

Reviewed: May 2018

Science Policy – A Personal Approach

We uphold the ideal of inclusion in its broadest sense and seek to involve all stakeholders in achieving this.

As a team we aim to stimulate re-engagement, participation, interest and achievement by providing bespoke educational intervention programmes, pupil centred planning and solution focused support – ultimately leading to successful educational integration.

We endeavour to provide a safe, nurturing, community based environment that facilitates a personalised holistic approach to learning enabling pupils to reach their potential.

INTRODUCTION

The disparate needs, disabilities, conditions, profiles, backgrounds and circumstances of our pupils mean that a 'one size fits all' approach is unlikely to be successful. A personalised approach/response/plan will be considered, devised, developed and reviewed.

At Northumberland Pupil Referral Unit, we believe that all pupils of this school should access the science curriculum. We aim to make the curriculum appropriate for each individual's age and ability in an interesting, meaningful and enjoyable way.

Aims and Objectives

Science should allow pupils to relate investigations to real life issues/situations, e.g. pond dipping and pollution using the appropriate equipment for a particular task. Students will be able to represent results from obtained data, using IT where appropriate and be able to predict and/or anticipate the outcome of investigations. Pupils will be encouraged to make and use their own experiments, whilst learning to choose materials for investigations. Students will use their senses to explore a range of materials and objects whilst exploring and investigating changes in naturally occurring materials. To explore materials which are grouped by a given property, e.g. sweet items to taste and all wet items to feel. They will also explore the smell, texture and visual appearance of a variety of plants and indicate preferences, e.g. colour or scents. Students will experience the contrasts of light and dark, noticing and anticipating changes and to experience the contrasts of silence and sound, through their own bodies and musical media. Pupils will explore and investigate movement, pushing and pulling, including exploring and investigating the properties of magnets. Students will explore changes in humans from babyhood to old age, explore a range of switches and explore different habitats and organisms connected to those habitats. They will also learn about food and diet and explore and investigate solids, liquids and gasses. Pupils will learn about friction as a force that slows things down.

The Aims of Science are:

To promote learning opportunities which conform to the National Curriculum guidelines.

To promote sensory development.

To provide a safe, practically based opportunity for controlled curiosity, and to encourage an appreciation of the need for safe and careful action.

To provide a variety of experiences that allow exploration of their world without requiring complex knowledge of facts, and which allows responses at each pupils level of ability.

To be accessible to pupils with a short attention span, through dramatic and practical areas of

Science.

To involve the pupils and their teachers in promoting ideas and seeking solutions.

To encourage the sorting, grouping and describing of objects and events in their immediate environment using their senses and noting similarities and differences.

To enhance language and communication through discussion of Scientific events.

To provide an environment which will stimulate both interest and pleasure in Science and will develop, extend and reinforce other areas of the curriculum, e.g. cookery, PE and Technology.

Further Science and policy for secondary students

The teaching of Science will be made relevant by increasing awareness of the importance of science in everyday life. Students will be taught that many people from different cultures and times have contributed to our present day understanding of science. Students will learn how to work safely in practical situations.

Teaching and learning style

Modification to the scheme of work and subject objectives may be made on response to evaluation feedback from individual class teachers. Science is a time-tabled subject, taught by Class Teachers. The teaching and learning approaches used are carefully matched to the learning needs of students, taking into account their individual needs, SEN and learning styles. A range of teaching methods are employed, which include teacher presentation and demonstration, group discussion, practical work, problem solving, student presentation, role play, individual work and investigation. Where necessary, risk assessments are carried out in accordance with the guidance offered by the offered by the LEA.

Science curriculum planning

The curriculum planning in Science is the responsibility of the class teacher. The long-term plan maps out the Science activities covered in each term during the key stage. There is scope for teachers to plan to suit their childrens' interests, current events, their own teaching style, with the use of any support staff and the resources available.

The Science plans are incorporated into the medium term plan. These define what we teach and ensure an appropriate balance and distribution of work across the term. The SLT keeps and reviews these plans.

