



Science Policy

INTRODUCTION/RATIONAL

Science is offered to all pupils within key stages 1 to 4 of The Beacon as an entitlement. As one of the core subjects under the National Curriculum, time and financial investment has been made to provide suitable activities and resourcing to enable all students to achieve their potential in the subject. We aim to maximize opportunities to create activities that stimulate all their senses whilst interacting with peers and adults.

The science curriculum is designed to build students' knowledge and understanding of physical, chemical and biological phenomena through an investigative approach.

This document sets out the federation's approach to science education, in terms of its aims, principles and strategies as well as other specific issues and practical considerations that fall within the policy.

Aims

- To develop student enjoyment and curiosity in science and to show the contribution of science in aspects of everyday life.
- Introduce situations and provide guidance to enable students to explore their own ideas.
- To develop students' practical skills, their ability to plan and execute investigations, to make accurate and appropriate measurements and to apply these skills to the phenomena they observe.
- To use a range of investigative methods and activities to allow pupils to access understanding of the concepts and knowledge of science.
- To develop general communication and language skills and those specifically associated with the vocabulary of science.
- To develop the use of ICT as a source of information, measurement and recording.

Objectives

- For students to relate their own scientific studies to applications and effects within the real world.
- To develop safe practice within investigations and develop a conceptual base for health and safety.

- To develop knowledge and understanding of science as defined by the standards contained within the programmes of study of the National Curriculum.
- To develop a sense of enquiry about the natural world and to ask questions and make suggestions about what is seen.
- To develop the ability to predict events and outcomes based on gained knowledge and experiences.
- To effectively plan, carry out and review investigations
- To develop the means of communicating students' ideas using a variety of methods, including graphical and diagrammatic representation.
- To develop an understanding of the historical development of science. To develop an awareness of the contribution of individuals from all cultures to that understanding.

PRINCIPLES OF TEACHING AND LEARNING

Differentiation

Science activities are planned to give students a suitable range of differentiated activities appropriate to the key stage, age and ability and that will appropriately challenge each student.

- To allow students access to the science curriculum via visual, tactile and auditory means.
- To enable access to the vocabulary and language of science thorough a variety of methods, including symbols and signs.
- To use ICT methods to allow development / expression of ideas, including access via switches and other communication devices.
- To encourage and provide a variety of methods and resources for students to record and present work.
- To provide the appropriate level of adult support required to facilitate learning and whilst maximizing and developing their independence.

At Key Stage 4, many students follow the AQA Entry Level Science course. For some less confident pupils, this qualification may not be achievable, and they will be given the opportunity to work towards science related units within the AQA Unit Award Scheme, whilst still taking part in most of the practical activities carried out by their peers. At the other end of the scale, our most able students may be given the opportunity to work towards an AQA GCSE Science A qualification, and will be given extra work (including homework) and tuition to help them to achieve this.

Breadth and Balance

A clear understanding of the knowledge, skills and concepts taught is shown in the medium term schemes of work, allowing all staff working with the students to be proactive in the teaching and learning process.

The statutory requirements for teaching and learning in science are clearly defined in the National Curriculum at all key stages. To ensure a broad and balanced curriculum is maintained and that it has relevance to pupil needs, schemes of work are produced using a variety of sources including the National Curriculum and Kent Scheme of Work, for teaching children with special needs, and for younger children the EYFS guidelines. All schemes of work include a high content from AT1 (experimental and investigative science). The subject team will ensure that these schemes of work provide a balanced coverage of the National Curriculum programmes of study.

Equal Opportunities

Equal opportunities are achieved using the principles set out in the relevant policy statement.

Health and Safety

All practical activities in science must comply with the requirements of the Health and Safety at Work etc Act 1974. Specifically, teachers must carry out risk assessments of any hazards and are required to meet the demands of COSHH Regulations 1999 and/ or the Management of Health and Safety at Work Regulations 1992.

Employers (LEAs, school governors, etc) generally use model (general) risk assessments for science activities normally carried out in schools. These are found in the following publications:

- *Be safe! Some aspects of safety in science and technology for key stages 1 and 2* (ASE, 2nd edition, 1990);
- *Safeguards in the school laboratory* (ASE, 10th edition, 1996);
- *Topics in safety* (ASE, 2nd edition, 1998);
- *Safety reprints* (ASE, 1998 edition);
- *Safety in science education* (DfEE, 1996, HMSO);
- *Hazards* (CLEAPSS, 1995 or 1998 update);
- *Laboratory handbook* (CLEAPSS, 1997 or later);
- *Risk assessments for technology* (CLEAPSS, 1994).

