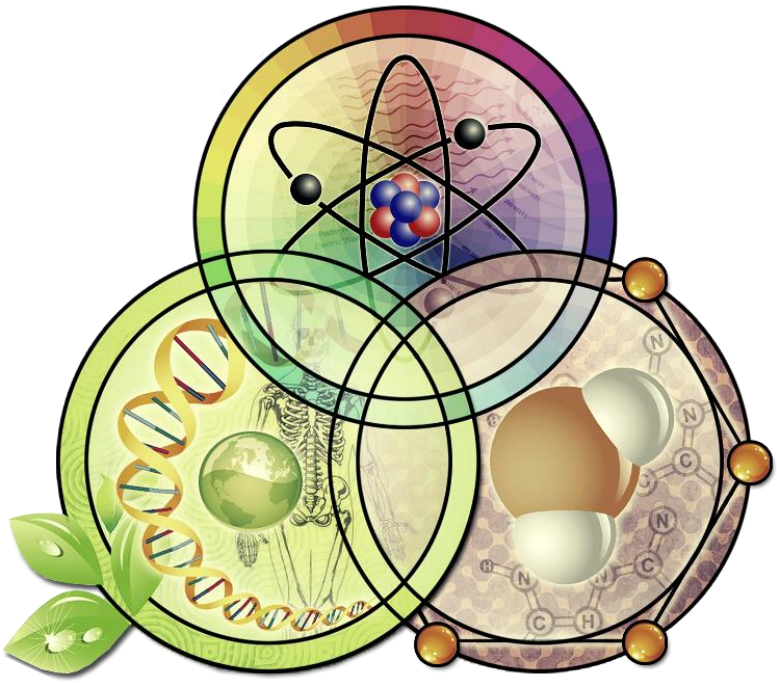
Kilburn Junior School

Science Policy



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EMBARK Federation

Kilburn Junior School: Science Policy 2020

1. RATIONALE.

1.1 At Kilburn Junior School, Science is viewed as a means of finding out about the real world through methodical investigation, systematic observation, questioning and experimentation. We provide appropriate learning opportunities so that they develop the skills needed to be active citizens within an increasingly scientific world. Science is a powerful and useful tool through which children's understanding of the world around them is carefully developed. It is our aim to create a challenging environment that raises standards of achievement in Science through high quality teaching and learning. Pupils build up their scientific skills and knowledge, developing the necessary ability to investigate, question and understand scientific concepts.

1.2 This policy describes our values and philosophy in relation to meeting the needs of all scientific learners at Kilburn Junior School. It outlines the framework within which all staff work and provides guidance on planning, teaching and assessment. It describes how the school intends to meet the needs of scientific learners of all ages and abilities.

1.3 This policy follows the guidance of the national curriculum for science (2014) which outlines the coverage of scientific teaching across Key Stage 2.

2. AIMS AND OBJECTIVES

2.1 The national curriculum for science (2014) aims to ensure that all pupils:

- develop **scientific knowledge and conceptual understanding** through the specific disciplines of biology, chemistry and physics.
- develop understanding of the **nature, processes and methods of science** through different types of science enquiries that help them to answer scientific questions about the world around them.
- are equipped with the scientific knowledge required to understand the **uses and implications** of science, today and for the future.

2.2 It is essential that within each scientific topic taught at Kilburn Junior School children are given the opportunity to develop each of the above aspects of the science curriculum. It is our belief that this will equip them with the motivation and preparedness to negotiate life in an increasingly scientific world.

3. SPOKEN LANGUAGE.

3.1. The national curriculum for science reflects the importance of spoken language in pupils' development across the whole curriculum – cognitively, socially and linguistically. The quality and variety of language that pupils hear and speak are key factors in developing their scientific vocabulary and articulating scientific concepts clearly and precisely. They must be assisted in making their thinking clear, both to themselves and others, and teachers should ensure that pupils build secure foundations by using discussion to probe and remedy their misconceptions.

3.2. The vocabulary that children will be learning for each topic will be displayed on the whiteboard in the classroom and other appropriate locations for the children to access and to use to support their spoken interactions with the teachers and their peers. The teaching staff will endeavour to make this vocabulary as specific and accurate as possible. There will be an expectation that children use scientific vocabulary accurately in their written work.

3.3. The variety and scope of the vocabulary that it is essential to try to instil in the children is set out clearly in the ***INSPIRE key skills document for Science***.

4. PLANNING AND TEACHING

4.1 At Kilburn Junior School, it is essential that we teach scientific units of work that develop the children's scientific understanding through the specific areas of biology, chemistry and physics that are set out in the Science programmes of Study (National Curriculum for England). Whilst the Science programme of study in the National Curriculum are set out year by year, schools are only required to teach the relevant programme of study by the end of each key stage. Therefore, schools are afforded the flexibility to introduce content earlier or later on than set out in the programme of study. Details of the specific units taught at Kilburn Junior School can be accessed via our ***'INSPIRE Curriculum' Long term and Medium term plans*** for Lower and Upper Key Stage 2. Units of work have been planned that allocate sufficient time for children to develop and apply these skills. It is recommended that teachers should include at least one hour of science lessons each week.

