2016

SCIENCE POLICY

SPRING COMMON ACADEMY TRUST
AMERICAN LANE, HUNTINGDON, CAMBRIDGESHIRE. PE29 1TQ

INTRODUCTION

A balanced school curriculum for all pupils must cover a wide range of subjects, as stipulated in the National Curriculum, and this must include science and technology. Every child must be educated to their maximum potential. Their programmes of study must include materials that are relevant for their everyday living and help prepare them for their after school life, whether in employment, leisure or enforced home-based activities. Thus science must be: Broad, Balanced, Relevant and Understandable, promoting and fostering the main principles of every child matters.

DIFFERENTIATION AND SPECIAL NEEDS

Because of the investigative and collaborative nature of science it is particularly well suited to mixed ability work. It is important to realise that a child may have considerable scientific understanding without necessarily being able to record it. Each child will need to feel that their scientific enquiries are valued and given individual consideration. All children should have equal access to science irrespective of race, gender or mobility.

TEACHING SCIENCE TO CHILDREN WITH AUTISM SPECTRUM CONDITIONS (ASC)

General guidance on the approach to teaching and learning for children with ASC may be found within the school's Autism Handbook.

In Science students with ASC demonstrate the following characteristic learning and thinking styles:

- A relative strength in concrete thinking, for example, following a methodical sequence such as getting practical equipment ready.
- A preference for visually as opposed to orally presented materials, for example, the solar system, spacing between planets, use of scale models.
- A relatively slow speed of processing of orally presented materials leading to partial or incomplete understanding of a spoken instruction.
- A relative strength in rote memory, for example, the use of mnemonics to recall processes and cycles.
- A strength in understanding visuospatial relationships, for example, in the topic of forces building 3D bridges from modelling straws.
- Difficulties in abstract thinking, for example, unseen relationships such as the impact of sunlight on growth.
- Difficulties in social cognition, for example, understanding lifestyle choices that may be unhealthy.

- Difficulties in communication. Many people with ASC are reluctant writers, some ASC adults describe struggling to understand why they were expected to write down something they already knew.
- Unusual patterns of attention, for example, total absorption in a favourite activity and fleeting attention to something that is not preferred.

Aspects of the Science lab including unusual smells and the presence of dangerous equipment may cause sensory difficulties for children with ASC.

Students with ASC are often helped by:

- Visual representations of concepts and instructions.
- Additional time to process instructions.
- Choices / alternative recording techniques other than writing (especially a description of a practical which may be considered finished).

AFL FRAMEWORK

By regular monitoring and assessment we can identify and create a personalised programme for those with special talents and make corresponding changes to organisation methods and curriculum to meet their needs and where possible and appropriate, pupils in mainstream education may be accommodated with Spring Common. We will also make time to discuss with every child aspects of their scientific progress. We will regularly set a side a time to review current practices and resources to ensure equality of opportunity and personalization in all aspects of learning.

SPRING COMMON'S APPROACH TO SCIENCE

Science can be fascinating, interesting and exciting and develop a wide range of practical skills useful in other areas of life.

The approach is not only to accumulate knowledge but to develop good investigative practices and improve practical communication and cognitive skills. The topics have been chosen to allow a wide range of pupils to do the activities and a set of differentiated tasks are available on each topic.

The overall programme is designed to cover all requirements of the National Curriculum and totally support personalized learning programmes.

HEALTH AND SAFETY

At all times the science has been scrutinised to ensure safety whilst still allowing for a degree of excitement and responsibility on the part of the pupils. This is

important for preparing for living at home and for deciding learning objectives. Individual objectives and outcomes are set for each activity and the levels of achievement of these are recorded using the B-squared assessment tool. This information is then used to inform future teaching and learning in line with the medium term plan which teachers will use to set personalized objectives in the short term plans. Risk assessments will be carried out for all activities.

EVERY CHILD MATTERS

The Science Policy at seeks to support and deliver the Aims and the Mission Statements of the school and the aims of the Every Child Matters Agenda:

- Be healthy
- Stay safe
- Enjoy and achieve
- Make a positive contribution
- Achieve economic well being

All those involved in the teaching and learning of science will be valued for their individual specialist contributions to the subject and will be expected to give of their best.

Please note that areas that particularly apply to the ECMA throughout the Policy are printed in bold type.

