Pilgrim Federation Key Stage 2 Learning Theme:



Stone Age to Iron Age

Links to Other Learning Themes:
This Learning Theme links to: Invaders & Settlers Explorers Europe

KEY STAGE 2

To master the **'Stone Age to Iron Age'** learning theme, Key Stage 2 pupils should move beyond simple facts and begin to understand **change, causality, and evidence**.

By the end of the learning theme, they should be able to answer these six fundamental questions:

1. How did the way people get their food change over time?
This question addresses the massive transition from the **Palaeolithic** (Stone Age) to the **Neolithic** (New Stone Age). Pupils should be able to explain the shift from being **nomadic hunter-gatherers** to becoming **settled farmers**.

Key concepts: Foraging, hunting, domestication of animals, and the planting of the first crops (emmer wheat and barley).

2. How did tools and technology evolve across the three ages?
Pupils should understand that the "Ages" are defined by the materials humans mastered. They should be able to describe the progression from organic and stone tools to the chemistry of metalworking.

Key concepts: Flint knapping, the discovery of **Bronze** (copper + tin), and the superior strength of **Iron**.

3. Why did people start living in permanent settlements?
This explores the "why" behind human geography. As farming became the norm, people needed to stay in one place to tend to crops. This led to the development of the first villages and, eventually, defensive structures.

Key concepts: Skara Brae (Neolithic village), roundhouses, and Iron Age **hillforts** for protection against rival tribes.

4. What do monuments and burials tell us about prehistoric beliefs?
Because there are no written records, we must "read" the landscape. Pupils should analyse how much effort went into building structures that weren't for "living" in, but for ritual or remembrance.

Key concepts: Stonehenge (astronomical/religious significance), Long Barrows, and "Grave Goods" (objects buried with the dead that suggest a belief in an afterlife).

5. How did social 'tribes' and power structures develop?
In the early Stone Age, groups were small and relatively equal. By the Iron Age, society was much more complex. Pupils should be able to explain how the ownership of land and metal led to the rise of leaders.

Key concepts: Tribal chiefs, druids, warriors, and the introduction of **coinage** and trade.

6. How do we know about this period if no one wrote anything down?
This is the "**disciplinary**" question. Pupils must understand the role of the **archaeologist** and the limitations of our knowledge.

Key concepts: Primary evidence (artefacts, post-holes, skeletons), carbon dating, and the difference between "Prehistory" and "History" (the arrival of writing).

Summary Checklist for Pupils

Question Focus	Key Vocabulary to Include
Survival	Hunter-gatherer, Nomad, Agriculture.
Technology	Smelting, Alloy, Knapping.
Community	Settlement, Hillfort, Palisade.
Beliefs	Ritual, Solstice, Ancestor.
Evidence	Artefact, Excavation, Interpretation.

Key Vocabulary

To help pupils master the **'Stone Age to Iron Age'** learning theme, the vocabulary is typically divided into **Chronological**, **Technical**, and **Conceptual** terms.

1. Chronological Vocabulary (The Timeline)
These terms help pupils understand the massive scale of time and the order in which things happened.

Palaeolithic (Old Stone Age): The longest period, where humans used simple stone tools and were nomadic.
Mesolithic (Middle Stone Age): A time of transition where tools became smaller and more refined (microliths).
Neolithic (New Stone Age): The "New" Stone Age, defined by the start of farming and permanent settlements.
Bronze Age: The period beginning around 2500 BC when humans started working with copper and tin.
Iron Age: The final period before the Roman invasion, characterised by the use of iron for tools and weapons.
Chronology: The arrangement of events or dates in the order of their occurrence.
2. Technical Vocabulary (The Tools and Tech)
These words describe the "science" and engineering of the era.

Flint: A hard, sedimentary rock used to make sharp tools and weapons.

Knapping: The process of striking flint to create sharp flakes or "blades."
Smelting: The process of heating rocks (ore) to extract the metal inside.
Alloy: A mixture of two or more metals (e.g., Copper + Tin = Bronze).
Quern Stone: A stone tool used for grinding grain into flour.
Wattle and Daub: A building material made of interwoven sticks (wattle) covered in a mixture of mud, straw, and dung (daub).

3. Conceptual Vocabulary (The Way of Life)
These terms describe how society changed and how people interacted with the world.

Nomadic: People who move from place to place rather than living in one fixed settlement.
Hunter-Gatherer: A member of a nomadic people who live chiefly by hunting, fishing, and harvesting wild food.
Agriculture: The practice of farming, including cultivation of the soil for the growing of crops and the rearing of animals.
Settlement: A place, typically one which has previously been uninhabited, where people establish a community.
Hillfort: A protected Iron Age settlement built on high ground with defensive earthworks (ramparts).
Tribe: A social group consisting of families or communities linked by social, economic, religious, or blood ties.
Artefact: An object made by a human being, typically one of cultural or historical interest, which gives us clues about the past.

4. Ritual and Belief Vocabulary
Megalith: A large stone that forms a prehistoric monument (e.g., a stone at Stonehenge).
Henge: A prehistoric monument consisting of a circle of stone or wooden uprights.
Solstice: Either of the two times in the year (summer and winter) when the sun reaches its highest or lowest point in the sky at noon, marked by monuments like Stonehenge.

Why This Vocabulary Matters
1. **Precision:** It allows pupils to describe the past accurately. For example, knowing the difference between a "caveman" (a myth) and a "Neolithic farmer" (a fact) changes their whole perspective.
2. **Schema Building:** These words act as "hooks." Once a pupil understands the word **agriculture**, they can apply that knowledge to the Egyptians, the Romans, and the modern world.
3. **Confidence:** Being able to use more complex words like *Palaeolithic* or *smelting* gives pupils a sense of authority and pride in their learning.

Art & Design
Substantive Knowledge
In Art & Design, **substantive knowledge** for the **'Stone Age to Iron Age'** learning theme refers to the specific facts about the materials, techniques, and famous artefacts that define these eras. It is the "what" of prehistoric art—the actual names of pigments, the types of tools used, and the evolution of artistic styles over thousands of years.

1. Materials and Pigments (The Stone Age)
Early humans had to understand the chemistry of the earth to create art. **Substantive knowledge** includes:

Natural Pigments: Knowing the names and origins of colours, such as **Ochre** (clays/minerals for reds and yellows), **Charcoal** (burnt wood for black), and **Chalk** (for white).
Binders: Understanding that pigments need a substance to stick to a surface, such as water, animal fat, spit, or egg white.
Application Tools: Knowing about the use of hollow bird bones (for blowing pigment), moss/fur sponges, and "brushes" made from frayed sticks or animal hair.

2. Techniques and Genres
Pupils learn how prehistoric people moved from 2D marking to 3D construction.

Petroglyphs vs. Pictographs: Knowing that pictographs are *painted* onto a surface, while petroglyphs are *carved* or etched into the rock.
Stencil Art: The specific technique of placing a hand on a wall and blowing pigment over it to create a "negative" image.
Additive vs. Subtractive Sculpture: Identifying the difference between building with clay (**additive**) and carving away at bone or flint (**subtractive**).

3. The Evolution of Pattern and Form
As humans moved into the Bronze and Iron Ages, their art changed from "realistic" animals to complex "abstract" patterns.

Beaker Pottery: Understanding the distinct shapes and geometric "corded" patterns found on Bronze Age pottery.
Metalwork Aesthetics: Knowing about the **Celtic style**, which involves flowing lines, spirals, and interlocking "trumpet" or "S" shapes.
Jewellery and Status: Recognising specific items like the **Torc** (a large neck ring) and the use of enamel and glass for decoration.

4. Key Artefacts and Locations
Specific examples that serve as the "gold standard" for prehistoric art:

Lascaux and Altamira: Famous cave sites known for their massive, sophisticated murals of bison, deer, and horses.
The Venus of Willendorf: A famous example of a portable "mother goddess" sculpture.
The Battersea Shield: A world-renowned example of Iron Age metalwork found in the River Thames, showcasing advanced symmetry and design.
Why **Substantive Knowledge** Matters
1. It Provides a Technical Vocabulary
Without knowing what "ochre" or "enamel" is, a pupil cannot accurately describe or analyse prehistoric art. This knowledge allows them to speak and write like an art historian, using precise terms to explain how an object was made.

2. It Highlights Human Ingenuity
Learning that Stone Age people used "fat-lamps" to see in dark caves or designed complex casting moulds for bronze teaches pupils that "prehistoric" does not mean "unskilled." It builds respect for the intellectual and creative capacity of our ancestors.

3. It Informs Practical Work
Substantive knowledge acts as the "recipe" for the classroom. When a pupil knows that charcoal is burnt wood, they can attempt to make their own. When they understand the "S" curves of Celtic art, they can apply that specific geometry to their own metal-foil embossing or clay work.

4. It Tracks Cultural Change
Art is the best "fossil" for human thought. By learning the **substantive** differences between Stone Age and Iron Age art, pupils can see how human priorities shifted from **survival and hunting** (animals in caves) to **personal identity and power** (decorated shields and jewellery).

Disciplinary Knowledge

In Art & Design, **disciplinary knowledge** refers to the "thinking and doing" of an artist. For the **'Stone Age to Iron Age'** learning theme, this involves understanding how early humans invented the concept of art, how they manipulated raw earth into media, and how they used visual symbols to communicate before written language existed. It matters because it allows pupils to see art not just as a "pretty picture," but as a fundamental human technology for survival and storytelling.

1. Material Innovation and 'Making'
Early artists couldn't go to a shop; they had to be chemists and engineers. **Disciplinary knowledge** here is about understanding the **source and behaviour of media.**

Pigment Extraction: Understanding that colour comes from the earth (ochre, charcoal, berries, clay) and that it requires a "binder" (spit, animal fat, egg white, or water) to stick to a surface.
Tool Invention: Exploring how the "mark" changes based on the tool—moving from fingertips to "brushes" made of animal hair, sticks, or blown pigments (stencil art).
Substrate Awareness: Learning how the texture of the "canvas" (rough cave walls or bone) dictates what can be drawn.

2. Formal Elements: Line, Shape, and Scale
Stone Age artists were masters of simplifying complex forms into recognisable symbols.

Simplification and Abstraction: Developing the skill to strip an animal (like a mammoth or bison) down to its most essential lines and shapes.
Capturing Motion: Understanding how early artists used the contours of the cave wall to give the illusion of muscle or movement to their figures.
Scaling: Moving from small-scale portable art (like carved "Venus" figurines) to massive, collaborative cave murals, requiring an understanding of proportion.

3. Sculpture and Form (Bronze & Iron Age)
As technology moved from stone to metal, the **disciplinary** focus shifts to three-dimensional design.

Subtractive vs. Additive Sculpture: Understanding the difference between carving away (flint knapping/stone carving) and building up (clay moulding/metal casting).

The Aesthetics of Utility: Exploring how Iron Age people decorated functional items (shields, mirrors, torcs (or torques) with complex, interlocking patterns (like Celtic knots).
Casting and Moulding: Understanding the process of creating a shape in one material (wax or clay) to be replicated in another (bronze).

4. Analysis and Context (The 'Why')
This is the "critical" side of **disciplinary knowledge**—reading art as evidence.

Interpreting Purpose: Asking whether an artwork was created for ritual, magic, storytelling, or simply decoration.
Symbolic Communication: Understanding that in a pre-literate society, art *is* the record. Pupils learn to "read" the transition from realistic animals to abstract symbols.
Continuity and Change: Analysing how art evolved as human society became more settled and technologically advanced (from the "raw" cave paintings to the "refined" metalwork of the Iron Age).

Why **Disciplinary Knowledge** Matters in Art
1. It Connects Art to Science and Geography
By studying pigments and metallurgy, pupils realise that art is deeply rooted in the natural world. They learn that an artist must understand the properties of rocks, minerals, and fire to create.

2. It Develops Visual Literacy
Before a pupil can write a sentence, they can draw a shape. **Disciplinary knowledge** in this learning theme honours that "primitive" urge to communicate, teaching pupils that symbols are a powerful way to represent thoughts and feelings.

3. It Fosters Innovation
When pupils are tasked with making their own "charcoal" or finding "natural brushes," they are forced into a problem-solving mindset. This mirrors the ingenuity of early humans and encourages pupils to be resourceful with the materials around them.

4. It Bridges the Gap to the Past
History can feel like a list of dates. Art, however, is a physical "touchstone." Holding a piece of clay or recreating a hand-stencil allows a pupil to feel a direct, sensory connection to a person who lived 10,000 years ago.

Disciplinary Skills Progression Table

Skill Area	Stone Age Focus	Iron Age Focus
Media	Mixing earth pigments with binders.	Shaping clay for pottery or "casting" designs.
Mark-Making	Stencilling, blowing pigment, and engraving.	Engraving complex, repeating patterns on metal.

Concept	Art as ritual or hunting magic.	Art as status, decoration, and identity.

Learning Objectives

In Art & Design, the **'Stone Age to Iron Age'** learning theme offers a journey from the very birth of human creativity to the sophisticated craftsmanship of the first metalworkers. The **learning objective**s focus on **innovation**, **materiality**, and **symbolism**.

1. Materials and Making: The Chemistry of Art

Objective: *To improve mastery of art and design techniques, including drawing, painting, and sculpture with a range of materials.*

Pupils will: Experiment with "primitive" media. They will learn to create their own pigments using natural materials like charcoal, berries, and earth (ochre), understanding that art requires a "binder" (like water or vegetable oil) to stick.

Key Skill: Moving beyond the paintbrush. Pupils explore using sponges, moss, frayed sticks, or even their own hands to apply colour.

Outcome: Creating a "Cave Wall" texture using mixed media (plaster, sand, and glue) and applying hand-made paints.

2. Drawing and Line: The Power of the Silhouette

Objective: *To develop their techniques, including their control and their use of materials, with creativity, experimentation, and an increasing awareness of different kinds of art and design.*

Pupils will: Study the sketches found in places like Lascaux. They focus on how to capture the "essence" of an animal (mammoths, bison, deer) using bold, simplified lines rather than complex shading.

Key Skill: Observational drawing of animal forms, focusing on the silhouette and the use of "negative space" (the area around the subject).

Outcome: A series of charcoal studies that mimic the fluid, moving lines of prehistoric cave paintings.

3. Sculpture and Form: From Clay to Metal

Objective: *To learn about great artists, architects, and designers in history.*

Pupils will: Explore the transition from the "additive" process of Stone Age pottery (Beaker folk) to the "subtractive" or "casting" processes of the Bronze and Iron Ages.

Key Skill: Coiling and thumb-pot techniques to create functional vessels, and using "clay slips" to engrave patterns.

Outcome: Designing a decorative "Iron Age Mirror" or shield using foil embossing to replicate the intricate, symmetrical Celtic patterns.

4. Evaluation: Art as Evidence

Objective: *To evaluate and analyse creative works using the language of art, craft, and design.*

Pupils will: Act as "Art Detectives." They will look at artefacts like the **Battersea Shield** or the **Venus of Willendorf** and discuss why they were made. Was it for a ritual? For status? For survival?

Key Skill: Using specialised vocabulary such as *pigment, texture, form, symmetry,* and *engraving.*

Outcome: A written or spoken critique comparing the "naturalistic" style of the Stone Age (animals) with the "abstract" style of the Iron Age (geometric spirals).

Why These Learning Objectives Matter

1. It Demystifies Creativity
Pupils often feel they need expensive kits to be "artists." This learning theme teaches them that humans have been creative for 30,000 years using nothing but rocks, burnt wood, and mud. It builds **resourcefulness** and **confidence**.

2. It Connects Art to Survival
In prehistory, art wasn't a hobby; it was a way to communicate, hunt, and build community. These **learning objectives** help pupils see art as a **fundamental human technology**, linking it to History, Geography, and Science.

3. It Develops Fine Motor Skills
Working with raw clay, knapping flint-like shapes out of soap, or weaving patterns into "metal" foil requires a high level of hand-eye coordination and precision.

4. It Fosters Historical Empathy
By physically recreating the methods of an ancient artist—perhaps by drawing in low light or using rough surfaces—pupils develop a deep, sensory connection to the people of the past that reading a textbook alone cannot provide.

Learning Objective Summary Table

Focus Area	**I can… (Pupil-friendly LO)**
Media	I can make my own paint from natural materials like charcoal and clay.
Drawing	I can use simple lines to capture the movement of a wild animal.
Patterns	I can identify and recreate the repeating spirals of Iron Age Celtic art.
Sculpture	I can use the "coiling" technique to build a clay pot like the Beaker people.

Lesson Ideas

Here is a complete, 6-week Medium-Term Plan for Key Stage 2 Art & Design framed around **'Stone Age to Iron Age'**. This unit connects core National Curriculum Art strands—**Drawing & Mark-Making, Natural Pigment Chemistry & Painting, Clay Sculpture & Relief, Metalworking Simulation & Embossing, and Textiles/Weaving**—with prehistoric cave wall art, Beaker culture pottery, Bronze Age torcs, and Iron Age Celtic knotwork. It balances **substantive knowledge** (earth pigment binders, charcoal mark-making techniques, coil and pinch pot clay construction, metal repoussé, cross-hatching, and warp/weft weaving mechanics) with **disciplinary knowledge** ("Thinking & Acting Like an Artist & Historian"—evaluating symbolic visual language, experimenting with material properties, analysing artefact aesthetics, making deliberate process choices, and critiquing artwork through formal elements).

Unit Title: Prehistoric Palette & Craft: Cave Murals, Beaker Pottery, and Iron Age Metalwork
Duration: 6 Weeks (Approx. 1.5 to 2 hours per week)
Theme: Stone Age Cave Art, Bronze Age Metallurgy, and Iron Age Celtic Design.
Art Contexts:
Drawing & Mark-Making: Charcoal smudging, dynamic line weight, negative stencil techniques, cross-hatching for texture.
Painting & Pigments: Grinding natural materials (ochre, chalk, charcoal), testing binders (water, oil, egg yolk), impasto wall textures.
3D Form & Ceramics: Clay coil building, pinch pot moulding, incised surface decoration, score-and-slip joining.
Craft & Metalwork: Foil embossing (repoussé and chasing), symmetric line symmetry, Celtic knotwork patterns, loom weaving.
Key Art Pillars
Substantive Knowledge:
Media Mechanics: Charcoal gradations (soft, compressed, willow), earth pigment binding chemistry, clay plastic state vs. bone dry, foil gauge malleability.
Formal Elements: Line weight, organic texture, positive vs. negative space, form (3D volume), geometric symmetry.
Techniques: Hand-stencil blowing/dabbing, coil-pot construction, clay scoring/slipping, metal chasing/repoussé, warp and weft threading.
Disciplinary Knowledge ('Thinking Like an Artist'):
Material Exploration: Investigating raw materials to evaluate how medium constraints shape artistic output.
Cultural & Historical Analysis: Deciphering how prehistoric humans used visual art for storytelling, ritual, and functional status.
Reflective Practice: Documenting process iterations in sketchbooks and making deliberate choices to refine technique.
Weekly Progression Scheme
Week 1: Lascaux & Chauvet – Charcoal Mechanics & Negative Stencils
Art Focus: Drawing, Mark-Making & Value.
Substantive Knowledge:
LKS2: Willow charcoal vs. graphite; creating line weight variations; smudging and blending for form; negative space hand-stencilling.
UKS2: Chiaroscuro shading using compressed charcoal; cross-hatching to represent animal fur texture; dynamic gesture drawing to capture animal movement.
Disciplinary Knowledge:
Visual Interpretation: Analysing how Palaeolithic artists utilised natural cave wall contours to give 3D volume to animal drawings.
Practical Task:
LKS2 (Y3/4): *The Cave Wall Mural.* Pupils work on textured brown sugar paper taped under tables (simulating cave roofs), using charcoal sticks to draw megafauna (mammoths, bison) and dabbing sponges to create negative hand-stencils.
UKS2 (Y5/6): *Dynamic Gesture Mammoths.* Pupils use mixed charcoal mediums on crumpled, tea-stained cartridge paper, applying cross-hatching and pressure modulation to create realistic 3D volume and motion in prehistoric fauna.

Week 2: Earth & Marrow – Natural Pigment Chemistry & Paint Making

Art Focus: Painting, Colour Mixing & Material Processing.
Substantive Knowledge:
LKS2: Identifying natural earth pigments (yellow ochre, red iron oxide, chalk, charcoal); binders vs. pigments; matte vs. textured paint finishes.
UKS2: Viscosity control; binder performance (water PVA vs. vegetable oil/egg yolk); applying impasto texture using palette knives or twig brushes on rough stone-look plaster grounds.
Disciplinary Knowledge:
Material Testing: Experimenting with raw earth materials to evaluate paint opacity, adhesion, and drying times.
Practical Task:
LKS2 (Y3/4): *Grinding and Binding.* Pupils grind chalk, paprika/cinnamon, and charcoal using pestles and mortars, mixing them with water and PVA binder to produce natural paints for rock surface studies.
UKS2 (Y5/6): *Plaster Surface Pigment Study.* Pupils construct plaster-of-Paris stone slabs, making custom earth paints using egg tempera/oil binders, and painting ritual animal symbols with natural bristle twig brushes.

Week 3: The Beaker Folk – Clay Coiling, Pinching & Incised Texture
Art Focus: 3D Ceramics & Sculpture.
Substantive Knowledge:
LKS2: Clay malleability; pinch pot construction; score-and-slip method for joining clay parts; incising geometric line patterns with wooden tools.
UKS2: Coil pot building mechanics (maintaining wall thickness and structural integrity); burnishing clay surfaces; complex geometric impression making using notched sticks, cord, and bone tools.

Disciplinary Knowledge:
Artefact Analysis: Examining Bronze Age Beaker pottery fragments to deduce how form followed function in prehistoric vessel making.
Practical Task:
LKS2 (Y3/4): *Bronze Age Pinch & Coil Pot.* Pupils craft a Bell-Beaker style pot using terracotta clay, combining pinch-pot bases with stacked coils, securing joints with slip, and carving geometric bands around the rim.
UKS2 (Y5/6): *Incised Beaker Vessel.* Pupils build a tall flared beaker vessel using structural coiling techniques, wrapping textured string around wooden sticks to stamp intricate geometric repeat patterns into the damp clay walls.

Week 4: Bronze Age Metallurgy – Repoussé, Chasing & Metal Embossing
Art Focus: Metalwork Simulation, Relief & Texture.
Substantive Knowledge:
LKS2: Relief sculpture (high vs. low relief); foil embossing mechanics; repoussé (pushing from behind) and chasing (indenting from front) using wooden styluses.
UKS2: Tool pressure control on heavy-gauge foil; radial symmetry in Celtic shield designs; applying patinas (black acrylic wash) to antiquate metal recesses.
Disciplinary Knowledge:
Technique Comparison: Evaluating how sheet metal shaping differs from additive modelling in clay.
Practical Task:
LKS2 (Y3/4): *Bronze Age Sun Shield.* Pupils draw symmetrical geometric sun patterns onto paper,

transfer them onto heavy copper foil, and use wooden clay tools to emboss low-relief patterns into the surface.
UKS2 (Y5/6): *The Battersea Shield Repoussé.* Pupils design a complex Celtic shield boss, using repoussé and chasing techniques on thick metallic foil mounted on foam board, finishing with a dark acrylic paint wash wiped back to highlight raised metal relief.

Week 5: Iron Age Weaving – Warp, Weft & Textile Mechanics
Art Focus: Textiles, Craft & Pattern.
Substantive Knowledge:
LKS2: Understanding warp (vertical structural threads) and weft (horizontal weaving threads); over-under shuttle mechanics; natural dye colours (woad blue, madder red).
UKS2: Cardboard frame loom setup; maintaining thread tension without pulling in edges; weaving complex patterns (twill, plaid, tartan); integrating natural materials (twigs, feathers).
Disciplinary Knowledge:
Tactile Evaluation: Assessing how thread tension and material choices alter the strength and visual texture of woven textiles.
Practical Task:
LKS2 (Y3/4): *Simple Frame Loom Weaving.* Pupils string a 10-notch cardboard loom with warp yarn, weaving strips of earthy-toned wool, jute, and fleece using an over-under pattern to create a piece of coarse Celtic cloth.
UKS2 (Y5/6): *Celtic Tartan Textile.* Pupils construct a multi-warp loom, weaving multi-coloured wool yarns in structured repeat patterns (e.g., 2 over, 2 under) to recreate authentic Iron Age plaid fabric samples.

Week 6: The Hillfort Gallery – Exhibition & Critical Evaluation
Art Focus: Curation, Synthesis & Critical Evaluation.
Substantive Knowledge:
LKS2/UKS2 Synthesis: Reviewing portfolio work spanning charcoal drawings, pigment studies, Beaker pots, metal repoussé, and textiles; applying formal art vocabulary (texture, tone, form, medium, relief).
Disciplinary Knowledge:
Curatorial Critique: Selecting and arranging artwork to convey a historical narrative and giving constructive peer feedback using formal artistic criteria.
Practical Task:
LKS2 & UKS2: *The Prehistoric Art Exhibition & Critique.*
Task 1: Pupils curate a display table combining their charcoal cave mural, terracotta beaker pot, embossed bronze metalwork, and woven textile sample.
Task 2: Pupils write formal exhibition labels detailing the materials, historical inspiration, and artistic techniques used.
Plenary: Conduct a "Gallery Walk" peer evaluation where pupils use sticky notes to highlight technical strengths in line, tone, and form across peer collections.

Assessment Matrix (Progression Indicators)

Phase	Working Towards	Expected Standard	Greater Depth
Lower Key Stage 2	• Uses charcoal like a standard pencil,	• Creates variable line weights and soft	• Combines charcoal line, smudge value, and

(Years 3 & 4)	struggling to create smudged tonal variation. • Shapes clay pots that collapse due to uneven wall thickness or un-scored joints. • Presses too hard on metal foil, tearing through the material during embossing. • Pulls weft threads too tight on the loom, warping the rectangular shape.	smudged tones using willow charcoal. • Builds a stable pinch/coil pot using score-and-slip joining methods successfully. • Executes clear repoussé relief on foil using controlled tool pressure. • Maintains consistent tension on a frame loom to weave an even rectangular textile.	negative stencils to create deep 3D illusion. • Carves detailed geometric patterns into clay while maintaining vessel wall structure. • Combines repoussé and chasing to produce intricate high-and-low relief metal designs. • Experiments with non-traditional materials in the weave (e.g., twigs, feathers) effortlessly.
Upper Key Stage 2 *(Years 5 & 6)*	• Draws animals statically without using cross-hatching or gesture lines for movement. • Prepares earth paint that flakes off surfaces due to incorrect binder ratios. • Embosses foil without creating distinct high and low relief zones. • Weaves simple over-under patterns without attempting multi-colour plaid patterns.	• Uses compressed charcoal and cross-hatching to render dynamic 3D animal forms. • Formulates functional earth pigment paints with balanced binders for plaster grounds. • Combines repoussé, chasing, and antiquing washes to create authentic metal artefacts. • Sets up multi-warp cardboard looms to weave structured Celtic tartan patterns.	• Explores chiaroscuro lighting effects in charcoal drawings to evoke firelit cave walls. • Evaluates chemical binder performance (oil vs. egg) and justifies selection in sketchbooks. • Executes complex symmetrical Celtic knotwork embossing with exceptional precision. • Designs and completes complex twill/tartan weaves with flawless edge tension control.

Other Information, Ideas and Resources

The journey from the **Stone Age to the Iron Age** is one of the most visually rich eras in the primary history curriculum. It marks the birth of human creativity, moving from primal cave painting to advanced metalworking and intricate geometric designs. Here are some alternative technique-driven Art & Design lesson sequences that explore the materials, textures, and cultural expressions of prehistory.

1. Cave Art: Making Authentic Pigments (Painting)
Art Focus: Making paint from natural materials, colour mixing, and texture creation.
Historical Link: Upper Palaeolithic Cave Paintings (e.g., Lascaux or Altamira).
The Lesson Concept

Early humans didn't have access to synthetic paint tubes. They made their own pigments using ground-up earth materials mixed with a binding agent. In this lesson, pupils step out of the comfort zone of plastic palettes and recreate pre-historic art using raw elements.
The Medium: Provide natural powders such as charcoal dust, turmeric, paprika, cocoa powder, and red clay/oxide powder.
The Binder: Mix these powders with water and a tiny bit of vegetable oil or PVA glue to act as the binder.
The Canvas: Use heavy, rough brown wrapping paper or crumpled sugar paper to mimic the uneven, textured stone surface of a cave wall.
Execution: Pupils use their fingers, twigs, or natural feather quills to paint stylised, dynamic silhouettes of Ice Age megafauna—such as woolly mammoths, bison, and sabretooth cats. They can also practice blowing diluted pigment over their hands to create the iconic "hand stencil" signature found in ancient caves.

2. Stone Age Hand-Axe Sculptures (Sculpture & Form)
Art Focus: Working with malleable media, subtractive carving techniques, and form.
Historical Link: Palaeolithic and Neolithic flint knapping tool-making.
The Lesson Concept
A hand-axe wasn't just a basic rock; it was a carefully engineered tool shaped through an artistic understanding of form and balance. Pupils will explore how to sculpt a 3D historical artefact, mimicking the flake marks of chiselled flint.
The Technique: Using grey air-drying clay or salt dough, pupils shape a basic teardrop form (the *core*).
The Carving: Instead of keeping it smooth, they use plastic clay modelling knives or old lolly sticks to carve out small, irregular, angled chips from the sides—a process mimicking real "flint knapping."
The Finish: Once the clay is dry, pupils apply a dark grey acrylic wash. Before it dries completely, they gently wipe away the surface paint with a damp sponge, leaving the dark pigment inside the carved crevices to emphasise the chiselled stone texture.

3. Neolithic Coil Pots (Ceramics & Craft)
Art Focus: Clay slip joining techniques, building structure, and surface impression decoration.
Historical Link: The Beaker Culture and Neolithic pottery advancements.
The Lesson Concept
The transition to farming in the Neolithic era meant humans needed to store grain and water. This sparked a massive leap forward in ceramic engineering. This lesson teaches the fundamental pottery technique of **coiling**.
The Process: Pupils roll out long, even "snakes" or coils of terracotta clay. They learn how to coil these ropes spirally on top of a flat clay base to build up the walls of a vessel.
The Structural Skill: Introduce the concept of **slip and score**. Pupils must scratch lines into the clay surface and apply a water-clay mixture (slip) to glue each layer together securely, preventing the pot from falling apart during drying.
Surface Decoration: Before the clay sets, pupils use natural items like twisted twine, seashells, pointed sticks, or combs to press geometric patterns around the rim, replicating the real design motifs of historical "Beaker" pottery.

4. Hill Fort Aerial Weaving (Textiles)
Art Focus: Cardboard loom weaving, texture juxtaposition, and landscape representation.
Historical Link: Bronze Age and Iron Age farming landscapes and settlement structures.

The Lesson Concept

As humans settled in the Bronze and Iron Ages, they divided the landscape into intricate networks of farming fields and defensive hill forts. This project uses textile arts to interpret an aerial, bird's-eye view of an ancient landscape.

The Loom Setup: Cut thick cardboard rectangles and notch the top and bottom edges to create simple individual hand looms. String them up with basic cotton warp thread.

The Textural Weaving: Pupils use a wide variety of yarns—chunky green wool (representing pastures), rough brown twine (ploughed earth), textured boucle yarn, and metallic threads—to weave a miniature abstract landscape.

Incorporating Form: To represent a circular Celtic hill fort ring, pupils learn how to weave a circular medallion or stitch a concentric ring of thick felt directly onto their woven background piece, creating a multi-layered textile relief map.

5. Iron Age Torcs: Manipulating Metal (Sculpture)

Art Focus: Wire manipulation, twisting techniques, symmetry, and burnishing.

Historical Link: Celtic metallurgy and the famous golden Snettisham Torc.

The Lesson Concept

The Iron Age saw the rise of Master Craftsmen capable of heating, melting, and twisting precious metals into high-status jewellery. This project replicates the creation of a **torc**—a heavy, twisted-metal neck ring worn by Celtic warriors and tribal chiefs.

The Classroom Modification: Instead of molten gold, pupils use two or three thick strands of soft aluminium craft wire or metallic pipe cleaners.

The Craft Process:

1. Pupils anchor one end of the parallel wires to a desk weight or work in pairs to tightly twist the metal strands together into a consistent, spiralling rope pattern.
2. They carefully bend the twisted rope into an open, symmetrical 'C' shape.
3. **The Terminals:** Using self-hardening metallic gold or copper clay, they sculpt two decorative, bulbous end pieces (terminals), carving intricate Celtic spirals into them before pushing them onto the wire tips.

Output: A high-quality wearable replica artefact that demonstrates an understanding of metal symmetry and ancient design aesthetics.

6. Celtic Interlocking Spirals (Printmaking)

Art Focus: Block printing, relief plate creation, repeating patterns, and rotation.

Historical Link: Late Iron Age Celtic art styles (La Tène style).

The Lesson Concept

Iron Age art shifted away from straight lines and moved toward sweeping, fluid, interlocking spirals, trumpet shapes, and stylised animal forms. This lesson introduces pupils to relief block printing to create repeating decorative borders.

The Printing Plate: Provide pupils with a square sheet of soft scratch-foam (or thick corrugated cardboard painted with PVA glue).

The Design: Using a blunt pencil, pupils press deep, flowing Celtic spiral lines down into the foam sheet, ensuring they don't break all the way through the surface. The areas pressed down will *not* pick up ink, forming the white lines of the print.

The Print Run: Using a foam roller (brayer), pupils apply a thin coat of printing ink across their block. They practice pressing the block onto clean paper, then reloading the ink, rotating the tile 90° each time to see how their individual spirals link up to build a massive, complex, interlocking tribal pattern.

Stone Age Art

Several types of art were created during the Stone Age: Cupules: Circular indentations in rock made by human chipping of the stone. Petroglyphs: Carvings into stone that displayed the underlying rock colour to delineate the image. Pictographs: Paintings, usually on stone, made with ochre and charcoal.

Prehistoric cave paintings can shed some light on what society valued at this time. They show that some human beings valued art and could have been motivated to create it. The subjects show what was important to them. They often depicted animals such as bison, deer, leopards, bears, bulls, and more.

The Lascaux paintings
The Lascaux paintings, discovered in 1940 when some teenagers followed a dog into the cave, feature hundreds of images of animals that date to around 17,000 years ago. Many of the images in the Lascaux cave depict easily -recognisable animals like horses, bulls or deer

Archaeologists believe they have discovered the world's oldest-known representational artwork: three wild pigs painted deep in a limestone cave on the Indonesian island of Sulawesi at least 45,500 years ago. The ancient images, revealed in the journal Science Advances, were found in Leang Tedongnge cave.

Animal drawings, sculpture & charcoal cave drawings.
Finger/stick painting.

Whole class mural (cave painting) with a modern twist to represent things that pupils do today.

Bronze Age Art
Bronze Age art included ornate metal objects like jewellery and weapons, as well as pottery and sculpture. Most Bronze Age art consists of decorations on everyday objects, as well as ceremonial pieces. Bronze Age art is characterised by repetitive patterns and depictions of humans, animals, and other natural subjects.

Iron Age Art
See also Greek Art, Egyptian, Persian and Celtic Art which appeared at a similar time to the Iron Age.

Considerations for Implementation

Computing

Substantive Knowledge

In Computing, **substantive knowledge** for the **'Stone Age to Iron Age'** learning theme focuses on the evolution of **information systems**, **data representation**, and the **logic of tools**. While our ancestors lacked electricity, their breakthroughs in communication and problem-solving are the direct ancestors of modern computer science.

1. Information Systems: From Cave to Cloud
Substantive knowledge involves understanding how information is stored and transmitted over distance and time.

Data Storage: Recognising that cave paintings and tally sticks were the first "hard drives." They allowed information to exist outside the human brain.
The Power of Symbols: Understanding that a symbol (like an Iron Age coin mark or a specific animal

in a painting) represents a specific "chunk" of data. This is the foundation of **encoding**.
Signalling Networks: Learning how Iron Age hillforts used visual signals (fire or smoke) to transmit "binary" messages (e.g., *Fire = Danger, No Fire = Safe*).

2. Algorithms and Decomposition (The Logic of Survival)
In Computing, an algorithm is a set of step-by-step instructions. Prehistoric life was governed by these logical sequences.

Process Decomposition: Breaking down a complex task, like "making a bronze axe," into a sequence of instructions:
Collect copper and tin ore.
Heat furnace to specific temperature.
Mix metals in correct ratio.
Pour into mould.
Conditionals (Selection): Understanding "If/Then" logic in survival. *If* the flint breaks this way, *then* use it for a scraper; *else*, discard it and start again.

3. Data Representation and Tallying
This is the "Maths-meets-Computing" aspect of prehistory.

One-to-One Correspondence: Knowing that one notch on a bone represents one item. This is the simplest form of a **data set**.
Sorting and Classifying: Understanding how prehistoric people categorised their world (e.g., edible vs. poisonous plants). In Computing, this relates to how we organise databases.

4. Modelling and Simulation
Substantive knowledge includes how we use technology today to understand the past.

Digital Reconstruction: Knowing that archaeologists use **CAD (Computer-Aided Design)** and **3D Modelling** to recreate what Stonehenge or a Roundhouse looked like based on post-hole data.
Simulations: Understanding how computers can simulate the weather or soil conditions of the Bronze Age to predict where people might have farmed.

Why This Knowledge Matters
1. It Humanises Technology
Pupils often think technology started with the iPhone. By linking Computing to the Stone Age, they realise that **Computational Thinking** is a fundamental human trait. It's about solving problems logically, whether you're using a flint knapper or a laptop.

2. It Teaches 'Low-Tech' Logic
Understanding how a "smoke signal" works teaches the core concept of **networks and protocols** without the distraction of complex hardware. If they can understand the logic of a signal fire, they can understand how a packet of data travels across the internet.

3. It Highlights the Importance of 'Data Persistence'
When pupils see that we only know about the Stone Age because of the "data" they left behind (artefacts/art), they begin to understand why digital preservation and "the cloud" are so important today.

It teaches them that **recorded information equals history**.

4. It Prepares them for Modern Tools
By using software to 3D model a prehistoric village, pupils apply modern skills (digital literacy) to ancient history. It shows them that Computing is a "lens" through which we can view and understand every other subject.

Prehistoric Computing Glossary

Modern Term	**Prehistoric Concept**
Input	Gathering raw materials (flint, ore, wood).
Process	The "Algorithm" of knapping or smelting.
Output	The finished tool or weapon.
Network	The line of hillforts communicating via beacons.

Disciplinary Knowledge

In Computing, **disciplinary knowledge** refers to how we think and act like a computer scientist. When applied to the **'Stone Age to Iron Age'** learning theme, this isn't just about using a laptop to research the past; it is about using computational concepts to model, organise, and reconstruct history. It matters because it helps pupils understand that **logic, algorithms, and data** are not just modern inventions, but tools that can be used to solve ancient mysteries.

1. Information Technology: Digital Archaeology
This is the skill of using digital tools to process and present historical evidence.

Effective Searching: Moving beyond basic Google searches to find reliable primary sources (like the British Museum's digital archives). Pupils learn to use Boolean operators (AND, OR, NOT) to filter results—for example, "Iron Age NOT Iron Man."
Data Integrity: Understanding that not everything on the internet is a "fact." Disciplined historians use digital tools to cross-reference multiple websites to verify the details of an archaeological find.

2. Computer Science: Modelling Ancient Logic
We can use modern code to understand ancient survival and structures.

Algorithmic Thinking: Breaking down a prehistoric process into a step-by-step sequence. For example, creating an **algorithm for flint-knapping** or a "recipe" for making bronze. If the steps are

out of order, the "program" (the tool-making) fails.
Simulations and Modelling: Using software (like Scratch or Minecraft) to build a virtual 3D model of a Hillfort or Stonehenge. This requires a **disciplinary understanding** of **spatial variables** and **decomposition** (breaking the big building into smaller, manageable blocks).

3. Data Representation: Organising the Past
Archaeology is essentially "Data Science" performed on the dirt.

Database Management: Understanding how to group and categorise artefacts. Pupils learn to use digital databases (like spreadsheets) to sort Iron Age tools by material, location, or age.
Pattern Recognition: Using digital charts and graphs to spot trends. For example, plotting the number of hillforts across the UK to see where populations were most dense.

