

Science Curriculum

Implementation

'let your light shine'
Matthew 5:16



Contents



1. Modular knowledge approach
2. Developing disciplinary knowledge and skills development
3. Lesson structure
4. Knowledge organisers and knowledge notes
5. Formative assessment (hinge points, exit tickets, cumulative assessment)
6. Summative assessment (end of unit and end of year assessment)
7. Supporting pupils with SEND
8. Reading and vocabulary instruction
9. **Science** in the EYFS
10. Celebrating diversity
11. Training for classroom teachers (QFT teacher and unit specific training)

1. Modular knowledge approach



Science is taught across each year group in modules that enable pupils to study in depth key scientific understanding, skills and vocabulary. Each module aims to activate and build upon prior learning, including EYFS, to ensure better cognition and retention.

Each module is carefully sequenced to enable pupils to purposefully layer learning from previous sessions to facilitate the acquisition and retention of key scientific knowledge and skills.

Each module is revisited either later in the year or in the following year as part of a spaced retrieval practice method to ensure pupils retain key knowledge and information. Data is also used from assessments to inform focus modules to reteach during Summer 2.

Do Nows, Hinge Knowledge questions, Reteach and Retrieval weeks are also used to support retention of knowledge.

2. Developing Disciplinary knowledge and skill development



As well as ensuring pupils are taught key knowledge, each module is designed to offer pupils the opportunity to undertake scientific enquiries and develop their skills as a Scientist in asking questions, planning and carrying out experiments, collecting and analysing information and drawing conclusions. The working scientifically objectives are clearly displayed on each lesson of our science modules for both Key Stage 1 and Key Stage 2. It is clear which of the objectives are being taught throughout a specific module which ensures full coverage and allows for skills to be built upon.

Year 1 Medium Term Plan
(Everyday Materials)

- Including learning objectives and Working Scientifically objectives.

	Teaching Point 1 Materials		Teaching Point 2 Properties			Teaching Point 3 Use what you know
Lesson Objective	To identify a variety of common materials.	To distinguish between an object and the material from which it is made.	To describe materials according to their properties.	To investigate which materials are waterproof.	To investigate which materials are opaque	To compare and group objects based upon their properties.
Working Scientifically	Make relevant observations Identify and classify, with guidance. Use their observations and ideas to suggest answers to simple questions.	Make relevant observations Identify and classify, with guidance. Use their observations and ideas to suggest answers to simple questions.	Make relevant observations Identify and classify, with guidance. Recognise findings. Use their observations and ideas to suggest answers to simple questions.	Make relevant observations Identify and classify, with guidance. Use their observations and ideas to suggest answers to simple questions.	Suggest ways of answering a question. Make relevant observations using simple equipment. Conduct simple tests, with support. Identify and classify, with guidance. Gather and record data. Recognise findings. Use their observations and ideas to suggest answers to simple questions.	Make relevant observations using simple equipment. Identify and classify, with guidance. Recognise findings. Use their observations and ideas to suggest answers to simple questions.

3. Lesson structure



Feature	Function
Do Now	To recall prior learning related to the module, to help the child know and remember more and make connections within their learning.
Hinge Knowledge Retrieval	Taken from the whole school knowledge progression for science recall/retrieving knowledge so all children meet end points in order to pivot to their next years learning.
I (Model/Guided Discourse)	The class teacher will model substantive knowledge (and model the skills necessary for disciplinary knowledge) to achieve the sequenced learning objective for that lesson. The steps for learning will be explicitly taught through the teaching of success criteria.
We	Using partner work, the children will practice the skills necessary to achieve the learning objective. This is to be used as an 'Assessment for Learning' opportunity by the teacher to assess if the children are ready to move on.
You	The children will complete an independent task (or work in a small group when completing an investigation) to show that they can independently apply the skills necessary to achieve the learning objective.
Exit ticket (cumulative)	An assessment question (linked to the learning objective) is completed independently at the end of every lesson. These questions are cumulative, allowing for continual retrieval of prior knowledge.

