

Raynham Science Curriculum (Intent, Implementation and Impact)

Key Principles:

The curriculum builds on **prior learning with progression** throughout the school. Consideration is given to the order in which knowledge is taught so that children can relate their learning to previous learning. There are **key concepts** (see below) that children must know by the end of year 6 – these are the ‘nuggets’ of learning in this subject (**sticky knowledge, components/composites**). Recall opportunities relating to the key concepts are built into the planning regularly so that children retain these ‘nuggets’ so that they ‘know more, remember more and can do more.

Intent - Our Vision and Key Principles

In science at Raynham we aim to enthuse the children’s love and **curiosity** about natural phenomena and events around them. We encourage children to **explore** confidently in order to develop and deepen their understanding of the world in which they live, **explaining** what is occurring, **predicting** how things will behave and **analysing causes**. They learn to **question** and **discuss** science-based issues that may **affect their own lives**, the **directions of society** and **the future** of the world, encouraging and supporting the development of **science capital**. Our pupils will understand how major scientific ideas and specific scientists in the past have contributed toward societal change – impacting on industry, medicine, business and improving quality of life. By implementing an inclusive, progressive, creative and inspiring curriculum with **real-life links**, we ensure children have a **meaningful conceptual** understanding of the essential aspects of the knowledge, methods, processes and uses of science. We encourage children to raise their own questions for exploration and develop **transferable skills** such as observation, **communication** and **teamwork**. By working scientifically, through investigations involving planning, testing, recording and analysing results, children come to appreciate the nature of the learning process and its practical application to **everyday experiences**. We aim for our children to have **high aspirations** for themselves and teach them about **diversity** in science including important **scientists** whose discoveries have impacted on the way we live.

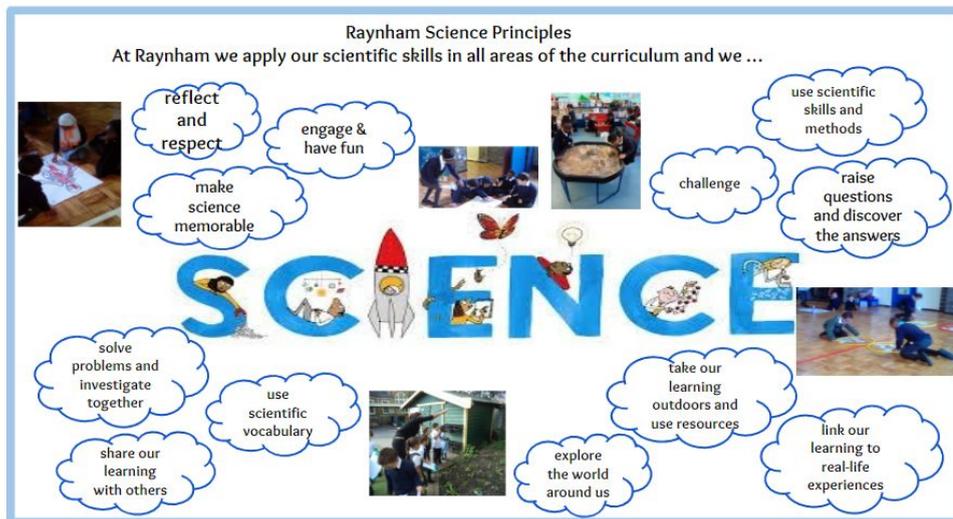
The staff at Raynham ensure that all children are exposed to **high quality teaching** and **learning experiences**, which allow them to explore their **outdoor environment** which is also important for their social and imaginative development. **Communication** is key and we value the importance of developing **spoken language** during science lessons. The children are immersed in **subject specific language** to enable development and confidence in using **scientific vocabulary** to articulate concepts clearly. Teachers build the children’s foundations securely with discussion to iron out misconceptions.

We aim to develop children’s sense of **global and local citizenship** through understanding the value and importance of making responsible, informed and more **sustainable lifestyle** choices that minimise our impact on the environment. We do this through embedding our **whole school values** and providing a **creative approach to learning** that is rich in making **cross-curricular links** so that learning is meaningful thus contributing to a lasting, positive behavioural change.