Role of Subject Team

Subject teams ensure curriculum continuity and best practice for pupils in all key stages (EYFS to Sixth Form).

The teams are responsible for ensuring practice matches policy and they have opportunities during the academic year to monitor and support learning and teaching in their subjects.

SPIRITUAL, MORAL, SOCIAL AND CULTURAL LEARNING

Spiritual development is encouraged by the emphasis on practical, experiential learning, building on the natural sense of enquiry that children possess.

Moral issues are sensitively discussed within a variety of topics, including the study of animals and their care, energy production, the environment and climate change, the effect of drugs, and genetics and reproduction.

Social skills are encouraged through practical group work. Pupils are expected to work collaboratively when collecting, using and returning apparatus. They are encouraged to share ideas and observations with others, and to be aware of the safety of others.

Cultural awareness is encouraged through discussions related to the history of science. Pupils should understand that science has developed through contributions from all over the world, and from a wide range of cultures.

HEALTH & SAFETY

Whatever activity a child undertakes, all reasonable steps must be taken to ensure his / her safety and to predict dangers before they occur and is set out in detail in the school's Health and Safety policy.

- All pupils are properly supervised at all times.
- All reasonable precautions are taken to ensure the health and safety of pupils engaged in practical activities. This includes the use of safety glasses, removal of loose clothing and the tying of long hair when heating materials, as well as the immediate mopping up of spillages. Protective gloves or aprons are worn when it is deemed necessary. Protective screens are also used when potentially hazardous demonstrations are carried out.
- Students are withdrawn from an activity, or the activity adapted, if they appear unable to carry it out safely, after support is given.
- Safe working is modelled and discussed as a matter of course in all practical lessons.

A detailed risk assessment has been carried out in accordance with the advice from the KCSA science consultant using CLEAPSS L196, "Managing Risk Assessments in Science Departments", CLEAPSS "Hazards" and the "CLEAPSS Laboratory Handbook". All science schemes of work and plans for lessons taking place in the laboratory contain a summary and reference to the risk assessment for the specific activity involved.

Reception and Key Stage 1

The majority of students now entering The Beacon have complex needs, some of which may be medical or physical. Science is delivered through a programme of half-termly, cross-curricular topics covering history, geography and P.S.H.E. as well as science which covers the programmes of study whilst allowing for the necessary re-inforcement of key skills and concepts. The lessons are of short duration and concepts are delivered using concrete materials, providing multisensory-tactile experiences. Because of

the high levels of language delay or disorder, key vocabulary is supported by Makaton signing and Makaton or Rebus symbols and pupils require support to communicate their findings. Few children at this level are able to read or write more than one or two words out of context so alternative methods of recording are used, which can involve Makaton symbols where this is considered a suitable learning outcome for their emotional, mental and physical needs.

Key Stage 2

The programme of study comprises of approximately 6-7 week (one term) topics delivered by class teachers. These topics were developed and adapted from the new Kent Primary Science Scheme of Work, which meets the new National curriculum from 2014. Each primary class teacher is provided with the materials necessary to deliver a programme that is suitable, through appropriate differentiation, for the developmental capabilities of all students. Resources for each topic can be found in the designated boxes, which are kept in the science laboratory or in the P2 classroom resource area. Other resources can also be loaned from the secondary science laboratory.

KS3 and 4

Our least confident students continue to study science within their class groups, using a topic based structure as in KS2.

For our more able students, KS3 and 4 Science is included within the timetable and is delivered, by the specialist science leader, in specific topic modules of approximately half-termly duration. Pupils in Key Stage 3 take part in one double lesson of 90 minutes per week, whilst at Key Stage 4 students receive 3 periods, totaling 135 minutes per week. These sessions are designed to be largely practical in nature, taking place within the science laboratory.

At Key Stage 4, the syllabus for the AQA Entry level Science A has formed the core programme of study since September 2011. The assessment for this involves formal, externally set tests for each topic, and a portfolio of at least three practical investigations, set by the teacher.

As described earlier in the section on differentiation, pupils can work towards identified Unit Awards or towards GCSE Science A, where their needs are not fully met by Entry Level. In the latter case, the GCSE examination will be taken in addition to Entry level, rather than as replacement. The GCSE examination involves formal academic examinations in the hall and one Controlled Assessment, which requires they investigate, through experiment and research, a specific problem set by the examination board.