4. Knowledge organisers and knowledge notes

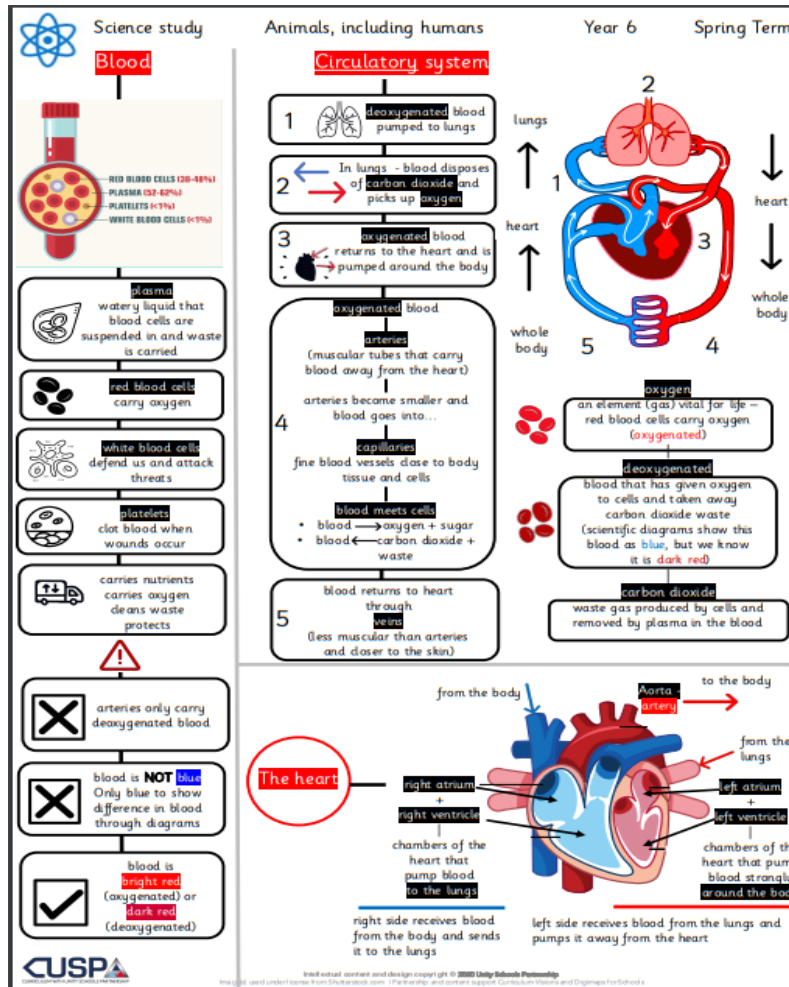


Accompanying each module is a Knowledge Organiser which contains key vocabulary, information and concepts which all pupils are expected to understand and retain.

Knowledge notes are the elaboration and detail which help pupils acquire the content of each module. They support vocabulary and concept acquisition through a well-structured sequence that is cumulative. Each Knowledge Note begins with questions that link back to the cumulative quizzing, focussing on key content to be learnt and understood.

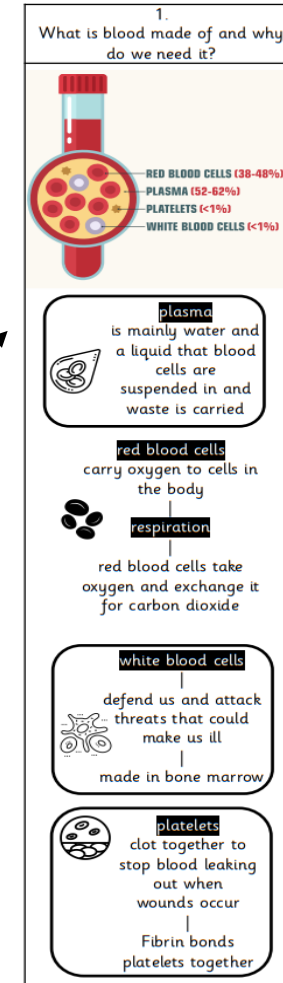
Knowledge Organisers and Knowledge Notes are dual coded to provide pupils with visual calls to aid understanding and recall. Knowledge Organisers and Knowledge Notes are referenced throughout each module.

4. Knowledge organisers and knowledge notes



Year 6 Knowledge Organiser

Accompanying Year 6 Knowledge Note



5. Formative Assessment



Assessment for learning strategies

Think-pair-share, sage and scribe, cold calling, strategic questioning, round robin.

Hinge Points

Strategic questioning is used by teachers to assess 'hinge knowledge' which is essential for the children's understanding and tackling misconceptions.

The whole school knowledge progression for science is also used for 'hinge knowledge' retrieval questions at the beginning of each lesson.

Exit Tickets

Links directly to each lesson learning objects assessing everyone's individual understanding every lesson and allowing for any misconceptions to be addressed in the next lesson.

Cumulative assessments

Exit tickets are completed cumulatively supporting children to recall prior learning so they can learn and remember more.

6. Summative Assessment



End of unit assessments

End of unit assessments are completed each half term at the end of each unit to assess children's understanding. They are made up of the exit tickets completed at the end of each lesson.

End of term assessments

End of term assessment are completed at the end of Autumn, Spring and Summer which assess children's understanding from units they have complete that year and key hinge knowledge from previous years in the style of multiple choice and explanation questions.

End of year assessments

End of year assessments are made up of end of unit and end of half term assessments from across the year. Children will also complete a set task (based on a science investigation) to showcase to knowledge and skills they have learnt in that particular year group.

Reteach weeks

During reteach week the children are retaught a lesson from a the previous unit. This lesson is identified through gap analysis of the assessment results.

