



# **Science Policy**



**Headlands Primary School**

## SCIENCE POLICY

**Name of School:** Headlands Primary School

**Person(s) Responsible:**  
Headteacher, Governors and  
Science Co-ordinator

**Review Date:** April 2012

**Distribution:** Governors and whole staff

**Web Page:** [www.headlandsprimary.co.uk](http://www.headlandsprimary.co.uk)

Replaces Policy written in 1989 by Shelley Brown

Re-Written by Mrs. H. Hartley February 1997

Miss Julie Dunt became Caretaker Co-ordinator from January 1998 as Helen Hartley resigned after Maternity Leave. New appointment to be made in September 1998. Review re-scheduled to October 1998.

Re-written by Darren Smith February 1999 following publication of QCA Scheme of Work for Science.

October 2000 - Reviewed by Darren Smith – Addition of assessment framework for Sc1, 2, 3 and 4.

October 2001 – Reviewed by Christine Babb – Minor changes and additions to Appendices.

October 2002 - Reviewed by Christine Babb - changes to Assessment section of Policy, additions and deletion in Appendices Schemes of Work and NC programmes of study added. All in, all out.

October 2003 – Reviewed by Christine Babb. Changes only to school name throughout.

October 2004 – Reviewed by Emma Lynes – changes including addition of Year 5 and 6 Sc1 information and deleting of assessment sheets no longer in use. Rearranging of appendices.

April 2006 – Reviewed by Emma Lynes and Curriculum Sub-Group – minor changes including addition of sentence about Year 6 assessment and Sc1 on p3, addition of statement about Sc1 planning p3, change to p4 regarding Foundation Stage, p6 homework statement, p7 assessing and recording – addition of computer programme for end of unit assessment.

April 2007 – reviewed by Emma Lynes and Kevin Steel – slight change to p4 – new location of resources, p5 – Yr 6 level expectations, P7 assessment paragraph re-written. p6 minor correction.

April 2008 – Reviewed by Margaret Brown and Kevin Steel. Removal of Overview, changes to Scheme of Work, amendment of appendices.

April 2010 – Reviewed by Margaret Brown.

**The Purpose of this document:-**

This policy reflects the School's values and philosophy in relation to the teaching and learning of Science. It sets out a framework in which teaching and non-teaching staff can operate. It gives guidance on planning teaching and assessment.

“Scientific Literacy is an essential capability for an educated young person. Newspaper, TV, magazines for example call on knowledge of the function of machines and electrical devices, the effects of chemicals and drugs, the nutritional value of food, the ecology of different parts of the world and the ethics of transplant surgery and genetics. Part of this ability is to seek out explanations for things. Children need to use their skills to devise ways of testing their ideas, and the ideas of others, and to evaluate possible solutions to problems”

**National Curriculum Council  
1991**

**Science**

“There are many opportunities to generate awe and wonder through the teaching of science. For example, the creation of Earth and space (the Big Bang) and the theory of evolution will all provoke discussion and promote reflection. “

Croner - 182

## **Aims and Purposes of Science Curriculum**

### **Aims and purposes**

The teaching and learning of Science will enable children to:

- Develop knowledge and understanding of important scientific ideas, processes and skills and relate these to everyday experiences;
- Learn about ways of thinking and ways of finding out and communicating ideas;
- Explore values and attitudes through science

These aims and purposes are expanded below

### **Knowledge and understanding**

Children should:

- Be curious about things they observe, and experience and explore the world about them with all their senses;
- Use this experience to develop their understanding of key scientific ideas and make links between different phenomena and experiences;
- Begin to think about models to represent things they cannot directly experience;
- Try to make sense of phenomena, seeking explanations and thinking critically about claims and ideas.

### **Processes and skills**

Children should:

- Acquire and refine the practical skills needed to investigate questions safely;
- Develop skills of predicting, asking questions, making inferences, concluding and evaluating based on evidence and understanding and use these skills in investigative work;
- Practise mathematical skills e.g. counting, ordering numbers, measuring to an appropriate number of decimal places, drawing and interpreting graphs and bar charts in real contexts;
- Learn why numerical and mathematical skills aid understanding.

### **Language and communication**

Children should:

- Think creatively about science and enjoy trying to make sense of phenomena;
- Develop language skills through talking about their work and presenting their own ideas using sustained and systematic writing of different kinds;
- Use scientific and mathematical language including technical vocabulary and conventions, and draw diagrams and charts to communicate scientific ideas;
- Read non-fiction and extract information from sources such as reference books or the internet.

### **Values and attitudes**

Children should:

- Work with others, listening to their ideas and treating these with respect;
- Develop respect for evidence and evaluate critically ideas which may or may not fit evidence available;
- Develop a respect for the environment and living things, and for their own health and safety.

## **Science in the National Curriculum**

Science is a core subject of the National Curriculum and the programmes of study are split into 4 attainment targets of which Sc 1 (Scientific Enquiry) is seen by Headlands Primary School as the core for which all skills, knowledge, understanding of Sc 2 (Life Processes and Living Things), Sc 3 (Materials and Their Properties), Sc 4 (Physical processes) are built around. All planning will be based upon Sc1 in order to facilitate learning in the three other areas.

The aims and purposes of the Science Curriculum are consistent with the Schools Mission Statement and are partly based on the QCA Scheme of Work. The aims and purposes of this Scheme of Work take account of the National Curriculum programmes of study and the end of Key Stage Level descriptions.

## **Features of Progression**

To ensure all children make progress in Science, teachers will provide opportunities to progress for children as they move through Key Stage 1 and 2.

- From using everyday language to increasingly precise use of technical and scientific vocabulary, notation and symbols;
- From personal scientific knowledge in a few areas to understanding in a wider range of areas and of links between areas;
- From describing events and phenomena to explaining events and phenomena;
- From explaining phenomena in terms of their own ideas to explaining phenomena in terms of accepted ideas or models;
- From participating in practical science activities to building increasingly abstract models of real situations;
- From unstructured exploration to more systematic investigation of a question;
- From whole class planning of Sc1 activities to independent planning; (Scientific Enquiry see National Curriculum) <http://www.curriculumonline.gov.uk/Subjects/Sc/Browse.htm?hid=1002050>
- From using simple drawings, diagrams and charts to represent and communicate scientific information to using more conventional diagrams and graphs.

## **Building on Children's Earlier Experiences**

Children in Foundation Stage follow the Early Learning Journey through the knowledge and understanding strand of this document. Children in the Foundation Stage will find out and learn about the world they live in. These experiences will have included:

- Asking questions about why things happen.
- Investigating a wide variety of objects and materials in the man made world.
- Learning about themselves and living things.
- Looking closely at similarities and differences, pattern and change.
- Talking about their observations and sometimes recording them.

(A more detailed set of Headlands Primary School Early Learning Goals entitled My Learning Journey can be found in **Appendix A**). This document is used as a long term plan by Nursery and Reception. Reception use the criteria in the Foundation Stage Profile to assess the children's scientific abilities against. This information is recorded and sent to the Local Authority each year.

## **Scheme of Work for Science**

The overall detailed Scheme of Work for Science is currently the QCA Scheme of Work. This Scheme of Work shows clear progression through the year groups. At Headlands, teachers are encouraged to

have a more creative approach with cross-curricular teaching, such as that suggested by “EdisonLearning,” whilst still keeping in line with the National Curriculum, to make learning more exciting and relevant to the interests, needs and abilities of children. It is important to consider the impact of making such changes and to ensure that a range of lessons still teaches all important learning objectives and learning outcomes so that children’s learning is not disrupted; that children are stretched to reach their full potential; that changes do not lead to overlaps between different year groups’ plans and to consider knock-on effects for the whole school curriculum plan as a whole, including availability of resources. Children will be given opportunities to learn through a range of practical, explorative and investigative activities, through focussed analysis of data, published learning materials, teacher prepared materials, educational visits, appropriate use of TV programmes, ICT and tasks set at home.

### **The Role of the Science Co-ordinator**

The Science Co-ordinator is responsible for the development, monitoring and evaluating the Science Curriculum to ensure progression and continuity, and quality of teaching and learning is coherent throughout the School. He/she will provide support to enable teachers to plan effectively and to adhere to the schools Science Policy and Scheme of Work. He/she is responsible for updating the schools Policy and Scheme of Work. There is an inventory of resources which is checked annually by the Co-ordinator.

### **Resources and Accommodation**

A wide selection of teachers’ resources and children’s reference books are available and are housed in the school library. Science equipment for classroom work is kept in the resources cupboard, in the room just outside the lower hall. Teachers have a list of Science Resources, which can be kept in Planning Files for reference.

### **Framework for the Teaching of the Science Curriculum**

At Headlands Primary School we are concerned with the development of the whole child. Each unit of the Science Scheme of Work will be taught in modules in each of the six school terms progressively and continuously. Links can be made with other subjects to enhance the teaching and learning of Science. See General Information Policy for a full overview of the school curriculum Opportunities for teaching experimental and investigative Science and the introduction of the programmes of study are built into each unit. **Appendix B** shows how each QCA unit relates to the National Curriculum Programmes of Study (P.O.S.) references.

### **Relationship of the End of Unit Expectations to Level Description**

The end of unit expectations correspond to levels in the National Curriculum for Science as set out below:

- Year 2 - Level 2
- Year 4 - Level 3
- Year 6 - Level 4

## **Scientific Enquiry from Year 1 - 6**

**Appendix C** summarises the opportunities provided in the units for each year group so that children can develop the processes and skills of investigative Science. Teachers may use this in short term planning to modify what they do to meet the needs of children or groups of children. When teachers come to the end of Key Stage judgements they will continue to use the level descriptions. **Appendix D** provides some enabling questions to prompt Sc 1 which can be used using differentiated language throughout the year groups. At Headlands Primary School we consider Sc 1 (Scientific Enquiry) as the core of teaching and learning of the Science Curriculum for which Sc 2 - 4 are built around.

## **Planning the Science Curriculum**

**Long Term Planning** - is currently under review as the school is taking on the new curriculum supplied by Edison in preparation for changing over in September 2010 ready for the revised Primary National Curriculum requirements for September 2011.

Science Units of Work will still be sequenced to ensure progression and continuity of children's learning and will reflect the balance of the programme of study.

**Medium Term Planning** - is carried out by class teachers and monitored by the Science Co-ordinator. Such planning, whether from Q.C.A. Units or from Edison, has defined learning objectives and outcomes for each unit of work to be undertaken in Science each term and suggests activities for such objectives to be achieved. A suggested format of planning is included in **Appendix E**. Teachers are encouraged to make cross-curricular links.

**Short Term Planning** - is the responsibility of the individual teacher who will build on the medium term planning by taking on the needs of the individual children in a particular class and identifying strategies in which objectives may be approached by different ability children in each class. Suggested Resources and Curriculum Links including ICT are shown in **Appendix F**

Individual teachers will need to decide:

- Which learning objectives are to be addressed in a particular lesson and how these relate to the work in previous lessons;
- Whether these objectives need to be modified for particular children or groups of children in the light of their existing knowledge, skills and understanding;
- What resources are needed;
- How to divide up time during lessons;
- How to introduce the activities *e.g. to a whole class or to groups of children, what questions to ask, how to draw in prior knowledge;*
- How to organise the activities *e.g. which groups children should work in, whether the activities need to be modified for particular children or groups of children;*
- What will show what children have learnt *e.g. responses to questioning, questions children ask, observation of practical tasks, children's records of their work;*
- What to look for in children's responses;
- How to draw the lesson together at the end and to evaluate whether children are ready to move.

