be reflected from surfaces
- explain how shadows are formed when light is blocked by opaque objects
- observe and identify patterns in changing shadows
- make predictions and justify ideas using evidence and scientific reasoning
- retrieve and apply prior knowledge independently
- use increasingly ambitious scientific vocabulary
- work collaboratively and sustain focus for longer periods
- reflect critically on learning and outcomes
- identify common appliances that use electricity
- construct simple series electrical circuits
- identify and name components within a simple circuit including cells, wires, bulbs, buzzers and switches
- identify whether or not a lamp will light within a simple series circuit
- recognise that some materials are conductors and others are insulators

This unit demonstrates how a knowledge-rich, ambitious and SEMH-informed curriculum can simultaneously develop substantive scientific knowledge, disciplinary understanding, resilience, communication and independence. Learning opportunities encourage pupils to question, investigate and explain the world around them whilst developing confidence and curiosity as young scientists.

Within the Storybrook context, practical experiences, collaborative enquiry and purposeful outcomes support pupils to develop confidence, belonging and engagement whilst accessing ambitious scientific learning.

For SEMH learners, learning is scaffolded through predictable routines, retrieval practice, visual supports, explicit modelling, chunked tasks, emotional regulation opportunities, movement breaks and relationship-based teaching. Adults carefully support executive functioning, confidence and engagement without reducing curriculum ambition.

Adaptive Teaching

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
- independently plan investigations linked to light and shadow patterns
- analyse observations and evaluate the reliability of findings
- justify scientific explanations using evidence and precise vocabulary

Hook:

Pupils are immersed in the world of Light and Shadows through artefacts, role play, practical enquiry, collaborative challenges, storytelling, video stimuli and sensory exploration designed to provoke curiosity and engagement.

Opening challenge

Can you become an expert investigator and create an outcome that teaches others what you have discovered?

Writing Outcomes

By the end of the unit pupils will:

- orally rehearse ideas before recording and explaining scientific thinking
- write descriptive phrases and sentences using ambitious scientific vocabulary linked to light, reflection and shadows
- create labels, captions and annotated diagrams linked to light sources, reflection and shadow formation
- record predictions before investigations using scientific reasoning and evidence
- compose short explanation texts describing how light travels and how shadows are formed
- write comparative responses identifying similarities and differences between materials, light sources and shadow observations
- record observations, measurements and results from practical investigations using increasingly precise scientific vocabulary
- use evidence from investigations to explain findings and justify conclusions
- create simple scientific reports, fact files or explanation texts linked to light and shadows

	<ul style="list-style-type: none"> • communicate ideas and scientific understanding through discussion, practical outcomes and written responses • organise ideas into sentences and increasingly coherent paragraphs appropriate to purpose and audience • edit and improve writing through discussion, peer support and adult guidance • present findings through spoken, practical and written outcomes for different audiences <p>Mixed-age challenge (Year 4 depth):</p> <ul style="list-style-type: none"> • explain scientific understanding using increasingly precise vocabulary independently • justify predictions and conclusions using evidence from investigations • organise explanations into coherent sections and paragraphs • adapt writing for different purposes including reports, explanations and presentations
<p>Outcomes:</p> <p>By the end of the unit pupils produce:</p> <ul style="list-style-type: none"> • a Light and Shadows Showcase shared with adults, peers or visitors demonstrating scientific understanding, investigation outcomes and communication skills • a collection of spoken, practical and written learning evidence • a scientific explanation text, investigation write-up or information outcome demonstrating understanding of light and shadow concepts • labelled diagrams, annotated drawings and scientific observations linked to light sources, reflection and shadow formation • predictions, investigation records and conclusions using scientific vocabulary and evidence • comparative work linked to different materials, light sources or changing shadows • a practical outcome linked to scientific understanding (e.g. shadow puppets, shadow investigations, light experiments or models) • vocabulary-rich classroom display work linked to scientific enquiry and disciplinary vocabulary • a collaborative presentation, demonstration or performance outcome explaining learning and findings • digital or creative outcomes such as photographs, presentations or recorded explanations where appropriate 	<p>Success Criteria:</p> <ul style="list-style-type: none"> • use scientific vocabulary accurately within discussion and learning activities • identify and describe a range of natural and artificial light sources • explain that light is needed in order to see things • recognise that darkness is the absence of light • explain how shadows are formed when light is blocked by opaque objects • observe and identify patterns in changing shadows • make predictions and explain ideas using evidence and scientific reasoning • retrieve information and apply learning during practical investigations • record observations, results and findings using appropriate scientific vocabulary and sentence structures • participate in discussion, collaborative activities and practical investigations • communicate scientific understanding confidently through practical, spoken and written outcomes

Secure End Point

Pupils can:

- explain how light travels and how shadows are formed
- identify and explain how different materials affect the movement of light
- use observations and evidence from investigations to identify patterns and justify conclusions
- use scientific vocabulary accurately to explain findings and ideas
- communicate scientific understanding confidently through spoken, practical and written outcomes