4.2 Children at Kilburn Junior School are taught to **work scientifically. When** planning a series of lessons, teachers should take into consideration the following elements scientific enquiry: **observing changes over time; pattern seeking; identifying, classifying and grouping; comparative and fair testing (controlled investigations); and researching using secondary sources.** Further details of the skills that should be developed in each year group are clearly outlined in the school's ***INSPIRE key skills document for Science***. It should be noted that this should be embedded within the content of the scientific curriculum and not as a separate strand.

> *'Working scientifically' specifies the understanding of the nature, processes and methods of science for each year group. It should not be taught as a separate strand. The notes and guidance give examples of how 'working scientifically' might be embedded within the content of biology, chemistry and physics, focusing on the key features of scientific enquiry, so that pupils learn to use a variety of approaches*

to answer relevant scientific questions. These types of scientific enquiry should include: observing over time; pattern seeking; identifying, classifying and grouping; comparative and fair testing (controlled investigations); and researching using secondary sources. Pupils should seek answers to questions through collecting, analysing and presenting data. 'Working scientifically' will be developed further at key stages 3 and 4, once pupils have built up sufficient understanding of science to engage meaningfully in more sophisticated discussion of experimental design and control.

• National Curriculum in England: Science programmes of study.

4.3 At Kilburn Junior School, we believe in providing children with a rich and varied curriculum. Good quality and well prepared planning should identify opportunities for links to be made with other subjects through the teaching of science. Indeed, it can be far more beneficial to the children's learning if certain mathematical and English concepts are contextualised in a cross-curricular manner. In addition to the core curriculum of English and Maths, opportunities should be made to make cross-curricular links across all areas of our curriculum.

They should also apply their mathematical knowledge to their understanding of science, including collecting, presenting and analysing data. The social and economic implications of science are important but, generally, they are taught most appropriately within the wider school curriculum: teachers will wish to use different contexts to maximise their pupils' engagement with and motivation to study science.

• National Curriculum in England: Science programmes of study.

4.4 Science is a practical subject and the use of practical equipment to demonstrate scientific phenomena is an expectation of teaching at Kilburn Junior School. It is the responsibility of the school's science co-ordinator to ensure that these materials are up to date and are of a high enough quality to support the lessons. In addition to good quality scientific resources, staff should plan to make sure that scientific lessons are enriched by use of the extensive school grounds that are available to the children. Staff should also aim to plan for opportunities to enrich the science curriculum in the local area. This can take the form of well-planned school trips with clear aims and objectives.

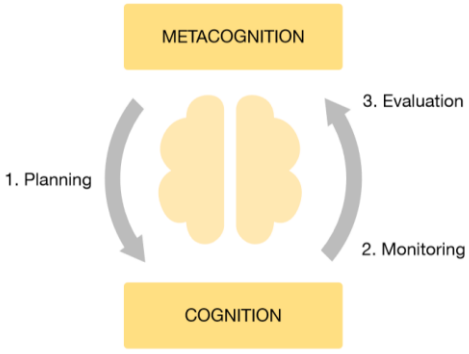
4.5 When planning lessons, staff should aim to extend the children's learning through the use of **Bloom's Taxonomy** in order to develop their scientific understanding through good quality differentiated questioning. **Accelerated learning** should also be used in the teaching of science at Kilburn Junior School in order to ensure that the subject is taught in an engaging, well-paced and stimulating manner.

4.6. The teaching of science at Kilburn Junior School is underpinned by the belief that, by working hard, **all children are capable of succeeding at science**. On this basis, children are taught all together as a class and are not split into 'ability' groupings. As teachers of science, we aim for **integration** in our lessons through differentiation. Carefully chosen resources, questioning and scaffolds allow the children within the class to

work on similar areas of the curriculum without capping the attainment of children with perceived lower abilities. All children should be taught to identify (with support from an adult) where they can push themselves onto more challenging work or where they might need to take a small step back to build their understanding of concepts. Carefully structured teaching, planned in small steps provides both the necessary scaffold for all to achieve, and the necessary detail and rigour of all aspects of science to facilitate deep thinking. The small steps are connected, leading to generalisation of scientific concepts, and the ability to apply it to multiple contexts and work scientifically. It is expected that those that will achieve well on a particular topic may not necessarily be the same children that achieved well on other topics. Our experience shows that it is not always the same pupils who require this form of intervention and this boosts the self-belief of previously low attaining pupils.

4.7. It is vital that we teach children **precise scientific language** and insist upon its use, to support children's ability to think scientifically. Learning this language and using it accurately, empowers children's ability to think about and articulate the scientific concepts they have learned.

4.8. Our teaching aims to support **metacognition** and **self-regulated learning** in school by encouraging children to reflect on their learning in collaborative groups so that learners can support each other and make their scientific thinking explicit through discussion. The work that children undertake is designed to support metacognition by encouraging them to monitor and evaluate their thinking, applying newly learned scientific concepts to similar problems.



