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Children in Y3 carrying out an acid test.

Science - Implementation

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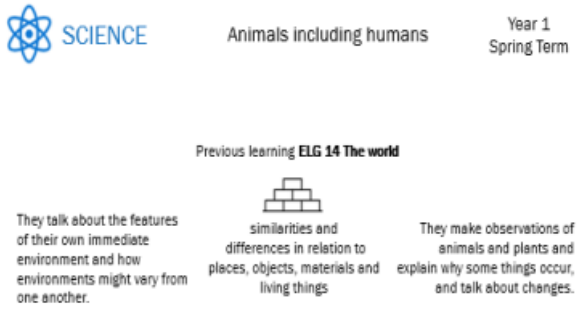
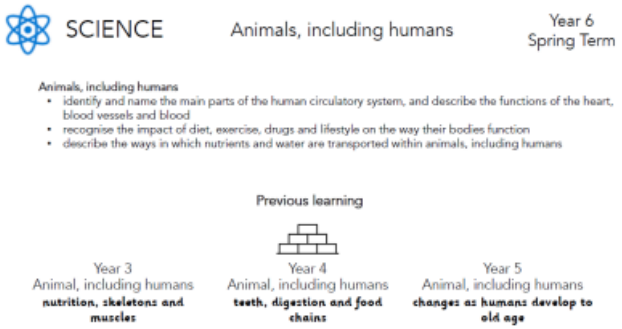
Modular Approach – Knowledge

At Beckstone Primary School, 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. 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.



Linking to previous learning – EYFS to Year 1



Linking to previous learning Year 3-5 to Year 6

Scientific Enquiry

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.

Example of a Key Stage 1 Module

Example of a Upper Key Stage 2 Module

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Knowledge Retrieval and Recall (Supporting Cognitive Load)

At the start of each lesson, pupils will retrieve and activate their prior knowledge gained in previous lessons. This may be evident through short quizzes, Flick Back 5s, Flick Back 3s, Wordle tasks or targeted questioning. This ensures pupils have the opportunity to recall and revise understanding of key information and concepts. Throughout each module pupils continually revisit previous content to reinforce key knowledge and vocabulary.

Planning

All modules have a sequenced overview outlining recommended number of sessions, key concepts, knowledge and vocabulary to be taught. Teachers use this overview to plan individual sessions approximately 45-50 minutes in length. Planning is produced on using a template which makes connections to previous learning, explains concepts with examples and give opportunities for pupils to apply their learning. Challenge is built into this model too.

Connect	Explain	Example	Attempt	Apply	Challenge
Make Connections with previous learning through questions, quizzes, two things, give one and get one routines. Position and frame substantive concepts in context of this learning using Big Ideas map. For example, the concept of LIGHT connects to the SCIENCE domain of PHYSICS and the importance of understanding that LIGHT is made of waves that help us communicate.	Focus the learning question to help pupils attend. Introduce essential vocabulary in the context of the lesson. Use vocabulary modules and scripts to introduce new words. Be efficient with words and clear with explanations. RECEPTIVE LANGUAGE DEVELOPMENT	Make worked examples really explicit. Use diagrams, images, videos, artefacts to help articulate the content. Reduce number of slides on interactive boards. Use My Turn boards to capture the core content by writing on flip chart paper and hanging it up.	USE WHAT YOU KNOW Pupils practically have a go at selecting and organising the content you have taught them. DELIBERATE PRACTICE Develop receptive and expressive language. This enables pupils to rehearse and make sense of the learning. FEEDBACK – a great opportunity to Diagnose, Intervene and Evaluate (Hattie) the learning taking place.	SHOW WHAT YOU KNOW Use teacher books to model page layout using double page spreads. Use CUSP Thinking Hard routines to help pupils explain and connect their learning. Use and apply vocabulary all the time. Make it unmissable and irresistible. Increase productivity through CUSP Hexagon pathways to explain content.	DEEPEN WHAT YOU KNOW Quizzes to increase the retrieval practice effect. Self-questions to develop richer knowledge of the content. Two things Blank hexagon pathways Open word paths Partial word paths Closed word paths

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THINKING SCIENCE TASKS TO SUPPORT WORKING SCIENTIFICALLY

Using these CUSP resources gives teachers the opportunity to consolidate or elaborate pupil thinking through disciplinary knowledge tasks. The IPROF targets the area being taught.

