



## Science at The Ryde School

### Research and reading

The 10 key issues with children's learning in primary Science in England: by Dr Lynne Bianchi, Christina Whittaker & Amanda Poole.

[https://www.scienceacrossthecity.co.uk/wp-content/uploads/2021/03/3634\\_Childrens\\_Learning\\_in\\_Primary\\_Science\\_Report\\_2020\\_v8.pdf](https://www.scienceacrossthecity.co.uk/wp-content/uploads/2021/03/3634_Childrens_Learning_in_Primary_Science_Report_2020_v8.pdf)

A review by Ofsted of research into factors that influence the quality of science education in schools in England.

<https://www.gov.uk/government/publications/research-review-series-science>

Cognitive Load Theory and its application in the classroom: Dominic Shibli and Rachel West

<https://impact.chartered.college/wp-content/uploads/2018/03/Cognitive-Load-Theory-and-its-application-in-the-classroom.pdf>

'State of the nation' report of UK primary science education: Wellcome Trust.

[State of the nation' report of UK primary science education | Wellcome](#)

Science education in schools: maintaining curiosity: Ofsted.

<https://www.gov.uk/government/publications/maintaining-curiosity-a-survey-into-science-education-in-schools>

### Science Curriculum Rationale

At the Ryde School our vision is to give all children a science curriculum which ignites pupil's curiosity and encourages them to explore and question the world around them. We encourage children to identify how Science can be used to explain what is occurring, predict how things will behave and analyse possible causes. Science should encourage our children to be critical, creative and reflective thinkers and inspire them to take risks in order to improve and discover. To fulfil these aims children, need to acquire both factual knowledge and the skills of enquiry.

At the Ryde School learning outside the classroom is an embedded feature of Science lessons ensuring children make connections to real life experiences and events. Regular trips, visitors and workshops enrich the science curriculum, these can include: **an Ark farm visit, Palaeontologist workshop, STEM Knex Challenge, Bat expert visit, Kew Garden trip and moving toys workshop.**

Our Science curriculum enables children to see the relevance of the subject in their own lives and through the learning of Biology, Chemistry and Physics they are introduced and can further imagine potential future science related careers.

### **Curriculum Intent**

At The Ryde Primary School, the Science curriculum promotes a love and thirst for learning. We want to nurture and inspire children's natural curiosity and enable our pupils to discover and explore the world around them

The National Curriculum provides the minimum statutory requirements for Science teaching and learning, our staff then build on this essential knowledge using questions and ideas generated by the pupils themselves, utilising our local environment including our forest school area and planning for classes unique interests. Teachers also use the Herts for Learning Progression in Science guidance to support planning and ensure knowledge is built on across the school as well as the PLAN Knowledge matrices. .

In every year group, each area of Science is taught every term meaning learning is revisited and built across the year. Through the interleaving of each area of Science children make links to previous learning, other subjects and are able to ask and investigate their own questions. This process gives children the opportunities to retrieve information, become more fluent with the subjects and transfer knowledge into their long term memory.

Our intention is to enable our pupils to acquire specific skills and knowledge to help them think scientifically, gain understanding of scientific processes and develop an understanding of the uses and implications of Science, today and for the future. This is strengthened by regular opportunities to learn outside the classroom. Teachers plan trips, experiences and workshops each year. Examples of these include; **visits to RAF Hendon, Lee Valley Park wildlife, STEM CAMS workshops, trips to the Dutch Garden Centre, Kew Gardens trip, Paradise Wildlife Park visit and trips to the STEM Discovery Centre.**

We plan for and embed 'the working scientifically skills' into each area of study to ensure children are developing the practical skills they need to be scientists. Through letting our pupils wonder about the world, pose their own questions and find ways of answering them we put our pupils at the centre of their enquiry: developing resilient and engaged learners.

There are seven working scientifically skills which children develop from ages 4 to 11 years they include:

*asking questions, making predictions, setting up tests, observing and measuring, recording data, interpreting and communicating results and evaluating.*

At The Ryde our intention is to encourage children to be lifelong learners in Science and to feel inspired to learn, discover and to investigate beyond the classroom.