4. Digital Literacy: Ethics and Narratives
Curation: Deciding how to present the past digitally. A disciplined computer user understands how to combine text, sound, and images to tell the story of a Stone Age tribe without infringing on **copyright** or spreading **misinformation**.
Collaborative Tools: Using shared documents or "wikis" to build a collective "Prehistoric Encyclopaedia," mimicking the way real archaeologists collaborate across the globe.

Why **Disciplinary Knowledge** Matters in Computing
1. It Makes History 'Active'
Rather than just reading about a Hillfort, a pupil has to understand its logic to build it in a digital world. This move from "consumer" to "creator" deepens their understanding of defensive architecture and community layout.

2. It Teaches 'Process over Product'
By writing an algorithm for an ancient task, pupils realise that success in any age—Stone or Digital—is about following a logical, refined process. This builds the **debugging** mindset: "Why didn't my bronze-making algorithm work? Where is the error in the sequence?"

3. It Prepares for Future Careers
Modern archaeology relies heavily on **Lidar**, **3D scanning**, and **big data**. By introducing these **disciplinary** habits in KS2, we are showing pupils that history is a high-tech field, not just a dusty one.

4. It Develops Critical Evaluation
When pupils use the internet to find "Stone Age facts," they are practicing the most important computing skill of the 21st century: **Information Evaluation**. They learn to be sceptical, to check sources, and to understand how digital information is authored.

Disciplinary Skills Progression

Skill Area	**The 'Computing' Thought Process**
Logic	"If I build my hillfort on a slope, how does that affect the defences in my simulation?"

Data	"How can I sort these 50 artefacts so a visitor to my digital museum can find them easily?"
Algorithms	"What are the exact steps a Stone Age person took to create a fire? Can I write this as a clear set of instructions?"

Learning Objectives

In Key Stage 2, the **'Stone Age to Iron Age'** learning theme provides a unique opportunity to apply **Computational Thinking** to historical systems. The **learning objectives** focus on using digital tools to model ancient life, organise archaeological data, and understand the "algorithms" of survival.

1. Computer Science: Modelling and Logic
Objective: *To design, write and debug programs that accomplish specific goals, including controlling or simulating physical systems.*
Pupils will: Use block-based coding (like Scratch) to create a simulation of a prehistoric task, such as a "Hunting Algorithm" where a sprite must follow a specific sequence of logic to successfully catch a mammoth.
Key Skill: Decomposition. Breaking down complex ancient processes—like the step-by-step smelting of tin and copper to make bronze—into logical, ordered instructions.
Outcome: A digital animation or game that demonstrates how an Iron Age hillfort's defences worked (e.g., "If enemy approaches, then sound the horn").

2. Information Technology: Digital Research and Curation
Objective: *To use search technologies effectively, appreciate how results are selected and ranked, and be discerning in evaluating digital content.*
Pupils will: Use the internet to find "primary evidence" of prehistoric life (such as images of the Skara Brae settlement or the Battersea Shield). They will learn to judge the reliability of different websites (e.g., a museum site vs. a personal blog).
Key Skill: Effective Searching. Using specific keywords and Boolean operators (e.g., "Stone Age houses AND UK") to find precise historical information.
Outcome: A digital "Museum Guide" or a multi-media presentation that combines text, images, and audio to explain a specific era.

3. Data Representation: Organising the Past
Objective: *To select, use and combine a variety of software on a range of digital devices to design and create a range of programs, systems and content.*
Pupils will: Act as "Digital Archaeologists" by using databases or spreadsheets to categorise different artefacts found in a "dig." They can sort items by material (flint, bronze, iron), estimated age, or function.
Key Skill: Data Interpretation. Using software to turn raw numbers into charts and graphs—for example, a bar chart showing the increase in tool durability as humans moved from Stone to Iron.
Outcome: A searchable digital database of prehistoric tools that allows users to filter results by specific criteria.

4. Digital Literacy: Communication and Community
Objective: *To use technology safely, respectfully and responsibly.*
Pupils will: Use collaborative online platforms (like shared documents or educational blogs) to

"reconstruct" a day in the life of a Stone Age tribe.
Key Skill: Collaborative Authoring. Learning how to contribute to a shared digital project respectfully, ensuring that their "historical facts" are backed up by evidence found during their research.

Why These Learning Objectives Matter

1. It Makes Abstract History Tangible

History can sometimes feel like a static list of dates. By using Computing to **model** or **simulate** a hillfort or a hunting trip, pupils have to understand the *mechanics* of how these things worked. They move from being passive readers to active "engineers" of history.

2. It Teaches 'Process over Product'

Writing an algorithm for making fire or knapping flint teaches pupils that success in any age—Stone or Digital—is about following a refined, logical sequence. If the code (or the flint-knapping) is out of order, the result fails. This builds a vital **debugging mindset**.

3. It Prepares for Modern Science

Modern archaeology is no longer just about brushes and shovels; it uses **3D scanning, Lidar, and Big Data**. By introducing these computing learning objectives through a history lens, we are showing pupils that the humanities and the sciences are deeply linked.

4. It Develops Information Literacy

In an age of "fake news," the objective of evaluating digital content is crucial. Using "Stone Age facts" as a training ground helps pupils develop the sceptical, evidence-based mindset needed to navigate the modern internet safely.

Learning Objective Summary Table

Focus Area	**I can… (Pupil-friendly LO)**
Algorithms	I can write a sequence of instructions to explain how to make a bronze axe.
Simulations	I can use code to show how a prehistoric tribe survived a winter.
Research	I can use keywords to find reliable facts about Stonehenge on the internet.
Data	I can use a table to sort Stone Age artefacts by their material and use.

Lesson Ideas

Here is a complete, 6-week Medium-Term Plan for Key Stage 2 Computing framed around **'Stone Age to Iron Age'**. This unit connects core National Curriculum Computing strands—**Algorithms & Programming, Data & Information/Databases, Data Logging & Sensors, Digital Media & Stop-Motion Animation, and Networks & Communication Systems**—with hunter-gatherer algorithms, tribal artefact databases, iron smelting environmental sensors, cave art animation, and hillfort signal beacons. It balances **substantive knowledge** (algorithmic logic, variable blocks, database records/fields, digital sensor logging, frame rates, and network packet protocols) with **disciplinary**

knowledge ("Thinking & Acting Like a Computer Scientist"—debugging logic errors, evaluating data collection efficiency, querying databases to answer historical questions, manipulating digital media for storytelling, and modelling network reliability under physical constraints).

Unit Title: Prehistoric Code & Craft: Algorithms, Data Logging, Databases, and Signal Networks
Duration: 6 Weeks (Approx. 1 to 1.5 hours per week)
Theme: Stone Age Survival, Beaker Culture Artefact Analysis, Iron Age Metallurgy, and Hillfort Communication.
Computing Contexts:
Algorithms & Programming: Designing and debugging sequence/loop/conditional logic for hunter-gatherer navigation and tool crafting in block-based languages (e.g., Scratch).
Data & Information (Databases): Constructing, searching, and querying flat-file databases containing archaeological artefact records (fields, records, sorting, filtering).
Data Logging & Sensors: **Using** digital light and temperature sensors to measure conditions inside simulated cave dwellings and iron smelting furnaces.
Digital Media & Stop-Motion: Creating frame-by-frame stop-motion animations depicting the transition from Stone tools to Iron metallurgy.
Networks & Communication: Modelling physical and digital network protocols using hillfort beacon signals and packet routing simulations.
Key Computing Pillars
Substantive Knowledge:
Programming Logic: Sequences, repetition loops (repeat until), conditional branch statements (if…then…else), and variables (health, grain count).
Data Systems: Database structure (records = rows, fields = columns), data types (text, number, boolean), search operators (AND, OR, =, >).
Physical Computing & Sensing: Analog vs. digital inputs, data sampling rates, real-time logging graphs (temperature vs. time).
Digital Media & Networks: Frame-rate speed (fps), onion-skinning, IP address routing, packet headers, and signal latency.
Disciplinary Knowledge ('Thinking Like a Computer Scientist'):
Algorithmic Decomposition: Breaking complex historical processes (e.g., flint knapping, iron smelting) into unambiguous computational steps.
Systematic Debugging: Identifying and resolving logical errors in code sequences through step-by-step execution.
Data Interrogation: Formulating precise database queries to test historical hypotheses about prehistoric trade and materials.

Weekly Progression Scheme
Week 1: The Hunter-Gatherer Algorithm – Sequencing, Loops & Debugging
Computing Strand: Algorithms & Programming.
Substantive Knowledge:
LKS2: Algorithm definition as a precise set of instructions; sequence order importance; count-controlled loops (repeat 4 times).
UKS2: Condition-controlled loops (repeat until touched edge); decomposition of complex tasks; identifying logical errors vs. syntax errors.
Disciplinary Knowledge:
Algorithmic Evaluation: Comparing two different navigation algorithms to determine which uses fewer blocks and runs more efficiently.

Practical Computing Task:
LKS2 (Y3/4): *Mammoth Hunt Maze.* Pupils program a hunter sprite in Scratch to navigate around river hazards and collect berries using precise arrow sequence blocks and repeat loops.
UKS2 (Y5/6): *Foraging Survival Simulation.* Pupils code an interactive program where a sprite searches a randomised terrain map for firewood, using repeat until firewood = 5 and debugging pathing bugs when sprites get stuck on terrain boundaries.

Week 2: Cave Dwelling Climate – Physical Computing & Data Logging
Computing Strand: Data & Information / Physical Computing.
Substantive Knowledge:
LKS2: Sensors as digital input devices; collecting continuous environmental data (light, temperature); reading interval tables.
UKS2: Sensor sampling frequency (e.g., 1 read per second vs. 1 per minute); analysing digital line graphs; calibrating digital sensors.
Disciplinary Knowledge:
Scientific Data Interpretation: Using sensor line graph trends to prove whether cave entry barriers successfully retained thermal energy.
Practical Computing Task:
LKS2 (Y3/4): *Stone Age Shelter Heat Test.* Pupils attach temperature logging probes to cardboard "cave" models with different door coverings (wool, animal fur, open entrance), recording temperature drops every 10 seconds.
UKS2 (Y5/6): *Iron Forge Temperature Monitoring.* Pupils use data loggers to monitor temperature rise during simulated smelting, manipulating sampling rates on software to capture high-speed heat changes and exporting line graphs for analysis.

Week 3: The Artefact Archive – Database Structures & Search Queries
Computing Strand: Data & Information / Computer Systems.
Substantive Knowledge:
LKS2: Understanding databases as organised information collections; distinguishing between records (rows) and fields (columns); sorting data alphabetically or numerically.
UKS2: Complex multi-field filtering using comparison operators (=, >, <); Boolean operators (AND, OR); data entry validation rules.
Disciplinary Knowledge:
Data Interrogation: Formulating precise database search strings to answer historical questions about Bronze Age trade routes.
Practical Computing Task:
LKS2 (Y3/4): *Prehistoric Tool Inventory.* Pupils populate a digital flat-file database with 12 prehistoric artefacts, creating fields for Artefact Name, Era (Stone/Bronze/Iron), Material, and Weight (g), then sorting by weight.
UKS2 (Y5/6): *Museum Artefact Search System.* Pupils query a large dataset of 50 archaeological finds using complex search logic (e.g., `Material` = "Bronze" AND `Weight` > 200g) to prove which settlements produced high-status weapons.

Week 4: From Flint to Iron – Digital Media & Stop-Motion Animation
Computing Strand: Digital Media & Creating Content.
Substantive Knowledge:
LKS2: Understanding frame-by-frame illusion of movement; frame rate basics (FPS); onion-skinning

alignment tools.
UKS2: Editing animation timelines; importing background audio tracks and voiceover sound effects; adjusting frame duration for dramatic pacing (e.g., slow-motion strike).
Disciplinary Knowledge:
Media Evaluation: Assessing how frame rate stability and consistent camera positioning impact the clarity of a historical digital narrative.
Practical Computing Task:
LKS2 (Y3/4): *Flint Knapping Frame Animation.* Pupils use plasticine and tablet stop-motion software to capture 20 sequential frames showing a rough flint block being shaped into a hand-axe at 6 FPS.
UKS2 (Y5/6): *The Iron Age Smelting Process.* Pupils create a 12 FPS stop-motion video showing iron ore being extracted, smelted in a furnace, and hammered into a sword, editing in recorded audio sound effects and title cards.

Week 5: Hillfort Beacon Networks – Networks & Data Packet Communications
Computing Strand: Computer Systems & Networks.
Substantive Knowledge:
LKS2: Basic computer network definition; inputs, outputs, and transmission pathways; understanding physical vs. wireless signals.
UKS2: How information moves across networks in packets; IP addresses and routing; network latency, corruption, and packet loss.
Disciplinary Knowledge:
System Modelling: Simulating physical network failure points to understand how modern internet data re-routing operates.
Practical Computing Task:
LKS2 (Y3/4): *Beacon Signal Network.* Pupils build an LED/buzzer circuit on micro-controllers (e.g., micro:bit) to transmit binary beacon signals (0 = No Attack}, 1 = Attack) between simulated hillfort stations across the classroom.
UKS2 (Y5/6): *Packet-Switched Hillfort Network.* Pupils simulate an Iron Age warning system where message cards are broken into numbered "data packets," routed across different peer "beacon stations," and reassembled at the target destination despite dropped signals.

Week 6: The Interactive Prehistoric Museum – Code & Media Synthesis
Computing Strand: Synthesis, Programming & Presentation.
Substantive Knowledge:
LKS2/UKS2 Synthesis: Combining user input loops, conditional branch statements, embedded media clips, and database lookup links into an interactive project.
Disciplinary Knowledge:
User-Experience (UX) Evaluation: Peer-testing interactive programs to identify navigation glitches, broken loops, or unclear user interface cues.
Practical Computing Task:
LKS2 & UKS2: *The Prehistoric Virtual Museum Showcase.*
Task 1: Pupils construct a Scratch interactive museum guide program featuring selectable rooms (Stone Age, Bronze Age, Iron Age).
Task 2: Clicking on artefact sprites triggers voiceover audio files recorded in Week 4 and displays filtered database records created in Week 3.
Plenary: Class "User-Testing Workshop" where pupils evaluate peer interactive guides, logging bug reports and suggesting code optimisation fixes.

Assessment Matrix (Progression Indicators)

Phase	Working Towards	Expected Standard	Greater Depth
Lower Key Stage 2 *(Years 3 & 4)*	• Writes code sequences with step-order errors, causing sprites to collide with hazards. • Confuses records and fields when entering artefact information into database tables. • Takes stop-motion photos with unsteady camera movement, resulting in blurry animation. • Requires prompting to explain how signals travel between networked devices.	• Constructs accurate algorithm sequences with working count-controlled loops. • Creates a database table, accurately defining fields and sorting records by numerical criteria. • Captures a smooth 6 FPS stop-motion animation using onion-skinning alignment tools. • Explains how micro-controllers transmit binary input signals across a simple network circuit.	• Identifies and fixes logical bugs independently during algorithm execution. • Interrogates databases using targeted search filters to answer complex questions. • Edits frame rates deliberately to vary movement speed and dramatic timing. • Explains network reliability factors when transmitting data between multiple connected nodes.
Upper Key Stage 2 *(Years 5 & 6)*	• Struggles to construct conditional if…then loops without logic errors causing infinite loops. • Searches databases using single fields only, struggling with Boolean AND/OR operators. • Imports audio into animations without syncing frame timings to the sound file. • Explains network data transfer without understanding how information is split into packets.	• Programs complex conditional logic (if…then…else) and variables (health/score) in Scratch. • Formulates multi-field database queries using Boolean logic (AND, OR, >, <) accurately. • Produces a 12 FPS stop-motion video with synced voiceovers, sound effects, and title cards. • Models packet-switched routing across networks, explaining packet loss and re-assembly.	• Writes clean, modular code scripts using custom functions or broadcast blocks efficiently. • Analyses database query results to spot data anomalies and evaluates dataset reliability. • Applies advanced media editing techniques (e.g., chroma key/green-screen layering) seamlessly. • Evaluates network topology efficiency and designs redundant signal routing protocols.

Other Information, Ideas and Resources

Integrating the '**Stone Age to Iron Age**' learning theme into Key Stage 2 Computing bridges the gap between ancient human engineering and modern digital technology. Prehistoric history is fundamentally about computational thinking: designing systems to store information, creating algorithms to build monuments, and decoding hidden symbols.
Here are six alternative, technique-driven computing lesson sequences that cover information technology, digital literacy, and computer science.

1. Scratching the Cave Walls: Algorithmic Drawing

Computing Domain: Computer Science (Programming, Sequencing, and Variables)
Historical Link: Upper Palaeolithic Cave Paintings (The birth of symbolic communication).
The Lesson Concept
Pupils learn that computer graphics are not magic; they are built out of precise coordinate algorithms. Using a block-based programming language like **Scratch**, pupils code an digital "paintbrush" sprite to draw clean geometric pre-historic shapes.
The Coding Challenge: Using the Pen extension blocks in Scratch, pupils write a script that clears the screen, sets a brown "mud" background, and programs a sprite to move in an algorithmic path.
The Code Structure: Instead of writing hundreds of lines of code, they must use **Repeat Loops** to efficiently generate shapes, such as a sharp 3-sided triangle for a spearhead or a recurring spiral pattern for Celtic art.
The Technique:
When green flag clicked
Erase all
Set pen colour to [Oxide Red]
Repeat 3 times:
  Move 100 steps
  Turn right 120 degrees
Output: A fully functional script where pressing different keys triggers the automated drawing of different prehistoric tools or geometric cave symbols on screen.

2. Navigating the Neolithic Landscape: Logo Floor Robots
Computing Domain: Computer Science (Programming, Debugging, and Spatial Awareness)
Historical Link: Stonehenge and Neolithic monument layouts.
The Lesson Concept
Before humans could move massive stones across kilometres of wilderness, they had to plan precise movement paths. Pupils step into the role of ancient structural engineers, using floor robots (like Bee-Bots or Blue-Bots) or screen-based Logo turtle graphics to map out a historic landscape.
The Grid Setup: Lay out a physical grid mat over a giant map of prehistoric Britain. Scatter physical obstacles across the grid, such as a "Boring Swamp," a "Dense Oak Forest," and the final "Stonehenge Build Site."
The Task: Pupils write a structural sequence of commands on a whiteboard *before* touching the robot (e.g., `Forward 3`, `Left 90`, `Forward 2`). They must program their device to transport a "sarsen stone" cube safely from the quarry to the build site without crashing.
The Key Skill (Debugging): When the robot inevitably veers off course, pupils cannot simply shake it; they must identify the exact line of code that failed and rewrite the command structure.

3. The Tribal Leader Vote: Data Branching and Branching Databases
Computing Domain: Information Technology (Data Handling and Categorisation)
Historical Link: Bronze Age and Iron Age social hierarchies and tribal artefacts.
The Lesson Concept
This lesson focuses on how information is systematically sorted and classified by computer systems using binary data architecture (yes/no structures).
The Activity: Provide pupils with a digital file containing 8–10 distinct objects from the Stone, Bronze, and Iron ages (e.g., a flint scraper, a bronze sword, an iron torc, a ceramic beaker, a bone needle).
The Database Structure: Using a database tool (like j2data or Purple Mash 2Question), pupils build a digital binary branching database to sort these tools based on distinct physical properties.

The Constraint: Questions must yield definitive, objective answers so a computer can execute them without human bias.
Bad Question: "Is it a strong weapon?" (Too subjective)
Good Question: "Is this artefact made entirely of metal?" / "Was it invented before the discovery of copper?"
Output: A fully functioning interactive database that allows a user to think of a prehistoric item and find it on screen within four questions.

4. The Hill Fort Defensive Simulation: Scratch Variables
Computing Domain: Computer Science (Variables, Conditionals, and Game Design)
Historical Link: Iron Age Hill Forts (e.g., Maiden Castle) and tribal warfare.
The Lesson Concept
Iron Age tribes built elaborate concentric earthen walls to delay invading forces. In this lesson, pupils build a basic defensive tower defence game in Scratch, learning how computers use variables to keep score and track changing mathematical states.
The Programming Elements:
1. The Background: Pupils design a top-down view of an Iron Age hill fort ring.
2. The Variable: Create a new variable box named `Fort Health` and set its initial value to `100`. Create a second variable named `Gold Rations`.
3. The Conditional Statement:** Write an `if-then` sensor loop script:
```text
If <Sprite1 (Invader) touches Sprite2 (Fort Wall)> then:
  Change [Fort Health] by -10
  Play sound [Stone Crumble]
```
Output: A prototype simulation game where pupils balance the variables—testing if changing the speed of the invaders makes the game mathematically impossible to win.

5. Decoding the Bronze Age: Cryptography and Network Data
Computing Domain: Digital Literacy (Cybersecurity, Cryptography, and How the Internet Works)
Historical Link: The shift from unwritten prehistory to early symbolic codes and record-keeping.
The Lesson Concept
Long before data packets moved across fibre-optic cables, messages were sent over distances using smoke signals, horns, or early carved markings. This lesson explores the fundamentals of data encryption and security.
The Cipher Challenge: Introduce pupils to basic cryptography using a "Prehistoric Runes Shift Cipher" (a Caesar Cipher). Pupils create two concentric cardboard alphabetic wheels. By shifting the inner wheel by a fixed number factor (the *Encryption Key*, e.g., +4), they transform plain text English words into an unreadable tribal code.
The Network Application: Pupils act as separate "routers" across the classroom network. They pass encrypted paper messages across the room to a target recipient. If a rival tribe intercepts the paper packet along the way, they cannot read the contents because they do not possess the digital key factor.
Output: Pupils decode a hidden message outlining an incoming tribal raid, demonstrating an understanding of how encryption keys secure data transmissions.

6. The Virtual Museum Guide: Green Screening & Video Editing
Computing Domain: Information Technology / Digital Literacy (Multimedia Content Creation)
Historical Link: Modern curation of Stone Age artefacts.
The Lesson Concept

Computers are essential tools for communication and media production. Pupils learn how to import assets, lay down multi-track audio timelines, and layer visual components using green-screen software (like DoInk or iMovie).

The Media Production:

Step 1 (The Asset Hunt): Pupils download public-domain images of real museum artefact displays (like Skara Brae or a Bronze Age burial mound).

Step 2 (The Performance): Standing in front of a green fabric wall, pupils film each other acting as historical tour guides, holding up physical classroom replicas (like a clay coil pot they made in Art).

Step 3 (The Digital Compositing): In the editing software, pupils drop out the green colour chroma-key and replace it with their historical background imagery. They edit out background noise and trim the clip down into a crisp 60-second video clip.

Output: A polished, exported digital museum video guide that can be uploaded to the school's virtual learning environment using a scannable QR code.

How has computing supported insights into how stone age to iron age living.
E.g., GPS, geotagging, databases to record finds. Radiocarbon dating.

http://www.digitaljournal.com/tech-and-science/science/archaeology-unearthing-the-past-using-modern-technology/article/508 536

Considerations for Implementation

Design & Technology

Substantive Knowledge

In DT, **substantive knowledge** for the **'Stone Age to Iron Age'** learning theme focuses on the "what": the specific materials, tools, and construction techniques developed by prehistoric humans to solve the problems of shelter, food, and survival. It is the study of how humanity moved from **using** the environment to **re-engineering** it.

1. Materials and Their Properties

Substantive knowledge involves knowing the specific characteristics of prehistoric materials and why they were chosen for certain tasks.

Natural Fibres: Understanding how materials like wool, flax, and nettle were processed and spun to create textiles.

Stone and Flint: Knowing that flint was prized for its ability to produce a sharp, glass-like edge through "knapping."

Metals and Alloys: Understanding that **Bronze** is an alloy (Copper + Tin) and that **Iron** required much higher temperatures to extract from ore, leading to the development of more advanced furnaces.

Composites: Knowing the "recipe" for **Wattle and Daub**—a mixture of mud, straw, and animal dung used to create weatherproof walls.

2. Construction and Structures

This covers the knowledge of how prehistoric people built lasting homes and monuments without modern machinery.

Roundhouse Engineering: Understanding the components of a roundhouse, including the **conical roof** (which sheds rain efficiently) and the **central hearth** for heating and cooking.

Joinery: Knowing about ancient methods of fixing materials together, such as **mortise and tenon joints** (used in wood and stone) and **lashing** with animal sinew or leather strips.
Dry Stone Walling: Understanding how stones can be stacked without mortar to create stable boundaries or homes (as seen at Skara Brae).
3. Food Technology and Processing
Substantive knowledge includes how humans developed machines to process the new crops they were farming.

Milling: Knowing how a **Saddle Quern** (a flat stone) and later a **Rotary Quern** (a circular stone) were used to grind grain into flour.
Preservation: Understanding the techniques used to keep food edible through winter, such as smoking, drying, or storing in cool, underground pits.
Cooking Vessels: Identifying the shift from woven baskets (lined with clay) to the mass-produced, decorated **Beaker pottery** of the Bronze Age.

4. Mechanical Systems
Even in prehistory, "simple machines" were used to make work easier.

The Lever and Friction: Understanding how large megaliths (like those at Stonehenge) were moved using wooden rollers and levers.
The Loom: Knowing how a warp-weighted loom functioned to weave cloth using gravity and tension.
The Drill: Understanding how "bow drills" were used to create fire through friction or to drill holes in beads and bone.

Why **Substantive Knowledge** Matters in DT
1. It Explains the 'Why' of History
Knowing that iron is harder than bronze explains why the Iron Age was a time of increased warfare and more efficient farming. The **technology (DT)** provides the reason for the **historical change**.

2. It Builds an Appreciation for Innovation
When pupils understand how difficult it is to smelt metal or build a stable roundhouse, they stop seeing prehistoric people as "primitive." They begin to respect them as **innovators** who achieved incredible feats with limited resources.

3. It Provides a Foundation for Science
The knowledge of alloys (Bronze) and the properties of materials (Tensile strength of fibres) directly links DT to the Science curriculum. It shows that science and technology have always worked hand-in-hand.

4. It Inspires Sustainable Thinking
By studying "low-tech" solutions—like using mud for insulation or stone for heat retention—pupils learn about **sustainable design**. These ancient methods are increasingly being looked at today as eco-friendly alternatives to modern building materials.

Disciplinary Knowledge

In DT, **disciplinary knowledge** refers to the "thinking and doing" skills that allow a designer to solve a problem. For the **'Stone Age to Iron Age'** learning theme, this is the study of **Experimental Engineering**. It focuses on how early humans acted as the first designers—moving from simply finding

objects to intentionally manipulating materials to fulfil a specific need.

1. The Design Loop: Iterative Improvement
Disciplinary knowledge in DT involves understanding that products are rarely perfect the first time.
Testing and Evaluating: Investigating why a Stone Age "design" (like a flint-tipped spear) was eventually replaced. Pupils look for "failure points" in prehistoric tools (e.g., the brittle nature of stone vs. the flexibility of bronze).
The Problem-Solving Mindset: Asking, "How do we make this tool lighter/sharper/stronger?"
Outcome: Pupils "deconstruct" an ancient design to identify the **user's needs** (e.g., portability for a nomad vs. durability for a farmer).

2. Materials Engineering (Technical Knowledge)
A designer must understand the "functional properties" of their materials. In this era, this meant mastering the transition from natural to synthetic materials.

Property Selection: Understanding why specific woods were used for specific tasks (e.g., flexible hazel for baskets vs. hard oak for gateposts).
The Discovery of Composites: Learning the discipline of combining materials to create something better, such as **Wattle and Daub** (sticks for structure + mud/straw for insulation).
Outcome: Testing different natural fibres (nettle, wool, flax) to see which has the highest **tensile strength** for making rope.

3. Structural Integrity and Mechanics
Disciplinary knowledge involves the physics of building—how to make a structure stand up and stay up.

Joinery and Joining: Investigating how to attach two different materials without modern "fixes" like screws or glue. This includes learning about **mortise and tenon joints** used at Stonehenge or "hafting" techniques using animal sinew and resin.
Load Bearing: Understanding how a conical roof on a roundhouse distributes weight evenly down to the walls, preventing collapse.
Outcome: Building small-scale structures to test which roof shapes are most **aerodynamic** or water-resistant.

4. Systems Thinking (Food and Tool Production)
DT is about more than just making objects; it's about understanding the **systems** they belong to.

The Food System: Moving from "gathering" to "processing." This includes the engineering of the **Quern Stone**—a machine designed to transform grain into flour using rotational force.
The Manufacturing System: Understanding the "workflow" of an Iron Age forge. This involves managing **inputs** (ore, charcoal, air), **processes** (smelting, hammering), and **outputs** (tools).

Why **Disciplinary Knowledge** Matters in DT
1. It Elevates 'Craft' to 'Engineering'

Instead of just "making a caveman house," pupils learn about **structural stability** and **thermal insulation**. It helps them see our ancestors not as "primitive" people, but as sophisticated engineers working with the tools they had.

2. It Teaches Resourcefulness
In the Stone Age, you couldn't "buy" a solution. You had to look at a forest or a rock and see a tool. This develops **divergent thinking**—the ability to see multiple uses for a single object, which is a core skill for any modern innovator.

3. It Develops Technical Vocabulary
By using terms like *tensile strength*, *compression*, *durability*, and *alloy*, pupils build the language of a professional designer. They learn that every "making" choice has a scientific reason behind it.

4. It Encourages Sustainable Design
By studying how ancestors used "zero-waste" materials that were 100% biodegradable or recyclable (like melting down old bronze), pupils gain a foundation in **circular economy** thinking—one of the most important concepts in 21st-century design.

The DT Disciplinarian's Challenge

Concept	The Design Question
User Needs	"Who is using this, and what environment are they in?"
Material Choice	"Will this material snap under pressure or bend?"
Joinery	"How can I fix these two items together using only what I find in nature?"
Evaluation	"What part of this design broke first, and how can I fix it?"

Learning Objectives

In DT, the **'Stone Age to Iron Age'** learning theme is essentially a study of the **origins of engineering**. The **learning objectives** focus on moving pupils from being "consumers" of the environment to "designers" who can manipulate materials to solve problems of shelter, survival, and efficiency.

1. Research and Design: Identifying Needs
Objective: *To use research and develop design criteria to inform the design of innovative, functional, appealing products that are fit for purpose, aimed at particular individuals or groups.*
The Focus: Moving from "generic" making to "purposeful" design. Pupils must understand why a design changed (e.g., why did a nomadic tent become a permanent stone house?).
Key Skill: User-centred design. If designing a Stone Age tool, pupils must consider the hand-grip

and the weight; if designing an Iron Age shield, they must consider protection vs. weight.
Outcome: Creating a design specification for a prehistoric dwelling that considers the climate, available materials, and the number of people it must house.

2. Making: Mastering Materials and Tools
Objective: *To select from and use a wider range of tools and equipment to perform practical tasks accurately; to select from and use a wider range of materials and components, including construction materials, textiles and ingredients.*
The Focus: Understanding the properties of "raw" materials.
Key Skill: Material selection. Choosing the right material for the job (e.g., using flexible willow for "wattle" and heavy clay for "daub").
Outcome: Building a small-scale model of a **roundhouse** or a **hillfort**, demonstrating how different materials provide structural strength and weatherproofing.

3. Evaluating: The Evolution of Technology
Objective: *To investigate and analyse a range of existing products; to evaluate their ideas and products against their own design criteria and consider the views of others to improve their work.*
The Focus: Comparing the "Old" vs. the "New." This is where pupils analyse the shift from Stone to Bronze to Iron.
Key Skill: Critical Analysis. Asking: *"Why was an iron axe better than a flint one?"* (It's easier to sharpen, less likely to shatter, and more abundant).
Outcome: Testing a "flint" (soap) tool against a "metal" (cardboard/wire) tool to see which is more durable, then using those findings to "upgrade" their design.

4. Technical Knowledge: Structural Integrity
Objective: *To apply their understanding of how to strengthen, stiffen and reinforce more complex structures.*
The Focus: Prehistoric engineering without modern adhesives.
Key Skill: Mechanical joins. Learning about how ancient people attached things using **lashing** (with string or sinew) or **mortise and tenon joints** (interlocking parts).
Outcome: Successfully building a "lintel" structure (like Stonehenge) that can support a specific weight without collapsing, using only friction and gravity.

Why These Objectives Matter
1. They Humanise Innovation
By following these **learning objectives**, pupils realise that "technology" isn't just electronics—it's any tool used to solve a problem. It bridges the gap between seeing prehistoric people as "primitive" and seeing them as **resourceful engineers**.

2. They Develop 'Trial and Error' Resilience
Prehistoric technology was perfected through thousands of years of failure. DT learning objectives teach pupils that **iteration** (making, testing, improving) is the heart of all progress. This builds a growth mindset.

3. They Teach Sustainable Resourcefulness
In this learning theme, pupils are limited to "natural" materials. This forces them to think creatively about the properties of the world around them—a foundational skill for modern **sustainable design**

and the "circular economy."

4. They Contextualise Science
When a pupil learns how an alloy is made (Bronze) or how a conical roof distributes weight, they are applying **chemistry and physics** in a physical way. DT makes the abstract concepts of science feel "real" and useful.

The DT Designer's Success Criteria

Concept	The Pupil Can…
Material Choice	I can explain why I chose clay instead of sand for my model walls.
Structure	I can use a "triangle" shape to make my roundhouse roof stronger.
Joins	I can join two sticks together without using sticky tape or glue.
Analysis	I can explain one reason why the Iron Age made farming easier.

Lesson Ideas

Here is a complete, 6-week Medium-Term Plan for Key Stage 2 Design & Technology framed around **'Stone Age to Iron Age'**. This unit connects core National Curriculum Design & Technology strands—**Structures & Mechanics, Mechanical Systems (Pulleys & Levers), Textiles & Joining Techniques, Food & Agriculture Technology, and Materials/Metals Simulation**—with hunter-gatherer shelters, prehistoric stone-moving cranes, leather/pelt footwear, ancient grain processing, and Iron Age hillfort defences. It balances **substantive knowledge** (triangulation and structural bracing, mechanical advantage in pulley/lever systems, seam allowance and blanket stitching, nutritional composition of ancient grains, and material properties across stone, wood, bronze, and iron) with **disciplinary knowledge** ("Thinking & Acting Like an Engineer & Designer"—analysing user needs under environmental constraints, selecting appropriate materials based on functional testing, evaluating structural failure points, and iteratively refining prototypes).

Unit Title: Prehistoric Engineering: Shelters, Mechanics, Textiles, and Metallurgy
Duration: 6 Weeks (Approx. 1.5 to 2 hours per week)
Theme: Stone Age Nomadic Survival, Bronze Age Agricultural Mechanisms, and Iron Age Hillfort Technology.

DT Focus Areas:
Structures & Frame Design: Triangulated shelter frames, weight distribution, and weatherproofing.
Mechanical Systems: Simple machines (pulleys, levers, and winches) for moving heavy megalithic loads.

Textiles & Functional Products: Pattern drafting, seam allowance, and thread-joining techniques for prehistoric leather/pelt pouches and footwear.
Food & Culinary Technology: Processing ancient grains (einkorn/spelt), yeast-free flatbread formulation, and hygiene/nutrition comparison.
Materials & Castings: Simulated cold-casting processes, mould making, and structural comparison across material eras.

Key Design & Technology Pillars

Substantive Knowledge:

Structural Engineering: Frame structures, diagonals for stability (triangulation), centre of gravity, footing load distribution.
Mechanical Systems: Mechanical advantage (effort x distance = load), fixed vs. movable pulleys, first-class levers, rotational force via winches.
Textiles: Fasteners, template creation, seam allowances (1cm margin), running stitch vs. blanket stitch strength.
Food Technology: Processing raw grain through hand-milling (quern stones), gluten development, unleavened bread baking mechanics.

Disciplinary Knowledge ('Thinking Like an Engineer'):

User-Centred Design: Developing design criteria tailored to specific prehistoric environmental stressors (wind, rain, terrain).
Functional Material Selection: Testing materials for tensile strength, flexibility, and impermeability before prototyping.
Iterative Evaluation: Conducting destructive load testing and refining structural joints based on failure analysis.

Weekly Progression Scheme

Week 1: Nomadic Shelters – Frame Triangulation & Joint Lashing

DT Strand: Technical Knowledge (Structures).

Substantive Knowledge:

LKS2: Understanding frame structures vs. shell structures; square vs. triangular stability; using natural cordage for friction lashing.
UKS2: Structural forces (compression and tension); calculating load distribution across multiple support legs; weatherproofing membranes.

Disciplinary Knowledge:

Structural Testing: Testing frame prototypes against simulated wind forces to identify weak joints and add cross-bracing.

Practical DT Task:

LKS2 (Y3/4): *Tepee & Lean-To Frame Construction.* Pupils construct scale frame shelters using wooden dowels and jute twine lashing, comparing square frames against triangulated frames under weight loads.
UKS2 (Y5/6): *Weatherproof Mesolithic Dwelling.* Pupils design and build a braced scale shelter, applying waterproofing coatings (paraffin wax/oil) to textile covers and testing water shed efficiency.

Week 2: Moving the Megaliths – Levers, Pulleys & Mechanical Advantage

DT Strand: Technical Knowledge (Mechanical Systems).

Substantive Knowledge:

LKS2: Simple levers (fulcrum, load, effort); friction reduction using wooden rollers; mechanical

advantage concept.

UKS2: Compound pulley systems; effort force calculations (Effort = $\frac{Load}{Number\ of\ Ropes}$); axle and winch mechanics.

Disciplinary Knowledge:

Mechanical Evaluation: Measuring the reduction in force required to move a "sarsen stone" weight using spring balances across different mechanical setups.

Practical DT Task:

LKS2 (Y3/4): *Saddle Lever & Roller Rig.* Pupils construct a lever and timber roller sled system to move a 1 kg stone block across sand, recording effort force using force meters.

UKS2 (Y5/6): *Stonehenge Crane Winch.* Pupils design and build a working timber A-frame crane featuring a double-pulley and axle winch, measuring effort reductions when lifting simulated megalith blocks.

Week 3: Ice Age Survival Wear – Pattern Drafting & Heavy Textiles

DT Strand: Design, Make & Evaluate (Textiles).

Substantive Knowledge:

LKS2: Creating flat paper templates; seam allowances; basic functional stitches (running stitch, backstitch).

UKS2: 3D pattern drafting; heavy-duty edge finishes (blanket stitch); material testing for tensile resistance and water repellence (felt, leatherette, fleece).

Disciplinary Knowledge:

Functional Ergonomics: Designing a wearable container or footwear accessory that stays attached during rapid movement.

Practical DT Task:

LKS2 (Y3/4): *Ötzi's Tool Pouch.* Pupils design a paper template, cut thick felt/faux-leather, and sew a belt-mounted tool pouch using running stitch and horn toggle closures.

UKS2 (Y5/6): *Prehistoric Leather Gaiters / Footwear.* Pupils draft a 3D foot-wrapping template, cut reinforced materials with 1.5 cm seam allowances, and sew protective trail gaiters using blanket stitch and cordage lacing.

Week 4: The Neolithic Kitchen – Grain Milling & Flatbread Formulation

DT Strand: Cooking & Nutrition (Food Technology).

Substantive Knowledge:

LKS2: Whole grains vs. processed flour; mechanical processing using saddle querns; basic unleavened bread ingredients (flour, water, salt).

UKS2: Nutritional role of complex carbohydrates and fibre; binding chemistry (gluten network development); hygienic food preparation protocols in field environments.

Disciplinary Knowledge:

Recipe Modification: Adjusting water-to-flour ratios systematically to optimise dough elasticity and baking texture.

Practical DT Task:

LKS2 (Y3/4): *Quern Stone Grinding & Flatbreads.* Pupils grind wheat berries between flat stone querns, mix flour with water to form a unleavened dough, and bake flatbreads on dry griddle pans.

UKS2 (Y5/6): *Ancient Grain Formulations.* Pupils compare processing difficulty and dough performance across spelt, einkorn, and modern wheat, developing a fortified seed-and-herb flatbread recipe with sensory evaluations.

