

### **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**

- Y1-6 class teachers follow the National Curriculum and ensure the working scientifically skills are taught, revisited and embedded. This builds on the foundations for Science learning within the EYFS curriculum in Reception, such as through working towards the Natural World Early Learning Goal.
- In KS1 and KS2, the science skills are taught alongside and through learning the science content. Lessons are carefully planned to ensure skills and knowledge progression within each year group, as well as throughout the school. The curriculum is designed so that by end of Year 6, pupils have built solid working scientifically skills (disciplinary knowledge) and have secure knowledge of the science content (substantive knowledge).
- A range of enquiry types are planned, taught and built upon across the Science curriculum (grouping and classifying; noticing patterns, observations over time, fair and comparative testing, research and modelling).
- 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.

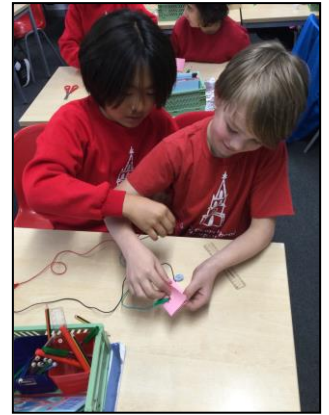


- Both formative and summative assessment is used in science. Teachers will use formative assessment (including questioning, observing, feedback and marking) to help shape a lesson, direct learning, address misconceptions, provide feedback and adapt future lessons. Key learning for each year group is identified in our key learning sheets for each topic. This also includes key vocabulary. Using a range of evidence including observation, work sampling, discussion with pupils and questioning, teachers make summative assessments against key standards and statements for all pupils. This is shared with future class teachers and parents in end of year reports. This data is also analysed and used to decide on future targets or areas of improvement in science.

- Children use a wide range of relevant resources to help them with their learning and the curriculum is enriched through various trips and visits: e.g. 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 and seeds) computing (fact pages, research), PSHE (healthy living) are utilised to consolidate prior science learning.
- All children are supported to acquire the intended knowledge and skills in science, through adaptive teaching in the classroom. Learning is adapted for children with SEND and scaffolded support is given where needed.
- Lessons are sequenced effectively, enabling 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.

**Impact**

- Children enjoy science lessons in school and as 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 key science curriculum content and can make connections across the curriculum. Children are able to identify topics that have been introduced in earlier year groups and understand how new learning builds 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 Tier 3, subject-specific vocabulary is built on each year across the school, with opportunities to use this vocabulary orally, in their writing and through reading non-fiction texts.
- 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, endangered animals.



**Whole School Standards (three year trend):**

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### Response to the Ofsted Research Review and Subject Report

The **Ofsted curriculum research review for Science** (June 2021) reviews a wide range of relevant educational research into both primary and secondary science teaching and identifies factors which may contribute to high-quality science education. The Christ Church reflection on and response to the curriculum review is summarised in our Autumn 2022 curriculum leader report.

The **Ofsted subject report for Science: Finding the Optimum**, was published in February 2023. The subject report built on the research review, shared strengths and weaknesses in Science in schools and identified factors which support effective curriculums, pedagogy, assessment and systems in Science. Please see the October 2024 curriculum report for some of the main recommendations and findings from the subject review, alongside our responses and, where relevant, next steps.

### Last year's key developments and successes in 2023/24:

#### **1. Ensure that science skills and knowledge are continued to be focused on in first half of academic year.**

*Intended outcome: All children to continue building on and refining their working scientifically skills and recapping on prior learning, even when science lessons are not explicitly happening.*

**23/24 target achieved:** Children were supplied with non-fiction books in the Autumn term related to science topics from previous year. Class teachers delivered numerous spaced retrieval sessions in first half of year to keep science learning alive in children's minds



#### **2. Continue to improve, add to and refine wider enrichment activities to complement the planned Science curriculum, continuing to increase child enjoyment and engagement in science.**

*Intended outcome: All children are able to build on and enrich their Science learning outside the classroom or with visiting specialists, supporting them to remember more of the planned curriculum.*

**23/24 target achieved:** Work with the Francis Crick Institute was continued for both in-school class workshops and Year 5 visit to the Institute. A range of class trips were carried out to Hampstead Heath, Camley Street, the Natural History Museum and the Royal Institute. Children also learnt about different issues and strategies to combat sustainability.