## Curriculum Implementation

Our Science curriculum was reviewed in 2019. Using evidence from *Maintaining Curiosity* (Ofsted, 2013) and *State of the Nation* (Wellcome Trust, 2017) the subject leader led CPD sessions with staff to review and improve how science was taught at The Ryde. As a result, teachers allow pupils to follow their interests, record knowledge creatively and ensure experiments and investigations are purposeful and develop specific skills. Teachers plan for and provide a rich, practical and engaging Science curriculum.

At the start of each topic, children are given an opportunity to explain or revisit their previous learning, depending on the age of the children this is done through **class discussions, quizzes, big question activities or the completion of different formative assessment tasks**. This ensures that teaching is informed by the children's starting points, it takes in to account pupil voice and gives them the opportunity to pose their own questions and ensures that any misconceptions are identified. **In class 5 children have posed questions like what substances melt ice quickest, do thermal insulators act the same on both hot and cold temperatures and what surfaces create the most friction.**

At the beginning of most lessons, teachers plan opportunities for pupils to recall prior learning. This can be done in a range of ways including: **teacher's using precise questions, low stakes quizzes or odd one out activities**. This enables pupils to consolidate their previous learning, while also preparing them for future learning, in line with the sequence of lessons. This is particularly important for our EAL and SEND children, who may need more opportunities to retain and embed scientific vocabulary and key concepts.

We aim to develop our pupils' scientific vocabulary, which aids children's knowledge and understanding not only of the topic they are studying in Science, but of the world around them. Children are often asked to record their understanding of Science learning through comic strips, letters, flow charts and even stories. These can be standalone lessons that develop vocabulary skills or can be the culmination of an extended piece of learning across literacy and science. **For example, in year 2, in the autumn term, children begin to identify animals that are herbivores, carnivores and omnivores. In the spring term, they build on this work by categorising animals including fish, mammals, amphibians, birds and reptiles. In the summer term children take part in trip to a different habitat where they study and explore pond habitats and the creatures that live there. Combined with work in science, the story *A Tadpoles Promise* by Jeanne Willis is used as a stimulus to inspire a piece of cross-curricula writing.**

Where possible teachers plan for practical Science, making it as hands on and pupil led as it can be. Working Scientifically skills are embedded into lessons to ensure that skills are systematically developed throughout the year and beyond. The Working Scientifically skills are at the beginning of our science books (or for KS1, the beginning of their science floor books) and teachers refer to relevant skills at the beginning of each lesson. The use of high quality science resources and equipment are used purposefully by staff and pupils

and the grounds including our forest school area are used to take learning out of the classroom.

### **Curriculum Impact**

We use both formative and summative assessment information in Science. This information is used by staff to inform their short term planning.

Assessment milestones for each phase have been broken down for each year group, allowing for detailed assessment of progress. Within each milestone children gradually progress through three cognitive fields: basic, advancing and deep. The ambition is that most children will achieve a sustained mastery at the 'advancing' stage of understanding by the end of each milestone, and for the more-able to have a greater depth of understanding at the 'deep' stage. This is completed yearly to support planning for the next year and identify gaps in learning. **Therefore, the time-scale for sustained mastery or greater depth is two years.**

Formative assessment is used as the main tool for assessing the impact of Science teaching and learning within a year as it allows for misconceptions and gaps in knowledge and skills to be addressed more proactively.

At The Ryde School teacher's and the subject leader use a range of strategies to assess children's understanding, progress and attitudes in Science. These include: book monitoring, learning walks, discussions with class teachers, discussions with pupils and pupil voice surveys, monitoring of the Science floor books, comparison of key activities across year groups including odd one out activities or plus, minus interesting activities.

Monitoring is used to measure whether:

- Children enjoy and are enthusiastic about Science in our school.
- There is a clear progression of children's work and teachers' expectations in our school.
- Children's work shows a range of topics and evidence of the curriculum coverage for all Science topics.
- Children are becoming increasingly independent in Science, selecting their own tools and materials, completing pupil lead investigations and choosing their own strategies for recording.
- All children are making progress, including EAL and SEND children.

Monitoring is also used to identify gaps in the curriculum that may need to be addressed across the school, or within individual year groups. Monitoring is an ongoing cycle, which is used productively to provide the best possible Science curriculum for our children.