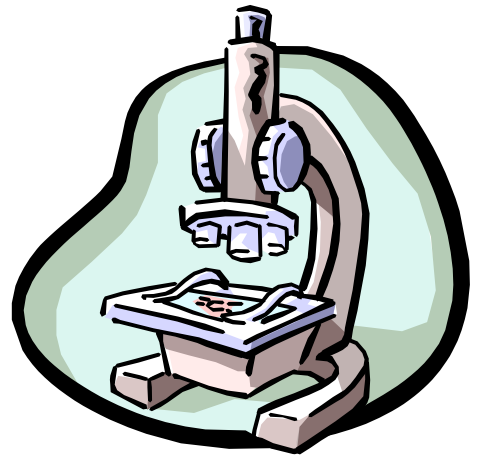


Waterfield Primary School

Science Policy



January 2006

1. Introduction

This document should be read in conjunction with our Teaching and Learning Policy, Equal Opportunities Policy, Special Educational Needs Policy and More Able Pupils Policy.

Science stimulates and excites pupil's curiosity about phenomena and events in the world around them. It also satisfies this curiosity with knowledge. Because Science links direct practical experience with ideas, it can engage learners at many levels. Scientific method is about developing and evaluating explanations through experimental evidence and modelling. This is a spur to critical and creative thought. Through Science, pupils understand how major scientific ideas contribute to technological change – impacting on industry, business and medicine and improving quality of life. Pupils recognise the cultural significance of Science and trace its worldwide development. They learn to question and discuss Science based issues that may affect their own lives, the direction of society and the future of the world.

Through Science, pupils observe, explore and ask questions about living things, materials and phenomena. They begin to work together to collect evidence to help them answer questions and to link this to simple scientific ideas they evaluate evidence and consider whether tests or comparisons are fair. Children use reference materials to support their scientific ideas. They share their ideas and communicate them using scientific language, drawings, charts and tables.

Pupils should be taught the knowledge, skills and understanding through:

- A range of domestic and environmental contexts that are familiar and of interest to them
- Looking at the part science has played in the development of many useful things
- Using a range of sources of information and data, including ICT based sources
- Using first-hand and secondary data to carry out a range of scientific investigations.

Alongside, the pupils should be taught to:

- Use simple scientific language to communicate ideas and to name and describe living things, materials, phenomena and processes
- Recognise that there are hazards in living things, materials and physical processes, assess risks and take action to reduce risks to themselves and others

2. Teaching and Learning of Science

- Effective Science teaching takes place in a supportive environment with a caring and sympathetic adult providing developmental and challenging opportunities for the child
- Scientific learning must be planned so that it matches the children's interests and aptitudes and their current and potential abilities
- Children need to build on their natural curiosity and teachers must stimulate exploration, investigation and a questioning attitude by direct interaction with the materials, concepts and procedures of Science in everyday and scientific situations
- Children learn best through first hand experience involving the use of all the senses to observe a variety of phenomena both within and beyond the classroom environment
- Science is best learned when peers are collaborating to gather information, solve problems and present findings to others
- Science is not compartmentalised and will inform and be informed by other areas of the curriculum

3a. The Curriculum: Foundation Stage

The curriculum for the Foundation Stage should underpin all future learning by supporting, fostering, promoting and developing children's **knowledge and understanding of the world**. The Foundation Stage provides opportunities for all children to solve problems, make decisions, experiment, predict, plan and question in a variety of contexts. The children explore and find out about their environment and people and places that have significance in their lives.

To give all children the best opportunities for effectively developing their knowledge and understanding of the world, particular attention will be given to:

- Activities based on first-hand experiences that encourage exploration, observation, problem solving, prediction, critical thinking, decision making and discussion
- An environment with a wide range of indoor and outdoor activities that stimulate children's interest and curiosity
- Adult support in helping children communicate and record orally and in other ways
- Supplementary experience and information for children with sensory impairment

The **Early Learning Goals** establish expectations for most children to reach by the end of the Foundation Stage. Although not a curriculum in themselves they provide the basis for planning throughout the Foundation Stage.

At Waterfield School Science in the Foundation Stage is delivered through activities such as:

Foundation Stage Knowledge and Understanding Activities

These include:

- Visiting animals
- Visits to farms
- Use of the mill pond
- Use of sand tray
- Use of water tray
- Using dough and plasticine
- Using a wide range of natural materials
- Role play
- Looking after plants and garden areas
- Investigating and exploring individually or with an adult
- Thinking about the seasons
- Noticing the weather
- Being encouraged to ask questions
- Open access to an adult to have queries answered
- Looking at lifestyles
- Completing relevant picture puzzles
- Using a range of equipment such as magnifying glasses

3b. The Curriculum – NC 2000

The scientific experiences and activities presented to the children are planned to incorporate the programme of study for Key Stage One and Key Stage Two of the National Curriculum.