## **Work at Home and Outside Lessons**

Many Units of Work provide opportunities for tasks that can be completed outside formal teaching time. Suitable tasks include:

- Finding out more about the Topics in the Units.

- Identifying where ideas they encounter are relevant to everyday life.
- Collecting data and information.

These are used as homework tasks particularly for older children in Years 5 and 6.

### **Assessing and Recording Children's Attainment**

At Headlands Primary School our aim is to see an overall improvement in standards year on year in the long term. Therefore ongoing assessment and monitoring of individual children's progress is considered essential.

#### **Formative assessment**

Formative assessment of each unit of work should be planned for by each class teacher within their medium term planning. It is recommended that formative assessment is used at the beginning of a unit and again at the beginning of some lessons to plan a series of lessons, and to group children within a lesson, to enable them to make maximum progress.

#### **Focussed Assessments**

About half way through a unit a lesson should be planned so that a focussed assessment of SC1 can be made. Some ideas are available from Astro Zeneca assessment lesson plans. (Saved on school server: RMstaff, teachers, science, AZSc1 assessments)

#### **APP for Sc1 – Scientific Enquiry**

Science is no longer tested at the end of Key Stage 2. At Headlands we use the APP system of assessing a sample of 5 children in each class. Evidence is obtained from class work in the form of children's work, photographs, copies of group work and notes made by staff. This is used to assess the child against the statements for SC1 and a best fit of a high (a), secure (b) or low(c). The rest of the class are then assessed according to this. Evidence for the levelling of children's ability is monitored by the Science Co-ordinator. This data will be collected three times a year at the same time as data is collected for Literacy and Numeracy.

A copy of the APP statements, a group record sheet and Level Descriptions can be found in **Appendices G,H and I.**

Teachers in Foundation Stage, using the Early Learning Goals for Children's Learning, will record children's knowledge and understanding assessment on the relevant sections of My Learning Journey (**Appendix A**) and also against the Foundation Stage Profile as set out by LASI.

### **Annual Reports to Parents**

The Class Teacher will make a written comment on every child's progress in Science. This will incorporate comments on each of the four attainment targets.

### **Equal Opportunities**

At Headland's Primary School, we value every child. We seek to provide a rich and relevant curriculum for all pupils, regardless of gender, race, ethnicity, religion, disability etc. The curriculum taught will prepare our children to become full and active citizens in an ethnically and culturally diverse society. The Science curriculum seeks to challenge stereotypes based on gender, race or ability and provides equal access and educational outcomes for all pupils.

### **Special Educational Needs**

The Governing Body of the school will not discriminate against any pupil on the grounds of race, colour, ethnic or national origin, religion, creed, sex or disability with regards to Special Needs Provision.

A child will be regarded as having Special Educational Needs if he or she has a learning and/or behaviour difficulty, as outlined in the Code of Practice (2001) which calls for Special Education provision to be made.

It is our policy to concentrate on pupils' abilities and needs, not on their disabilities. This emphasis aims to change feelings of disaffection, underachievement and low self-esteem. Everything should be done to avoid highlighting the disabilities of any child. Pupils of low ability require constant reassurance and

patience to help improve their confidence. We aim to develop a culture of achievement and high self esteem with all our children.

In this subject all children will achieve through planned differentiated activities. High achieving children will have work planned for them to broaden and deepen their scientific understanding of the planned objective to take their learning further. Such planning will be done in consultation with the Co-ordinator.

## My Learning Journey

## Appendix A (1 of 7)

### Knowledge and Understanding of the World - reference sheet for practitioners

STEP 0	Exploration and investigation (page 86)	Exploration and investigation (page 88)	Designing and making skills (page 90)	Information and communication technology (page 92)	Sense of time (page 94)	Sense of place (page 96)	Cultures and beliefs (page 98)
Cream 1	Shows curiosity and interest by facial expression, movement and sound.  (Observes closely)	Explores objects.  Shows and interest in why things happen and how things work.	Investigates construction materials.  Realises tools can be used or a purpose.	Show an interest in ICT.  (Is beginning to operate simple equipment),	Remembers and talks about significant things that have happened to them.	Shows an interest in the world in which they live.	Expresses feelings about a significant personal event.
Blue 2	Shows curiosity, observes and manipulates objects.  Describes simple features of objects and events.	Sorts objects by the function.  (Asks questions).  Talks about what is seen and what is happening.	Joins construction pieces together to build and balance.  Begin to try out a range of tools and techniques safely.	Knows how to operate simple equipment.	Shows an interest in lives of people familiar to them.  Beginning to differentiate between past and present.	Comments and asks questions about where they live and the natural world.  Notices differences between features of the local environment.	Describes significant events for family or friends.
Green 3	Examines objects and living things to find out more about them. (Shows willingness to experiment to solve simple problems).	Notices and comment on patterns.  (Makes comparisons).  Shows an awareness of change.	Constructs with a purpose in mind using a variety of resources.  Uses a range of simple tools and techniques competently and appropriately.	Completes a simple program on the computer and/or performs simple functions on ICT apparatus.		(Has an understanding of self in relation to their family, their environment and their culture).  Gains an awareness of the cultures and beliefs of others.	
By end of Year R  ELG 4	Investigates objects and materials (through first hand experiences) by using all of their senses as appropriate.  Finds out about, and identifies, some features of living things, objects and events they observe.	Looks closely at similarities, differences, patterns and change.  Asks questions about why things happen and how things work.  (Hypothesis and makes predictions).	Builds and constructs with a wide range of objects, selecting appropriate resources, and adapting their work where necessary.  Selects the tools and techniques they need to shape, assemble and join materials they are using.	Finds out about and identifies the uses of everyday technology and uses information and communication technology and programmable toys to support their learning.	Finds out about past and present events in their own lives, and in those of their families and other people they know.	Observes, finds out about and identifies features in the place they live and the natural world.  Finds out about their environment, and talks about those features they like and dislike.	Beginning to know about their own cultures and beliefs and those of other people.

# My Learning Journey

# Appendix A (2 of 7)

## Physical Development - reference sheet for practitioners

STEP	Movement (page 104)	Movement (page 106)	Sense of space (page 108)	Health and body awareness (page 110)	Using equipment (page 112)	Using tools and materials (page 114)
0						
Cream  1	Moves spontaneously within available space.  Responds to rhythm, music and story by means of gesture and movement.  Can stop.	Manages body to create intended movements.  Combines and repeats a range of movements.	Negotiates an appropriate pathway when walking, running or using a wheelchair or other mobility aids, both indoors and outdoors.  Judges body space in relation to spaces available when fitting into confined spaces or negotiating holes & boundaries.	Shows awareness of own needs with regard to eating, sleeping and hygiene.  Often needs adult support to meet those needs.	Operates equipment by means of pushing and pulling movements.	Engages in activities requiring hand-eye co-ordination.  Uses one-handed tools and equipment.
Blue  2	Moves freely with pleasure and confidence.  Moves in a range of ways, such as slithering, shuffling, rolling, crawling, walking and running, jumping, skipping, sliding and hopping.  Uses movement to express feelings.  Adjusts speed or change direction to avoid obstacles.  Negotiates space successfully when playing racing and chasing games with other children.	Sits up, stands up and balances on various parts of the body.  Demonstrates the control necessary to hold a shape or fixed position.  Mounts stairs, steps or climbing equipment using alternate feet.	Shows respect for other children's personal space when playing among them.  Perseveres in repeating some actions/attempts when developing a new skill.  Collaborates in devising and sharing tasks, including those, which involve accepting rules.	Shows awareness of a range of healthy practices with regard to eating, sleeping and hygiene.  Observes the effects of activity on their body.	Constructs with large materials such as cartons, long lengths of fabric and planks.  Shows increasing control in using equipment for climbing, scrambling, sliding and swinging.  (Shows increasing awareness of safety).	Demonstrates increasing skill and control in the use of mark-making implements, blocks, construction sets and 'small world' activities.  Understands that equipment and tools have to be used safely.
Green  3	Goes backwards and sideways as well as forward.  Experiments with different ways of moving.  Initiates new combinations of movement and gesture in order to express and respond to feelings, ideas and experiences.  Jumps off an object and land appropriately.	Manipulates materials and objects by picking up, releasing, arranging, threading and posting them. Shows increasing control over clothing and fastenings.  (Responds to situations that require control and balance).	Moves body positions as necessary.  Shows a clear and consistent preference for the left or right hand.	Shows some understanding that good practices with regard to exercise, eating, sleeping and hygiene can contribute to good health.	Uses increasing control over an object by touching, pushing, patting, throwing, catching or kicking it.  Retrieves, collects and catches objects.	Explores malleable materials by patting, stroking, poking, squeezing, pinching and twisting them.  Manipulates materials to achieve a planned effect.  Uses simple tools to effect the changes to the materials.  Shows understanding of how to transport and store equipment safely.  Practises some appropriate safety measures without direct supervision.
By end of Year R ELG  4	Moves with confidence, imagination and in safety.	Moves with control and co-ordination.  Travels around under, over and through balancing and climbing equipment.	Shows awareness of space, of themselves and of others.	Recognise the importance of keeping healthy and those things, which contribute to this.  Recognise the changes that happen to their bodies when they are active.	Uses a range of small and large equipment (with increasing control and safety).  (Co-operates as part of a team).	Handles tools, objects, construction and malleable materials safely and with increasing control.

# My Learning Journey

# Appendix A (3 of 7)

## Creative Development - reference sheet for practitioners

STEP	Exploring media and materials (page 120)	Music (page 122)	Imagination (page 124)	Responding to experiences and expressing and communicating ideas(page 126)
0				
Cream 1	Beginning to differentiate colours. Uses their body to explore texture and space. Make three-dimensional structures.	Joins in favourite songs. Shows an interest in the way musical instruments sound. Responds to sound with body movements. Enjoys joining in with dancing and singing games.	Pretends that one object represents another, especially when objects have characteristics in common. Notifies what adults do, imitating what is observed and then doing it spontaneously when the adult is not there.	Shows an interest in what they see, hear, smell, touch and feel. Uses body language, gestures, facial expression or words to indicate personal satisfaction or frustration.
Blue 2	Differentiates marks and movements on paper. Beginning to describe the texture of things. Uses lines to enclose a space, then begins to use these shapes to represent objects. Beginning to construct, stacking blocks vertically and horizontally and making enclosures and creating spaces.	Sings a few simple, familiar songs. Sings to themselves and make up simple songs. Taps out simple repeated rhythms and make some up. Explores and learns how sounds can be changed. Imitates and creates movement in response to music.	Uses one object to represent another, even when the objects have few characteristics in common. Uses available resources to create props to support role-play. Develops a repertoire of actions by putting a sequence of movements together. Enjoys stories based on themselves and people and places they know well. Engages in imaginative role-play bases on their own first-hand experiences.	Further explores an experience using a range of senses.  Beginning to use representation as a means of communication.  Describes experiences and past actions, using a widening range of materials.
Green 3	Explores what happens when they mix colours. Understands that different media can be combined. Make constructions, collages, paintings drawings and dances. Uses ideas involving fitting, overlapping, in, out, enclosure, grids and sun-like shapes. Chooses particular colours to use for a purpose. Experiments to create different textures. Works creatively on a large and small scale (using 2D or 3D materials).	Beginning to build a repertoire of songs.  Explores the different sounds of instruments.  Beginning to move rhythmically (in response to music).	Introduces a story line or narrative into their play.  Plays alongside other children who are engaged in the same theme.  (Plays alongside other children who are engaged in role-play).  Plays co-operatively as part of a group to act out a narrative.	Tries to capture experiences and responds with music, dance, paint and other materials or words. Develops a preference for forms or expression. Talks about a personal intention, describing what they are trying to do. Responds to comments and questions, entering into dialogue about their creations. Make comparisons.
By end of Year R ELG 4	Explores (and experiments with), colour, texture, shape, forms and space in two and three dimensions.	Recognises and explores how sounds can be changed, sings simple songs from memory, recognises repeated sounds and sound patterns and matches movements to music. (Responds creatively to sound and rhythm).	Uses their imagination in art and design, music, dance, imaginative and role-play and stories.	Responds in a variety of ways to what they see, hear, smell, touch and feel. Expresses and communicate their ideas, thoughts and feelings by using a widening range of materials, suitable tools, imaginative and role play, movement, esinging and making, and a variety of songs and musical instruments.

