

Science Curriculum

'Following Jesus, together we care, inspire and achieve.'

Through Science, we nurture and grow the natural curiosity and enquiry within children, creating a desire to explore and question the hows and whys of the world around them

Introduction

Science has led to the discovery of everything from gravity to medicine. Science is based on curiosity—and when children aim to learn more about the world around them, it is a science that often holds the clues they need for a better understanding.

Science, directly and indirectly, influences all aspects of everyday life. From the food we eat to the way we get around, science is everywhere. Once you begin to see all the opportunities to learn, the relationship between science and critical-thinking skills becomes apparent.

Beginning when children are very young, science helps shape their development. As they learn to ask questions, make predictions, observe, test, and then communicate their findings, they are developing critical science skills.

We believe children should learn science because:

- Science helps children develop key life skills, including an ability to communicate, remain organised and focused, and even form their own opinions based on observation. Science also helps children develop their senses and overall awareness.
- Children are hands-on learners, and the world around them provides so many natural opportunities. That is why you should never underestimate the power of learning through play. Interacting with their environment will support their intellectual development.
- Children are primed for learning, and what they learn while they're young can impact their interests later in life. Studies have shown that students begin to develop an interest in science, technology, engineering, and mathematics (STEM) during the elementary years. Having an interest and knowledge in these subject areas provides future career opportunities.

Science is a core subject and at Crawford's, we follow the aims, principles and content of the National Curriculum.

The Science National Curriculum has three stated aims to ensure that all pupils;

- Develop scientific knowledge and conceptual understanding through the specific disciplines of biology, chemistry and physics
- Develop an 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 knowledge required to understand the uses and implications of science today and for the future

Guiding Principles

At Crawford's we believe good Science teaching and learning allow:

- Children to develop their own lines of enquiry by asking and answering questions which are scientifically focussed
- Children to explore the phenomenon of Science in a “hands-on, minds-on” way
- Children to willingly take risks and *appreciate proving and disproving are equally valid results*



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- Children to understand the link between their scientific understanding and its relevance to the world around them
- Teachers to develop their subject knowledge, confidence and enjoyment for Science.

We believe that Science is an essential component of the curriculum because it aims to develop:

Basic knowledge and identity of:

- Plants
- Animals
- Habitats
- Humans
- Evolution
- Materials and their properties
- Changing Materials
- Forces
- Light
- Earth and Space
- Electricity
- Sound

Competence in:

Working Scientifically through the 5 key areas of;

- Observation
- Identifying and Classifying
- Pattern Seeking
- Research
- Fair Testing

Awareness of:

- Real life situations and Impact of Science (past, present and future)
- Conflicts of interests (personal, economic and environmental)

Attitudes should encourage:

- Independent Enquiry
- Creative Thinking
- Reflective Learning
- Confidence, Resilience and self-awareness
- Cooperation and Society
- Listening and attention
- Health and self-care

TEACHING AND LEARNING

The principal aim is to develop children's knowledge, skills, language and understanding in the subject. Teachers ensure that children apply their knowledge and understanding when developing ideas, during



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the planning and carrying out enquiries and when evaluating them. This is done through a mixture of whole-class teaching and individual or group activities.

Within lessons, children are given the opportunity both to work on their own and to collaborate with others, listening to other children's ideas and treating them with respect.

We believe that good teaching in science features teachers who:

- Use existing science discoveries, theories and Scientists to inspire pupils and to support their investigations, testing and analysis;
- Use focused tasks and models effectively to show pupils different enquiry skills and show abstract concepts in a concrete way;
- Use their own work to model ideas, and to explain the methods they use to answer scientific questions;
- Uses resources effectively and adapt them well to overcome barriers to participation in practical work for pupils who are disabled or have special educational needs;
- Use questioning to encourage classes to contribute to the development of success criteria for scientific enquiries to prompt pupils to think through the problems they might encounter and to share strategies to solve them;
- Model and use technical language and subject-specific terms accurately;
- Structure learning effectively to encourage the pooling of ideas and findings to support pupils critically evaluating and extending or improving the ideas;
- Ensure Science is relevant by linking activity to pupils' interests, establishing real contexts for their work, and building upon their knowledge and skills in other subjects;
- Manage discussions effectively to include all pupils' views and challenged pupils' thinking;
- Ensure that learning intentions are clear in plans, make good use of available time, offer suitable challenges to all groups of pupils – including the more able – and develop their learning.

In order to achieve these principles of good teaching we appreciate that our science curriculum should be delivered with consideration and implementation of the following policies and frameworks (Effective Teaching; Learning; Curriculum Statement and the Framework for independence) and will ensure the curriculum remains meaningful through regular review.

Science Curriculum Planning

Science is a core subject in the National Curriculum and our planning allows for discrete science lessons as well as taking a cross-curricular approach when appropriate and adds purpose to the learning. We may use the local environment or a current theme or topic as the basis for the required skills which are taught as part of the flexible curriculum.

Activities in Science are planned so that they build on prior learning. Children of all abilities are given the opportunity to develop their skills, knowledge and understanding, and we also build planned progression into the themes so that the children are increasingly challenged as they move through the school.

