

# **Christ Church, Church of England, Junior School**

## **Science Policy**



**'Working together to build a strong foundation through Faith and learning'.**

**Grow and learn together with God by our side.**

**Reviewed March 2023**

## Science Policy

This policy is the statement of the aims, principles and strategies for teaching and learning of science at Christ Church C E Junior School.

It has been compiled and revised through a process of consultation with the science co-ordinator and teaching staff.

### Statutory Requirements:

At Christ Church Junior (Church of England) Junior School we follow the statutory requirements for the teaching and learning of Science, laid out in The National Curriculum in England Framework Document for Teaching, September 2014. We have decided to teach the five topics throughout each year group, however it is not set out half termly so that there is fluidity with in the plans allowing teachers to allocate needed time to each topic dependent on children's misconceptions, previous knowledge, length of half terms, missed lesson time due to holidays etc. Teachers plan to suit their children's interests, their own teaching style, the use of support staff and resources available as well as responding to current events.

### Aims:

At Christ Church Junior School we aim to ensure that all pupils:

1. Develop a **scientific knowledge and conceptual understanding** through the specific disciplines of biology, chemistry and physics.
2. 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.
3. Are equipped with the scientific knowledge required to understand the **uses and implications** of science, today and for the future.

(National Curriculum – September 2014)

### Introduction:

A high quality science education provides the foundations for understanding the world through the specific disciplines of biology, chemistry and physics. Science has changed our lives and is vital to the world's future prosperity. All pupils should be taught essential aspects of the knowledge, methods, processes and uses of science. Through building up a body of key foundational knowledge and concepts, pupils should be encouraged to recognise the power of rational explanation and develop a sense of excitement and curiosity about natural phenomena. They should be encouraged to understand how science can be used to explain what is occurring, predict how things will behave, and analyse causes. We seek to encourage an enjoyment of Science through opportunities showing how Science works in the real world, allowing children to engage with the subject in the hope that they will develop a lifelong interest in the discipline. We actively encourage STEM learning and engagement.

## **Teaching and Learning**

### **Intent:**

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
- are equipped with the scientific skills required to understand the uses and implications of Science, today and for the future. We understand that it is important for lessons to have a skills -based focus, and that the knowledge can be taught through this

It is our intention that the pupils at Christ Church will develop their natural sense of curiosity and respect of the world around them, during their time at school and beyond. Science encompasses the acquisition of knowledge, concepts, skills and positive attitudes and our children will develop the abilities which promote scientific ways of thinking, open-mindedness, perseverance, objectivity and collaborative work. Throughout the programmes of study, the children will acquire and develop the key knowledge that has been identified within each unit and across each year group, as well as the application of scientific skills. Children at Christ Church will develop the skills of working scientifically i.e. asking questions, planning an enquiry, observing closely, taking measurements, gathering and recording results, presenting results, interpreting results, drawing conclusions, making predictions, evaluating an enquiry. These skills are built -on and developed throughout children's time at the school so that they can apply their knowledge and skills to be successful scientists, answering questions using the scientific enquiry process: using equipment, conducting experiments, building arguments and explaining concepts confidently and continue to ask questions and be curious about their surroundings, effectively communicating scientific concepts, facts and data in a variety of ways. Children will leave Christ Church with a curious mind, eager to continue to explore and understand the world of STEM learning.

### **Implementation:**

Teachers 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.

- staff will work cooperatively to deliver a broad and balanced Science education which incorporates a range of teaching styles to suit individual needs.
- Science will be planned and taught weekly or in arranged topic 'blocks' by the class teachers, following a project-based approach. This is a strategy to enable the achievement of a greater depth of knowledge.
- teachers will create engaging lessons, often involving high-quality resources to aid understanding of conceptual knowledge. Teachers use precise questioning in

class to test conceptual knowledge and skills, and assess children regularly to identify those children with gaps in learning, so that all children keep up.

- teachers build upon the learning and skill development of the previous years. As the children's knowledge and understanding increases, and they become more proficient in selecting, using scientific equipment, collating and interpreting results, they become increasingly confident in their growing ability to come to conclusions based on real evidence.
- problem solving opportunities will be built into planning that allow children to find out for themselves and ask questions. Children will be given opportunities to use their scientific skills and research to discover the answers. This will help the children become curious about the world around them and the things that they observe, experience and explore through exciting and interactive teaching.
- working scientifically skills are embedded into lessons to ensure these skills are being developed throughout the children's time at school and new vocabulary and challenging concepts are introduced through direct teaching. This is developed through the years, in-keeping with the topics., allowing the children to explore using the different enquiry skills - observing over time, identifying, classifying and grouping, pattern seeking, comparative and fair testing, researching using secondary sources
- teachers demonstrate how to use scientific equipment, and the various Working Scientifically skills in order to embed scientific understanding. Teachers find opportunities to develop children's understanding of their surroundings by accessing outdoor learning, visits and workshops with experts.
- Science lessons will practise mathematical skills and enhance literacy skills (where possible) within real life contexts.

