

Marlborough Road Academy

Science Intent

Intent

At Marlborough Road Academy, we follow the United Learning EYFS Curriculum in Nursery and Reception and the United Learning Curriculum for Science at Key Stage 1 and Key Stage 2. The United Learning Curriculum for science is based on the National Curriculum for science (2014), which is taken as a minimum entitlement for learners in United Learning schools.

The national curriculum for science 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 (National Curriculum, 2014)

Building on the United Learning Framework for Excellence, The United Learning Primary Curriculum has six core principles:

Entitlement: All pupils have the right to learn what is in the Marlborough Road Academy curriculum, and we have a duty to ensure that all pupils are taught the whole of it.

Coherence: Taking the National Curriculum as its starting point, our curriculum is carefully sequenced so that powerful knowledge builds term by term and year by year. We make meaningful connections within subjects and between subjects.

Mastery: We ensure that foundational knowledge, skills and concepts are secure before moving on. Pupils revisit prior learning and apply their understanding in new contexts.

Adaptability: The core content – the ‘what’ – of the curriculum is stable, but we will bring it to life in our own local context, and teachers will adapt lessons – the ‘how’ – to meet the needs of their own classes.

Representation: All pupils see themselves in our curriculum, and our curriculum takes all pupils beyond their immediate experience.

Education with character: Our curriculum - which includes the taught subject timetable as well as spiritual, moral, social and cultural development, our co-curricular provision and the ethos and ‘hidden curriculum’ of the school – is intended to spark curiosity and to nourish both the head and the heart.

We recognise that progression and coherence in the teaching and learning of science needs to flow effectively from Nursery to Year 6. We ensure that pupils master core content through identifying and revisiting key knowledge (substantive and disciplinary). We sequence the curriculum to allow for gradual development of vertical concepts – the ‘big ideas’ in science – to provide firm foundations for KS3 and KS4. Our curriculum is designed to prevent common misconceptions that are often formed at an early age and prove problematic at the later stages of pupils’ science education

At Marlborough Road Academy, we inspire our children to think and work like scientists. We encourage them to be inquisitive and to develop ideas and ways of working that enable them to make connections within and beyond science to make sense of the world in which they live. At Marlborough Road Academy pupils are encouraged to make deliberate and explicit links to other curriculum areas – particularly geography and mathematics.

In science at Marlborough Road Academy teaching covers Biology, Physics and Chemistry at an age appropriate level. Disciplinary knowledge (working scientifically) is addressed under the following categories:

- **Scientific Attitudes and Planning**
- **Measuring And Observing**
- **Recording And Presenting**
- **Analysing And Evaluating**

Implementation

- The teaching of the wider curriculum at Marlborough Road Academy is organised so that pupils are always first taught content in the most relevant subject. For example, pupils are taught how to construct bar charts or calculate the mean in mathematics before they are applied in science.
- The science curriculum is sequenced so that the disciplinary knowledge is explicitly taught and practised alongside the substantive knowledge, and regularly reviewed and built upon across the years and key stages.
- Practical tasks are planned to have a clear purpose: to demonstrate or prove substantive concepts, or to allow pupils to deliberately practice working scientifically skills in a relevant context. Practical tasks also generate an excitement and 'buzz' about the subject, which serves to motivate and inspire pupils to engage with their learning at a deeper level. Teachers select examples and applications of science that inspire pupils' curiosity about the world and natural phenomena. Teachers at Marlborough Road Academy create a positive attitude to science learning within their classrooms and reinforce an expectation that all children are capable of achieving high standards in science. Teachers have high expectations of pupils and they are required to work hard.

Our whole school approach to the teaching and learning of science involves planning for the following;

- A pre learning quiz which takes place at least one week before the new learning is delivered which identifies gaps in prior knowledge that is needed to fully access the current learning.
- Gap teaching following the outcomes of the pre learning quiz.
- Pre teaching key vocabulary and concepts for SEND pupils.
- A knowledge organiser outlining the substantive and disciplinary knowledge, including vocabulary and the correct definition, that all children must master.
- A cycle of lessons, which carefully plans for progression and depth.
- Educational visits, visiting experts and artifacts that will enhance the learning experience.
- Classroom working walls which detail current, prior and future learning, the substantive and disciplinary knowledge children will learn, key vocabulary with definitions, and the vertical concept the area of learning falls within.
- Planning, which includes the five enquiry types (observation over time, pattern seeking, identifying, classifying and grouping, comparative and fair testing and research using secondary sources.)
- Sentence practice, which enables children to develop their sentence structure not only in English lessons, but throughout our school curriculum in different contexts
- Scaffolding within each lesson for children that need support and deepening tasks for children who require additional challenge
- Practical learning experiences and investigations within the classroom
- Learning through our hidden curriculum (lunch time activities), such as observing mini beasts in the bug hotel in the wooded area.
- The use of kagan structures to ensure that all children are fully participating in their learning in a supportive and safe environment;
- High quality modelling and direct instructions
- Questioning to assess understanding (hinge point questioning, funnelling, direct), which form part of the Rosenshine principles

- Encouraging open-mindedness, self-assessment, perseverance and development of scientific skills – including: observing, measuring, predicting, hypothesising, experimenting, communicating, interpreting, explaining and evaluating
- Links to other subject areas. As a school, we include as many opportunities for writing like a scientist in our lessons as possible, along with opportunities for using and applying maths and grammar practice, using daily sentence practices.