Week 5: Bronze to Iron – Casting Simulations & Material Testing
DT Strand: Materials, Design & Prototype Casting.
Substantive Knowledge:
LKS2: Material properties (hardness, malleability, brittleness); mould casting principles; comparing stone tools to metal tools.
UKS2: Press-mould casting processes; evaluating alloy advantages (copper + tin = bronze); structural comparison between cast bronze and forged iron.
Disciplinary Knowledge:
Material Failure Analysis: Testing prototype blade edges for bending resistance vs. impact shattering to evaluate material suitability.
Practical DT Task:
LKS2 (Y3/4): *Clay Mould Cold-Casting.* Pupils carve axe-head impressions into clay moulds and pour in quick-setting casting compound (pewter simulation/plaster), filing the hardened casting smooth.
UKS2 (Y5/6): *Bronze Age Sword Production.* Pupils craft two-part silicone/clay moulds, cast replica bronze socketed axe heads or daggers, and design ergonomic wooden handle sockets with dowel fixings.

Week 6: The Iron Age Hillfort Defence – Structural Engineering Synthesis
DT Strand: Evaluation, Structural Synthesis & Design Presentation.
Substantive Knowledge:
LKS2/UKS2 Synthesis: Integrating frame triangulation, mechanical gate levers, textile barriers, and forged metal fittings into a cohesive fortification prototype.
Disciplinary Knowledge:
Rigorous Product Evaluation: Conducting destructive stress testing on hillfort gates and wall sections, recording failure causes, and documenting design revisions.
Practical DT Task:
LKS2 & UKS2: *The Hillfort Gateway Engineering Challenge.*
Task 1: Groups design and build a scale model Iron Age hillfort entrance featuring a timber palisade wall, a lever-operated draw-gate, and a stone-moving crane.
Task 2: Test the gateway against mechanical stress (impact pendulum, weight loading) and evaluate performance against initial design criteria.
Plenary: Groups deliver a design presentation explaining their material choices, mechanical advantage calculations, and structural bracing logic.

Assessment Matrix (Progression Indicators)

Phase	Working Towards	Expected Standard	Greater Depth
Lower Key Stage 2 *(Years 3 & 4)*	• Builds unbraced square frames that collapse under light top pressure. • Requires assistance to set up simple levers and force meters. • Cuts textile shapes without leaving seam allowances, resulting in undersized products.	• Constructs stable frame structures using triangulation and tight twine lashing. • Builds a functional lever and roller system, measuring effort force accurately with a spring balance. • Cuts textiles from paper	• Explains how triangulation redirects compressive forces away from joint centres. • Modifies fulcrum positioning on levers to maximise mechanical advantage systematically. • Uses backstitch/blanket stitch variations to

	• Combines flour and water without measuring, producing overly sticky or crumbly dough.	templates, leaving adequate seam margins for running stitch assembly. • Grinds grain using saddle querns and bakes edible unleavened flatbreads safely.	reinforce high-stress seam joints. • Evaluates dough texture variations and adjusts ingredient ratios independently.
Upper Key Stage 2 *(Years 5 & 6)*	• Constructs shelters without applying weatherproofing membranes or wind bracing. • Assembles single-pulley setups without calculating mechanical effort reduction. • Struggles to sew 3D textile patterns without twisting seam alignments. • Compares grain flours without analysing nutritional composition or gluten strength.	• Builds load-bearing, waterproofed frame shelters, justifying material selections. • Designs compound pulley and winch cranes, calculating effort force reductions accurately. • Drafts 3D textile patterns and executes clean blanket-stitched seams with toggles. • Develops fortified ancient grain flatbread recipes, evaluating texture, elasticity, and yield.	• Performs structural stress tests on prototypes, optimising frame layouts based on load data. • Combines mechanical advantage systems (pulleys + winches) into efficient complex machines. • Incorporates gussets and reinforced stitch patterns to handle heavy structural loads. • Analyses the biochemical role of gluten in dough development using precise technical language.

Other Information, Ideas and Resources

The transition from the **Stone Age to the Iron Age** is fundamentally a story of human technological revolution. It traces how early humans advanced from foraging with basic flint tools to engineering complex wooden mechanisms, domesticating agriculture, and smelting raw metals. These are alternative technique-driven DT lesson sequences that focus on structural stability, mechanical systems, material properties, and textiles.

1. Materials: Testing the Ultimate Prehistoric Rope

DT Domain: Materials and Technical Knowledge (Tensile Strength & Properties)

Historical Link: Mesolithic and Neolithic binding techniques (building shelters and axes).

The Lesson Concept

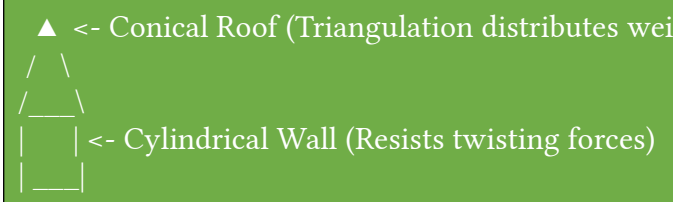
Before screws and nails, early humans relied entirely on cordage made from plant fibres and animal sinew to hold their world together. In this lesson, pupils investigate the structural properties of different materials to determine which makes the strongest rope.

The Design Brief: *Design and construct a high-strength composite cord capable of lashed construction for a Neolithic shelter.*

The Testing Method: Provide pupils with raw, single-strand fibres (e.g., *jute twine, hemp fibres, cotton*

string, raffia, and long grass). Pupils learn the ancient mechanical technique of **reverse-twisting** (or braiding) to combine weak individual strands into a thick, interlocking rope.
The Evaluation: Hang a plastic bucket from each group's finished cord. Slowly add 100g weights to the bucket until the cord snaps, recording the exact mass held (**tensile strength**).
Output: An evaluation chart comparing material performance, detailing how twisting multiple fibres together distributes mechanical stress and increases loading capacity.

2. Structures: Designing a Stable Neolithic Roundhouse
DT Domain: Structures (Stability, Triangulation, and Load-Bearing Frameworks)
Historical Link: Neolithic and Bronze Age settlements (e.g., Skara Brae or Flag Fen).
The Lesson Concept
This lesson focuses on architectural engineering. Pupils move away from flimsy card models and explore how interlocking vertical pillars and a conical roof distribute weight downwards and outwards to withstand extreme weather.
The Design Brief: *Build a structurally sound 3D scale model of a Celtic roundhouse framework that remains stable under wind and vertical load stresses.*



The Construction Technique: Pupils use natural willow twigs or dowel rods to create the main circular frame. They learn to join elements securely using their homemade cordage from Lesson 1 or raffia.
The Engineering Skill: Introduce **triangulation**. Pupils discover that a square frame wobbles, but adding a diagonal cross-strut (forming triangles) locks the joints in place. They construct a stable, self-supporting conical roof structure to sit atop the cylindrical wall base.
Output: A finished structural skeleton of a roundhouse, stress-tested by placing a heavy book on the roof to evaluate its load-bearing capacity.

3. Mechanical Systems: The Rotary Quern Stone (Gears)
DT Domain: Mechanical Systems (Rotary Motion, Friction, and Axles)
Historical Link: The Iron Age agricultural revolution and flour production.
The Lesson Concept
The invention of the rotary quern stone in the Iron Age was a massive leap forward in food processing technology. It transformed simple back-and-forth linear friction into continuous **rotary motion**, allowing grains to be milled rapidly.
The Design Brief: *Construct a working mechanical model of a rotary milling system that uses an axle and a pivot to grind simulated grain.*
The Mechanism: Using thick corrugated cardboard disks, foam wheels, or plastic gear kits, pupils construct two flat, parallel wheels:
1. The lower disk (the *bed stone*) is fixed completely stationary on an axle.
2. The upper disk (the *capstone*) is mounted onto a central pivot handle, allowing it to spin smoothly on top of the lower disk.

The Mechanical Test: Pupils drop dried oats or coarse sea salt into a central hole in the top disk. They

turn the handle, applying downward force while rotating the wheel. The friction between the two spinning surfaces shears the oats down into a fine powder that spills out the sides.
Output: A functional, hand-cranked rotary mechanism that demonstrates how rotating machine elements reduce manual physical effort.

4. Cooking and Nutrition: Hardtack Biscuits vs. Iron Age Stew
DT Domain: Cooking and Nutrition (Seasonality, Food Preservation, and Preparation)
Historical Link: Shifting diets from Palaeolithic hunting to Iron Age farming.
The Lesson Concept
Pupils explore how the human diet changed across thousands of years. They learn the basic food hygiene principles of preserving items for long storage without access to refrigeration, contrasting it with a nutrient-dense farm meal.
The Culinary Challenge:
Part 1 (Preservation): Pupils bake a traditional hunter-gatherer / early farmer **hardtack biscuit** using only wholemeal flour, water, and a pinch of salt. They discover that removing moisture completely prevents microbial growth, allowing food to be kept for multi-month voyages.
Part 2 (Seasonality): Pupils practice culinary knife skills (using the *bridge and claw* safety grips) to chop seasonal root vegetables, barley, and herbs to prepare a rich Iron Age pottage stew.
Output: A sensory evaluation matrix rating both food profiles based on texture, longevity, ease of prep, and nutritional profile.

5. Textiles: Loom Construction and Wattle-and-Daub Insulation
DT Domain: Textiles / Materials (Weaving Systems and Thermal Mass)
Historical Link: Iron Age weaving rooms and wattle-and-daub wall insulation.
The Lesson Concept
This lesson combines clothing textiles with structural building methods. Pupils explore how interlocking horizontal and vertical lines create tight barriers—whether weaving wool yarn for a tunic or interlacing wooden hazel sticks (*wattle*) coated in mud (*daub*) to seal a draughty house wall.
The Design Brief: *Design and assemble a miniature interwoven structural screen wall panel that blocks cold air movement.*
The Dual-Track Construction:
Track A (Textiles): Pupils build a wooden frame loom using lolly sticks, stringing up a strong vertical **warp**. They use thick woolly weft threads to weave a dense, windproof fabric swatch.
Track B (Structures): Pupils weave thick, flexible willow branches horizontally through fixed vertical posts to make a wattle fencing panel. They patch the gaps with a homemade "daub" mixture of clay, sand, and straw.
Output: A finished composite wall sample or heavy textile insulating swatch, evaluated against a classroom fan to test its wind-blocking capabilities.

6. Mechanisms: The Bronze Age Socketed Axe (Joinery)
DT Domain: Materials and Technical Knowledge (Fixings, Mechanical Joins, and Casts)
Historical Link: The invention of metal casting and advanced tool joinery.
The Lesson Concept
When humans moved from stone to bronze, they faced an engineering crisis: metal axe heads were slick and heavy, meaning they flew right off traditional wooden split-handle mounts upon heavy impact. The solution was the **socketed join**—a hollow metal pocket that slid neatly over a bent wooden crook handle.

The Design Brief: *Design an interlocking socket-and-peg mechanical joint that securely fixes a tool head to a handle without relying on glue.*

The Technique:

1. Pupils carve a bent wooden branch profile out of thick dense Styrofoam or stiff corrugated layers (the *handle*).
2. Using a malleable wrapping sheet like heavy-gauge aluminium foil or plaster bandages, they mould a hollow pouch (the *socket axe-head*) directly over the tip of the handle.
3. They design a small horizontal locking loop on the side of the socket, allowing them to tie a leather cord tight to pull the axe head backwards into the wooden joint whenever it strikes an object.

Output: A non-glue tool assembly prototype that demonstrates an understanding of how interlocking geometric forms hold together securely under mechanical tension.

Stone Age:

During the Stone Age, humans created increasingly more sophisticated stone tools. These included: hand axes, spear points for hunting large game, scrapers which could be used to prepare animal hides and awls for shredding plant fibres and making clothing. Not all Stone Age tools were made of stone.

Use research and develop design criteria to inform the design of innovative, functional, appealing products that are fit for purpose, aimed at particular individuals or groups.

Possibly think about creating things that the different time periods may have made to help them with day-to-day living.

Tools for building, mending & hunting – What types of tools did they make and what was the purpose?

Pupils design and make their own tool.

Considerations for Implementation

Geography

Substantive Knowledge

In Geography, **substantive knowledge** for the **'Stone Age to Iron Age'** learning theme focuses on the physical features of the landscape and how early humans interacted with them. It is the study of **location, land use, and environmental change.** Before written history, the shape of the land was the "instruction manual" for human survival.

1. Physical Geography: Landscapes and Climate

Substantive knowledge involves understanding the physical world that prehistoric humans inherited.

The End of the Ice Age: Knowing how the melting of the glaciers around 10,000 years ago changed the landscape, turning tundra into forest and creating the British Isles by flooding the land bridge known as **Doggerland**.

Natural Resources: Identifying where essential materials were found geographically, such as flint in chalky areas (like the South Downs) or copper and tin in the rocky terrain of Cornwall and Wales.

Topography: Understanding different landforms—hills, plateaus, valleys, and rivers—and how they provided either protection or resources.

2. Settlement and Site Selection

This is the "Where" and "Why" of prehistoric living.

Site Requirements: Knowing the geographical factors needed for a successful settlement:
Water: Access to rivers or springs for drinking and transport.
Aspect: South-facing slopes to catch the most sunlight (warmth).
Defence: High ground (for hillforts) to spot approaching threats.
Soil and Fertility: Understanding that the Neolithic "revolution" required humans to find well-drained, fertile land for the first crops of wheat and barley.

3. Human Geography: Land Use and Trade
Substantive knowledge includes how humans began to modify the environment to suit their needs.

Deforestation: Knowing that early farmers were the first to significantly change the landscape by clearing forests (the "wildwood") to create fields.
Trade Routes: Understanding how people used physical features like rivers (the Thames, the Severn) and "ridgeways" (high-ground paths) to transport goods like axe heads and bronze.
Land Ownership: Recognising that farming led to the first boundaries in the landscape, such as ditches and field systems, marking the start of "territory."
4. Map Skills and Fieldwork
This involves the practical knowledge of how we locate prehistoric sites today.

OS Map Symbols: Identifying symbols for "Ancient Monuments," "Henges," or "Hillforts" on modern maps.
Direction and Distance: Using the eight points of a compass to describe the movement of people or the location of major sites like Skara Brae (Orkney) in relation to Stonehenge (Wiltshire).

Why **Substantive Knowledge** Matters in Geography
1. It Explains Human Adaptation
By knowing the geography of the time, pupils understand that prehistoric people weren't "primitive"; they were **geographical experts**. They knew exactly which stones made the best tools and which hills offered the best defence.

2. It Highlights Environmental Responsibility
Learning about the first instances of deforestation shows pupils that human impact on the planet is an ancient story. It provides the foundation for understanding modern issues like **sustainability and biodiversity loss**.

3. It Develops Spatial Reasoning
Mapping the journey of a Bronze Age merchant or the spread of farming across Europe helps pupils visualise the world as a connected system. It moves geography from "static maps" to a "dynamic story" of movement and change.

4. It Bridges History and Science
Geography is the "connective tissue" between these subjects. It shows that **History** (what happened) is often determined by **Geography** (where it happened). Without the specific mineral geography of Britain, the Bronze and Iron Ages would have looked very different.

Disciplinary Knowledge

In Geography, **disciplinary knowledge** refers to the ability to think like a geographer—understanding the relationship between people and their environment. For the **'Stone Age to Iron Age'** learning theme, this involves looking at how the physical landscape dictated where people lived, how they moved, and how they eventually began to reshape the Earth to suit their needs.

1. Settlement and Site Selection
Disciplinary knowledge involves analysing *why* a specific location was chosen for a home. Geographers look for patterns in the landscape.

Physical Requirements: Identifying the "essential ingredients" for a prehistoric settlement: proximity to fresh water, fertile soil for early farming, and natural defences (like high ground for a hillfort).
Defensive Mapping: Investigating the strategic geography of the Iron Age. Why build on a hill? Pupils look at "line of sight" and how the steepness of the terrain acted as a natural barrier.
Outcome: Pupils "site" a new settlement on a topographical map, justifying their choice based on geographical features like river meanders or plateaus.
2. Human Impact and Environmental Change
This is the study of how humans began to change the "face of the Earth."

Deforestation and Land Use: Understanding that the transition to the Neolithic (farming) was the first major human-led environmental change. Geographers look at how clearing forests for wheat and barley altered the local ecosystem.
Modification of the Landscape: Studying the "engineering" of the earth, such as the digging of huge ditches for henges or the terracing of hills for ramparts.
Outcome: Comparing "Before" and "After" maps of a landscape to see how the shift from hunter-gathering to farming changed the land-cover.

3. Resource Management and Trade Networks
Disciplinary knowledge involves understanding the "geography of stuff"—where materials come from and how they move.

Sourcing Raw Materials: Why is a Stone Age axe made of Cumbrian "greenstone" found in London? This teaches the concept of **spatial distribution** and early transport links (rivers and coastal paths).
The Geography of Bronze: Understanding that Bronze required Copper and Tin, which are rarely found in the same place. This is the origin of **international trade** and the "Global Supply Chain."
Outcome: Mapping the trade routes of the Bronze Age, connecting mines in Cornwall to settlements in Europe.

4. Physical Geography: Climate and Change
Understanding how the Earth's natural cycles forced human adaptation.
Post-Glacial Geography: Learning how the melting of the ice sheets (the end of the Palaeolithic) created the British Isles by flooding "Doggerland."
Climate as a Driver: Understanding how a change in weather (becoming wetter or colder) forced people to move from high-altitude dwellings to valley floors.

Why **Disciplinary Knowledge** Matters in Geography
1. It Connects the 'Where' to the 'Why'
Instead of just learning that people lived in hillforts, pupils understand the **strategic logic** behind it. It

teaches them that humans are not random; our choices are often a response to the shape of the world around us.

2. It Develops 'Spatial Thinking'
Mapping ancient trade routes or settlement patterns helps pupils visualise the world in 3D. They begin to see hills, rivers, and forests not just as scenery, but as **opportunities and obstacles**.

3. It Introduces Environmental Responsibility
By seeing the very first examples of deforestation and land modification, pupils realise that humans have been impacting the climate for thousands of years. This provides a vital historical context for modern discussions on **sustainability and climate change**.

4. It Bridges History and Science
Geography acts as the "connective tissue." It shows that "History" (what happened) is often caused by "Geography" (where it happened). This interdisciplinary thinking is a key skill for higher-level education.

The Prehistoric Geographer's Toolkit

Geographical Concept	**Prehistoric Example**
Site	Choosing a dry, flat area near a spring for a roundhouse.
Connectivity	Using the River Thames as a "highway" for transporting flint.
Human Impact	Slashing and burning a forest to create the first fields.
Topography	Using the natural curve of a hill to build defensive ramparts.

Learning Objectives

To anchor the **'Stone Age to Iron Age'** history learning theme into the Key Stage 2 Geography curriculum, the learning objectives should focus on **physical geography** (how ice sheets and rising sea levels changed the land) and **human geography** (how access to natural resources drove early human settlement). Here are the progressive learning objectives structured by geographical domain, complete with specific success criteria.

1. Geographical Skills & Fieldwork
Learning Objective: To use physical and digital maps to identify and locate changes in settlement patterns from the Palaeolithic to the Iron Age.
Success Criteria:

I can locate key prehistoric sites on a map of the UK (e.g., Star Carr, Skara Brae, Maiden Castle).
I can use the eight points of a compass to describe the movement of early human tribes across the British landscape.
I can identify spatial patterns showing why humans abandoned upland sites for lowland river valleys over time.

2. Physical Geography: Changing Landscapes
Learning Objective: To describe and understand how climate change transformed the physical geography of Britain, creating the British Isles.
Success Criteria:
I can explain how the retreat of glaciers at the end of the last Ice Age altered the physical shape of the land.
I can describe how rising sea levels submerged **Doggerland** and separated Britain from mainland Europe.
I can use geographical vocabulary (such as *glacier, tundra, sea level, erosion, land bridge*) to explain why Britain's flora and fauna changed.

3. Human Geography: Natural Resources & Metallurgy
Learning Objective: To analyse how the distribution of natural raw materials influenced trade networks and settlement locations in the Bronze and Iron Ages.
Success Criteria:
I can locate the natural sources of copper and tin in the UK (such as Cornwall and Wales) and explain why these areas became early industrial hubs.
I can describe how the discovery of local iron ore expanded human settlements by freeing them from long-distance trade routes.
I can map early European trade networks to show how raw materials moved across physical borders.

4. Settlements & Land Use: Designing Hill Forts
Learning Objective: To explain how the physical topography of the land dictated the design and defensive positioning of Iron Age settlements.
Success Criteria:
I can define *topography* and explain why Iron Age tribes chose elevated contours (like hills and ridges) for their fortresses.
I can identify how natural physical features (such as rivers, steep slopes, and cliffs) were used alongside human-made ramparts for defence.
I can compare a Neolithic farming village with an Iron Age hill fort, highlighting how land use changed as tribal warfare increased.

5. Human-Environment Interaction: The Birth of Farming
Learning Objective: To understand how the transition from hunter-gatherer to farmer fundamentally altered the physical environment and land use of Britain.
Success Criteria:
I can explain how the clearance of native oak forests (**deforestation**) was necessary to create the first pastoral fields and crop arable plots.
I can describe how early agricultural practices modified local water systems and soil structures.

I can give examples of how permanent farming settlements left lasting marks on the physical landscape that are still visible from the air today.

Lesson Ideas

Here is a complete, 6-week Medium-Term Plan for Key Stage 2 Geography framed around **'Stone Age to Iron Age'**. This unit connects core National Curriculum Geography strands—**Physical Landscape Formation & Geology, Human Settlement & Migration, Resource Mapping & Trade Networks, Fieldwork & Spatial Analysis, and GIS/Topographical Mapping**—with glaciation, cave settlements, rivers, raw material distribution (flint, copper, tin, iron), and hillfort site selection. It balances **substantive knowledge** (glaciated landforms, karst topography, river valley settlement drivers, mineral resource distribution, contour lines, and trade topology) with **disciplinary knowledge** ("Thinking & Acting Like a Geographer"—interpreting OS maps, analysing spatial distribution patterns, conducting local site surveys, evaluating physical vs. human environmental trade-offs, and querying digital spatial data).

Unit Title: Prehistoric Landscapes: Geology, Settlement, Resources, and Hillfort Topography
Duration: 6 Weeks (Approx. 1.5 to 2 hours per week)
Theme: Stone Age Glacial & Karst Environments, Bronze Age Trade Networks, and Iron Age Hillfort Geomorphology.
Geographical Strands:
Physical Geography: Glaciation, limestone weathering (karst caves), river meanders, and ore deposit geology.
Human Geography: Hunter-gatherer migration routes, agricultural land use shifts, settlement patterns, and trade topology.
Mapping & GIS: OS map symbols, 4/6-figure grid references, contour line interpretation, and digital spatial analysis.
Fieldwork: Local land-use mapping, soil/rock sampling, slope gradient profiling, and environmental site surveys.
Key Geographical Pillars
Substantive Knowledge:
Geomorphology & Geology: Karst landscapes (limestone dissolution), glacial retreat landforms, alluvial floodplains, chalk/flint strata, copper/tin ore veins.
Settlement & Spatial Dynamics: Site factors (water access, defensibility, fertile soil, fuel), nomadic migration vs. sedentary farming footprint.
Cartography & GIS: Scale, 4-figure (LKS2) and 6-figure (UKS2) grid references, relief representation (contour interval spacing).
Disciplinary Knowledge ('Thinking Like a Geographer'):
Spatial Pattern Analysis: Identifying relationships between physical landscape features and human settlement density.
Cartographic Interpretation: Translating 2D contour maps into 3D mental models of terrain steepness and defensibility.
Geographical Inquiry & Fieldwork: Collecting primary environmental data to evaluate land-use suitability across different historical eras.

Weekly Progression Scheme
Week 1: Glaciers & Caves – Ice Age Environments & Karst Landscapes
Geographical Strand: Physical Geography (Geomorphology & Geology).
Substantive Knowledge:

LKS2: The Last Glacial Maximum in Britain; ice sheet coverage boundaries; limestone cave formation (water dissolution of calcium carbonate).
UKS2: Glacial retreat landforms (moraines, meltwater valleys); tundra climate characteristics; how geology dictated Palaeolithic shelter locations (Creswell Crags, Cheddar Gorge).

Disciplinary Knowledge:
Spatial Distribution: Comparing UK geological maps with known Palaeolithic cave sites to establish correlation between rock type and shelter availability.
Practical Geography Task:
LKS2 (Y3/4): *The Ice Edge Map.* Pupils map the maximum extent of the British ice sheet on outline maps, plotting key cave sites and categorising tundra vs. glaciated zones.
UKS2 (Y5/6): *Karst Landscape Analysis.* Pupils analyse geological cross-sections of limestone regions, tracing underground water pathways and explaining why hunter-gatherers selected specific cave orientations (south-facing for solar gain).

Week 2: Settling the Valleys – Neolithic Farming & River Geomorphology
Geographical Strand: Physical & Human Geography (Settlement & Rivers).
Substantive Knowledge:
LKS2: Physical requirements for early permanent settlements (fresh water, flat fertile land, timber); river features (meanders, floodplains).
UKS2: Alluvial soil formation through flooding; forest clearance impacts on soil erosion; comparing nomadic land footprint vs. agricultural land footprint (Skara Brae vs. Star Carr).
Disciplinary Knowledge:
Site Suitability Evaluation: Weighing competing physical factors (e.g., flood risk vs. soil fertility) to justify settlement location choices.
Practical Geography Task:
LKS2 (Y3/4): *Neolithic Site Selection.* Pupils evaluate three river valley locations on a simplified map, scoring each site for water access, flat land, and shelter before choosing an ideal village location.
UKS2 (Y5/6): *Skara Brae & River Valley GIS.* Pupils use digital mapping tools (e.g., Digimap for Schools) to measure coastal/river distances and analyse how local geology (sandstone flags) enabled Skara Brae's unique stone construction.

Week 3: Flint, Copper & Tin – Resource Mapping & Trade Topology
Geographical Strand: Human Geography & Fieldwork (Economic & Physical Distribution).
Substantive Knowledge:
LKS2: Distribution of natural resources across the UK (chalk/flint in South/East, copper/tin in South West/Wales); basic trade route concepts.
UKS2: Resource scarcity driving trade networks; maritime and riverine transport routes; the geopolitical importance of Cornwall's tin deposits in Bronze Age Europe.
Disciplinary Knowledge:
Map Overlay & Synthesis: Overlaying mineral distribution maps with trade route maps to deduce economic hubs and transport corridors.
Practical Geography Task:
LKS2 (Y3/4): *The Prehistoric Resource Map.* Pupils plot flint mines (Grime's Graves) and metal deposits on UK maps using map keys and 4-figure grid references.
UKS2 (Y5/6): *Bronze Age Trade Network Analysis.* Pupils map the European trade network connecting

Cornish tin and Welsh copper to continental hubs, analysing how physical river networks (Thames, Severn, Rhine) acted as highway corridors.

Week 4: Contour Lines & Fortifications – Iron Age Topography
Geographical Strand: Geographical Skills & Fieldwork (Cartography & Relief).
Substantive Knowledge:
LKS2: Understanding elevation and hill representation; introducing contour lines (close lines = steep, far apart = gentle); OS map symbols.
UKS2: 6-figure grid references; interpreting spot heights and contour intervals; analysing strategic physical advantages of hillfort locations (Maiden Castle, Danebury).
Disciplinary Knowledge:
Cartographic Translation: Converting 2D contour patterns on OS maps into 3D elevation profiles to assess slope steepness and defensive value.
Practical Geography Task:
LKS2 (Y3/4): *Contour Model Building.* Pupils create stacked cardboard 3D hill models from contour templates, placing an Iron Age hillfort on the highest, most defensible plateau.
UKS2 (Y5/6): *Maiden Castle OS Map Analysis.* Pupils examine 1:25,000 OS maps of Maiden Castle, using 6-figure grid references to locate ramparts, calculating slope gradients, and plotting cross-sectional elevation graphs.

Week 5: Local Prehistoric Footprint – Fieldwork Survey & Soil/Slope Analysis
Geographical Strand: Fieldwork & Enquiry.
Substantive Knowledge:
LKS2: Primary data collection; measuring environmental factors (soil texture, infiltration rate, slope); recording observations using tally sheets and sketches.
UKS2: Systematic field sampling methods; measuring slope angles using clinometers; assessing human impact and physical suitability of local landforms.
Disciplinary Knowledge:
Empirical Fieldwork Inquiry: Gathering and recording quantitative field data to test a hypothesis regarding local site suitability for prehistoric settlement.
Practical Geography Task:
LKS2 (Y3/4): *School Grounds Settlement Survey.* Pupils conduct a fieldwork survey of the school grounds, recording soil drainage rates and slope gradients to map the "most liveable Stone Age site" on school grounds.
UKS2 (Y5/6): *Micro-Topography & Slope Profiling.* Pupils use ranging poles, tape measures, and clinometers to record slope profiles across a local hill or embankment, producing a cross-sectional field diagram and evaluating its defensibility.

Week 6: The Prehistoric Atlas & Land-Use Synthesis
Geographical Strand: Synthesis, Geographical Enquiry & Presentation.
Substantive Knowledge:
LKS2/UKS2 Synthesis: Consolidating knowledge of geological change, river valley mechanics, resource distribution, and topographical hillfort selection across Britain.
Disciplinary Knowledge:
Geographical Reasoning: Presenting a structured argument explaining how physical geography

governed human survival and technological advancement from the Stone Age to the Iron Age.

Practical Geography Task:

LKS2 & UKS2: *The Prehistoric British Landscape Atlas & Inquiry Showcase.*

Task 1: Pupils assemble a comprehensive "Prehistoric Geographical Atlas" combining geological maps, river settlement studies, trade route overlays, and contour elevation profiles.

Task 2: Pupils write a geographical report answering the enquiry question: *"How did Britain's physical landscape shape human life from the Stone Age to the Iron Age?"*

Plenary: Class "Geography Conference" where pupils present their atlas findings, using geographical terminology (relief, alluvial, karst, trade network, grid reference) to justify their conclusions.

Assessment Matrix (Progression Indicators)

Phase	Working Towards	Expected Standard	Greater Depth
Lower Key Stage 2 *(Years 3 & 4)*	• Identifies basic landscape features (hills, rivers) but struggles to explain why cave sites were chosen. • Locates sites on simple maps but cannot use 4-figure grid references accurately. • Confuses contour lines with rivers or roads on topographical maps. • Collects fieldwork observations without recording data systematically on recording sheets.	• Explains how physical factors (water, shelter, fertile soil) influenced prehistoric settlement location. • Uses 4-figure grid references and map keys to locate resources and settlements on UK maps. • Identifies contour line density to distinguish steep slopes from flat terrain. • Conducts systematic fieldwork observations, recording soil and slope data on field sheets accurately.	• Evaluates trade-offs between physical advantages and disadvantages across different settlement sites. • Uses 4-figure grid references fluently and calculates direct distances between resource points. • Explains how contour spacing reflects physical landform gradient and strategic defensibility. • Analyses primary fieldwork data to draw justified conclusions about land-use suitability.

Upper Key Stage 2 *(Years 5 & 6)*	• Describes river valley settlements without referencing alluvial soil formation or flooding dynamics. • Locates places using 4-figure references but struggles with 6-figure grid reference precision. • Draws cross-sections without accurately translating contour elevation intervals. • Records slope measurements in fieldwork without analysing what the data reveals about defensibility.	• Analyses the relationship between geological strata (limestone chalk), water sources, and settlement density. • Uses 6-figure grid references accurately to pinpoint features on 1:25,000 OS maps. • Constructs accurate cross-sectional elevation profiles from OS contour line intervals. • Uses clinometer and transect field data to evaluate the defensive geomorphology of hillfort sites.	• Synthesises physical and human geographical factors to explain macro-shifts in land use over millennia. • Navigates complex digital GIS layers, overlaying geology, relief, and archaeological finds effortlessly. • Interprets subtle contour patterns to identify complex landforms (e.g., spurs, re-entrants, saddles). • Critiques fieldwork methodology, identifying potential data anomalies and suggesting procedural improvements.

Other Information, Ideas and Resources

Building on the **learning objectives** that we mapped out, here are six alternative practical, hands-on lesson ideas for Key Stage 2 Geography. These lessons blend physical mapping, environmental science, and human geography to show how Britain's prehistoric landscape shaped the way early humans lived, travelled, and settled.

1. The Lost Land: Mapping Doggerland (Physical Geography)
Geographical Focus: Climate change, rising sea levels, and changing coastlines.
The Scenario: *Travel back 10,000 years to Mesolithic Britain, when you could walk from London to Amsterdam across a vast, fertile plain called Doggerland before it was swallowed by the North Sea.*
The Activity
Pupils investigate how changing global temperatures physically reshaped the map of the British Isles.
The Map Work: Provide pupils with a map showing the modern coastlines of Western Europe alongside an overlay of the ancient, submerged boundaries of Doggerland.
The Investigation:
1. Pupils locate and shade the North Sea area that used to be dry land, tundra, and dense forest.
2. Using red markers, they plot the forced migration routes of Mesolithic hunter-gatherers as rising sea levels slowly flooded their hunting grounds, turning Britain from a peninsula into an isolated island.

Geographical Skills: Using compass directions (N, NE, E, SE, etc.) to describe migration patterns out of the sinking plains toward modern-day higher ground in England and Scotland.

2. Settling Skara Brae: Site Analysis (Human/Physical Geography)
Geographical Focus: Land use, natural resources, and extreme environments.
The Scenario: *Analyse the isolated, coastal environment of the Orkney Islands to discover why a Neolithic community built the famous stone village of Skara Brae.*

The Activity
Pupils act as environmental detectives, studying the climate and physical landscape of the Orkney Islands to determine why this settlement survived.
The Data Dive: Provide children with climate data for the north of Scotland (temperatures, wind speeds, rainfall) alongside aerial photographs of the Skara Brae site.
The Environmental Matrix: Pupils fill out a "Site Suitability Matrix" answering spatial questions:
Where did they get building materials? (Lack of trees meant they had to use local split flagstone instead of wood).
How did they use the topography for protection? (They sunk the houses into giant mounds of organic waste, called *midden*, to act as thick thermal insulation against freezing North Atlantic gales).
Output: A annotated site plan identifying the physical advantages and disadvantages of settling in a coastal island ecosystem.

3. The Great Metal Hunt: Resource Mapping (Human Geography)
Geographical Focus: Natural resources, industrial locations, and trade networks.
The Scenario: *You are a Bronze Age trader. You need to source copper and tin—the two ingredients needed to forge bronze—but they are found in completely different parts of the country.*
The Activity
This lesson focuses on how geology dictates human trade and wealth.
The Mapping Challenge: Provide a blank geological resource map of the UK. Pupils must locate and mark the primary prehistoric mining hubs:
Tin: Cornwall (South-West England).
Copper: Great Orme (North Wales).
The Trade Network: Pupils use rulers and map scales to draw shipping lanes and overland trackways (like the ancient Ridgeway) connecting these remote mining sites to major farming settlements in the south-east.
Discussion: Why did certain regions become incredibly wealthy and powerful purely because of the unique rocks hiding beneath their soil?

4. Topography and Defence: Choosing a Hill Fort (Fieldwork & Map Skills)
Geographical Focus: Relief, contour lines, and defensive physical features.
The Scenario: *As an Iron Age chieftain, your village is under threat. You must select the most naturally defensive point on a local terrain map to construct a new hill fort.*
The Activity
Pupils learn how to read height and slope on a map using **contour lines** or shaded relief maps.
The Task: Hand out Ordnance Survey (OS) maps or simplified topographic maps showing varied land reliefs (steep hills, flat plains, winding river valleys). Mark three potential locations (A, B, and C).
Location A: Flat open valley floor near a river.
Location B: A steep-sided, isolated hill summit (a ridge).
Location C: A deep woodland plateau.
The Analysis: Pupils analyse the contour lines. Tightly packed lines mean a brutally steep slope—terrible for attacking warriors, perfect for fort defence.
Output: A written strategic recommendation evaluating the chosen site's physical topography, explaining how natural cliffs and rivers reduce the need for artificial walls.

5. Clearing the Wild: Deforestation and Land Use Change
Geographical Focus: Human impact on the environment, changing ecosystems, and agriculture.

The Scenario: *Track how the wild, dense primeval forests of Britain were systematically transformed into a grid-work of structured farming fields.*
The Activity
Pupils examine how the shift from nomadic hunting to permanent farming permanently changed the British ecosystem.
The Visual Comparison: Compare aerial satellite images of modern English countryside (with its geometric patchwork of hedgerows and fields) with a reconstructed map of prehistoric "Wildwood" Britain.
The Mapping Task: Pupils create a "Before and After" land-use map. They calculate the percentage of forest cleared over time to build pastures for livestock and arable plots for wheat, identifying how human hunger alters local biodiversity and river runoff patterns.

6. The Shadow of the Past: Aerial Archaeology (Geographical Skills)
Geographical Focus: Remote sensing, identifying human impacts on landscapes from above.
The Scenario: *Use satellite imagery and modern aerial drone photography to find hidden "cropmarks" and ancient earthworks carved into the ground thousands of years ago.*
The Activity
Modern geographers use aerial imagery to spot historic sites that are completely invisible from the ground.
The Digital Search: Using tools like Google Earth, pupils inspect famous prehistoric sites from above (e.g., the concentric defensive rings of **Maiden Castle** hill fort, or the circular earthworks around Stonehenge).
The Cropmark Science: Explain how buried prehistoric ditches hold more moisture than surrounding soil, causing the crops growing directly above them to grow taller and greener during summer droughts.
Output: Pupils trace over aerial photos to outline the hidden geometric patterns of Iron Age field boundaries and circular roundhouses, proving that human actions from 3,000 years ago still dictate the shape of the land today.

How does physical geography and human geography link?
Stonehenge
Stonehenge is situated on the Salisbury plain in the county of Wiltshire in England.
Stonehenge is a human feature.
Stonehenge attracts many visitors every year to sightsee, worship, history and relaxation (contemplation).
Some of the stones used came from Wales.
The stones had to be floated along the river and then dragged with ropes by men and oxen.

Skara Brae
Orkney is a group of islands, off the north coast of Scotland, in the North Sea.
Orkney is made up of 70 islands.
Skara Brae is a very old Stone Age village on the largest island of Orkney.
It is possible to see what like was like in the village due to the excavation and restoration.
Many people visit Skara Brae every year to understand about the way of life in the Stone Age as the settlement is well preserved.
Stone Age settlers would have used the land for farming.
The farming included growing crops and rearing cattle and sheep.
The way of life indicates that they were peaceful people.

Considerations for Implementation

History

Substantive Knowledge

In History, **substantive knowledge** refers to the "stuff" of the past—the specific facts, events, people, and time periods that form the core of the story. For the **'Stone Age to Iron Age'** learning theme, this involves understanding the massive 800,000-year journey of human development in Britain. It is essentially the story of how humans went from being just another animal in the landscape to the masters of it.

1. Chronology: The Three Ages
Substantive knowledge begins with the "Big Three" periods and their place on a timeline.

The Stone Age: Divided into the **Palaeolithic** (Old), **Mesolithic** (Middle), and **Neolithic** (New). This covers the time from the first flint tools to the beginning of farming.
The Bronze Age: Starting around 2500 BC, when people discovered how to smelt copper and tin to make a stronger metal alloy.
The Iron Age: Starting around 800 BC, where the use of iron led to more advanced farming tools and, significantly, more effective weaponry.

2. Key Changes in Human Lifestyle
This is the core "narrative" of prehistory. Pupils must know the specific shifts in how people lived:

Hunter-Gatherers to Farmers: The "Neolithic Revolution"—knowing that humans stopped following herds and started planting crops (wheat/barley) and domesticating animals (dogs/sheep/cattle).
Nomadic vs. Settled: Moving from temporary tents or caves to permanent settlements like **Skara Brae**.
Land Ownership: Recognising that farming led to people "owning" patches of land, which eventually led to the need for defences like **hillforts**.
3. Technology and Materials
Knowing the "tools of the trade" for each era is vital **substantive knowledge**.

Lithics (Stone): Understanding the use of flint, antler, and bone for scrapers, spears, and arrows.
Metallurgy: Knowing that Bronze is an alloy and that Iron required much higher temperatures (and more complex furnaces) to produce.
Pottery: Identifying the "Beaker" folk and how the introduction of pottery changed food storage and ritual.