THE UNIQUE CONTRIBUTION OF THE SUBJECT

The following constitute the unique contribution that science brings to the curriculum:

- Its ability to develop an understanding to key scientific concepts and skills which students can use to increase their perception of the world around them
- Its ability to develop responsible attitudes towards safety that can be applied to new situations or working environments that students may encounter.
- Its ability to build on students; natural curiosity in order to make them more systematic and critical in their approaches to scientific phenomena.
- Its ability to offer students opportunities to examine some of the moral dilemmas that have arisen out of scientific discoveries.
- Its ability to encourage understanding and respect for all living organisms.
- Its ability to make students aware of the 'fragile' nature of our planet and develop their respect for the environment.

AIMS AND OBJECTIVES

General Aims of the Science Policy

These aims are not expressed in any hierarchy and their relevance will vary from one individual to the next depending on their own particular needs at any given moment. They should encourage and develop each individual pupil's potential for:

- Logical, constructive and sustained thinking.
- Improving self-awareness and an understanding of the environment as a whole.
- Increasing confidence, initiative and perseverance when tackling problems.
- Increasing independence, self-reliance and self-esteem.
- Working with others and the developing of a spirit of co-operation, care and concern.
- Enhancing communication skills.
- Increase practical skills, utilising cross curricular skills especially verbal communication, reading, listening, recording, classifying, measuring, comparing and evaluating findings.
- Improving observation skills.
- The learning of the correct, skilled and safe use of tools (artifacts).
- Increasing confident handling of new materials and objects.
- Improving understanding through practical experience.
- To encourage pupils to investigate and enjoy the science and technology and to develop a sense of curiosity and stimulate the asking of questions.
- To develop the pupils self-esteem, self-confidence, initiative, manipulative skills and perseverance through successful science programmes.
- To encourage a wide variety of communication skills by co-operation and group work.
- To set practical work tasks as a preparation for adulthood and, where appropriate, employment.
- To develop an everyday application of scientific knowledge in the world around us.
- To promote the learning of skills, understanding and key vocabulary through a scientific attitude to the solving of problems.
- To develop the skills of experimenting, devising and carrying out investigations and testing hypotheses by means of fair tests.
- Communicating and recording information following practical observations.
- To promote confidence in the use of appropriate scientific equipment correctly and safely, including the use if ICT to collect and display data.
- To encourage the ability to make predictions and suggest explanations based on an understanding of the world around them and scientific knowledge.
- To carry out a full, fair test investigation when the science theme allows.
- To ensure that each lesson incorporates some scientific investigation skills.
- To develop a respect for all living things and the environment and an understanding of their interdependence.
- To develop an ability to understand and interpret scientific information presented in verbal, mathematical, diagrammatic or graphic form and translating such information from one form to another.

These aims are met by:

- Following the National Curriculum and the Early Learning Goals using the equals scheme of work
- Supplementing teaching using relevant, up to date and stimulating resources
- Teaching scientific skills as a separate learning objective to those that have a specific content learning objective
- Reinforcing these scientific skills in lessons that are more content specific.

These aims support the overall aims of the school which are:

- To develop pupil's knowledge and skills, and widen their experience and understanding.
- To promote the spiritual, moral and cultural development of our pupils.
- To prepare pupils to enter adulthood confidently as active participants in society.

PERSONAL DEVELOPMENT SKILLS

- Handling apparatus with care and confidence
- Following instructions
- Observing, recording and reporting accurately
- Seeking explanations and drawing conclusions through identifying patterns and trends
- Solving problems and making decisions
- Handling living things responsibly
- Working co-operatively and assuming different roles within groups
- Developing meaningful strategies to cope with complex scientific and technologically
  advanced world we now live in e.g. estimating, problem solving
- Producing a fair test (one that eliminates variables which affect the validity of the test)
- making predictions based on knowledge
- Using communication tools to formulate their ideas.

In Science there is an intrinsic link to PSHE, Citizenship and life skills programmes.

It is important to have a clear idea of those basic skills a child already has, in order to plan a science lesson which moulds, develops and extends these skills, using science investigations as the motivator.

With the National Curriculum in mind we should aim at the highest level possible within the child's capabilities. We must not lose sight, however, of the fact that some children may never progress beyond Attainment Level 1 of the National Curriculum even at Key Stage 3.

PROMOTING KEY SKILLS THROUGH SCIENCE

In Science functional skills are promoted across the curriculum, for example:

English:

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 the Literacy Hour are of a scientific nature.
The children develop oral skills in science lessons through discussions (for example of the environment) and through recounting their observations of scientific experiments. They develop their writing skills through writing reports and projects and by recording information.

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 by drawing graphs and charts. They use numbers in many of their answers and conclusions.

