

Science Policy

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Aims

The aims of the school in teaching science are:

1. To develop knowledge and understanding, as far as possible through practical activities and experiences.
2. To develop the ability to explore and experiment, to make and test hypotheses.
3. To develop measuring and recording skills.
4. To develop communication skills
5. To develop an ability to bring a scientific understanding to practical, social and environmental issues.

As far as possible learning should be through practical activities, including play, directed activities that illustrate a science concept, and investigations. Activities should involve the following:

Observing - look carefully at objects, events, using all the senses
finding patterns - sorting, comparing and classifying, identifying similarities and differences

Investigating - "Why does it happen?", "What is it?" "How does it work?"

Hypothesising - reasonable explanations based on what they know already

Predicting - reasonable guesses of what might happen if ...

Experimenting - testing hypotheses with a 'fair' test

Recording - orally, in pictures and diagrams, graphically, writing ...

Evaluating - looking at the reliability of their results and conclusions and suggesting improvements in method

Communicating - talking, discussing, writing, drawing, graphs

Applying - their knowledge and understanding to new situations ...

Resources

Each Key Stage 2 year group has a set of science textbooks with a teachers' manual that contains lesson ideas and assessment material.

Resources including equipment, samples, and posters are stored in the Teachers' resource room when not in use. Videos on many science topics are kept in the library. There are science sections in the library [Dewey 500-599]. There are programs for use in science on the computer network and as cdroms. A list of science equipment is included at the end of this document. Please ask the coordinator for help and advice on use of resources.

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Role of Coordinator and Monitoring

Teachers can ask the coordinator for advice on background knowledge, organisation, alternative or extension activities, resources and assessment. The science coordinator receives copies of termly plans for each class in science. From time to time the coordinator will look at children's written work in different classes.

Grouping and Differentiation

Group size - Everybody in a practical group must have a job to do so group size will vary with the activity e.g. for rolling a ball down a slope, one lets go, one times or measures, one records.

Group structure - Ability grouping can enable teachers to provide differentiation for bright children; mixed-ability grouping can keep everyone on task by providing support for less able children from their classmates. Groups for practical activities need at least one child who can organise or have ideas.

Differentiation - children of all abilities can take part and contribute to practical activities. In most cases teachers can give more support by:

- repeated explanation
- more direction [instead of 'allowing' them to come up with their own ideas]
- easier recording [predrawn tables, transcribing their oral comments...]
- allowing more time to finish tasks

Most aspects of the curriculum are repeated and children will to some extent approach practical work at their own level. For example, a year 5 child might not understand about current and resistance but finally grasp that you need a complete circuit for bulbs to light.

Assessment

Assessment for learning

The school Assessment for learning guidelines should be followed for formative assessment.

The QCA Scheme of work identifies objectives that children should achieve for each activity. Children's progress based on these objectives should be assessed at the end of each QCA unit.

In Key stage 2, children take end-of-year science tests based on the National Curriculum Year 6 tests to give an indication of each child's progress.

Health and Safety

The QCA scheme of work identifies safety issues for each activity. Here are some general safety points:

Glass - glass is heat resistant, transparent, stiff and cheap and used for thermometers, mirrors [much clearer than plastic mirrors], and containers. Children in Key Stage 1 should not use glass equipment. Table tops and classroom floors need to be kept clear of clutter to avoid knocking things over or off tables. Thermometers and test tubes roll easily so should be kept in large plastic tubs and test tube racks. Mirrors can be kept in plastic trays. Children should be warned of the danger of broken glass and not allowed to clear it up. Warn the cleaners of broken glass in bins.

Heat and Flame - activities using boiling water, melted sugar etc should be done as demonstrations by an adult with children far enough away not to be splashed, especially faces. children need to be told that hotplates stay hot for a long time,. When using nightlights, tables should be empty and candles on saucers or plates, ideally on a tray of sand. Children must be closely supervised. They need their hair tied back and loose sleeves pushed back. They should not lean over the flame, or reach over the flame, and need tongs to hold samples.

Chemicals - use cooking ingredients, for example sugar, salt, sodium bicarbonate, tartaric acid, citric acid, vinegar, plus washing soda, plaster of Paris, polyfilla. Any others check

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with science coordinator. Most of these will sting if they get into the eyes - warn children and have a wash bottle of plain water to clean them if necessary. Children should not taste without permission.

Heavy objects - warn children about kilogram weights, large stones etc being knocked off tables or especially falling when being use for activities such as stretching springs.

Food - when doing taste activities use one straw, spoon, cup etc per person and don't return them to the food after use. Children should wash hands before eating. 'Mould' experiments should only use bread or fruit, not meat. Keep the mouldy food in plastic bags and do not open them to examine the mould.

Animals and Plants - children should wash hands after handling gerbils, snails etc. Warn them to keep fingers away from mouths. Bites need to be treated by the qualified first-aider in the office.. Some plants, especially berries etc possibly brought in for display can be poisonous. Try to identify and exclude poisonous plants and warn children about eating any plant samples without permission.

For further health and safety advice look in the book 'Be Safe' kept in the staffroom or ask the science coordinator.

Schemes of Work

The present scheme of work is based on the QCA Scheme of Work. This covers the Years 1 to 6. Because of changes to the Key Stage 1 curriculum, teachers should try to integrate as much of the QCA scheme as possible into their topic- based activities.

Classes with Year 6 children will need to spend time on revision. This will mean that at their teacher's discretion, some of the activities will need to be shortened.

