

Programme of Study for Science and Technology at Key Stage 1

Introduction

The early years of Key Stage 1 are important in laying the foundations for developing the basic skills in science and technology. Pupils should be given opportunities, during structured play and in other activities, to:

- explore;
- make observations;
- use a range of materials to build and construct.

During these early years, pupils should be given opportunities to develop appropriate language associated with science and technology by talking with their teachers and other pupils during play and in other planned activities.

Pupils should also be given opportunities to increase their awareness of the importance of both science and technology in everyday life. This understanding should arise from everyday experiences in school, at home and in their local environment.

Pupils should develop an awareness and an understanding of the need to conserve the natural environment. They should appreciate the need for the sensitive collection and care of living things that are used as the subject of any environmental study.

Building on the experiences gained in these early years, pupils should begin to understand what science and technology is about. They should be given opportunities to:

- try things out for themselves;
- explore;
- ask questions;
- suggest ideas;
- record observations;
- draw pictures to record what they have done or made;
- try to explain what they have seen or done;
- put things together and take things apart;
- make things (construct);
- plan and adapt as they construct.

Activities and experiences in science and technology may sometimes link into themes and topics incorporating other areas of the curriculum and should be integrated with them, where appropriate.

Communication

During science and technology activities, pupils should have opportunities to communicate their ideas and findings to the teacher and other pupils. They should be encouraged to communicate by talking and listening, drawing, writing and making simple models and charts. These practical experiences should be supplemented, as appropriate, by using sources, *for example, books, charts, pictures, television and radio programmes, video resources, educational visits and the use of computers.*

Progression

The programme of study for science and technology is set out under 2 attainment targets - Investigating and Making in Science and Technology and Knowledge and Understanding of Science and Technology.

Progression in science and technology requires pupils to develop, in parallel, both their skills in investigating and making and their knowledge and understanding. They should progress from activities linked to their immediate environment to less familiar situations.

The programme of study has been set out in strands with sub-headings to indicate progression. Within each of these sub-sections, the order of the material indicates a line of progression. It should not be felt, however, that this order should restrict the planning of teaching schemes.

Technology

Elements of technology in Investigating and Making are identified by the use of (T). These elements should be integrated with work in science. When planning activities teachers should identify opportunities for technology from the Knowledge and Understanding strands - Materials and Physical Processes. There also may be opportunities for developing investigations in science from work in technology.

Contribution to Educational (Cross-curricular) Themes

During science and technology activities pupils should have opportunities to engage in discussion and to undertake activities which fulfil the objectives of the cross-curricular themes. The opportunities listed in this section should not be treated as a check list to be covered but as illustrations of some of the ways in which the cross-curricular themes can be developed as an integral part of science and technology.

Information Technology

Pupils should be given opportunities to develop and apply their knowledge, skills and understanding of information technology and in particular to use an appropriate device, *for example, a concept keyboard*, to sort information and enter it into a prepared database. They should also be given opportunities to talk about and use electronic and programmable toys, *for example, a Roamer.*

Health Education

Science provides pupils with opportunities to develop positive attitudes to keeping healthy through exercise, diet and personal hygiene. They should be made aware of the importance of safety and careful actions in all science and technology activities particularly when using equipment.

EMU and Cultural Heritage

Pupils should have opportunities to develop an understanding of themselves and others by exploring similarities and differences between themselves and other children, and developing a sense of their own individuality. They should appreciate the environment around them, the need to take care of it and how human activities can upset the natural environment. They should consider how some toys and devices work and know that the technology which drives them has been developed over a period of time.

INVESTIGATING AND MAKING IN SCIENCE AND TECHNOLOGY

Investigating and Making in Science and Technology is set out under three strands - Planning, Carrying Out and Making and Interpreting and Evaluating. Investigating and Making is central to the Knowledge and Understanding of Science and Technology. Activities in Investigating and Making should be introduced through the Knowledge and Understanding section of the programme of study.