A [skills progression for Scientific Enquiry](#) is also in place from reception to Year 6.



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Science in EYFS

Science at Foundation Stage is introduced indirectly through activities that encourage your child to explore, problem-solve, observe, predict, think, make decisions and talk about the world around them.

Early Years science also helps children with skills in other Foundation Stage areas of the national curriculum, such as physical development and creative development.

Knowledge and Understanding of the World

Children explore creatures, people, plants and objects in their natural environments. They observe and manipulate objects and materials to identify differences and similarities. For example, they may look at an egg whisk, sand, paper and water to learn about things that are natural and manmade and their different functions. Children also learn to use their senses, feeling dough or listening to sounds in the environment, such as sirens or farm animals.

Children will be encouraged to ask questions about why things happen and how things work. They might do activities such as increasing the incline of a slope to observe how fast a vehicle travels or opening a mechanical toy to see how it works. Children will also be asked questions about what they think will happen to help them communicate, plan, investigate, record and evaluate findings.

Physical Development

Awareness of space may be taught by encouraging children to make big and small movements to music and to think about how much space they need. They will also learn to recognise changes that happen to the body when they are active.

Children will also learn about the importance of keeping healthy and the things that contribute to this by, for example, cooking or identifying fruit and vegetables.

Creative Development

Children explore and respond to a variety of sensory experiences through music and art. Children might collect materials, such as rough sandpaper, soft fabric and shiny bottle tops to build a sensory wall. They explore colour, texture, shape, form and space by mixing colours, painting, modelling and dancing.

They also learn about sounds - how they can be changed and how to imitate sounds they hear.

Science IN KEY STAGE 1

Under the new 2014 national curriculum, children in Year 1 will learn about:

- **Plants**, identifying and naming plants and looking at their basic structure;
- **Animals including humans**, identify and naming a range of animals and understand how and why they are grouped (e.g. mammals, birds, amphibians etc);
- **Everyday materials**, looking at their properties;
- **Seasonal changes**, observing changes across the four seasons and looking at different types of weather.

Year 2 Science

Children will be looking at:

- **Living things and their habitats**, including dependence within habitats and microhabitats;



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- **Plants**, observing how seeds and bulbs grow into plants and what plants need to stay healthy;
- **Animals including humans**, focus on reproduction, nutrition and exercise;
- **Everyday materials**, comparing their uses and looking at how they can be changed by exerting force.

Science IN KEY STAGE 2

Year 3

- **Plants**, including parts of plants, needs of plants and their life cycle;
- **Animals, including humans**, focusing on nutrition, skeletons and muscles;
- **Rocks**, including comparing rocks, looking at fossils and understanding how soil is made;
- **Light**, looking at how light is reflected, how shadows are formed and can change;
- **Forces and magnets**, focusing on the attraction and repulsion of magnets, magnetic materials and the two poles of a magnet.

Year 4

- **Living things and their habitats**, including classifying living things and looking at changes to environments;
- **Animals, including humans**, focusing on eating: teeth, the digestive system and food chains;
- **States of matter**, including grouping materials, changing state, evaporation and condensation;
- **Sound**, looking at creation of sound through vibration and changes in pitch and volume;
- **Electricity**, including constructing a circuit and understanding conductors and insulators.

Year 5

- **Living things and their habitats**, including life cycles of a mammal, amphibian, insect and bird;
- **Animals, including humans**, focusing on changes from birth to old age;
- **Properties and changes of materials**, including dissolving, separating and reversible changes;
- **Earth and space**, looking at the movement of the sun, earth and moon;
- **Forces**, including gravity, air resistance, water resistance and friction.

Year 6

- **Living things and their habitats**, including classifying microorganisms, plants and animals;
- **Animals, including humans**, focusing mainly on diet and exercise;
- **Evolution and inheritance**, looking at fossils, reproduction and adaptation;
- **Light**, looking closely at how it travels and how shadows are made;
- **Electricity**, analysing the function of lamps, buzzers, cells and switches.

Good achievement and challenge are evident when pupils:

- Demonstrate a secure understanding of what questions they are trying to answer and the best way to go about it and how they will know if they have been successful;
- Communicate their ideas and plans clearly and modify their enquiries/questions in light of their testing and evaluation;



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- Develop technical competence, applying measurement and using tools and components with increasing accuracy to safely;
- Draw effectively upon their scientific understanding and their knowledge to make links to the world around them;
- Use an increasingly scientific vocabulary when talking or writing about their knowledge and enquiries.

HEALTH AND SAFETY

All children are made aware of Health and Safety issues when undertaking work in Science. When working with tools, equipment and materials, in practical activities and in different environments, including those that are unfamiliar, pupils should be taught:

- About hazards, risks and risk control;
- To recognise hazards, assess consequent risks and take steps to control the risks to themselves and others;
- To use the information to assess the immediate and cumulative risks;
- To manage their environment to ensure the health & safety of themselves and others;
- To explain the steps they take to control risks.

In this subject the general teaching requirement for health and safety applies. It is the responsibility of the subject leader to pass on any relevant Health and Safety information to staff. It is the individual member of staff's responsibility to ensure that they have read, understood and acted on this information.



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