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Science and ICT

The QCA Scheme of Work documents indicate opportunities for using ICT in Science. Here are some possibilities:

Science Unit	ICT opportunity and ICT unit
Unit 1A	Use Pick a Picture database to describe themselves. Use an encyclopedia cdrom to look at animals [unit 2C] Use Starting Graph to draw class graphs [Units 1E, 2E]
Unit 1B	Use Softease Branch to explore a branching database on minibeasts or plants. [Unit 2E]
Unit 1C	Make a database on materials using First Workshop Use My World or Talking First Word to write about materials [Units 1B, 1D]
Unit 1F	Use Sound Recorder and a microphone to record and play sounds [Unit 1C]
Unit 2A	Use Starting Graph to draw graphs of favourite foods [Units 1E, 2E]
Unit 2B	Use a CDrom or Internet to look at baby animals [Unit 2C]
Unit 2C	Use Starting Graph to draw block graphs [Unit 2E]
Unit 2D	Use CDrom or Internet to look at materials information [Unit 2C]
Unit 2E	Use Starting Graph to draw block graphs [Unit 2E]
Unit 3A	Use CDrom or Internet to find information on food [Unit 2C] Use Starting Graph to draw pictograms [Unit 1E, 2E] Write about teeth using Talking First word [Unit 3A]
Unit 3B	Use a spreadsheet program to draw line or bar graph for plant growth [Unit 4D]
Unit 3C	Use a spreadsheet program to draw line or bar graph for tights stretching [Unit 4D]
Unit 3D	Use CD rom or Internet to find information on rocks [Unit 2C]
Unit 3F	Use Internet to find information on sundials [Unit 2C] Use spreadsheet program to draw line or bar graph for shadows [Unit 4D]
Unit 4A	Use CDrom to find information on human body [Unit 2C] Use Softease database to make database on class measurements and draw graphs [Unit 4D]
Unit 4B	Use Softease Branch to make a key for identifying minibeasts etc [Unit 4C] Use Softease Database to make a database on habitats [Unit 4D]
Unit 4C	Use a spreadsheet to show cooling curve
Unit 5A	Use CD rom and Internet to find information on food [Units 5B, 6D] Use a spreadsheet to graph pulse rates [Unit 4D]
Unit 5B	Use CD rom and Internet to find information on life cycles [Units 5B, 6D]
Unit 5C	Use CD rom and Internet to find information on gases [Units 5B, 6D]
Unit 5D	Use a spreadsheet to draw graph of evaporation experiment [Unit 4D]
Unit 5E	Use CD rom and Internet to find information on space [Units 5B, 6D] Use a spreadsheet to make graph of sunrise times
Unit 5F	Use CD rom and Internet to find information on sound [Units 5B, 6D] Use Sound Recorder to record and 'view' sounds [Unit 5F]
Unit 5/6H	Use a spreadsheet to draw graphs, calculate averages [Units 4D, 5D]
Unit 6A	Use and develop keys using Softease branch [Unit 4C]
Unit 6B	Use CD rom and Internet to find information on micro-organisms [Units 5B, 6D]
Unit 6C	Use a spreadsheet to draw line graphs [Unit 4D]
Unit 6 E	Use CD rom and Internet to find information on space [Units 5B, 6D] Use spreadsheet to draw line graphs of stretching experiment [Unit 4D]

Science Equipment March 2007

Electricity and Magnetism

bar magnets, horseshoe magnets, other magnets [about 30]

assorted metal magnetic test discs, nails, aluminium foil, paper clips, steel needles...

iron filings in pepper pots

nails and lacquer-coated wire for electromagnets

batteries 6V [30] and some 1.5V AA type, 1.5V R14 type

battery holders for AA and R14 types

screwdrivers [4]

wire cutters [2]

wires with crocodile clips [30+]

reels of wire, plastic covered and cotton covered.

nichrome resistance wire [5m, in small packets]

switches [30] magnetic switches [5]

bulbs 6V and 2.5V

bulb holders [20]

buzzers [20]

electric motors with sprockets [13] others [7]

a lighter to make sparks for static electricity

Heat

thermometers forehead [12] room [14] – 10 to 100°C [13] dial [2]

insulated drinks flasks [3] and one in half to show insulation

nightlights

goggles [5]

Forces

forcemeters 10N [10] and 50N [10]

springs assorted

sink plunger

pulleys assorted

Weather

rain gauge

Light

mirrors glass plane, plastic

concave/convex and plastic plane

colour paddles

coloured acetate sheets

kaleidoscopes [2]

magnifying glasses [20] bug viewers [10]

microscopes [5] good quality [4] computer [1]

torches [3]

perspex blocks cuboid [6] triangular [3]

prisms [5]

lenses convex [3]

Plants and Animals

fishing nets [3]

pooters [3]

fish tanks for minibeasts or small mammals

disposable gloves and aprons

large plastic sacks, paper bags

plant pots, plant trays

samples - bone samples, shells...

Containers and Capacity

plastic test tubes with lids [50]

glass test tubes 15 mm diameter [50] 10

mm diameter [100] 8mm [50]

test tube racks [10]

test tube holders [3]

test tube brushes

measuring beakers 100ml [10]

measuring jugs 1litre [3] 2 litre [1]

measuring cylinders 50 ml [2]

syringes 5 and 10 ml [20+]

plastic tubing

sieves [3]

funnels [6]

petri dishes with lids [20]

wash bottles [2]

Materials

Materials blocks assorted

kitchen chemicals and food dyes for dissolving

filter paper

indicator paper strips blue litmus red

litmus universal indicator

eye droppers [10]

aluminium foil

rock and fossil samples

sand/stones mixture

household and building materials samples

balloons

Human Body

plastic skeleton [2]

X-ray pictures

stethoscopes [2]

plaster casts of teeth

Posters of skeleton, teeth, showing other organs...

Sound

tuning forks set

stethoscopes [2]