Principles

- The 2014 National Curriculum for Science aims to ensure that all children:
- 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.
- Children are equipped with the scientific skills required to understand the uses and implications of science, today and for the future.

Science Principles at Raynham:



Teaching & Learning

Our science teaching is underpinned by our vision and principles shared with everyone.

Reflective learning and **questioning** opportunities for all pupils building on their **prior knowledge** and providing **cross-curricular links**.

An environment that **encourages** pupils to **pose their own questions** and **suggest** their own way of **investigating** their **hypotheses** to **develop** their **ideas** and **independence**,

Key vocabulary and **scientific** pedagogical methods are used in order to **challenge** pupils and **broaden** their **understanding**.

Nurturing and **applying** pupils' science learning to **real-life experiences**, making science **meaningful** and building the 'Science Cultural Capital'.

Hands-on, practical experiences of working in a range of **scientific methods** to explore, **inspire** and foster pupils' **natural curiosity**.

A creative, inclusive and stimulating science curriculum, enabling pupils to secure and extend their scientific knowledge and vocabulary. Making learning fun!

Memorable, exciting and collaborative learning experiences, that carries on beyond the classroom.

Key concepts: Early Years to Year 6

1. **Structures:** Anything composed of parts arranged together in some way
2. **Function:** A specific job or procedure
3. **Variation:** Similarities & differences between living things of the same species
4. **Adaptation:** The process by which animals, plants and other living things have changed so that they better suit their habitat
5. **Cause and effect:** Cause is why something happens / Effect is what event has happened as a result of this
6. **Changes:** Changing from one material / state to another
7. **Evolution:** The way that living things change over time
8. **Growth:** The process of increasing in size

9. **Energy:** Strength and power. There are many forms such as thermal (heat), radiant (light) or kinetic (movement)
10. **Process:** A series of actions or steps taken in order to achieve a particular end
11. **Similarity and Difference:** Similarity is sameness or a likeness between things and differences a way in which people or things are dissimilar
12. **Working scientifically:** The processes of science: asking questions, designing experiments, reasoning and arguing with scientific evidence and analysing and interpreting data.

Biology – Plants, animals including humans, habitats, evolution and inheritance

Chemistry – use of everyday materials, rocks, states of matter, properties and changes of materials

Physics – light, forces, magnets, sound, electricity, Earth and space

Implementation

Medium Term Plan and Progression Map, Knowledge Organisers

The medium term planning and progression mapping of Science lessons will reflect exactly what content, knowledge and skills are critical for pupils to progress through the curriculum in each year. There is a clearly mapped curriculum coverage document for each year group and how these topics progress across the years including EYFS.

Topic Blocks

Science is taught in topic blocks with cross curricular links to enable the achievement of greater depth of knowledge.

Curriculum Knowledge Organisers

Teachers plan and have access to curriculum knowledge organisers for each science topic which contain key facts, vocabulary, prior learning, key concepts and other information. This aids planning and teaching.

Working Scientifically

These processes and methods should be embedded in lessons so that children learn to use a variety of skills to answer scientific questions / investigations. These are: Observing over time, pattern seeking, identifying and classifying, comparative and fair testing and researching secondary resources.

Subject specific vocabulary

Subject specific vocabulary is identified through knowledge organisers and displays, and is highlighted to the children at the beginning of lessons and revisited through class assemblies and knowledge quizzes.

Collins Connect

Teachers use Collins 'Snap Science' an online science resource to support planning for the current curriculum. Other resources are ASE - The Association of Science Education.

Title / Topic pages

Title pages are used at the start of each new science topic to revisit and assess prior learning, raise questions to investigate and challenge. They also showcase, collate, review and assess new science learning during and at the end of a unit. This follows the KWL approach - What I know, What I wonder, What I have learned. Children suggest what they would like to learn at the start of each topic and this is to maximise engagement and motivation.

