

Intent

At Christ Church School we aim to instil a love of science within our pupils. Science at our school supports our vision of *inspiring life in all its fullness* through its contribution to a wide breadth of curriculum and we believe that high-quality science education is essential for understanding and respecting the world around us. Science in our school aims to encourage curiosity and develop a sense of excitement, in order to make sense of the world in which we live and give children a strong understanding of the uses and implications of science, today and for the future.

Our science curriculum is designed with high expectations in mind and provides opportunities for children to acquire the knowledge and skills they need to make progress throughout their time here at Christ Church and prepare them for when they move on to secondary science. At Christ Church, we aim to build and expand every child's science capital, in the hope that more children will continue to enjoy science and progress into STEM careers in the future. Science learning begins in Early Years in 'Understanding the World' and our curriculum covers the specific disciplines of Biology, Chemistry and Physics and these are made explicit to children in upper Key Stage 2.

The key skills needed to work scientifically are embedded in all our science teaching and build sequentially through the school, ensuring that all children have the opportunity to question, observe, discover, conclude and evaluate (essentially an understanding of the nature, processes and methods of science). Children are taught how to use scientific equipment by working practically throughout both Key Stages and we aim to encourage the children to be enquiry-based learners who can pose their own questions and seek answers to these. Science is taught across the curriculum wherever possible, including within additional enrichment activities, providing essential exposure and understanding for the children of how science impacts our daily lives.



Implementation

- All class teachers follow the National Curriculum and ensure the working scientifically skills are taught, revisited and embedded. The science skills are taught through learning the science content. Lessons are carefully planned to ensure skills progression within each year group, as well as throughout the school. By the end of year 6, pupils should have built solid working scientifically skills and have secure knowledge of the science content.
- Class teachers deliver science lessons and help to draw out links between previous learning and other curriculum areas.
- Class teachers are supported by the science subject leader and receive CPD through staff meetings and tailored support. Teachers demonstrate strong subject knowledge.
- Both formative and summative assessment is used in science. Teachers will use formative assessment to help shape a lesson, direct learning, provide feedback and adapt future lessons. Summative assessment is carried out at the end of each science topic. Assessment results will be shared with future class teachers when necessary.
- Children use a wide range of relevant resources to help them with their learning.
- The curriculum is enriched through various trips and visits: Thames Explorer, Francis Crick Institute, Science Museum, Hampstead Heath Education Centre. These all help to enhance our children's science capital.
- Strong curriculum links with maths (handling data, light and reflection), geography (weather, seasons), DT (electrical circuits to build torches, forces to build cars), English (explanation texts, persuasive writing), history (fossils and evolution), art (pencil drawings of invertebrates) computing (fact pages, research), PSHE (healthy living).
- All children are able to acquire the intended knowledge and skills in science. Learning is adapted for children with SEND and scaffolded support is given where needed.
- Children's work shows that lessons are sequenced effectively, showing progress throughout each topic within one year group and also across one topic over multiple year groups, where the topic is studied again and built on.
- Class teachers planned science activities throughout both periods of school closures. These activities ensured new content was learnt and working scientifically skills continued to be practised, but also ensured consolidation of previous learning.

Impact

- Children enjoy science lessons in school and as part of home learning or homework activities. Children are interested in what they learn about and often continue to learn outside the classroom by doing their own research. Pupil voice shows that children find science exciting, interesting and relevant.
- All children develop their working scientifically skills to become better problem-solvers and work with increasing independence as they move through the school. Children learn to communicate effectively by presenting their findings in various different ways, with different audiences in mind.
- Children have a good knowledge of the science curriculum and can make connections across the curriculum. Children are able to identify topics that have been introduced in earlier year groups and understand how they build on previous learning.
- Children have the opportunity to use a range of resources to carry out their work including scientific equipment and technology. Children's independence progresses throughout the school and they are given more opportunities to design their own investigations, select relevant equipment and consider how to record and present their findings.
- Children ask relevant scientific questions using subject-specific language. This subject-specific vocabulary is built on each year across the school.
- Science learning gives a chance for children to express views and opinions on topics which are important to them, e.g. climate change, plastics, sustainability.

Whole School Standards (two year trend):

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Last year's key developments and successes in 2020/21:

- Another very successful home learning period for science- schools continued to be closed at the time when we begin our science teaching (Spring 2). Science for all year groups began at home and continued on return to school to ensure the full curriculum was delivered.
- Supported class teachers in implementing content and skills taught so successfully during home learning into a classroom setting (20/21 target achieved)
- Equipment loaned from Francis Crick Institute (20/21 target achieved) – data logger borrowed for Year 4 sound insulation investigation.
- Enrichment activities/trips with COVID restrictions in place were successful (20/21 target achieved) Year 3 visited Hampstead Heath educational centre for a soil workshop and Year 5 took part in two remote workshops delivered by the Royal Observatory. Year 4 also took part in a workshop delivered by The Smallpiece Trust in partnership with the RAF in which they revisited learning from Year 3 about forces and designed and created their own mini gliders.
- Continuing to analyse data from individual reports to help assess standards in the subject area.