# My Learning Journey

# Appendix A (4 of 7)

## Personal, Social and Emotional Development – reference sheet for practitioners

STEP	Dispositions and Attitudes (thirty-two)	Self-confidence and Self-esteem (thirty-four)	Making Relationships (thirty-six)	Behaviour and self-control (thirty-eight)	Self-care (forty)	Sense of community (forty-two)
0						
Cream 1	Show curiosity  Have a strong exploratory impulse.  Have a positive approach to new experiences.	Separate from main carer with support.	Feel safe and secure and demonstrate a sense of trust. Seek out others to share experiences. Relate and make attachment to members of their group.	Begin to accept the needs of others with support.	Show willingness to tackle problems and enjoy self-chosen challenges.  Demonstrate a sense of pride in own achievement.	Make connections between different parts of their life experiences.
Blue 2	Show increasing independence in selecting and carrying out activities. Show confidence in linking up with others for support and guidance.	Separate from main carer with confidence. Have a sense of belonging. Show care and concern for self. Talk freely about their home and community.	Demonstrate flexibility and adapt their behaviour to different events, social situations and changes to routine.	Show care and concern for others, living things and the environment.	Take initiatives and manage developmentally appropriate tasks.	Show a strong sense of self as a member of different communities, such as their family or setting.
Green 3	Display high levels of involvement in activities. Persist for extended periods of time at an activity of their choosing.	Have a sense of self as a member of different communities. Express needs and feelings in appropriate ways. Initiate interactions with other people.	Value and contribute to own well-being and self-control.	Show confidence and the ability to stand up for own rights. Have an awareness of the boundaries set and behavioural expectations within the settings.	Operate independently within the environment and show confidence in linking up with others for support and guidance.	Have an awareness of, and show interest and enjoyment in, cultural and religious differences. Have a positive self-image and show that they are comfortable with themselves.
By end of Year R ELG 4	Continue to be interested, excited and motivated to learn. Be confident to try out new activities, initiate ideas and speak in familiar group. Maintain attention, concentrate and sit quietly when appropriate.	Respond to significant experiences, showing a range of feelings when appropriate. Have a developing awareness of their own needs, views and feelings and be sensitive to the needs, views and feelings of others. Have a developing respect for their own culture and beliefs and those of other people	Form good relationships with adults and peers.  Work as part of a group of class, taking turns and sharing fairly, understanding that there needs to be agreed values and codes of behaviour for groups of people, including adults and children, to work together harmoniously.	Understand what is right, what is wrong, and why. Consider the consequences of their words and actions for themselves and others.	Dress and undress independently and manage their own personal hygiene.  Select and use activities and resources independently.	Understand that people have difference needs, views, cultures and beliefs, that need to be treated with respect.  Understand that they can expect others to treat their needs, views, cultures and beliefs with respect.

STEP 0	Numbers as labels and counting (page 74)	Calculating (page 76)	Shape, space and measures (page 78/80)
Cream  1	Shows an interest in numbers and counting. Uses some number names and number language spontaneously. Enjoys joining in with number rhymes, songs (and activities). Uses mathematical language in play.	Compares two groups of objects, saying when they have the same number.	Shows an interest in shape and space by playing with shapes or making arrangements with objects. Shows an awareness of similarities in shapes (and pattern) in the environment. Observes and uses positional language. Uses size language such as 'big' and 'little'.
Blue  2	Shows curiosity about numbers by offering comments or asking questions. Use some number names (and number language) accurately in play. Recognise groups with one, two or three objects.	Shows an interest in number problems. Separates a group of three or four objects in different ways, beginning to recognise that the total is still the same.	Shows an interest by sustained construction activity or by talking about shape or arrangements. Uses shapes appropriately for tasks. Beginning to talk about the shapes of everyday objects. Beginning to match and sort by own criteria in play. (Makes predictions and estimates relating to measure in play).
Green  3	(Is beginning to show understanding of quantity). Shows confidence with numbers by initiating or requesting number activities. Counts up to three or four objects by saying one number name for each of them. Recognises some numerals of personal significance. Beginning to represent numbers using fingers, marks on paper or pictures. Recognises some numerals one to five, then one to nine. Counts out up to six objects from a larger group. Counts actions or objects that cannot be moved. Selects the correct numeral to represent one to five, then one to nine and objects. Shows increased confidence with numbers by spotting errors. Counts an irregular arrangement of up to ten objects. Says the number after any number up to nine. Beginning to count beyond ten.	Sometimes shows confidence and offers solutions to problems. Finds the total number of items in two groups by counting all of them. Uses own methods to solve a problem. Says with confidence the number that is one more than of a given number. (Make calculations in play, eg adding, subtracting and sharing).	Sustains an interest for a length of time on a pre-decided construction or arrangement. Matches some shapes by recognising similarities and orientation. Uses appropriate shapes to make representational models or more elaborate pictures. Shows curiosity and observation by talking about shapes, how they are the same or why some are different. Finds items from positional/directional clues. (Uses positional vocabulary in context). Describes a simple journey. Orders two items by length or height. Chooses suitable components to make a particular model. Adapts shapes or cuts material to size. Selects a particular named shape. Beginning to use mathematical names for 'solid' 3D shapes and 'flat' 2D shapes and mathematical terms to describe shapes. Shows an awareness of symmetry. Orders two or three items by length. Orders two or three items by weight or capacity. Instructs a programmable toy.
By end of Year R ELG 4	(Uses number meaningfully in play). Says and uses number names in order in familiar contexts. Counts reliably up to ten everyday objects. Recognise numerals one to nine. Uses developing mathematical ideas and methods to solve practical problems.	In practical activities and discussion beginning to use the vocabulary involved in adding and subtracting. Uses language such as 'more' or 'less' to compare two numbers. Finds one more or one less than a number from one to ten. Beginning to relate addition to combining two groups of objects and subtraction to 'taking away'.	(Classifies using mathematical language). Uses language such as 'greater', 'smaller', 'heavier' or 'lighter' to compare quantities. Talks about, recognises and recreates simple patterns. Uses language such as 'circle' or 'bigger' to describe the shape and size of solids and flat shapes. Uses everyday words to describe position. Uses developing mathematical ideas and methods to solve practical problems.

## My Learning Journey Communication, Language and Literacy (1) - reference sheet for practitioners

## Appendix A (6 of 7)

STEP	Language for communication (page 48)	Language for communication (page 50)	Language communication (page 52)	Language for communication (page 54)	Language for thinking (page 58)
0					
Cream 1	Uses words and/or gestures, including body language such as eye contact and facial expression, to communication. (Communicates needs).	Listens to favourite nursery rhymes, stories and songs. Join in with repeated refrains, anticipating key events and important phrase. Responds to simple instructions. Listens to others in one-to-one/small groups when conversation interests them.	Uses familiar words, often in isolation, to identify what they do and do not want.  Uses vocabulary focused on objects and people who are of particular importance to them.	(Uses single words). (Uses simple phrases with understanding).  Uses isolated words and phrases and/or gestures to communicate with those well known to them.	Uses action sometimes with limited talk that is largely concerned with the 'here and now'.
Blue 2	Uses simple statements and questions often linked to gestures. (Responds to others, including non-verbal communication). Uses intonation, rhythm and phrasing to make their meaning clear to others.	Listens to stories with increasing attention and recall. Describes main story settings, events and principal characters. Questions why things happen, and give explanations. (Interacts as a listener with: peers/adults/group).	Builds up vocabulary that reflects the breadth of their experience. Beginning to experiment with language describing possession.	Beginning to use more complex sentences. Uses a widening range of words to express or elaborate ideas (to accompany play).	Talks activities through. Reflecting and modifying what they are doing. Uses talk to give new meanings to objects and actions, treating them as symbols for other things. Uses talk to connect ideas, explain what is happening and anticipate what might happen next? Uses talk, actions and objects to recall and relive past experiences.
Green 3	Has an emerging self-confidence to speak to others about wants and interest. Uses simple grammatical structures. Asks simple questions, often in the form of 'where' or 'what'. Talks alongside others, rather than with them. Uses talk to gain attention and initiate exchanges. Uses action rather than talk to demonstrate or explain to others. Initiates conversation, attends to and takes account of what others say, and uses talk to resolve disagreements.	Initiates conversation, negotiates positions, pays attention to and takes account of others' views.	Extends vocabulary, especially by grouping and naming. Uses vocabulary and forms of speech that are increasingly influenced by experience of books.	Links statements and sticks to main theme or intention. Consistently develops a simple story, explanation or line of questioning. Uses language for an increasing range of purposes. Confidently talks to people other than those who are well known to them (and participates in conversation).	Begins to talk instead of action. To rehearse, re-order and reflect on. Past experience, linking significant events from own experiences and from stories, paying attention to sequence and how events lead into one another. Begins to make patterns in their experience through linking cause and effect, sequencing, ordering and grouping. Begins to use talk to pretend imaginary situations.
By end of Year R  ELG 4	Interacts with others, negotiating plans and activities and taking turns in conversations.	Enjoys listening to and using spoken language, and readily turns to it in their play and learning. Sustains attentive listening responding to what they have heard by relevant comments, questions or actions. Listens with enjoyment and responds to stories, songs and other music, rhymes and poems and makes up their own stories, songs, rhymes and poems.	Extends their vocabulary, exploring the meanings and sounds of new words.	(Communicates verbally in a variety of situations). Speaks clearly and audibly with confidence and control and shows awareness of the listener, for example by their use of conventions such as greetings, 'please' and 'thank you'.	Uses language to imagine and re-create roles and experiences. Uses talk to organise, sequence and clarify thinking, ideas, feelings and events.