Using the QCA documentation, staff have utilised and developed its units of work in order to fit in with specific year group themes. For example, the unit 'pushes and pulls' has been incorporated into the theme 'toys'.

4. Planning

Long Term

This derives from the Foundation Stages Early Learning Goals and the National Curriculum for Science. In Key Stages 1 and 2, in support of the National Curriculum, staff use the QCA schemes as one of the tools in their planning.

Medium Term

Learning Intentions and outcomes are broken down into a weekly programme of delivery with associated activities and assessments.

Short Term Plans

Year groups work as teams and as appropriate to review and plan on a regular basis. These meetings translate the medium term plans into differentiated goals for direct delivery in the classroom.

5. Experimental and Investigative Science

“Teachers know that children do not become competent investigators and experimenters by chance. Just as you have to teach children concepts, you also have to teach them the skills of Science”

Star Science Teachers Guide

At Waterfield we believe that it is important that children fully understand the process and the purpose of scientific investigation, and that they use their knowledge and understanding in Attainment Targets (SC) 2, 3 and 4 at an appropriate investigative level.

Children will need to develop a range of skills to be effective in carrying out investigations. These skills include:

- Predicting
- Fair testing
- Measuring
- Recording
- Considering evidence
- Observation
- Collaboration

Initially, it may be necessary for teachers to model different methods of recording results, before children are able to adopt these methods independently.

It is important to remember that SC1 (Scientific Enquiry) accounts for **50%** weighting within the Science Curriculum.

At Waterfield, our teaching of Sc1 ensures that Scientific Enquiry is taught through contexts taken from the sections on life processes and living things, materials and their properties and physical processes.

We teach the importance of collecting evidence by making observations and measurements when trying to answer a question. Children are taught to plan, obtain and present evidence and then consider their findings and evaluate.

6. Science and the use of ICT

At Waterfield pupils will be given opportunities to develop their learning of science through the use of ICT.

Pupils will be given opportunities to develop their knowledge and understanding by:

- Find things out from a variety of sources, selecting and synthesising the information to meet their needs and developing an ability to question its accuracy, bias and plausibility
- Develop their ideas using ICT tools to amend and refine their work and enhance its quality and accuracy
- Exchange and share information, both directly and through electronic media
- Review, modify and evaluate their work, reflecting critically on its quality, as it progresses

QCA

ICT Resources for Science

Foundation	My World Science Fair Volume one	Year 1	Plants and Growth Science Fair Living and Growing Learning Ladder My World of Science KS1 Science
Year 2	Sound and Light Plants and Growth Living and Growing Learning Ladder Interfact Solar System Interfact ladders – Exploring Space KS1 Science	Year 3, Year 4 Year 5 Year 6	The mystery of the vanishing trees Human Body DK Human Body – Magic Bus Adventure Solar System – Magic school bus KS2 Science

Encyclopedia

Encarta 97
Hutchinson Encarta

Garden and Wildlife
Trains and magnets
From seeds to plants
Decisions 3 starter pack
Domeworld
Science Stars – Underwater
rescue (forces)
Science Stars – Lost in
Labyrinth (forces)
BBC Science Simulations

7. Assessment

Assessment and record keeping are closely linked to planning and teaching and needs to be carried out at three connected levels:

- **Short Term**
- **Medium Term**
- **Long Term**

This ensures that the assessments made effectively measure learning and produce more focused and appropriate teaching.

Short Term Assessment

These are informal assessments, which feed into day-by-day teaching. Informal notes are recorded on the weekly planning sheets.

To assess children's learning informally teachers need to:

- Observe groups or individuals as they work on an activity or task, questioning them about the strategies they used
- Monitor individual children's performances as they respond
- Collect and evaluate evidence of practical tasks, explanations and recorded work
- Provide an occasional short informal test either in written or oral form
- Analyse errors carefully, trying to determine if they are careless slips or basic misconceptions

Medium and Long Term Assessments

Assessment sheets will be used across the key stages to record individual children's attainment on an ongoing basis. These social assessments inform planning and teachers need to plan assessment activities and written tasks. Arrows are used to record a child's "over" (↑) and "under" (↓) attainment. Children operating at the expected level will register an empty box.

At the beginning and end of each topic, classes at Waterfield undertake concept mapping exercises to determine their knowledge and level of understanding of individual topics.

In Year 2 there is an end of key stage teacher assessment in Science, undertaken as part of the SATs process. The same process is also undertaken in years 3,4,5 and 6 for key stage 2.