Retrieval Weeks

During retrieval week the children complete a lesson which enables them to retrieve key knowledge related to the knowledge progression in order to help them retrieve essential knowledge to help them achieve the relevant end point.

Summer 2

As there are only 5 science modules per year group, the final half term is used as a reteach opportunity where teachers reteach misconceptions that have been identified through the end of unit and end of term assessments throughout the year.

Autumn Anchors

Teachers communicate with their class's teacher for the next academic year in regards to any gaps or areas of weakness that need to be filled before starting the next academic years learning.

7. Supporting pupils with SEND



We aim for all science lessons and learning questions to be accessible to all pupils. Pre-teaching of scientific vocabulary provides all children with the opportunity to demonstrate an understanding of subject specific language.

The use of dual coded Knowledge Notes and Organisers provide visuals to aid understanding and recall. In addition, knowledge notes are utilised in all lessons to minimise cognitive overload, so children can use and apply their knowledge more easily. Sentence stems can be used where necessary to aid with written evidence.

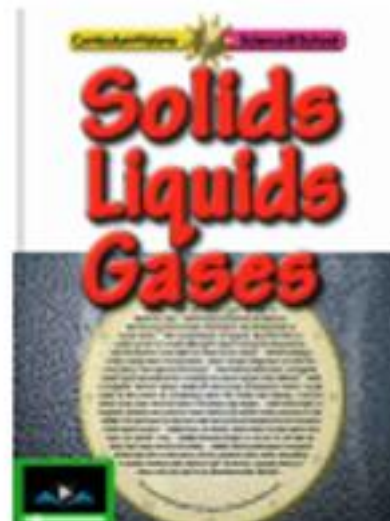
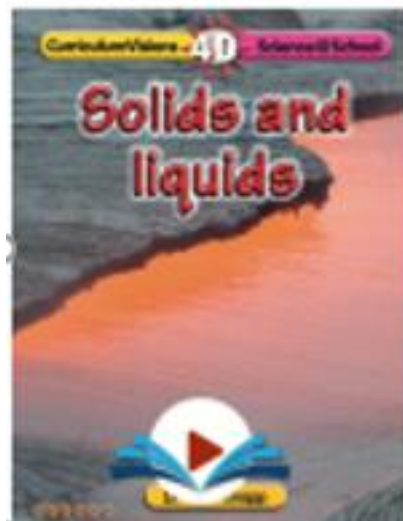
As part of termly SEND reviews, the SENDCO uses the foundation assessment tracker to identify pupils where Tier 1 and Tier 2 intervention isn't effective in ensuring mastery for all in order to provide tailored CPD and training to staff.

8. Reading and vocabulary instruction



We want our children to have an expansive vocabulary and through teacher modelling and planning, children are given opportunity to use and apply appropriate vocabulary. Scientific language is taught and built upon with vocabulary being a focus. Utilising research, the school explicitly teaches Tier 2 and Tier 3 vocabulary in all subjects.

Our Science curriculum is supported by a wealth of high-quality texts which support pupil's learning and develop their skills in accessing information from a range of sources. We aim to utilise, 'Curriculum Visions,' to ensure that our subject content has materials that can be accessed by pupils both in school and at home.



9. Science in the EYFS



At Hawkesley we have one curriculum. However, the end points for EYFS and Years 1 – 6 come from different places. For each subject we have broken down end points into component parts to create one cumulative journey from Nursery to the end of Year 6. The school has created and adopted bridging documentation to manage the difference in expectations of early learning goals and knowledge needed to successfully integrate into the National Curriculum.

The areas of the EYFS curriculum which link directly to science are:

1. Understanding the world
2. Communication and language

Each EYFS medium term plan has a subject overview document that allows curriculum leaders to monitor the activities that link directly to each curriculum areas.

Examples of Science learning in Nursery and Reception include:

- Stem investigation – look at and construct bridges and use positional language to investigate under and over.
- Use seasonal natural occurrences like ice/snow as a provocation to discuss natural observations.
- Use a range of materials and simple tools correctly- junk modelling to create rockets, space ship portholes



10. Celebrating diversity

We are committed to ensure that our curriculum reflects the diversity of British society.

In Science, the children are exposed to a variety of LGBTQ+, disabled and members of the GM/BME (Global Majority and Black and Minority Ethnic) including:



George Washington Carver



Mae Jemison



Bernard Harris Jr.



11. Staff CPD



All staff have undergone CPD in Cognitive Load Theory, Spaced Practice Retrieval Theory and planning the wider curriculum. Staff receive regular quality first teaching coaching from senior leaders to support with the implementation of all areas of the curriculum. All staff have completed online training on 'teaching the working scientifically skills' and identified members of staff have been signposted towards online training to support their subject knowledge.

- Audit
- Briefing training based on audit needs
- Curriculum leader coaching for target teachers
- Detailed MTPs
- Access to unit support through UNITY curriculum