# My Learning Journey

## Communication, Language and Literacy (2) - reference sheet for practitioners

## Appendix A (7 of 7)

STEP 0	Linking sounds and letters (page 60)	Reading (page 62)	Writing (page 64)	Handwriting (page 66)
Cream  1	Enjoys rhyming and rhythmic activities.  Distinguishes one sound from another.	Listens to and joins in with stories and poems, one-to-one and also in small groups. ((Enjoys shared stories). Shows an interest in illustrations and print in books and print in the environment. Beginning to be aware of the way stories are structured.	Draws and paints, sometimes giving meanings to marks.  (Understands that writing conveys messages).	Engages in activities required hand-eye co-ordination.  Uses one-handed tools and equipment.
Blue  2	Shows an awareness of rhyme and alliteration.  Recognises rhythm in spoken words.	Has favourite books/(shares books). Handles books carefully (and appropriately). Suggests how the story might end. Knows information can be relayed in the form of print (and understands that print can carry meaning). Holds book the correct way up and turn pages. (Differentiates between pictures and text). Understands the concept of a word.	Ascribes meaning to marks.  (Writes' spontaneously).  (Uses emergent writing to convey meaning).	Draws lines and circles using gross motor movement.  Manipulates objects with increasing control.  (Holds pencil effectively).
Green  3	Continues a rhyming string. (Is developing phonic knowledge). Hears and says the initial sound in words and knows which letters represent some of the sounds.	Enjoys an increasing range of books (and poems). Beginning to recognise some familiar words. Knows that information can be retrieved from books and computers.	Beginning to break the flow of speech into words.  Uses writing as a means of recording and communicating.  (Knows that writing can be used for different purposes).	Beginning to use anticlockwise movement and retrace vertical lines.  Beginning to form recognisable letters.
By end of Year R  ELG  4	Hears and says the initial and final sounds in words, and short vowel sounds within words. Links sounds to letters, naming and sounding the letters of the alphabet. Uses their phonic knowledge to write simple regular words and makes phonetically plausible attempts at more complex words.	(Has confidence to behave as a reader). Explores and experiments with sounds, words and letters. Retells narratives in the correct sequence, drawing on language patterns of stories. Reads a range of familiar and common words and simple sentences independently. Knows that print carries meaning and in English, is read from left to right and top to bottom. Shows an understanding of the elements of stories, such as main characters, sequence of events, and openings, and how information can be found in non-fiction texts to answer questions about where, who, why and how.	(Has confidence to behave as a writer).  Uses their phonic knowledge to write simple regular words and makes phonetically plausible attempts at more complex words. Attempts writing for different purposes, using features of different forms such as lists, stories and instructions. Write their own name and other things such as labels and captions and is beginning to form simple sentences, sometimes using punctuation.	(Is developing skill and control as a writer).  Uses a pencil and holds it effectively to form recognisable letters, most of which are correctly formed.

# Overview of Science Units - subject to review as Edison curriculum is incorporated.

Appendix B

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## Opportunities for Sc1, Scientific Enquiry, from Year 1 - 3

## Appendix C (1 of 2)

	Term: Autumn 1	Term: Autumn 2	Term: Spring 1	Term: Spring 2	Term: Summer 1	Term: Summer 2
Foundation Stage	Exploration and investigation linked to Early Learning Goal – Knowledge and Understanding of the World; Practical activities that explore objects and materials (through first hand experiences) by using all the senses, identify some features of living things, objects and events they observe; ask questions about why things happen and how things work; find out about and identify features in the natural world and their immediate environment.					
Year 1 (QCA Unit)  (Curriculum 2000 )	Unit 1A OurselvesKS1: Sc1: 1; 2a Sc2: 1a,b; 2a,e,f,g	Unit 1D Light and Dark  KS1: Sc1: 1 Sc4: 3a,b	Unit 1E Push and Pull  KS1: Sc1: 1 Sc2: 2a, b, c	Unit 1C Sorting and using Materials  KS1: Sc1: 1; 2a,b,c,g,h Sc3: 1a,b,c,d	Unit 1B Growing Plants  KS1: Sc1: 1; 2a-j Sc2: 3a,b,c	Unit 1F Sound and Hearing  KS1: Sc1: 1; 2a-j Sc4: 3c,d
Year 2	Unit 2E Forces and Movement  KS1: Sc1: 1; 2a,b,c,d Sc4: 2a,b,c	Unit 2A Health and Growth  KS1: Sc1: 1; 2a,b,c Sc2: b,c,d,e,f	Unit 2D Grouping and Changing Materials  KS1: Sc1: 1; 2a-h Sc3: 1a-d; 2a,b	Unit 2C Variation  KS1: Sc1: 1; 2a-j Sc2: 4a,b	Unit 2B Plants and Animals in the Local Environment  KS1: Sc1: 1; 2a-j Sc2: 1c; 3a-c; 5a-c	Unit 2F Using Electricity  KS1: Sc1: 1; 2a-j Sc4: 1a,b,c
Year 3	Unit 3D Rocks and Soils  KS2: Sc1: 1a,b; 2a-h Sc3: 1d; 3a	Unit 3C Characteristics of Materials  KS2: Sc1: 1; 2a-h Sc3: 1a	Unit 3A Teeth and Eating  KS2: Sc1: 1a,b; 2a-m Sc2: 2a,b,g,h	Unit 3E Magnets and Springs  KS2: Sc1: 1; 2a-m Sc2: 2a,d,e	Unit 3B Helping Plants Grow Well  KS2: Sc1: 1; 2a-m Sc2: 3a,b,c	Unit 3F Light and Shadows  KS2: Sc1: 1; 2a-m Sc4: 3a,b,c
Year 4	Unit 4F Circuits and Conductors  KS2: Sc1: 1; 2a-d Sc4: 1a-c	Unit 4A Moving and Growing  KS2: Sc1: 1a,b; 2a-e Sc2: 2e	Unit 4E Friction  KS2: Sc1: 1; 2a-m Sc4: 2a-c	Unit 4D Solids, Liquids and how they can be separated  KS2: Sc1: 1; 2a-m Sc3: 2d, 3b-e	Unit 4B Habitats  KS2: Sc1:1; 2a-m Sc2: 4a-c; 5a-e	Unit 4C Keeping Warm  KS2: Sc1: 1; 2a-m Sc3: 1a,b,c; 2c,d
Year 5	Unit 5A Keeping Healthy  KS2: Sc1: 1; 2a-m Sc2: 2b-h	Unit 5F Changing Sounds  KS2: Sc1: 1; 2a-m Sc4: 3e-g	Unit 5E and 6F Earth, Sun and Moon How we see Things (short unit) KS2: Sc1: 1; 2a-m Sc4: 4a-d (Sc4: 3a-d)	Unit 5D Changing State  KS2: Sc1: 1; 2a-m Sc3: 1e; 2a-e	Unit 5B Life Cycles  KS2: Sc1: 1; 2a-m Sc2: 1a-c, 2f, 3a-d	Unit 5C Gases around us  KS2: Sc1: 1; 2a-m Sc3: 1e, 3a-e
Year 6	Unit 6G Changing Circuits (short unit) Units 6C More about Dissolving (long unit) Unit 6D Reversible and Irreversible Changes (short unit)  KS2: Sc1: 1; 2a-m Sc4: 1a-c Sc3: 2a-g		Unit 6E Balanced and Unbalanced Forces  KS2: Sc1: 1; 2a-m Sc4: 2a-e	Unit 6A Interdependence and Adaptation Unit 6B Micro Organisms (short unit) KS2: Sc1: 1; 2a-m Sc2: 3a-c, 5b,c,d,e; 5f	Revision of Unit 6F  SSSTs	Unit 5/6H Enquiry Unit (AT1)  KS2: Sc1: 1a,b; 2a-m

Experimental and Investigative Science is integrated into each unit. In each year there are opportunities in the scheme for children to carry out the whole process of investigating an idea. This table summarises the opportunities to provided each year for children to learn about aspects of Experimental and Investigative Science. It is not intended to show the expectations at the end of each year.

	<b>Year 1 Children have opportunities:</b>	<b>Year 2 Children have opportunities:</b>	<b>Year 3 Children have opportunities:</b>
<b>Planning Experimental work</b>	To test ideas suggested to them and say what they think will happen.	To suggest some ideas and questions based on simple knowledge and to say how they might find out about them; to say what they think might happen; and to think about and discuss whether comparisons and tests are unfair or fair.	In a variety of contexts, to suggest questions and ideas and how to test them; to make predictions about what will happen; to think about how to collect sufficient evidence in some contexts; to consider what makes a test unfair or evidence insufficient and, with help, to plan fair tests
<b>Obtaining evidence</b>	To make observations using appropriate senses; and to make some measurements of length using standard or non-standard measures	To make observations; to make measurements of length in standard and non -standard measures; and to make records of observations	To make observations and comparisons; to measure length, volume of water and time in standard measures using simple measuring equipment effectively
<b>Considering Evidence</b>	To communicate observations orally, in drawing, by labelling and in simple writing; to make simple comparisons and groupings that relate to differences and similarities in living things and objects; to present some findings in simple tables and block graphs; in some cases to say what their observations show; and to draw simple conclusions	To make simple comparisons, identifying similarities and differences between living things, objects and events; to present results in tables, drawings and block graphs and give simple interpretations of these; to say whether their predictions were supported; and in some cases to use knowledge to explain what was found out and to draw conclusions	To present results in drawings, bar charts and tables; to draw conclusions from results and to begin to use scientific knowledge to suggest explanations for these, to make generalisations and to begin to identify simple patters in results presented in tables and charts

**Q.C.A. 2000**

**Opportunities for Science One, Scientific Enquiry, from Year 4 -6**

**Appendix C (2 of 2)**

	<b>Year 4</b> Children have opportunities:	<b>Year 5</b> <b>Children have opportunities:</b>	<b>Year 6</b> <b>Children have opportunities:</b>
<b>Planning Experimental work</b>	To suggest questions that can be tested and make predictions of what will happen, some of which are based on scientific knowledge to design a fair test or plan how to collect sufficient evidence; and in some contexts to choose what apparatus to use and what to measure	To make predictions of what will happen and suggest how to test these; to use knowledge and understanding to plan how to carry out a fair test or how to collect sufficient evidence to test an idea; and to identify factors that need to be taken into consideration in different contexts.	To decide how to turn ideas into a form that can be tested and, where appropriate, to make predictions using scientific knowledge and understanding; to identify factors that are relevant to a particular situation; to choose what evidence to collect to investigate a question, ensuring the evidence is sufficient; and choose what equipment to use.
<b>Obtaining evidence</b>	To make observations and comparisons of relevant features in a variety of contexts; to make measurements of temperature, time and force as well as measurements of length and to begin to think about why measurements of length should be repeated.	To make relevant observations; to consolidate measurement of volume, temperature, time and length; to measure pulse rate; and to think about why observations and measurements should be repeated.	To make a variety of relevant observations and measurements using simple apparatus correctly; to suggest how to make observations safely; to decide when observations and measurements need to be checked by repeating to give more reliable data.
<b>Considering Evidence</b>	To present results in bar charts and tables; to identify simple trends and patters in results presented in tables, charts and graphs and to suggest explanations for some of these to explain what the evidence shows and whether it supports any prediction made; and to link the evidence to scientific knowledge and understanding in some contexts.	To present results in bar charts and line graphs and to decide whether they support any prediction; to recognise and make predictions from patterns in data and suggest explanations for these using scientific knowledge and understanding; to interpret data and think about whether it is sufficient to draw conclusions; and draw conclusions indicating whether these match any prediction made.	to use tables, bar charts and line graphs to present results and to make comparisons; to identify patterns in the results and results that do not appear to fit the pattern; to use results to draw conclusions and to make further predictions; to suggest explanations for these using scientific knowledge and understanding; and to say whether evidence supports any prediction made.