Short term planning lists the specific learning objectives for each lesson and give details of how the lessons should be taught.

We plan the Science lessons so they build upon the prior learning of the pupils. While there are opportunities for children of all abilities to develop their skills, knowledge and understanding in each activity area, there is planned progression built into the scheme of work, so that the pupils are increasingly challenged as they move through lessons.

Contribution of Science to teaching in other curriculum areas

Teachers will seek to take advantage of opportunities to make cross-curricular links. They will plan for pupils to practise and apply the skills, knowledge and understanding acquired through Science lessons to other areas of the curriculum:

- **Mathematics.** Sharing strong links with mathematics – taking measurements (length, time, mass, etc), data handling and presenting data in tables and through the use of graphs and pie charts.
- **ICT.** We recognise the important role computing skills have to play in the development of scientific skills. We also recognise the importance of being computer literate. Computing skills are used on a daily basis to enhance teaching and learning of science and to give all children the opportunity to use computing to research, collect, analyse and present scientific findings.
- **Geography** shares a 'natural' link with Science and pupils should have every possible opportunity to explore the science present in and around their school environment.

- **History.** To bring in History children should have the opportunity to research and learn about famous scientists from history and how their achievements have changed or impacted upon our lives.
- **English.** A Science activity can be used to stimulate pupils to write their own text in the genre about which they have been learning. This approach means that the limited time allocated to science can be used primarily for practical work, as communication of science ideas is covered in the literacy periods.
- **PSHE** education and the study in science lessons of reproduction and human development. Such learning both boosts children's knowledge of human biology and helps pupils to stay healthy and safe as they grow up. The aim of teaching about this in the primary curriculum is to allow the school and parents to work in partnership to keep children knowledgeable and safe as they grow up.

Teaching Science to children with Special Educational Needs.

At the PRU we teach Science to all children, whatever their ability. Pupils with Special Educational Needs can excel in Science because it is a potentially practical subject where pupils work in groups. Equally if a Science curriculum is provided that more able and 'mainstream' pupils find inaccessible or boring, management and engagement problems are likely to be magnified with SEN pupils. To optimise pupils' potential, staff need to think about the Science environment, activities and how they communicate to pupils. They also have to consider safety issues and how to enable pupils with physical disabilities to participate in practical work using manipulatively difficult equipment. It is advantageous if there is/are:

- An active stimulating learning environment
- Step-by-step activities
- Active, relevant multi-sensory activities
- Effective teachers' communication
- Equipment
- Safety
- Support of other adults and organisations
- General background material about pupils with SEN

Resources

Resources are held across the school. Topic boxes can be ordered by email or through the school office. For effective teaching of Science, resources (books, artefacts, etc) should be present on display and accessible to children within the classrooms. Some items of equipment are stored centrally in the main shed for safety reasons. Displays should also contain age and topic appropriate questions to challenge and develop their pupils' scientific understanding.

Health and Safety

Teachers have a general duty to take reasonable care for the health and safety of themselves, of other members of staff and of pupils. They must cooperate with the employer's instructions and fulfil any special responsibilities it gives them. They must cooperate with colleagues in their specific health & safety duties. Staff practice must set a good example to pupils and be consistent with pupil experiment rules, e.g. over the wearing of eye protection. Staff must be familiar with emergency drills and with the location in each room of: the escape route and fire-fighting equipment. Special arrangements must be made for hazardous equipment which has to be left out. Eating, drinking and the application of cosmetics should not take place. A teacher must assess risks very carefully before conducting any practical experiment. Pupils must not be left unsupervised in a classroom. Lesson preparation should be adequate and include checking on risk assessments and, where necessary, the health & safety precautions required. Time should be allowed for consulting more-senior colleagues where there is any doubt and to try out experiments, particularly those involving significant hazards. If, because of indiscipline, health and safety cannot be maintained during certain practical work, the work should be modified or abandoned.

Monitoring and review

The class teacher is responsible for monitoring the standard of the children's work and the quality of teaching in Science. The SLT is responsible for supporting colleagues in the teaching of Science, for being informed about current developments in the subject and for providing a strategic lead and direction for the subject in the school.

