

Science - Preview



Science Key Stage 2

Schemes of Work for the National Curriculum for pupils working below age related expectations

■ **Animals, Including Humans**

Plants and animals in the local environment
Living things and their environments
Variation and classification

■ **Earth and Space**

The earth and beyond

■ **Electricity**

Using electricity

■ **Everyday Materials**

Characteristics of materials
Grouping and changing materials

■ **Forces**

Pushes and pulls
Forces and movement

■ **Forces and Magnets**

Forces and motion
Electricity and magnetism
Magnets and magnetism

■ **Light and Sound**

Light and sound

■ **Light**

Light and shadow

■ **Plants**

Green plants

■ **Properties and Changes of Materials**

Grouping and classifying
Materials and their properties
Part one Part two Part three

■ **Rocks**

Rocks and soils

■ **Sound**

Sound and hearing

■ **Scientific Enquiry**

Working scientifically

Key Stage 2 - Contents - Preview



Science

Key Stage 2

Schemes of Work for the National Curriculum for pupils working below age related expectations

**Preview - First 3 pages
from Teacher's Guide**

Teacher's Guide

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EQUALS Preamble

These schemes of work have been written by teachers who have an expertise in Science. The information has also been reviewed and critically appraised by another group of teaching professionals, including Head teachers and schools inspectors.

We hope that you will find the materials helpful when working with pupils who are working consistently and over time at levels below age related expectations within the National Curriculum in key stages 1 and 2.

In writing these examples of good teaching practice, special consideration was given to the mainstream and special education guidance from the QCA. Much of this guidance is still extant at the time of writing but archived at <http://nationalarchives.gov.uk/webarchive/>

In this scheme of work the materials are designed to help schools develop their Science framework. Schools may plan to address other aspects of the framework in conjunction with this guidance, building on links identified in the units. The scheme of work illustrates the different ways in which teachers can develop Science learning opportunities to respond to the specific needs and priorities of the children, their communities and the schools themselves. It also builds on children's experiences and earlier learning from the foundation stage.

This scheme of work is for all teachers involved in the delivery of Science and for head teachers and governors with responsibility for developing this area of the curriculum. In these materials:

- a **scheme of work** is the overall planned provision of science in a key stage. It is made up of units of work, which may be taught in any order across the key stage;
- **units** are medium-term plans, usually designed for a term or less. They set out specific learning objectives that reflect the programme of study, as well as possible teaching activities and learning outcomes.

The scheme of work consists of exemplar teaching units that can be combined in different ways to address Science. The units may be supplemented with materials from other subjects and sources.

This Teacher's guide gives information about:

- deciding how best to combine the different ways of delivering Science;
- links between Science framework, national curriculum subjects, as well as literacy, numeracy and thinking skills;
- how to assess children and involve them in reviewing their own progress;
- different approaches to teaching and learning

- how to use and combine units to address children's needs and school priorities; and
- dealing with health and safety issues

The importance of science to pupils with learning difficulties

Learning science gives all pupils the opportunity to think and learn, and develop an interest in, and curiosity about, the world around them through exploratory and investigative experiences and activities.

In particular, science offers pupils with learning difficulties opportunities to:

- develop an awareness of, and interest in, themselves and their immediate surroundings and environment
- join in practical activities that link to ideas, for example, doing and thinking
- use their senses to explore and investigate
- develop an understanding of cause and effect.

In response to these opportunities, pupils can make progress in science by:

- experiencing that personal actions have consequences, leading to the seeking of explanations, and an understanding of the links between causes and effects
- increasing the breadth and depth of their experience, knowledge and understanding
- linking and applying scientific knowledge and understanding to everyday life, for example, to cooking, to their own health, in the use of materials for functional purposes
- investigating the familiar, and later developing a broader environmental and technological perspective
- developing an understanding of the more abstract as well as the concrete and practical
- moving from description to explanation of events and phenomena.

Modifying the science programmes of study

The National Curriculum requires staff to modify the programmes of study to give all pupils relevant and appropriately challenging work at each key stage. Staff should teach knowledge, skills and understanding in ways that match and challenge their pupils' abilities.