Pupils should be encouraged to adopt safe practices when undertaking science and technology activities. They should be made aware of potential hazards and the appropriate actions necessary to avoid risks.

Planning

Pupils should have opportunities to participate in practical activities which involve them in talking to the teacher and each other about ideas, predictions and solutions to problems and planning what to make.

Pupils should be given opportunities to:

- a respond to questions, *for example, how can this box be moved along the floor or what will happen if this stone is put into the water?*
- b talk about what they are going to make and the materials they will use, *for example, suggest ideas for making Postman Pat's van (T);*
- c ask questions, discuss ideas and make predictions, *for example, suggest what will happen if you hold chocolate in your hands or predict how far a toy car will travel;*
- d recognise a fair test, *for example, know that when testing the bounce of balls they must be dropped from the same height onto the same surface;*
- e suggest ideas which can be investigated and make predictions, *for example, find out which material is best for keeping ice cubes solid;*
- f choose appropriate materials and components when planning what to make, *for example, choose cartons, doweling, wheels and tape, when planning how to make a toy vehicle (T).*

Carrying Out and Making

Pupils should have opportunities to participate in practical activities which involve them in exploring familiar objects and materials in their immediate environment and recording what they have done.

Pupils should be given opportunities to:

- a make observations using their senses, *for example, describe objects in a 'feely box' using terms such as bumpy, soft, hard or pointy;*
- b assemble and rearrange materials, *for example, construct using building blocks (T);*
- c make observations noting similarities and differences, *for example, sort each other into groups by hair colour;*
- d record observations in a simple form, *for example, draw a group of animals and a group of plants;*

- e explore different ways of joining materials, for example, join materials using tags, string, fasteners, folds, stitches, adhesives or staples, or construct a model swing using straws, pipe cleaners and blue tack (T);
- f reinforce measuring skills using non-standard measures and progress to using standard measures, for example, use string to measure the distance travelled by a toy car;
- g develop manipulative skills using a range of materials and tools, for example, use scissors or snips to cut paper, card, straws or string (T);
- h record what they have done or observed using appropriate methods, for example, use a simple table to record substances which do/do not dissolve in water, or record findings using a computer database.

Interpreting and Evaluating

Pupils should participate in practical activities which provide them with opportunities to develop skills in reporting, presenting and interpreting results and evaluating what they have made.

Pupils should be given opportunities to:

- a talk to the teacher and others about what happened or about what they have made, for example, tell the teacher that some fabrics stretched and some did not;
- b comment on what happened or what they like or dislike about what they have made, for example, comment that the fabric with the most holes was the 'stretchiest';
- c present their findings using appropriate methods, for example, block graphs, labelled pictures, drawings, bar charts, pictograms or a simple written record;
- d relate what happened to what they predicted;
- e talk about what they have made in terms of materials, colour, size or shape and make suggestions for improvement, for example, talk to the teacher about how well their model vehicle moves and suggest how it might be improved by changing the size of the wheels (T).

KNOWLEDGE AND UNDERSTANDING OF SCIENCE AND TECHNOLOGY

Knowledge and Understanding of Science and Technology is set out under three strands - Living Things, Materials and Physical Processes.

Living Things

Ourselves

Pupils should be given opportunities to:

- a recognise and name the main external parts of the human body, *for example, hand, elbow or knee;*
- b observe seasonal changes and talk about how these affect themselves;
- c explore similarities and differences between themselves and other children, *for example, compare eye colours, hair colours, heights or weights;*
- d develop ideas about how to keep healthy, through exercise, rest, diet, personal hygiene and safety, *for example, receive a visit from the dental hygienist, sort food into healthy/unhealthy food or discuss the dangers of some household substances;*
- e be introduced to the main stages of human development, *for example, sequence pictures from birth to old age;*
- f find out about themselves including how they grow, move and use their senses.