Every teacher receives additional planning days, to ensure the curriculum is being planned thoroughly and teacher subject knowledge is strong

EYFS

In our Early Years provision, science is mainly taught through the strand of 'Understanding of The World', however we try to include science in many other ways including as a focused topic, reading books, trips, experiences and visitors and through art and design. In the EYFS opportunities are provided for pupils to explore the natural world and investigate forces and materials through play, observation, stories, hands on activities and to use their 5 senses. Planning for base times, continuous provision, indoor and outdoor learning is well thought out and links to many events throughout the year and the seasonal changes.

K.S 1

This is then built on when moving onto key stage one. Science is taught for an hour a week in Years 1 and 2. At K.S 1 all science is taught in single year gps, despite having a mixed age class to ensure that pupils build knowledge gradually and in a way that means pupils are not expected to deal with more complex content, before having mastered the basics. Learning is very hands on and interactive, while introducing more formal methods of recording. When planning, we make sure that a variety of forms of scientific enquiry are covered throughout the year. Where possible, we link our science lessons to our local area, for example we have a large wooded area, which can be used for mini beast hunts and can be used to see the changes in trees during the different seasons.

K.S.2

As pupils move into KS2, science is taught for two hours a week. In key Stage 2, some year groups are 1.5 form entry and so planning for these year groups works on a two year rotation: Cycle A and Cycle B. In the curriculum for these year groups knowledge builds within and across each cycle, so that pupils develop the same substantive and disciplinary knowledge by the end of each cycle, as they do in single age year groups. Teachers pre-teach required ideas to younger pupils who are in their first year of the two-year cycle and stretch older pupils who are in their second year to link knowledge to previous learning.

We provide opportunities for interactive learning in as many lessons as possible. For example, when the children are learning about muscles, they create their own working model of a muscle (Year 3), Year 4 use observation to investigate condensation and evaporation, and Year 5/ 6 build and test periscopes when learning about light.

Our curriculum allows pupils to consider the work and impact of scientists past and present and to understand the potential employment opportunities science brings. Year 5/6, for example, research the anthropologist Jane Goodall as part of their topic on life cycles and class family meetings provide an opportunity to discuss the link between current affairs and science e.g. the role of scientists during the C19 pandemic.

Parents are informed of what their children are learning in science every term through a curriculum overview of the unit of work. This information is also published on our school website for parents to view, along with the outcomes in the form of a face to face learning sharing event. If parents ever want to know more we are always open to discussing our science curriculum with them.

Impact

The United Learning Curriculum for science is progressive, giving pupils the skills and knowledge that they need to move forward in their learning, alongside opportunities to apply their knowledge to different situations. When children keep up with the curriculum, they are considered to be making progress towards the identified end points the curriculum builds to. This enables pupils to access the next stage of their education.

Regular, low stakes assessments in lessons enable teachers to assess each pupil's understanding of the curriculum. These include:

- Pre-learning quiz for each unit, which takes place at least one week before the new learning is delivered and identifies gaps in prior knowledge that is needed to fully access the current learning.
- Post Learning Quiz; a low stakes quiz which is tested to support learners' ability to block learning and increase space in the working memory. This allows the teacher to assess how much key knowledge the children have remembered. The questions focus on the knowledge children can remember and not the activities completed. Post learning quizzes allow teachers to identify any gaps in knowledge and ensure appropriate children are targeted for support.
- Retrieval practice at the beginning of each lesson to review prior learning. This demonstrates how well children can remember and recall key knowledge. It also enables teachers to identify gaps in knowledge and/or address misconceptions with 'in the moment' feedback.
- Spaced retrieval after a period of time to assess how well pupils have remembered prior learning over time. **Progress is demonstrated by children knowing and remembering more** and by them being able to keep up with the demands of the curriculum.
- 'Deep Dive' book looks with pupil conferencing gives all learners the opportunity to explain their understanding of their learning. This information is used to identify and fill gaps in their knowledge and understanding and to ensure that pupils make rapid progress.

SEND children have access to the same curriculum as non SEND pupils and are assessed in the same way, however, their activity may be scaffolded in order to remove their barrier to learning. For example, if a child's specific needs relate to writing, they may have a scribe/multiple choice to help them answer the same questions as the other children. We believe that it is important to give SEND children the opportunity to show their understanding in science in a way that is appropriate for them, in order for them to demonstrate the depth and breadth of their understanding.

'Deep Dive' book looks with pupil conferencing gives all learners the opportunity to explain their understanding of their learning. This information is used to identify and fill gaps in their knowledge and understanding and to ensure that pupils make rapid progress.

We give each pupil at Marlborough Road Academy the opportunity to not only strive to achieve academic excellence, but also to recognise and develop their individual talents and become the best person that they can be. With this in mind, we hope that pupils are inspired and enthused by our science curriculum and will take an interest in the subject with them into the next stage of their education and their lives as adults.