Staff can modify the science programmes of study for pupils with learning difficulties by:

- choosing material from earlier key stages
- maintaining, reinforcing, consolidating and generalising previous learning, as well as introducing new knowledge, skills and understanding
- using the programmes of study for science as a resource, or to provide a context, in planning learning appropriate to the age and needs of pupils
- focusing on one aspect, or a limited number of aspects, in depth or in outline, of the age-related programme of study
- including experiences which allow pupils at the early stages of learning to gain knowledge, skills and understanding in science as part of their study



Science

Key Stage 1

Schemes of Work for the National Curriculum for pupils working below age related expectations

Preview of first 3 pages
from **Animals**
including **Humans**

■ **Animals Including Humans**

Ourselves

Health and growth

Variation and comparison with plants

Moving and growing

Help

Quit

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Science

Animals, including humans 2

Unit title: Health and growth (KS1)

ABOUT THE UNIT

Through this unit pupils will:

- experience and learn about the conditions needed for life to develop and change

VOCABULARY

Pupils will hear and may use:

live, die, baby, adult, people, children, young, old, sense, breathe, eat, drink, fruit, vegetables, snack foods, staple foods, exercise, running, dancing, swimming, football, healthy, fit, active, unhealthy, ill, sick, pain, safe, look after yourself.

RESOURCES

Secondary sources e.g. videos of people and animals with their young, people who experience famine or drought.

Puppets and representations of people and animals with their young.

Photos of themselves and classroom adults in different stages of life.

Posters of food types and variety of food groups.

Posters of medicines / tablets and safety information.

Sport information.

Massage oils / creams.

A range of food and drink for tasting e.g. those with a similar taste.

EXPECTATIONS

At the end of this unit

All pupils will: have tasted (where appropriate) different tastes, experienced movement of their body and participated in some physical activities. They will have experienced people and / or animals with their young.

Most pupils will: have experienced and learned that people and animals change as they grow and that the young children are called babies. They will know that they have to drink, eat, exercise and rest to stay healthy. They will know that when people are ill they may have to take medicines to get better. They will know that it is not safe to take medicines or drink unknown things from bottles unless an adult gives them out. They will know several forms of exercise and participate in them to the best of their ability.

A few pupils will: have learned that babies have different needs from children and adults. They will know that adults can have babies and that animals also have young. They will know that we eat a balance of foods to stay healthy and that exercise is good for you. They will know how to explain if they have a problem or are ill.

Science

Animals, including humans 2

Unit title: Health and growth (KS1)

Scientific enquiry : this unit permeates all units and reference to it is within each subsequent unit.
In all units in scientific enquiry pupils will

- predict the results of simple investigations
- obtain and present evidence
- consider evidence and evaluate

LEARNING OBJECTIVES	POSSIBLE EXPERIENCES AND TEACHING ACTIVITIES	DIFFERENTIATED LEARNING OUTCOMES	POINTS TO NOTE
<p>Pupils should experience, explore and investigate, record and communicate what they discover and learn about.</p> <p>The movement and growth of all living things</p>	<p>Experience a range of movement e.g. walking, swimming in the pool, rolling in a blanket, stretching during physiotherapy, massage. Look at photos or video footage of themselves and familiar people as babies.</p> <p>As above and join in activities that encourage movement in different planes e.g. reaching up high, crouching low, spreading self wide on the floor.</p> <p>Use photos (of themselves), pictures and video to make a pictogram / list of activities associated with babies e.g. crawl, chew, cry, use drinking bottles. Compare to the things pupils like to do now.</p> <p>Look at photos, puppets, pictures of animals. Make a comparison poster of changes since they have grown up e.g. mobility, communication, choice, likes / dislikes, friends. Take recent photos and compare with photos as babies. Record changes on a chart. Use secondary sources to find out about animals and their young. Match pictures of baby to adult.</p>	<ul style="list-style-type: none"> • encounter and become aware of moving and being moved • purposefully move the body or respond to being moved • show an interest in themselves as babies • move the body in a variety of ways • identify some differences between themselves and babies • recognise and identify some common animals • name differences between children and babies • recognise themselves as babies • recognise and name some animals and their young 	<p>All pupils can engage in physical activity, but a solid understanding of what makes a person feel comfortable or uncomfortable is essential, specifically when working with pupils who have physical disabilities or physical impairments. Liaise with parents and health professionals if you are unsure about any aspect of a pupil's care or needs.</p> <p>Adult to introduce key words e.g. stretch, move, grow.</p> <p>Adult to point out and label young animals with their parents.</p>
<p>The necessity for all living things to eat and drink in order to stay alive</p>	<p>Experience different tastes and textures / temperatures / consistencies through a range of food and drink e.g. sweet, savoury, salty, sour, warm, cold, thick, runny.</p> <p>As above and explore first hand a plant that has been given no water or food.</p>	<ul style="list-style-type: none"> • encounter and be aware of tasting foods and liquids using all available senses • independently taste and respond to a range of foods and demonstrate preferences 	<p>Pupils may have allergies to some foods. Ensure that you know about sensitivities before embarking on tasting activities.</p>