### Planning

Teachers will base their planning on the programmes of study for their relevant year group or key stage. Teachers will plan using long term and medium term planning documents. The medium term plans from the Christ Church Long Tern Plan and PLAN documents are used to inform planning. The programmes of study for science will be taught discretely for one afternoon per week, but can also be delivered creatively through whole class topics where possible to enable children to make cross as many cross-curricular links as possible. Science can be linked to maths through the use of measuring equipment and standard measures to record results in investigations. Linking science with English will enable pupils to develop reference and language skills when carrying out research, writing notes and recording observations and investigations.

Regular liaison with other teachers in the federation ensures continuity and progression of the science objectives covered in each year group. It also enables the transfer of pupils from one year group to the next to be smoother.

### Medium/Short Term Planning:

Teachers should complete a plan for each unit of work so that they can plan for clear progression. Each unit plan should provide an overview of the unit of study, breaking it down into individual lessons. As a starting point, teachers should refer to the

schools Long Term Plan which identifies the statutory requirements and the progression of skills and knowledge for each strand of learning.

The plan should identify learning objectives, main learning activities and differentiation. Opportunities to ‘work scientifically’ and use scientific enquiry should also be clearly shown. This planning is the responsibility of individual teachers and they will take account of the needs of children in their class and identifying the way in which ideas might be taught. The planning will take the form of Smartboard slides which are saved for reference for next year.

### Teaching and Learning continued:

It is important that the teacher identifies the most appropriate teaching strategy to suit the purpose of the particular learning situation and should use their flair, enthusiasm and professional judgement to identify the most sensible, enjoyable and safe methods for the work to be conducted.

We use a variety of teaching and learning styles in Science lessons.

1. Individual/paired work
2. Small groups
3. Triad groups (mixed ability threes – one lower, middle and higher ability).
4. Large groups (half class)
5. Whole class
  - We encourage the children to ask, as well as answer, scientific questions, engaging in higher order thinking.
  - Children have the opportunity to use a variety of data, such as statistics, graphs, pictures and photographs.
  - Children use technology in Science lessons, where it enhances their learning.
  - Children take part in discussions and present reports to the rest of the class.
  - They engage in a wide variety of problem solving activities such as odd one out activities and big questions.
  - Wherever possible, we involve the pupils in ‘real’ scientific activities where they see themselves as scientists and relate their learning to careers in Science and STEM.

### WORKING SCIENTIFICALLY WITHIN THE CURRICULUM:

Class teachers ensure that there are opportunities in every lesson for pupils to ‘work scientifically’ within the curriculum, carrying out investigations and encouraging the use of higher order thinking skills. ‘Working scientifically’ specifies the understanding of the nature, processes and methods of science for each year group and this is embedded within lessons and focuses on the key features of scientific enquiry, so that pupils learn to use a variety of approaches to answer relevant scientific questions. These types of scientific enquiry include: observing over time; pattern seeking; identifying, classifying and grouping; comparative and fair testing (controlled investigations); and researching using secondary sources. Pupils are given opportunity to seek answers to questions through collecting, analysing and presenting data.

The following skills are statutory:

### **Years 3 and 4**

During Years 3 and 4, pupils should be taught to use the following practical scientific methods, processes and skills through the teaching of the programme of study content:

- asking relevant questions and using different types of scientific enquiries to answer them
- setting up simple practical enquiries, comparative and fair tests
- making systematic and careful observations and, where appropriate, taking accurate measurements using standard units, using a range of equipment, including thermometers and data loggers
- gathering, recording, classifying and presenting data in a variety of ways to help in answering questions
- recording findings using simple scientific language, drawings, labelled diagrams, keys, bar charts, and tables
- reporting on findings from enquiries, including oral and written explanations, displays or presentations of results and conclusions
- using results to draw simple conclusions, make predictions for new values, suggest improvements and raise further questions
- identifying differences, similarities or changes related to simple scientific ideas and processes
- using straight forward scientific evidence to answer questions or to support their findings.

### **Years 5 and 6**

During Years 5 and 6, pupils should be taught to use the following practical scientific methods, processes and skills through the teaching of the programme of study content:

- planning different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary
- taking measurements, using a range of scientific equipment, with increasing accuracy and precision, taking repeat readings when appropriate
- recording data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs
- using test results to make predictions to set up further comparative and fair tests
- reporting and presenting findings from enquiries, including: conclusions, causal relationships and explanations of and degree of trust in results, in oral and written forms such as displays and other presentations
- identifying scientific evidence that has been used to support or refute ideas or arguments.