4. Religion, Ritual, and Death
How people thought about the world beyond survival.

Monuments: Knowing about "Henges" (like Stonehenge) and what they suggest about communal effort and solar calendars.
Burial Rites: From the "Long Barrows" (communal tombs) of the Stone Age to the individual "Round Barrows" of the Bronze Age, often containing grave goods like jewellery or daggers.

5. Key Sites and Evidence

Specific examples that prove the "facts" of the era.

Skara Brae: An incredibly well-preserved Neolithic village in Orkney.
Maiden Castle: A massive Iron Age hillfort in Dorset showing advanced defensive ramparts.
Star Carr: A Mesolithic site that provides evidence of early ritual (the antler headdresses).

Why This Substantive Knowledge Matters
1. It Provides the 'Anchor' for Time
Without knowing these facts, "History" is just a blur of old things. This knowledge gives pupils a mental map of time. It helps them understand that "ancient" can mean 100 years ago or 10,000 years ago, and how to tell the difference.

2. It Explains the Modern World
Most of our modern world—farming, cities, trade, technology—has its roots in these three ages. By learning the **substantive facts** of prehistory, pupils see that the "foundations" of their own lives were laid down by people who lived thousands of years ago.

3. It Challenges 'Primitive' Stereotypes
Knowing the specific details of a Bronze Age sword or the alignment of Stonehenge proves to pupils that "prehistoric" does not mean "stupid." It fosters respect for human ingenuity and the capacity to solve problems with limited resources.

4. It Builds a Vocabulary for Analysis
You cannot discuss history without the right words. Terms like *nomadic, agricultural, smelting,* and *chronology* are the "substance" that allows pupils to have high-level debates about human progress.

Disciplinary Knowledge

In History, **disciplinary knowledge** refers to the specific skills and methods historians and archaeologists use to "do" history. It isn't just about knowing *that* Stonehenge exists; it is about understanding *how* we know it exists and how we interpret its purpose without any written records. For the **'Stone Age to Iron Age'** learning theme, this is the most critical part of the curriculum because it teaches pupils to think like detectives.

1. Using Evidence and Archaeology
Since there are no written accounts from this period (prehistory), historians must rely entirely on physical remains.

Primary Evidence: Analysing artefacts (tools, jewellery, coins) and ecofacts (seeds, bones) to reconstruct daily life.
Inference: Making logical guesses based on finds. For example: *"We found a 'lozenge-shaped' piece of gold in a burial, which suggests this person had high status and trade links."*
The 'Detective' Skill: Understanding that a post-hole in the ground is evidence of a building, even if the wood has long since rotted away.

2. Change and Continuity
Disciplinary knowledge involves looking at the pace of human progress over thousands of years.

Identifying Turning Points: Recognising that the discovery of farming (Neolithic) was a more

significant "change" than the switch from stone to bronze.
Tracking Progress: Noting what stayed the same (e.g., people still needed shelter and food) versus what changed (e.g., the materials they used to build and hunt).
Relative Duration: Realising that the Stone Age lasted for millions of years, while the Iron Age lasted only a few hundred—understanding that human "innovation" accelerates over time.

3. Historical Interpretation
This is the understanding that different people can have different ideas about the same evidence.

Contested Theories: Discussing why some people think Stonehenge was a temple, while others think it was a calendar or a burial site.
The 'Holes' in History: Learning that because we have no writing, some things (like the names of tribes or the specific words of a ritual) are lost forever, leaving room for interpretation.
Perspective: Considering how our modern "digital" perspective might bias how we view "primitive" people.

4. Cause and Effect
Historians look for the "Why" behind the "What."

The Domino Effect: Understanding how one change led to another.
Example: Farming led to **settlement**, which led to **land ownership**, which led to **warfare**, which led to the building of **hillforts**.
Impact of Environment: Analysing how the end of the Ice Age (Climate Change) was the ultimate "cause" for the shift in human lifestyle.
5. Similarity and Difference
Comparing lives across different eras or locations.

Tribal Differences: Understanding that not everyone in Britain lived the same way at the same time. A tribe in Skara Brae had a very different life from a tribe in the south of England.
Cross-Era Comparison: Comparing an Iron Age warrior to a modern soldier to see how the concept of "defence" has evolved.

Why **Disciplinary Knowledge** Matters
1. It Builds Critical Thinking
When pupils realise there are no "right answers" for why a stone circle was built, they learn to evaluate the **strength of an argument** based on the evidence available. This is a vital life skill for spotting misinformation today.

2. It Respects Human Intelligence
By looking at the complexity of Iron Age minting or Neolithic engineering, pupils move away from the "Ogg the Caveman" stereotype. They realise our ancestors were just as smart as us, just working with different tools.

3. It Encourages Curiosity
Disciplinary knowledge turns history into a mystery. Instead of memorising dates, pupils become "Historical Detectives." This makes the subject far more engaging and memorable.

4. It Prepares them for Future Learning

Understanding how to handle evidence and analyse change is the foundation for all secondary school history. If a pupil can analyse a Bronze Age burial, they will be much better equipped to analyse a Victorian census or a World War II diary later on.

Learning Objectives

In History, because the **'Stone Age to Iron Age'** period is "prehistoric" (occurring before written records), the **learning objectives** focus heavily on **chronology**, **process**, and **archaeological evidence**.

1. Chronological Understanding
Objective: *To establish a clear narrative of British prehistory, noting connections, contrasts, and trends over time.*
The Focus: Pupils must understand the vast scale of time. The Stone Age alone accounts for over 98% of human history in Britain.
Key Skill: Placing the **Palaeolithic, Mesolithic, Neolithic, Bronze Age,** and **Iron Age** in the correct order.
Outcome: Pupils recognise that "history" didn't happen all at once; they can visualise the acceleration of change as technology moved from stone to metal.

2. Change and Continuity: The Neolithic Revolution
Objective: *To describe the characteristic features of past periods and identify the reasons for, and results of, historical events and changes.*
The Focus: The shift from **Hunter-Gatherers** to **Farmers**. This is arguably the most significant change in human history.
Key Skill: Identifying "Cause and Effect." For example, how the end of the Ice Age led to more forests, which led to different hunting tools, which eventually led to settled farming.
Outcome: Pupils can explain why people stopped moving (nomadic) and started building permanent homes (settled), such as those at **Skara Brae**.

3. Historical Enquiry: Thinking Like an Archaeologist
Objective: *To understand how our knowledge of the past is constructed from a range of sources.*
The Focus: Since there are no books from the Stone Age, pupils must learn to read "objects."
Key Skill: Inference. If we find a skeleton buried with a beaker and a gold earring, what does that tell us about their status or beliefs?
Outcome: Using primary evidence—like the **Star Carr** antler headdresses or **Amesbury Archer** finds—to piece together a story of the past without words.

4. Historical Interpretation
Objective: *To understand that different versions of the past may exist and giving reasons for this.*
The Focus: Debating the "Why." Why was Stonehenge built? Was it a calendar, a temple, or a graveyard?
Key Skill: Evaluating theories. Pupils learn that because there is no "written proof," historians often disagree, and new discoveries (like DNA testing on ancient bones) can change our "facts."
Outcome: Developing a critical mind that asks, "How do we know this?" rather than just accepting a single narrative.

5. Significant Sites and Turning Points
Objective: *To identify significant people and events from the era and describe their impact.*

The Focus: Specific breakthroughs like the discovery of **smelting** (Bronze Age) or the building of **Hillforts** (Iron Age).
Key Skill: Understanding technological progression. Why was iron a "game-changer" for farming and warfare compared to bronze?
Outcome: Analysing sites like **Maiden Castle** to understand how society became more organised, tribal, and defensive over time.

Why These Learning Objectives Matter

1. It Explains Who We Are

This learning theme covers the "Foundations of Britain." From the first farmers to the first trade networks with Europe, these learning objectives help pupils understand the origins of the landscapes, towns, and technologies they see today.

2. It Challenges Stereotypes

By meeting these learning objectives, pupils move away from the "Ogg the Caveman" trope. They realise that Neolithic engineers (Stonehenge) and Iron Age mint-masters (coins) were highly sophisticated, intelligent people who solved complex problems without modern tools.

3. It Teaches the Value of Evidence

In a world of "fake news," learning to look at an object (evidence) and draw a logical conclusion (inference) is a vital life skill. It teaches pupils to respect facts while remaining open to new interpretations.

4. It Puts Modern Problems in Context

Studying how our ancestors survived massive climate shifts (the end of the Ice Age) or managed limited resources provides a grounded perspective on modern global challenges.

Lesson Ideas

Here is a complete, 6-week Medium-Term Plan for Key Stage 2 History framed around **'Stone Age to Iron Age'**. This unit covers the statutory National Curriculum History period—tracing the chronological sweep from **Palaeolithic hunter-gatherers, through Neolithic agricultural revolutions and Bronze Age metallurgy, to Iron Age hillfort societies and Celtic tribal culture**. It balances **substantive knowledge** (chronological timelines, Skara Brae housing, Stonehenge construction phases, Beaker folk migration, bronze smelting, Amesbury Archer artefacts, Iron Age hillfort ramparts, and Celtic druidic societies) with **disciplinary knowledge** ("Thinking & Acting Like a Historian"—analysing primary archaeological evidence vs. secondary reconstructions, evaluating historical significance, examining continuity and change over millennia, assessing causation behind technological shifts, and addressing historical interpretations/gaps in unwritten history).

Unit Title: From Hunters to Hillforts: Changes in Britain from the Stone Age to the Iron Age
Duration: 6 Weeks (Approx. 1.5 to 2 hours per week)
Theme: Prehistoric Chronology, Archaeological Interpretation, Technological Progress, and Social Evolution in Britain.
Historical Strands:
Chronology & Periodisation: Palaeolithic, Mesolithic, Neolithic, Bronze Age, and Iron Age timelines and scale.
Historical Enquiry & Evidence: Artefact analysis, grave goods evaluation, structural remains, and limits of prehistoric evidence.

Continuity & Change: Shifts in diet, housing, technology, burial practices, and community organisation.
Cause & Consequence: The impact of agriculture on settlement, and the societal shifts triggered by bronze and iron metallurgy.

Key Historical Pillars

Substantive Knowledge:

Chronological Framework: The vast temporal scale of prehistory (~ 800,000 BC to 43 AD), distinguishing Stone Age sub-eras (Palaeolithic, Mesolithic, Neolithic) from metal ages.
Archaeological Sites & Artefacts: Star Carr, Skara Brae, Stonehenge, Amesbury Archer burial, Mold Gold Cape, Battersea Shield, Maiden Castle.
Technological & Cultural Concepts: Hunter-gatherer nomadic movement, agricultural domestication, flint knapping, megalithic monumentality, alloy smelting, hillfort tribal hierarchies.

Disciplinary Knowledge ('Thinking Like a Historian'):

Evidence & Interpretation: Deductive reasoning using unwritten archaeological artefacts; recognising that historical claims about prehistory are hypotheses open to revision.
Continuity & Change: Tracking core human needs (food, shelter, safety, belief) across technological shifts to evaluate what changed rapidly versus what persisted.
Historical Significance: Evaluating why certain sites or discoveries (e.g., Skara Brae or the Amesbury Archer) drastically altered historical understandings of prehistoric capability.

Weekly Progression Scheme

Week 1: Deep Time & The First Britons – Palaeolithic & Mesolithic Hunters

Historical Focus: Chronology, Periodisation & Hunter-Gatherer Life.

Substantive Knowledge:

LKS2: The chronological scale of the Stone Age; nomadic lifestyle; seasonal movement following megafauna; Mesolithic hunter-gatherer toolkits (flint microliths, bone harpoons).
UKS2: Environmental changes (glaciation retreat, land-bridge flooding/Doggerland); archaeological significance of Star Carr (flint tools, stag antler headdresses).

Disciplinary Knowledge:

Chronological Understanding: Placing prehistoric eras on proportional timelines to grasp the immense duration of the Stone Age relative to modern history.

Practical Historical Inquiry:

LKS2 (Y3/4): *The Prehistoric Timeline Challenge.* Pupils construct proportional physical timelines across the playground, mapping the key eras (Palaeolithic → Mesolithic → Neolithic → Bronze Iron) and placing artefact clue cards along the timeline.
UKS2 (Y5/6): *Doggerland & Star Carr Investigation.* Pupils analyse archaeological reports from Star Carr, evaluating antler headdresses to debate whether they were used for hunting camouflage or shamanistic rituals, recording hypotheses on evidence templates.

Week 2: The Neolithic Revolution & Skara Brae – The First Farmers

Historical Focus: Cause & Consequence, Domestic Life & Settlement Evidence.

Substantive Knowledge:

LKS2: Transition from hunter-gatherer nomads to sedentary farmers (~4000BC); domestication of animals and crops; Skara Brae stone village structure (stone beds, dressers, hearths).
UKS2: Technological causes (flint axes for forest clearance, pottery for storage); dietary shifts; analysing how the discovery of Skara Brae in 1850 transformed views of Neolithic domestic sophistication.

Disciplinary Knowledge:

Historical Interpretation: Using physical site plans and artefact remains to reconstruct daily life and

social structure without written records.
Practical Historical Inquiry:
LKS2 (Y3/4): *Skara Brae Artefact Deduction.* Pupils act as archaeologists analysing plan diagrams of Skara Brae House 1, deducing room functions from central hearths, stone dressers, and limpet tanks.
UKS2 (Y5/6): *The Great Agricultural Debate.* Pupils evaluate the consequences of the Neolithic Revolution, weighing benefits (food surplus, permanent shelter) against drawbacks (disease spread, physical labour) in a structured historical debate.

Week 3: Monuments & Mystery – Stonehenge & Neolithic Belief
Historical Focus: Historical Significance, Monumentality & Multi-Phase Change.
Substantive Knowledge:
LKS2: Stonehenge construction phases (~3000BC to 1500BC); bluestones (Preseli Hills, Wales) vs. Sarsen stones; effort and teamwork required without modern machinery.
UKS2: Multi-site landscape context (Durrington Walls vs. Stonehenge); solar alignments (summer/winter solstices); burial practices (long barrows vs. round barrows).
Disciplinary Knowledge:
Evaluating Historical Interpretations: Examining multiple competing theories regarding Stonehenge's purpose (temple, burial site, calendar, healing centre) and identifying which theory has the strongest archaeological backing.
Practical Historical Inquiry:
LKS2 (Y3/4): *Stonehenge Mystery Solved?* Pupils examine source evidence showing transport routes of bluestones, sorting theories about its purpose into "supported by evidence" vs. "pure speculation."
UKS2 (Y5/6): *Durrington Walls vs. Stonehenge Dual-Site Study.* Pupils compare archaeological finds at Durrington Walls (timber, animal bones - place of the living) with Stonehenge (stone, cremated remains - place of the dead) to evaluate Parker Pearson's landscape interpretation.

Week 4: The Beaker Folk & Metallurgy – The Bronze Age Arrives
Historical Focus: Migration, Material Change & The Amesbury Archer.
Substantive Knowledge:
LKS2: Introduction of copper and bronze (~2500BC); the Beaker culture (distinct pottery, archer wrist guards); alloy creation (copper + tin = bronze).
UKS2: Continental migration patterns (DNA evidence of Beaker people replacing older populations); status division indicated by rich grave goods; the Amesbury Archer discovery.
Disciplinary Knowledge:
Evidence & Deductive Reasoning: Interrogating grave goods to reconstruct an individual's status, health, geographic origins, and societal role.
Practical Historical Inquiry:
LKS2 (Y3/4): *The Amesbury Archer Grave Site.* Pupils inspect drawings of the Amesbury Archer burial, identifying artefacts (gold hair tresses, copper daggers, beaker pots) to deduce his occupation and social standing.
UKS2 (Y5/6): *The Bronze Age Migration Puzzle.* Pupils examine scientific isotopes/DNA evidence from the Amesbury Archer (originating in the Alps), writing a historical enquiry report explaining how trade networks and migration transformed British society.

Week 5: Hillforts & Tribal Chiefs – Iron Age Warfare & Community
Historical Focus: Technological Change, Social Structure & Defensibility.
Substantive Knowledge:

LKS2: Introduction of iron (~800BC); superiority of iron tools/weapons over bronze; Iron Age roundhouses; Celtic tribal structure (chiefs, warriors, druids, farmers).
UKS2: Hillfort engineering (ramparts, ditches, defensive entrances, e.g., Maiden Castle); tribal warfare vs. trade centres; Celtic art and symbolism (Torcs, Battersea Shield).
Disciplinary Knowledge:
Continuity & Change: Comparing Stone Age nomadic camps, Neolithic stone villages, and Iron Age fortified hillforts to evaluate security, scale, and social hierarchy changes.
Practical Historical Inquiry:
LKS2 (Y3/4): *Inside the Iron Age Roundhouse.* Pupils explore virtual or diagrammatic cross-sections of an Iron Age roundhouse, labelling functional zones (weaving, cooking, grain storage) and comparing daily life with Skara Brae.
UKS2 (Y5/6): *Maiden Castle Defence Critique.* Pupils analyse topographical maps and archaeological site plans of Maiden Castle, investigating the defensive multi-vallate ramparts and evaluating the strategic effectiveness of sling-stone stockpiles.

Week 6: The Unwritten Past – Prehistoric Legacy & Synthesis
Historical Focus: Synthesis, Historical Gaps & Archaeological Evaluation.
Substantive Knowledge:
LKS2/UKS2 Synthesis: Reviewing the progression from Stone Age survival to Iron Age tribal power; summarising key technological leaps (flint → bronze → iron) and lifestyle transformations (nomadic → agricultural → fortified).
Disciplinary Knowledge:
Reflective Historical Inquiry: Addressing the challenge of studying prehistory without written records, evaluating how new technology (DNA testing, LiDAR, radiocarbon dating) continually reshapes historical knowledge.
Practical Historical Inquiry:
LKS2 & UKS2: *The Prehistoric Museum Curator Challenge & Historical Conference.*
Task 1: Pupils curate a 5-artefact exhibition representing the turning points from the Stone Age to the Iron Age, writing interpretive museum labels explaining each object's historical significance.
Task 2: Pupils answer the overarching enquiry question: *"Which technological leap changed life in prehistoric Britain the most: agriculture, bronze, or iron?"*
Plenary: Class "Archaeological Summit" where pupils present their arguments, citing primary artefact evidence to justify their choices.

Assessment Matrix (Progression Indicators)

Phase	Working Towards	Expected Standard	Greater Depth
Lower Key Stage 2 *(Years 3 & 4)*	• Places the Stone, Bronze, and Iron Ages in order but struggles to grasp chronological proportions. • Describes artefacts factually without deducing what they reveal about prehistoric people.	• Positions prehistoric eras accurately on timelines relative to modern history. • Uses artefact evidence (e.g., grave goods) to make valid deductions about past lives and roles. • Explains key causes and consequences of the shift	• Demonstrates a clear understanding of the vast scale of the Stone Age relative to metal ages. • Synthesises evidence from multiple artefacts to build nuanced historical reconstructions. • Evaluates how technological progress

	• Identifies basic differences between farming and hunting but struggles to explain why society changed. • Relies heavily on fictional representations rather than physical archaeological evidence.	from hunter-gatherer to agricultural life. • Distinguishes between proven archaeological facts and historical theories/speculations.	(flint → bronze → iron) altered social hierarchies. • Identifies limitations in archaeological evidence and suggests plausible historical hypotheses.
Upper Key Stage 2 *(Years 5 & 6)*	• Recalls facts about Skara Brae or Stonehenge but struggles to place them within broader chronological frameworks. • Accepts single interpretations of monuments without considering competing theories. • Describes the Amesbury Archer without linking his discovery to broader migration patterns. • Views prehistory as a simple linear progression rather than analysing areas of continuity.	• Explains complex chronological transitions and overlap across the Palaeolithic to Iron Age. • Evaluates competing historical theories (e.g., Stonehenge's purpose) using physical evidence. • Analyses scientific evidence (isotopes, DNA) to explain continental migration and trade impact. • Compares settlement structures (Skara Brae vs. Hillforts) to track social evolution over millennia.	• Critiques how modern archaeological methods (LiDAR, isotope analysis) challenge established views. • Weighs multiple factors (climate, technology, migration) when explaining major prehistoric shifts. • Formulates sophisticated historical arguments regarding the nature of power and belief in prehistory. • Articulates clearly how the absence of written records shapes historical method and confidence.

Other Information, Ideas and Resources

When was this period of history?

This period of prehistory in Britain generally refers to the time before written records began. It begins when the earliest hunter-gatherers came to Britain from Europe around 450,000 BC and ends with the invasion of the Romans in AD 43.

With no written sources, what we know about this period comes mostly from artefacts and monuments that archaeologists have discovered. What we do know is that the period from the Stone Age to the Iron Age was one of immense change in human development, spanning from the early hunter-gatherers who roamed the countryside to the highly sophisticated and organised groups of the late Iron Age. We generally break this period into the following historical divisions: The Stone Age, The Bronze Age and The Iron Age

What was it like in the Stone Age?
The Stone Age refers to such a vast period of time that we break it into three sections. In the early Stone Age, which we call the Palaeolithic, early people were hunter-gatherers and found food by roaming from place to place according to the seasons. The middle Stone Age, called the Mesolithic, begins at the end of the last Ice Age when sea levels rose and Britain became an island. Tools were developed to become smaller and finer and the invention of canoes meant that people were able to hunt for fish as well as animals. In the late Stone Age, which is called the Neolithic, the way people lived changed significantly because they began to settle into farming communities (like Skara Brae) instead of moving from place to place. People started to domesticate animals and grow their own crops.

What was the Bronze Age?
When people discovered how to extract metal from rocks, bronze replaced stone as the best material for tools. People were able to build better tools for agriculture and they also began to produce weapons and jewellery. Elaborate burial ceremonies took place and important objects were buried alongside bodies in round barrows. Many of these objects have now been discovered and they help us to know more about what life was like in the Bronze Age.

How was the Iron Age different?
Iron replaced bronze as the main metal for making tools and weapons. Better tools for agriculture improved farming and this meant that the population began to rise. People lived in tribes and they were often at war with each other. Soon people protected themselves by settling in hillforts, which were groups of roundhouses and farming land protected by stone walls. During the Iron Age, British society became more sophisticated and people produced ornate art and music. Often these people are called 'Celts', although historians believe that this term was not used until the 18th Century. This period ends with the invasion of the Romans in AD 43.

Iron Age Hill forts: Tribal kingdoms, farming, art and culture.
https://www.bbc.co.uk/teach/class-clips-video/history-ks1-ks2-explain-this-hill-forts/z4xx6v4
https://www.cam.ac.uk/research/news/bronze-age-stilt-houses-unearthed-in-east-anglian-fens
https://www.prehistoricexperiences.com/more-info-outdoor-classroom

Flag Fen https://www.visitpeterborough.com/things-to-do/flag-fen-archaeological-park-p875 681
https://teachers.thenational.academy/units/prehistoric-britain-b65f

https://www.bbc.co.uk/bitesize/topics/z82hsbk/year/z63tt39

https://www.bbc.co.uk/bitesize/topics/z82hsbk/year/zhgppg8
https://www.twinkl.co.uk/resources/ks2-history/ks2-history-prehistoric/ks2-history-stone-age-through-to-iron-age
https://www.ks2history.com/lesson-plans-cnot
https://www.history.org.uk/primary/categories/the-stone-age-to-the-iron-age
https://www.hamilton-trust.org.uk/topics/lower-key-stage-2-topics/stone-age-iron-age-britain/
https://planbee.com/products/the-prehistoric-world-stone-age-to-iron-age

Considerations for Implementation

Modern Foreign Languages

Substantive Knowledge
In MFL, **substantive knowledge** for the **'Stone Age to Iron Age'** learning theme focuses on the **origins of language families**, the development of **etymology** (the history of words), and how the movement of prehistoric people spread languages across Europe. While we cannot "speak" Stone Age languages, we can study the "DNA" of modern languages like French, Spanish, and German to see how they were shaped during this period. **1. The Indo-European Language Family** **Substantive knowledge** involves knowing that most European languages share a common "ancestor." **Proto-Indo-European (PIE):** Knowing that around the Bronze Age, a group of people began to migrate, carrying a root language that eventually evolved into English, French, Spanish, German, and Greek. **The 'Mother' Tongue:** Identifying "cognates"—words that sound similar across different languages because they come from the same ancient root (e.g., the root *mater* becoming *mother*, *mère*, *madre*, and *mutter*). **2. Celtic Language and Culture** Before the Romans arrived (bringing Latin), much of Britain and Western Europe spoke Celtic languages. **The Iron Age Tribes:** Knowing that "Brittonic" was the language spoken in Britain during the Iron Age. **Survival of Language:** Recognising that while Latin and Anglo-Saxon later took over, Celtic languages survived in the form of Welsh, Cornish, Irish, and Breton (spoken in France). **Toponymy (Place Names):** Understanding that many geographical names in Europe have prehistoric origins (e.g., the "Avon" in River Avon comes from the Celtic word for "river"). **3. Vocabulary of Materials and Technology** **Substantive knowledge** includes learning the words for the "Big Three" eras in the target language (e.g., French or Spanish) to build a technical vocabulary. **Materials:** Learning the nouns for Stone, Bronze, Iron, Wood, and Bone (*la pierre, le bronze, le fer, le bois, l'os*). **Verbs of Action:** Mastering verbs associated with prehistoric survival, such as *chasser* (to hunt), *cueillir* (to gather), and *fabriquer* (to make/build). **The Language of Trade:** Understanding that the Bronze Age was the first time "international" vocabulary would have been needed for trading tin and copper across borders. **4. The Evolution of Writing** **Pictograms to Alphabets:** Knowing that for most of this period, Britain was "pre-literate" (no writing). **Symbolic Communication:** Understanding that cave paintings and carvings were a form of "visual language" that preceded the phonetic alphabets we study in MFL today. Why This **Substantive Knowledge** Matters **1. It Explains Language 'Logic'** When pupils understand that languages are related, French or Spanish feels less like a "foreign" code and more like a long-lost cousin. It makes the irregular patterns of language feel like historical "scars" that

have a story.

2. It Builds Cultural Connections
By tracking language back to the Bronze Age, pupils realise that Britain has never been isolated. Our language and the languages of our neighbours were born from the same migrations and trade routes. This fosters **European and Global Citizenship**.

3. It Enhances Literacy Skills
Studying the roots of words (Etymology) helps pupils with their English vocabulary as well. If they know the prehistoric root for a word, they can often "guess" the meaning of complex scientific or academic words in multiple languages.

4. It Makes MFL 'Cross-Curricular'
Linking MFL to a History learning theme proves to pupils that language is not a "stand-alone" subject. It is the tool that humans have used for 800,000 years to share ideas, negotiate peace, and build civilisations.

The Linguistic 'Artefact' Table

English Word	French Cognate	Spanish Cognate	Ancient Root Link
Brother	Frère	Fratello (It.)	*Bhrater* (PIE)
Sun	Soleil	Sol	*Sawel* (PIE)
New	Nouveau	Nuevo	*Newo* (PIE)
Night	Nuit	Noche	*Nekt* (PIE)

Disciplinary Knowledge

In MFL, **disciplinary knowledge** refers to the "how" of language learning—the skills used to decode, analyse, and communicate in a new tongue. While the "Stone Age to Iron Age" is a history learning theme, the **disciplinary knowledge** in MFL centres on **Linguistic Archaeology**: the ability to look at word origins, patterns, and the evolution of communication to understand how languages are built and shared.

1. Etymology and Language Families
Disciplinary knowledge involves understanding that languages have "ancestors," just as humans do.
Identifying Patterns: Recognising that many European languages (French, Spanish, German) share a common ancestor known as "Proto-Indo-European," which began to spread during the Bronze Age.
Cognates and Clues: Learning to spot "sister words" across languages (e.g., *Mère* in French, *Madre* in Spanish, *Mutter* in German) and realising they stem from ancient roots.
Outcome: Pupils develop a "detective" mindset, looking for linguistic clues to decode meaning in unfamiliar texts.

2. Deciphering Non-Verbal and Proto-Communication
Before modern grammar existed, communication relied on different systems. In MFL, this develops the skill of **deciphering meaning without a dictionary**.

Symbology: Understanding how a symbol (like a cave painting or a Celtic knot) communicates a complex idea. This mirrors the MFL skill of using context and visual cues to understand a message.
Phonology (Sound Patterns): Exploring how early humans might have used sounds to signify danger, food, or family, which builds an ear for the **phonemes** (sounds) that make up modern languages.

3. The Geography of Language (Loanwords)
Disciplinary knowledge includes understanding how trade and movement (vital in the Bronze and Iron Ages) "mix" languages.

Language Contact: Investigating how the movement of "Beaker People" or Celtic tribes brought new words for technology (like "iron" or "chariot") into different regions.
Borrowing Words: Recognising that English is a "mongrel" language that has borrowed heavily from its neighbours throughout history.
Outcome: Pupils understand that language is fluid and changing, rather than a fixed set of rules to be memorised.

4. Grammatical Awareness and Structure
MFL requires an understanding of how "parts" of a sentence fit together.

Sentence Building: Just as an Iron Age builder follows a "code" to build a roundhouse, a linguist follows "syntax" to build a sentence.
Comparing Structures: Reflecting on how different cultures organise their thoughts. (e.g., "Do they say 'the red ox' or 'the ox red'?")

Why **Disciplinary Knowledge** Matters in MFL
1. It Removes the 'Fear' of the Unknown
When pupils learn to look for roots and patterns rather than just memorising vocabulary, they become more confident. They realise they can "hack" a language by using logic, similar to how an archaeologist hacks into the meaning of a site.

2. It Builds Cultural Awareness
By studying the Celtic or Indo-European roots of languages, pupils see that Britain has always been part of a wider European linguistic story. This fosters a sense of **global citizenship** and connection to their neighbours.
3. It Engages Metacognition
Learning *how* to learn a language (identifying patterns, using context, comparing roots) is a transferable skill. A pupil who understands linguistic **disciplinary knowledge** will find it much easier to pick up a third or fourth language later in life.

4. It Makes Language 'Tangible'
Linking language to history makes it feel less like a school subject and more like a human tool. Seeing that the word for "metal" or "mother" has survived for thousands of years gives pupils a sense of awe and wonder about the power of speech.

The Linguistic Detective's Toolkit

MFL Skill	Prehistoric Link
Decoding	Using symbols and context clues to find meaning.
Comparative Linguistics	Comparing words for "sun" or "water" across Europe.
Oral Tradition	Understanding that stories were "spoken" long before they were "written."
Synthesis	Putting word "roots" together to create new meaning.

Learning Objectives

In MFL, the **'Stone Age to Iron Age'** learning theme is rarely about speaking an ancient language; rather, it is used as a vehicle to understand the **mechanics of language**, **cultural migration**, and **comparative linguistics**. The **learning objectives** focus on how languages travel, how they are structured, and how we can decode meaning from unfamiliar sources.

1. Intercultural Understanding: The Origins of Language
Objective: *To understand that many European languages are related and share common roots.*
The Focus: Identifying the "Family Tree" of languages. Pupils learn that during the Bronze and Iron Ages, migrations spread the **Proto-Indo-European** language across Europe.
Key Skill: Identifying **cognates** (words that look and sound the same across languages). For example, comparing the English *Mother*, French *Mère*, and Spanish *Madre* to see their shared prehistoric ancestry.
Outcome: Pupils recognise that the language they are learning (e.g., French or Spanish) is a "cousin" to English, making it feel less "foreign."

2. Decoding and Linguistic Inference
Objective: *To use context and clues to interpret the meaning of unfamiliar words and symbols.*
The Focus: Acting as a "Linguistic Archaeologist." Before writing existed, people communicated through symbols (pictograms) and oral traditions.
Key Skill: Decoding. Just as archaeologists decode cave paintings, MFL pupils use visual cues, gestures, and root words to figure out what a sentence means without a dictionary.
Outcome: Developing the "detective" skills needed to tackle complex texts in the target language.

3. Vocabulary Building: Materials and Era-Specific Terms
Objective: *To learn and use a range of vocabulary related to a specific theme in the target language.*
The Focus: Equipping pupils with the "Big Three" era names and material words in the target language (e.g., French or Spanish).
Key Skill: Categorisation. Learning nouns for stone, bronze, and iron (*la pierre, le bronze, le fer*) and verbs for prehistoric actions like *chasser* (to hunt) or *fabriquer* (to make).

Outcome: The ability to describe a historical timeline or a museum artefact using basic sentences in a second language.

4. Comparing Language Systems (Grammar)
Objective: *To compare the grammar and structure of the target language with English.*
The Focus: Understanding that different cultures organise thoughts differently.
Key Skill: Noticing **syntax**. For example, while an English speaker might say "the stone axe," a French speaker says "l'hache de pierre."
Outcome: Pupils become more aware of how their own language (English) works by seeing it reflected against another, much like comparing a Stone Age tool to a modern one to see how "design" has changed.

Why These Learning Objectives Matter
1. It Builds 'Global Citizenship'
By tracing languages back to the Bronze Age, pupils realise that Britain has never been isolated. Our language and the languages of our neighbours were born from the same prehistoric migrations. It creates a sense of belonging to a wider European and global story.

2. It Improves Literacy in English
Studying **etymology** (word origins) helps pupils understand the building blocks of English. If they know the prehistoric root for a word, they can often "guess" the meaning of complex scientific or academic words later in life.

3. It Makes Language 'Human'
Linking MFL to history proves that language is a tool for survival and connection, not just a set of rules in a textbook. It shows that humans have been trying to find ways to talk to one another for over 800,000 years.

4. It Encourages 'Pattern-Spotting'
Language learning is essentially a high-level game of pattern-spotting. Using the **'Stone Age to Iron Age'** learning theme allows pupils to practice this skill by looking for historical and linguistic patterns, which is a core skill for problem-solving across the entire curriculum.

The MFL 'Linguistic Detective' Success Criteria

Concept	**The Pupil Can...**
Cognates	I can find three words that look similar in English and French.
Origins	I can explain why many European languages sound alike.

Vocabulary	I can say the names of the three ages in my target language.
Decoding	I can use a picture of an artefact to guess a new word's meaning.

Lesson Ideas

Here is a complete, 6-week Medium-Term Plan for Key Stage 2 MFL—adaptable for **French or Spanish**—framed around **'Stone Age to Iron Age'**. This unit connects core National Curriculum MFL strands—**Phonetics & Pronunciation, High-Frequency Grammar & Syntax, Vocabulary Acquisition, Listening/Speaking/Reading/Writing, and Intercultural Understanding**—with prehistoric themes: cave art, animal hunting vocabulary, natural materials, weather/shelter, ancient tools, and historical timeline descriptions. It balances **substantive knowledge** (phonics rules, gendered nouns, indefinite/definite articles, adjective agreement, high-frequency verbs in the present tense, and connectives) with **disciplinary knowledge** ("Thinking & Acting Like a Linguist"—spotting patterns across languages, decoding unfamiliar texts using cognates, applying grammatical rules systematically to construct original sentences, and understanding cultural heritage connections).

Unit Title: Les Chasseurs et les Artisans / Los Cazadores y los Artesanos (Hunters and Craftsmen)
Duration: 6 Weeks (Approx. 1 hour per week)
Theme: Prehistoric Animals, Cave Paintings, Natural Materials, Daily Survival Routines, and Tool Production.
MFL Strands:
Phonetics & Oracy: Key sound-spelling patterns, correct pronunciation of nasal vowels/ accent marks, and spoken fluency in role-play contexts.
Grammar & Syntax: Gendered nouns (un/une or un/una), plural formations, adjective agreement (position and gender endings), present tense action verbs (j'habite/vivo, je chasse/cazo, j'utilise/uso).
Reading & Literacy: Decoding simple and complex texts using cognates, sentence strip sequencing, and short historical narratives.
Writing: Constructing descriptive sentences, using connectives (et/y, mais/pero), and writing a mini prehistoric survival guide.
Key MFL Pillars
Substantive Knowledge:
Phonetics: **French:** [ou], [on], [ch], [é] **Spanish:** [ñ], [j/g], [ll], [rr] and silent [h].
Vocabulary: Prehistoric animals (bison, mammoth, bear, deer), terrain/nature (cave, forest, river, stone, wood, bronze, iron), survival actions (hunt, gather, build, paint).
Grammar Rules: Article-noun matching, placement of colour and size adjectives, first-person singular (I...) and third-person (He/She/They...) verb endings.
Disciplinary Knowledge ('Thinking Like a Linguist'):
Gist Extraction & Decoding: Using context clues, near-cognates (un bison/un bisonte, un marteau/un martillo), and syntax structure to understand authentic texts.
Linguistic Pattern Spotting: Applying gender and number agreement rules consistently across new, unfamiliar material nouns.
Intercultural Comparison: Exploring famous European prehistoric heritage sites (e.g., Lascaux Cave in France, Altamira Cave in Spain) and comparing regional terminology.

Weekly Progression Scheme

Week 1: Animals of the Ice Age – Nouns, Gender & Phonetics

MFL Focus: Oracy, Vocabulary & Sound-Spelling Connection.

Substantive Knowledge:

LKS2: Naming 6 key prehistoric animals; identifying masculine and feminine indefinite articles (un/une or un/una); target phonics focus ([ch] in French/[j] in Spanish).

UKS2: Expanding to 10 animals; using definite articles (le/la/l' or el/la); plural noun rules (les/los-las); silent final consonants.

Disciplinary Knowledge:

Phonetic Precision: Noticing how written graphemes correspond to spoken sounds to pronounce unfamiliar historical terms accurately.

Practical Language Task:

LKS2 (Y3/4): *Ice Age Animal Call-and-Response.* Pupils listen to animal target sounds, practice mouth-mechanics for phonics focus, and play "True/False" flashcard games matching un/une (un/una) to mammoths, bears, and wolves.

UKS2 (Y5/6): *Prehistoric Safari Classification.* Pupils sort animal vocabulary into plural categories on mini-whiteboards, applying correct definite articles and reading short description strips aloud with correct phonetic stress.

Week 2: Cave Art Descriptions – Adjectives, Colour & Agreement

MFL Focus: Grammar & Syntax (Adjective Rules) & Intercultural Heritage.

Substantive Knowledge:

LKS2: Colour vocabulary (rouge/rojo, noir/negro, marron/marrón); rule that adjectives follow the noun in French/Spanish; basic adjective agreement (Adding -e/-a).

UKS2: Size adjectives (grand/grande, petit/pequeño); double adjective positioning; analysing the world-famous **Lascaux (France)** or **Altamira (Spain)** cave paintings.

Disciplinary Knowledge:

Grammar Manipulation: Adjusting adjective endings systematically based on whether the animal noun is masculine or feminine.

Practical Language Task:

LKS2 (Y3/4): *Cave Wall Art Descriptions.* Pupils label a simulated cave painting, writing short noun-adjective phrases (e.g., "Un bison noir"/"Un bisonte negro") with correct noun-adjective order.

UKS2 (Y5/6): *Lascaux & Altamira Tour Guide.* Pupils read a short authentic description of the cave paintings, highlighting cognates, and write 3-part descriptive sentences (e.g., "Je vois un grand cheval ocre"/"Veo un caballo grande y ocre").

Week 3: From Stone to Iron – Natural Materials & Connectives

MFL Focus: Literacy, Vocabulary Building & Sentence Structure.

Substantive Knowledge:

LKS2: Material vocabulary (la pierre/la piedra, le bois/la madera, le bronze/el bronce, le fer/ el hierro); using en/de to state material composition.

UKS2: Connectives (et/y, mais/pero, car/porque); expressing preference and utility (C'est solide/Es fuerte).

Disciplinary Knowledge:

Cognate Decoding: Using similarities between target language material words and English terms (bronze/bronce, métal/metal) to read historical text snippets independently.

Practical Language Task:

LKS2 (Y3/4): *Tool Material Matching.* Pupils build simple sentences describing prehistoric tools using sentence strips (e.g., "Une hache en pierre"/"Un hacha de piedra").
UKS2 (Y5/6): *Material Era Comparison.* Pupils construct comparative sentences evaluating tool materials using connectives (e.g., "Le fer est plus fort que le bronze, mais le bronze est beau").