The **anti-racist curriculum review** document prompted us to reflect on the examples of scientists we hear and learn about and on the range of characters and names used in the resources we use for Science. We will continue to review our resources as we teach the science curriculum this year.



COVID impact- remote learning provision and recovery curriculum

Home learning provision (March- June 2020 and January- March 2021) included a wide range of activities set by teachers to be completed at home. There was ample opportunity for children to work practically to develop their working scientific skills. In the first closure, some science had been taught in school already, but the majority of the science curriculum was taught remotely by class teachers. In the second closure period, science teaching started remotely but then continued in the classroom once schools reopened. Remote science learning was a huge success across the whole school, with opportunities for children to share their learning via twice-weekly zoom meetings with their classes. Opportunities for children to work practically were hugely beneficial for developing skills but also for well-being, meaning that children utilised their local area and the outdoors to help them complete various investigations. Parents were hugely supportive of these practical tasks set by teachers and feedback from both parents and children shows these activities were welcomed and thoroughly enjoyed. The Science Challenge (linked with the Francis Crick Institute) for children in Year 4, 5 and 6 proved to be a huge success in 2020. Each class was tasked with carrying out an investigation, using as many working scientifically skills as possible. Children designed and planned their own investigations, made predictions, carried out their observations, presented their findings and drew conclusions. Entries were shared with the whole school community.



Recovery curriculum: no major adaptations to our Science curriculum have had to be made for 21/22 school year, as the full curriculum was delivered last year, including many opportunities to work scientifically using a range of enquiry types. The DfE recovery curriculum document makes suggestions which identify the most important content across the three scientific disciplines. An example is shown below:

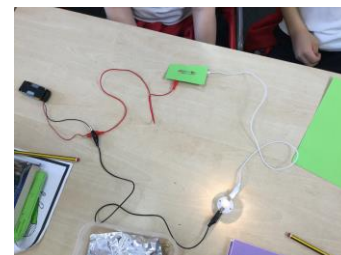
At key stage 1:

- an example of content which will support future study is knowledge about herbivores because it allows pupils to learn about food chains in key stage 2. This, in turn, enables them to understand ecosystems in key stages 3 and 4.

At key stage 2:

- concepts that are beneficial to future study include, but are not limited to, forces, electricity, magnetism, materials and substance, reactions, nutrition, evolution and inheritance, ecosystems, properties and changes of materials.

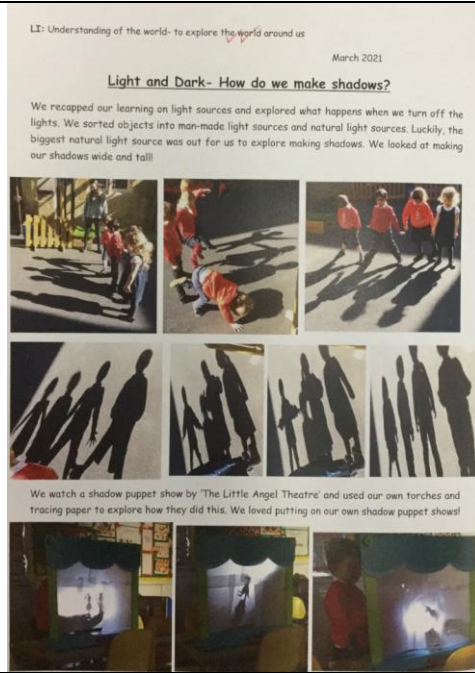
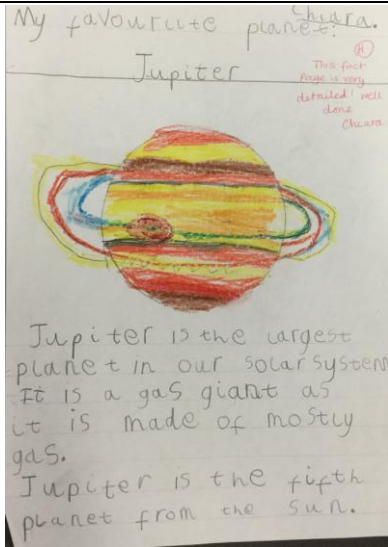
Teachers will use this information to inform their future planning for science this academic year but also when planning spaced retrieval opportunities throughout the autumn term and spring 1. We have also identified specific working scientifically skills to focus on in each phase.



