BPS SCIENCE CURRICULUM AT A GLANCE

Your aims and ambitions for the curriculum

We believe a high-quality Science Curriculum will ensure that pupils are passionate and inquisitive about science and become investigative scientists through high quality lessons, revisiting scientific knowledge and practical, engaging activities.

Our broad science curriculum empowers pupils to feel good about science and promotes interest around the material world. The profile of science is high within school and is taught for 2 hours per week, not being 'squeezed' out for an over focus on other subject areas. An aspect of the SDP for 2023-24 is to ensure that standards in pupils work are equal/the same in all subjects – the science books reflect this.

Scope and breadth of the curriculum

The disciplinary knowledge of our science curriculum begins in FS2 and the learning is focussed heavily on expanding their own knowledge and experiences e.g. bodies, senses, weather, seasons, animals, environments etc. This knowledge builds from FS2 to UKS2.

Scientific texts are made more accessible through explicit teaching of knowledge and vocabulary and symbols and diagrams [mats/prompts].

Our curriculum is aspirational as it leads pupils to achieve and fulfil the requirements of the National Curriculum.

What to teach and when

The substantive knowledge in science is organised around key scientific concepts each half-term e.g. electricity, forces, materials. This substantive knowledge is explicitly outlined within our Science Overview document, which also outlines the progression of knowledge allowing pupils to build a schema [examine milestones in curriculum overview document]. This allows for connections to be made within concepts, across milestones.

The curriculum has been mapped out prescriptively to ensure that teachers know what, [disciplinary and substantive knowledge] when and where to teach their lessons, carefully following both curriculum overview documentation.

Know more, do more and remember more

Our curriculum and teaching has substantive knowledge planned across class groups into each unit, providing opportunities for retrieval practice of prior knowledge and vocabulary at the start of each lesson. This is made up of summative assessment opportunities such as quizzes or projects. Retrieval at the beginning of each session allows staff to be adaptive in the recall at the beginning of the next lesson to ensure children know and remember more.

The curriculum is been chosen to fulfil the needs of the national curriculum and is sequenced using 'milestones' which progressively allow for knowledge to be built upon and revisited over time – this is often done through our practical and engaging delivery, planned using the ELS documentation from the Science Overview documents. Retrieval at the start of each lesson also aides in developing a child's long-term memory. Songs [heads, shoulders, knees and toes/skeleteon song/dingle dangle scarecrow] and books [picture and reference] are used to introduce vocabulary and rehearse content.

Sequencing of learning, particularly through concepts, vocabulary and skills

Science is broken down into the domains of Biology, Chemistry and Physics. The substantive knowledge is taken from the NC and then is sequenced across milestones, taking account of progression within the milestones/concepts. Additionally, the curriculum is organised, through the milestones, to develop expanding knowledge over the sequence of milestones, allowing for core concepts to be developed e.g. plants, materials, circuits. This knowledge builds from FS2 to UKS2. Examples of how knowledge progresses from FS2 include exposure to the substantive knowledge of their senses and weather, which is consolidated in Class 1, which is then consolidated in Class 2 and 3 through knowledge of the movement of the earth relative to the Sun and the earth's rotation to explain day/night. This sequencing is similar in all other areas too and it is sequenced to minimalise the likelihood that pupils will develop misconceptions – with some units in KS2 revisiting more tricky aspects such as forces, electricity and evolution.

ELS documents [teacher's mid-term plans] break down the knowledge into the precise knowledge to be learned, meaning pupils do not learn too much new knowledge in one go. This knowledge is then carefully considered within the planning of the sequence of learning within the ELS documents. Component disciplinary knowledge, such as graphs and tables are always used/taught relative to the year groups' age and stage of learning e.g. pictograms in KS1, bar charts/tables in LKS2 and graphs/keys etc. in UKS2. This ensures that the learning is carefully sequences/taught.

Substantive and disciplinary knowledge

Our curriculum and teaching has progressive disciplinary and substantive knowledge planned across each year/class group into each unit, providing opportunities for retrieval practice of prior knowledge and vocabulary at the start of each lesson. This comprises of summative assessment opportunities such as quizzes or projects. Disciplinary knowledge allows for scientific enquiry and allows the growth of substantive knowledge allowing pupils to consider methods, measurement and practical approaches. Disciplinary knowledge is organised so that pupils' knowledge of working scientifically advances over time [linked to the NC 'working scientifically' section – see curriculum overview document. This knowledge advances comparative/fair testing, identifying/classification and gathering/recording data. An example of how it is different in Y6 to Y3 is that Y3 pupils know that identified criteria will determine how living and non-living things are classified, whilst in Y6 they will know that their own branching and dichotomous classification methods can be chose and developed in order to sort living/non-living things.

Curriculum documentation clearly outlines the opportunities for working scientifically through the disciplinary knowledge being drawn out and this is further identified within the ELS documentation.

Curriculum adaptation; Access for all.

For the B20% of pupils, DP pupils and pupils with SEND, learning is adapted through adaptations to the scaffolds which pupils undertake. Pupils who require additional support with their learning are supported through bespoke/adapted 1:1 or small group support to ensure that pupils are carefully guided to discover knowledge. At the beginning of the lesson, there is explicit teaching of the most important scientific vocabulary. An area of strength within the delivery of our curriculum is the adaptation to ensure that the majority of the learning is practical so that all learners can access the full curriculum. Learning is shared with the support staff prior to the lesson taking place to ensure they are aware of the lesson intent.