#### **3. Continue to ensure all teaching staff, including new teachers, ECTs and those working in new year groups, are confident to appropriately sequence and interleave substantive and disciplinary science knowledge.**

*Intended outcome: Both substantive and disciplinary knowledge are built progressively and sequenced so as to support each other. Pupil progress in both areas is assessed to be at least good across the school, with children knowing and remembering more of the planned science curriculum. Staff are confident in the teaching of science.*

**23/24 target achieved:** Science curriculum leader attended science leads network meetings and fed back relevant information to teaching staff. Delivered staff CPD to discuss sequencing and coverage of both areas of science learning. Supported new staff and staff in new year groups with curriculum and subject knowledge. Monitored lessons

through lesson visits, pupil voice and assessment data, which showed effective and increasing levels of staff confidence in both areas of science teaching.

**Additional successful development activities which have taken place in 23/24:**

**Trips**

More classes went on trips related to their science learning, and to a wider variety of places – see enrichment section below

**Science Club**

New science club was started in the summer term and was attended by a range of children in KS2. This will continue in Autumn 2024.

**Sustainability and Climate Action**

Throughout the year, each class focused on a specific Global Sustainability Goal, some of which linked to the science curriculum. They learnt about the goal, created some artwork based on it, and took part in some kind of action to make a difference. Reception focused on Goal 15 – life on land and created bunting to share information with the local community; Year 1 focused on Goal 3 – good health and wellbeing and created bunting to share information with the local community; Year 2 focused on Goal 14 – life below water and created bunting to share information with the local community; Year 3 focused on Goal 15 – life on land and created posters to share information with the local community; Year 4 focused on Goal 14 – Climate action and wrote letters to our local MP asking her to discuss their concerns with the government.

**Key targets and actions moving forward (development priorities for 2024/25):**

<b>Target and intended outcome</b>	<b>Planned actions (including dates where applicable)</b>
<p><b>1. Continue to ensure that science skills and knowledge continue to be focused on in first half of academic year.</b>  <i>Intended outcome: All children to continue building on and refining their working scientifically skills and recapping on prior learning, even when science lessons are not explicitly happening.</i></p>	<p>Spaced retrieval sessions in 1<sup>st</sup> half of year to focus on disciplinary as well as substantive knowledge.            Non-fiction books from previous year’s topics to be available and in use in the classrooms.            Potential for science trips/workshops in 1<sup>st</sup> half of year to recap or pre-teach – with focus on working scientifically skills.            Use of working scientifically skills in other subject areas such as maths or geography (as set out in Science curriculum pack).</p>
<p><b>2. Continue refining and developing key vocabulary in science</b>  <i>Intended outcome: All children are able to discuss learning, using key vocabulary accurately.</i></p>	<p>Large focus on key scientific vocabulary during lessons.            Key vocabulary to be displayed in classes.            Explicitly teach new vocabulary and its meaning, creating opportunities for repeated engagement and use over time            Model the use of new words in context.            Provide multiple opportunities to revisit and engage with scientific vocabulary over time.            Use vocabulary approaches that promote rich language connections and help pupils understand the relationships between words and concepts. Visual aids combined with image creation, such as drawing pictures or diagrams, as well as discussing the origin of words (etymology) or the structure of words (morphology), may be useful.</p>
<p><b>3. Relate new learning to relevant, real-world contexts</b>  <i>Intended outcome: All children, with a particular focus on those with SEND/individual needs, should be able to see how learning in school can be applied to relevant, real-world contexts.</i></p>	<p>Link learning to children’s interests and own experiences where possible            Link new learning to prior learning and other curriculum areas/topics            Engage with science concepts supported by virtual models.</p>