### **STEM**

At Christ Church we will be developing a STEM approach to Science so that children do not see the subject in isolation. The children will work in a cross curricular manner to consider the science, technology and mathematics skills and knowledge that are needed to solve a problem. Subject leaders will work in collaboration when curriculum mapping to identify opportunities where the skills can be taught in collaboration.

Long term planning:  
Appendix A



**Christ Church Junior School**  
**Long Term Plan – Science 2022-2023**

The following plan shows the order of topics with in each year group at Christ Church Junior School. This plan is not set out half termly so that there is fluidity with in the plans allowing teachers to allocate needed time to each topic dependent on children’s misconceptions, previous knowledge, length of half terms, missed lesson time due to holidays etc.

Year 3	Forces and magnets Animals, including humans Rocks Plants Light
Year 4	States of matter Electricity Sound Living things and their habitats Animals, including humans
Year 5	Properties and changes of materials Forces Earth and space Living things and their habitats Animals, including humans
Year 6	Electricity Evolution and inheritance Animals including humans Light Living things and their habitats

Additional notes about sequencing;

Year 4 - Living things and their habitats/ Animals Including Humans

Pupil should be taught to construct and interpret a variety of food chains, identifying producers, predators and prey. This statement is within the Animals, including humans topic. In order to construct food chains based on their first-hand experience, this statement should be taught after they have visited a habitat to name and identify the plants and animals.

Year 4 - States of matter/Sound In the States of matter topic, children learn about solids, liquids and gases. This knowledge is required in order for children to understand, in the Sound topic, that vibrations from sounds travel through a medium to the ear. It is therefore appropriate to teach the States of matter topic before the Sound topic.

Year 5 - Living things and their habitats/ Animals Including Humans Before learning about the life cycle of humans, it is helpful if pupils have learnt about the life cycle of plants and animals. It is therefore appropriate to teach the Living things and their habitats topic before the Animals, including humans topic.

Year 5 - Earth and space/Forces If the Forces topic is taught before the Earth and space topic, pupils are able to use their understanding of gravity to help them make sense of why the planets orbit the Sun, and the Moon orbits the Earth.

### Disciplinary Knowledge through 'Big Questions'

Each topic will have an attached 'big question' to help children to link their learning. This will be displayed on class boards for children to add their ideas to as the topic progresses.

Year 3	Forces & Magnets	Animals, including humans	Rocks	Plants	Light
BIG QUESTION	How can we move magnets?	Why do animals have skeletons? What is a healthy diet and why is it important?	What are rocks and soils like?	Why do plants have flowers?	What is a shadow?
Year 4	States of matter		Electricity	Sound	Living things and their habitats
BIG QUESTION	Where do ice cubes go when they disappear?	Why does it rain and hail?	What can we do with electricity?	How can we make different sounds?	Are living things in danger?
Year 5	Properties and changes of materials		Forces	Space	Living things and their habitats
BIG QUESTION	How can we separate a mixture of water, iron filings, salt and sand?	How can we change materials reversibly and irreversibly?	How and why do objects move?	Sun, Earth & Moon: What is moving and how do we know?	Do all plants and animals reproduce in the same way?
Year 6	Electricity	Evolution & Inheritance		Animals, including humans	Light
BIG QUESTION	Can we vary the effects of electricity?	What is evolution, how does it happen and how do scientists know?		How do our choices affect how our	Why does my shadow change length
					In what ways can we sort living things?



			bodies work? Why does my heart beat?	over the course of a day?	
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### Procedures for Assessment and Reporting

#### Assessment:

Reporting in Science will be in line with the school's practice as described in the Policy for Planning, Assessment, Recording and Reporting.

For each unit of work the teacher will use a traffic light system to assess against the topics objectives and this will be shared in Science assessment folder, (Science Trackers) and therefore can be accessed by subsequent teachers and can be used to help make judgements for end of Key Stage.

Teachers assess each child at the end of each academic unit, using the following descriptors:

- 1. Working below the expectations for the year group.**
- 2. Secure in understanding and applying in most areas of the unit.**
- 3. More able- working above the ARE and are able to apply their understanding to other circumstances.**

These grades are based on the expectations for children in that year group. (See moderation assessment grid).

#### Science is assessed by:

- Beginning and end of unit assessments in children's books. The progress can be seen by comparing answers from the beginning of a topic with the end of a topic.
- Children conduct elicitation tasks where teachers can assess the retention from previous topics that act as a foundation for new learning. This helps to set a starting point for each unit.
- Flashbacks are used regularly to assess children's retention of learning and address any gaps or misconceptions that arise.
- Focused assessment tasks take place once per topic. This allows the teacher the opportunity to ask questions and make observations to secure their assessment judgements.
- Talking to the pupils and asking questions.
- Discussing the work with the pupil.
- Looking at the work and marking against the learning objective.
- Observing the pupils carrying out practical tasks.
- Pupils self-evaluation of their work.
- Marking children's work. (Please refer to the whole School Marking Policy).