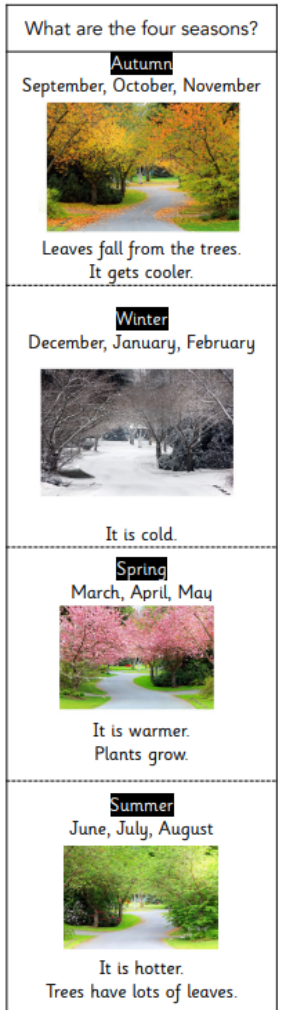
I = Identifying and classifying

P = Pattern seeking

R = Research using secondary sources

O = Observing

F = Fair and comparative testing



Year 1 Changes
Seasons and weather
Day and night

Q1 What are the four seasons?

Sorting **Matching**

Print and cut out the separate elements from Slide 14 of the CUSP Science unit. Work as a class to order the months of the year. Label four hoops with one of each of the seasons. Show and describe an image representing a month. Pupils decide which hoop it goes into. Continue until all the months are sorted. Encourage pupils to explain their reasoning using visual cues from the images.

Identifying IPROF

Give groups of pupils the same resources as for the previous task. Ask them to sort the months correctly into their hoops. Then, taking it in turns, one pupil moves away whilst the remainder swap two of the months over or switch two hoop titles. Can the returning pupil spot the mistakes and explain how they know?

Describing

Give each group a copy of the images from Slides 16 – 19 of the CUSP Science unit. Pupils take it in turns to secretly select one of the seasons illustrated. They give the others a verbal clue to the chosen season in **one sentence only.** Using the sentence stem *In this season … ,* can the others identify the correct season? Encourage pupils to work together to see how many they can guess correctly in a set time.
Challenge: If pupils have more than one turn, previous clues cannot be repeated.

Observing IPROF

Go into the school grounds or alternative setting with drawing materials. Encourage pupils to look closely at a deciduous tree. Confirm the current season and ask pupils how what they observe about the trees indicates this. Then ask them to predict and draw what the tree will look like in the next season. Share responses.

Reasoning

Share the image of Autumn leaves from Slide 16 of the CUSP Science unit. Ask pupils where the fallen leaves go to.

Applying

Ask pupils to illustrate how each season affects their daily life in terms of: • the clothes they wear • the activities they do.

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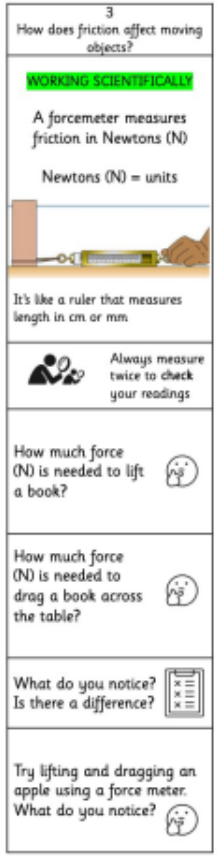
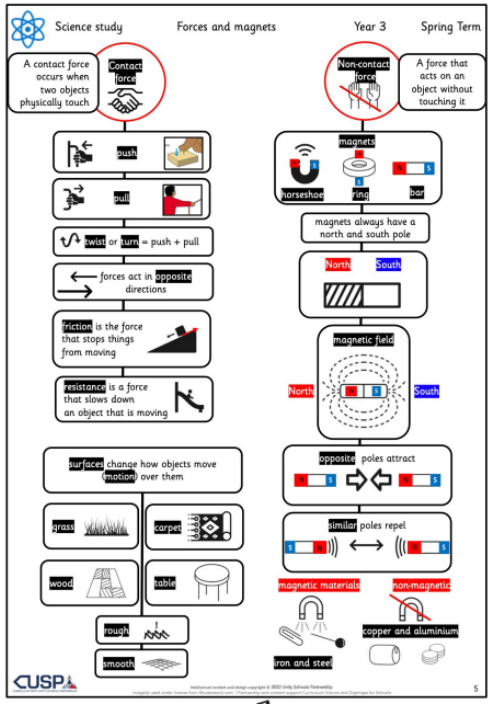
Knowledge Organisers and Knowledge Notes

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 to 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, focusing 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 and copies of the Knowledge Organiser are sent home to families to support with home learning.

In addition, pupils can access at home key learning platforms that are used in school e.g. Curriculum Visions.

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Science and Literacy Reading

In our Science curriculum we encourage pupils to access high quality texts to support their learning and develop their skills in accessing information from a range of sources. Teachers model reading Science texts and we use Cumbria Library Services Topic box loans to supplement our class libraries with books to support our science learning.