Common Misconceptions

- light only comes from the Sun
- darkness is a thing or source rather than the absence of light
- people can see objects without light being present
- shadows are objects rather than areas where light is blocked
- shadows are always the same size and shape
- shadows move on their own rather than changing because of the position of the light source
- all materials allow light to pass through in the same way
- transparent, translucent and opaque mean the same thing
- reflective objects create light rather than reflect it
- mirrors produce light rather than bounce light from a source
- brighter light sources always create larger shadows
- objects always create shadows of the same size regardless of distance or position
- scientific investigations always produce one perfect answer
- predictions are guesses rather than ideas informed by prior knowledge and evidence

Sticky Knowledge (Non-negotiable Learning)

- light is needed in order for us to see things
- some objects are natural light sources and some are artificial light sources
- darkness is the absence of light
- light travels from a source and reflects from surfaces into our eyes so that we can see objects
- reflective surfaces can change the direction of light
- shadows are formed when light is blocked by an opaque object
- transparent materials allow most light to pass through, translucent materials allow some light to pass through and opaque materials block light
- the size, shape and position of a shadow can change depending on the position of the light source and the object
- scientists use observation, prediction and evidence to investigate and explain ideas
- evidence from investigations helps us draw conclusions and explain patterns
- light from the Sun can be dangerous and we should protect our eyes appropriately

Year 4 Extension / Mixed-age Challenge

- explain observations using increasingly precise scientific vocabulary
- identify and explain patterns in investigations independently
- justify predictions and conclusions using evidence
- organise and communicate findings with increasing independence
- make links between scientific ideas and real-life experiences
- evaluate investigations and suggest improvements

Core taught content within this unit:

- recognise that light is needed to see
- identify light sources
- explain how shadows form and change

Wider application and retrieval opportunities:

- observe patterns and changes
- use prediction and investigation skills
- apply vocabulary through practical enquiry

Retrieval Opportunities

Week 1 - recall prior learning linked to day and night, light sources and seeing; discuss existing knowledge and misconceptions about light and shadows; revisit vocabulary linked to light, dark, source and shadow

Week 2 - retrieve information about natural and artificial light sources; recall key vocabulary through discussion and oral rehearsal; explain that light is needed in order to see things and recognise that darkness is the absence of light

Week 3 - retrieve understanding of reflection and how light behaves; recall properties of materials and explain how reflective surfaces change the direction of light; use scientific vocabulary within discussion and practical activities

Week 4 - revisit shadow formation and investigate how shadows change; retrieve prior learning about opaque, translucent and transparent materials; identify and explain patterns observed during investigations

Week 5 - revisit sticky knowledge from across the unit; retrieve learning linked to light sources, reflection and shadows; justify understanding using evidence and explain how scientific thinking has developed throughout the unit

Prior Learning

Pupils may already:

- recognise that darkness occurs when light is absent
- identify everyday sources of light including the Sun and artificial light sources
- understand that some materials can be seen because light reflects from them
- observe and describe changes within their environment
- use simple scientific vocabulary linked to light and observation
- ask questions and share ideas during practical activities and discussions
- make simple predictions based on observations and prior experiences
- communicate ideas through speaking, drawing and writing
- recognise patterns and similarities when observing objects and events
- understand basic safety expectations linked to using light sources appropriately

Reading Retrieval Opportunities

- retrieval of scientific vocabulary linked to light and observation
- flashback questions revisiting prior science concepts
- recall of sticky knowledge through investigations

- retrieval through explanation and discussion

Spelling

Pupils apply:

- spelling patterns and rules taught through the school spelling programme and English curriculum
- common exception words appropriate to Year 3 and Year 4 expectations
- topic vocabulary linked to light, reflection, shadows, transparent, translucent, opaque and investigation
- prefixes and suffixes introduced within Year 3/4 learning (e.g. *inter-*, *sub-*, *anti-*, *super-*, *-ly*, *-ation*)
- oral segmenting, syllabification and proofreading strategies
- spelling through repeated retrieval, oral rehearsal and purposeful application within writing tasks
- increasing independence in checking and editing spelling within written outcomes
- accurate application of scientific and disciplinary vocabulary within spoken and written responses
- apply spelling knowledge within scientific vocabulary including *electricity*, *circuit*, *conductor*, *insulator* and *switch*

Spelling Progression Links - Unit Specific

- apply prefixes including **sub-**, **inter-**, **anti-** and **super-** within scientific vocabulary
- practise Year 3-4 statutory spelling words through scientific investigation outcomes
- apply spelling knowledge within explanation texts, diagrams and observations

Grammar and Punctuation Focus

Pupils develop:

- use of **expanded noun phrases** to describe light sources, materials and observations
- use of **coordinating conjunctions** (*and*, *but*, *so*) to connect ideas and observations
- use of **subordinating conjunctions** (*because*, *when*, *if*, *although*) to explain scientific reasoning and relationships
- use of **fronted adverbials** to sequence investigations and explain findings (*During the investigation...*, *As the light moved...*, *Later in the enquiry...*)
- use of **comparative language** to explain similarities and differences between materials and observations
- accurate use of **capital letters**, **full stops**, **question marks** and **commas** within written outcomes
- use of **precise scientific vocabulary** within spoken and written explanations
- editing and improving work for spelling, punctuation and meaning with increasing independence

Computing Integration

Pupils learn to:

- use simple programmable devices
- predict outcomes from sequences of commands
- identify and correct errors within instructions

NC coverage:

- programming
- debugging

Independence

Pupils move from:

- supported exploration and heavily modelled scientific investigation
- relying on adults to identify important information and explain scientific ideas
- using ideas mainly through guided talk and structured responses
- needing support to make predictions, record observations and organise findings
- using scientific vocabulary through adult modelling and prompts

To:

- increasingly independent participation in scientific enquiry and investigation activities
- making predictions and identifying patterns with growing confidence
- selecting and applying scientific vocabulary independently within speaking and writing
- organising and communicating observations, findings and conclusions with reduced prompting
- using evidence from investigations to explain thinking and justify ideas independently
- sharing learning confidently through presentations, practical outcomes and discussion

By the end of the unit pupils can:

- recall and apply key vocabulary and sticky knowledge
- explain how light and shadows behave using scientific understanding
- use evidence from investigations to support conclusions
- communicate scientific understanding through practical, spoken and written outcomes
- present learning with increasing confidence and independence

Thinking:

This unit develops:

- scientific observation and enquiry
- prediction and reasoning
- comparison and identifying patterns
- interpretation of evidence and observations
- drawing conclusions from investigations
- communication and scientific vocabulary development
- reflection and collaboration
- making connections between scientific learning and the wider world

Cognitive Progression

Pupils move from:

identifying and recalling scientific information

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recognising patterns and making observations

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asking questions and making predictions

↓

investigating and gathering evidence

↓

explaining ideas using scientific vocabulary

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communicating and justifying understanding using evidence

4 Lead Subjects National Curriculum Links

Subject 1: Science

Core Knowledge

Pupils develop understanding of light and shadows through practical investigation, observation and discussion. Pupils explore sources of light, understand that light is needed in order to see and investigate how shadows are formed and change. Learning develops understanding of how scientific knowledge helps us explain the world around us.

Year 3

- identify and describe natural and artificial light sources
- recognise that light is needed in order to see things and that darkness is the absence of light
- investigate how light is reflected from surfaces
- observe and identify patterns in changing shadows
- ask questions and carry out simple practical investigations linked to light and shadows

Year 4 extension

- explain relationships and identify patterns within investigations and observations
- interpret evidence and use findings to explain how light behaves
- justify scientific conclusions using increasingly independent reasoning
- communicate scientific understanding using precise vocabulary

National Curriculum links

Pupils:

- recognise that they need light in order to see things and that darkness is the absence of light
- notice that light is reflected from surfaces
- recognise that light from the sun can be dangerous and identify ways to protect eyes
- recognise that shadows are formed when the light from a source is blocked by an opaque object
- find patterns in the way that the size of shadows change
- ask relevant questions and use different types of scientific enquiries to answer them
- make systematic and careful observations and gather evidence
- record findings and communicate ideas using scientific language, drawings and written outcomes

Disciplinary Knowledge

Pupils work as scientists by:

- observing
- predicting
- asking questions
- investigating
- identifying patterns
- gathering evidence
- drawing conclusions
- communicating findings

Disciplinary Progression

- observe → question → investigate → predict → identify patterns → conclude → justify

Secure End Point

Pupils independently use scientific vocabulary and evidence from investigations to explain how light and shadows behave and communicate understanding confidently through practical, spoken and written outcomes.

Subject 2: English

Core Knowledge

Pupils develop understanding of explanation texts, descriptive writing and scientific vocabulary linked to light and shadows. Pupils use reading and discussion to explore scientific ideas whilst developing vocabulary, communication and understanding.

Year 3

- retrieve information from fiction and non-fiction texts
- identify scientific vocabulary and key ideas
- discuss observations and predictions
- communicate understanding through discussion and writing

Year 4 Extension

- explain how vocabulary creates meaning and atmosphere
- justify interpretations using evidence independently
- communicate increasingly sophisticated responses through discussion and writing

Disciplinary Knowledge

Pupils work as readers and writers by:

- retrieving information
- identifying key ideas
- interpreting vocabulary
- discussing and reflecting on meaning
- explaining ideas using evidence
- communicating understanding through spoken and written outcomes

Disciplinary Progression

retrieve → infer → interpret → explain → justify

Secure End Point

Pupils independently communicate scientific understanding using evidence, ambitious vocabulary and increasingly confident spoken and written responses.