Week 4: A Day in the Life of a Hunter – First Person Verbs
MFL Focus: Verbs, Present Tense & Spoken Role-Play.
Substantive Knowledge:
LKS2: 4 key high-frequency action verbs in 1st person singular (j'habite/vivo, je chasse/ cazo, mange/como, je fabrique/fabrico).
UKS2: Conjoining action verbs with time phrases (d'abord/primero, ensuite/luego, enfin/por último); negative structures (je ne chasse pas/no cazo).
Disciplinary Knowledge:
Verbal Fluency: Transitioning from single nouns to full verb-predicate clauses to express personal action in a narrative context.
Practical Language Task:
LKS2 (Y3/4): *Prehistoric Role-Play.* Pupils pair up in costume/props to introduce their prehistoric persona using 1st person verbs (e.g., "Bonjour! J'habite dans une grotte et je mange de la viande"/"¡Hola! Vivo en una cueva y como carne").
UKS2 (Y5/6): *Hunter-Gatherer Daily Journal.* Pupils write a 4-line mini diary entry in the target language detailing their daily routine, incorporating time adverbs and negative sentences for what they *don't* do.

Week 5: Survival Shelters & Weather – Environment & Third Person
MFL Focus: Reading Comprehension, Environment Vocab & 3rd Person Verbs.
Substantive Knowledge:
LKS2: Weather phrases (il fait froid/hace frío, il pleut/llueve); 3rd person singular verb forms (il/elle habite or él/ella vive).
UKS2: Extended habitat descriptions; multi-clause weather conditions (Quand il fait froid, il vit dans la grotte); 3rd person plural (ils/elles habitent or ellos/ellas viven).

Disciplinary Knowledge:
Text Interrogation: Scanning a short geographical/historical text to extract specific information about how weather dictated prehistoric shelter choices.
Practical Language Task:
LKS2 (Y3/4): *Weather & Shelter Matching.* Pupils listen to weather reports in the target language and match hunter-gatherer characters to appropriate shelters (cave vs. wooden tent).
UKS2 (Y5/6): *Archaeological Report Reading.* Pupils read a short paragraph describing an Iron Age village, answering comprehension questions in English and translating key sentences about how tribal families survived cold seasons.

Week 6: The Prehistoric Survival Guide – Synthesis & Presentation
MFL Focus: Writing Synthesis, Oracy & Language Presentation.
Substantive Knowledge:
LKS2/UKS2 Synthesis: Integrating animal vocabulary, descriptive adjectives, material nouns, 1st/3rd person verbs, and connectives into a multi-sentence project.

Disciplinary Knowledge:
Language Production: Applying cumulative phonetic, grammatical, and lexical knowledge to produce an original, structured target-language presentation.
Practical Language Task:
LKS2 & UKS2: *The Stone Age to Iron Age Language Showcase.*
Task 1: Pupils create an illustrated "Prehistoric Survival Guide" booklet or poster in French or Spanish, writing captions for hunting, toolmaking, and village life.
Task 2: Pupils deliver a 1-minute spoken presentation to the class or a peer, reading their guide aloud with accurate target-language phonetics and intonation.
Plenary: Class "Peer Linguist Review" where students identify well-agreed adjectives, correct verb forms, and smooth pronunciation in peer presentations.

Assessment Matrix (Progression Indicators)

Phase	Working Towards	Expected Standard	Greater Depth
Lower Key Stage 2 *(Years 3 & 4)*	• Recalls animal words but forgets gendered articles (un/une or un/una). • Places adjectives before the noun incorrectly (e.g., "noir bison"). • Relies heavily on teacher prompts to pronounce key phonics sounds. • Writes single words rather than short verb phrases.	• Uses gendered articles (un/une, un/una) with animal and material nouns accurately. • Applies correct noun-adjective order and basic gender agreement rules. • Pronounces key target phonics sounds correctly when reading aloud. • Constructs short 1st person sentences using present-tense verbs (j'habite/vivo).	• Identifies noun gender patterns independently across unfamiliar vocabulary. • Explains the adjective agreement rule clearly to peers. • Reads short passages aloud with natural rhythm and confident phonetic accuracy. • Combines two clauses using connectives (et/y, mais/pero) in spoken and written tasks.
Upper Key Stage 2 *(Years 5 & 6)*	• Uses indefinite articles but struggles with plural definite articles (les/los-las). • Forgets to make adjectives agree when modifying feminine or plural nouns. • Decodes texts word-for-word rather than scanning for cognates and main ideas. • Confuses 1st person (I) and 3rd person (He/She/They) verb forms in writing.	• Applies plural definite articles and double adjective positioning accurately. • Decodes longer historical texts using cognates, context clues, and syntax structure. • Uses 1st and 3rd person present tense verb forms correctly in multi-clause sentences. • Writes structured paragraphs using time adverbs, connectives, and negative structures.	• Manipulates grammar rules fluently to construct complex, original descriptive sentences. • Translates unfamiliar historical passages accurately by applying grammatical deduction. • Speaks with clear intonation, applying silent consonant rules consistently. • Evaluates linguistic patterns across English and the target language (French/Spanish) insightfully.

Other Information, Ideas and Resources

Integrating a MFL—such as **French** or **Spanish**—with the **Stone Age to Iron Age** theme is an excellent way to practice core language skills like phonics, basic descriptions, sorting, and storytelling using high-interest historical concepts. Here are some alternative technique-driven MFL lesson ideas designed for Key Stage 2.

1. Prehistoric Animal Hunt (Noun Genders & Plurals)

Language Skill: Vocabulary acquisition, using definite/indefinite articles, and forming plurals.

Historical Link: Palaeolithic hunting and Ice Age megafauna.

The Lesson Concept

Instead of learning standard classroom objects or domestic pets, pupils learn the names of prehistoric animals in the target language. They focus on identifying whether the animals are masculine or feminine, and how to change them into plurals.

Target Vocabulary (French / Spanish Example):

A mammoth: un mammouth / un mamut

A bison: un bison / un bisonte

A bear: un ours / un oso

A sabretooth cat: un tigre à dents de sabre / un tigre de dientes de sable

The Activity: Hide illustrations of these animals around the room. The teacher calls out a quantity and a gendered plural (e.g., *"Je vois trois bisons!"* or *"¡Veo dos osos!"*). Pupils must hunt for the correct card, racing to bring it back to the board while repeating the phrase using the correct pronunciation.

2. Cave Painter Palette (Colours & Adjective Agreement)

Language Skill: Adjective agreement (making colours match the noun's gender and quantity).

Historical Link: Neolithic cave art and natural earth pigments.

The Lesson Concept

Pupils step into the role of a cave artist describing the natural tones they are using to paint a cave wall. This enforces the tricky grammar rule that colours must agree with the noun they describe.

The Practice: Pupils create a miniature "cave wall" out of brown sugar paper. They choose an animal noun (e.g., *une vache* / *una vaca* — a cow).

The Grammar Challenge: They must select an authentic earth tone and write the correct descriptive phrase underneath. The teacher guides them through adding a silent 'e' or 's' in French, or changing 'o' to 'a' in Spanish.

French: une vache **brune** (feminine agreement) vs. un mammouth **brun** (masculine).

Spanish: una vaca **negra** vs. un bisonte **negro**.

Output: A labelled classroom cave display completely written and spoken in the target language.

3. 'Je porte…' Prehistoric Fashion Show (Clothing & Materials)

Language Skill: Present tense verbs (*I am wearing…*), materials, and simple connectives.

Historical Link: Shifting fashion from Stone Age animal furs to Bronze Age woven wool textiles.

The Lesson Concept

Pupils practice speaking and listening skills by writing and narrating a short script for a prehistoric runway show, contrasting the styles of different eras.

The Sentence Builder: Teach the core verb structure for "I am wearing" (*Je porte…* / *Llevo…*) alongside materials (*en fourrure* / *de piel* — made of fur; *en laine* / *de lana* — made of wool).

The Performance: In small groups, one pupil wears a basic prop (like a faux-fur cloak or a wool tunic

they constructed in DT). A peer acts as the commentator, reading aloud a short descriptive profile to the class:
"Voici Édouard. Il porte un manteau marron en fourrure et des chaussures grises."
(Here is Edward. He is wearing a brown fur coat and grey shoes.)

4. Packing a Bronze Age Travel Sack (Speaking & Negatives)
Language Skill: Expressing possession, using the negative (*I have... / I don't have...*), and basic survival nouns.
Historical Link: Bronze Age travel, migration, and trade networks.
The Lesson Concept
To practice conversational fluency, pupils simulate pack preparation for a journey across the ancient landscape to trade for metals. This introduces the structure of a conversational dialogue.
The Sentence Structures:
French: J'ai... (I have) / Je n'ai pas de... (I do not have)
Spanish: Tengo... / No tengo...
The Vocabulary: *Un couteau / un cuchillo* (a knife), *un pot / una vasija* (a pot), *du pain / pan* (bread), *de l'eau / agua* (water).
The Game: Pupils pair up with a small velvet pouch and mini picture cards. Partner A asks, *"Tu as un couteau ?"* Partner B checks their sack and must reply using the correct negative or positive structure (*"Non, je n'ai pas de couteau, j'ai du pain."*). They swap until both sacks are packed correctly for the journey.

5. Timeline Sorting: True or False? (Reading Comprehension)
Language Skill: Reading unfamiliar texts for gist, identifying cognates (words that look similar in English), and reading dates.
Historical Link: Chronological progression from Stone to Iron Age.
The Lesson Concept
Instead of translating line-by-line, pupils develop reading resilience by decoding short historical statements in the target language, spotting clues to sort them chronologically.
The Resource: Provide 6 short, simplified sentences on cards.
The Strategy: Pupils highlight **cognates**—words like *l'âge de bronze / la edad de bronce*, *l'agriculture / la agricultura*, or *les métaux / los metales*—to guess the meaning of the sentence.
The Task: Pupils decide if the statement belongs to the Stone Age (*L'âge de pierre*), Bronze Age (*L'âge de bronze*), or Iron Age (*L'âge de fer*) and stick them onto a class timeline wall under the correct header.

6. The Tribal Leader's Commands (Listening & Imperatives)
Language Skill: Listening to, understanding, and executing classroom commands/imperatives.
Historical Link: Iron Age tribal hierarchy, chieftains, and warriors.
The Lesson Concept
This is a themed twist on the classic game "Simon Says" (*Jacques a dit* / *Simón dice*). It practices physical response to spoken verbs, which helps solidify vocabulary memory.
The Setup: The teacher (or a confident pupil) wears a Celtic torc and acts as the *Chef de tribu* (Tribal Chief). The rest of the class are the Celtic warriors.
The Action Commands: Teach action imperatives linked to prehistoric survival:
Chassez le mammouth ! / ¡Cazad al mamut! (Mime throwing a spear)
Coupez le bois ! / ¡Cortad la madera! (Mime chopping wood with an axe)
Peignez la grotte ! / ¡Pintad la cueva! (Mime painting a wall)
Mangez le pottage ! / ¡Comed el guiso! (Mime eating stew)

The Rule: Pupils must only perform the action if the leader begins the command with *"Le chef dit..."*. If they move without hearing that phrase, they must sit down and try to translate the next command from their seat to get back into the tribe.

Considerations for Implementation

Music

See also Charanga Schemes of work.

Substantive Knowledge

In Music, **substantive knowledge** for the **'Stone Age to Iron Age'** learning theme focuses on the origin of instruments, the physics of natural sound, and the role of music in early human communities. Since there is no written "sheet music" from prehistory, the substance of this subject is found in **archaeological finds** and **acoustic science**.

1. The First Instruments (Organology)
Substantive knowledge involves knowing what the earliest instruments were made of and how they functioned.

Aerophones (Wind): Knowing that the oldest known musical instruments are flutes made from bird bone and mammoth ivory (some dating back over 40,000 years).
Idiophones (Percussion): Understanding that "lithophones" (musical stones) were used—certain rocks produce a bell-like tone when struck.
Membranophones (Drums): Recognising that animal skins stretched over hollow logs or frames provided the first rhythmic pulse for tribes.
Chordophones (Strings): Knowing that the end of the Stone Age and the start of the Bronze Age saw the development of simple harps and lyres.

2. Acoustic Knowledge: The Science of Sound
This involves understanding how prehistoric people used their environment to amplify or change sound.

Reverberation and Echo: Knowing that many cave paintings are located in the most "resonant" parts of a cave, suggesting they were sites for musical rituals.
Pitch and Length: Understanding the basic principle that a shorter bone or pipe produces a higher pitch, while a longer one produces a lower pitch.
Natural Materials: Identifying which woods, stones, and metals (later in the Bronze and Iron Ages) produce different "timbres" (sound qualities).

3. Musical Structure and Purpose
While we don't know the exact melodies, we know the "shape" of how music was used.

The Pulse: Understanding that prehistoric music was built on a steady beat, often mimicking natural rhythms like a heartbeat or a walking pace.
Oral Tradition: Knowing that music was passed down through memory, not writing. This meant music was repetitive (using **ostinato**) to make it easy to remember.
Function: Recognising that music was a functional tool for:
Ritual: Solstices, burials, and ceremonies.
Communication: Signalling over long distances (e.g., conch shells or animal horns).

Work: Keeping a rhythm during group tasks like grinding grain.

4. Notation: The First 'Scores'
Substantive knowledge includes how we "write" music without an alphabet.
Graphic Notation: Understanding that symbols (similar to cave art) can be used to represent volume, speed, or the type of instrument to be played.

Why This **Substantive Knowledge** Matters
1. It Proves Music is Fundamental
By learning that flutes existed 40,000 years ago, pupils realise that music isn't just "entertainment"—it is a core human need. It shows that as long as there have been humans, there has been art and melody.

2. It Teaches 'Low-Tech' Engineering
Understanding how a bone flute is tuned or how a drum is tensioned teaches pupils about **physics and design**. It shows that prehistoric "technology" included the mastery of sound.

3. It Develops 'Sound Awareness'
In a world of digital music, studying Stone Age music forces pupils to listen to the properties of real materials. They learn the difference between the "clack" of flint and the "thud" of wood, heightening their **aural sensitivity**.

4. It Bridges History and Expression
Music gives a "voice" to people who lived before writing. When a pupil plays a rhythm on a replica drum, they are experiencing the same physical sensation as a pupil from 5,000 years ago. It creates an **empathetic link** to the past that a textbook cannot provide.

Disciplinary Knowledge

In Music, **disciplinary knowledge** refers to the skills and processes of "being a musician." For the **'Stone Age to Iron Age'** learning theme, this involves **Ethnomusicology**—the study of how and why people make music using the resources available in their environment. Since no sheet music or recordings exist from prehistory, pupils must use "musical archaeology" to explore sound.

1. Acoustic Archaeology (Sound Exploration)
Disciplinary knowledge involves understanding how different spaces and materials create sound.

Site Acoustics: Investigating how the "reverb" or "echo" in a cave or a stone circle (like Stonehenge) might have influenced ritual music.
Soundscapes: Reconstructing the "world of sound" our ancestors lived in. This isn't just "music," but the rhythm of flint knapping, the crackle of fire, and the calls of animals.
Outcome: Pupils experiment with different areas of the school to find the best "acoustic" spot for a prehistoric chant.

2. Instrumental Invention (Materiality)
This is the skill of identifying the musical potential in raw materials.

Classification of Instruments: Understanding the four ways sound is made (without modern tech):
Idiophones: Hitting solid materials (stones, wood, bone).
Membranophones: Hitting a stretched skin (early drums).

Aerophones: Blowing air through a tube (bone flutes, conch shells).
Chordophones: Plucking a stretched string (the origin of the lyre/harp in the Bronze/Iron Age).
Outcome: Pupils design and "perform" using found natural objects, focusing on the quality of tone (timbre).

3. Rhythmic and Oral Tradition
Because there was no notation, music was a shared, lived experience passed down through memory.

Ostinato and Pulse: Using repetitive rhythmic patterns to mimic the "heartbeat" of a tribe or the process of work (like grinding grain).
Call and Response: Practicing the social discipline of music—listening to a leader and responding as a group. This is the foundation of communal bonding.
Outcome: Creating a "working rhythm" that stays in time while the group simulates a task like building a wattle-and-daub wall.

4. Composition: Expressing Narrative
Disciplinary knowledge in composition involves using sound to tell a story or represent a feeling.

Graphic Notation: Since they can't use traditional staves, pupils create their own "Cave Painting Notation"—using symbols to represent when to play loud (crescendo), soft, fast, or slow.
Ritual Structure: Understanding that music often has a purpose (a hunt, a funeral, a solstice). Pupils compose a piece with a clear **beginning, middle, and end** to represent an Iron Age celebration.

Why This Disciplinary Knowledge Matters
1. It Develops 'Active Listening'
By trying to hear the music in a piece of flint or a hollow log, pupils develop a highly sensitive ear. They stop taking "sound" for granted and start hearing the musicality in the world around them.

2. It Connects Art and Science
Understanding why a long bone makes a lower sound than a short bone is **Physics (Acoustics)**. Music in this learning theme provides a physical, creative way to explore the properties of matter.

3. It Fosters Communal Discipline
In prehistoric times, music was about the **tribe**, not the individual. Playing in a rhythmic "drum circle" or a call-and-response chant teaches pupils the vital social skills of timing, empathy, and working together toward a single goal.

4. It Bridges the 'Prehistoric Gap'
We often feel disconnected from the Stone Age because they seem so different. However, rhythm and melody are universal. When a pupil plays a rhythm that sounds "good," they are connecting to a human instinct that is hundreds of thousands of years old. It makes history feel **alive**.

The Prehistoric Musician's Success Criteria

Concept	I Can...

Acoustics	I can explain why a cave makes my voice sound different.
Rhythm	I can keep a steady "pulse" using two stones.
Notation	I can draw a symbol that tells someone else how to play my music.
Timbre	I can describe the difference between the sound of wood and the sound of stone.

Learning Objectives

In Music, the **'Stone Age to Iron Age'** learning theme is a journey into **Ethnomusicology**—the study of why humans make music and how they use the environment to do it. Since there is no written music from prehistory, the **learning objectives** focus on the **physics of sound**, **rhythm**, and **composition using natural materials**.

1. Exploring Sound (Acoustics and Timbre)
Objective: *To use and explore a range of sound sources; to understand how the use of different materials can change the quality of a sound.*
The Focus: Understanding that "everything is an instrument."
Key Skill: Aural Discrimination. Distinguishing between the sharp "clack" of flint, the hollow "thud" of wood, and the resonant "ring" of metal (Iron Age).
Outcome: Pupils can explain how the length of a bone flute or the size of a drum affects its **pitch** (high vs. low).

2. Rhythm and Pulse (Communal Music)
Objective: *To play and perform in solo and ensemble contexts, using their voices and playing musical instruments with increasing accuracy, fluency, control and expression.*
The Focus: The heartbeat of the tribe. Prehistoric music was often communal, used for work or ritual.
Key Skill: Maintaining a Pulse. Using "body percussion" or stones to keep a steady beat while others perform a different rhythm (polyrhythms).
Outcome: Performing a "working rhythm" (e.g., a chant for grinding grain) that stays in time as a group.

3. Composition: Narrative and Ritual
Objective: *To improvise and compose music for a range of purposes using the inter-related dimensions of music.*
The Focus: Using sound to tell a story (like a hunt) or mark an event (like a solstice).
Key Skill: Structure. Creating a piece with a clear beginning, middle, and end.
Outcome: Composing a "Sun-Rise Ceremony" soundscape that uses **dynamics** (getting louder/crescendo) to represent the sun appearing over a stone circle.

4. Notation: The 'Cave Art' of Music

Objective: *To use and explore a range of visual representations to record and communicate musical ideas.*
The Focus: How do you remember a song without an alphabet?
Key Skill: Graphic Notation. Inventing symbols to represent sounds. For example, a jagged line for a loud rattle or a small dot for a short tap.
Outcome: Creating a "Graphic Score" that another pupil can "read" and perform.

Why These Learning Objectives Matter
1. It Humanises the Past
By meeting these **learning objectives,** pupils realise that prehistoric people weren't just "surviving"—they were **creating**. Finding a 40,000-year-old flute proves that humans have always needed beauty and expression.

2. It Teaches Resourcefulness
In this learning theme, pupils are often limited to natural objects. This forces them to be more creative than if they were given a digital keyboard. They learn to find the "music" in the ordinary, which is a core skill for any innovator.

3. It Develops 'Active Listening'
Because the sounds of stone and wood are subtle, pupils must listen much more carefully than they do to electronic music. This builds **aural sensitivity**, which improves their ability to sing in tune and play other instruments later.

4. It Connects Science and Art
Exploring how sound travels in a "cave" (the school hall) or why a hollow log echoes teaches **Acoustic Physics**. It shows that music and science are two sides of the same coin.

The Prehistoric Musician's Success Criteria

Musical Dimension	The Pupil Can...
Pitch	I can explain why a short stick makes a higher sound than a long one.
Duration	I can keep a steady beat for 16 counts without stopping.
Dynamics	I can make my "ritual chant" get slowly louder.
Timbre	I can choose the best material (stone/wood/skin) for a "scary" sound.

Lesson Ideas

Here is a complete, 6-week Medium-Term Plan for Key Stage 2 Music framed around **'Stone Age to Iron Age'**. This unit covers core National Curriculum Music strands—**Listening & Appraising,**

Performing (Vocal & Instrumental), Composing, Soundscapes, and Notation/Musical Elements—linking prehistoric themes like bone flute melodies, body percussion hunting rhythms, bronze horn fanfares, tribal vocal chants, and iron forge soundscapes with formal musical concepts. It balances **substantive knowledge** (pitch, duration, dynamics, tempo, timbre, texture, structure, pentatonic scales, rhythm grids, graphic scores, and staff notation) with **disciplinary knowledge** ("Thinking & Acting Like a Musician"—improvising under stylistic constraints, evaluating structural balance in compositions, controlling instrumental timbre for atmospheric effect, and performing as a collaborative ensemble).

Unit Title: Prehistoric Sonic Echoes: Flutes, Chants, Metallurgy Soundscapes & Tribal Fanfares
Duration: 6 Weeks (Approx. 1 hour per week)
Theme: Palaeolithic Bone Instruments, Mesolithic Hunting Calls, Bronze Age Horn Rituals, and Iron Age Forge Rhythms.
Music Focus Areas:
Listening & Appraising: Ancient instrument reconstructions (divje babe flute replica, Carnyx horn), acoustic space dynamics, and graphic scores.
Vocal & Body Percussion: Call-and-response vocal chants, polyrhythmic body percussion patterns, and ostinato loops.
Instrumental Performance: Pentatonic bone-flute melodies on tuned percussion (glockenspiels/xylophones/recorders) and bronze-horn fanfares.
Composition: Graphic-score soundscapes, metallic polyrhythms, and multi-layered ensemble pieces reflecting prehistoric technological shifts.
Key Music Pillars
Substantive Knowledge:
Interrelated Dimensions of Music: Pitch (high/low), Duration (rhythm/tempo), Dynamics (piano/forte), Timbre (instrumental colour), Texture (monophonic/polyphonic/layering), Structure (call & response, ABA).
Notation & Systems: Graphic scores, rhythm grids (crotchets, quavers, semibreves), basic pentatonic scale patterns (C-D-E-G-A).
Acoustics & History: How natural spaces (caves, stone circles) amplify sound; evolution of musical materials from bone/wood to bronze and iron.
Disciplinary Knowledge ('Thinking Like a Musician'):
Compositional Design: Selecting and manipulating timbre and dynamics deliberately to depict narrative tension and historical atmosphere.
Ensemble & Performance Practice: Maintaining independent rhythmic ostinatos within a multi-part texture while adjusting volume to balance the group.
Critical Appraising: Analysing how music evokes physical environments and evaluating performance accuracy against established criteria.

Weekly Progression Scheme
Week 1: Cave Reverberations & Bone Flutes – Pitch & Pentatonic Melodies
Music Strand: Listening, Pitch & Instrumental Performance.
Substantive Knowledge:
LKS2: Understanding high/low pitch; step-wise melody; the 5-note pentatonic scale (C-D-E-G-A); wood vs. bone timbre.
UKS2: Acoustic resonance in enclosed spaces (caves); pentatonic transposition; reading simple pitch notation on a staff or grid.
Disciplinary Knowledge:

Melodic Improvisation: Constructing short, peaceful melodies within a restricted pentatonic framework to evoke ancient flute music.

Practical Music Task:

LKS2 (Y3/4): *The Palaeolithic Cave Melody.* Pupils listen to recordings of reconstructed bone flutes, then play step-wise 4-note pentatonic motifs (C-D-E-G) on glockenspiels or recorders, maintaining a slow, ambient tempo.

UKS2 (Y5/6): *Cave Acoustic Composition.* Pupils improvise a 5-note pentatonic bone-flute solo, using echo-effects (dynamics: forte → piano) on tuned percussion to simulate cave reverberation.

Week 2: The Mesolithic Hunt – Rhythmic Ostinato & Body Percussion

Music Strand: Rhythm, Duration & Vocal/Body Performance.

Substantive Knowledge:

LKS2: Pulse vs. rhythm; simple rhythm notation (crotchets, quavers, rests); call-and-response structure; body percussion timbres (stomp, pat, clap, snap).

UKS2: Complex polyrhythms (two contrasting rhythms played simultaneously); tempo acceleration (accelerando) to build narrative tension.

Disciplinary Knowledge:

Rhythmic Precision: Maintaining an independent rhythm pattern (ostinato) against a competing group rhythm without dropping the core pulse.

Practical Music Task:

LKS2 (Y3/4): *Hunter-Gatherer Call & Response.* Pupils perform a vocal hunting chant with teacher-led call and response, layering a 2-bar body percussion ostinato (stomp-stomp-clap-rest).

UKS2 (Y5/6): *Polyrhythmic Mammoths.* Class splits into two groups performing complementary body percussion patterns (Group A: 4/4 steady march; Group B: 3/4 triplet chase), gradually increasing tempo to mimic a hunt.

Week 3: Stonehenge Solstice – Graphic Scores & Dynamic Texture

Music Strand: Composing, Graphic Notation & Texture.

Substantive Knowledge:

LKS2: Graphic notation symbols for sound length and volume; understanding texture (thin = solo instrument; thick = full group).

UKS2: Designing intuitive graphic score keys; layering dynamic changes (crescendo/ diminuendo); structuring pieces into ABA ternary form.

Disciplinary Knowledge:

Graphic Interpretation: Translating visual symbols accurately into controlled musical sounds using voice and untuned percussion.

Practical Music Task:

LKS2 (Y3/4): *Megalith Sunrise Soundscape.* Pupils compose a graphic score depicting sunrise over Stonehenge, using symbols for quiet vocal hums, rustling shakers, and building woodblock strikes.

UKS2 (Y5/6): *Neolithic Ritual Ceremony.* Pupils design an ABA graphic score (A = quiet night hums, B = loud ritual drumming crescendo, A = fading night), conducting their group using visual score cues.

Week 4: The Bronze Age Carnyx Fanfare – Brass Timbres & Structure

Music Strand: Listening, Appraising & Timbre Analysis.

Substantive Knowledge:

LKS2: Introduction of metal instruments; contrasting warm wooden timbres with bright, piercing

metallic timbres (triangles, cymbals, agogos).
UKS2: The Celtic Carnyx horn (iron/bronze boar-headed horn); fanfare structures; harmonic intervals (fifths and octaves) used in signalling music.
Disciplinary Knowledge:
Appraising Historical Instruments: Analysing how the introduction of bronze metallurgy allowed ancient musicians to produce louder, more piercing signalling sounds.
Practical Music Task:
LKS2 (Y3/4): *Bronze vs. Stone Timbre Sort.* Pupils listen to metal vs. wooden instruments, categorising their timbre qualities (bright, harsh, warm, resonant), then perform a short brassy fanfare on metal untuned percussion.
UKS2 (Y5/6): *Carnyx Horn Signal Composition.* Pupils use brass instruments or tuned percussion to compose a 4-bar signalling fanfare using open fifth intervals (C → G), evaluating how effectively it communicates across distance.

Week 5: Iron Age Forge & Hillfort Beats – Metallic Polyrhythms
Music Strand: Composing, Timbre & Industrial Rhythms.
Substantive Knowledge:
LKS2: Anvil and forge rhythm concepts; repeating metallic loops; controlling dynamic volume on metal instruments.
UKS2: Complex syncopated rhythms; 16-beat rhythm grid notation; balancing metallic high-frequency timbres (triangles) with low-frequency drums (djembe/bass).
Disciplinary Knowledge:
Compositional Balance: Structuring contrasting metallic timbres so that high-pitched strikes do not overpower low-frequency rhythmic bases.
Practical Music Task:
LKS2 (Y3/4): *The Blacksmith's Anvil.* Pupils build a 4-beat rhythm pattern using metal beaters on cowbells and metal bars, mimicking the hammer-strikes of an Iron Age forge.
UKS2 (Y5/6): *Hillfort Armoury Polyrhythmic Grid.* Pupils write a 16-beat grid composition featuring 3 distinct metallic parts (anvil strike, sword filing, bellows breathing), performing the piece with strict rhythmic timing.

Week 6: The Prehistoric Symphony – Grand Ensemble & Synthesis
Music Strand: Performance Synthesis, Ensemble Skills & Appraising.
Substantive Knowledge:
LKS2/UKS2 Synthesis: Combining bone-flute melodies, body percussion chants, solstice graphic soundscapes, and iron forge metallic polyrhythms into a unified 4-part performance.
Disciplinary Knowledge:
Reflective Musical Appraisal: Evaluating performance quality using technical musical vocabulary (pitch, tempo, dynamics, balance, precision).
Practical Music Task:
LKS2 & UKS2: *The Prehistoric Sonic Odyssey Showcase.*
Task 1: The class rehearses a multi-movement piece tracing prehistory: ***Movement 1:*** *Stone Age Cave Echoes* (Pentatonic flutes), ***Movement 2:*** *Mesolithic Hunt* (Body percussion chant), ***Movement 3:*** *Iron Age Forge* (Metallic polyrhythmic climax).
Task 2: Pupils perform the piece as an ensemble under pupil conductors who direct dynamic changes using hand gestures.
Plenary: Class "Critique & Review" session where pupils watch a video recording of their performance,

evaluating dynamic contrast, rhythmic tightness, and timbre balance.

Assessment Matrix (Progression Indicators)

Phase	Working Towards	Expected Standard	Greater Depth
Lower Key Stage 2 *(Years 3 & 4)*	• Plays notes on tuned percussion with erratic timing, losing the steady pulse. • Struggles to distinguish between pitch (high/low) and dynamics (loud/quiet). • Draws graphic scores that do not clearly represent the musical sounds produced. • Requires teacher prompting to maintain a simple body percussion ostinato.	• Plays pentatonic melodies (C-D-E-G) on tuned percussion with consistent pulse. • Controls dynamics (piano/forte) and timbre deliberately during group compositions. • Creates and performs accurately from intuitive graphic scores. • Performs a 2-bar body percussion ostinato alongside a vocal chant in time.	• Improvises expressive, step-wise melodies within a pentatonic scale effortlessly. • Identifies subtle timbre and dynamic differences across historical instruments. • Uses graphic score notation with advanced symbols for duration, pitch, and dynamics. • Leads peers as a conductor, guiding dynamic contrast and tempo changes during performance.
Upper Key Stage 2 *(Years 5 & 6)*	• Plays pentatonic notes but struggles to transpose or read basic staff/grid notation. • Confuses texture (thin/thick) with dynamic volume during appraising tasks. • Plays polyrhythms hesitantly, falling back into the dominant group rhythm. • Appraises music using general descriptive words rather than musical terminology.	• Reads basic pitch/rhythm grids and performs multi-note pentatonic melodies accurately. • Explains how acoustic environments and materials (wood → metal) shape musical timbre. • Holds an independent polyrhythmic part securely within a multi-layered ensemble composition. • Appraises performances using formal musical vocabulary (crescendo, ostinato, timbre, texture).	• Composes multi-part pieces in ABA ternary form using staff/grid notation with high precision. • Analyses complex harmonic intervals and acoustic properties of ancient instruments insightfully. • Maintains intricate syncopated polyrhythms against fast tempos without losing accuracy. • Critiques ensemble balance constructively, offering technical solutions for performance optimisation.

Other Information, Ideas and Resources

Exploring music through the '**Stone Age to Iron Age**' learning theme offers a brilliant sensory journey. Before structured orchestras or digital notation, human music was deeply connected to the natural world, tribal rituals, and the developing technologies of bone, stone, and metal. Here are some alternative, technique-driven music lesson ideas tailored for Key Stage 2.

1. Cave Echoes: Soundscape Composition

Music Focus: Exploring **timbre** (sound quality), dynamics, and graphic notation.

Historical Link: Upper Palaeolithic cave resonance and acoustics.

The Lesson Concept

Archaeologists have found that the deepest parts of caves—where paintings are located—have the highest level of echo and resonance. Early humans likely used these chambers to chant and make music. Pupils recreate a textured, mysterious cave soundscape.

The Instruments: Use found objects or classroom percussion with distinct natural textures. Scraping corrugated cardboard or dynamic guiros mimics the sound of crawling over rock; striking hollow woodblocks sounds like dripping water; using soft mallets on log drums provides a low, rhythmic heartbeat.

The Technique: Pupils explore **dynamics** (loud and quiet) to simulate a traveller walking deeper into a cave system. They use vocal clicks and abstract humming to test the "echoes."

Graphic Notation: Instead of standard musical staves, pupils draw a "Graphic Score"—using jagged lines for rough, scraping sounds, big dots for heavy drum beats, and wavy lines for fading echoes. A pupil conductor traces their finger along the drawing to lead the class performance.

2. Palaeolithic Flute Melodies: The Pentatonic Scale

Music Focus: Pitch, melody construction, and the pentatonic scale.

Historical Link: Stone Age bone flutes (e.g., the Divje Babe flute).

The Lesson Concept

Some of the oldest musical instruments ever discovered are flutes carved from the hollow leg bones of bears or swans, featuring precision-bored finger holes.

The Musical Constraint: Many ancient instruments naturally produce a **pentatonic scale** (a 5-note scale). On classroom glockenspiels, xylophones, or recorders, remove or ignore the 'F' and 'B' bars, leaving just **C, D, E, G, and A**.

The Task: Because the pentatonic scale contains no harsh intervals, any combination of these notes sounds naturally harmonious and evocative. Pupils compose a short, haunting "Hunter's Motif" (a recurring melodic theme). They practice control of duration and breathing to play their melodies smoothly (**legato**).



A replica of a prehistoric bone flute. Source: ResearchGate

3. The Mammoth Hunt: Ostinato & Pulse

Music Focus: Maintaining a steady **pulse**, creating an **ostinato** (repeating rhythm), and polyrhythms.

Historical Link: Palaeolithic group hunting communication and coordination.

The Lesson Concept

A successful hunt required rhythmic teamwork. Pupils learn how to overlay different repeating rhythmic patterns over a single steady heartbeat pulse.

The Heartbeat: The teacher or a confident pupil beats a steady, unchanging walking pulse on a large gathering drum.

Layering the Ostinatos: Divide the class into three tribal groups, each with a specific rhythmic job:

Group 1 (The Trackers): Shakers playing a fast, constant pattern mimicking footsteps through tall grass

(1-2-3-4, 1-2-3-4).
Group 2 (The Flankers): Claves or sticks playing a syncopated, warning click pattern (1 - 3-4, 1 - 3-4).
Group 3 (The Hunters): Heavy hand-drums playing a low, sudden strike to simulate a spear throw (1 - - -, 1 - - -).
The Core Skill: Pupils must lock their patterns together without speeding up, developing group synchronisation and rhythmic independence.

4. Stone vs. Bronze vs. Iron: The Material Audition
Music Focus: Appraising, listening skills, and describing changing acoustic properties.
Historical Link: The technological transition from the Stone Age to the Iron Age.
The Lesson Concept
As human tool-making materials evolved, the fundamental sounds of their world completely changed. This listening and appraising lesson explores the sonic profile of the three distinct archaeological eras.

Prehistoric Era	Musical Texture Class Analogy	Acoustic Properties
Stone Age	Flint stones, granite rocks, wooden logs, bone scrapers	Thudding, scraping, dry, earthy, short sustain.
Bronze Age	Triangles, finger cymbals, brass bars, bells	Bright, ringing, piercing, metallic, long sustaining ring.
Iron Age	Heavy iron pans, metallic rods, larger gongs	Deep, resonant, industrial, clanging, dark tone.

The Task: Blindfold a group of pupils. Strike different classroom materials (e.g., clacking two flint stones vs. striking a brass chime bar). Pupils use precise musical vocabulary to describe the **timbre** and **sustain** of the sound, correctly identifying which historical era the material represents based entirely on its acoustic signature.

5. The Celtic Carnyx: Fanfares and Signals
Music Focus: Improvisation, structure, and call-and-response.
Historical Link: Iron Age warfare and the Carnyx (a towering bronze war horn).
The Lesson Concept
The **Carnyx** was a magnificent, vertical brass horn used by Iron Age Celts. It stood over two metres high, topped with an open mouthpiece shaped like a screaming wild boar or dragon. It was used to terrify enemies and signal troops across a battlefield.
The Classroom Hack: Pupils can simulate the brassy, blaring call of a war horn using plastic kazoos, or low notes on recorders/panpipes.
The Structure: Introduce **Call-and-Response** structure.
1. The "Chieftain" stands at the front of the room and plays an improvised, aggressive 4-beat war signal (The Call).
2. The rest of the class (The Clan) must instantly mimic the rhythm and volume exactly back to them (The Response).

The Expression: Pupils play with **staccato** (short, sharp detached notes) to build a military, confrontational atmosphere.

6. Storytelling by the Campfire: Ballad Structure

Music Focus: Vocal performance, lyric writing, and structure (Verse and Chorus).

Historical Link: Oral history traditions of the Bronze and Iron Ages.

The Lesson Concept

Before writing existed, history was passed down through generations using song and poetry. Rhythm and rhyme served as memory anchors to keep tribal histories alive.

The Composition: The class works together to write a traditional repeating chorus about a massive tribal event, like the building of Stonehenge or a voyage across the sea.

The Structure: Keep the backing music simple using a basic acoustic chord drone (such as an open fifth 'C-G' pulse played on an acoustic guitar or synth keyboard).

The Performance: Individual groups compose short spoken or sung verses detailing specific plot points (e.g., *"We dragged the stones through mud and rain..."*), interspersed with the entire class bursting into the powerful, unified rhythmic chorus.

What was music like in the Stone Age?

The first rhythm instruments or percussion instruments most likely involved the clapping of hands, stones hit together, or other things that are useful to create rhythm. There are bone flutes and pipes which are unambiguously Palaeolithic.

https://www.youtube.com/watch?v=4oqTdg2Rq1o

What instruments were used in the Iron Age?

It used percussion instruments like drums, tambourines, and small castanet-like cymbals; and the aulos, a kind of double pipe that sounded like a cross between an oboe and a bagpipe and was so loud it could be heard on battlefields. For a long time, that was the only type of their music we knew about.

Considerations for Implementation

Physical Education

Substantive Knowledge

In PE, **substantive knowledge** for the **'Stone Age to Iron Age'** learning theme focuses on the **fundamental movement skills** and **physical capabilities** required for survival, labour, and tribal life. It is the study of the body as a "tool" that evolved to master the natural environment.

1. Functional Survival Skills

Substantive knowledge involves the specific types of "natural" movements that humans have used for millennia.

Locomotion: Mastering the mechanics of stalking, sprinting, and long-distance running (persistence hunting).

Body Management: Developing the strength and balance needed for climbing, crawling, and navigating uneven terrain.

The 'Three-Plane' Movement: Understanding that prehistoric survival required moving vertically (climbing), horizontally (running), and rotationally (throwing).

2. Object Control and Hunting Mechanics

This covers the physical techniques required to interact with tools and food sources.

The Mechanics of Throwing: Knowing the difference between the "power" required to throw a heavy

rock and the "accuracy" needed for a spear or arrow.
Grip and Precision: Understanding how fine motor skills were used in flint knapping or weaving, and how "gross motor skills" were used for heavy lifting and wood chopping.
Coordination: Using hand-eye coordination to track a "moving target" during a simulated hunt.