## Enabling Questions Planner

Starting Point		KS1 and 2
Specific Learning Objectives Children should:	Possible Enabling Questions	PoS
Hypothesise /Predict	Which one will be best ? Why do you think that ?	1b
Plan Investigation	How will you find out ? What will you need to do?	1b
Select resources needed	What equipment will you need to help you find out?	1e
Control variables (fair test)	How are you going to make sure the test is fair ?	1d (1c)
Observe and Measure	Are you going to measure anything or count anything ?	2a,b,c
Record outcomes	How will you remember what you did and what happened ?	
Interpret	What do you think your results show ?	3b
Infer	What does this mean ? Can you say which is best and why?	3c,d,e
Communicate	What will be the best way to tell about what you have found out ?	3a
Evaluate	Are you happy with what you did ? What would you do to make your test better ?	


 The logo for NIAS (National Institute for Research in Science and Technology) is located in the bottom right corner of the table. It consists of the letters 'NIAS' in a stylized, bold, sans-serif font, with a horizontal line underneath the letters.

Appendix E (1 of 2)



Medium Term Plans:

Year .....: Title.....



Term: :

**About the Unit: (Unit outcome)**

***Most children will:***

***Some children will not have made so much progress and will:***

***Some children will have progressed further and will also:***

<b>Session</b>	<b>Activity Core learning skill (I can statements)</b>	<b>Differentiation</b>	<b>Assessment opportunities</b>	<b>Resources</b>

## Suggested Resources and Curriculum Links including ICT

## Appendix F

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### Autumn 1

Year	QCA Unit	Resources	ICT links	Other Curriculum Links
1	Unit 1A Ourselves	<p>pictures of young and adult animals</p> <p>collection of photographs showing the same people as they get older</p> <p>video/CD-ROM showing animals moving</p> <p>tape of familiar sounds</p> <p>objects and magnifying glasses</p> <p>collection of things that smell, feely bags</p> <p>modelling materials <i>eg playdough, plasticine</i></p>	<a href="http://www.bbc.co.uk/schools/scienceclips/ages/5_6/ourselves.shtml">http://www.bbc.co.uk/schools/scienceclips/ages/5_6/ourselves.shtml</a>	PSHE Art
2	Unit 2E Forces and Movement	<p>materials such as plasticine or dough</p> <p>toy cars and other toys that move</p> <p>apparatus for measuring length</p> <p>bean bags and soft balls</p> <p>ramp kit</p> <p>video clips showing moving objects</p> <p>large apparatus</p>	<a href="http://www.bbc.co.uk/schools/scienceclips/ages/6_7/forces_movement.shtml">http://www.bbc.co.uk/schools/scienceclips/ages/6_7/forces_movement.shtml</a>	

3	Unit 3D Rocks and Soils	<p>collection of secondary sources <i>eg CD-ROMs</i></p> <p>collection of rocks</p> <p>hand lenses</p> <p>sieves, timers and measuring jugs or cylinders</p> <p>containers for soil tests, <i>eg transparent plastic tubes with gauze covering the bottom</i></p> <p>pictures/video showing landscapes with and without visible rocks and different soils</p>	<a href="http://www.bbc.co.uk/schools/scienceclips/ages/7_8/rocks_soils.shtml">http://www.bbc.co.uk/schools/scienceclips/ages/7_8/rocks_soils.shtml</a>	
4	Unit 4A Moving and Growing	<p>model skeletons, “bag of bones,”</p> <p>CD-ROM, video or other secondary sources to provide pictures of skeletons</p> <p>models illustrating how muscles work</p> <p>X-rays of bones provide additional interest for children</p>	<a href="http://www.innerbody.com/htm/body.html">http://www.innerbody.com/htm/body.html:</a> <a href="http://www.imcpl.org/kids_skel.htm">http://www.imcpl.org/kids_skel.htm</a> <a href="http://www.brainpop.com/health/skeletalsystem/">http://www.brainpop.com/health/skeletalsystem/</a> <a href="http://www.eskeletons.org/">http://www.eskeletons.org/</a> <a href="http://tqjunior.thinkquest.org/5777/ske1.htm">http://tqjunior.thinkquest.org/5777/ske1.htm</a> <a href="http://www.enchantedlearning.com/coloring/skeleton_s.shtml">http://www.enchantedlearning.com/coloring/skeleton_s.shtml</a> <a href="http://www.d91.k12.id.us/www/skyline/teachers/robertsd/skulls.htm">http://www.d91.k12.id.us/www/skyline/teachers/robertsd/skulls.htm</a>	Numeracy - graphs
5	Unit 5A Keeping Healthy	<p>reference books, CD-ROMs, the internet, leaflets about food from supermarkets, health centres, food labels</p> <p>timing devices</p> <p>balloon pump or bicycle pump</p> <p>video/other secondary sources illustrating the function of the heart</p> <p>spreadsheet, graphing and DTP software</p> <p>model of human body internal organs</p>	<a href="http://www.bbc.co.uk/schools/ks2bitesize/science/activities/keeping_healthy.shtml">http://www.bbc.co.uk/schools/ks2bitesize/science/activities/keeping_healthy.shtml</a>	PSHE Maths – graphs
6	Unit 6G Changing Circuits (short unit)	<p>batteries of different voltages, wires, bulbs, motors and/or buzzers for circuit construction</p> <p>diagrams of simple circuits</p>	<a href="http://www.bbc.co.uk/schools/ks2bitesize/science/activities/changing_circuits.shtml">http://www.bbc.co.uk/schools/ks2bitesize/science/activities/changing_circuits.shtml</a>	

	<p>Unit 6D Reversible and Irreversible Changes (short unit)</p>	<p>wires of different thickness and made from different materials</p> <p>a range of solids which dissolve and which do not dissolve in water <i>eg sand, salt, talc, flour, chalk, bath salts, baking powder</i></p> <p>a range of solids which react with water, lemon juice or vinegar <i>eg washing soda, plaster of Paris, cement, bicarbonate of soda</i></p> <p>real items, or pictures of items, which change when they are heated <i>eg egg, cake mixture, ice, dough, water, chocolate</i></p> <p>materials which burn <i>eg wax, twigs, paper, charcoal</i></p> <p>fire hazard warning labels from furniture</p>	<p><a href="http://www.bbc.co.uk/schools/ks2bitesize/science/activities/reversible_irreversible.shtml">http://www.bbc.co.uk/schools/ks2bitesize/science/activities/reversible_irreversible.shtml</a></p>	
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## Autumn 2

Year	QCA Unit	Resources	ICT links	Other Curriculum Links
1	Unit 1D Light and Dark	torches with bright beams, shiny objects, <i>eg reflective strips from bags, clothing, tinsel</i>  story about light/dark  dark area, eg resource cupboard  collection of light sources  collection of torches  black box(es), shoe box(es) lined with black paper	<a href="http://www.bbc.co.uk/schools/scienceclips/ages/5_6/light_dark.shtml">http://www.bbc.co.uk/schools/scienceclips/ages/5_6/light_dark.shtml</a>	
2	Unit 2A Health and Growth	collection of pictures of adults and young including some where young look different at different stages <i>eg ducks, hens</i> and some where young and adult appear totally different <i>eg frogs and tadpoles</i>  collection of packaging for medicines <i>eg safety bottles, bubble packs</i>  secondary sources <i>eg books, posters</i> showing the needs of young children	<a href="http://www.bbc.co.uk/schools/scienceclips/ages/6_7/health_growth.shtml">http://www.bbc.co.uk/schools/scienceclips/ages/6_7/health_growth.shtml</a>	Literacy – writing about animals, life - cycles
3	Unit 3C Characteristics of Materials	collections of objects made from different materials  pictures of everyday objects made of specific materials  collection of floor coverings, weights  measuring jugs  variety of paper towels  apparatus for measuring length	<a href="http://www.bbc.co.uk/schools/ks2bitesize/science/activities/materials.shtml">http://www.bbc.co.uk/schools/ks2bitesize/science/activities/materials.shtml</a>	
4	Unit 4F Circuits and Conductors	batteries of different voltages, wires, bulbs, motors and/or buzzers  secondary sources to show hazards of mains electricity	<a href="http://www.bbc.co.uk/schools/ks2bitesize/science/activities/conductors.shtml">http://www.bbc.co.uk/schools/ks2bitesize/science/activities/conductors.shtml</a>	D & T – Lighting it up PSHE – safety near electricity

		<p>samples of materials that are good conductors of electricity and those which are insulators</p> <p>electrical devices with switches</p>		
5	Unit 5F Changing Sounds	<p>selection of musical instruments</p> <p>tuning fork</p> <p>clamp to attach a ruler to a desk or table (D&amp;T stock)</p> <p>buzzers/ticking clocks</p> <p>variety of materials</p> <p>video of orchestra/band, or observation of school band/orchestra, "The Dums" CD-Rom</p> <p>tuned steel pan or drum</p> <p>wide-necked bottles</p> <p>secondary sources</p>	<a href="http://www.bbc.co.uk/schools/ks2bitesize/science/activities/changing_sounds.shtml">http://www.bbc.co.uk/schools/ks2bitesize/science/activities/changing_sounds.shtml</a>	<p>D &amp; T – musical instruments</p> <p>Music</p>
6	Units 6C More about Dissolving (long unit)	<p>filters and sieves for 'dirty' water containing an undissolved solid <i>eg gravel</i> and dissolved solid <i>eg salt</i></p> <p>containers for solutions</p> <p>distilled water, 'sea' water, water coloured with blue ink</p> <p>apparatus for boiling salty water</p> <p>cold surface for condensing water</p> <p>thermometers</p> <p>apparatus for measuring volumes of water</p> <p>timers, scoops</p> <p>sugar, salt, artificial sweetener</p>		<p>Geography – need for clean water globally</p>

## Spring 1

Year	QCA Unit	Resources	ICT links	Other Curriculum Links
1	Unit 1E Push and Pull	collection of toys which move in different ways  PE apparatus  toy windmills, water wheels, and sand wheels  wands blowing bubbles	<a href="http://www.bbc.co.uk/schools/scienceclips/ages/5_6/pushes_pulls.shtml">http://www.bbc.co.uk/schools/scienceclips/ages/5_6/pushes_pulls.shtml</a>	
2	Unit 2D Grouping and Changing Materials	collection of natural and man-made materials  objects made from naturally occurring materials  shapes/moulds for making ice shapes  access to a freezer  access to an oven for cooking  materials which harden on cooling	<a href="http://www.bbc.co.uk/schools/scienceclips/ages/6_7/grouping_materials.shtml">http://www.bbc.co.uk/schools/scienceclips/ages/6_7/grouping_materials.shtml</a>	D & T - cooking
3	Unit 3A Teeth and Eating	books about food types and diets of animals  models of teeth, small mirrors for examining teeth  collection of foods/food packets	<a href="http://www.bbc.co.uk/schools/ks2bitesize/science/activities/teeth_eating.shtml">http://www.bbc.co.uk/schools/ks2bitesize/science/activities/teeth_eating.shtml</a>	PSHE – healthy eating
4	Unit 4E Friction	forcemeters with a range of 0-10N  ramp set  tall cylindrical container for water, blu-tack  timers capable of reading to 0.1 second  large sheet(s) of card  material/paper for parachutes , string	<a href="http://www.bbc.co.uk/schools/ks2bitesize/science/activities/friction.shtml">http://www.bbc.co.uk/schools/ks2bitesize/science/activities/friction.shtml</a>	Maths – graphs, time
5	Unit 5E Earth, Sun and	photographs of Sun, Moon and Earth	<a href="http://www.bbc.co.uk/schools/ks2bitesize/science/activities/earth_sun_moon.shtml">http://www.bbc.co.uk/schools/ks2bitesize/science/activities/earth_sun_moon.shtml</a>	History – earlier ideas

