

Science Policy Hornsea Burton and Skipsea Federation

Aims and objectives

Science teaches an understanding of natural phenomena. It aims to stimulate a child's curiosity in finding out why things happen in the way they do. It teaches methods of enquiry and investigation to stimulate creative thought. Children learn to ask scientific questions and begin to appreciate the way science will affect their future on a personal, national, and global level.

The aims of science are to enable children to:

ask and answer scientific questions;

plan and carry out scientific investigations, using equipment, including computers, correctly;

know and understand the life processes of living things;

know and understand the physical processes of materials, electricity, light, sound and natural forces;

know about the nature of the solar system, including the earth;

evaluate evidence and present their conclusions clearly and accurately.

Teaching and learning style

The school uses a variety of teaching and learning styles in science lessons. The principal aim is to develop children's knowledge, skills, and understanding.

Sometimes we do this through whole-class teaching or group teaching, while at other times we engage the children in an enquiry-based research activity.

We encourage the children to ask, as well as answer, scientific questions.

They have the opportunity to use a variety of data, such as statistics, graphs, pictures, and photographs. They apply and reinforce Literacy, Numeracy and ICT skills in science lessons where it enhances their learning. They take part in role-play and discussions and they present reports to the rest of the class.

They engage in a wide variety of problem-solving activities. Wherever possible, we involve the pupils in 'real' scientific activities, for example, researching a local environmental problem or carrying out a practical experiment and analysing the results.

We recognise that there are children of widely different scientific abilities in all classes and we ensure that we provide suitable learning opportunities for all

children by matching the challenge of the task to the ability of the child. We achieve this in a variety of ways by:

- setting common tasks which are open-ended and can have a variety of responses;
- setting tasks of increasing difficulty (we do not expect all children to complete all tasks);
- grouping children by ability in the room and setting different tasks for each ability group;
- providing resources of different complexity, matched to the ability of the child;
- using classroom assistants to support the work of individual children or groups of children.

Science curriculum planning



The school uses Chris Quigley Essentials Curriculum and also Pixl Huddle resources to support teaching and learning in KS2 (probing questions and working scientifically) which are both linked to the new National Curriculum as the basis for its core subject teaching.

These are the essential characteristics of scientists that we want our pupils to achieve during their time at our school:

- The ability to think independently and raise questions about working scientifically and the knowledge and skills that it brings.
- Confidence and competence in the full range of practical skills, taking the initiative in, for example, planning and carrying out scientific investigations.
- Excellent scientific knowledge and understanding which is demonstrated in written and verbal explanations, solving challenging problems and reporting scientific findings.
- High levels of originality, imagination or innovation in the application of skills.
- The ability to undertake practical work in a variety of contexts, including fieldwork.
- A passion for science and its application.

In accordance with the new National Curriculum for Science, our school will provide opportunities for children in KS1 so that they:

Are taught scientific knowledge and skills by working scientifically.

Biology

Plants:

Identify, classify and describe their basic structure.

Observe and describe growth and conditions for growth.

Habitats:

Look at the suitability of environments and at food chains.

Animals and humans:

Identify, classify and observe.

Look at growth, basic needs, exercise, food and hygiene.

Chemistry

Materials:

Identify, name, describe, classify, compare properties and changes.

Look at the practical uses of everyday materials.

Physics

Forces:

Describe basic movements.

Earth and space:

Observe seasonal changes.

For children in KS2, opportunities will be provided so that they:

Are taught scientific knowledge and skills by working scientifically.

Biology

Plants:

Look at the function of parts of flowering plants, requirements of growth, water transportation in plants, life cycles and seed dispersal.

Evolution and inheritance:

Look at resemblance in offspring.

Look at changes in animals over time.

Look at adaptation to environments.

Look at differences in offspring.

Look at adaptation and evolution.

Look at changes to the human skeleton over time.

Animals and humans:

Look at nutrition, transportation of water and nutrients in the body, and the muscle and skeleton system of humans and animals.

Look at the digestive system in humans.

Look at teeth.

Look at the human circulatory system.

All living things:

Identify and name plants and animals

Look at classification keys.

Look at the life cycle of animals and plants.

Look at classification of plants, animals and micro organisms.

Look at reproduction in plants and animals, and human growth and changes.

Look at the effect of diet, exercise and drugs.

Chemistry

Rocks and fossils:

Compare and group rocks and describe the formation of fossils.

States of matter:

Look at solids, liquids and gases, changes of state, evaporation, condensation and the water cycle.

Materials:

Examine the properties of materials using various tests.

Look at solubility and recovering dissolved substances.

Separate mixtures.

Examine changes to materials that create new materials that are usually not reversible.