3. Team Tactics and Social Movement
This is the knowledge of how individuals move together for a common goal.

Invasion Tactics: Understanding how to move in a group to "corral" or "trap" an opponent (or animal), which is the ancestor of modern defensive line-play in sports.
Non-Verbal Communication: Knowing how to use body language and hand signals to coordinate movements silently.
Dance and Ritual: Knowing specific rhythmic movements or sequences that tell a story of a successful hunt or the change of seasons.

4. Health and Fitness (The 'Hunter-Gatherer' Body)
Substantive knowledge includes understanding the physical toll and advantages of the prehistoric lifestyle.

Functional Strength: Understanding that building muscle in prehistory came from "functional" work (carrying water, building huts) rather than isolated exercises.
Agility and Flexibility: Knowing that a flexible body was essential for escaping predators or moving through dense forest.

Why **Substantive Knowledge** Matters in PE
1. It Reconnects Movement to Purpose
In modern PE, pupils often perform exercises (like squats or lunges) without knowing why. Linking these to Stone Age tasks—like "picking up heavy stones for a henge" or "lunging to throw a spear"—makes the movement feel meaningful and purposeful.

2. It Builds a Foundation for All Sports
The "Big Three" of prehistoric movement (Running, Throwing, Jumping) are the exact same skills found in the **Olympic Heptathlon** and almost every modern field sport. Mastering these ancient skills creates a "physically literate" pupil.

3. It Encourages Outdoor Literacy
This learning theme moves PE away from the plastic and rubber of the sports hall and back to the "natural gym" of the outdoors. It teaches pupils that they can be active and fit anywhere, using only their own body and the terrain.

4. It Teaches 'Embodied History'
Pupils learn best by doing. By physically "acting out" the life of an Iron Age warrior or a Neolithic farmer, the history lessons they learn in the classroom become "locked" into their physical memory. They don't just know about the past; they **feel** it.

The Prehistoric Physical Profile

Movement Category	Prehistoric Purpose	Modern Sport Link
Persistence	Long-distance tracking of herds.	Cross-country / Marathon.
Explosive Power	Jumping a stream or throwing a spear.	Javelin / Long Jump.
Tactical Cooperation	Tribal hunting formations.	Football / Rugby / Netball.
Rhythmic Sequence	Celebration and Ritual.	Dance / Gymnastics.

Disciplinary Knowledge

In PE, **disciplinary knowledge** for the **'Stone Age to Iron Age'** learning theme focuses on the transition from **survival-based movement** to **disciplined athletic and combat skills**. It is the study of "Physical Literacy" through the lens of human evolution—how we moved to stay alive then, and how those movements form the basis of sports and dance today.

1. Functional Movement and Biomechanics

Disciplinary knowledge involves understanding how the body moves to perform specific tasks efficiently.

The Hunter-Gatherer 'Workout': Analysing the movements required for survival—sprinting, crawling, climbing, and lifting.

Precision and Power: Developing the "throwing" mechanic. In prehistory, this was for a spear; in PE, this translates to the discipline of javelin or cricket bowling.

Outcome: Pupils analyse their own posture and balance while performing "low-to-ground" movements (like a stalk or a crawl), understanding how a low centre of gravity provides stability.

2. Tactical Thinking and Teamwork

This is the "logic of the game." In prehistory, failure to work as a team meant no food; in PE, it means losing the match.

Formations and Strategy: Studying how tribes would "herd" or "corral" prey. In a PE context, this is mirrored in "invasion games" like football or netball, where players must create space and cut off passing lanes.

Non-Verbal Communication: Practicing the discipline of "silent" teamwork—using hand signals and eye contact to coordinate movements, just as hunters would have done.

Outcome: Pupils play a game of "predator vs. prey" where they must use tactical formations to trap an "animal" (another player) without speaking.

3. Combat and Defensive Agility
As society moved into the Iron Age, movement became focused on protection and warfare.

Reaction and Response: Developing the "reflex" skills needed for defence. This involves footwork (pivoting, sidestepping) and spatial awareness.
Resistance and Strength: Understanding "push and pull" mechanics, similar to the labour of building hillforts or the physical struggle of ancient wrestling.
Outcome: Engaging in "tag" games that emphasise quick changes of direction and "defensive stances" to mimic protecting a tribal territory.

4. Narrative Dance and Ritual Expression
PE isn't just about sport; it's about how the body communicates culture.

Ritual Movement: Investigating how repetitive movements (like a sun-dance or a harvest ritual) can be turned into a "sequence."
Expression through Action: Using the body to tell a story of a hunt or the change of seasons.
Outcome: Creating a group "Haka-style" dance that uses strong, rhythmic movements to show the power of an Iron Age tribe.

Why Disciplinary Knowledge Matters in PE
1. It Provides 'Context for Effort'
When pupils understand that a "squat" or a "lunge" is a movement their ancestors used to harvest grain or track animals, the exercise feels more meaningful. It connects their physical body to their historical identity.

2. It Highlights 'Natural' Fitness
In a world of gym machines, this learning theme teaches pupils that the most effective "equipment" is their own body. It promotes the idea that being "fit" means being capable of navigating the natural world—climbing a tree, jumping a stream, or carrying a load.

3. It Develops 'Spatial Intelligence'
Learning the tactics of a hunt or the defence of a hillfort improves a pupil's **proprioception** (awareness of their body in space). This is a foundational skill that makes them better at every other sport, from gymnastics to rugby.

4. It Values 'Process over Result'
In prehistory, the *process* of movement (being quiet, being steady, being patient) was what led to success. This **disciplinary knowledge** helps pupils realise that in PE, how you move is often more important than how fast you finish.

The Prehistoric Athlete's Success Criteria

Physical Concept	I Can…

Agility	I can change direction quickly while staying balanced.
Tactics	I can work with my "tribe" to block a space in a game.
Coordination	I can throw an object accurately at a moving target.
Expression	I can use my body to perform a rhythmic ritual dance.

Learning Objectives

In PE, the **'Stone Age to Iron Age'** learning theme offers a unique opportunity to move away from modern sports and focus on **Fundamental Movement Skills (FMS)** through the lens of human evolution. The **learning objectives** centre on "functional fitness"—the idea that the human body evolved to run, throw, jump, and cooperate to survive.

1. Locomotion: Navigating the Wild
Objective: *To develop flexibility, strength, technique, control, and balance through a range of movement patterns.*
The Focus: Moving like a hunter-gatherer. This involves mastering "natural" movements that modern life often ignores.
Key Skill: Agility and Balance. Navigating uneven terrain (or PE mats/benches) by crawling, stalking, and leaping.
Outcome: Pupils can move "silently" and with a low centre of gravity (the "stalk"), demonstrating core strength and control over their own body weight.

2. Object Control: The Mechanics of the Hunt
Objective: *To use running, jumping, throwing, and catching in isolation and in combination.*
The Focus: The evolution of the throw. Pupils look at how humans developed the ability to propel objects with power and accuracy.
Key Skill: Coordination and Precision. Transitioning from a simple "toss" to a technically accurate "overarm throw" (simulating a spear or stone throw).
Outcome: Pupils can hit a moving or stationary target from a distance, understanding the biomechanics of using their whole body to generate force.

3. Dynamic Tactics: Tribal Cooperation
Objective: *To play competitive games, modified where appropriate, and apply basic principles suitable for attacking and defending.*
The Focus: The "Invasion Game" of the hunt. Prehistoric survival relied on the "tribe" moving as a single unit to corral prey or defend a hillfort.
Key Skill: Spatial Awareness and Tactical Formation. Learning how to "close down" space as a group and use non-verbal signals to communicate.

Outcome: Working in teams to "trap" an opponent or protect a "territory" (base) using defensive formations and quick reaction times.

4. Performance: Ritual and Storytelling
Objective: *To perform dances using a range of movement patterns.*
The Focus: Movement as communication. Before written history, tribes used dance to recount successful hunts or celebrate the seasons.
Key Skill: Rhythm and Expression. Creating a sequence of movements that tell a narrative, using heavy, grounded actions (stamping, rhythmic clapping).
Outcome: Pupils can choreograph and perform a "Tribal Ritual" dance that maintains a steady pulse and shows a clear beginning, middle, and end.

Why These Learning Objectives Matter
1. It Validates 'Natural' Movement
By framing PE through the Stone Age, pupils realise that running and jumping aren't just "school rules"—they are the skills that kept our ancestors alive for 800,000 years. This builds a deeper, more primal connection to physical activity.

2. It Builds Multi-Directional Strength
Unlike many modern sports that focus on forward motion, "Stone Age PE" encourages crawling, climbing, and twisting. This develops **functional strength** in the joints and core, which helps prevent injuries in later life.

3. It Develops 'Silent' Teamwork
In a world of constant digital noise, these learning objectives teach pupils to "read" their teammates' body language. High-level sports like rugby or basketball rely on this exact same "sixth sense" of spatial awareness and non-verbal coordination.

4. It Makes History 'Sticky'
Pupils are far more likely to remember the difference between a Mesolithic nomad and a Neolithic farmer if they have physically embodied those roles—feeling the fatigue of a "long-distance track" or the discipline of a "stationary defence."

The Prehistoric Athlete's Success Criteria

Concept	The Pupil Can...
Balance	I can move across an "unstable" path without losing my footing.
Power	I can use my legs and core to throw an object further and straighter.
Strategy	I can work with my tribe to block an "animal" from escaping.

Resilience	I can keep going during a "persistence hunt" (sustained aerobic activity).

Lesson Ideas

Here is a complete, 6-week Medium-Term Plan for Key Stage 2 PE framed around **'Stone Age to Iron Age'**. This unit connects core National Curriculum PE strands—**Dance & Narrative Movement, Gymnastics & Locomotion, Athletics (Throwing & Running), Outdoor Adventurous Activities (OAA) & Orienteering, and Invasion Games/Tactics**—with prehistoric themes: hunter-gatherer tracking, stone-hauling team dynamics, javelin/spear throwing, tribal signal networks, and hillfort defensive tactics. It balances **substantive knowledge** (fundamental movement skills, spatial awareness, force mechanics in throwing, body tension/balance, tactical positioning, and cardiovascular pacing) with **disciplinary knowledge** ("Thinking & Acting Like an Athlete"—evaluating movement efficiency, analysing tactical decisions under pressure, applying biomechanical feedback to refine techniques, and collaborating effectively in team challenges).

Unit Title: Prehistoric Movements: Tracking, Tactics, Tribal Athletics, and Hillfort Defence
Duration: 6 Weeks (Approx. 1 to 1.5 hours per week)
Theme: Stone Age Hunting & Gathering, Megalithic Team Logistics, Bronze Age Athletics, and Iron Age Hillfort Games.
PE Focus Areas:
Dance & Narrative Movement: Embodying animal prey dynamics, tribal celebration dances, and metallic tool-forging rhythms.
Gymnastics & Balance: Low-centre-of-gravity balances, agility land-traversals, weight-bearing balances, and dynamic vaulting/stepping.
Athletics (Run, Jump, Throw): Spear/javelin trajectory mechanics, target precision throwing, sprinting acceleration, and stamina pacing.
OAA & Outdoor Orienteering: Symbol navigation, route planning, non-verbal team communication, and strategic resource retrieval.
Invasion Games & Defence: Defensive wall formations, dodging/evading tactics, tagging mechanics, and spatial interception.
Key PE Pillars
Substantive Knowledge:
Biomechanical Concepts: Centre of gravity, release angles (45° optimum throwing trajectory), stride frequency vs. stride length, weight transfer in balance.
Tactical Dynamics: Defensive spacing, line-of-sight interception, evasive dodge pathways (cutting/pivoting), resource management pacing.
Physical Literacy: Dynamic balance, static balance, coordination, spatial awareness, cardiovascular endurance, and explosive muscular power.
Disciplinary Knowledge ('Thinking Like an Athlete & Tactician'):
Performance Analysis: Observing peer movement mechanics to provide actionable biomechanical feedback (e.g., "Extend your throwing arm fully at release").
Tactical Evaluation: Adapting team movement strategies dynamically based on spatial constraints and opponent positioning.
Self-Regulation & Effort: Monitoring heart rate and physical fatigue to pace energy expenditure across sustained athletic tasks.

Weekly Progression Scheme

Week 1: The Hunter's Stealth – Gymnastics, Balance & Stealth Locomotion
PE Strand: Gymnastics & Body Control.
Substantive Knowledge:
LKS2: Low-centre-of-gravity travelling (crouching, quadrupedal crawl); static balance on 1, 2, and 3 bases of support; weight transfer smoothly between levels.
UKS2: Dynamic balances on unstable equipment; silent landing mechanics (toe-ball-heel flexed knee absorb); spatial awareness while moving through dynamic obstacles.
Disciplinary Knowledge:
Movement Precision: Evaluating body tension and alignment to maintain balance while travelling silently across varying surface heights.

Practical PE Task:
LKS2 (Y3/4): *Stealthy Stalking Course.* Pupils travel through an obstacle terrain (bench balance beams, mat rolls, low hurdles) using silent footwork, holding a 3-second freeze balance when a "Prehistoric Beast" caller turns around.
UKS2 (Y5/6): *Predator vs. Prey Gymnastics Routine.* In pairs, pupils construct a 6-element sequence incorporating a low level stealth crawl, a synchronised high static balance, a controlled vault roll, and a silent jump landing.

Week 2: Moving the Sarsen Stones – Heavy Team Logistics & OAA
PE Strand: Outdoor Adventurous Activities (OAA) & Teamwork.
Substantive Knowledge:
LKS2: Collaborative weight handling; spatial communication without verbal cues; role distribution within small teams.
UKS2: Strategic pathfinding under physical constraints; load balance mechanics; evaluating team efficiency during physical challenges.
Disciplinary Knowledge:
Tactical Problem Solving: Formulating and testing different physical strategies to transport objects across physical hazards efficiently.
Practical PE Task:
LKS2 (Y3/4): *Stonehenge Timber Rollers.* Teams of 4 must transport a heavy gym mat ("sarsen stone") across the hall without it touching the floor, using wooden apparatus poles as continuous rolling tracks underneath.
UKS2 (Y5/6): *Megalith Transport Logistics.* Teams navigate a complex outdoor obstacle course while carrying a weighted parcel, adhering to strict rules (e.g., non-verbal communication only, rotating load-bearers every 30 seconds).

Week 3: Spear of the Bronze Age – Throwing Mechanics & Precision
PE Strand: Athletics (Throwing for Distance & Accuracy).
Substantive Knowledge:
LKS2: Overarm throw mechanics (side-on stance, non-throwing arm pointing, weight shift rear-to-front, high release point).
UKS2: Release trajectory physics (aiming for optimal 45° angle); linear acceleration; transferring momentum from legs through core to arm release.
Disciplinary Knowledge:
Biomechanical Feedback: Analysing peer throwing technique to identify energy leakage (e.g., throwing flat vs. arc trajectory).

Practical PE Task:
LKS2 (Y3/4): *Target Spear Throwing.* Pupils practice overarm throwing technique using foam javelins/vortex howlers, aiming for target hoops placed at varying distances (5m, 10m, 15m).
UKS2 (Y5/6): *The Amesbury Archer Javelin Challenge.* Pupils record throwing distances under two conditions: throwing from a standing position vs. throwing with a 3-step approach run, analysing how velocity increases total throwing distance.

Week 4: The Tribal Gathering – Narrative Dance & Rhythmic Dynamics
PE Strand: Dance & Creative Movement.
Substantive Knowledge:
LKS2: Responding to rhythmic beats; levels (high, medium, low); pathways (curved, zig-zag, straight); motif development.
UKS2: Polyrhythmic movement sync; expressiveness through dynamic speed (staccato vs. fluid); choreographing small group formations (canon and unison).
Disciplinary Knowledge:
Choreographic Evaluation: Assessing how changes in movement dynamics (force, tempo, spatial direction) communicate historical themes effectively.
Practical PE Task:
LKS2 (Y3/4): *The Cave Art & Ritual Dance.* Pupils create a narrative dance sequence starting as frozen cave art figures, transitioning into dynamic animal hunting movements using drumming beats for tempo transitions.
UKS2 (Y5/6): *Iron Age Forge & Sword Dance.* Small groups choreograph a 3-part rhythmic dance reflecting the transformation of raw metal into tools: ***Part 1:*** *Heavy hammer strikes (Staccato unison),* ***Part 2:*** *Smelting fire (Fluid canon),* ***Part 3:*** *Warrior display.*

Week 5: Defence of Maiden Castle – Invasion Tactics, Tagging & Evasion
PE Strand: Invasion Games & Defensive Tactics.
Substantive Knowledge:
LKS2: Dodging mechanics (change of direction, side-stepping, fake movements); defensive guard stance; spatial boundary awareness.
UKS2: Defensive wall communication; zonal vs. man-marking tactics; strategic interception of attackers entering a protected zone.
Disciplinary Knowledge:
Tactical Decision Making: Reading opponent hips and body weight to predict directional cuts and cut off attacking angles.
Practical PE Task:
LKS2 (Y3/4): *Raid on the Roundhouse.* A classic evasive game where "raiders" attempt to snatch beanbags from a central circle zone while "defenders" use side-stepping tag tactics to block entry paths.
UKS2 (Y5/6): *Maiden Castle Rampart Invasion.* Teams play a modified invasion game. Defenders hold an inner concentric circle (hillfort ramparts), organising zonal defence line tactics to stop attackers from delivering "food supply" balls into the citadel.

Week 6: The Tribal Games – Athletic & Tactical Decathlon Showcase
PE Strand: Physical Synthesis, Athletic Events & Team Competition.

Substantive Knowledge:

LKS2/UKS2 Synthesis: Integrating agility locomotion, overarm spear throwing accuracy, sprint acceleration, and team tactical evasion into a unified multi-event competition.

Disciplinary Knowledge:

Sportsmanship & Self-Evaluation: Evaluating personal physical improvements across the unit and demonstrating leadership during team competitive events.

Practical PE Task:

LKS2 & UKS2: *The Prehistoric Tribal Decathlon Showcase.*

Event 1: *Spear Precision Throwing* (Javelin target scoring).

Event 2: *Mammoth Tracking Relay* (Agility course sprint with hurdle jumps).

Event 3: *Hillfort Siege Challenge* (Tactical tag/evasion team tournament).

Plenary: Medal presentation and athletic reflection, where pupils evaluate their biomechanical growth (throwing arc, balance control) and tactical progress.

Assessment Matrix (Progression Indicators)

Phase	Working Towards	Expected Standard	Greater Depth
Lower Key Stage 2 *(Years 3 & 4)*	• Loses balance frequently during low-level stealth locomotion tasks. • Throws foam spears with a pushing action rather than an overarm pull. • Runs directly into tagged zones without using side-step dodging movements. • Struggles to work cooperatively during team OAA challenges.	• Maintains controlled static and dynamic balances at varying level heights. • Executes overarm throw mechanics with a clear side-on stance and high release. • Uses change of speed and direction to dodge opponents in invasion games. • Communicates constructively with team members to solve physical OAA tasks.	• Transitions smoothly between complex movement levels while maintaining complete silence. • Consistently hits distant targets by adjusting release trajectory and force application. • Anticipates opponent movement patterns, using deceptive fakes and quick cuts. • Takes on leadership roles during team physical challenges, organising roles efficiently.
Upper Key Stage 2 *(Years 5 & 6)*	• Landings from apparatus are heavy, failing to flex knees to absorb shock. • Throws javelins flat without utilising leg and core weight transfer momentum. • Performs dance movements without varying dynamic quality, speed, or spatial levels. • Plays invasion games	• Absorbs landing forces safely using toe-ball-heel flexed knee mechanics. • Optimises throwing trajectory angle (~45°) to maximise distance. • Choreographs multi-part group dance sequences using canon, unison, and dynamic contrast. • Communicates and executes zonal defensive	• Analyses peer biomechanical movement and provides precise constructive feedback. • Seamlessly combines approach-run speed into explosive throw release power. • Leads choreographic development, incorporating complex polyrhythmic movements.

	individualistically without executing zonal defensive tactics.	strategies in invasion game contexts.	• Adapts defensive and offensive tactics dynamically during gameplay based on spatial shifts.

Other Information, Ideas and Resources

Integrating the '**Stone Age to Iron Age'** learning theme into Key Stage 2 PE transforms standard fitness drills into high-stakes prehistoric survival challenges. Survival in prehistory required raw power, stealth agility, coordination, and collective strategic teamwork. Here are some alternative curriculum-linked PE lesson sequences spanning games, athletics, gymnastics, dance, and outdoor adventurous activities (OAA).

1. The Palaeolithic Tracker (Agility and Reaction Time)

PE Focus: Fundamental Movement Skills (Sprinting, Side-Shuffling, and Agility)

Historical Link: Palaeolithic hunter-gatherers tracking Ice Age megafauna.

The Lesson Concept

Before humans developed farming, tracking animals required absolute control over body movement—bursting into explosive sprints, shuffling silently through brush, and freezing instantly to avoid detection.

The Agility Grid: Set up a chaotic forest of cones and low foam hurdles across the hall.

The Gameplay:

Pupils practice high-tempo slalom running through the cones, keeping their centre of gravity low to change direction rapidly without losing speed.

The Stealth Twist: Introduce an audio cue (e.g., a hand drum beat). When the drum beats, pupils must instantly freeze in a low, balanced crouch, holding their position for 3 seconds to practice core stability and deceleration.

Physical Takeaway: Children learn how bending the knees and dropping the hips allows for sharp, explosive directional changes.

2. Pulling the Sarsen Stones (OAA and Teamwork)

PE Focus: Outdoor Adventurous Activities (Problem Solving and Weight-Distribution)

Historical Link: The construction of Neolithic monuments like Stonehenge.

The Lesson Concept

Moving a 25-tonne sarsen stone across Salisbury Plain required immense collaborative physical effort. This team-building module shifts the focus from individual athletic speed to collective physical coordination.

The Setup: Divide the class into teams of 5 or 6. Provide each team with a heavy gym mat (the "Sarsen Stone"), several plastic balance benches or floor rollers, and a couple of skipping ropes.

The Challenge: Teams must transport their mat from one side of the hall to the other without allowing any part of the mat to touch the bare gym floor.

The Technique: Pupils must communicate to coordinate their movements—rolling the mat over the benches, picking up the cleared benches from the back, and sprinting to place them at the front to create a continuous trackway.

Physical Takeaway: Safe lifting mechanics (lifting with legs, not the back) and synchronised team pacing.

3. The Bronze Age Spear (Athletics - Throwing)
PE Focus: Athletics (Overarm Throwing Mechanics, Power, and Accuracy)
Historical Link: The development of Bronze Age hunting spears and weaponry.
The Lesson Concept
As human tool-making advanced from stone to bronze, projectile weapons became lighter and more aerodynamic. This lesson refines the mechanical phase of the overarm throw.
The Technical Setup: Set up clear throwing lanes on the field or playground. Use hula hoops suspended from football goals or upturned mats as targets.
The Teaching Points: Pupils practice the proper athletic throwing stance:
Standing side-on to the target.
Throwing arm drawn back in a wide 'arc' at shoulder height.
Stepping forward with the opposite foot to transfer body weight from back to front during the release.
The Activity: Pupils use foam javelins or weighted beanbags to score points by hitting targets at progressive distances (5m, 10m, 15m).
Physical Takeaway: Understanding how shifting weight from the back foot to the front foot generates velocity and distance.

4. Defending the Hill Fort (Games - Invasion Tactics)
PE Focus: Invasion Games (Spatial Awareness, Strategic Mark-Defending, and Intercepting)
Historical Link: Iron Age Hill Forts (e.g., Maiden Castle) and tribal skirmishes.
The Lesson Concept
Iron Age societies constructed complex, concentric earthen ramparts to keep invading tribes out. This tactical invasion game simulates defending a circular fort boundary.

Outer Ring	← Attackers try to breach the zones
Inner Ring	← Defenders can only move along these lines
The Citadel	← The prize (Target cones/balls to steal)

The Layout: Use marking tape or cones to create three concentric rings in the centre of the hall.
The Rules:
The *Defenders* can only move along the circular lines of the inner ring.
The *Attackers* start on the outside and must dodge, fake, and change pace to slip past the defenders to grab a beanbag from the central "Citadel."
Defenders cannot grab attackers; they must block their paths using lateral side-shuffling or tag them with a two-hand touch.
Physical Takeaway: Developing tactical defensive positioning, learning to block space rather than chasing the ball/player directly.

5. Glacial Melting: The Moving Earth (Gymnastics)
PE Focus: Gymnastics (Level Transitions, Core Tension, and Controlled Rolling)
Historical Link: The physical transition from the freezing Ice Age to the temperate Mesolithic era.

The Lesson Concept
Pupils use gymnastics movements to tell a physical story of changing landscape states, transitioning

smoothly between low, compressed underground shapes and elevated, balanced structural forms.

The Floor Sequence: Pupils compose a continuous 4-part floor routine that incorporates:

1. **The Tundra (Low Level):** A slow, tightly compressed egg roll or commando crawl, keeping the body low and tense.
2. **The Thaw (Level Transition):** Moving smoothly from a low crawl into a medium-level bridge or cat-stretch, showing controlled spinal extension.
3. **The Standing Ridge (High Level):** Exploding into a high-level, rock-solid balance (e.g., an arabesque or a tucked 1-legged hold) held perfectly still for **4 seconds**.

Physical Takeaway: Controlling transitions between fluid, dynamic movement and static, locked balances.

6. The Dance of the Celtic Forge (Dance)

PE Focus: Dance (Rhythm Synchronisation, Canon, and Heavy Expressive Motifs)

Historical Link: Iron Age metallurgy and blacksmithing rituals.

The Lesson Concept

The discovery of how to smelt iron ore changed civilisation. The blacksmith's forge was a place of heavy, rhythmic, industrial movement. Pupils translate these percussive concepts into a structured group dance performance.

Choreographic Motifs: Teach three distinct physical movement loops:

The Bellows (Sustained Air): Wide, deep-squatting lunges accompanied by slow, sweeping arm expansions to mimic pumping air into a furnace.

The Hammer Strike (Percussive Power): Heavy, downward arm strikes with sharp torso twists, utilising sudden acceleration and impact lines.

The Quenching (Fluid Contrast): Rapid, shaking, vibrating movements that drop sharply to the floor, representing hot metal hitting cold water.

The Performance Structure: Pupils arrange their routines using **Canon** (Group A performs the hammer strike on beat 1, Group B on beat 2, Group C on beat 3) to create an interlocking, rhythmic loop.

Considerations for Implementation

Science

Substantive Knowledge

In Science, **substantive knowledge** for the **'Stone Age to Iron Age'** learning theme focuses on the properties of natural materials, the physics of early tools, and the biological transition from foraging to farming. It is the study of how prehistoric humans acted as the world's first "natural scientists," observing the environment to identify resources that could be manipulated for survival.

1. Materials and Their Properties

Substantive knowledge involves understanding why certain materials were selected for specific technological "leaps."

Rocks and Fossils: Knowing the difference between sedimentary, igneous, and metamorphic rocks. Specifically, understanding the properties of **flint** (a form of chert)—it is hard but brittle, allowing it to be "knapped" into a razor-sharp edge.

Permeability and Insulation: Understanding the "Science of the Roundhouse." Knowing that **thatch** (straw/reeds) is a natural insulator and that **wattle and daub** (mud, straw, and dung) creates a

composite material that is windproof and thermally efficient.
Soil Science: Recognising that the move to farming in the Neolithic required a **substantive** understanding of soil quality (nutrients and drainage) to successfully grow cereal crops like emmer wheat.

2. States of Matter and Chemical Changes
This covers the fundamental chemistry of the Bronze and Iron Ages.
Reversible and Irreversible Changes: Understanding that melting metal to pour into a mould is a physical change (it can be re-melted), but **smelting** (extracting metal from ore using heat and chemical reactions) is a more complex transformation.
Alloys: Knowing that **Bronze** is a mixture (alloy) of two elements: Copper and Tin. **Substantive knowledge** here includes the fact that the resulting alloy is harder and more durable than its parent metals.
Thermal Energy: Understanding that **Iron** required much higher temperatures to extract than copper, leading to the development of "bellows" to pump oxygen into furnaces (the science of combustion).

3. Animals, Including Humans (Biology)
This involves the science of nutrition and the impact of the environment on the human body.

The Digestive System and Nutrition: Knowing how the human diet changed from the high-protein/high-fibre hunter-gatherer diet to the carbohydrate-heavy diet of early farmers.
Skeletons and Muscles: Understanding the physical demands of prehistoric life. Analysing how "carrying and lifting" (for monuments like Stonehenge) requires an understanding of muscles and the use of **levers** and **rollers** (simple machines).
Domesticating Species: Knowing how humans used selective breeding to change wild wolves into domestic dogs and wild grasses into high-yield crops.

4. Light and the Solar System
Prehistoric people were expert observers of the sky, which was their only "clock" and "calendar."

Shadows and Seasons: Knowing how the movement of the Earth relative to the Sun creates the seasons.
Astronomical Alignment: Understanding that sites like Stonehenge are massive scientific instruments designed to track the **Summer and Winter Solstices**, allowing farmers to know when to plant and harvest.

Why **Substantive Knowledge** Matters in Science
1. It Explains the Origin of Technology
By learning the properties of flint or the chemistry of bronze, pupils see that "technology" isn't just computers—it's the application of scientific knowledge to solve human problems.

2. It Connects Science to Survival
When pupils study wattle and daub or prehistoric diets, they see that science is a matter of life and death. It makes the study of materials and nutrition feel urgent and practical rather than abstract.

3. It Highlights Human Ingenuity
Knowing that Iron Age people could reach temperatures of over 1,500℃ without electricity fosters a

deep respect for human intelligence. It challenges the "primitive" stereotype and shows that our ancestors were sophisticated observers of the physical world.

4. It Provides a Foundation for Sustainability
Studying how early humans used purely natural, biodegradable materials provides a vital contrast to modern plastic-heavy technology. It encourages pupils to think about the **lifecycle of materials** and sustainable design.

Disciplinary Knowledge

In Science, **disciplinary knowledge** refers to the "how" of the subject—the skills and methods used by scientists to observe, test, and categorise the natural world. For the **'Stone Age to Iron Age'** learning theme, this involves **Experimental Archaeology** and **Materials Science**.
It is the study of how humanity first used the "Scientific Method" (trial, error, and observation) to move from surviving nature to mastering it.

1. Comparing and Grouping (Materials Science)
Disciplinary knowledge involves the systematic testing of natural materials to see which are fit for a specific purpose.

Hardness and Durability: Testing different stones. Why is flint better for a knife than sandstone? A scientist would test for "fracture" patterns and the ability to hold a sharp edge.
Absorbency and Permeability: Testing "Wattle and Daub" recipes. Pupils act as scientists to find the perfect ratio of mud, straw, and dung to create a waterproof and windproof wall.
Thermal Conductivity: Understanding why stone houses (Skara Brae) or roundhouses with thick thatch were used to keep heat in.

2. Investigating Chemical Changes (Metallurgy)
This is the "Chemistry" of prehistory—understanding that some changes are reversible (melting ice) while others are irreversible (smelting ore).

State Changes: Understanding that heating copper and tin until they turn from solid to liquid allows them to be mixed to create a new material: **Bronze**.
The 'Recipe' for Metal: Testing the properties of an **alloy**. Scientists observe that Bronze is harder and more durable than the two metals that created it.
Observation over Time: Investigating how different metals react to the environment (oxidation/rusting), explaining why we find many bronze artefacts but fewer iron ones that haven't corroded.

3. Biological Classification and Nutrition
Disciplinary knowledge involves looking at the "Science of Survival"—how humans categorised the living world to stay alive.

Plant Classification: Identifying which wild plants were safe to eat versus poisonous, and eventually selecting the best "wild grasses" to breed into modern wheat and barley.
Skeletons and Muscles: Analysing animal remains from the period to understand their diet and how they moved. This helps pupils understand the **vertebrate/invertebrate** classification system.
The Digestive System: Comparing the "Hunter-Gatherer" diet (high fibre, wild meat) with the "Early Farmer" diet (grains/dairy) and the impact on human health.

4. Light and Earth Science (The Sun and Seasons)
Understanding how prehistoric people "read" the sky to manage their year.

Shadows and Light: Investigating how a "Henge" works like a giant sun-dial. Scientists use the position of the sun to predict the **Solstices**.
Soil Science: Testing different soil types (chalky, clay, sandy) to see which is best for growing the first Neolithic crops.

Why **Disciplinary Knowledge** Matters in Science
1. It Proves Science is an Ancient Human Instinct
By meeting these **learning objectives**, pupils realise that "Science" didn't start in a laboratory with a white coat. It started when a Stone Age person wondered, *"What happens if I hit this rock with that rock?"* It makes Science feel accessible and human.

2. It Teaches the Value of 'Failure'
Experimental archaeology is built on trial and error. If a Bronze Age sword snapped, the "scientist" had to change the ratio of the alloy. This teaches pupils that **iteration** and learning from mistakes is the heart of scientific progress.

3. It Develops 'Fair Testing' Skills
When pupils try to build a model roundhouse, they are performing a fair test. They must keep certain variables the same (size of the house) while changing others (the material of the roof) to see which performs best.

4. It Contextualises Environmental Science
Studying how the first farmers changed the soil or cleared forests provides a direct link to modern **Ecology**. It helps pupils understand that human activity has a measurable scientific impact on the Earth's systems.

Learning Objectives

In Science, the **'Stone Age to Iron Age'** learning theme provides a hands-on laboratory for exploring **Materials**, **Earth Science**, and **Biological Evolution**. The **learning objectives** focus on how humans observed the natural world and used scientific principles to transform raw resources into sophisticated technology.

1. Materials: Properties and Testing
Objective: *To compare and group together everyday materials on the basis of their properties, including their hardness, solubility, transparency, conductivity, and response to magnets.*
The Focus: Why did people choose specific materials for specific jobs?
Key Skill: Fair Testing. Pupils investigate why flint was the "high-tech" material of the Stone Age (because of its conchoidal fracture which creates razor-sharp edges) versus softer stones like limestone.
Outcome: Pupils can explain why **wattle and daub** (a composite material) was an effective insulator for a roundhouse and why bronze replaced stone for tools.

2. States of Matter and Chemical Changes
Objective: *To explain that some changes result in the formation of new materials, and that this kind of change is not usually reversible.*

The Focus: The birth of Chemistry (Metallurgy).
Key Skill: Observing Changes. Understanding the difference between a physical change (melting copper and tin) and a chemical change (smelting iron ore using carbon/charcoal in a furnace).
Outcome: Pupils understand that **Bronze** is an alloy that is harder than the copper and tin that made it, marking a massive leap in human scientific capability.

3. Rocks and Soils
Objective: *To compare and group together different kinds of rocks on the basis of their appearance and simple physical properties.*
The Focus: The Earth as a resource.
Key Skill: Classification. Identifying sedimentary, igneous, and metamorphic rocks and understanding how their formation dictated where prehistoric people settled.
Outcome: Pupils can explain the importance of **soil science** for the first Neolithic farmers—identifying which soils (like silt or clay-rich earth) were nutrient-dense enough to grow crops.

4. Animals, Including Humans (Biology and Nutrition)
Objective: *To identify that humans and some other animals have skeletons and muscles for support, protection, and movement.*
The Focus: The "Science of Survival."
Key Skill: Comparative Anatomy. Looking at the diet of a hunter-gatherer versus an early farmer and how it affected their health, teeth, and bone structure.
Outcome: Understanding the biological process of **domestication**—how humans used selective breeding (early genetics) to turn wild wolves into dogs and wild grasses into wheat.

5. Light and the Solar System
Objective: *To notice that light is reflected from surfaces and to find patterns in the way that the size of shadows change.*
The Focus: Prehistoric "Astronomy."
Key Skill: Data Observation. Using the sun as a scientific tool.
Outcome: Understanding that sites like Stonehenge were essentially giant solar calculators used to predict the **Summer and Winter Solstices**, allowing ancient scientists to track the passing of the year.

Why These Learning Objectives Matter
1. It Humanises Science
By meeting these **learning objective**s, pupils realise that Science isn't just something that happens in a lab with a white coat. It started when a person noticed that certain stones spark or that certain metals melt. It proves that **innovation is a core human trait.**

2. It Teaches Resourcefulness
Studying prehistory forces pupils to think about the **natural origins** of everything we use today. It builds a deeper understanding of the "Lifecycle of Materials," which is crucial for modern lessons on sustainability and the environment.

3. It Develops the Scientific Method
Experimental archaeology (e.g., trying to build a shelter or "melt" copper) is the perfect way to teach **trial and error**. If a "test" fails, pupils must change one variable and try again—this is the heart of all scientific discovery.

4. It Bridges Theory and Practice
It's one thing to read about "thermal insulation"; it's another to build a model roundhouse and measure the temperature drop inside. This learning theme makes abstract scientific concepts **tangible and memorable.**

Lesson Ideas

Here is a complete, 6-week Medium-Term Plan for Key Stage 2 Science framed around **'Stone Age to Iron Age'**. This unit connects core National Curriculum Science strands—**Rocks, Soils & Fossils; Working Scientifically & Material Properties; Human & Animal Nutrition/Skeletons; Living Things & Botany; and Forces & Simple Machines**—with prehistoric themes: stone tool knapping, soil analysis around ancient hearths, hunter-gatherer diets, wild forage botany, metal alloy smelting, and megalithic lever mechanics. It balances **substantive knowledge** (rock formation, fossilisation, soil layers, food groups, skeletal functions, plant life cycles, physical vs. chemical material changes, and mechanical advantage) with **disciplinary knowledge** ("Working Scientifically"—fair testing, classifying using keys, recording quantitative data, controlling variables, interpreting archaeological evidence, and evaluating experimental validity).

Unit Title: Prehistoric Science: Rocks, Metallurgy, Diets, Botany, and Megalithic Forces
Duration: 6 Weeks (Approx. 1.5 hours per week)
Theme: Palaeolithic Flint Knapping, Fossil Preservation, Hunter-Gatherer Diets, Mesolithic Botany, Bronze/Iron Metallurgy, and Stonehenge Mechanical Forces.
Science Focus Areas:
Chemistry/Earth Science: Rock classification (igneous, sedimentary, metamorphic), soil permeability, physical properties of natural materials vs. metals, and reversible/irreversible changes (smelting).
Biology: Skeletal support/protection, hunter-gatherer vs. agricultural nutrition, plant structures, wild seed dispersal, and fossil formation.
Physics: Friction, effort/load, simple levers, inclined planes, and mechanical force transfer in megalithic construction.

Key Science Pillars
Substantive Knowledge:
Earth & Materials: Properties of flint, chalk, granite, slate; soil composition (clay, loam, sand, humus); hardness, durability, conductivity of stone, wood, bronze, and iron.
Living Things & Humans: Functions of skeletons/muscles; balanced diets (proteins, carbohydrates, fats, vitamins); plant reproduction and wild seed dispersal mechanisms.
Forces: Friction between moving surfaces; mechanical advantage using levers (pivots/fulcrums) and inclined ramps to move heavy loads.
Disciplinary Knowledge ('Working Scientifically'):
Systematic Testing: Conducting fair tests to measure rock durability, soil absorption, and material hardness (Mohs-inspired testing).
Data Collection & Visual Representation: Recording results in structured tables, drawing force diagrams with labelled vectors, and constructing bar charts.
Evidence-Based Deduction: Analysing mock archaeological finds (coprolites, bone fragments, soil samples) to deduce past environments and human activity.

Weekly Progression Scheme

Week 1: Palaeolithic Rocks & Flint Knapping – Properties & Classification
Science Strand: Rocks & Earth Science / Working Scientifically.
Substantive Knowledge:
LKS2: Classifying rocks into three main groups (Sedimentary: chalk/sandstone; Igneous: granite/basalt; Metamorphic: slate/marble); physical properties (hardness, permeability, texture); why flint was chosen for axes (fractures with sharp conchoidal edges).
UKS2: Microscopic structure of rocks; how formation conditions dictate crystalline size and erosion resistance; fossilisation process within sedimentary layers.
Disciplinary Knowledge:
Comparative Testing: Planning a fair test to compare rock hardness (scratch test) and permeability (water absorption rate).
Practical Science Task:
LKS2 (Y3/4): *The Flint & Stone Tool Investigation.* Pupils test 5 rock specimens (including flint, chalk, and granite) for hardness using coins/nails and permeability using droppers, recording data in a comparative table to determine which rock makes the best axe-head.
UKS2 (Y5/6): *Sedimentary Fossil Excavation Analysis.* Pupils examine sedimentary rock samples containing micro-fossils, mapping fossil formation stages and using a dichotomous key to identify ancient rock types based on texture, density, and acid reaction.