Information and communication technology (ICT):

The use of I.T. within science is valued and encouraged within the school. Pupils 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 e.g. graphs, tables, pictograms etc.

Many programmes used incorporate science elements directly or indirectly. Communication and data recording using I.T. is also encouraged.

Pupils have access to the Sensory Room e.g. interactive bubble tubes and Soft Play room e.g. musical box (cause and effect).

Pupils have access to videos, CD's, switches and digital cameras.

Opportunities for the use of IWB and audio through specialist software is under development and review and is specified in medium and short term plans.

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. They organise campaigns on matters of concern to them, such as helping the poor or homeless. 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.

Opportunities will be taken to capitalise on appropriate links between subjects especially in the area of the environment making full use of the school grounds and our tradition of field work. Where possible aspects of the wider community's involvement in school will be built on to provide new examples of scientific experience. The long term planning process will take account of cross-curricular and multi-cultural opportunities and group units of work accordingly.

PRESENTATION: UPPER SCHOOL

KEY STAGES THREE AND FOUR

Pupils are taught in a small group as a discreet subject, the accent being on investigation, exploration and problem solving. This is often supported in other subject areas by cross-curricular links. However some class groups will follow aspects of the science programmes through topic and life skills activities.

Four areas of study have been selected by the school for their relevance to the pupils' everyday lives and the important scientific concepts they embody. These are grouped under their main headings as follows:

EXPERIMENTAL AND INVESTIGATIVE SCIENCE

This attainment target is continuous throughout all areas of scientific study.

Life and Living Processes

1. Life Processes
2. The Environment
3. Plants
4. Diet
5. The Body
6. Health

Materials and their Properties

1. Grouping and classifying materials and their properties.
2. Changing materials and their properties.
3. Changing materials and their properties.

Physical processes

1. The Earth and Beyond
2. Electricity and energy
3. Magnetism
4. Forces and Motion
5. Light and Colour.
6. Sound

Progression is important in order to avoid repetition of the same work and to enable the children to develop, where possible, a hierarchical set of concepts related both to science and their everyday lives. However, some children will need far more consolidation than others and so repetition of themes and concepts is acceptable provided that the more able pupils are sufficiently extended by being given new material. In order to ensure progression, the equals system of work will be used.

PRESENTATION: LOWER SCHOOL

Science will be taught as a distinct subject, however cross curricular work will be encouraged with the class teacher developing the subject through a topic. The accent is on observation and discovery through scientific enquiry.

EARLY YEARS AND FOUNDATION STAGE

In early years science is taught as part of the foundation curriculum with particular emphasis on knowledge and understanding of the world.

Scientific investigation

Opportunities will be taken throughout the day to share appropriate questions that arise from day to day observations or special 'one off' events. Observation, recording and discussion will take place within relevant areas of the curriculum and will concentrate on responding to young children's natural curiosity about their world

Life and living processes

Finding the correct names for things will be an important part of early years' education, songs, rhymes and games will prove useful here. An introduction to learning to care for other living creatures will give practical insights into living processes. The children's knowledge of the range of life will be extended through books, videos and television programmes.

Materials

By playing with sand and water and a range of other materials the children will explore a range of properties. More structures activities such as cooking introduce the idea of changes brought about by heating and cooling.

Physical processes

Consideration of their home and school surroundings will lead into work on the uses of electricity and important safety matters. A range of toys and games will be used to introduce ideas about forces and energy.

KEY STAGE ONE

Key stage 1 Science is being delivered using the Equals scheme of work, with additional material from the QCA.

Scientific investigation

The focus will shift as the children grow older from the simply observational to the investigative whilst maintaining an interest in everyday events. The use of scientific language will increasingly be promoted and more accurate forms of record keeping introduced. An element of evaluation will be expected so the children become more conscious of the processes they are working through and particularly start to recognise the concept of a fair test.

Life and Living Processes

The children's own growth will be studied for its insights into human development and they will be encouraged to appreciate the new responsibilities they have to take on for a healthy lifestyle and personal safety. Opportunities will be taken to move further afield in our study of living things and some understanding of the effect we have on the environment introduced.

Materials

The children will have access to a greater range of materials and additional opportunities for seeing chemical and other changes at work, as when firing pots for example.

Physical Processes

Practical investigations with a range of simple electrical apparatus will be extended. A more experimental approach to uses of power will be undertaken and additional investigative work in the environment will take place.