	<p>As above and sort foods into pupils' likes and dislikes. Make a class bar chart using pictures / photos / words.</p> <p>Use salt dough to model favourite breakfast food, paint and display on a paper plate.</p> <p>Look at plants (as above). Discuss methods of reviving limp cress seedlings using previous knowledge. Observe and record results. Take photos. Make a chart of likes and dislikes and sort food into categories e.g. salty foods / sweet foods. Watch a video about water and food shortages around the world. Talk about hunger and thirst and how this feels. Investigate water e.g. tap water, flavoured spring water, sparkling or still water, communicate preferences and record.</p>	<ul style="list-style-type: none"> • know you must eat and drink to stay alive • know that there are different types of food and drink and that you must eat and drink to stay alive 	<p>When tasting drinks, be aware of how well pupils can control fluid in their mouths. They may not swallow well causing aspiration of fluid into the lungs – a major cause of chest infections.</p> <p>Pupils who are fed through a tube may participate in smelling foods or having a tiny amount of food put on the lips assuming parental consent.</p>
<p>The necessity for all living things to rest and take exercise in order to stay healthy</p>	<p>Experience movement and rest as a pattern during physical activities e.g. music and movement, TacPac Activities, physiotherapy, leisure time.</p> <p>Experience a range of stimulating physical activities contrasted with periods of rest e.g. use of wheel chair – accessible playground equipment, go for a walk on a windy day, move for a purpose such as reach for a chocolate sweet and then rest. Play physical group games e.g. parachute game then rest or engage in leisure activities.</p> <p>Undertake energetic activities for 10 minutes and talk about how this affects the body. Take photos of different states to aid comparison. Make a timetable of activity during the day e.g. running about at playtime, sitting still for story time.</p> <p>As above. Take part in relaxation activities including simple visualisation journeys. Experience calm and quiet. Discuss the experience with others.</p>	<ul style="list-style-type: none"> • encounter activity and rest • respond to active and restful periods • know the difference between being active and at rest • know that we need to rest and to be active in order to be healthy • know that people move in different ways at different times and that after physical activity you need to rest. 	<p>NOTE Video players, microwaves, televisions and food mixers require a 30amp switch box controller to operate.</p> <p>Make sure that pupils can undertake strenuous activities by confirming that they do not have medical conditions that preclude them from taking part.</p> <p>Adult to use key words e.g. 'rest', 'move', 'go' and large symbols to anticipate the next activity.</p> <p>They may decide to run for 10 minutes at the beginning of each day to see how this affects them as a group. Does it help them to work more effectively?</p>



Science

Key Stage 2

Schemes of Work for the National Curriculum for pupils working below age related expectations

Preview of first 3 pages
from **Everyday Materials**

■ **Everyday Materials**

Characteristics of materials

Grouping and changing materials

Science

Everyday materials 1

Unit title: Characteristics of materials (KS2)

About the unit

Through this unit pupils will:

- revisit properties of materials and encounter materials practically
- explore a range of commonly used materials
- find out about the uses of some materials
- look at the characteristics of materials and how these are useful

VOCABULARY

Pupils will hear and may use:

material, wood, plastic, paper,
 glass, metal, clay, test,
 fair test, strong / hard, soft, smooth, flexible /
 bendy,
 see through / transparent,
 shock absorbent, absorbent,
 same / different, compare,
 use, texture, mass / weight, shape, colour, sound,
 temperature, size.

RESOURCES

A range of different materials that are commonly found around school.

Collections of real objects e.g. bowls, umbrellas made from the same contrasting materials.

Photos of objects which are obviously made of a particular material.

A feely bag and interesting objects.

A selection of unusual objects or parts of larger machines.

Question cards with different activities to support material tests.

Torches and lamps.

A selection of storage containers.

EXPECTATIONS

At the end of this unit

All pupils will: have experienced types of materials and their familiar uses under the same conditions.

Most pupils will: have learned the names of some common materials and identified some key properties. They will have created collections of objects of one material and explored how different materials are used for the same purpose. They will have participated in a fair test with some assistance and found out that some objects need to be made out of particular materials.

A few pupils will: have found information about a particular object and explain why a particular material has been used for the purpose. They understand that different materials share similar properties, but that each material has a distinct selection of properties. They predict and explain why some materials are more suitable to use than others by considering all their characteristics.