Key targets and actions moving forward (development priorities for 2021/22):

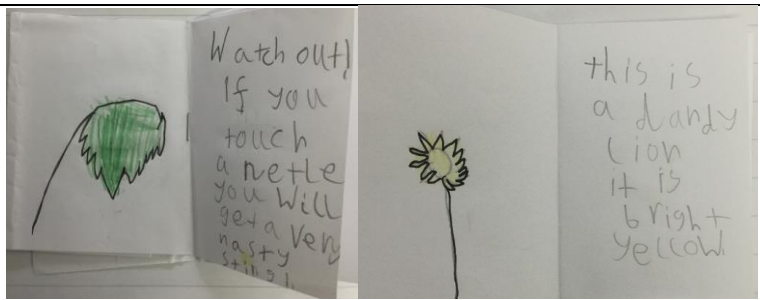
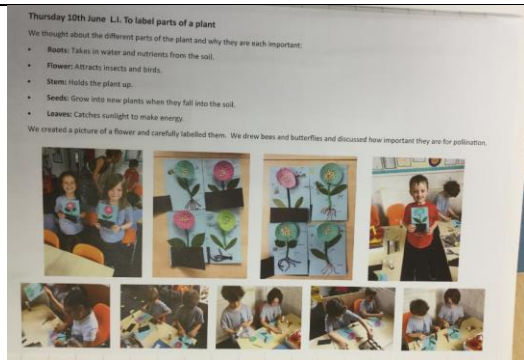
Target and intended outcome	Planned actions (including dates where applicable)
<p>Ensure connection with the Francis Crick Institute is maintained.</p> <p>Arrange trips to relevant institutions that link to learning to ensure enrichment opportunities are in line with or above pre-COVID levels.</p> <p><i>All children to have experience of appreciating or engaging with science in a wider setting through enrichment opportunities.</i></p>	<p>Crick workshops taking place in summer term with Year 5 visiting the discovery lab on-site. Arrange for Year 6 to experience something similar by arranging an in-school session (Year 6 missed this opportunity due to COVID restrictions). Science lead to setup equipment loan and organise science enrichment day for Year 6.</p> <p>Science lead to stay in regular contact with Crick and attend network meetings and CPD offers.</p> <p>Take part in the Science Challenge run by Regent High School and the Francis Crick Institute, following the success from doing this during home learning in 2020.</p> <p>Promote equipment loans across the school.</p>
<p>Continue to provide opportunities to revisit/use science learning in other curriculum areas during the summer term but also in autumn term when science is not being directly taught. Ensure regular spaced retrieval opportunities in autumn term for learning from previous academic year.</p> <p><i>Children are given ample opportunities to revisit and use previous learning and use their working scientifically skills across the curriculum, throughout the school year.</i></p>	<p>Use the DfE recovery document to inform spaced retrieval opportunities and future planning.</p> <p>Work with class teachers to implement low-stakes science quizzes across the autumn term and spring 1, covering content from previous year.</p>
<p>Consider how end of topic assessments are run. Implement more consistency across the school in this.</p> <p><i>Consistent summative assessment is carried out at the end of each topic to assess what children have learned and remembered.</i></p>	<p>Work with class teachers to see what is already being used. Consider existing resources to use for assessment purposes. Use this data to help inform end of year decisions.</p>
<p>Continue to ensure all children are able to talk about the skills and enquiry types being used. In upper KS2 children should be able to describe which enquiry type would fit their investigation.</p> <p><i>All children can talk about the working scientifically skills and enquiry types they are using in their learning.</i></p>	<p>Trial use of WS/ enquiry type icon stickers in lessons. Ensure icons are displayed on flipcharts in lessons.</p>

Work sampling – Home learning/ in school



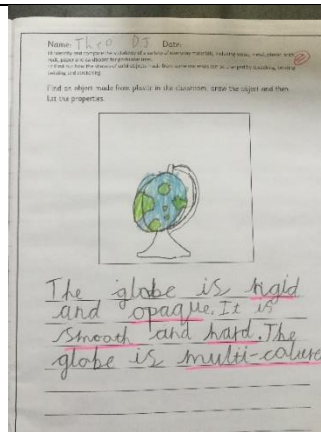
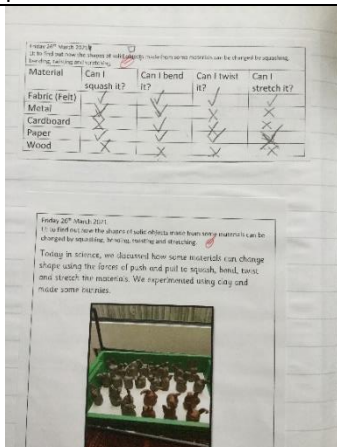
Reception- Understanding the world

Reception learnt about space and created fact files about different planets. They also identified different light sources and used the playground to explore how shadows are made.