Science Vision and Principles

Science vision and principles are shared with all staff and they are discussed and acknowledged during lessons providing consistency and a road-map of what is to be expected and celebrated by everyone.

Books

Children will have constant access to a wide variety of subject specific fiction and non-fiction Science books, available during lessons, and in the school library.

Scientific Writing

Encourage scientific writing to be meaningful and demonstrate high quality writing across the curriculum.

Use of scientific resources

Where possible, scientific equipment is used for children to explore and investigate (stored in the mezzanine) . Children get a first-hand learning experience by performing various experiments. Students are made to use the models and understand different scientific theories and concepts.

Displays

Science displays provide a way to introduce new material and showcase students' work. Teachers and children create displays that are equally engaging, inspirational and educational. Question boards / boxes for science are

used to promote children to raise their own questions. The five enquiry types (Observation over time, Pattern seeking, Identifying, classifying and grouping, Comparative and Fair Testing, Research using secondary sources) are also displayed in every classroom describing the processes and skills pupils should be taught and use, to find out more about the world and how it works.

Outdoor learning and trips

Children learn in a variety of ways, and so where appropriate, children will learn science outside the classroom. On site we have access to our large playground, school farm, herb garden, orchard / meadow and sensory garden. We also have access to the school field. We also plan visits to museums and local places of scientific relevance.

Children can clearly see things in context which promotes and fosters an emotional connection between children and the natural environment. The outdoors also facilitates creative activities such as drawing and sketching, basic skills in science that we should encourage.

Marking special days such as World Science Week, Earth Day, STEAM week, British Science week.

Teacher expectations

- To be confident about what they are teaching and understand the scientific knowledge and skills required for the topic being taught.
- To use a wide range of resources that are easily accessible and well maintained.
- To plan and prepare meaningful science experiments
- To use open ended questions to challenge and lead children's thinking.
- To challenge pupils and ensure progression throughout the school.
- To work as a whole school to improve standards in science.

Professional Development

Teachers are well-supported and are continuously encouraged to pursue professional development through internal twilight sessions, observations as well as external training where needs are identified.

Impact

Science progress in Raynham, is measured through the child's ability to obtain sustainable knowledge, remember more and explain more. Our successful, consistent approach results in fun, engaging, high-quality Science education, that provides children with the foundations and knowledge for understanding the world. This is evident in pupils' work, photos, and displays.

Through a variety of well designed and well delivered Science lessons, workshops, trips and interactions with experts and local charities, children have the understanding that science has changed our lives and that it is vital to the world's future prosperity. Children are aware of the possibilities for careers in Science, as a result of our community links and connection with national and local agencies such as the STEM association, North Middlesex Hospital, Secondary Schools and the ASE. This gives our children access to positive role models within the field of science from the immediate and wider local community. We also deliver science fairs for the parents and carers to attend.

At Raynham Primary school, all children have a voice and are scientists and through exposure to a range of different scientists from various backgrounds, all children feel they are scientists and capable of achieving. Teachers are well-supported and are continuously encouraged to pursue professional development through internal twilight sessions, observations as well as external training where needs are identified.

Assessment

In EY, children are assessed through observations. In KS1 and KS2, children are assessed against the NC core objectives stated on the medium term plans for each half term. Teacher assessments are informed through carefully differentiated planning and teaching, targeted questioning, observations, challenges and next steps. Knowledge and skills are assessed through teacher assessments evidenced through pictures, observations pupils' work inc books, quizzes and next steps. Half termly assessments are collated on Scholar Pack.

Monitoring and Evaluation

Monitoring and evaluation of the impact on children's learning includes regular monitoring of books by the subject coordinator, year groups mini moderations, learning and environment walks as well as half-termly progress meetings with each year group.

Equality and Inclusion

Providing equal opportunities for all the children is at the heart of teaching practice at Raynham Primary School.

Activities are differentiated to ensure all the children, including PP, MABLE+, SEND and low attainers needs are met.

[Links to key drivers in school:](#)

Creative curriculum, Outdoor learning, Topic Based learning