Area	Coverage within this unit
Reading	scientific enquiry; retrieval from fiction and non-fiction texts; cause and effect; evidence and interpretation; prediction; inference; comparison of light sources and shadows; shared reading of anchor texts
Writing	oral rehearsal; sentence composition; scientific explanation writing; investigation write-ups; prediction and conclusion writing; information texts; captions and labels; shared and independent writing
Spelling	application of Year 3-4 spelling rules and patterns; common exception words; scientific topic vocabulary linked to light and shadows; prefixes and suffixes; proofreading and editing strategies
Grammar and Punctuation	expanded noun phrases; conjunctions including <i>because</i> , <i>when</i> , <i>if</i> , <i>although</i> , <i>so</i> and <i>while</i> ; fronted adverbials; commas after fronted adverbials; paragraphs; accurate punctuation and sentence construction
Spoken Language / Oracy	discussion; questioning; scientific enquiry; prediction and reasoning; presentation; collaborative talk; explanation and justification using evidence

Genre coverage

Genre	Coverage
Narrative	investigation diary writing; imaginative shadow stories; descriptive narratives linked to light and darkness
Explanation	explanation of how light travels; explanation of reflection and shadow formation
Information	labelled diagrams; information texts; scientific reports and fact files
Persuasion	invitation/poster encouraging visitors to attend a Light and Shadows showcase; persuasive writing linked to safety around light sources
Comparison	comparison of materials and light sources; comparing observations and investigation outcomes
Spoken presentation	scientific presentations; investigation outcomes; explanation and evidence-based discussion

Subject 3: Art

Core Knowledge

Pupils develop understanding of how light, shade, shape and pattern can be used within artwork. Pupils explore how artists use light and shadow to create mood, contrast and visual effect.

Year 3

- explore ideas through drawing and visual responses
- experiment with light, dark and shadow effects
- create artwork inspired by observation and investigation
- discuss artistic choices

Year 4 Extension

- use artistic techniques with increasing control and purpose
- explain how artistic choices communicate meaning
- select materials and techniques intentionally
- evaluate and refine outcomes independently

Disciplinary Knowledge

Pupils work as artists by:

- exploring ideas
- experimenting with techniques
- creating outcomes
- refining work
- evaluating choices

Disciplinary Progression

explore → experiment → create → refine → evaluate

Secure End Point

Pupils independently create and explain artwork using light and shadow techniques with increasing confidence and purpose.

Links to Design Technology

Design

- design a light source or illuminated object

Make

- create using simple electrical components

Evaluate

- test effectiveness and identify improvements

DT coverage

- electrical systems

Subject 4: Music

Core Knowledge

Pupils develop understanding of how music can communicate ideas, mood and atmosphere through sound, rhythm and performance. Pupils explore how sounds and musical elements can represent light, darkness and changing shadows and use musical responses to communicate scientific understanding creatively.

Year 3

- identify how music can create mood and atmosphere
- explore pulse, rhythm and sound patterns linked to light and shadow themes
- participate in collaborative performance activities using voices, body percussion and instruments
- respond creatively to sounds and musical experiences

Year 4 Extension

- explain how rhythm, pitch, tempo and dynamics affect meaning and atmosphere
- create and refine increasingly purposeful musical compositions inspired by light and shadow investigations
- perform with increasing confidence, control and expression
- evaluate and improve musical responses and outcomes independently

Disciplinary Knowledge

Pupils work as musicians by:

- listening and responding
- exploring sounds and musical elements
- creating and composing musical ideas
- performing collaboratively
- evaluating musical choices

Disciplinary Progression

listen → explore → create → perform → evaluate

Secure End Point

Pupils independently create and perform musical outcomes inspired by light and shadow concepts whilst explaining how musical elements communicate mood, atmosphere and meaning.

Music element	Integration
Listening and appraising	listen to music that creates different moods
Singing	songs linked to light, day and night
Composition	create contrasting soundscapes (light/shadow)
Performance	perform mood compositions
Musical vocabulary	pitch, dynamics, tempo

Application Subjects

Subject: Mathematics

Core Knowledge

Pupils develop understanding of how mathematical skills support scientific enquiry through measuring, comparing, observing patterns and interpreting findings. Pupils apply mathematical thinking to practical investigations involving light and shadows.

Year 3

- measure and compare lengths and distances linked to shadows
- identify and describe patterns and changes
- record observations and results using simple tables and diagrams
- use mathematical language to discuss findings

Year 4 Extension

- interpret patterns and relationships with increasing independence
- compare and analyse results from investigations
- explain mathematical reasoning using evidence
- present findings clearly using tables and charts where appropriate

Disciplinary Knowledge

Pupils work as mathematicians by:

- observing patterns
- measuring and comparing
- organising information
- interpreting findings
- reasoning mathematically
- explaining ideas

Disciplinary Progression

measure → compare → identify patterns → interpret → explain

Secure End Point

Pupils independently apply mathematical skills to scientific investigations and use evidence to identify and explain patterns confidently.