8. Presentation and Recording of Children's Work

Purposes for which pupils record their work include:

- Communicating with others
- Helping in clarifying their own thinking
- Providing evidence of work in Science

The recording and/or presentation will take many different forms depending on the nature of the task and stage of development. This could be individual, group or whole class recording.

Whilst at Waterfield, children will have the opportunity to:

- Discuss verbally
- Make observations
- Draw pictures
- Make models
- Take photographs
- Draw diagrams
- Construct graphs
- Use a range of pencil and paper methods

Wherever possible, the teacher should respond constructively to pupil's work while they are present. Comments and suggestions about where the child could go next are essential.

Further information can be found in the Waterfield School Marking Policy.

9. Organisation of Resources and Equipment

Resource cupboard in yellow room within year 1 unit

Ginn science – KS1& lower junior

Pupil books, books, teacher books, teacher books (lower junior)

Changes, plants, the environment, light, earth and beyond, ourselves and other animals, sound, forces.

Corks

Plastic tubing

Wires and bulbs

Pond dipping equipment – nets and transparent containers

Bricks/stones/wood/tree bark

Plastic funnels

Weighing scales

2 x large long periscopes

magnifying tripods

Magnifying glasses

Wires and bulbs

Plastic tubing

Plastic containers

Force meters

Spring balances

Long spring balances

Differing size measuring transparent containers

Plastic transparent containers

Resource area Year 5

Sieves

Filter papers

Colanders

Newton Meters

Stop watches

CGP study books

Due to Science's standing as a core subject, it would be envisaged that each year group, and as appropriate, each class, will contain resources relevant to the theme being covered (and that resources will be returned to the resources cupboard as the theme is completed).

The school has adopted the Ginn Star Science Scheme.

This is used, alongside other resources, to find appropriate activities to fulfil the learning intentions and outcomes of the medium and short term plans. As such, it is a valuable teaching resource.

10. Outside School Links

Many of the units of work covered provide opportunities for tasks that can be completed outside school.

Suitable tasks include:

- Finding out more about the topics in the units
- Identifying where ideas encountered are relevant to everyday life
- Collecting data and information

At Waterfield our ethos places great emphasis on the partnership between Parents/Carers and teachers.

We actively encourage Parents/Carers to get involved in scientific learning as part of the curriculum:

- Inviting Parents/Carers into the classroom to observe or to work with children on a practical task
- Inviting Parents/Carers to twice yearly consultation evenings
- Producing an end of year report which summarises their child's achievements in Science
- Organising home visits for children in the Nursery and Reception

We encourage children to further their experiences as scientists outside school with the aid and support of parents through their everyday experiences.

Waterfield invites visitors in to school to share their experiences and knowledge with the children as appropriate to the topics being covered.

As appropriate to topics being covered, trips are organised for year groups to extend their range of experience and bring elements of the curriculum alive.

When off site trips are organised, staff need to consult the WSCC regulations and notes of guidance for off-site activities.

As with all school trips, parental contributions towards funding will be requested.

11. Monitoring and Standards

Once a year a whole school agreement trial is undertaken with a different Attainment Target focus. This provides an opportunity for moderation across the school from Foundation age upwards, to check teachers' "levelling" of assessments and ensures consistent judgements.

Termly samples of children's work are kept for the Science portfolio. The portfolio aims to show breadth of study. This should be looked at in conjunction with the Science work in the Waterfield School Assessment portfolio. Each piece of work is annotated by the class teacher to provide a context for the sample.

12. Health and Safety

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, consequent risks and take steps to minimise the risks to themselves and others
- To use information to assess the immediate and cumulative risks
- To manage their environment to ensure the health and safety to themselves and others
- To explain the steps they take to minimise risks.

Every effort will have been made to ensure that the activities in the National Curriculum 2000 are safe. But it is essential to carry out a risk assessment before trying any practical activity; and to warn children of any apparent hazards. This safety advice is grouped under three familiar science areas:

Ourselves and other animals

Know your children. Be aware of their individual characteristics and circumstances. Be careful not to place children in positions of physical and emotional strain. Do your research. Find out the animals that are suited to classrooms, and obtain them from reputable suppliers. Some children may be allergic to some animals, and you should take precautions. Remember that well-kept animals can expect a long life; make plans for holiday care, and for what may happen to them should circumstances change.

Plant Life – Environment

Choose suitable plants for classroom use. Avoid plants that are considered poisonous. Don't establish a garden or wildlife area without plans for its long-term care. Be especially careful around ponds; these may need fencing in school grounds, and you should be aware of any dangers of tetanus and of Weill's disease.

Microbes release large quantities of spores into the air and some children may be allergic to these. If you allow food material to decay – growing micro-organisms – keep it in sealed polythene bags, and throw them away without opening. Never use meat, or animal products.