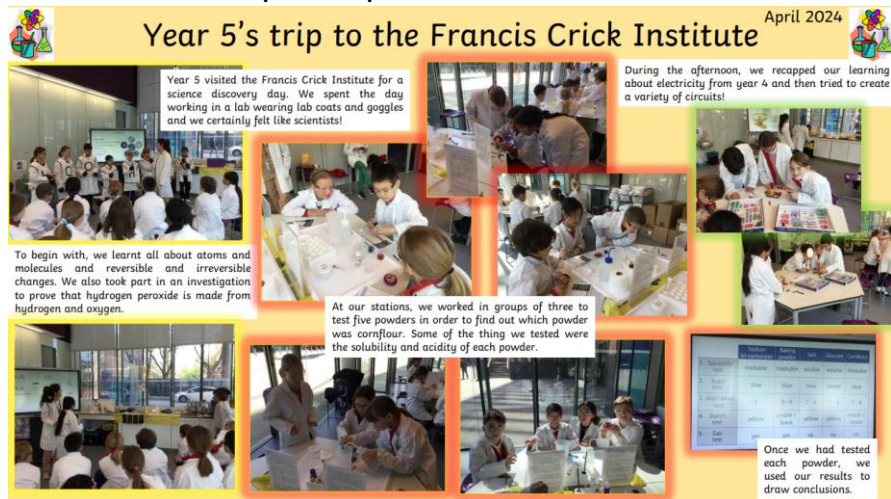
## Trips and wider enrichment

In Science, enrichment and trips are designed to build on what children are learning in class, or demonstrate real life uses of their scientific substantive and disciplinary knowledge. These opportunities help children to make links between prior, current and future learning, and provide them with learning that is memorable. Wider enrichment includes trips to museums or nature parks, workshops in and out of school, and visiting the local environment.

## Successful examples of enrichment from 23/24:

### Whole-school workshops and trips with the Francis Crick Institute

Year 5's trip to the Francis Crick Institute April 2024



Year 5 visited the Francis Crick Institute for a science discovery day. We spent the day working in a lab wearing lab coats and goggles and we certainly felt like scientists!

To begin with, we learnt all about atoms and molecules and reversible and irreversible changes. We also took part in an investigation to prove that hydrogen peroxide is made from hydrogen and oxygen.

At our stations, we worked in groups of three to test five powders in order to find out which powder was cornflour. Some of the things we tested were the solubility and acidity of each powder.

During the afternoon, we recapped our learning about electricity from year 4 and then tried to create a variety of circuits!

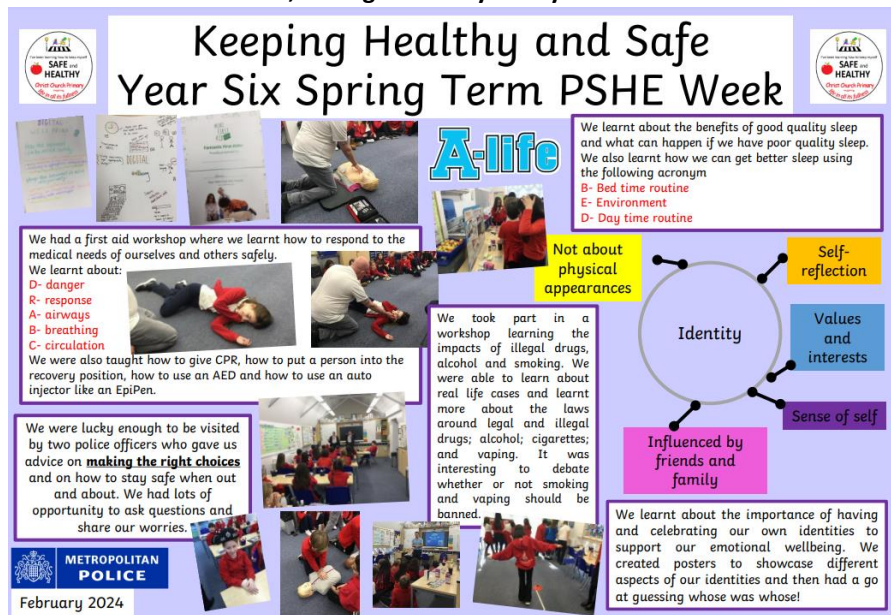
Once we had tested each powder, we used our results to draw conclusions.