Science Everyday materials 1 Unit title: Characteristics of materials (KS2)			
Scientific enquiry : this unit permeates all units and reference to it is within each subsequent unit. In all units in scientific enquiry pupils will - predict the results of simple investigations - obtain and present evidence - consider evidence and evaluate			
LEARNING OBJECTIVES	POSSIBLE EXPERIENCES AND TEACHING ACTIVITIES	DIFFERENTIATED LEARNING OUTCOMES	POINTS TO NOTE
<p>Pupils should experience, explore, and investigate, record and communicate what they discover and learn about</p> <p>Properties of materials</p>	<p>Experience a range of materials using all available senses e.g. shiny plastic mobile, move hand in a bowl of crinkly materials or papers, taste different snacks to see if they dissolve on the tongue (try Wotsits or Skips), scents on differently textured materials.</p> <p>Experience different materials that share one similar property e.g. fluffiness – fleece, cotton wool, hamster bedding, cuddly toys, feather fan OR can be changed by pressure – stress balls, partially inflated balloons, foam, sponge.</p> <p>Explore real objects made from a range of materials e.g. spoons – plastic, bone, metal. Feel the differences between the materials.</p> <p>Experience a range of objects made from the same material e.g. metal – tables, chairs, trinket boxes, vegetable boxes, rulers, baskets or metal bathroom accessories on a trip out of school.</p> <p>Explore a range of objects or photos of objects and begin to use key words in description e.g. scratches, shiny, cold, hard.</p> <p>Use a feely bag to select an object from a variety. Describe one property and name it. If correct choose the next object. Use interesting objects e.g. small pineapple, piece of wood, large key, Lego brick. Pupils cannot repeat the property previously mentioned.</p>	<ul style="list-style-type: none"> • encounter and begin to show awareness of different types of materials and their characteristics • respond to exploring common materials with similar characteristics • show preferences • name some common materials and identify some key properties • identify different properties of a range of materials • name a range of common materials and name items made from it • know that different materials share similar properties. • know that each material has distinct properties. 	<p>Ensure that fluffy materials are not mouthed as long strands may pose a choking hazard.</p> <p>Note pupil responses and check if this is similar to the last time they encountered materials in this way.</p> <p>Pupils may begin to show preferences to a particular property e.g. select round objects when offered a choice. They may then use this object to roll down a drainpipe or tube and be excited by this. They find that other shaped objects or those which are flexible do not slide as well and are less rewarding.</p> <p>In the feely bag activity prompt answers with symbol cards. Present key concepts with open and closed questions such as, 'is it heavy?' or 'what does it smell like?'</p>

	<p>While exploring a range of materials, use prompt cards (symbol / words) with activities on different materials e.g. will it bend / fold, is it transparent, will it bounce, can it be squashed or will it stretch? Construct a simple 'yes / no' table for comparing the properties of particular materials.</p>		<p>Yes/no tables are easy for pupils to understand and they introduce simple data bases, but be careful that the pupil is not simply repeating the last word you say.</p> <ul style="list-style-type: none"> • is it hard? Yes/No • is it solid? Yes/No • is it flexible? Yes/No
Use of materials	<p>Experience grouped materials e.g. plastic bags, guttering, UPVC window panels, hair accessories, bottles, coloured acetate sheets, vinyl table cloth.</p> <p>As above in appropriate contexts e.g. feeling wood on the hall floor and the apparatus, exploring a range of plastic objects and toys in the swimming pool.</p> <p>Explore a selection of familiar objects. After free exploration group each object according to the material. Consider the evidence and what the material is meant to do. Is it appropriate for the object?</p> <p>Explore one particular object e.g. a door and with help talk about why it is made from wood. Try making a model from several materials – paper, fabric, metal and devise tests.</p> <p>Provide interesting / unusual objects or parts of objects and guess what they might be used for and why.</p>	<ul style="list-style-type: none"> • encounter and become aware of basic uses of materials in the immediate environment • respond to and recognises some different materials used in a particular context. • group objects according to their materials • begin to explain why a particular material has been used for the purpose 	<p>Initially encourage pupils to suggest the uses for a door e.g. keep out draughts and noise, save us from fire, separate two rooms.</p>
Fair testing materials	<p>Experience a range of materials under the same conditions e.g. under water, in a coloured light, in the dark with a torch, all cold from the fridge.</p> <p>Use the same materials e.g. washing-up bottle, book, plasticene, biscuit and the same actions e.g. bend, drop, tear, stretch. Record outcomes with help.</p> <p>Compare a set of bowls made of different materials. Decide what can be tested and why e.g. will they hold breakfast cereal effectively; taste of the cereal. Talk about keeping everything the same e.g. amount of cereal,</p>	<ul style="list-style-type: none"> • encounter and be aware of materials under the same conditions • use a consistent action to obtain a reaction • participate in simple investigation • with help, suggest ways of testing materials 	<p>Note responses e.g. pupils may be startled by experiencing a familiar object out of context such as a hot water bottle that is cold.</p> <p>Use small items of food e.g. crisps so that whole group can sample at the end.</p>