Week 2: Mesolithic Soil & Hearth Analysis – Soil Layers & Permeability
Science Strand: Soil Science & Environmental Archaeology.
Substantive Knowledge:
LKS2: Soil components (rock fragments, organic humus, air, water); basic soil types (sandy, clay, loam); how soil forms over time from weathered rock and organic matter.
UKS2: Soil horizon profile layers (topsoil, subsoil, bedrock); soil pH impacts on organic preservation (bones dissolve in acidic soil, preserve in alkaline chalk); filtration rates.
Disciplinary Knowledge:
Quantitative Measurement: Timing liquid drainage through soil samples using filter funnels and measuring cylinders accurately.

Practical Science Task:
LKS2 (Y3/4): *Prehistoric Soil Permeability Test.* Pupils setup filter funnels with clay, sandy, and loamy soils, pouring 50ml of water into each and measuring water collection over 3 minutes to determine which soil type ancient builders would select for dry shelter bases.
UKS2 (Y5/6): *Archaeological Site Soil Profile.* Pupils analyse mock soil core samples from a Stone Age hearth site, measuring organic content percentage and calculating drainage rates to deduce past climate conditions.

Week 3: The Hunter-Gatherer vs. Farmer Diet – Human Nutrition & Skeletons
Science Strand: Biology (Animals Including Humans).
Substantive Knowledge:
LKS2: The 5 core food groups (carbohydrates, proteins, fats, vitamins/minerals, water); functions of the human skeleton (support, protection, movement); skeletal adaptation in wild animals vs. domestic livestock.
UKS2: Nutritional breakdown of Palaeolithic diets (wild game, berries, nuts) vs. Neolithic diets (farmed wheat, dairy); bone density impact; energy requirements measured in calories/joules.

Disciplinary Knowledge:
Evidence-Based Deduction: Analysing mock coprolites (fossilised dung) and bone fragments to infer dietary habits and health states.
Practical Science Task:
LKS2 (Y3/4): *Prehistoric Menu & Skeleton Sorting.* Pupils inspect animal bone replicas (identifying skull, ribcage, spine functions) and categorise prehistoric foods into food groups, designing a balanced 1-day meal plan for a Mesolithic hunter.
UKS2 (Y5/6): *Coprolite & Dietary Health Analysis.* Pupils dissect mock coprolites containing seeds, char, and bone fragments, gathering quantitative data to compare the nutritional balance and bone-health impacts of hunter-gatherers versus early farmers.

Week 4: Neolithic Foraging & Crop Domestication – Botany & Seed Dispersal
Science Strand: Plant Biology & Agriculture.
Substantive Knowledge:
LKS2: Parts of a flowering plant (roots, stem, leaves, flower); requirements for plant life (light, water, CO_2, nutrients); seed dispersal methods (wind, animal transport, explosion).
UKS2: Selective breeding/domestication of wild emmer wheat into agricultural crops; plant reproduction cycles (pollination, fertilisation, seed formation); soil nutrient depletion (nitrogen/phosphorus cycle).
Disciplinary Knowledge:
Observation & Classification: Using hand lenses to observe seed dispersal adaptations and classifying plant specimens.
Practical Science Task:
LKS2 (Y3/4): *Wild Seed Dispersal Investigation.* Pupils examine wild seeds (burdock, dandelion, hazelnut) under hand lenses, testing paper models of seed shapes in front of fans to measure flight distance and categorise dispersal mechanisms used by Mesolithic foragers.
UKS2 (Y5/6): *Wheat Domestication & Soil Health Experiment.* Pupils test how changing light and nutrient levels affect early crop growth, mapping how Neolithic farmers rotated crops to prevent soil depletion.

Week 5: From Bronze to Iron – Metallurgy, States of Matter & Heat
Science Strand: Chemistry / Materials & States of Matter.
Substantive Knowledge:
LKS2: States of matter (solid, liquid, gas); melting and freezing points; comparing physical properties of stone vs. metals (malleability, electrical/thermal conductivity).
UKS2: Reversible vs. irreversible changes; copper + tin alloy creation (Bronze); higher melting points of Iron vs. Bronze; oxidation/corrosion properties of metals.
Disciplinary Knowledge:
Controlling Variables: Conducting a fair investigation into material thermal conductivity while keeping surface area, water temperature, and time constant.
Practical Science Task:
LKS2 (Y3/4): *Thermal Conductivity of Tools.* Pupils test spoons made of wood, stone, bronze (brass), and iron (steel) placed in hot water with butter/bead indicators, timing how fast heat travels to classify thermal conductors and insulators.
UKS2 (Y5/6): *Smelting & Alloy Simulation.* Pupils model the reversible phase changes of metals using low-melting-point wax/salts to simulate bronze casting in moulds, evaluating why iron replaced bronze based on raw material availability and structural hardness data.

Week 6: Raising the Megaliths – Forces, Friction & Simple Machines
Science Strand: Physics (Forces, Levers & Mechanical Advantage).
Substantive Knowledge:
LKS2: Friction between different contact surfaces; push/pull forces; how rollers reduce friction when moving heavy loads.
UKS2: Mechanical advantage of first-class levers (pivot/fulcrum, effort, load); inclined planes (ramps); calculating force reduction using Newton meters (N).
Disciplinary Knowledge:
Quantitative Data Analysis: Measuring pulling force in Newtons (N) across different variables and plotting scatter graphs or bar charts.
Practical Science Task:
LKS2 & UKS2: *The Stonehenge Transport & Erection Challenge.*
Task 1 (LKS2 Focus): Pupils measure the force (using Newton meters) required to drag a heavy stone block across grass, mud, gravel, and wood rollers, proving how friction reduction enabled megalith transport.
Task 2 (UKS2 Focus): Pupils build scale lever systems using wooden planks and fulcrums to lift stones, measuring how moving the pivot closer to the load decreases the effort force needed.
Plenary: Pupils synthesise their findings into an "Engineering Report" explaining how Stone Age people used simple machines to build monuments like Stonehenge.

Assessment Matrix (Progression Indicators)

Phase	Working Towards	Expected Standard	Greater Depth
Lower Key Stage 2 *(Years 3 & 4)*	• Identifies rocks by visual colour only rather than testing physical properties. • Requires teacher guidance to record data in simple tables. • Confuses food groups when analysing prehistoric diets. • Measures forces inaccurately without checking Newton meter zero-settings.	• Classifies rocks accurately based on hardness, texture, and permeability test data. • Records quantitative results systematically in tables and bar charts. • Explains the functions of human skeletons and categorises prehistoric foods into food groups. • Demonstrates how rollers reduce friction when moving heavy loads using force meters.	• Explains why flint's unique fracturing properties made it ideal for stone tool production. • Identifies anomalies in experimental test data independently and suggests improvements. • Compares nutritional benefits of hunter-gatherer vs. early agricultural diets insightfully. • Draws accurate force diagrams using arrows to show relative magnitude and direction of friction.
Upper Key Stage 2 *(Years 5 & 6)*	• Tests materials but struggles to identify independent and dependent variables. • Identifies reversible	• Controls variables systematically during fair tests (e.g., thermal conductivity, soil drainage).	• Evaluates experimental validity critically, proposing refined scientific methodologies. • Explains why alloy

	changes but confuses melting with dissolving. • Mentions seed dispersal without linking adaptations to evolutionary advantages. • Measures lever distance without calculating mechanical advantage relationships.	• Differentiates between reversible phase changes (melting metal) and irreversible chemical changes. • Explains crop domestication and seed adaptation using appropriate botanical vocabulary. • Calculates mechanical advantage of levers (Load vs. Effort) using Newtons and distance metrics.	creation (Bronze) alters atomic structures to increase material hardness. • Synthesises botanical and soil data to reconstruct ancient farming environments. • Applies physics formulas (Work = Force x Distance) to model prehistoric construction techniques.

Other Information, Ideas and Resources

The transition from the **Stone Age to the Iron Age** provides a brilliant context for the Key Stage 2 Science curriculum. Prehistoric humans were, by necessity, some of our earliest practical scientists—testing the structural durability of rocks, discovering the chemical transformation of ores into metals, and observing astronomical cycles to plan their survival.
Here are some alternative technique-driven science lesson sequences that bridge prehistory with core physics, chemistry, and biology units.

1. The Flint Detective: Testing Rock Properties
Science Topic: Rocks and Soils (Year 3/4)
The Scenario: *You are a Palaeolithic toolmaker. Test a batch of newly collected rocks to see which ones are durable enough to be knapped into sharp arrowheads and axes.*
The Lesson Concept
Pupils learn how to group and classify rocks based on their physical properties, explicitly investigating **hardness**, **permeability**, and how a rock fractures (**durability**).
The Investigation: Provide groups with distinct rock samples: *flint, chalk, sandstone, granite,* and *marble.*
The Science Lab:
The Scratch Test: Pupils use copper coins, steel paperclips, and fingernails to determine the relative hardness of the samples.
The Permeability Test: Use a pipette to drop water onto each rock. If the water absorbs (like sandstone), the rock is porous and weak against frost-shattering.
The Fracture Analysis: Examine photos of fractured flint. Explain that flint is rich in silica, causing it to break in clean, curved shell-like patterns (conchoidal fractures) that create razor-sharp edges.
Output: A comparative database matrix proving why flint and granite were highly prized for tools, while chalk and sandstone were rejected.

2. Stonehenge Shadows: Prehistoric Calendars
Science Topic: Light (Year 3/4)/Earth and Space (Year 5/6)
The Scenario: *Neolithic farmers need to know exactly when to plant and harvest crops. Investigate how the alignment of stones tracks the movement of the Earth relative to the Sun.*
The Lesson Concept

This lesson uses the architecture of Stonehenge to teach how shadows are formed when light from a source is blocked by an opaque object, and how the rotation of the Earth changes shadow lengths throughout the day.
The Model Construction: In a darkened room, pupils build a miniature concentric circle of "stones" using clay blocks or Lego bricks on a large sheet of paper.
The Solar Simulation: Using a torch to represent the Sun, pupils slowly move the light source in an arc over their model from east to west.
The Observation: Pupils trace the changing length and direction of the shadows. They discover that a specific "heel stone" outside the circle aligns perfectly with the shortest shadow cast at the summer solstice.
Output: A scientific diagram detailing how an opaque structure acts as a giant solar clock and calendar.

3. The Metallurgy Timeline: Material States
Science Topic: Properties and Changes of Materials (Year 5/6)
The Scenario: *Why did the Bronze Age happen before the Iron Age? Investigate the thermal properties and physical limitations of different materials.*
The Lesson Concept
Pupils explore the properties of metals versus non-metals, focusing on thermal conductivity, flexibility, and the concept of melting points.
The Data Investigation: Pupils examine a scientific data table showing the raw melting points of ancient materials:
Copper: 1,085℃
Tin: 232℃ (Combined with copper to form Bronze at a lower overall required temperature)
Iron: 1,538℃
The Science: Explain that early campfire technology could reach temperatures hot enough to melt copper and tin, but could not reach the extreme heat needed to isolate pure iron from ore. Iron required the invention of the forced-air furnace (bellows).
The Property Test: Pupils test modern equivalents of stone, bronze (brass/copper), and iron (steel nails) for magnetic properties, weight, and signs of **oxidation** (rusting), discovering that while iron is harder, it decays much faster than bronze.
Output: A scientific timeline report explaining how human technology was limited by the chemical melting points of raw earthly elements.

4. Hunter-Gatherer vs. Farmer: Prehistoric Teeth
Science Topic: Animals, Including Humans (Year 3/4 - Nutrition and Teeth)
The Scenario: *Archaeologists have excavated two skeletons. One is a Palaeolithic caveman, the other is an Iron Age farmer. Look at their teeth to deduce their diet and health.*
The Lesson Concept
Pupils learn about the functions of different types of human teeth (incisors, canines, molars) and how nutrition and food processing alter dental health.
The Biological Audit: Provide data cards detailing dental patterns from real archaeological finds.
The Palaeolithic Dentition: Teeth are heavily worn down flat but show **zero cavities**. (Diet: rough wild meats, fibrous plants, berries, no processed sugars).
The Iron Age Dentition: Teeth show massive **bacterial decay and cavities**. (Diet: soft, sticky carbohydrate-rich porridges made from stone-milled grains).
The Experiment: Pupils simulate the wear and tear of stone-ground flour. They grind wheat seeds between two rough granite stones, observing how microscopic stone dust enters the flour mix, acting as

an abrasive sander on tooth enamel.
Output: A comparative dental health report mapping tooth types to diets and detailing why the farming revolution changed human oral health.

5. Neolithic Crop Master: Soil Permeability
Science Topic: Rocks and Soils / Plants
The Scenario: *The First Farmers are looking for land to plant emmer wheat. Test different local soil samples to see which offers the perfect drainage and organic profile for farming.*
The Lesson Concept
Pupils investigate the composition of different organic layers, learning how soil texture impacts water retention and plant roots.
The Investigation: Set up a fair test using three funnel setups lined with filter paper. Fill each with a different soil profile:
1. ***Sandy Soil:*** High drainage, low nutrients.
2. ***Clay Soil:*** Dense, water-clogged, heavy.
3. ***Loam/Compost:*** Rich organic matter, balanced retention.

The Measurement: Pour 100ml of water simultaneously into each funnel. Pupils time how long it takes for the water to drain through into a beaker beneath, measuring the final volume of retained water.
Output: Pupils write a land-use recommendation file for a Neolithic clan, explaining how soil drainage values impact the success of newly domesticated agricultural crops.

6. Dragging the Sarsen Stones: Friction & Mass
Science Topic: Forces
The Scenario: *Your clan needs to move a 40-ton Megalith across Britain. Test how changing the friction of the terrain surface alters the force required to pull the mass.*
The Lesson Concept
This physics investigation explores **friction** as an opposing force that acts between two surfaces moving across each other, and how simple machines (rollers) can reduce resistance.
The Investigation: Pupils use Newton meters (force metres) to pull a heavy wooden block across a series of varying test tracks:
Track 1: Rough sandpaper/carpet (mimicking dry grass and soil).
Track 2: Wet clay/soap solution (mimicking a lubricated mud trackway).
Track 3: A series of round wooden dowels placed underneath the block (mimicking timber rollers).
The Variable Control: Pupils measure the exact force (in Newtons) required to initiate motion, keeping the block mass and pull angle constant to ensure a **fair test**.
Output: A bar graph showing Newton values per track surface. Pupils write a physics summary detailing how rolling friction significantly decreases surface-to-surface resistance compared to sliding friction.

Recognise that living things have changed over time and that fossils provide information about living things that inhabited the Earth millions of years ago.
Describe in simple terms how fossils are formed when things that have lived are trapped within rock – also look at Cromerian Period (Deep History Coast)

https://www.north-norfolk.gov.uk/tasks/your-community/find-out-about-norfolks-deep-history-coast/

Visit West Runton Beach – go on a fossil hunt. (you can download the app on to a tablet which uses AR

and gives extra information about the coastline)

Recognise that soils are made from rocks and organic matter.
Look at metamorphic, igneous and sedimentary rock.

Describe the changes as humans develop to old age.

Considerations for Implementation

English
Book/Text Ideas
https://www.booksfortopics.com/booklists/topics/history/stone-age-to-iron-age/ **Fiction:** The Wild Way Home by Sophie Kirtley Chapter book Wolf Brother by Michelle Paver Chapter book The Boy with the Bronze Axe by Kathleen Fidler Chapter book Stig of the Dump by Clive King & Edward Ardizzone Chapter book The Stolen Spear by Saviour Pirotta & Davide Ortu Chapter book Defenders: Pitch Invasion by Tom Palmer & David Shephard Chapter book Dyslexia-friendly The Great Cave by Terry Deary Chapter book Stone Age Boy by Satoshi Kitamura Picture book The First Drawing by Mordicai Gerstein Picture book How to Wash a Woolly Mammoth by Michelle Robinson & Kate Hindley Picture book **Non-fiction:** Ancestory by Hannah Salyer Non-fiction Picture book The Secrets of Stonehenge by Mick Manning & Brita Granström The Stone Age: Hunters, Gatherers and Woolly Mammoths by Marcia Williams The History Detective Investigates: Stone Age to Iron Age by Clare Hibbert Live Like a Hunter Gatherer by Naomi Walmsley 24 Hours in the Stone Age by Lan Cook & Laurent Kling Graphic Novel
Substantive Knowledge
In the context of the **'Stone Age to Iron Age'** learning theme, **substantive knowledge** in English refers to the specific vocabulary, genre structures, and literary content pupils must master to communicate effectively about the period. Because we cannot read "Stone Age books," the **substantive knowledge** involves the language we use to reconstruct their world and the modern literature that brings it to life. **1. Reading: Literature and Vocabulary** **Substantive knowledge** includes the specific texts used to explore the era and the "tier-three" vocabulary (subject-specific words) required to understand them. **Core Texts:** Familiarity with key historical fiction that defines the genre (e.g., *Wolf Brother* by Michelle Paver, *The Stone Age Sentinel*, or *Stig of the Dump*). **Tier 3 Vocabulary:** Mastery of precise terminology such as **nomadic**, **agricultural**, **metallurgy**, **hillfort**, **monument**, and **chronological**. **Fact vs. Fiction:** Understanding the difference between a historical report (non-fiction) and a narrative set in the past (historical fiction).

2. Writing: Genre and Structure
This is the knowledge of *what* a piece of writing should look like when documenting or imagining prehistory.

Non-Chronological Reports: Knowing how to organise facts about Celtic life or Stone Age tools into sub-headings, introductions, and glossaries.
Instructional Writing: Understanding the structure of a process (e.g., "How to make a Bronze Age beaker"), using imperative verbs (cut, mix, heat) and technical language.
Historical Narratives: Knowing how to build a setting using sensory details specific to the era (the smell of woodsmoke, the texture of flint, the sound of a carnyx).
Formal Letter Writing: Writing as a tribal leader to a neighbouring settlement, requiring knowledge of formal addresses and persuasive structures.

3. Oracy: Language of Debate and Storytelling
Substantive knowledge in oracy involves the "sentence stems" and rhetorical devices used to discuss history.

Language of Deduction: Using phrases that acknowledge the mystery of prehistory: *"The evidence suggests..."*, *"We can infer that..."*, or *"Historians disagree on..."*
Rhetorical Devices: Understanding how to use alliteration, repetition, and varying volume to mimic the oral storytelling traditions used before writing existed.
Discussion Rules: Knowing the **substantive** "moves" in a debate: how to concede a point, how to challenge an idea politely, and how to summarise a group's consensus.

Why This **Substantive Knowledge** Matters
1. It Provides the 'Tools' for Thought
Without the **substantive vocabulary** (like *Neolithic* or *smelting*), a pupil's ability to think deeply about history is limited. Language provides the scaffolding for complex ideas; you cannot discuss the shift to farming if you don't have the word "settlement."

2. It Improves Precision in Communication
In English, "good writing" is often about choosing the most accurate word. Learning the difference between a "cave," a "rock shelter," and a "roundhouse" teaches pupils that specific nouns carry more power than general ones.

3. It Bridges the Gap Between Fact and Imagination
By reading high-quality historical fiction, pupils learn how to take cold archaeological facts (**substantive history**) and turn them into "lived" experiences. This is the foundation of creative writing—taking a seed of truth and growing a world around it.

4. It Prepares Them for Secondary 'Academic' English
Learning to write non-chronological reports and persuasive debates prepares pupils for the analytical writing they will face in Key Stage 3 and beyond. It moves them from "writing what I feel" to "writing what the evidence shows."

The English 'Knowledge Organiser' for Prehistory

Component	Substantive Knowledge Examples
Reading	Identifying themes of "Survival" and "Nature" in *Wolf Brother.*
Writing	Using **fronted adverbials** for time: *"During the Iron Age..."*
Oracy	Using **modal verbs** to show uncertainty: *"It **might** have been a temple."*
Vocabulary	*Palaeolithic, Mesolithic, Neolithic, Bronze, Iron, Tribe, Ancestor.*

Disciplinary Knowledge

In English, **disciplinary knowledge** refers to the specific tools we use to decode meaning, craft narratives, and communicate ideas effectively. For the **'Stone Age to Iron Age'** learning theme, this is a fascinating challenge because the period is *prehistoric*—meaning there are no written texts from the time itself. **Disciplinary knowledge** here focuses on how we use language to fill the "silence" of the past and how we interpret non-verbal storytelling.

1. Reading: Decoding the 'Unwritten'
Since we lack books from 5,000 years ago, "reading" expands to include the analysis of symbols and archaeological "narratives."

Inference from Non-Textual Sources: Treating a cave painting or a burial site like a page in a book. Pupils use clues to infer character, setting, and plot (e.g., *"The red ochre suggests this was a ritual, not just a doodle."*).
Analysing Modern Interpretations: Reading historical fiction (like *Stig of the Dump* or *Wolf Brother*) and evaluating how the author uses descriptive language to create a "primitive" atmosphere.
Terminology and Etymology: Understanding how the "roots" of our words (many of which formed during the Indo-European migrations of the Bronze Age) carry meaning across time.

2. Writing: Narrative and Instructional Voice
Writing in this learning theme requires pupils to adapt their "voice" to suit different purposes—from the visceral and sensory to the technical.

Sensory Narrative: Using the "Show, Don't Tell" technique to describe the prehistoric world. Instead of saying "it was cold," a pupil might write: *"The frost bit at his bare ankles as the flint blade sliced through the hide."*
Informative and Explanatory Texts: Writing "How-to" guides (e.g., *How to Smelt Bronze* or *How to Build a Roundhouse*). This requires the discipline of using precise verbs and chronological transitions (first, then, subsequently).
Persuasive Writing: Crafting arguments for why a tribe should settle near a river versus a hillfort, requiring the use of logical connectors and emotive language.

3. Oracy: The Oral Tradition
Before writing, history was kept alive through speech. Oracy in this learning theme is about the power of the spoken word.

Oral Storytelling: Practicing the art of the "Bard." Using intonation, pace, and gesture to pass down a "myth" about the creation of the stars or the discovery of fire.
Formal Debate: Engaging in "Tribal Councils" to make decisions. This teaches the discipline of active listening, responding to points made by others, and using "standard English" to present a formal case.
Performance: Using drama and role-play to explore the "inner dialogue" of a prehistoric person, helping pupils understand perspective and empathy.

Why **Disciplinary Knowledge** Matters in English
1. It Develops 'Visual Literacy'
By "reading" artefacts and cave art, pupils learn that communication isn't just about letters on a page. This builds a foundation for analysing media, advertisements, and complex imagery in the modern world.

2. It Sharpens Vocabulary and Precision
Describing the difference between "knapping," "smelting," and "forging" forces pupils to be precise with their language. It teaches them that the right word is a tool, much like a flint scraper or a bronze axe.

3. It Fosters Creative Empathy
To write a diary entry as a Neolithic pupil, a pupil must step out of their own digital world. This "historical imagination" is a sophisticated form of empathy that improves their ability to write complex characters in any genre.

4. It Values the Power of Voice
In an age of texting, practicing oral tradition reminds pupils that speech is a powerful, rhythmic, and persuasive tool. It builds the confidence to speak in front of others and the "discipline" to listen to different viewpoints.

The English 'Toolbox' for Prehistory

Skill	Disciplinary Application
Inference	"Reading" a burial to guess the person's status.
Vocabulary	Using era-specific nouns (quern-stone, palisade, torc).
Structure	Using chronological markers in a "Guide to Hunting Mammoths."

Rhetoric	Using persuasive devices in a Tribal Council debate.

Learning Objectives

In English, the **'Stone Age to Iron Age'** learning theme acts as a bridge between **literary imagination** and **factual analysis**. Since this period lacks its own written records, the **learning objectives** focus on how we use language to reconstruct "silent" history and how we adapt our communication for different audiences and purposes.

1. Reading: Inference and Analytical Thinking
Objective: *To draw inferences such as inferring characters' feelings, thoughts, and motives from their actions, and justifying inferences with evidence.*
The Focus: Using historical fiction (like *Wolf Brother* or *Stig of the Dump*) to explore human experience.
Key Skill: Evidence-based Deduction. In the absence of diaries from the past, pupils "read" the descriptions of artefacts and settings to infer how people lived and felt.
Outcome: Pupils can distinguish between historical facts (archaeology) and the "author's craft" (fiction), identifying how writers create atmosphere through vocabulary.

2. Writing: Adapting Form and Register
Objective: *To select the appropriate grammar and vocabulary, understanding how such choices can change and enhance meaning.*
The Focus: Writing for two distinct worlds: the creative and the technical.
Key Skill: Genre Switching.
Creative: Writing sensory-rich narratives (e.g., a "day in the life" of a Neolithic farmer).
Technical: Writing non-chronological reports or instructional texts (e.g., "How to Build a Hillfort").
Outcome: Using era-specific vocabulary (e.g., *nomadic, smelting, palisade*) and organisational devices like sub-headings and bullet points to communicate complex historical information clearly.

3. Oracy: The Power of Oral Tradition and Debate
Objective: *To give well-structured descriptions, explanations and narratives for different purposes, including for expressing feelings.*
The Focus: Honouring the way history was "told" before it was "written."
Key Skill: Rhetoric and Storytelling.
Narrative: Using intonation and volume to retell "origin myths" (e.g., why the sun rises) to mimic the oral traditions of prehistoric bards.
Debate: Participating in "Tribal Councils" to argue points of survival (e.g., *"Should we move to the hilltop for defence or stay by the river for fish?"*).
Outcome: Developing the ability to listen to others' viewpoints, use "sentence stems" to disagree politely, and present a spoken argument with confidence.

Why These Learning Objectives Matter
1. They Build 'Historical Imagination'
English allows pupils to step inside the mind of someone from 5,000 years ago. By writing in the first person, they move from seeing prehistoric people as "exhibits" to seeing them as humans with fears, families, and ingenuity.

2. They Enhance Vocabulary Precision

In this learning theme, general words aren't enough. A "house" becomes a *roundhouse*; "making metal" becomes *smelting*. This teaches pupils that specific nouns and verbs are tools that make their writing more powerful and professional.

3. They Teach the Value of the Spoken Word
By practicing oral storytelling, pupils learn that communication doesn't always need a screen or a book to be effective. It builds "soft skills" like eye contact, projection, and the ability to read an audience—skills that are vital in the modern workplace.

4. They Develop Critical Literacy
When pupils read a book about the Stone Age, they learn to ask: *"Is this how it really was, or is the author imagining it?"* This is the foundation of media literacy—learning to identify the difference between evidence-based facts and creative interpretation.

Key Stage 2 English Success Criteria

Skill Area	**The Pupil Can...**
Inference	I can use a description of a Bronze Age burial to explain the person's status.
Transcription	I can use **fronted adverbials** to show the passage of time (e.g., *"Centuries later..."*).
Composition	I can use imperative verbs to write clear instructions for making a flint scraper.
Oracy	I can use persuasive language to convince my "tribe" to start farming.

Lesson Ideas

Here is a complete, 6-week Medium-Term Plan for Key Stage 2 English—integrating **Oracy, Reading, and Writing**—framed around **'Stone Age to Iron Age'**. This unit covers core National Curriculum English strands—**Oracy & Rhetoric, Reading Comprehension & Analysis, Grammar & Vocabulary, and Purposeful Writing (Narrative, Instructional, & Persuasive)**—linking prehistoric literature (e.g., *The Boy with the Bronze Axe* by Kathleen Fidler, *Ug: Boy Genius of the Stone Age* by Raymond Briggs, and *Stig of the Dump* by Clive King) with historical communication. It balances **substantive knowledge** (sentence mechanics, expanded noun phrases, fronted adverbials, relative clauses, cohesive devices, direct/indirect speech, and formal vs. informal register) with **disciplinary knowledge** ("Thinking & Acting Like a Writer, Reader, and Orator"—analysing authorial intent, decoding archaic vocabulary, structuring persuasive arguments, and adapting voice/tone for authentic audiences).

Unit Title: Voices from the Past: Stone Age Survival, Bronze Age Legends, and Iron Age Debates
Duration: 6 Weeks (Approx. 5 hours per week)

Theme: Palaeolithic Cave Art & Survival, Skara Brae Community Life, Bronze Metallurgy Innovations, and Iron Age Hillfort Tribal Governance.

Core Mentor Texts:

Ug: Boy Genius of the Stone Age by Raymond Briggs (Instructional & Comic Narrative)

The Boy with the Bronze Axe by Kathleen Fidler (Historical Fiction Narrative)

Secrets of Stonehenge / Hillfort Historical Non-Fiction Archives (Informational & Persuasive Texts)

Key English Pillars

Substantive Knowledge:

Grammar & Punctuation: Expanded noun phrases for vivid description, fronted adverbials for time and place, relative clauses using *who/which/that*, modal verbs for possibility, inverted commas for direct speech, and semi-colons/dashes for cohesion.

Vocabulary: Prehistoric domain vocabulary (*flint, hearth, pelt, forge, rampart, megalith, tribal*), emotive language, and formal persuasive vocabulary.

Oracy Conventions: Projection, pace, active listening protocols, rhetorical questions, counter-argument structures, and formal debate conventions.

Disciplinary Knowledge ('Thinking Like an Author & Reader'):

Authorial Intent & Inference: Analysing how authors build atmospheric tension in historical settings using sensory language and syntax choices.

Rhetorical Crafting: Selecting grammatical structures strategically to persuade, instruct, or evoke empathy in a reader or listener.

Textual Evaluation: Comparing perspectives across narrative fiction and historical non-fiction sources to assess reliability and tone.

Weekly Progression Scheme

Week 1: Voices in the Cave – Setting Description & Descriptive Oracy

Focus Area: Descriptive Narrative & Sensory Spoken Expression.

Mentor Text: Excerpts from *The Boy with the Bronze Axe* (Cave exploration chapters) & cave art visual sources.

Substantive Knowledge:

LKS2: Expanded noun phrases (e.g., "the damp, pitch-black cavern"); prepositions for spatial positioning (beneath, beyond, within); sensory adjectives.

UKS2: Complex relative clauses (e.g., "the flickering shadows, which danced across the cold granite walls..."); atmospheric figurative language (personification, metaphors).

Disciplinary Knowledge:

Authorial Crafting: Using varied sentence lengths to manipulate narrative pacing and evoke vulnerability in an unfamiliar setting.

Practical English Tasks:

Oracy: *The Blindfolded Cave Walk.* In pairs, one pupil guides a "blindfolded hunter" through a simulated cave, using descriptive sensory language to paint a vivid spoken picture.

Reading: Analysing descriptive mentor sentences, identifying how the author uses sensory adjectives to build atmosphere, and inferring the protagonist's emotional state.

Writing Outcome: A 2-paragraph descriptive setting narrative detailing a Palaeolithic tribe entering a dark cave art chamber for a ritual.

Week 2: How to Survive the Ice Age – Instructional Writing & Explanations

Focus Area: Procedural & Instructional Writing.
Mentor Text: *Ug: Boy Genius of the Stone Age* by Raymond Briggs.
Substantive Knowledge:
LKS2: Imperative (bossy) verbs (carve, bind, stoke); fronted adverbials of time and manner (Carefully, Before sunset); bulleted structural layout.
UKS2: Technical causal connectives (consequently, as a result of); passive voice for formal explanation (e.g., "The flint must be struck firmly..."); precise sub-headings.
Disciplinary Knowledge:
Structural Adaptation: Formatting information logically so an unfamiliar audience can execute a complex survival task safely.
Practical English Tasks:
Oracy: *The Prehistoric TV Presenter.* Pupils perform a 90-second instructional broadcast demonstrating "How to Knap a Flint Hand-Axe," focusing on clear vocal pacing and imperative gestures.
Reading: Comparing a humorous instructional text (*Ug*) with an authentic historical survival guide, evaluating clarity, tone, and structural features.
Writing Outcome: A formal, illustrated "Stone Age Survival Guide: Building a Fire & Shelter" using clear imperative structures, bullet points, and fronted adverbials.

Week 3: Tragedy at Skara Brae – Historical Fiction Narrative & Dialogue
Focus Area: Narrative Writing (Dialogue & Action).
Mentor Text: *The Boy with the Bronze Axe* (The Sandstorm at Skara Brae).
Substantive Knowledge:
LKS2: Inverted commas for direct speech; replacing "said" with expressive speech verbs (whispered, bellowed); comma rules after reporting clauses.
UKS2: Integrating speech to advance narrative action and reveal character traits; semi-colons and dashes for dramatic tension; shift between formal and informal dialogue registers.
Disciplinary Knowledge:
Characterisation through Voice: Showing character relationships and emotional reactions during a disaster through spoken dialogue rather than exposition.
Practical English Tasks:
Oracy: *Hot-Seating Skara Brae Survivors.* Pupils take on character roles following a devastating sandstorm, answering peer questions in role with appropriate historical emotion and voice.
Reading: Text-marking dialogue scenes to identify how speech punctuation is structured and analysing how character motivation is revealed through spoken words.
Writing Outcome: A dramatic narrative scene depicting two children escaping a sudden storm in the stone village of Skara Brae, incorporating punctuated dialogue and action.

Week 4: The Bronze Revolution – Non-Chronological Reports & Formal Tone
Focus Area: Informational Non-Chronological Reports.
Mentor Text: Non-Fiction Archive Texts on Bronze Age Metallurgy & Trade Routes.
Substantive Knowledge:
LKS2: Sub-headings; third-person formal voice; conjunctions for coordination and subordination (because, although, whereas); technical vocabulary.
UKS2: Formal cohesive devices (furthermore, in contrast, historically); subject-verb agreement; parenthetical brackets and dashes for additional technical details.
Disciplinary Knowledge:
Information Synthesis: Cross-referencing archaeological evidence with text sources to write an

objective, well-structured historical report.
Practical English Tasks:
Oracy: *Museum Expert Presentations.* Pupils act as bronze-casting historians, delivering a short presentation on the discovery of metal alloys to a visiting "tourist group," taking audience questions.
Reading: Skimming and scanning non-fiction articles to retrieve specific facts about copper/tin mining, identifying non-fiction organisational features.
Writing Outcome: A multi-paragraph Non-Chronological Report titled "The Spark of Metal: How Bronze Transformed Britain," featuring introduction, technical sub-sections, and glossary.

Week 5: Defence of the Hillfort – Persuasive Letters & Rhetoric
Focus Area: Persuasive Writing & Rhetorical Speech.
Mentor Text: Hillfort Chieftain Speeches & Persuasive Letter Extracts.
Substantive Knowledge:
LKS2: Persuasive vocabulary (essential, vital, disaster); rhetorical questions; modal verbs (must, should, could); paragraphing around main arguments.
UKS2: Advanced persuasive devices (Rule of Three, repetition, counter-argument refutation); subjunctive form (e.g., "If I were chieftain..."); emotive appeal.
Disciplinary Knowledge:
Rhetorical Strategy: Structuring arguments to influence an audience's beliefs, balancing logical reasoning (logos) with emotional appeal (pathos).
Practical English Tasks:
Oracy: *The Hillfort Tribal Council Debate.* Class divides into two Iron Age clans debating whether to unite against an incoming invader or retreat, using formal debate protocols ("I agree with my peer, however...").
Reading: Analysing famous persuasive speeches, identifying modal verbs, rhetorical questions, and emotive vocabulary used to persuade listeners.
Writing Outcome: A persuasive letter from an Iron Age chieftain to a neighbouring tribe, arguing for a military alliance to build a shared hillfort.

Week 6: The Iron Age Epic – Narrative Poetry & Performance Showcase
Focus Area: Poetry Writing, Performance & Unit Synthesis.
Mentor Text: Historical ballads and narrative epic poetry (*The Lay of the Ancient Warrior* extracts).
Substantive Knowledge:
LKS2: Stanza structures; imagery (similes, alliteration); rhythm and metre patterns; expressive choral reading.
UKS2: Extended metaphors; rhythm variations for dramatic effect; internal rhyme and assonance; theatrical vocal inflection.
Disciplinary Knowledge:
Oral Interpretation: Translating written poetic techniques into spoken performances using vocal pitch, pace, volume, and gesture to captivate an audience.

Practical English Tasks:
Oracy & Writing Synthesis: *The Prehistoric Bard Performance Showcase.*
Task 1 (Writing): Pupils compose an 8-12 line narrative poem tracing the journey from Stone Age hunters to Iron Age warriors, incorporating figurative language, expanded noun phrases, and dramatic rhythm.
Task 2 (Oracy): Pupils perform their poem aloud as "Tribal Bards" accompanied by low drum beats,

focusing on vocal projection, eye contact, and dramatic pacing.
Plenary: Class "Peer Author Review" evaluating peer performances against vocal delivery and grammatical impact rubrics.

Assessment Matrix (Progression Indicators)

Phase	Working Towards	Expected Standard	Greater Depth
Lower Key Stage 2 *(Years 3 & 4)*	• Uses simple noun phrases without descriptive expansion. • Forgets inverted commas when punctuating direct speech scenes. • Writes instructions without consistent imperative verbs or layout. • Speaks hesitatingly during oracy tasks, needing teacher prompting.	• Uses expanded noun phrases and fronted adverbials (with commas) to enrich settings. • Punctuates direct speech accurately using inverted commas and reporting clauses. • Writes clear instructions using imperative verbs and logical bulleted structures. • Speaks with clear projection and appropriate pace during role-play and presentations.	• Manipulates sentence structures purposefully to build dramatic tension. • Integrates speech and action seamlessly to reveal character motivation. • Adapts formal and informal registers effectively across narrative and instructional texts. • Uses rhetorical techniques (questions, vocal emphasis) to captivate listeners during speeches.
Upper Key Stage 2 *(Years 5 & 6)*	• Uses relative clauses but punctuates relative pronouns (who/which) incorrectly. • Includes persuasive ideas but lacks formal cohesive devices between paragraphs. • Writes reports with inconsistent subject-verb agreement or informal slang. • Delivers presentations with limited eye contact or monotone delivery.	• Uses relative clauses, modal verbs, and parenthetical dashes to build complex sentences. • Punctuates dialogue accurately while using speech to advance narrative plot action. • Structures persuasive letters logically using counter-arguments and cohesive devices. • Delivers persuasive speeches with confident vocal inflection, posture, and rhetorical impact.	• Crafts subtle, evocative prose using extended metaphor, personification, and varied syntax. • Manipulates passive voice and subjunctive mood (If I were...) to enhance formal register. • Refutes counter-arguments effortlessly in persuasive writing using sophisticated rhetoric. • Commands audience attention naturally, adapting spoken tone dynamically during debates.

Other Information, Ideas and Resources

Teaching English through the **'Stone Age to Iron Age'** learning theme, lessons should blend historical evidence with creative "voice." Since prehistory is a period of silence (no written records), these alternative ideas focus on using language to fill the gaps and bring the past to life.

1. Reading Lesson Ideas

Focus: *Inference, Vocabulary, and Analytical Thinking.*

The 'Artefact Detective' (Inference): Present pupils with a collection of images or physical replicas (e.g., a flint scraper, a bronze torc, a piece of charcoal).
Activity: Pupils write "character profiles" of the person who owned the object. *What did they value? What was their daily life like?* This builds the skill of inferring character from evidence.
Genre Study – Wolf Brother vs. Non-Fiction: Compare an extract from Michelle Paver's *Wolf Brother* with a page from an information text about Mesolithic life.
Activity: Highlight the "sensory language" used in the fiction (smells of woodsmoke, textures of fur) versus the "technical language" of the non-fiction.
'Reading' Cave Art: Treat the Cave of Lascaux like a picture book.
Activity: Pupils "read" the sequence of animals on the wall to determine the "plot" of the hunt. They identify the "protagonist" and the "conflict" within the painting.