Subject: ICT

Core Knowledge

Pupils develop understanding of how technology can support investigation, communication and presentation of learning. Pupils use digital tools to record observations, organise information and communicate findings linked to light and shadows.

Year 3

- use digital tools to record investigations and observations
- create simple presentations and visual outcomes
- communicate ideas using technology
- use technology safely and appropriately

Year 4 Extension

- select appropriate digital tools independently
- organise and present information clearly for an audience
- evaluate and improve digital outcomes
- 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 create and communicate purposeful outcomes linked to scientific understanding and enquiry.

English Progression and National Curriculum Links

This curriculum follows a spiral progression model. Knowledge and skills are revisited and developed with increasing complexity. Pupils build upon prior learning through greater independence, increasingly ambitious vocabulary and increasingly sophisticated reading, writing and communication outcomes.

Reading

- retrieve information from fiction, non-fiction and scientific texts
- identify key ideas, themes and important scientific information within texts
- discuss vocabulary, scientific language and author choices
- make inferences using evidence from texts, images and observations
- compare ideas, findings and observations across investigations and experiences
- use evidence from reading to support understanding and discussion

Writing

- orally rehearse ideas before writing
- write descriptive phrases and sentences linked to light and shadow experiences
- compose scientific explanations, investigation write-ups and information texts
- create captions, labels and comparative responses linked to observations and evidence
- write reflections and responses linked to practical investigations and findings
- create written outcomes using increasingly ambitious scientific vocabulary

Grammar and Punctuation

- use expanded noun phrases to create detail and description
- extend ideas using conjunctions including *because*, *when*, *if*, *although*, *so* and *while*
- use fronted adverbials linked to time, place and cause
- organise ideas into paragraphs around themes and scientific concepts
- use punctuation accurately within increasingly detailed writing
- apply ambitious and topic-specific vocabulary to communicate ideas effectively

Spoken Language / Oracy

- participate in discussion and collaborative activities
- ask and answer questions using scientific vocabulary
- explain ideas and observations using evidence
- participate in presentations, discussion and scientific enquiry activities
- communicate understanding confidently through presentations and discussion

Mixed-age Challenge (Year 4 depth)

Reading

- identify themes and patterns across scientific texts and sources
- justify interpretations using evidence independently
- compare viewpoints and information across texts

Writing

- write increasingly detailed scientific explanations and investigation outcomes independently
- organise writing into coherent sections and paragraphs
- adapt writing for different audiences and purposes

Grammar

- use a wider range of conjunctions and sentence structures independently
- vary sentence openings and improve cohesion across writing
- apply increasingly ambitious scientific vocabulary accurately

Future Learning (English)

Pupils are preparing for future English and wider curriculum units where they will:

Reading

- retrieve, infer and interpret information from increasingly complex texts and sources
- compare themes, viewpoints and evidence across texts and curriculum areas

Writing

- write increasingly detailed explanations, reports and comparative outcomes
- justify ideas and conclusions using evidence

Grammar and Punctuation

- organise writing effectively for different purposes
- apply increasingly complex sentence structures accurately

Spoken Language / Oracy

- communicate ideas confidently through discussion, presentation and debate

Curriculum Progression and National Curriculum Links

Science

Year 3

- recognise that light is needed in order to see things and that darkness is the absence of light
- identify natural and artificial light sources
- recognise that light is reflected from surfaces
- explain that shadows are formed when light is blocked by opaque objects
- identify patterns in changing shadows
- use observations and practical investigations to develop understanding

Year 4 Extension

- explain observations using increasingly precise scientific vocabulary
- identify and explain patterns independently
- justify predictions and conclusions using evidence
- explain relationships between light sources, objects and changing shadows
- interpret findings and communicate scientific understanding with increasing independence

National Curriculum Links

Pupils:

- recognise that they need light in order to see things and that darkness is the absence of light
- notice that light is reflected from surfaces
- recognise that light from the Sun can be dangerous and identify ways to protect their eyes
- recognise that shadows are formed when light from a light source is blocked by an opaque object

- find patterns in the way that the size of shadows changes

Working Scientifically links:

Pupils investigate light and shadow patterns through prediction, observation and evidence-informed conclusions.

Progression:

- question → predict → investigate → observe → analyse → conclude → justify → evaluate

Art

Year 3

- explore ideas and record observations linked to light and shadow
- experiment with light, dark, tone and shape
- create visual responses inspired by observations and investigations
- discuss and describe artistic choices

Year 4 Extension

- use artistic techniques with increasing control and purpose
- select materials and techniques intentionally
- explain how artistic choices create mood and effect
- evaluate and refine work independently

National Curriculum Links

Pupils:

- create sketchbooks to record observations and review ideas
- improve mastery of drawing and artistic techniques
- use tone, pattern, shape and form purposefully
- evaluate and analyse creative work using artistic vocabulary

Music

Year 3

- identify how music can create mood and atmosphere
- explore pulse, rhythm and sound patterns linked to light and shadow themes
- participate in collaborative performance activities using voices, body percussion and instruments
- respond creatively to sounds and musical experiences