In any work with food – you must have the highest standards of hygiene. Surfaces, utensils, and children must all be clean; and you should use fresh properly stored foods, with a proper awareness of children’s sensitivities and allergies. Do not use food utensils for any other purpose. Closely supervise the use of cookers.

Materials and change

Chemicals – not all kitchen chemicals are safe to use in schools. Bleaches, cleaners, washing machine powders and liquids, and fertilisers are often harmful. If in doubt, check with ‘**Be Safe!**’ an ASE publication. Store chemicals safely, well away from food materials and securely locked. Children may need to wear eye protection if there is any risk of chemicals splashing or spitting.

If you need sources of heat, you should find that hot tap water, or possibly a night-light in a sand tray will meet all your needs. If you use a stove or other kitchen cooker, ensure a high degree of adult supervision.

Almost always there is a plastic substitute for glassware – even for mirrors. If you use glass, have a plan for dealing with broken glass.

Physical Processes

Electricity – children will not be handling mains devices in primary science – except, perhaps, low voltage transformers at Key Stage 2, when they must be instructed in their proper use. But it’s much more likely that they will be using dry batteries, which are perfectly safe – though be aware that if rechargeable batteries are short-circuited (joined up to themselves without operating a bulb, buzzer, or any other device) then they, and their wires, may get very hot. Always remind children that mains electricity is dangerous.

Do not buy or accept domestic mains electrical devices – hair dryers or projectors; those for use in school are made to far higher safety standards.

Flying models – these need close supervision. Children must not climb, or lean from heights, to launch models. The usual rules applied to kites are important – flying well away from power lines and roads.

Design and make – children should be taught the correct way to handle tools – especially those with sharp edges. Maintain your tools in good condition; sharp, efficient tools are much safer than blunt ones. Only use school glues – ordinary wallpaper pastes, for example, may contain fungicides.

Testing – Primary scientists may be testing things to destruction. Be aware of the dangers that may follow a structure collapsing, or a band or thread snapping. Always use secure fixings, and eye protection where appropriate.

For further information, there is one unrivalled source: '**Be Safe!**' a publication of the Association for Science Education (ISBN 0 86357 081 X). This document is available from the ASE, from the School Science Service, or from SSERC in Edinburgh (which publishes a Scottish edition); many Local Education Authorities hold stocks and issue them to their schools. This document is regularly updated in the light of new advice and experience.

Additional Safety Advice

- Crocus bulbs are toxic and should be avoided
- Children should wear gloves when handling **any** bulbs
- The leaves of potato, tomato and rhubarb plants are **very** toxic

Growing Mould

Organisms grown in the absence of air can be very dangerous. A "**sealed container**" should **not** be airtight. For example, if growing mould in a jar, leave the lid a quarter turn undone (so that it wobbles a bit) to let some air in. (Make sure the lid cannot fall off). A bleach solution can be used to sterilise if necessary.

Further advice may be found in the Waterfield Health and Safety Policy as well as the WSCC schools Health and Safety Manual.

13. Personal, Social and health education

Health Education is taught as part of the units on ourselves, health and growing, teeth and eating, moving and growing, keeping healthy and life cycles. Sex Education is taught in Year 5 where children will learn about human life cycles and development and in Year 6, children will learn about puberty and relationships. Teaching of sex education will generally be carried out by the class teacher or another member of the year group team. They may be supported in this by the school nurse, who is aware of, and will work within the policy.

Drugs education is taught as part of the unit on Keeping Healthy and involves:

- discussion and research on legally available drugs such as alcohol, tobacco, caffeine and solvents and the effects that these drugs have on our bodies.
- over the counter and prescribed medicines.

Further advice may be found in the Waterfield Drugs & Sex Education Policy.

14. The Curriculum teams Role

The Curriculum team will:

- Play a leading role in preparing and reviewing **policies and schemes of work** for Science ensuring that these are consistent with the school Teaching and Learning policy and any statutory or LEA requirements.
- Work with colleagues to support high **standards, continuity and progression** in these subjects
- Liaise with the Headteacher and other colleagues to **monitor** the standards of achievement by all children in Science; identify areas for development; plan targets and co-ordinate development activities; **evaluate** these against agreed criteria
- Keep a portfolio of evidence of standards and improvement (children's work, test results, photographs etc)
- Provide colleagues with regular **guidance on content, methods and resources**
- **Organise and maintain equipment and books** associated with Science; produce a prioritised list of resources needed.
- Organise and maintain a co-ordinators file using the agreed school format.
- Oversee the **assessment and recording** of pupils' progress
- Attend relevant INSET and disseminate information from it to the whole staff; be aware of current research, national developments, etc. by reading the relevant literature, and inform the whole staff about them.

Appendices

Ideas for Pupil
Investigation Sheets
& Assessment Sheets