SMSC in Science

Spiritual Development

Sometimes Science and spiritual ideas do cause conflict but in a modern society it is important to understand why these conflicts arise so we can respect the views of others and move forward. It is also seen more often that Science is able to stand alongside the spiritual beliefs of many. This is looked at often from a neutral stand point within Science lessons.

Experiencing awe and wonder

- The impact of waves (Tsunamis and Earthquakes) in Physics
- Evolution in Biology
- The Big Bang Theory in Physics
- The development of the periodic table in Chemistry
- The miracle of birth in human biology

Exploring the values and beliefs of others

- The use of stem cells in reproductive research and the cure for inherited diseases
- The morality of blood transfusions for some religious groups
- Genetically modified crops
- The impact of pollution on our planet
- The anti-evolution movement (creationism)

Understanding Human feelings and emotions

- The impact of drug misuse
- The impact of alcohol on individuals, families and society
- Human behaviour and psychology

Using imagination and creativity in learning

- Students develop speaking skills
- Presentation skills
- Using descriptive writing to elicit emotion and feelings.

Moral Development

Our understanding of Science has allowed us to develop technology we couldn't have imagined 50 years ago. Now however, we must start deciding if we should we do all the scientific activities we are able to or morally should we decide not to. This can be as simple as should we test medicines for humans that could save lives on animals causing them cruelty? It could be as complex as should we allow somatic or germ line cell therapy. Moral development is a vital part of any Scientist's development. Students will need to develop a good understanding of it to firstly pass exams which always comprise of ethical questions but more importantly to become a good rounded Scientist.

Investigating moral values and ethical issues

- Human impact upon our planet and environment
- Should we colonise Mars?
- The ethics of human organ transplantation
- The debate on the use of alternative energy forms (impact of wind farms or the use of bio fuels)
- The safety of nuclear fuels and reactors.

Recognising right from wrong and applying it:

- The use of biotechnology
- Farming – are we dependent on monocultures
- Deforestation
- Animal rights

Understanding the consequences of their actions

- Staff role model the behaviour expected from their students
- The legal aspects of drug abuse
- The growing impact of rising obesity levels in Western Society
- The use of chemical based fertilisers on land – eutrophication.

Social Development

Science is changing our society. The life expectancy is getting larger, people are driving more efficient cars, and more people are putting solar panels on their rooftops. Our society has become dependent on scientific developments which we could not have foreseen 50 years ago but also our lives are likely to change significantly in the future because of our reckless damaging activities to the environment as a human society. Students must consider their impact on the world around them and start to look at what we can do to help the next generation have a habitable planet.

Developing personal qualities and social skills

- The use of mobile phones and smart technology
- Limestone quarrying
- Listening to the viewpoints of different scientific groups and politicians
- Developing the ability to take a full and active part in lessons

Participating cooperatively and resolving conflict

- The nuclear debate pro and cons
- Fossil fuels v biofuels
- Should we colonise Mars?

Understanding how communities and societies function

- Limestone quarrying
- Laws relating to drink driving
- The law in UK relating to euthanasia compared to European laws
- How science is portrayed in the media (Science in the news)

Cultural Development

Scientific development comes from all across the world, from people of all backgrounds and cultures. Some of Science's most important discoveries have come from other parts of the world and it's important for students to understand this as many believe that progress comes largely from the UK or America. It is also important to understand how the different cultures around the world can have different impacts on the planet and what impact more economically developed countries have on poorer areas. This will also be vital into the future as we need to monitor the impact of quickly developing cultures around the world on our environment.

Exploring, understanding and respecting diversity

- Understanding genetic variation
- Plant and animal biodiversity
- Classification and ecology

Participating in and responding to cultural activities

- Celebrating Space
- Star formation
- Big Bang Theory
- Changing ideas about the universe

- Transplantation
- Understanding and appreciating personal influences

Celebrating the role Scientists have played in our society. For example the influence of:

- Newton
- Darwin
- Mendel
- Mendeleev
- Galileo