Year 4 Extension

- explain how rhythm, pitch, tempo and dynamics affect meaning and atmosphere
- create and refine increasingly purposeful musical compositions inspired by light and shadow investigations
- perform with increasing confidence, control and expression
- evaluate and improve musical responses and outcomes independently

National Curriculum Links

Pupils:

- play and perform in solo and ensemble contexts using voices and instruments
- improvise and compose music for different purposes
- listen with attention to detail and recall sounds with increasing accuracy
- use and understand musical vocabulary including pulse, rhythm, pitch, tempo and dynamics
- appreciate and respond to a range of musical experiences and traditions

Application Subject Progression and National Curriculum Links

Mathematics

Year 3

- measure and compare shadow lengths and observations
- identify and describe patterns and changes during investigations
- record findings using simple tables, diagrams and charts
- use mathematical vocabulary to discuss observations and results

Year 4 Extension

- interpret patterns and relationships independently
- compare and analyse findings with increasing accuracy
- explain mathematical reasoning using evidence
- organise and present findings clearly

National Curriculum Links

Pupils:

- measure, compare and interpret data
- identify patterns and relationships
- solve problems and explain reasoning
- apply mathematical understanding within practical contexts

ICT

Year 3

- use digital tools to record investigations and observations
- create simple presentations and visual outcomes
- communicate ideas using technology
- use technology safely and appropriately

Year 4 Extension

- select appropriate digital tools independently
- organise and present information clearly for an audience
- evaluate and improve digital outcomes
- communicate information confidently through a range of media

National Curriculum Links

Pupils:

- use technology purposefully to create, organise and present information
- develop understanding of digital communication
- select and use software effectively
- use technology safely and responsibly

Personal Development and Learning (PDL)

Year 3

- identify and discuss feelings and responses during collaborative learning
- recognise how perseverance and resilience support learning
- discuss thoughts and ideas respectfully
- reflect on personal responses to investigations and outcomes

Year 4 Extension

- explain how experiences and emotions can influence learning and behaviour
- discuss differing viewpoints with increasing confidence and empathy
- reflect on personal growth and understanding
- justify ideas respectfully using examples and discussion

National Curriculum Links

Pupils:

- develop self-awareness and emotional understanding
- build positive relationships and communication skills
- develop resilience and confidence
- reflect on experiences and learning

Cross-curricular links

Subject	Application
English	scientific explanations, investigation writing, descriptive writing, inference and evidence-based discussion
Science	scientific enquiry, observation, prediction, investigation, identifying patterns and drawing conclusions
Art	creating shadow artwork, observational drawing, experimenting with light, dark, tone and silhouette techniques
Personal Development and Learning	developing confidence, resilience, collaboration and reflection through investigations and shared learning experiences
ICT	recording investigations, creating presentations and communicating ideas digitally
Mathematics	measuring and comparing shadows, identifying patterns, interpreting results and applying reasoning skills
Reading Spine	disciplinary reading, vocabulary development, fluency, prosody and scientific interpretation opportunities

Substantive Knowledge Sequence

Week	Substantive knowledge
Week 1	Light is needed in order for us to see things; some objects are natural light sources and some are artificial light sources; scientists use observations and questions to investigate the world around them
Week 2	Darkness is the absence of light; light travels from a source and reflects from surfaces into our eyes so that we can see objects; different surfaces reflect light differently

	Light from the Sun can be harmful and we can protect our eyes safely.
Week 3	Transparent materials allow most light to pass through, translucent materials allow some light to pass through and opaque materials block light
Week 4	Shadows are formed when light is blocked by opaque objects; the position of a light source affects the size, shape and position of shadows
Week 5	Patterns can be identified through investigation and observation; evidence from investigations helps scientists explain ideas and draw conclusions; scientific understanding can be used to explain real-world experiences involving light and shadows

National Curriculum Coverage Audit

Subject	National Curriculum Coverage within this Unit
Science	recognise that they need light in order to see things and that dark is the absence of light; notice that light is reflected from surfaces; recognise that light from the Sun can be dangerous and identify ways to protect eyes; recognise that shadows are formed when light from a light source is blocked by a solid object; find patterns in the way that the size of shadows change
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
Art	create sketchbooks to record observations and develop ideas; improve mastery of drawing and artistic techniques; use tone, pattern, shape and form purposefully; evaluate and discuss creative work
Mathematics	measure, compare and interpret information; identify patterns and relationships; apply mathematical reasoning and problem-solving skills within practical contexts
ICT	use technology purposefully to create, organise and present information; develop understanding of digital communication; select and use software effectively; use technology safely and responsibly
Personal Development and Learning	develop self-awareness and emotional understanding; build positive relationships and communication skills; recognise and respect similarities and differences; reflect on experiences, learning and personal development

Anchor Texts:

- Oscar and the Bird
- Lights out Leonard

Supporting texts/recommended reads:

- The Darkest Dark
- The Element in the Room
- How Does Light Work?
- The Usborne Book of Light
- Step into Science: Light
- Jack's Amazing Shadow

Reading Focus:

- scientific vocabulary and explanation
- retrieval and interpretation from non-fiction texts
- prediction and observation
- evidence and scientific enquiry
- discussion and questioning

Disciplinary Reading Opportunities:

- retrieval from fiction, non-fiction and scientific texts
- interpretation of diagrams, images and scientific information
- inference using evidence and clues from texts, illustrations and investigations
- vocabulary exploration linked to light, shadows and scientific enquiry

- identifying patterns and relationships within observations and investigations
- comparison of materials, light sources and shadow observations
- questioning and evaluating scientific evidence
- discussion, explanation and justification using evidence

Genre Coverage

Genre	Coverage
Narrative	investigation diary writing; imaginative shadow stories; scientific narratives linked to light and darkness
Explanation	explanation of how light travels; explanation of reflection and shadow formation
Information	labelled diagrams; scientific reports; fact files and non-fiction information texts
Persuasion	Light and Shadows showcase invitation/poster; persuasive writing encouraging visitors to attend a scientific exhibition
Comparison	comparison of materials, light sources and shadow observations; comparing scientific findings and patterns
Spoken presentation	scientific presentations; investigation outcomes; explanation and evidence-based discussion

Reading Progression Audit

Area	Progression within this unit
Vocabulary	scientific and disciplinary vocabulary → ambitious scientific language → precise use of topic vocabulary within discussion and writing
Retrieval	locate simple information → retrieve relevant information from texts and investigations → select evidence independently
Inference	identify clues from texts and images → interpret meaning using evidence → justify conclusions using scientific evidence
Scientific Reading	identify key scientific information → interpret diagrams, observations and investigations → explain what evidence tells scientists
Comparison	identify similarities and differences → compare materials, light sources and observations → explain patterns and relationships
Discussion and Oracy	answer questions → explain ideas → justify understanding using evidence and scientific vocabulary
Reading Behaviours	supported reading and discussion → increasing independence in interpreting information → confident application of reading skills across the curriculum

Reading Spine Links

Reading Spine Unit: *Light and Shadows (LKS2 Cycle 1)*

Reading focus areas:

- scientific vocabulary and explanation
- retrieval and interpretation from non-fiction texts
- prediction and observation
- comparison and evidence
- discussion and questioning

Fluency approaches:

- reader's theatre

- performance reading
- oral rehearsal before writing
- guided group reading aloud
- choral reading of information texts
- echo reading for scientific vocabulary
- storytelling and role-play
- partner explanation and discussion

Retrieval focus:

- recalling key vocabulary and scientific concepts
- retrieving information from fiction, non-fiction and scientific texts
- identifying evidence from observations, diagrams and investigations
- using evidence to explain ideas and scientific understanding
- comparing materials, light sources and shadow observations

Reading Spine Impact

The Reading Spine is intentionally designed to ensure pupils experience:

- scientific fiction, non-fiction and explanation texts
- increasingly ambitious scientific and disciplinary vocabulary
- opportunities for retrieval, prediction and interpretation
- repeated reading opportunities to strengthen fluency, prosody and confidence
- discussion and evidence-based reasoning opportunities to strengthen comprehension and communication
- texts which promote curiosity, scientific thinking and understanding of the wider world
- opportunities to develop confidence, resilience and positive reading identities within the Storybrook context

Vocabulary Development

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

Tiered Vocabulary:

Tier 1: light, dark, sun, torch, lamp, mirror, shadow, see, object, surface

Tier 2: reflect, observe, predict, investigate, compare, evidence, pattern, explanation, source, conclude

Tier 3: light source, reflection, opaque, translucent, transparent, beam, light ray, scientific enquiry, observation, hypothesis, conclusion

Oracy & Fluency:

- echo reading for scientific and disciplinary vocabulary
- paired reading
- oral storytelling linked to light, darkness and scientific concepts
- performance reading
- discussion circles
- reader's theatre
- storytelling and role-play (e.g. scientist, investigator, inventor, 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