Y1 Plants

Vocabulary Essentials: Teacher Guide

Prior vocabulary knowledge

Words I should know	Roots, prefixes, suffixes and spelling rules
plant, tree, fruit, flower, roots, leaf garden living, grow	

Vocabulary for explicit instruction

Tier 2 multiple meaning or high frequency		Tier 3 subject specific	
bud	growth on a plant that becomes a leaf, shoot or flower	nutrients	substances essential for life and growth
trunk	main woody stem of tree	stem	central, long, thin part of a plant
branch	part of tree that grows out from trunk	deciduous	(of trees) sheds leaves in autumn
bark	protective outer covering of tree	evergreen	(of trees) keeps leaves all year
seed	food store from which a new plant grows		
wild	growing naturally without human help		

Etymology and **morphology** for explicit instruction

Prefix / Suffix / Root	Meaning	Examples
-s /-es	plural – more than one	plants, branches, roots
-ly	how something is	naturally, quickly, strongly
-ous	having the qualities of	deciduous, famous, delicious
herb-	plant, grass	herbaceous, herbivore, herbal

Vocabulary

Vocabulary forms a key part of our wider curriculum. Subject specific Tier 2 and Tier 3 words are incorporated into each module and through specific vocabulary modules, children explore the etymology and morphology of words linked to their learning.

Oracy

When discussing their findings or presenting information, pupils are encouraged to speak using full sentences and incorporating the key scientific vocabulary. Peer and group work and feedback also engage children articulating their learning.

Writing

Pupils are encouraged to write across all areas of the curriculum and teachers model how to write purposefully in each subject using key structures and vocabulary. Pupils are encouraged to use their Science curriculum books as reference books, using previous work, knowledge organisers and knowledge notes.

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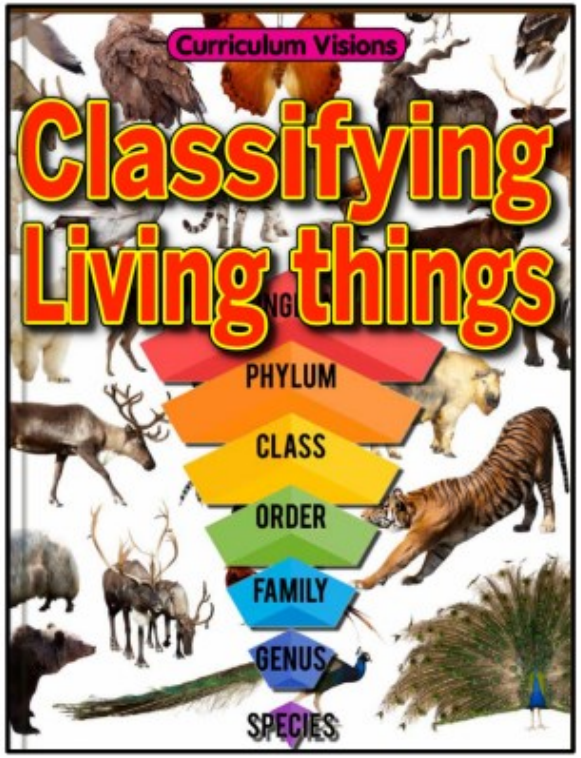
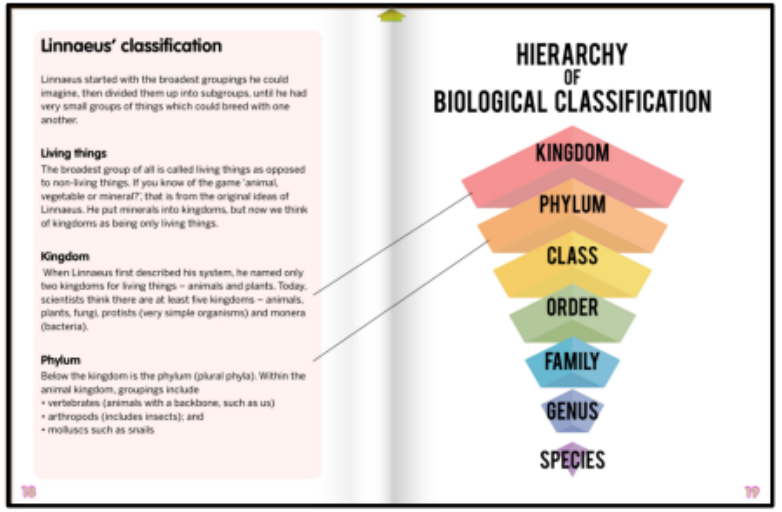
Resources

All Science modules are underpinned by high quality texts which support wider curriculum reading. We use Curriculum Visions to ensure our subject content has supporting materials which can be accessed by pupils in school and at home.





Recommended reads are referenced in our learning modules. Books are digital and can be used to support teacher knowledge. The digital book can be used as part of the explain and example part of a lesson. The web link can be sent home as pre reading or a review.