	Moon, and 6F How we see Things (short unit)	globe with small object attached inflatable planet set compass shadow stick torch or projector secondary data about times of sunrise and sunset photographs of appearance of the Moon over a 28-day period		
6	Unit 6E Balanced and Unbalanced Forces	forcemeters (0-10N) objects to suspend and immersed in water elastic bands, magnets objects to be pulled by forcemeters paper parachute weighted by paper clips weights, metre sticks/tape measures plasticine, cotton wool timers capable of reading to 0.1s spinners weighted with paper clips graphing software or spreadsheet	<a href="http://www.bbc.co.uk/schools/ks2bitesize/science/activities/forces_action.shtml">http://www.bbc.co.uk/schools/ks2bitesize/science/activities/forces_action.shtml</a>	Maths – graphs, time

## Spring 2

Year	QCA Unit	Resources	ICT links	Other Curriculum Links
1	Unit 1C Sorting and using Materials	<p>collection of materials and wooden objects</p> <p>feely bags/blindfold</p> <p>collection of objects/materials to illustrate particular properties</p> <p>magnets of different types</p> <p>selection of papers and fabrics including some waterproof containers</p>	<a href="http://www.bbc.co.uk/schools/scienceclips/ages/5_6/sorting_using_materials.shtml">http://www.bbc.co.uk/schools/scienceclips/ages/5_6/sorting_using_materials.shtml</a>	
2	Unit 2C Variation	<p>pictures showing people of different genders, ages and ethnic origin</p> <p>pictures and specimens of a range of animals and plants</p> <p>apparatus for measuring length</p>	<a href="http://www.bbc.co.uk/schools/scienceclips/ages/6_7/variation.shtml">http://www.bbc.co.uk/schools/scienceclips/ages/6_7/variation.shtml</a>	PSHE
3	Unit 3E Magnets and Springs	<p>variety of magnets (type and size)</p> <p>paper clips, springs, elastic bands</p> <p>rulers or tape measures</p> <p>variety of materials for testing magnetic attraction (including iron and steel)</p>	<a href="http://www.bbc.co.uk/schools/ks2bitesize/science/activities/magnets_springs.shtml">http://www.bbc.co.uk/schools/ks2bitesize/science/activities/magnets_springs.shtml</a>	Maths - measuring
4	Unit 4B Habitats	<p>hand lenses, collecting nets, containers for small animals</p> <p>posters, video, CD-ROMs, reference books, simple biological keys, pictures of a variety of habitats</p> <p>plastic containers suitable for investigating preferences of small animals <i>eg snails, woodlice</i></p>	<a href="http://www.bbc.co.uk/schools/scienceclips/ages/8_9/habitats.shtml">http://www.bbc.co.uk/schools/scienceclips/ages/8_9/habitats.shtml</a>	

5	Unit 5D Changing State	<p>kettle for boiling water, ice , cling film</p> <p>apparatus for measuring volume</p> <p>thermometers</p> <p>containers of similar size and shape <i>eg margarine tubs, yoghurt pots</i></p> <p>ice</p> <p>pictures of appliances for 'drying' <i>eg tumble dryers, rotary clothes line</i></p> <p>can of soft drink from freezer</p> <p>IT temperature sensor</p>	<a href="http://www.bbc.co.uk/schools/ks2bitesize/science/activities/changing_state.shtml">http://www.bbc.co.uk/schools/ks2bitesize/science/activities/changing_state.shtml</a>	
6	Unit 6A Interdependence & Adaptation Unit 6B Micro Organisms (short unit)	<p>plant kept in the dark for 2 weeks</p> <p>secondary sources <i>eg video, CD-ROM</i> showing plant growing in time-lapse</p> <p>plant labels, soil samples</p> <p>hand lenses/microscopes</p> <p>examples of plants with different types of root or pictures showing plant roots</p> <p>secondary sources <i>eg reference books, video</i> showing a different, possibly non-local habitat</p> <p>secondary sources providing information about micro-organisms <i>eg video, CD-ROM showing decay within a compost heap</i></p> <p>live yeast, dough, sealed bag of grass cuttings</p> <p>mouldy food <i>eg fruit, bread</i></p>	<a href="http://www.bbc.co.uk/schools/ks2bitesize/science/activities/food_chains.shtml">http://www.bbc.co.uk/schools/ks2bitesize/science/activities/food_chains.shtml</a>  <a href="http://www.bbc.co.uk/schools/ks2bitesize/science/activities/micro_organisms.shtml">http://www.bbc.co.uk/schools/ks2bitesize/science/activities/micro_organisms.shtml</a>	(Includes visit to Newton field centre)

## Summer 1

Year	QCA Unit	Resources	ICT links	Other Curriculum Links
1	Unit 1B Growing Plants	<p>planted seedlings or seeds</p> <p>small plants in pots or tubs or garden which will flower later in the year <i>eg pea, broad bean, mung bean, amaryllis, sunflower, marrow</i></p> <p>pot plant to be re-potted</p> <p>soil and containers for growing plants</p> <p>collection of pictures of plants of a variety of types</p> <p>large labelled plan/drawing of the school grounds</p> <p>artificial plant</p>	<a href="http://www.bbc.co.uk/schools/scienceclips/ages/5_6/growing_plants.shtml">http://www.bbc.co.uk/schools/scienceclips/ages/5_6/growing_plants.shtml</a>	
2	Unit 2B Plants and Animals in the Local Environment	<p>secondary sources <i>eg video, CD-ROM</i> showing adults</p> <p>pictures of plants in flower and with fruits and seeds</p> <p>soil, compost, sand, absorbent paper</p> <p>transparent containers for growing seed without soil</p> <p>seed pods and fruits</p>	<a href="http://www.bbc.co.uk/schools/scienceclips/ages/6_7/plants_animals_env.shtml">http://www.bbc.co.uk/schools/scienceclips/ages/6_7/plants_animals_env.shtml</a>	
3	Unit 3B Helping Plants Grow Well	<p>suitable apparatus for measuring the height of plants <i>eg metre stick, tape measure</i></p> <p>pot-bound pot plant , two similar plants, celery, germinated beans</p> <p>hand lenses, water coloured red with ink or other dye</p> <p>plant pots with holes in the bottom</p> <p>cross seeds which have germinated in shallow containers</p>	<a href="http://www.bbc.co.uk/schools/ks2bitesize/science/activities/plants_grow.shtml">http://www.bbc.co.uk/schools/ks2bitesize/science/activities/plants_grow.shtml</a>	

4	Unit 4D Solids, Liquids and how they can be separated	<p>a range of measuring jugs, cups or cylinders</p> <p>collection of solids, liquids and powders in transparent containers</p> <p>magnets, water wheel or sand wheel</p> <p>sieves, funnels, filters, coffee bags and tea bags</p> <p>solids which behave differently with water</p>	<a href="http://www.bbc.co.uk/schools/ks2bitesize/science/activities/solids_liquids.shtml">http://www.bbc.co.uk/schools/ks2bitesize/science/activities/solids_liquids.shtml</a>	
5	Unit 5B Life Cycles	<p>collection of pictures of plants with fruit</p> <p>hand lenses/microscopes</p> <p>examples of flowers and pictures of flowers</p> <p>collection of fruits and seeds including those dispersed by different mechanisms</p> <p>pictures illustrating the plants from which seeds come</p> <p>rapidly germinating seeds <i>eg radish, spring onion</i></p> <p>thermometers</p> <p>containers and soil to germinate seeds</p>	<a href="http://www.bbc.co.uk/schools/ks2bitesize/science/activities/life_cycles.shtml">http://www.bbc.co.uk/schools/ks2bitesize/science/activities/life_cycles.shtml</a>	
6	Revision of Unit 6F  SSSTs	<p>torches, white card, small mirrors</p> <p>selection of shiny/polished and unpolished/dull materials</p> <p>opaque objects for shadow formation</p> <p>metre sticks or tape measures</p>	<a href="http://www.bbc.co.uk/schools/ks2bitesize/science/activities/see_things.shtml">http://www.bbc.co.uk/schools/ks2bitesize/science/activities/see_things.shtml</a>	

## Summer 2

Year	QCA Unit	Resources	ICT links	Other Curriculum Links
1	Unit 1F Sound and Hearing	tapes of familiar sounds, and of children speaking selection of musical instruments blindfold, ear muffs/headphones apparatus for measuring length 'buzzers' or other continuous sound sources	<a href="http://www.bbc.co.uk/schools/scienceclips/ages/5_6/sound_hearing.shtml">http://www.bbc.co.uk/schools/scienceclips/ages/5_6/sound_hearing.shtml</a>	Maths - measure
2	Unit 2F Using Electricity	batteries, bulbs, bulb holders, buzzers and insulated wires, crocodile clips, battery holders torches, electrical devices which use batteries drawings of simple circuits which do not work	<a href="http://www.bbc.co.uk/schools/scienceclips/ages/6_7/electricity.shtml">http://www.bbc.co.uk/schools/scienceclips/ages/6_7/electricity.shtml</a>	
3	Unit 3F Light and Shadows	torches, combs with widely spaced teeth, cardboard tubes, objects of a variety of shapes shadow sticks, metre sticks or tape measures compass collection of opaque, transparent and translucent objects and materials white cardboard to act as screen	<a href="http://www.bbc.co.uk/schools/ks2bitesize/science/activities/light_shadows.shtml">http://www.bbc.co.uk/schools/ks2bitesize/science/activities/light_shadows.shtml</a>	
4	Unit 4C Keeping Warm	thermometers, containers for water IT temperature sensor, ice a variety of materials, wooden, plastic and metal spoons metal saucepan with wooden or plastic handle	<a href="http://www.bbc.co.uk/schools/ks2bitesize/science/activities/keeping_warm.shtml">http://www.bbc.co.uk/schools/ks2bitesize/science/activities/keeping_warm.shtml</a>	

5	Unit 5C Gases around us	digital balance or coat hanger balloons (reasonably large) sheets of card sponge jar of marbles/ball bearings measuring jugs/cylinders can of fizzy drink picture of gas cooker strong perfume syringes filled with air, water and sand sealed balloons/polythene bags containing air and water	<a href="http://www.bbc.co.uk/schools/ks2bitesize/science/activities/gases.shtml">http://www.bbc.co.uk/schools/ks2bitesize/science/activities/gases.shtml</a>	
6	Unit 5/6H Enquiry Unit (AT1)	ICT data-handling package apparatus for measuring length of dandelion leaves wires, buzzers, lamps for circuit construction aluminium foil sponge, carpet or other soft insulating materials		