<ul style="list-style-type: none"> • partner explanation and evidence talk • questioning and scientific enquiry discussion • collaborative interpretation of diagrams, images and investigations • explanation and justification using scientific evidence 	<p>scientific enquiry and develop confidence without reducing curriculum expectations.</p> <p>Reading experiences are designed to:</p> <ul style="list-style-type: none"> • build curiosity through scientific investigation, stories and practical exploration • provide opportunities for repeated reading and oral rehearsal to strengthen fluency and confidence • use diagrams, images, practical resources and visual prompts to support understanding • encourage discussion and exploration before recording ideas • strengthen comprehension through retrieval, prediction 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
<p>Visits and Visitors:</p> <ul style="list-style-type: none"> • visit to a science museum, interactive science centre or light-based exhibition • virtual tours exploring light, space, inventions or scientific discoveries linked to light • visitor with expertise in science, engineering, photography or technology • scientist, engineer or inventor workshop linked to light and scientific enquiry • practical investigation sessions exploring light sources, reflection and shadows • outdoor learning opportunities investigating changing shadows and natural light • shadow puppet workshops or creative light exploration activities • opportunities to use digital tools, photography and observation equipment during investigations • Light and Shadows showcase event involving families, staff or members of the school community <p>Visits and visitors are used to:</p> <ul style="list-style-type: none"> • strengthen scientific vocabulary and disciplinary understanding • develop curiosity and scientific enquiry skills • provide meaningful real-world connections to learning • encourage questioning and evidence-based discussion • build confidence through communication and collaborative experiences • support engagement, belonging and positive learning experiences within the Storybrook context 	
<p>Home Learning:</p> <ul style="list-style-type: none"> • family discussion prompt linked to light, shadows or everyday scientific experiences • simple creative activity to reinforce retrieval (e.g. create a shadow puppet, investigate shadows at home, design a light source poster or produce a labelled diagram) • optional object, photograph, drawing or spoken contribution to bring back and share with the class 	<p>Home Reading Opportunities</p> <p>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 how light and shadows behave in the world around us.</p>

- short reading, storytelling or discussion activity linked to anchor or supporting texts
- observation and comparison activity (e.g. compare shadows at different times of the day, compare natural and artificial light sources or observe reflective surfaces)
- vocabulary retrieval activities using key scientific and disciplinary vocabulary
- research task linked to a scientific question (e.g. *How are shadows formed?*, *Where do we find light sources?* or *Why do shadows change?*)

Assessment opportunities:

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

Week	Assessment focus	Evidence
Week 1	prior knowledge of light, darkness and light sources; misconceptions and vocabulary	discussion, questioning, retrieval activities, vocabulary use and observation
Week 2	understanding that light is needed in order to see and recognition of natural and artificial light sources	discussion, practical activities, written responses, retrieval tasks and vocabulary use
Week 3	understanding of reflection and properties of materials; application of scientific vocabulary	discussion, investigations, practical activities and observation
Week 4	understanding of shadow formation and patterns in changing shadows	questioning, discussion, investigation outcomes and written responses
Week 5	application of sticky knowledge across the unit; communication and presentation of learning	final outcomes, presentations, retrieval tasks, pupil discussion and reflection; investigation conclusions and application of scientific enquiry skills

Assessment Checkpoints

Teachers monitor whether pupils can:

Knowledge

- identify light sources and explain how shadows form
- recall key vocabulary linked to light and materials
- explain how light behaves

Disciplinary Thinking

- ask scientific questions and plan investigations
- identify patterns from observations and results
- 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 vocabulary in reading and writing
- monitoring interpretation and use of evidence within discussion and written outcomes
- monitoring application of scientific enquiry skills and investigation 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
- Handwriting and Recording Development Policy

Appendix 1: Year 3-4 Spelling Progression Map

Term	Focus	Example patterns	Linked units
Autumn 1	Prefixes	dis-, mis-, in-, il-, im-, ir-, re-	Stone Age
Autumn 2	Suffixes	-ation, -ly	Rock Detectives
Autumn 2	Statutory words	accident, actual, address, answer	Winter Wishes
Spring 1	Possessive apostrophes	plural possession	Ancient Egypt
Spring 1	Prefixes and root words	sub-, inter-, anti-, super-	Light and Shadows
Spring 2	Homophones	scene/seen, weather/whether	Easter Journeys
Summer 1	Suffix rules	-ous	Tremors
Summer 2	Statutory word review	favourite, grammar, guide, interest, knowledge	Passport to Europe

Appendix 2: Year 3-4 Grammar Progression Map

Unit	Main grammar focus
Stone Age	expanded noun phrases; chronological language
Rock Detectives	conjunctions; explanation language
Winter Wishes	descriptive language; figurative language
Ancient Egypt	fronted adverbials; paragraph organisation
Light and Shadows	subordinate clauses; scientific explanation
Easter Journeys	comparative language; reflection
Tremors	explanation and reasoning language
Healthy Me	persuasive and evaluative language
Passport to Europe	paragraph cohesion; comparative language

Appendix 3: Appendix: English Coverage and Progression Overview

Area	Coverage	Where evidenced
Year 3-4 statutory spelling words	✓	Spelling Appendix + unit retrieval
Prefixes/suffixes	✓	Unit spelling sections
Homophones	✓	Spelling Appendix
Word families/morphology	✓	Unit spelling progression
Expanded noun phrases	✓	Grammar Appendix + unit application
Fronted adverbials	✓	Unit grammar sections
Direct speech	✓	Narrative units
Present perfect tense	✓	Unit progression
Paragraphs	✓	Writing outcomes
Editing/proofreading	✓	Writing process sections
Handwriting	✓	Handwriting curriculum

Appendix 4: Storybrook 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