Opportunities for checking progress will arise naturally whilst teaching the science programmes of study. Watching children work, talking to them about their work and listening to them describe their work will generate useful assessment information. Monitoring the learning outcomes and expectations in each unit will help teachers assess progress and target activities appropriately. This information can be passed onto parents through termly reports

#### Reporting to parents:

This will be done at Parents Evenings in the Autumn and Spring terms and Science will be reported on specifically in the annual end of year academic report for each pupil.

#### The role of the co-ordinator is to:

- take the lead in policy development and the monitoring of the schemes of work.
- promote progression and continuity throughout the school.
- undertake classroom observations to monitor the delivery of the Science curriculum.
- monitor books.
- support colleagues in the development of planning and implementation of the scheme of work.
- support colleagues in terms of continual professional development.
- support colleagues in assessment and record keeping activities.
- monitor end of unit evaluations for Science and advise the Head Teacher on action required.
- take responsibility for the writing of the SIP, after consultation with the staff.
- take responsibility for the purchase and organisation of central resources for Science.
- keep up to date with developments in Science and disseminate information to colleagues as appropriate.
- will attend any relevant courses and network meetings and report back to staff.
- All staff have up to date relevant planning documents and information.
- All staff are producing suitable long term and medium term plans for the science programmes of study that they are to teach.
- Resources are maintained, repaired or replaced.
- New equipment is ordered after consultation with staff.
- Training opportunities are arranged to enable staff to increase confidence, expertise and quality of delivery.
- All equipment is stored and used appropriately.
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#### Equipment and Resources:

The Science Coordinator carries out an annual audit of the resources and reorders any consumables when necessary. New resources can be purchased through negotiation between class teacher and co-ordinator, within the amount allocated in the annual budget. All practical equipment is located in the corridor between Year 1 and Year 3, on shelves, in labelled topic boxes. The children should always be given guidance when handling any equipment to ensure their safety and that there is no damage to resources. Pupils should be encouraged to treat all equipment with care and respect.

#### Health and Safety:

Science is an area of the curriculum in which issues of Health and Safety concerns arise. When working in Science lessons pupils should be taught about the dangers associated with the equipment, materials and activities. Christ Church Junior School is a member of the Consortium of Local Educational Authorities for the Provision of Science Services (CLEAPSS).

#### Pupils should be taught:

- About hazards, risks and risk control.
- To recognise hazards, assess consequences and take steps to control the risks to themselves and others.
- To manage their environment to ensure their safety and that of others.

As a school we follow the guidelines set out by CLEAPS in their publications. All staff, if they have any questions regarding safe working practices, has access to the Science co-ordinator and the Head Teacher. A risk assessment form will be completed before any external Science Trip and given to the Headteacher.

#### ICT:

Children use ICT in Science lessons where appropriate. The children have access to the internet to research information about their Science topics. They have access to word processing, spreadsheet and database packages enabling them to present results and findings in a variety of ways. Each classroom is fitted with an interactive whiteboard enabling the teacher to use video clips and demonstration programmes to enrich lessons. All classes in school have timetabled sessions in the ICT suite and the opportunity to book the suite, Ipads or laptops.

#### E-Safety:

When ICT is used in Science lessons, before every lesson the class teacher will remind children about how to use the internet safely and will monitor and report e-safety incidents in line with the school policy.

#### SEND:

Science teaching at Christ Church School involves adapting and extending the curriculum to match all pupils' needs. All of our children have the right to access to the Science curriculum. With regard to the above policy teachers will need to

differentiate in terms of task, approach, content and support to ensure that this right becomes a reality.

#### Equal Opportunities:

All children regardless of ability, gender, ethnic, cultural and socio-economic background will be given the same opportunities in all areas of the Science curriculum. Our activities in Science are organised to encourage a full and active participation by all of our children.

#### Impact

Children at Christ Church will have a fun, engaging, high-quality Science education meaning that at the end of each unit of work, the children will have learned more and will know more about the world in which they live. They will have further developed their investigation skills and ability to question what they are taught through varied and first hand experiences of the world around them. The successful approach at Christ Church results in the children having developed an interest in and a recognition of the importance of Science in improving the world. The vast majority of children will achieve the Age Related Expectations and will have developed an inquisitive and curious mind-set.

Children learn about the possibilities for careers in Science and we seek opportunities for community links; enabling children to learn from and work with professionals, ensuring that children have access to positive role models within the field of Science from the immediate and wider local community. Children are encouraged to see themselves as scientists, capable of achieving.