**Assessing Pupil Progress in Science – Sc1 Scientific Enquiry**

	Ideas and Evidence	Planning	Carrying Out	Interpreting and Evaluating	Recording and Presenting Data
Level 2	<ul style="list-style-type: none"> <li>▫ <b>makes suggestions as to how to collect information in response to a question.</b></li> </ul>	<ul style="list-style-type: none"> <li>▫ <b>uses simple texts with help to answer questions</b></li> <li>▫ uses other sources of information (ICT, non-fiction) to answer simple questions</li> <li>▫ begins to understand what makes a 'fair test'</li> <li>▫ can make simple predictions as to what may happen</li> <li>▫ recognises the need for a fair test</li> </ul>	<ul style="list-style-type: none"> <li>▫ <b>uses scientific equipment to support the collection of data</b></li> <li>▫ makes a series of related observations over time</li> </ul>	<ul style="list-style-type: none"> <li>▫ <b>can describe their observations using scientific vocabulary</b></li> <li>▫ <b>can say whether what happened was what they expected</b></li> <li>▫ offers explanations.</li> <li>▫ uses scientific equipment to support the collection of data</li> <li>▫ offers simple explanations as to why things happened using appropriate scientific vocabulary</li> <li>▫ begins to identify patterns within observations</li> <li>▫ makes more complex observations which include measurements of quantity, mass, length</li> </ul>	<ul style="list-style-type: none"> <li>▫ <b>can record their observations in a variety of ways (tables, charts and drawings)</b></li> </ul>
Level 1	<ul style="list-style-type: none"> <li>▫ <b>can communicate their ideas through talk</b></li> <li>▫ can suggest ideas for how to answer a simple question (find something out)</li> </ul>	<ul style="list-style-type: none"> <li>▫ <b>Can describe the simple features of objects and events they observe.</b></li> <li>▫ with support can plan how to answer a simple question (find something out)</li> <li>▫ begins to predict the possible outcome of an investigation</li> </ul>	<ul style="list-style-type: none"> <li>▫ observes the use of simple equipment to enhance observations and measure</li> </ul>	<ul style="list-style-type: none"> <li>▫ can describe their observations orally with increasing detail</li> </ul>	<ul style="list-style-type: none"> <li>▫ can record their observations using simple prepared tables and charts</li> <li>▫ records observations through drawings and diagrams</li> </ul>
BL					
IE					
<b>Overall Assessment (highlight 1 level):</b> <b>Low 1</b> <b>Secure 1</b> <b>High 1</b> <b>Low 2</b> <b>Secure 2</b> <b>High 2</b>					

BL = Below level    IE = Insufficient Evidence

## Assessing Pupil Progress in Science – Sc1 Scientific Enquiry

	Ideas and Evidence	Planning	Carrying Out	Interpreting and Evaluating	Recording and Presenting Data
Level 4	<ul style="list-style-type: none"> <li>▫ recognise scientific ideas based on evidence</li> <li>▫ understand that scientists use evidence to follow scientific ideas</li> <li>▫ can decide on an appropriate investigative approach to answer a question</li> <li>▫ can suggest new ideas and explanations for phenomena</li> </ul>	<ul style="list-style-type: none"> <li>▫ can select appropriate equipment making appropriate observations and measurements</li> <li>▫ select and use equipment accurately, reading standard measures</li> <li>▫ can make predictions of what will happen based on scientific knowledge and understanding and begin to suggest how to test these</li> <li>▫ able to show the way they perform their task, how to vary one factor while keeping the other the same</li> <li>▫ are able to recognise and apply the factors of fair testing</li> <li>▫ can use knowledge and understanding to plan how to carry out a fair test or how to collect sufficient evidence to test out an idea.</li> </ul>	<ul style="list-style-type: none"> <li>▫ are able to select information from sources provided for them</li> <li>▫ can choose information from different sources including use of ICT</li> </ul>	<ul style="list-style-type: none"> <li>▫ begin to suggest improvements in their work giving reasons</li> <li>▫ relate conclusions to the patterns in data and communicate them with appropriate scientific language</li> <li>▫ make a series of observations relevant to the task</li> <li>▫ consider how scientists have combined evidence from observation and measurement with creative thinking</li> <li>▫ begin to relate conclusions to patterns found in results and to scientific knowledge and understanding</li> </ul>	<ul style="list-style-type: none"> <li>▫ able to record observations, comparisons and measurements</li> <li>▫ begin to plot points to form simple graphs, and use these graphs to point out and interpret patterns in their data and draw conclusions</li> <li>▫ use tables and bar charts</li> </ul>
Level 3	<ul style="list-style-type: none"> <li>▫ responds to suggestions for investigations giving ideas and suggesting methods if investigating understanding the need to collect information when investigating</li> <li>▫ can forward their own ideas for investigation</li> <li>▫ suggests questions and offers ideas for investigations</li> <li>▫ uses simple texts and ICT to answer questions</li> </ul>	<ul style="list-style-type: none"> <li>▫ with help is able to make a test fair</li> <li>▫ recognises factors which makes test fair</li> <li>▫ with the aid of a prompt sheet plans and records investigations</li> </ul>	<ul style="list-style-type: none"> <li>▫ uses scientific equipment to make observations and take measurements</li> <li>▫ measures quantities and collects data during investigations</li> </ul>	<ul style="list-style-type: none"> <li>▫ explains clearly what they have found out from an investigation</li> <li>▫ can suggest improvements to their investigation techniques</li> <li>▫ identifies simple patterns in recorded measurements</li> <li>▫ with support begins to explain what they have found out</li> <li>▫ with support identifies patterns in recorded observations</li> <li>▫ can explain their findings</li> </ul>	<ul style="list-style-type: none"> <li>▫ records observations in charts, tables and graphs</li> <li>▫ records observations using structured prompt sheets</li> <li>▫ can suggest methods of data collection – measurement, observation over time</li> </ul>
BL					
IE					
<b>Overall Assessment (highlight 1 level): Low 3    Secure 3    High 3    Low 4    Secure 4    High 4</b>					

BL = Below level    IE = Insufficient Evidence

### Assessing Pupil Progress in Science – Sc1 Scientific Enquiry

	Ideas and Evidence	Planning	Carrying Out	Interpreting and Evaluating	Recording and Presenting Data
Level 5	<ul style="list-style-type: none"> <li>▫ begins to answer scientific questions in a systematic way</li> <li>▫ when trying to answer scientific questions, they identify an appropriate systematic approach</li> <li>▫ is able to describe how experimental evidence and creative thinking have been combined to provide a scientific explanation (e.g. Jenner)</li> <li>▫ begins to describe evidence for accepted scientific ideas and is able to explain how the interpretation of evidence by scientists, leads to the development and acceptance of new ideas</li> </ul>	<ul style="list-style-type: none"> <li>▫ can identify key factors to be considered when investigation involves a fair test</li> <li>▫ where appropriate, make predictions based on own scientific knowledge and understanding</li> <li>▫ is able to select apparatus for a range of tasks and can plan to use it effectively</li> </ul>	<ul style="list-style-type: none"> <li>▫ begins to repeat observations and measurements and to offer simple explanations for any differences they encounter</li> <li>▫ is able to select from a range of sources of information, including use of ICT</li> </ul>	<ul style="list-style-type: none"> <li>▫ starts to link experimental evidence and creative thinking to proven aspects (e.g. Jenner, gravity)</li> <li>▫ is able to make practical suggestions about how about how their working methods could be improved</li> <li>▫ is able to draw conclusion that are consistent with the evidence, and begin to relate these to scientific knowledge and understanding</li> <li>▫ starts to use appropriate scientific language and conventions to communicate quantitative and qualitative data</li> <li>▫ in investigative work begin to use scientific knowledge and understanding to identify an appropriate systematic approach</li> <li>▫ begins to select and use appropriate method for communicating qualitative and quantitative data using scientific language and conventions</li> <li>▫ can make reasoned suggestions about how their working methods could be improved</li> </ul>	<ul style="list-style-type: none"> <li>▫ can record observations and measurements systematically, and, where appropriate, present data as line graphs</li> <li>▫ understands when to use enough repeated measurements, comparisons and observations for the task</li> <li>▫ becoming more precise in observations, comparisons and measurements</li> </ul>
BL					
IE					
<b>Overall Assessment (highlight 1 level): Low 5    Secure 5    High 5</b>					

BL = Below level    IE = Insufficient Evidence

Science Targets: Sc1 Scientific Enquiry

APP Level 1

AF	Targets								
Ideas and Evidence	T1: can communicate their ideas through talk								
	T2: can suggest ideas for how to answer a simple question (find something out)								
Planning	T1: can describe the simple features of objects and events they observe.								
	T2: with support can plan how to answer a simple question (find something out)								
	T3: begins to predict the possible outcome of an investigation								
Carrying Out	T1: observes the use of simple equipment to enhance observations and measure								
Interpreting & Evaluating	T1: can describe their observations orally with increasing detail								
Recording & Presenting Data	T1: can record their observations using simple prepared tables and charts								
	T2: records observations through drawings and diagrams								

AF	Targets								
Ideas & Evidence	T1: makes suggestions as to how to collect information in response to a question								
Planning	T1: uses simple texts with help to answer questions								
	T2: uses other sources of information (ICT, non-fiction) to answer simple questions								
	T3: begins to understand what makes a 'fair test'								
	T4: can make simple predictions as to what may happen								
	T5: recognises the need for a fair test								
Carrying Out	T1: uses scientific equipment to support the collection of data								
	T2: makes a series of related observations over time								
Interpreting & Evaluating	T1: can describe their observations using scientific vocabulary								
	T2: can say whether what happened was what they expected								
	T3: offers explanations.								
	T4: uses scientific equipment to support the collection of data								
	T5: offers simple explanations as to why things happened using appropriate scientific vocabulary								
	T6: begins to identify patterns within observations								
	T7: makes more complex observations which include measurements of quantity, mass, length								
Recording & Presenting Data	T1: <b>can record their observations in a variety of ways (tables, charts and drawings)</b>								







**Attainment target 1: Scientific enquiry****Level 1**

Pupils describe or respond appropriately to simple features of objects, living things and events they observe, communicating their findings in simple ways *for example, talking about their work, through drawings, simple charts.*

**Level 2**

Pupils respond to suggestions about how to find things out and, with help, make their own suggestions about how to collect data to answer questions. They use simple texts, with help, to find information. They use simple equipment provided and make observations related to their task. They observe and compare objects, living things and events. They describe their observations using scientific vocabulary and record them, using simple tables when appropriate. They say whether what happened was what they expected.

**Level 3**

Pupils respond to suggestions and put forward their own ideas about how to find the answer to a question. They recognise why it is important to collect data to answer questions. They use simple texts to find information. They make relevant observations and measure quantities, such as length or mass, using a range of simple equipment. Where appropriate, they carry out a fair test with some help, recognising and explaining why it is fair. They record their observations in a variety of ways. They provide explanations for observations and for simple patterns in recorded measurements. They communicate in a scientific way what they have found out and suggest improvements in their work.

**Level 4**

Pupils recognise that scientific ideas are based on evidence. In their own investigative work, they decide on an appropriate approach *for example, using a fair test* to answer a question. Where appropriate, they describe, or show in the way they perform their task, how to vary one factor while keeping others the same. Where appropriate, they make predictions. They select information from sources provided for them. They select suitable equipment and make a series of observations and measurements that are adequate for the task. They record their observations, comparisons and measurements using tables and bar charts. They begin to plot points to form simple graphs, and use these graphs to point out and interpret patterns in their data. They begin to relate their conclusions to these patterns and to scientific knowledge and understanding, and to communicate them with appropriate scientific language. They suggest improvements in their work, giving reasons.