2. Writing Lesson Ideas
Focus: *Genre, Structure, and Precision.*

How to Survive the Stone Age (Instructional Writing):
Activity: Write a "survival guide" for a time-traveller. Pupils must use imperative verbs (e.g., *scrape, strike, sharpen*) and technical nouns (e.g., *sinew, flint, tinder*) to explain how to make fire or build a shelter.
The Beaker Person's Diary (Narrative/Perspective):
Activity: Write a first-person account of an "old-timer" Stone Age farmer meeting a "newcomer" Bronze Age traveller.
Objective: Focus on using **fronted adverbials** to show the passing of time (*"After many moons...", "Suddenly, at the riverbank..."*) and contrasting the tools they use.
Hillfort Advertisement (Persuasive Writing):
Activity: Create a "property brochure" for an Iron Age Hillfort.
Objective: Use persuasive devices (alliteration, rhetorical questions, and emotive language) to convince a tribe that your fort is the safest and most prestigious place to live.
3. Oracy Lesson Ideas
Focus: *Performance, Debate, and Rhetoric.*

The Great Farming Debate (Tribal Council):
Activity: Divide the class into "Nomadic Hunters" and "Early Farmers." Hold a formal debate on whether the tribe should settle down.
Objective: Use sentence stems like *"I hear your point about the river, however..."* or *"The evidence suggests that farming is more reliable because..."* to practice respectful disagreement.
The Bard's Oral Tradition (Performance):
Activity: Before writing existed, stories were memorised. Assign small groups a "creation myth" (e.g., how the stars were made).
Objective: Pupils must perform the story using only their voices and simple percussion, focusing on **intonation, pace, and gesture** to keep the "tribe" (the class) engaged.
Archaeological Press Conference:
Activity: One pupil plays an archaeologist who has just discovered a "mystery burial." The rest of the class are journalists asking "who, what, where, when, why" questions.
Objective: To practice formulating clear, concise questions and responding with speculative language

(*"It is possible that...", "We might conclude..."*).

Why English Lessons Matter in this Learning Theme

Area	Why it Matters
Reading	It teaches children that "texts" aren't just books; the landscape and artefacts can be read for meaning.
Writing	It forces children to adapt their style between "storyteller" and "technical expert," a key KS2 requirement.
Oracy	It honours the primary way humans communicated for 99% of our history—through the spoken word.

Suggested Lesson Sequence

1. **Oracy:** A Tribal Council to establish the setting and mood.
2. **Reading:** Exploring a core text (like *The Stone Age Sentinel*) to gather vocabulary.
3. **Writing:** A final "Discovery Report" or "Tribal Tale" that synthesises their learning.

Considerations for Implementation

Maths

We use the White Rose Maths Scheme. The information below is for enhanced provision purposes and do not replace the WRM lessons.

Substantive Knowledge

In Mathematics, **substantive knowledge** for the **'Stone Age to Iron Age'** learning theme involves the specific mathematical facts, formulas, and concepts required to understand the prehistoric world. While ancient people didn't use modern calculators, they possessed a deep "number sense" tied to their environment and survival.

1. Number and Place Value: The Scale of Time

Substantive knowledge here involves mastering the vast numbers associated with prehistory.

Chronology on a Number Line: Knowing how to represent thousands of years on a linear scale. This includes understanding the "negative" direction of **BCE** (Before Common Era) and the magnitude of the 800,000-year Stone Age compared to the 800-year Iron Age.

Tallying and Counting: Understanding the concept of one-to-one correspondence—how early humans used notches on bone or stone (tally marks) to record quantities long before numerals existed.

2. Geometry: Shapes in the Landscape

This is the knowledge of how 2D and 3D shapes were used in ancient construction and art.

Properties of Circles: Understanding the parts of a circle (circumference, radius, diameter) and how they were used to layout henge monuments like Stonehenge.
3D Shapes in Architecture: Recognising the geometric solids in a **Roundhouse**—a cylindrical base with a conical roof.
Symmetry and Pattern: Identifying reflectional and rotational symmetry in **Celtic art** and Iron Age "La Tène" style metalwork, which often used intricate repeating geometric patterns.

3. Measurement: Weight, Length, and Time
Substantive knowledge involves the practical application of measure in an era without digital scales.

Mass and Force: Knowing the metric equivalents (kilograms and tonnes) of prehistoric materials. For example, understanding that a single bluestone at Stonehenge weighs approximately 2,000kg (2 tonnes).
Standard vs. Non-Standard Units: Understanding that ancient builders used body parts (cubits, spans, paces) for measurement and the mathematical problems this caused before units were standardised.
Calendrical Maths: Knowing how to track the passage of time by measuring shadows (the science of sundials) and understanding the 365-day solar cycle reflected in megalithic alignments.

4. Statistics: Archaeological Data
This involves the factual data we extract from the ground.

Categorisation: Grouping artefacts by type, material, or date.
Interpreting Charts: Reading and creating bar charts or pictograms that show the frequency of finds (e.g., "Number of flint scrapers vs. arrowheads found in a trench").

Why **Substantive Knowledge** Matters in Maths
1. It Provides 'Physicality' to Abstract Numbers
It is difficult for a pupil to conceptualise "one tonne." However, when they learn that it is the weight of a specific Bronze Age stone they are studying, the number becomes **tangible**. It anchors abstract mathematical concepts in physical reality.

2. It Teaches the History of Logic
By learning how people counted before "0, 1, 2, 3" existed, pupils realise that maths is a language we invented to solve problems. This reduces "maths anxiety" by showing that humans have always been "maths-literate" in their own way.

3. It Develops Proportional Reasoning
Comparing the massive length of the Stone Age to the tiny Iron Age on a timeline is the best way to teach **scale and proportion**. It helps pupils understand that a large number (like 800,000) looks very different when placed next to a small one.

4. It Improves Spatial Reasoning
Building or drawing a roundhouse requires an understanding of how 2D shapes (circles and triangles) transform into 3D structures. This is foundational for later studies in **trigonometry and engineering**.

The Prehistoric Mathematician's Data Sheet

Maths Concept	Historical Context	Application
Diameter	Laying out a Roundhouse floor.	Measuring across the centre.
Mass	Transporting Sarsen stones.	Calculating total weight in tonnes.
Chronology	Prehistoric timeline.	Ordering four-digit dates (BCE).
Symmetry	Celtic shield design.	Finding the line of reflection.

Disciplinary Knowledge

In Mathematics, **disciplinary knowledge** refers to the ability to apply mathematical thinking to solve real-world (or historical) problems. For the **'Stone Age to Iron Age'** learning theme, this involves **Ethnomathematics**—understanding how early humans used shape, measure, and number to survive and build without modern tools. It is the study of maths as a practical, human invention rather than just abstract numbers on a page.

1. Geometry and Architectural Engineering
Disciplinary knowledge involves identifying the mathematical properties required to build stable structures.

Circle Geometry: Investigating why stone circles (Stonehenge, Avebury) use the circle as a primary shape. Pupils explore the concepts of **centre, radius, and circumference** to understand how ancient builders could lay out massive monuments using only a central peg and a length of rope.
Tessellation and Pattern: Analysing the symmetry and geometric patterns in Celtic knots or Iron Age pottery. This involves understanding **reflection, rotation, and translation**.
Structural Shapes: Understanding that a **Roundhouse** is a cylinder with a cone on top—calculating why this shape is structurally stronger against wind than a square house.

2. Measurement and Scale
Before standard units (cm/m) existed, humans used "informal" measures. **Disciplinary knowledge** here involves the transition from estimation to accuracy.

Non-Standard Units: Using parts of the body (cubits, spans, feet) to measure lengths. Pupils learn why this was problematic for trade and why standardising units was a "mathematical revolution."
Mass and Weight: Estimating the mass of a Sarsen stone (up to 25 tonnes) and calculating the "man-power" needed to move it using simple machines like rollers and levers.
Volume and Capacity: Understanding how much grain a Neolithic storage pit or a Bronze Age beaker could hold, requiring the use of **estimation and volume formulas**.

3. Chronology and Number Systems
This involves the "Maths of Time"—understanding the scale of history through number lines.

The Scale of Time: Using **proportional reasoning** to visualise the timeline. If 1 cm represents 100 years, pupils calculate that the Stone Age timeline would stretch far across the playground, while the Iron Age would be just a few centimetres.
Number Representation: Investigating how pre-literate people might have recorded numbers (e.g., tally marks on bone or "notched" sticks) and how this led to the development of base-10 or base-60 systems.

4. Statistics and Data Analysis
Disciplinary knowledge in stats involves "Reading the Evidence."

Data Interpretation: Looking at an archaeological site and counting the number of animal bones or types of flint tools. Pupils use **mean, median, and mode** to determine the "typical" diet or activity of a tribe.
Probabilistic Thinking: Using evidence to guess the likelihood of survival or the success of a hunt, fostering the ability to make predictions based on data.

Why **Disciplinary Knowledge** Matters in Maths
1. It Makes Maths 'Human'
By meeting these **learning objectives,** pupils see that Maths isn't something invented by a textbook. It was invented by people who needed to build houses, share food, and track the sun. It makes the subject feel **practical and urgent**.

2. It Teaches Resourceful Problem Solving
When pupils try to "measure" a roundhouse using only their bodies, they develop **spatial reasoning** and a deeper understanding of why we use the units we do today. It builds a "maker" mindset.

3. It Visualises Vast Scales
Many pupils struggle to understand the difference between 1,000 and 10,000. Applying maths to the prehistoric timeline provides a physical, visual way to understand **Place Value and Scale** that is far more effective than just writing zeros.

4. It Bridges Science and Art
Calculating the symmetry in a Celtic shield or the alignment of a Henge proves that Maths is the "language" that connects art, history, and the physical world. It encourages **cross-curricular fluency**.

Learning Objectives

In Mathematics, the **'Stone Age to Iron Age'** learning theme serves as a "living laboratory" where abstract concepts like **scale, geometry, and measurement** become essential tools for survival. The **learning objectives** focus on applying mathematical logic to the physical world—much like our ancestors did.

1. Number and the Number System: Chronology
Objective: *To identify, represent, and estimate numbers using different representations; to solve number and practical problems that involve all of the above and with increasingly large positive numbers.*
The Focus: Visualising the vastness of time.
Key Skill: Proportional Reasoning. Pupils use number lines to place the Palaeolithic, Mesolithic, Neolithic, Bronze, and Iron Ages. They must calculate the "gap" between eras (e.g., subtracting 800BCE from 2500BCE).

Outcome: Pupils understand the magnitude of "thousands of years" and can accurately order dates in the **BCE** (Before Common Era) format.

2. Geometry: Properties of Shapes
Objective: *To identify 3D shapes, including cubes and other cuboids, from 2D representations; to identify lines of symmetry in 2D shapes.*
The Focus: The maths of ancient architecture and art.
Key Skill: Geometric Analysis.
Architecture: Identifying the cylinder and cone in a Roundhouse.
Monuments: Understanding the circle's properties (radius, diameter, circumference) to explain how stone circles were laid out.
Art: Identifying **reflectional and rotational symmetry** in Celtic "La Tène" metalwork and shield designs.
Outcome: Pupils recognise that geometric shapes provide structural strength and aesthetic balance.

3. Measurement: Mass, Length, and Time
Objective: *To measure, compare, add, and subtract: lengths (m/cm/mm); mass (kg/g); volume/capacity (l/ml).*
The Focus: Engineering without modern technology.
Key Skill: Conversion and Estimation.
Mass: Calculating the weight of a 2-tonne Sarsen stone and converting it to kilograms (2000kg).
Length: Comparing modern metric units with "non-standard" units used in prehistory (e.g., cubits or hand-spans).
Time: Using the sun and shadows to calculate the passing of the day or the solar year (Solstices).
Outcome: Understanding how precision in measurement allowed for the transport of massive stones and the building of watertight shelters.

4. Statistics: Interpreting the Evidence
Objective: *To interpret and present data using bar charts, pictograms, and tables.*
The Focus: Thinking like an archaeologist.
Key Skill: Data Representation. Pupils might group artefacts (e.g., 15 flint scrapers, 8 arrowheads, 3 bone needles) and display them in a frequency table or bar chart.
Outcome: Using data to make inferences about tribal life (e.g., "The high number of scrapers suggests this tribe did a lot of leather-working").

Why These Learning Objectives Matter
1. It Anchors 'Big Numbers' in Reality
Most pupils struggle to imagine what 10,000 years or 20 tonnes looks like. By applying these numbers to the Stone Age, they gain a **sense of scale** that makes abstract place value much easier to grasp.

2. It Demonstrates the Origin of Maths
Maths can sometimes feel like a set of arbitrary rules. This learning theme proves that Maths was a **human invention** designed to solve urgent problems—sharing food fairly, building stable homes, and tracking the seasons for farming.

3. It Develops Spatial Reasoning
Designing a roundhouse or a hillfort requires pupils to think in 3D. This "engineering mindset" is the

foundation for later work in **Ratio, Proportion, and Trigonometry**.

4. It Values 'Informal' Maths
Before standardised units, humans used their bodies to measure. Exploring this helps pupils understand *why* we eventually needed standard units (cm, m, kg), giving them a deeper appreciation for the metric system.

The Prehistoric Maths Success Criteria

Concept	The Pupil Can...
Place Value	I can place 4500BCE and 2000BCE correctly on a number line.
Geometry	I can identify the 2D shapes that make up a 3D Iron Age roundhouse.
Statistics	I can create a bar chart showing the different types of tools found in a dig.
Measure	I can estimate how many "paces" wide a stone circle is and convert it to metres.

Lesson Ideas

Here is a complete, 6-week Medium-Term Plan for Key Stage 2 Mathematics framed around **'Stone Age to Iron Age'**. This unit connects core National Curriculum Mathematics strands—**Number & Place Value, Addition & Subtraction, Multiplication & Division, Fractions/Decimals/Percentages, Measurement & Time, Geometry (2D/3D shapes & perimeter), and Statistics**—with prehistoric themes: tallying mammoth counts, trading amber beads, measuring megalithic stone perimeters, scaling copper/tin alloy ratios, and calculating hillfort defence angles. It balances **substantive knowledge** (place value structures, formal written algorithms, scale factors, conversion of metric units, coordinate grids, and statistical interpretation) with **disciplinary knowledge** ("Thinking & Acting Like a Mathematician"—pattern seeking, mathematical proof, optimising spatial efficiency, estimating with bounds, and evaluating problem-solving strategies).

Unit Title: Prehistoric Numbers: Tallying, Trade Ratios, Megalithic Geometry, and Hillfort Data
Duration: 6 Weeks (Approx. 5 hours per week)
Theme: Palaeolithic Tally Systems, Neolithic Agricultural Yields, Megalithic Perimeter Geometry, Bronze Metallurgy Ratios, and Iron Age Settlement Statistics.
Maths Focus Areas:
Number & Place Value/Calculation: Counting systems, large numbers (thousands to millions), Roman/ancient numerals, standard written algorithms (+, -, x, ÷).
Fractions, Decimals, Ratio & Proportion: Scaling recipes/alloys, fractional resource sharing, and proportional scaling.
Measurement, Geometry & Coordinates: Metric conversions, perimeter/area of megalithic sites, 3D shape properties of roundhouses/forts, angles, and coordinate grids.
Statistics & Data Handling: Tally charts, bar charts, line graphs (population/temperature shifts), and pie charts.

Key Mathematics Pillars

Substantive Knowledge:

Place Value & Calculation: Place value up to 1,000,000; formal written methods for addition, subtraction, short/long multiplication, and division.

Ratio, Proportion & Fractions: Simplifying fractions, calculating fractions of quantities, scaling ratios (e.g., 9:1 Copper to Tin).

Geometry & Measurement: Perimeter of composite shapes, area of rectangles/triangles, angle rules, unit conversions (kg to g, m to cm).

Statistics: Reading, constructing, and interpreting line graphs, stacked bar charts, and coordinate planes.

Disciplinary Knowledge ('Thinking Like a Mathematician'):

Generalising & Pattern Seeking: Identifying numerical rules in ancient counting bases and geometric properties of prehistoric structures.

Systematic Problem Solving: Breaking complex multi-step real-world historical word problems into logical mathematical stages.

Proof & Reasoning: Explaining *why* a mathematical strategy works using formal vocabulary (e.g., "Because perimeter is additive, doubling the scale factor...").

Weekly Progression Scheme

Week 1: Palaeolithic Counting & Tallying – Place Value & Large Numbers

Maths Strand: Number & Place Value.

Substantive Knowledge:

LKS2: Place value up to 4-digit numbers (1,000s); tallying systems; comparing and ordering numbers using <, >, =; rounding to the nearest 10, 100, and 1,000.

UKS2: Place value up to 1,000,000; powers of 10; understanding ancient base-20 / tally mark systems vs. Hindu-Arabic place value; rounding to any required degree of accuracy.

Disciplinary Knowledge:

Generalising Systems: Comparing non-positional tally systems (Ishango bone marks) with positional base-10 value systems to explain place value efficiency.

Practical Maths Task:

LKS2 (Y3/4): *The Herd & Harvest Census.* Pupils decode ancient notched tally sticks into 4-digit numbers, order herd sizes, and round populations to the nearest 100.

UKS2 (Y5/6): *Palaeolithic Population Estimates.* Pupils analyse estimated global human populations across prehistory (10,000 to 1,000,000), practicing multiplying/dividing by 10, 100, 1,000 and rounding numbers to solve census problems.

Week 2: Stockpiling for Winter – Addition, Subtraction & Word Problems

Maths Strand: Addition & Subtraction (Formal Written Algorithms).

Substantive Knowledge:

LKS2: Column addition and subtraction up to 4 digits with regrouping/exchanging; estimating answers using inverse operations.

UKS2: Multi-digit formal addition and subtraction with numbers exceeding 5 digits and decimals; multi-step word problems involving resource management.

Disciplinary Knowledge:

Checking & Accuracy: Using estimation and inverse operations systematically to verify calculated historical inventory totals.

Practical Maths Task:

LKS2 (Y3/4): *Neolithic Granary Inventory.* Pupils calculate total grain stores (kg) and meat rations using

4-digit column addition and subtraction, solving 2-step word problems (e.g., "If 1,425kg of wheat is stored and 878kg eaten…").
UKS2 (Y5/6): *Winter Survival Resource Allocation.* Pupils manage a multi-tribe resource budget, using formal written calculation methods with decimal weights (kg/g) to determine surplus or deficit across winter months.

Week 3: Stonehenge Surveying – Perimeter, Area & Metric Conversions
Maths Strand: Measurement & Geometry.
Substantive Knowledge:
LKS2: Measuring and calculating the perimeter of 2D shapes in cm and m; area by counting squares; converting between metres and centimetres (1m = 100cm).
UKS2: Area of compound shapes and right-angled triangles (Area} = ½ x base x height); metric conversions (km, m, cm, mm); scale drawings.
Disciplinary Knowledge:
Spatial Optimisation: Analysing how different geometric shapes yield different enclosed areas for a fixed perimeter length.
Practical Maths Task:
LKS2 (Y3/4): *Megalith Enclosure Design.* Pupils calculate the perimeter of scale Stonehenge trilithon layouts using tape measures and rulers, converting measurements from cm to m.
UKS2 (Y5/6): *Surveying the Sacred Landscape.* Pupils calculate the surface area and perimeter of complex circular/polygonal ditch earthworks using scale drawings (1cm:5m), converting scale lengths to kilometres.

Week 4: The Bronze Foundry – Ratios, Fractions & Recipe Scaling
Maths Strand: Fractions, Decimals, Ratio & Proportion.
Substantive Knowledge:
LKS2: Unit and non-unit fractions of quantities; equivalent fractions; adding/subtracting fractions with the same denominator.
UKS2: Ratio notation (a:b); scale factors; converting fractions to percentages; calculating proportions of metal mixtures (Copper:Tin).
Disciplinary Knowledge:
Proportional Reasoning: Explaining how changing one part of a ratio necessitates proportional scaling of all other components to maintain balance.
Practical Maths Task:
LKS2 (Y3/4): *Sharing the Harvest.* Pupils solve fractional sharing problems (e.g., "Find ¾ of 120 bronze ingots") and simplify equivalent fraction trade deals.
UKS2 (Y5/6): *The Master Smelter's Alloy Recipe.* Pupils use ratio and scaling (9:1 Copper to Tin) to calculate exact raw material weights needed to forge weapons of varying total mass (kg/g).

Week 5: Mapping Maiden Castle – Coordinates, Angles & 3D Shapes
Maths Strand: Geometry (Position, Direction, Angles & 3D Shape Properties).
Substantive Knowledge:
LKS2: Reading and plotting coordinates in the first quadrant; identifying acute, right, and obtuse angles; 3D shape properties (faces, edges, vertices of cylinders/prisms).
UKS2: Coordinates in all 4 quadrants; calculating missing angles on a straight line (180°) and around a point (360°); nets of complex 3D shapes (roundhouses, hillfort ramparts).
Disciplinary Knowledge:

Geometric Deduction: Using known angle facts and coordinate rules to map defensive sightlines and structural geometry.

Practical Maths Task:

LKS2 (Y3/4): *Mapping the Iron Age Village.* Pupils plot 2D grid coordinates (x, y) to locate roundhouses, classifying acute and obtuse angles formed by defensive palisade walls.

UKS2 (Y5/6): *Hillfort Siege Radar & Sightlines.* Pupils calculate missing angles for catapult trajectories along ramparts and plot 4-quadrant coordinate grids to map incoming invader paths.

Week 6: Prehistoric Demographics – Statistics, Graphs & Unit Review

Maths Strand: Statistics & Data Handling.

Substantive Knowledge:

LKS2: Interpreting and constructing bar charts, pictograms, and frequency tables; calculating time intervals.

UKS2: Reading and interpreting line graphs (showing continuous changes over time); pie charts; calculating the mean as an average.

Disciplinary Knowledge:

Data Critique: Analysing statistical trends across historical datasets to draw mathematically sound conclusions about climate and population shifts.

Practical Maths Task:

LKS2 & UKS2: *The Prehistoric Data Analysis Showcase.*

Task 1 (LKS2): Pupils construct bar charts comparing rainfall and crop yields across the Stone, Bronze, and Iron Ages, solving comparison and difference problems.

Task 2 (UKS2): Pupils plot and interpret complex line graphs showing temperature fluctuations from the Ice Age to the Iron Age, calculating mean population growth rates per century.

Plenary: Mathematical reasoning presentation where pupils present their statistical findings using formal mathematical vocabulary.

Assessment Matrix (Progression Indicators)

Phase	Working Towards	Expected Standard	Greater Depth
Lower Key Stage 2 *(Years 3 & 4)*	• Reads numbers up to 1,000 but struggles with column regrouping in 4-digit addition. • Measures perimeter by counting side lines inaccurately without adding metrics. • Calculates unit fractions (¼) but stumbles on non-unit fractions (¾). • Plots coordinates incorrectly by reversing the x and y axes.	• Demonstrates fluent 4-digit formal addition/subtraction algorithms with regrouping. • Calculates perimeter and area of rectilinear shapes accurately using cm and m. • Calculates non-unit fractions of quantities fluently (e.g. ⅔ of 60} = 40). • Plots and reads coordinates in the first	• Explains place value regrouping errors in peer calculations systematically. • Solves multi-step perimeter problems involving missing side lengths effortlessly. • Connects fractions directly to division and ratio in real-world historical contexts. • Identifies and corrects grid coordinate translation errors

		quadrant accurately (x, y).	independently.
Upper Key Stage 2 *(Years 5 & 6)*	• Performs 4-operation calculations but makes frequent place value column errors. • Calculates area of rectangles but struggles with compound shapes and scale conversion. • Expresses simple ratios but fails to scale proportions up or down accurately. • Reads line graphs but misinterprets scales on non-standard axes.	• Uses long multiplication and division fluently for numbers over 5 digits. • Calculates surface areas, compound perimeters, and metric scale conversions (1cm:5m). • Applies ratio (a:b) and scaling factors to solve multi-step alloy mixture problems. • Interprets complex line graphs, pie charts, and calculates the mean average accurately.	• Evaluates alternative calculation strategies, selecting the most efficient method. • Derives formulas for complex perimeters/areas and applies algebraic reasoning. • Solves complex multi-part ratio problems involving fractions, decimals, and percentages. • Critiques statistical data sets, identifying bias, scaling errors, or missing variables.

Other Information, Ideas and Resources

Applying the learning theme of '**Stone Age to Iron Age'** to Key Stage 2 Mathematics grounds abstract numerical concepts in the ultimate survival skills of our ancestors. From measuring the precise angles of celestial stone circles to calculating the exact ratio of metals required to forge strong bronze tools, maths was the quiet engine of prehistoric engineering.
Here are some alternative practical, technique-driven maths lesson ideas that align prehistory with the primary mathematics national curriculum.

1. Stonehenge Circles: Angles and Turns
Maths Domain: Geometry (Properties of Shapes / Angles)
Historical Link: Neolithic and Bronze Age stone circles (Stonehenge, Avebury).
The Lesson Concept
Pupils explore the geometric properties of a circle, focusing on **radius, diameter, and angles** in a full turn (360 degrees). They learn how ancient builders divided up empty spaces without modern measuring tapes.
The Problem Solving: Give pupils a blank circular paper "monument ground." They must act as Neolithic builders placing 8 "sarsen stones" (counters) perfectly equidistant around the perimeter.
The Calculations:
Pupils divide a full turn (360 degrees) by 8 to calculate the exact angle required between each stone (45 degrees).
Using protractors, they plot the angles from a central point outward to place their stones precisely.
Extension: If the radius from the centre to the heel stone is 6 metres, what is the total diameter across the monument?
Output: A mathematically accurate geometric blueprint of a stone circle, proving that ancient architecture relied heavily on angular division.

2. Surviving the Winter: Fractions of Amounts
Maths Domain: Number (Fractions, Decimals, and Percentages)
Historical Link: Bronze Age agriculture, grain storage, and food preservation.
The Lesson Concept
The farming revolution meant tribes had to manage large grain surpluses to get through the barren winter months. Pupils solve complex sharing and scaling problems using fractions of mass and capacity.
The Inventory Challenge: Provide pupils with a manifest of an Iron Age storage pit (e.g., a **60kg** sack of emmer wheat grain, a **40-liter** jar of oil).
The Mathematical Tasks:
"The chieftain decrees that **2/5** of the grain sack must be saved for next spring's planting. How many kilograms are set aside?" (60 ÷ 5 = 12; 12 x 2 = 24kg).
"Dampness spoils **10%** of the oil jar. How many litres are lost? How many litres are left for the tribe?"
Output: A completed "Tribal Rations Ledger" verifying that the pupil's fraction calculations will prevent the village from running out of supplies before the winter thaw.

3. Smelting Bronze: Ratio and Proportion
Maths Domain: Ratio and Proportion (Upper KS2)
Historical Link: The invention of Bronze metallurgy.
The Lesson Concept
Bronze isn't a pure metal found in the ground; it is an alloy created by mixing copper and tin together. This provides a brilliant, concrete application for **ratio and proportion** calculations.
The Core Concept: To make authentic Bronze Age tools, a blacksmith uses a simplified recipe ratio of **4 parts Copper to 1 part Tin** (4:1).

The Scaling Problems:

Target Weight of Tool	Copper Required (4 parts)	Tin Required (1 part)
5kg Axe Head	4kg	1kg
10kg Chieftain Shield	8kg	2kg
2.5kg Spear Tip	2kg	0.5kg

The Challenge: If a smith has 12kg of copper but only 2kg of tin, what is the maximum weight of bronze they can actually forge? Pupils discover that the tin is the limiting factor.
Output: A scaled production chart for a Bronze Age foundry, demonstrating an understanding of how to multiply or divide parts in a fixed ratio.

4. Building the Hill Fort: Perimeter and Area
Maths Domain: Measurement (Perimeter and Area)
Historical Link: Iron Age hill forts (e.g., Maiden Castle).

The Lesson Concept
Iron Age tribes built massive, complex defensive walls and ditches to protect their settlements. Pupils use their knowledge of perimeter (the distance around a shape) and area (the space inside) to design an optimised fort layout.
The Design Brief: On squared grid paper, pupils design the aerial blueprint for a tribal hill fort.
The Constraints:
The outer defensive ditch must have a total **perimeter** of exactly 40 units to ensure the tribal guards can patrol it effectively.
Inside the fort, pupils must calculate the **area** of different composite rectangular shapes representing communal spaces: *The Chieftain's Roundhouse (Area = 12 squares), The Cattle Enclosure (Area = 24 squares).*
Output: A scaled, grid-mapped architectural plan of a fort, complete with verified column calculations of perimeter fences and internal space allocations.

5. The Deep Timeline: Negative Numbers
Maths Domain: Number (Number and Place Value / Negative Numbers)
Historical Link: Chronology spanning BCE (Before Common Era) and CE (Common Era).
The Lesson Concept
Prehistory stretches across thousands of years before the year zero. This lesson uses the historical timeline to teach pupils how to count backward and forward across zero using **negative and positive integers**.
The Number Line: Create a large floor timeline where BCE dates are represented as negative numbers (e.g., 2000 BCE is −2000) and CE dates are positive (+2026).
The Interval Calculations:
"An Iron Age sword was forged in 500 BCE (−500). It is discovered in a museum in the year 2000 CE (+2000). How many years old is the sword?"
Pupils use the number line to bridge through zero: 500 years to get to zero + 2000 years to get to the discovery = 2500 years old.
Output: A chronological map of key prehistoric inventions, calculated purely through interval addition and subtraction across the BCE/CE divide.

6. The Tribal Census: Statistics and Data
Maths Domain: Statistics (Tally Charts, Bar Charts, and the Mean Average)
Historical Link: Late Iron Age tribal villages and agricultural trade.
The Lesson Concept
Pupils practice data collection and presentation by conducting a mock "Census" of a newly settled Iron Age farming community to analyse its economic strength.
The Data Gathering: Provide pupils with a raw text description of an excavated village (e.g., *"Roundhouse 1 owns 4 cows and 2 pigs. Roundhouse 2 owns 6 cows and 0 pigs..."*).
The Tasks:
1. Pupils compile the raw data into a structured **tally chart**.
2. They transform the data into a clean, libelled **bar chart** or pictogram comparing the livestock types across the village.

Upper KS2: Pupils calculate the **mean average** number of cows owned per household to find out if wealth is shared equally.
Output: A statistical economic profile of an ancient village, showing clear axes, titles, and data trend interpretations.

Considerations for Implementation

Courageous Advocacy

In the context of the **'Stone Age to Iron Age'**, **Courageous Advocacy** means looking at the challenges faced by our ancestors—such as survival, resource management, and community building—and finding modern parallels where pupils can take action to make a difference.
It moves history from "what happened then" to "how we can help now."

1. Protecting Our Natural Resources (The Environment)
Our ancestors lived in total harmony with the land, using only what they needed. Today, we face a global climate crisis.

The Advocacy Idea: 'The Neolithic Garden Project.'
The Action: Pupils campaign for more green spaces in their local area or start a school "foraging" garden that promotes biodiversity.
The Goal: To advocate for the protection of local ecosystems, mirroring the respect for the land shown by the first farmers.
Modern Parallel: Combating deforestation and promoting sustainable farming.

2. Standing Up for 'Outsiders' (Migration & Belonging)
Archaeology (like the Amesbury Archer) proves that people moved across Europe to Britain during the Bronze Age, bringing new skills like metalworking.

The Advocacy Idea: 'Skills Without Borders.'
The Action: Pupils research the positive impact of migration on British history and create a "Welcome Campaign" for refugees or new arrivals in their community.
The Goal: To challenge xenophobia by showing that Britain has been shaped by "outsiders" since the Stone Age.
Modern Parallel: Supporting refugee charities or advocating for inclusive school policies.

3. Sustainable Design & 'Zero Waste' (Materials)
Stone Age people used every part of an animal and every scrap of flint. There was no such thing as "rubbish."

The Advocacy Idea: 'The Prehistoric Plastic Strike.'
The Action: Pupils audit the school's waste and advocate for "prehistoric" levels of sustainability—petitioning the school kitchen to remove single-use plastics or organising a "Repair Cafe" to fix items instead of throwing them away.
The Goal: To advocate for a circular economy where nothing is wasted.
Modern Parallel: Reducing plastic pollution and fighting "fast fashion."

4. Food Justice & Security (The Farming Revolution)
The shift from hunting to farming (The Neolithic Revolution) was the first time humans took control of their food supply to protect the tribe from hunger.

The Advocacy Idea: 'The Modern Tribe's Granary.'

The Action: Organising a high-impact collection for a local food bank, but taking it further by writing to local MPs about the "Right to Food" and the causes of food poverty.
The Goal: To advocate for a world where no one in the "tribe" goes hungry, just as early farmers worked to secure food for their communities.
Modern Parallel: Addressing the cost-of-living crisis and global food inequality.

5. Preserving Heritage (Culture)
Iron Age tribes used oral tradition to keep their culture alive. If we don't protect our history, it disappears.

The Advocacy Idea: 'Guardians of the Hillforts.'
The Action: If there is a local archaeological site or a struggling local museum, pupils can launch a social media campaign or a letter-writing strike to "Save Our History" from developers or budget cuts.
The Goal: To advocate for the protection of cultural identity and historical education.
Modern Parallel: Protecting indigenous lands and local community heritage sites.

Why Courageous Advocacy Matters in this Learning Theme

Prehistoric Value	**Modern Advocacy Goal**
Sustainability	Protecting the planet for future generations.
Community	Ensuring no one is left behind or excluded.
Ingenuity	Using our voices to solve "impossible" problems.
Heritage	Valuing where we came from to decide where we are going.

How to Start
1. **Identify:** Which "survival challenge" from the Stone Age bothers the pupils most today? (e.g., Hunger? Housing? Environment?)
2. **Research:** What is the modern equivalent of that challenge in our town?
3. **Action:** Who has the power to change it? (The Headteacher? The Mayor? The Prime Minister?)
4. **Advocate:** Write the letters, make the posters, or start the petition.

Developing Spirituality

Developing spirituality in Key Stage 2 isn't necessarily about religion; it's about exploring the **'Big Questions'** of life, meaning, and our connection to the world. The **'Stone Age to Iron Age'** learning theme is perfect for this because it strips away modern distractions and forces us to look at the core of the human experience. These are ways to develop spirituality through this learning theme, categorised by the "Four Aspects of Spirituality" (Self, Others, World, and Beyond).

1. Connection to 'The Beyond': The Mystery of the Stones

Prehistoric people left behind massive monuments like Stonehenge and Avebury without any explanation. This creates a sense of **awe and wonder**.

The 'Big Question': *Why do humans feel the need to build things that are bigger than themselves?*
Activity: Create a "Sensory Solstice" in the classroom. Use lighting to mimic the sunrise at Stonehenge. Have pupils sit in silence and consider what it feels like to wait for something bigger than us (the sun) to return.
Spiritual Development: Developing a sense of mystery and recognising that not everything in life can be explained by science or logic.

2. Connection to 'The World': The Sacredness of Nature
For hunter-gatherers, the Earth wasn't just a place to live; it was a provider. Every tree, animal, and river had a "spirit" or a purpose.

The 'Big Question': *If we treated every natural object as "sacred," how would we behave differently?*
Activity: 'The Gratitude of the Hunter.' Before eating a snack, pupils take a moment of "Stone Age Mindfulness" to trace that food back to the earth—the soil, the rain, and the sun.
Spiritual Development: Fostering a deep sense of gratitude and an ecological identity, realising we are "part" of nature, not "owners" of it.

3. Connection to 'Others': The Invisible Thread of Ancestry
There is a profound spiritual realisation in knowing that we are the "future" that Stone Age people were building for.

The 'Big Question': *What do we owe to people we will never meet?*
Activity: 'Handprints in the Cave.' Inspired by the hand stencils in Lascaux or Cueva de las Manos, have pupils create handprints using natural pigments (charcoal or beetroot). Ask them to imagine a pupil 5,000 years in the future looking at their print. What "message" of hope would they leave?
Spiritual Development: Developing empathy across time and a sense of belonging to the "human family."

4. Connection to 'Self': The Inner Life and Creativity
Prehistoric art suggests that even when survival was hard, humans *needed* to create.

The 'Big Question': *Why does making art make us feel more "human"?*
Activity: 'The Shaman's Journey.' Use drumming (Music link!) to lead a guided visualisation. Ask pupils to imagine they are alone in a forest 10,000 years ago. What are they afraid of? What gives them courage? Afterward, they draw their "inner spirit animal" or a symbol of their strength.
Spiritual Development: Self-reflection and discovering one's inner "voice" and resilience.

Why Spirituality Matters in This Learning Theme

Concept	Spiritual Impact
Silence	In a noisy digital world, imagining the quiet of the Stone Age helps pupils find "inner peace."

Perspective	Seeing the vastness of the timeline helps pupils realise that their modern problems are part of a much larger story.
Meaning	Exploring why people decorated their tools or buried their dead with care shows that humans have always searched for "meaning" beyond just eating and sleeping.

A Moment for Reflection
"We are not just looking at old stones and broken pots; we are looking at the hopes, fears, and dreams of people just like us, who stood under the same stars thousands of years ago."

Other

To truly bring the '**Stone Age to Iron Age**' learning theme to life, extra-curricular activities should focus on **experiential learning**—allowing pupils to step out of the classroom and into the roles of makers, hunters, and tribal citizens. Here are extra-curricular ideas categorised by the type of club or event:

1. The 'Tribal Skills' After-School Club (Bushcraft)
This club focuses on the practical survival skills that defined prehistoric life.

Shelter Building: Using natural materials (branches, leaves, mud) to build weather-proof dens in the school grounds.
The Art of Foraging: Inviting a local expert to lead a "nature walk" to identify plants that prehistoric people would have used for food, medicine, or dyes.
Primitive Fire-Lighting: Using flint and steel or bow-drills (under strict supervision) to understand the monumental effort required to create fire.
Cordage Making: Learning to make rope and string from garden weeds like nettles or willow bark.

2. Prehistoric 'Maker Space' (Arts & Engineering)
A club dedicated to the technological leaps of the three ages.

Neolithic Pottery: Using the "coil pot" method to recreate Beaker Folk pottery, followed by an outdoor pit-firing session.
Pewter Casting (Bronze Age Simulation): Using soft clay or cuttlefish bone to carve moulds and casting low-melting-point metal (pewter) to simulate the birth of metallurgy.
Weaving & Textiles: Building simple "warp-weighted" looms from sticks and stones to weave wool, exploring how Iron Age clothing was made.
Jewellery Design: Hammering copper wire to create "Torcs" (neck rings) and "Fibulae" (brooches) in the intricate Celtic style.

3. The 'Archery & Athletics' League (PE)
Focusing on the physical requirements of a hunter-gatherer or an Iron Age warrior.

The 'Mammoth Run': A cross-country club themed around "persistence hunting," where pupils learn to pace themselves over long distances.

Target Archery: Setting up a school archery club to master the precision required for Bronze and Iron Age hunting and defence.
Prehistoric Games: Playing games that develop "tribal" teamwork, such as "Stag and Hounds" (a sophisticated version of tag involving tactical corralling).

4. 'The Bards' Drama & Oracy Club
Before writing, there was the spoken word. This club focuses on the oral traditions of the Iron Age.

Night Around the Fire: Organising a twilight event where pupils retell myths and legends of the sun, moon, and ancestors, using rhythmic drumming and shadows.
Tribal Council Debates: Role-playing a community meeting where "villagers" must decide how to handle a drought or an incoming rival tribe.
Historical Film-Making: Using tablets to film "Breaking News" reports from the discovery of a new Hillfort or the first arrival of the "Beaker People" in the local area.

5. Whole-School 'Prehistoric Immersion Day'
An intensive, one-off event that involves the entire school community.

The 'Big Build': Working together to build a life-sized "Wattle and Daub" wall panel in the school playground.
Communal Feast: Preparing a "Stone Age Stew" (using ingredients available in prehistory) and eating together in a circle, practicing prehistoric social etiquette.
Cave Art Corridor: Transforming a school hallway into a "Cave" by lining the walls with brown paper and using charcoal and earth-tones to create a collaborative mural.

Why Extra-Curriculars Matter for this Learning Theme

Benefit	Impact on the Pupil
Resilience	Learning that "making" takes time and effort (e.g., pottery failing in a fire).
Wellbeing	Spending time outdoors and connecting with nature reduces stress.
Social Skills	Tribal roles require cooperation and the ability to work in multi-age groups.
Cultural Capital	Visiting local hillforts or working with real artefacts builds a sense of "place."