<https://christchurchschool.co.uk/wp-content/uploads/2024/05/Francis-Crick-Science-Workshops-April-2024.pdf>

<https://christchurchschool.co.uk/wp-content/uploads/2024/04/Y5-Science-trip-to-the-Francis-Crick-Institute-April-2024.pdf>

### Whole-school PSHE week, linking to healthy lifestyles

Keeping Healthy and Safe  
Year Six Spring Term PSHE Week



We had a first aid workshop where we learnt how to respond to the medical needs of ourselves and others safely. We learnt about:  
D- danger  
R- response  
A- airways  
B- breathing  
C- circulation  
We were also taught how to give CPR, how to put a person into the recovery position, how to use an AED and how to use an auto injector like an EpiPen.

We were lucky enough to be visited by two police officers who gave us advice on making the right choices and on how to stay safe when out and about. We had lots of opportunity to ask questions and share our worries.

We learnt about the benefits of good quality sleep and what can happen if we have poor quality sleep. We also learnt how we can get better sleep using the following acronym  
B- Bed time routine  
E- Environment  
D- Day time routine

Not about physical appearances

We took part in a workshop learning the impacts of illegal drugs, alcohol and smoking. We were able to learn about real life cases and learnt more about the laws around legal and illegal drugs; alcohol; cigarettes; and vaping. It was interesting to debate whether or not smoking and vaping should be banned.

Identity

Influenced by friends and family

Self-reflection

Values and interests

Sense of self

We learnt about the importance of having and celebrating our own identities to support our emotional wellbeing. We created posters to showcase different aspects of our identities and then had a go at guessing whose was whose!

METROPOLITAN POLICE  
February 2024

<https://christchurchschool.co.uk/wp-content/uploads/2024/02/Keeping-safe-and-healthy-Reception.pdf>

<https://christchurchschool.co.uk/wp-content/uploads/2024/02/Keeping-safe-and-healthy-Y2.pdf>

<https://christchurchschool.co.uk/wp-content/uploads/2024/02/Keeping-safe-and-healthy-Y4.pdf>

<https://christchurchschool.co.uk/wp-content/uploads/2024/02/Keeping-safe-and-healthy-Y5.pdf>

<https://christchurchschool.co.uk/wp-content/uploads/2024/02/Keeping-safe-and-healthy-Y6.pdf>

### Whole-school Eco/Biodiversity Week, linking to sustainability and environmental issues – part of summer term PSHE week

<https://christchurchschool.co.uk/wp-content/uploads/2024/06/Biodiversity-day-May-2024.pdf>

<https://christchurchschool.co.uk/wp-content/uploads/2024/06/Reception-PSHE-week-wider-world.pdf>

<https://christchurchschool.co.uk/wp-content/uploads/2024/06/Y1-PSHE-week-wider-world.pdf>

<https://christchurchschool.co.uk/wp-content/uploads/2024/06/Y3-Heath-Hands-volunteering-May-2024.pdf>

<https://christchurchschool.co.uk/wp-content/uploads/2024/07/Y4-PSHE-week-wider-world.pdf>

<https://christchurchschool.co.uk/wp-content/uploads/2024/06/Y6-PSHE-week-wider-world.pdf>

## Year 4 applying their knowledge of electricity, and investigating tooth decay

**Year 4 – DT: Electrical Circuits – Lighthouses and Torches** **Summer 2024**

Using our expert knowledge on electrical circuits and switches, we decided we would apply this to making a model with a working light. We chose between making a lighthouse model or a torch. We needed to design our model, then create a structure using junk modelling. After this, we made a circuit, then hid it away within our structure.

**Design**

**Building structures and decorating**

**Making circuits**

**Year 4 – Science: Tooth Decay and Looking after our Enamel** **Summer 2024**

During the summer term, we learnt all about animals, including humans, and about the importance of looking after our teeth. We found out that the enamel on our teeth stops us from getting cavities. Certain food and drink can weaken this enamel.