There are currently no Science based courses at Key stage 5, though the Science department is currently investigating possible developments in this area.

THE ROLE OF TEACHING ASSISTANTS

The teaching assistant is regarded as a key member of the teaching team. Learning aims and the lesson plan are shared with the teaching assistant prior to each lesson. The teacher is responsible for targeting teaching assistant support, though flexibility and initiative is encouraged.

Due to the practical and potentially hazardous nature of many of the activities, it is expected that teaching assistants share in the monitoring and supporting of safe working in science. They can also facilitate the smooth running of lessons and free the teacher to teach through carrying out essential practical tasks (e.g. collecting/distributing equipment and washing up). These tasks are in addition to their fundamental role of supporting learning, which applies in all areas of the curriculum. In science, we are especially keen that teaching assistants understand that their role is to encourage students to do it themselves and to enable them to carry out tasks and find answers as independently as possible.

ASSESSING PUPIL PROGRESS

Assessment, Recording and Reporting

The assessment of science adheres to the details contained in the School's Assessment Policy Document.

Formative and summative assessment methods are used, ranging from informal observation of practical tasks, to formal paper based end of module

tests. Teacher assessments are regularly updated on the computer based Pupil Asset system, providing an effective “live” mark book. For the more able KS3 and 4 students, student performance in each module is assessed through an internally standardized written test, designed to maximize assessment of scientific understanding and knowledge and to minimize the effect of any language and communication difficulties. Assessment of scientific skills and processes is done through practical tasks and links to national curriculum statements and, at Key Stage 4, also to the requirements of the examination specification.

Progress is formally monitored termly via collated data from the Pupil Asset system, and also informally through regular observation. Where pupils are identified as failing to progress well, then interventions, including further differentiation or targeted support, are identified to help them to move on.

RESOURCES & FACILITIES

The Science laboratory has teacher and pupil benches with ample gas and electricity points. The back bench contains three sinks. Chemicals are stored in a lockable cupboard, only accessible by the teacher. There is a dedicated computer which links up to a data projector. This enables large scale, visually based interactive activities to be integrated into lessons.

Many classrooms provide basic water and electricity requirements and, especially in the primary department, much of the science curriculum is delivered there. Use of the science laboratory by secondary aged pupils is timetabled for specific times on a weekly basis.

The science leader and primary based subject partners liaise with KS1 and 2 teachers to ensure that resources best meet the need of the curriculum, including new development, and maintenance of existing programmes.

Cross-curricular links

All planning will include basic skills development and will indicate the progress in communication, numeracy, and ICT skills, along with identified topic links in area such as humanities, PSHE and music.

CURRICULUM ENRICHMENT

We aim to give all students the opportunity take part in Science based visits during key stage 3 and key stage 4. This may involve ecological field activities, or visits to animal parks, science centres or museums.

EXTERNAL LINKS

The science department is committed to developing and maintaining external links. Staff have attended a range of science related INSET, including Foundation Science and KS1, and Key Stage 4 examination related courses.

We have developed links with the Natural History Museum, the Science Museum, EDF Energy, the Wildwood Trust, the Aspinall Foundation, Wingham Animal Park, the Woodland Trust and the RSPB.

THE ROLE OF THE SCIENCE LEADER AND SUBJECT PARTNER

The science leaders have responsibility for co-ordinating the development of the science curriculum and for monitoring its content and delivery, resourcing and staff training requirements. They are also responsible for monitoring pupil progress in Science throughout the school. They should organise and deliver all aspects and requirements of the accredited Key Stage 4 science courses and ensure that pupils work for this is maintained according to the examining board criteria. They are regarded as a focal point for the dissemination of matters relating to the science curriculum and are required to ensure that new information, county or national policy relating to all aspects of the teaching of science at all ages catered for by the school is, disseminated to relevant members of staff. On matters of policy, the science leaders have a duty to ensure that the policy documentation and schemes of work for science are progressive and appropriate to National Curriculum requirements and that they reflect the practices that are being undertaken across the school, reviewing these at regular agreed intervals and updating these as necessary. They also have a commitment to maintain awareness and understanding of the current developments within Science education. To this end, they should aim to attend any relevant courses and to keep abreast of appropriate literature and new resources.

Review

Review of this policy, resourcing, changes in science strategies, both local and national, and other aspects of subject development are revisited annually.

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