Physics

Light:

Look at sources, seeing, reflections and shadows.

Explain how light appears to travel in straight lines and how this affects seeing and shadows.

Sound:

Look at sources, vibration, volume and pitch.

Electricity:

Look at appliances, circuits, lamps, switches, insulators and conductors.

Look at circuits, the effect of the voltage in cells and the resistance and conductivity of materials.

Forces and magnets:

Look at contact and distant forces, attraction and repulsion, comparing and grouping materials.

Look at poles, attraction and repulsion.

Look at the effect of gravity and drag forces.

Look at transference of forces in gears, pulleys, levers and springs.

Earth and space:

Look at the movement of the Earth and the Moon

Explain day and night

We carry out the curriculum planning in Science in three phases (Long-term, Medium-term and Short-term). We refer to the new curriculum, Chris Quigley Essentials Curriculum and also in KS2 to the Pixl Science Resources.

Our long term plan shows how teaching units are distributed across the year groups, and how these fit together to ensure progression within the curriculum plan. The science coordinator works this out in conjunction with teaching colleagues in each year group.

Our medium-term plans give details of each unit of work for each term. The medium term overview sheets that we complete for each topic shows the coverage and Key Skills to be worked on during that unit. They identify the key learning objectives to be covered through that topic. The Science subject coordinator is responsible for keeping and reviewing these plans. As we have mixed-age classes, we do our medium-term planning based on the Key skills relating to national curriculum levels that children are working at over a two year cycle. In this way we ensure that we cover the National Curriculum without repeating topics and ensure that opportunities are planned at each child's current level.

The main learning objectives linked to the new curriculum for Science are:

- To work scientifically
- To understand plants
- To understand animals and humans
- To investigate living things
- To understand evolution and inheritance
- To investigate materials
- To understand movement, forces and magnets
- To understand the Earth's movement in space
- To investigate light and seeing
- To investigate sound and hearing
- To understand electrical circuits

The class teacher is responsible for writing the daily lesson plans for each lesson (short-term plans). These plans list the specific learning objectives of each lesson. The class teacher keeps these individual plans and s/he and the Science subject leader often discuss them on an informal basis. The class teacher gives copies of these individual plans to the Head Teacher and the plans are reviewed and evaluated as part of the school's ongoing self evaluation process.

The topics studied in Science are planned to build upon prior learning. While we offer opportunities for children of all abilities to develop their skills and knowledge in each unit, we also build planned progression into the scheme of work through the Chris Quigley Essentials Curriculum milestones, so that the children are increasingly challenged as they move up through the school.

As part of the Year 6 transition arrangements, the children attend a science activity morning or afternoon at the Secondary School during the Summer Second Half term.

Foundation Stage

We teach Science in reception class 1 as an integral part of the topic work covered during the year. As the reception class is part of the Early Years Foundation Stage, we relate the Science aspects of the children's work to the objectives set out in the Early Learning Goals (ELGs) which underpin the curriculum planning for children in the Foundation Stage.

The contribution of science to teaching in other curriculum areas

Literacy

Science contributes significantly to the teaching of English in our school by actively promoting the skills of reading, writing, speaking and listening. Some of the texts that the children study in Literacy are of a scientific nature. The children develop oral skills in science lessons through discussions and through recounting their observations of scientific experiments. They develop their writing skills through writing reports and presenting projects and by recording information in a wide variety of styles and formats.

Mathematics

Science contributes to the teaching of mathematics in a number of ways. The children use weights and measures and learn to use and apply number. Through working on investigations they learn to estimate and predict. They develop the skills of accurate observation and recording of events. They produce and interpret graphs and charts to draw conclusions.

Computing (ICT)

Children use ICT in science lessons where appropriate. They use it to support their work in science by learning how to find, select, and analyse information on the Internet and on CD-ROMs. Children use ICT to record, present and interpret data and to review, modify and evaluate their work and improve its presentation.

Personal, social and health education (PSHE) and citizenship

Science makes a significant contribution to the teaching of personal, social and health education. This is mainly in two areas. Firstly, the subject matter lends itself to raising matters of citizenship and social welfare. For example, children study the way people recycle material and how environments are changed for better or worse. Secondly, children benefit from the nature of the subject in that it gives them opportunities to take part in debates and discussions. Science

promotes the concept of positive citizenship.

Spiritual, moral, social and cultural development

Science teaching offers children many opportunities to examine some of the fundamental questions in life, for example, the evolution of living things and how the world was created. Through many of the amazing processes that affect living things, children develop a sense of awe and wonder regarding the nature of our world. Science raises many social and moral questions. Through the teaching of science, children have the opportunity to discuss, for example, the effects of smoking and the moral questions involved in this issue. We give them the chance to reflect on the way people care for the planet and how science can contribute to the way we manage the earth's resources. Science teaches children about the reasons why people are different and, by developing the children's knowledge and understanding of physical and environmental factors, it promotes respect for other people.