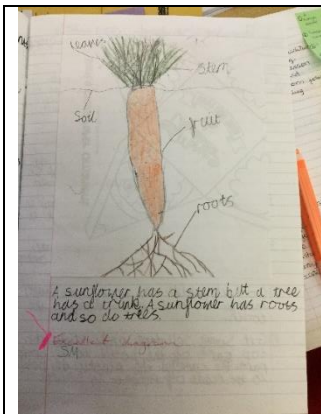
Year 1-Plants

Year 1 learnt to identify and label parts of a plant. They then created booklets to describe a variety of common wild and garden plants.



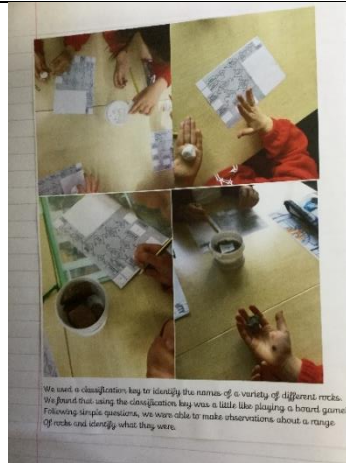
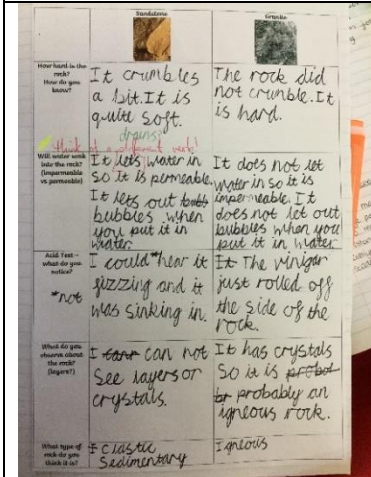
Year 2- Everyday materials and their uses

Year 2 learnt how shapes of solid objects made from some materials can be changed by squashing, bending, twisting and stretching.



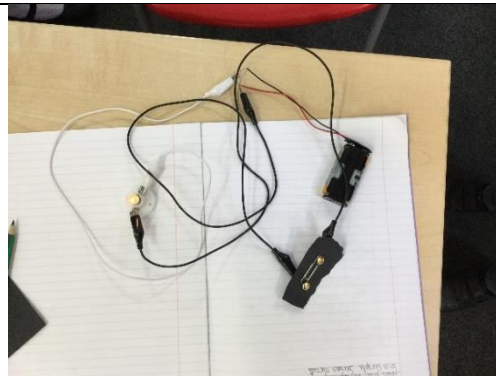
Year 3- Plants

Year 3 learnt about the basic parts and functions of a plant. They then found out about how water is transported through a plant, using food colouring and celery in a practical enquiry.



Year 3- Rocks

Year 3 learnt about properties of different types of rocks and then used their learning to classify two different rock samples, using a classification key.



Year 4- Electricity

Year 4 were introduced to a simple circuit and what is needed to ensure flow of electricity. They were then challenged to create a switch using a range of materials. Children had to transfer their knowledge of electrical conductors and insulators from a previous lesson to create a working switch.



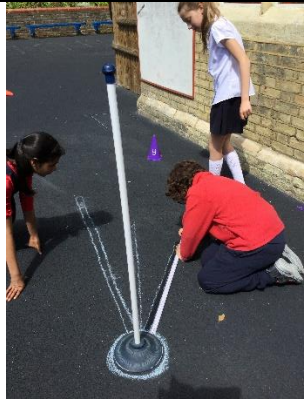
Year 4- Animals, including humans

Year 4 learnt about the different types of teeth and their functions. They were then challenged to create a model of the mouth, showing the different types of teeth and labelling them with their function.



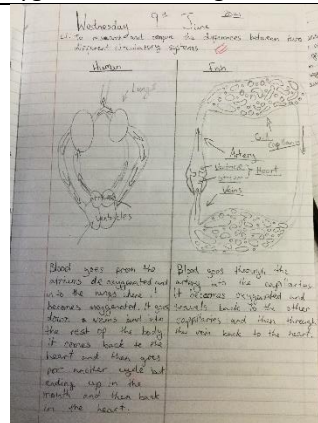
Year 5- Living things and their habitats

Year 5 students learnt about the parts of a flower and their functions in reproduction, extending their learning from Year 3. They then dissected a flower and labelled its reproductive parts.