4.9. A key aspect of encouraging children to monitor and evaluate their learning is through **teacher modelling.** This could be done verbally, demonstrated on a white board, in books, or in writing prior to the lesson on a handout5. In this way, children have the benefit of seeing how an experienced mathematician plans, monitors and evaluates their learning.

5. ASSESSMENT

5.1. Assessment should be used not only to track pupils' learning but also to provide teachers at Kilburn Junior School with information about what pupils do and do not know. This information allows teachers to adapt their teaching so it builds on pupils' existing knowledge, addresses their weaknesses, and focuses on the next steps that they need in order to make progress.

5.2. Teachers knowledge of pupils' strengths and weaknesses is used to inform their planning of future lessons and the focus of targeted support. In order to achieve this, teachers should aim to elicit the scientific understanding of their children through formative assessment at the beginning of a scientific topic. It is imperative that children have met the objectives and are secure before moving on to the next stage.

The programmes of study describe a sequence of knowledge and concepts. While it is important that pupils make progress, it is also vitally important that they develop secure understanding of each key block of knowledge and concepts in order to progress to the next stage. Insecure, superficial understanding will not allow genuine progression: pupils may struggle at key points of transition (such as between primary and secondary school), build up serious misconceptions, and/or have significant difficulties in understanding higher-order content.

• National Curriculum in England: Science programmes of study.

5.3. A variety of assessment methods are used to build a picture of the children's learning. Formal tests are a useful way to do this and should be conducted at the end of each scientific topic. Assessment can also take the form of informal observations of pupils or discussions with them about their scientific learning. A schedule of the different tests that will be undertaken are available in the document ***Assessment at Kilburn Junior School.***

5.4. Pupils' work will be marked in line with the ***Marking Policy*** and will model how corrections will be made, giving pupils a chance to learn from their misconceptions and mistakes. Guidance detailing how to give useful feedback can be found on the ***Marking Prompts in Science*** card.

5.5. Summative assessments are made at least once per term, three times per Academic year and logged on iTRACK. These teacher assessments are based on the evidence from formative and summative assessments made by the class teacher. The science subject co-ordinator will organise moderation and standardisation activities to ensure the accuracy of the assessments being made by the class teachers. It should be noted that children should be assessed no higher than 'secure' by teachers when they make their judgements. The reason for this is that children aren't currently assessed as 'working at greater depth' by the end of key stage 2.

6. STEM

6.1. STEM is defined as an approach to teaching science as an inter-connected discipline in conjunction with design & technology, engineering, mathematics and computing. Whilst STEM isn't in itself a discrete subject, it is the role of the science subject co-ordinator to identify opportunities to teach and develop STEM in the school curriculum, identify the need for high quality resources in this area and to arrange CPD opportunities for the teaching staff at Kilburn Junior School.

7. Role of the subject leader

The Subject Leader is responsible for improving the standards of teaching and learning in Science through:

7.1. Monitoring and evaluating Science:

- pupil progress and analysis of data three times per year

- provision of mathematics: ensuring the breadth and balance of the curriculum with clear and progressive steps taught.
- Science in other areas of the curriculum
- the quality of the learning environment (teaching, displays and use of ICT)

7.2. taking the lead in policy development
7.3. auditing and supporting colleagues in their CPD
7.4. purchasing and organising resources
7.5. reporting to governors and SLT
7.6. guidance support and training for parents and carers
7.7. keeping up to date with recent Scientific developments

8. Expectations of teaching staff

8.1. Teachers are aware of school policy and plan and teach lessons in keeping with its ethos.
8.2. A yearly overview is used to ensure coverage of the expected curriculum and progression from year to year.
8.3. Planning covers all Scientific objectives over a two-year cycle.
8.4. Planning covers all relevant key skills for 'working scientifically' each year.
8.5. Weekly plans are based on medium term planning and success criteria based on the most recent assessments available for each relevant science block.
8.6. A4 Science books with lined paper pages are used where relevant throughout the year
8.7. Skills taught in other subjects (particularly in English and mathematics) are reinforced, embedded and are evident in children's science books.
8.8. Topics offer children the opportunity to develop their knowledge and understanding of biology, chemistry and physics by working scientifically.
8.9. Guided group work is planned for and delivered.
8.10. Learning Objectives, success criteria and key pieces of vocabulary are displayed in all lessons and are evident in books.
8.11. Marking is directly linked to the Learning objective and Success Criteria in all lessons. (See feedback and Marking policy).
8.12. Assessment for Learning is used in classrooms.
8.13. The attainment and progress of pupils is tracked using itrack.
8.14. High quality displays are used to support teaching and celebrate the achievements of pupils.

9. THE EXPECTATIONS OF TEACHING AND LEARNING ASSISTANTS AND OTHER HELPERS IN CLASS

9.1. All staff are aware of school policy and plan and teach lessons in keeping with its ethos.
9.2. Staff will feedback to teachers and pupils as necessary and in line with marking and feedback policy.
9.3. Staff will use scientific vocabulary with accuracy and identify and correct misunderstandings or misconceptions in a timely manner.
9.4. Staff will model the high standards we expect from pupils and foster a love of science through their own enthusiasm for the subject.

Appendix

Include the progression in teaching (inclusive of Key Stage 1)