KEY STAGE TWO

Scientific Investigation

Children will be introduced more formally to the idea of setting up an experiment and recording it in detail. Although we will continue to look at issues close to home the use of field trips and additional resource materials will be used to extend the children's overall scientific background.

Life and Living Processes

Major responsibilities for caring for a variety of living things over a long period will be shared out. Further personal developments will be used to illustrate the processes of life. Long term investigations into the relationship between living things and the environment will be carried out.

Materials

The children will work on several different projects, linked through to technology, which will have some practical outcome. These will necessitate

developing an understanding of the properties of many different materials. More experimental work will be set up with a focus on measuring observed changes. Time will be spent away from school looking at the environmental consequences of using natural resources.

Physical Processes

As well as pursuing a programme of direct investigation through experiment we will use a wide range of books and other resources to develop the children's understanding of natural forces away from what is evident from immediate experience.

Progression

Progression is encouraged by presenting activities within different contexts according to the key stages as outlined in the National Curriculum. Pupil's achievements are measured in "P" scales (P1 to P8) and National Curriculum levels (Level One to Three).

SAFETY

To overcome possible hazards in science it is better that the subject be taught in a structured and teacher controlled way. Children are encouraged to "find out" for themselves through experiments but they are made aware of any possible dangers and trained to act in a responsible manner. With children who have special educational needs it is not enough simply to write out a list of do's and don'ts. Safety aspect must be an integral part of the science curriculum. This will be done without hindering the pupil's natural curiosity during the experiments.

ASSESSMENT, RECORDING AND REPORTING

The school science curriculum is divided into small, achievable steps which work towards the National Curriculum levels. This ensures that each pupil can achieve progress at their own rate, and also ensures continuity throughout the school.

At the end of each unit pupil achievement is recorded using the B-squared assessment tool, recording levels of experience, understanding, capability and/or achievement.

Pupils at the end of relevant key stages undertake a Teacher Assessment Process. Pupils functioning at level three or above of the National Curriculum are subject to Standard Attainment Tests.

Pupil's achievements are reported annually to parents and carers through annual reviews, and Learning Journeys.

Pupil's P levels and NC levels are reported to the LA annually, including caspa data which shows achievement over time.

Accurate record keeping is an essential part of the science policy facilitating continuity and developmental progress and equal exposure to the complete curriculum. Individual pupil records will be maintained showing topics covered and achievement levels attained.

The evaluation of the effectiveness of most of what has gone before depends on detailed and accurate use of the B-squared tool.

Each class teacher will use a variety of methods of assessment from formal tests to discussion and observation in order to inform the B-squared assessments. This will form the basis for statements of teacher assessment as regards National Curriculum reporting, our own written reports to parents and any transfer documents. In conjunction with our Special Needs Record it will enable informed decisions to be made about each child's programme of study.

These general policies have specific application to individual classes, each of which have their own approach depending on the abilities and interests of the children and to the relevant areas of the curriculum.

RESOURCES

Resources are readily available and stored correctly in the Science area. Given sufficient notice, specialist equipment can be used away from the Science Area providing it is promptly returned and the coordinator informed of any unservicabilities.

The School appreciates that access to good quality
resources is crucial to the successful teaching of science. These resources must include apparatus for practical work, consumable materials for use in such work and suitable published resources including books, charts, slides, IWB, software, ICT and videos. Not only do these materials need to be in good condition and up to date and readily available to the teacher and where appropriate, the children.

Each class teacher should be able to satisfy themselves that they have all the necessary resources to meet the day to day work in science readily available in their own room. Agreement should be reached as to what kinds of more specialist equipment should be kept in a central secure and controlled place and steps taken to ensure its careful ongoing storage and accessibility. Equipment held around the school should be examined regularly, any shortfalls made up and new material added as demanded by the curriculum. The use of printed resources should be regularly reviewed in the light of the changing curriculum

and what is currently on the market.

SUMMARY

This policy has been written to outline the school's approach to teaching Science. It is not intended to be a teaching sequence and, although suggested teaching aims are given, these may be adapted or modified to suit an individual pupil's physical and/or mental abilities.

The Science programme will always support and enhance the basic concepts of other subjects such as communication, design technology, mathematics. Also, it develops the pupils' interest in the world around them, encompassing some geographical topics. In order to improve cross curricular opportunities the suggested annual policy review board will consist of representatives from these subjects

Policy agreed on: 2016

Signed on behalf of the Trustees_____

Committee: CURRICULUM

Author: MIKE GIBBONS

Review date (optional): _____

Website **Y**/N