Teaching science to children with special educational needs

At our school we teach Science to all children, whatever their ability, Science forms part of the school curriculum policy to provide a broad and balanced education to all children. Through our Science teaching we provide learning opportunities that enable all pupils to make progress. We do this by setting suitable learning challenges and responding to each child's different needs. Assessment against the National Curriculum through use of Chris Quigley milestones allows us to consider each child's attainment and progress against expected levels.

When progress falls significantly outside the expected range, the child may have special educational needs. Our assessment process looks at a range of factors - classroom organisation, teaching materials, teaching style, differentiation so that we can take some additional or different action to enable the child to learn more effectively. This ensures that our teaching is matched to the child's needs.

Every pupil in the school has their own Personal Pupil Support Plan irrespective of their ability. This may include, as appropriate, specific targets relating to Science. In some instances the use of Science has a considerable impact on the quality of work that children produce; it increases their confidence and motivation.

We enable pupils to have access to the full range of activities involved in learning Science. Where children are to participate in activities outside the classroom, for example, a visit to a Science museum, we carry out a risk assessment prior to the activity, to ensure that the activity is safe and appropriate for all pupils.

Roles and responsibilities

The Head will

Set high expectations and monitor teaching, learning, standards and progress
Determine ways in which science can support, enrich and extend the curriculum
Ensure a whole school approach, keeping parents, governors and support staff well informed
Support the Science Co-ordinator and members of staff

The Governors will

Be well informed through the leadership of the Head teacher and the Science Co-ordinator
Support the staff in implementing the school's policy for Science
Help monitor and review progress on the Science action plan

The Science Co-ordinator will

Support colleagues in planning, teaching and assessment
Provide expertise and advice on the use of resources
Write, monitor and review progress on the Science action plan
Will act as a point of contact between the school and appropriate outside visitors
Work alongside the Head Teacher to monitor and evaluate teaching, learning, standards and progress
Coordinate the evaluation and review of the school's science policy
Manage the provision and deployment of resources

Teachers will

Plan effectively to meet the needs of all children
Liaise with the subject co-ordinator regarding planning, pupil standards and achievement
Share clear learning objectives and success criteria with the children
Use a range of teaching styles
Plan activities that allow for different levels of achievement by pupils
Use the learning outcomes at the end of each topic and any other assessments as an aid to record and monitor pupil progress

Support staff will

Be included in staff training for science where appropriate
Have a clear understanding of the scientific skills to be developed
Share the learning objectives for the lesson and know the key vocabulary to be developed

Parents will

Be encouraged to develop positive attitudes to science
Be given opportunities to view pupils work

Be informed of their child's progress through annual reports

Assessment and recording

Teachers assess children's work in science by making informal judgements as they observe them during lessons. On completion of a piece of work, the teacher marks the work and comments as necessary. At the end of a unit s/he makes a judgement about the work of each pupil in relation to the National Curriculum level of attainment / Chris Quigley milestones, and records whether the child has achieved Basic, Advanced or Deep during that unit against each area covered on the end of year assessment sheets. These are used as the basis for assessing the end of year attainment and progress of the children and informing end of year reporting to Parents. This information is also passed on to the next teacher at the end of the year.

The Science coordinator may keep samples of the children's work. The Staff may display in their own classrooms examples of work from their class.

Resources

The school has a wide range of resources to support the teaching of science across the school. These resources are kept centrally and are accessible to staff. The library contains a good supply of science topic books and computer software is used to support children's learning.

Health and Safety

The general teaching requirements for health and safety applies to this subject. In their planning of activities, teachers will anticipate likely safety issues. Risk assessments specifically for Science are kept in the school risk assessment file and staff are encouraged to read these as appropriate.

Reasons for safety measures and their implications are discussed with the children. Children are encouraged to consider safety for themselves, others, the environment and the resources they use, when undertaking scientific activities.

Monitoring and review

The monitoring of the standards of the children's work and of the quality of teaching in Science is the responsibility of the Science coordinator. The Science coordinator is also responsible for supporting colleagues in the teaching of Science, for keeping informed about current developments in the subject and for providing a strategic lead and direction for the subject in the school.

The Science coordinator has specially-allocated time for carrying out the vital task of reviewing samples of the children's work and for visiting classes to observe the teaching of Science during the Science review cycle. This policy has been reviewed and updated Spring 2017. It will be reviewed at least every 2 years.