We made some predictions about which drink would be the most damaging to our teeth, then waited a week to see.

**Don't hold vinegar in your mouth for a week!**

The orange juice made the shell (enamel) soft and discoloured. It was also peeling off the egg. The water did no damage to the shell. Although the milk had gone bad and smelt terribly, the shell was undamaged. The coke stained the shell and left a film all over it. The worst of the liquids was the vinegar, which totally dissolved the shell.

**Coke** **Vinegar** **Milk** **Orange Juice** **Water**

We decided to conduct an investigation to see the effect of different drinks on enamel. As an egg shell is very similar to our enamel, we used eggs. We placed the egg into the different drink and left it for a week.

<https://christchurchschool.co.uk/wp-content/uploads/2024/07/Y4-DT-electrical-lighthouses-July-2024.pdf>

<https://christchurchschool.co.uk/wp-content/uploads/2024/07/Y4-Science-tooth-enamel-enquiry-July-2024.pdf>

## Trips and workshops linked to our science learning

**Camley Street Natural Park – Living thing classification**

Year 4 went to Camley Street Natural Park in Kings Cross to see what different living things we could find there, and use our knowledge of classification keys to identify them.

**Year 4**  
**11<sup>th</sup> June 2024**

We did some pond dipping and were able to find and identify lots of little invertebrates such as water boatmen, snails, water striders, and more. We also saw some coots that were nesting and had some chicks.

<https://christchurchschool.co.uk/wp-content/uploads/2024/07/Y3-trip-to-Camley-Street-Nature-Park-July-2024.pdf>

<https://christchurchschool.co.uk/wp-content/uploads/2024/06/Y4-trip-to-Camley-Street-Nature-Park-June-2024.pdf>

<https://christchurchschool.co.uk/wp-content/uploads/2024/06/Y2-Science-trip-to-the-Heath-May-2024.pdf>

## **Pupil voice**

Pupil voice discussions in November 2023 demonstrated that

### **Children could talk about what they learnt in the previous year group:**

Y3 – *In Year 2, we learnt about plants. We also did this in Y1*

Y4 – *In Year 3, we learnt about rocks and soils – the three types of rock: igneous, sedimentary and metamorphic.*

Y5 – *In Year 4, we learnt about states of matter and electricity. For States of Matter we looked at ice and chocolate to see which would melt quicker. We made houses with working electric circuits*

Y6 – *In Year 5, we learnt about the gravitational pull of the Earth and how if you do sky diving, gravity will pull you down but air resistance slows your descent. We learnt about space and the solar system*

### **Children in upper KS2 were able to remember specific working scientifically skills**

Y5 – *collecting data and displaying data*

Y6 – *presenting data and research, making and using hypotheses*

### **KS2 children could remember specific enquiry types they had carried out in previous year group:**

Y3 – *We watched plants grow and looked for patterns*

Y4 – *We compared rocks to see if they were permeable or impermeable*

Y5 – *Researching weather stations. Comparative test with melting. Observing eggs over time*

Y6 – *Fair testing. Observing over time*

### **The children could discuss how their new learning builds on prior knowledge – e.g. in relation to plants**

Y2 – *In reception we learnt about the beanstalk and grew plants*

Y3 – *We learnt about bulbs in Y2 after we had learnt about parts of a plant in Y1*

Y4 – *In Y2 we learnt about life cycles of plants*

Y6 – *In Y1 we learnt about parts of a plant, in Y2 we grew plants and observed them. In Y5 we then dissected a flower to see the parts in a real plant.*

### **They could talk about how they are helped to remember what they learn in science:**

Y4 – *we do things for homework*

Y5 – *songs in assembly.*

Y6 – *in other classes' assemblies, we remember what we have learnt. We also go on trips. Experiments are memorable.*

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

- Relationship with the Francis Crick Institute for resources, CPD and enrichment
- Use of Hampstead Heath education centre and Heath in general for enrichment, as well as use of world class museums such as Science Museum, Royal Observatory and Royal Institution
- Clear progression of skills taught in each year group, building on what children have previously learnt, for both substantive and disciplinary knowledge

## **Key points for discussion about this report**

- Share work sampling with reference to where knowledge and skills have clearly been built on throughout the school
- Varied opportunity for enrichment through trips and Francis Crick provision
- Discussion of curriculum structure and how learning is recapped and kept up in first half of year (response to Ofsted subject report)
- Refined progression documents, with specific substantive and disciplinary knowledge and connections between them.