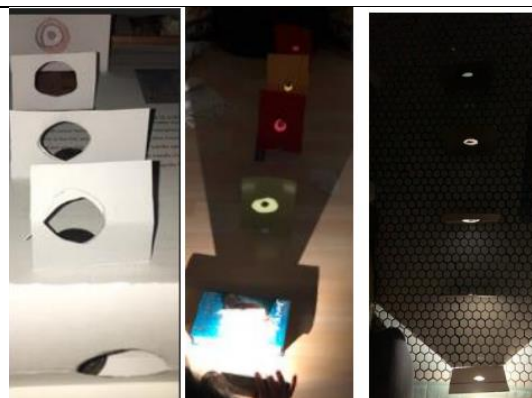
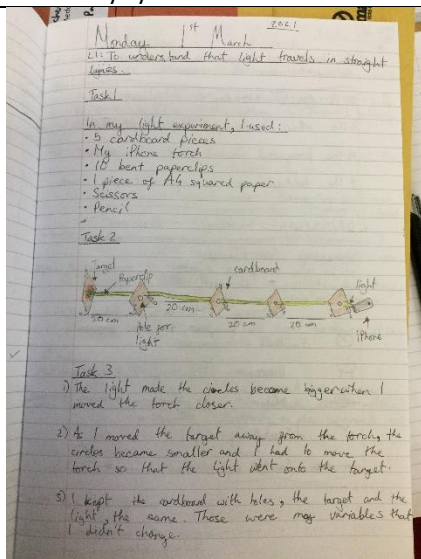
Year 5- Earth and Space

Year 5 learnt about the idea of Earth's rotation and used this to explain day and night and the apparent movement of the sun across the sky. They carried out an investigation in the playground, recording the movement of a shadow throughout the day.



Year 6- Animals, including humans

Year 6 learnt about the circulatory system and created animations to model how it works. They then compared human and fish circulatory systems.



Year 6- Light

Year 6 expanded on their learning from Year 3 and found out how light travels in straight lines. They completed this work during home learning and carried out their own investigations at home.

Home learning examples on our website:

Reception learning about seasons:

<https://christchurchschool.co.uk/wp-content/uploads/2021/01/Reception-Seasons-and-days.pdf>

Year 4 volcanic eruptions (geography topic but linked to science when creating the chemical reaction to cause the eruption!):

<https://christchurchschool.co.uk/wp-content/uploads/2021/02/Year-4-Geography-volcanic-eruptions.pdf>

Reception learning about plants:

<https://christchurchschool.co.uk/wp-content/uploads/2021/01/Reception-plants.pdf>

Year 6 learning about light:

<https://christchurchschool.co.uk/wp-content/uploads/2021/03/Year-6-Science-how-light-travels.pdf>

Enrichment of our curriculum



A Life workshop- children used 'Virtuali-tee' to explore the inside of the human body.



The workshop was organised as part of our whole school PSHE week but children were encouraged to make links with prior science knowledge.

All children in the school were given the opportunity to plant something around the grounds. Links were made to knowledge of parts of a plant and their basic needs.



Children learnt about renewable energy sources as part of our whole school arts project, linked to the Global Goals. Year 3 made their own model wind turbines.

Year 3's DT project was to create obilisks.



Year 3 visited Hampstead Heath education centre and took part in a soil workshop.



Year 5 took part in two workshops with the Royal Observatory.

Pupil voice

Pupil voice discussions in Autumn 2020 demonstrated that:

Children could talk about the importance of Science and how it links to the wider world:

“We need to know how our bodies work so we don’t get sick.” (Year 1 pupil)

“When you are older, you may come across something you need science to work out- like which material to use for something.” (Year 2 pupil)

“Science teaches us problem solving.” (Year 3 pupil)

“Science helps us understand medicine and make new discoveries.” (Year 6 pupil)

“We can look after the environment.” (Year 1 pupil)

“I want to be a scientist when I’m older and go to space.” (Reception pupil)

“Science knowledge helps us to live more sustainably.” (Year 4 pupil)

What makes our curriculum provision for Science exceptional and beyond the expected?

- Success of home learning activities, including science challenge in Year 4, 5 and 6.
- Relationship with the Francis Crick Institute for resources, CPD and enrichment
- Use of Hampstead Heath education centre for enrichment

Key points for discussion with governors about this report

- Sharing of work sampling with reference to where knowledge and skills have clearly been built on throughout the school
- Updating governors on Francis Crick provision
- Share key targets