CPD (and the impact of it)

4.10.22: Curriculum progression and assessment in EYFS NCC (R.B)
9.3.23: Curriculum design in small schools and mixed age classes. (PP/NS)
20.6.23: What subject leaders know and do - East Mids. Education Support Service (ED/KP/EH)
7.7.23: Ambitious curriculum for SEND - NCC (PP/RB)
4.9.23: Effective use of spacing and retrieval practice to boost classroom learning – National College (ALL)
5.9.23: A Practical guide to scaffolding to support Disadvantaged pupils – National College (ALL)
14.9.23: Subject leader action planning twilight. (ALL)
5.10.23: Subject leader deep dive/QA time twilight.
9.11.23: Phil Abbott – What subject leaders need to know - INSET training. (ALL)
23.11.23: Subject leader Deep Dive/QA time twilight. (ALL)
Ongoing: Reachoutcpd https://www.reachoutcpd.com/
Ongoing: Schemes of work are purchased for staff to adapt in order to support staff who are not subject specialists [and support workload].

Deliberate enhancements to the curriculum

We enhance the curriculum through visitors into school and educational visits off site through visits to local museums and centres e.g., Austerfield Study Centre, The Deep and Magna. We enhance further with practical resources and non-fiction texts from the Education Library Service and in KS2 The Week magazine, First News and Picture News assemblies

Where relevant, links are made with other subjects to deepen knowledge and to build a 'schema'.

Evidence of this is available via the school website, floor books, the school Facebook page and within pupil's books.

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What checks have you completed? What have they told you? What did you do about it? What is the impact of this?

Checks:

- Science Book Look – 10.3.23
- Science Lesson Observation – 27.3.23
- Science Lesson Observations – 14.3.23
- Deep Dive/QA time – 5.10.23
- Deep Dive/QA time – 9.11.23
- Science Book Look – 22.11.23
- Deep Dive/QA time – 23.11.23
- Science Pupil Interview – 24.11.23
- Science Lesson Observation – 4.12.23
- Science Lesson Observation – 7.12.23
- Science book look – 18.1.24

Findings:

- ELS documents [Medium Term Planning] are in place and make explicit the disciplinary and substantive knowledge to be taught. It also clearly explains/outlines the 'tier 3 language' taken from the BPS Curriculum overview documentation. Planning documents show clear alignment to the coverage of the substantive knowledge from the BPS overview documentation. **(22.11.23 – Science book look)**
- Assessment *AS* learning, to embed key knowledge into memory through low stakes quizzing/pre and post assessments are completed either in the book or via a Kahoot!. **(22.11.23 – Science book look)**
- Retrieval strategies are developing and are evidenced at the bottom of learning objectives. **(22.11.23 – Science book look)**
- Children are retaining the specific knowledge outlined in our Science Curriculum documentation of the knowledge taught last term. **(24.11.23 – Pupil interview)**
- Pupils enjoy the practical enhancements made to the delivery of the Science curriculum e.g. experiments/practical learning and these are evidenced in pupil's books **(24.11.23 – Pupil interview)**
- Children like that, where possible, we make links between the topic and other subjects e.g. D & T C2 light up Christmas cards using knowledge of electricity. & T to build a schema. **(24.11.23 – Pupil interview)**
- Adaptations and scaffolds for the B20% is evident. And, there is evidence of Bespoke Adaptations or support for pupils with particular SEND/EHCP needs. There is no evidence of pupils in the B20% receiving a different 'diet' as they are all equitably accessing the same curriculum content. **(22.11.23 – Science book look; 18.1.24 – Science book look)**
- By the end of KS2, pupils are able to explain the terms experiment, investigation, invention, classifying and patterns. These are all words taken from our Progression in Disciplinary Concepts documentation. **(24.11.23 – Pupil interview)**
- Focus areas of the SDP [2023] are being addressed or are becoming embedded as part of the whole-school non-negotiables. **(22.11.23 – Science book look)**
- The disciplinary skills of being a scientist can be observed in books. **(22.11.23 – Science book look)**
- Recall practice is embedded across all classes, the use of pre unit assessments is embedded and post unit in most classes. **(18.1.24 – Science book look)**

Next steps:

- Develop the consistent of knowledge organisers to ensure concepts are remembered and how they link together – including further visual prompts e.g. symbols, vocabulary etc.
- Develop and evidence the discipline of prediction within KS1, prior to pupils undertaking an experiment/practical activity.
- Develop the use of pupils being able to reason/develop a stronger sense of scale to reflect what is being studied.
- Develop further opportunity for assessment *OF* learning by enabling pupils to independently undertake scientific enquiry to showcase what has been taught to assess the learned, disciplinary knowledge – assessment of disciplinary knowledge.
- Increase opportunity for children to write freely in their books in UKS2. **(18.1.24 – Book look)**
- Develop the use of challenge for the more able students across all classes. **(18.1.24 – Book look)**
- Ensure that post unit assessments are taking place across all classes. **(18.1.24 – Book look)**
- Children should be given the opportunity to respond to feedback / complete unfinished work in KS2. **(18.1.24 – Book look)**

Actions taken:

- Feedback from most recent book looks was shared with the staff.
- Outcomes of the upcoming science lesson observations will be shared with staff and added to this document.
- Staff meeting to remind staff of the next steps in science to be timetabled early in the spring term.
- Outcome of book look on 18.1.24 shared with staff.

Impact of actions taken:

- To be reviewed and established at the next period of monitoring – Tuesday16th April 2024