Animals and Plants

Pupils should be given opportunities to:

- a find out about the variety of animal and plant life both through direct observations and by using secondary sources, *for example, draw and name living things seen on the way to school, in and around school or on a school visit;*
- b sort living things into the two broad groups of animals and plants, *for example, use a concept keyboard with appropriate overlays to sort living things;*
- c recognise and name the main parts of a flowering plant including root, stem, leaf and flower;
- d sort living things into groups using observable features;
- e find out about animals and their young, *for example, match a kitten to a cat, a foal to a horse or a pup to a dog;*
- f find out about some animals, including how they grow, feed, move and use their senses;
- g observe similarities and differences among animals and among plants;
- h discuss the use of colour in the natural environment, *for example, in camouflage, discuss how animals adapt to their surroundings;*
- i find out ways in which animal and plant behaviour is influenced by seasonal changes, *for example, find out about leaves falling in autumn, buds opening in spring or hibernation and migration.*

Materials

Properties

Pupils should be given opportunities to:

- a work with a range of everyday materials in a variety of activities, *for example, know, through playing with plasticine or dough, that it can be pushed, pulled, squashed, stretched, rolled or flattened;*
- b sort a range of everyday objects into groups according to the materials from which they are made, *for example, sort objects into sets of metal, wood, paper and plastic;*
- c explore the properties of materials including shape, colour, texture and behaviour, *for example, sort materials or objects and explore whether they stretch, bend, tear, pour, and whether they are magnetic or non-magnetic;*
- d find out some everyday uses of materials, *for example, find out that furniture can be made from wood and jumpers can be made from wool;*
- e investigate similarities and differences in materials and objects and sort them according to their properties, *for example, sort plastics into those which are transparent and those which are opaque or sort fabrics into those which absorb water and those which are waterproof.*

Change

Pupils should be given opportunities to:

- a find out about the effect of heating and cooling some everyday substances, such as water, chocolate or butter, *for example, describe changes that occur to chocolate when it is heated or jelly when it is cooled;*
- b investigate which everyday substances dissolve in water, *for example, find out that salt and sugar dissolve in water and rice and sand do not.*

Environment

Pupils should be given opportunities to:

- a identify the range of litter in and around their own locality, *for example, discuss the type of litter around the school;*
- b find out how human activities create a variety of waste products, *for example, match waste products to the activity that created them;*
- c find out that some materials decay naturally while others do not, *for example, find out that fruit and leaves decay while aluminium cans and glass do not.*

Physical Processes

Forces and Energy

Pupils should be given opportunities to:

- a explore forces which push, pull or make things move, *for example, find out that a gentle push will move a toy a short distance, but a stronger push will move it a longer distance;*
- b explore devices, including toys, which move, *for example, play with wind up toys, battery operated toys or the Roamer;*
- c explore how pushes and pulls make things speed up or stop, *for example, show that a further push can make a moving ball move faster, or produce movement in simple ways by making a push/pull lever;*
- d find out about the range of energy sources used in school and at home, *for example, create a class database of the methods used to heat their homes.*

Electricity

Pupils should be given opportunities to:

- a find out about some uses of electricity in the home and classroom, *for example, identify household and school appliances which use electricity;*
- b know that electricity can be dangerous;
- c know about the safe use of mains electricity and its associated dangers.

Sound

Pupils should be given opportunities to:

- a listen to and identify sources of sounds in their immediate environment, *for example, traffic noise, animal sounds, or a door slamming;*
- b explore ways of making sounds using familiar objects, *for example, make sounds by striking, plucking, scraping, blowing or vocalising;*
- c investigate how sounds are produced when objects vibrate, *for example, find out that vibrations caused by plucking an elastic band make sounds or make instruments which produce sounds.*

Light

Pupils should be given opportunities to:

- a find out that light comes from a variety of sources, *for example, the sun, a torch or a light bulb;*
- b explore the use of light including colour in relation to road safety, *for example, find out which colours can be most easily seen in the dark;*
- c explore how light passes through some materials and not others, *for example, use a torch to sort a variety of papers into those which allow light to pass through and those which do not.*