**Work sampling - Disciplinary knowledge: Working scientifically**  
**Planned progression in one enquiry type: *Observing Over Time*.**  
**Taught within the context of a range of science content.**

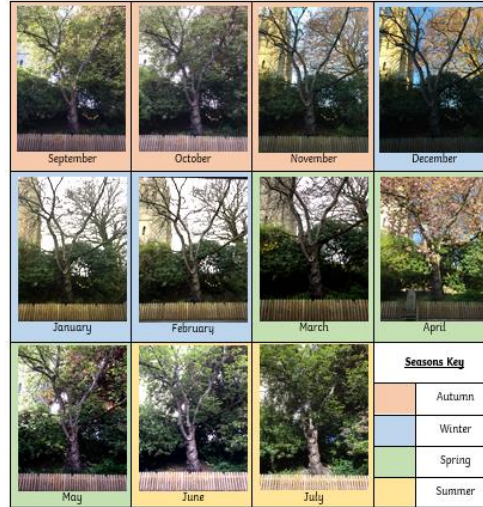
**Reception – What happens to a caterpillar over time?**



**Year 1 – What happens to our tree over the year?**

**Tree Observation Over Time**

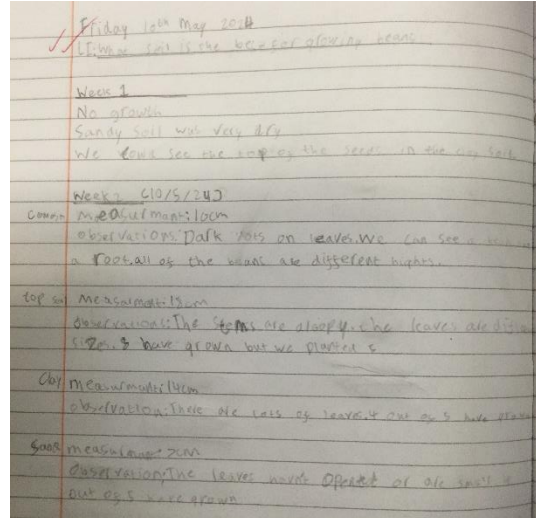
We have been making regular observations of the tree in our playground to see how it changes over the year. We took some photos to show this.



**Year 2 – What happens to a bean after we plant it?**

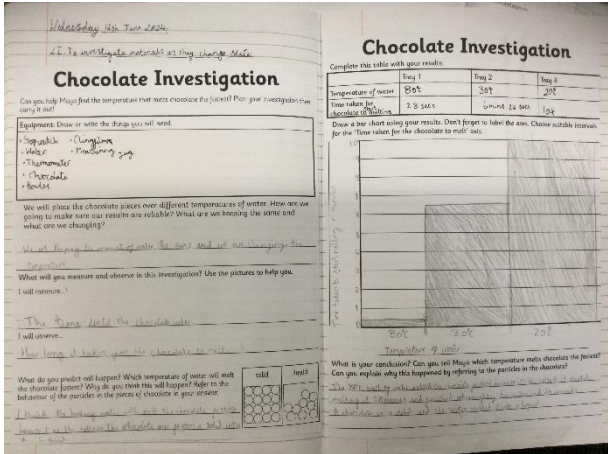


**Year 3 – Which soil is best for growing a bean?**



also comparative test

**Year 4 – What happens to chocolate when it is exposed to heat?**



**Year 5 – What does the length and definition of a shadow throughout the day tell us about the Earth's rotation?**