**Level 5**

Pupils describe how experimental evidence and creative thinking have been combined to provide a scientific explanation *for example, Jenner's work on vaccination at key stage 2, Lavoisier's work on burning at key stage 3*. When they try to answer a scientific question, they identify an appropriate approach. They select from a range of sources of information. When the investigation involves a fair test, they identify key factors to be considered. Where appropriate, they make predictions based on their scientific knowledge and understanding. They select apparatus for a range of tasks and plan to use it effectively. They make a series of observations, comparisons or measurements with precision appropriate to the task. They begin to repeat observations and measurements and to offer simple explanations for any differences they encounter. They record observations and measurements systematically and, where appropriate, present data as line graphs. They draw conclusions that are consistent with the evidence and begin to relate these to scientific knowledge and understanding. They make practical suggestions about how their working methods could be improved. They use appropriate scientific language and conventions to communicate quantitative and qualitative data.

**Level 6**

Pupils describe evidence for some accepted scientific ideas and explain how the interpretation of evidence by scientists leads to the development and acceptance of new ideas. In their own investigative work, they use scientific knowledge and understanding to identify an appropriate approach. They select and use sources of information effectively. They make enough measurements, comparisons and observations for the task. They measure a variety of quantities with precision, using instruments with fine-scale divisions. They choose scales for graphs and diagrams that enable them to show data and features effectively. They identify measurements and observations that do not fit the main pattern shown. They draw conclusions that are consistent with the evidence and use scientific knowledge and understanding to explain them. They make reasoned suggestions about how their working methods could be improved. They select and use appropriate methods for communicating qualitative and quantitative data using scientific language and conventions.

**Level 7**

Pupils describe some predictions based on scientific theories and give examples of the evidence collected to test these predictions. In their own work, they use scientific knowledge and understanding to decide on appropriate approaches to questions. They identify the key factors in complex contexts and in contexts in which variables cannot readily be controlled, and plan appropriate procedures. They synthesise information from a range of sources, and identify possible limitations in secondary data. They make systematic observations and measurements with precision, using a wide range of apparatus. They identify when they need to repeat measurements, comparisons and observations in order to obtain reliable data. Where appropriate, they represent data in graphs, using lines of best fit. They draw conclusions that are consistent with the evidence and explain these using scientific knowledge and understanding. They begin to consider whether the data they have collected are sufficient for the conclusions they have drawn. They communicate what they have done using a wide range of scientific and technical language and conventions, including symbols and flow diagrams.

**Level 8**

Pupils give examples of scientific explanations or models that have had to be changed in the light of additional scientific evidence. They evaluate and synthesise data from a range of sources. They recognise that investigating different kinds of scientific questions requires different strategies, and use scientific knowledge and understanding to select an appropriate strategy in their own work. They decide which observations are relevant in qualitative work and include suitable detail in their records. They decide the level of precision needed in comparisons or measurements, and collect data enabling them to test relationships between variables. They identify and begin to explain anomalous observations and measurements and allow for these when they draw graphs. They use scientific knowledge and understanding to draw conclusions from their evidence. They consider graphs and tables of results critically. They communicate findings and arguments using appropriate scientific language and conventions, showing awareness of a range of views.

**Exceptional performance**

Pupils give examples of scientific explanations and models that have been challenged by subsequent experiments and explain the significance of the evidence in modifying scientific theories. They evaluate and synthesise data from a range of sources. They recognise that investigating different kinds of scientific questions requires different strategies, and use scientific knowledge and understanding to select an appropriate strategy in their own work. They make records of relevant observations and comparisons, clearly identifying points of particular significance. They decide the level of precision needed in measurements and collect data that satisfy these requirements. They use their data to test relationships between variables. They identify and explain anomalous observations and measurements, allowing for these when they draw graphs. They use scientific knowledge and understanding to interpret trends and patterns and to draw conclusions from their evidence. They consider graphs and tables of results critically and give reasoned accounts of how they could collect additional evidence. They communicate findings and arguments using appropriate scientific language and conventions, showing their awareness of the degree of uncertainty and a range of alternative views.

## **Attainment target 2: Life processes and living things**

### **Level 1**

Pupils recognise and name external parts of the body *for example, head, arm* and of plants *for example, leaf, flower*. They communicate observations of a range of animals and plants in terms of features *for example, colour of coat, size of leaf*. They recognise and identify a range of common animals *for example, fly, goldfish, robin*.

### **Level 2**

Pupils use their knowledge about living things to describe the basic conditions *for example, a supply of food, water, air, light* that animals and plants need in order to survive. They recognise that living things grow and reproduce. They sort living things into groups, using simple features. They describe the basis for their groupings *for example, number of legs, shape of leaf*. They recognise that different living things are found in different places *for example, ponds, woods*.

### **Level 3**

Pupils use their knowledge and understanding of basic life processes *for example, growth, reproduction* when they describe differences between living and non-living things. They provide simple explanations for changes in living things *for example, diet affecting the health of humans or other animals, lack of light or water altering plant growth*. They identify ways in which an animal is suited to its environment *for example, a fish having fins to help it swim*.

### **Level 4**

Pupils demonstrate knowledge and understanding of life processes and living things drawn from the key stage 2 or key stage 3 programme of study. They use scientific names for some major organs of body systems *for example, the heart at key stage 2, the stomach at key stage 3* and identify the position of these organs in the human body. They identify organs *for example, stamen at key stage 2, stigma, root hairs at key stage 3* of different plants they observe. They use keys based on observable external features to help them to identify and group living things systematically. They recognise that feeding relationships exist between plants and animals in a habitat, and describe these relationships using food chains and terms *for example, predator and prey*.

### **Level 5**

Pupils demonstrate an increasing knowledge and understanding of life processes and living things drawn from the key stage 2 or key stage 3 programme of study. They describe the main functions of organs of the human body *for example, the heart at key stage 2, stomach at key stage 3*, and of the plant *for example, the stamen at key stage 2, root hairs at key stage 3*. They explain how these functions are essential to the organism. They describe the main stages of the life cycles of humans and flowering plants and point out similarities. They recognise that there is a great variety of living things and understand the importance of classification. They explain that different organisms are found in different habitats because of differences in environmental factors *for example, the availability of light or water*.

### **Level 6**

Pupils use knowledge and understanding drawn from the key stage 3 programme of study to describe and explain life processes and features of living things. They use appropriate scientific terminology when they describe life processes *for example, respiration, photosynthesis* in animals and plants. They distinguish between related processes *for example, pollination, fertilisation*. They describe simple cell structure and identify differences between simple animal and plant cells. They describe some of the causes of variation between living things. They explain that the distribution and abundance of organisms in habitats are affected by environmental factors *for example, the availability of light or water*.

### **Level 7**

Pupils use knowledge and understanding of life processes and living things drawn from the key stage 3 programme of study to make links between life processes in animals and plants and the organ systems involved. They explain the processes of respiration and photosynthesis in terms of the main underlying chemical change. They use their knowledge of cell structure to explain how cells *for example, ovum, sperm, root hair* are adapted to their functions. They identify common variations between individuals, including some features *for example, eye colour* that are inherited and others *for example, height* that can also be affected by environmental factors. They construct models *for example, food webs, pyramids of numbers* to show feeding relationships, and explain how these relationships affect population size.

### **Level 8**

Pupils demonstrate an extensive knowledge and understanding of life processes and living things drawn from

the key stage 3 programme of study by describing and explaining how biological systems function. They relate the cellular structure of organs to the associated life processes *for example, the absorption of food in the digestive system, gas exchange in the lungs*. They recognise, predict and explain changes in biological systems *for example, the effect of increased carbon dioxide concentration on the growth of greenhouse crops, the consequences of smoking for organ systems*. They explain how characteristics can be inherited by individuals and apply their knowledge *for example, in relation to selective breeding*. They predict the short-term and long-term effects of environmental change on ecosystems and use their understanding of such systems to justify their predictions.

#### **Exceptional performance**

Pupils demonstrate both breadth and depth of knowledge and understanding drawn from the key stage 3 programme of study when they describe and explain how biological systems function. They recognise that organisms respond to change, and describe ways in which this is achieved. They relate their understanding of internal and external cellular structures to life processes *for example, the increased surface areas of cells in the digestive system*. They relate their understanding of cellular structure to inheritance and variation and explain how this leads to new varieties *for example, how genetic engineering is a modern form of selective breeding*. They recognise the importance of quantitative data *for example, related to populations in an environment* when they describe and explain patterns of change within an ecosystem.

### **Attainment target 3: Materials and their properties**

Select a level to trigger a search for pupils' work that illustrates the level.

#### **Level 1**

Pupils know about a range of properties *for example, texture, appearance* and communicate observations of materials in terms of these properties.

#### **Level 2**

Pupils identify a range of common materials and know about some of their properties. They describe similarities and differences between materials. They sort materials into groups and describe the basis for their groupings in everyday terms *for example, shininess, hardness, smoothness*. They describe ways in which some materials are changed by heating or cooling or by processes such as bending or stretching.

#### **Level 3**

Pupils use their knowledge and understanding of materials when they describe a variety of ways of sorting them into groups according to their properties. They explain simply why some materials are particularly suitable for specific purposes *for example, glass for windows, copper for electrical cables*. They recognise that some changes *for example, the freezing of water* can be reversed and some *for example, the baking of clay* cannot, and they classify changes in this way.

#### **Level 4**

Pupils demonstrate knowledge and understanding of materials and their properties drawn from the key stage 2 or key stage 3 programme of study. They describe differences between the properties of different materials and explain how these differences are used to classify substances *for example, as solids, liquids, gases at key stage 2, as acids, alkalis at key stage 3*. They describe some methods *for example, filtration, distillation* that are used to separate simple mixtures. They use scientific terms *for example, evaporation, condensation* to describe changes. They use knowledge about some reversible and irreversible changes to make simple predictions about whether other changes are reversible or not.

#### **Level 5**

Pupils demonstrate an increasing knowledge and understanding of materials and their properties drawn from the key stage 2 or key stage 3 programme of study. They describe some metallic properties *for example, good electrical conductivity* and use these properties to distinguish metals from other solids. They identify a range of contexts in which changes *for example, evaporation, condensation* take place. They use knowledge about how a specific mixture *for example, salt and water, sand and water* can be separated to suggest ways in which other similar mixtures might be separated.

#### **Level 6**

Pupils use knowledge and understanding of the nature and behaviour of materials drawn from the key stage 3 programme of study to describe chemical and physical changes, and how new materials can be made. They recognise that matter is made up of particles, and describe differences between the arrangement and movement of particles in solids, liquids and gases. They identify and describe similarities between some chemical reactions *for example, the reactions of acids with metals, the reactions of a variety of substances with oxygen*. They use word equations to summarise simple reactions. They relate changes of state to energy transfers in a range of contexts *for example, the formation of igneous rocks*.

#### **Level 7**

Pupils use knowledge and understanding drawn from the key stage 3 programme of study to make links between the nature and behaviour of materials and the particles of which they are composed. They use the particle model of matter in explanations of phenomena *for example, changes of state*. They explain differences between elements, compounds and mixtures in terms of their constituent particles. They recognise that elements and compounds can be represented by symbols and formulae. They apply their knowledge of physical and chemical processes to explain the behaviour of materials in a variety of contexts *for example, the way in which natural limestone is changed through the action of rainwater, ways in which rocks are weathered*. They use patterns of reactivity *for example, those associated with a reactivity series of metals* to make predictions about other chemical reactions.

#### **Level 8**

Pupils demonstrate an extensive knowledge and understanding drawn from the key stage 3 programme of study, which they use to describe and explain the behaviour of, and changes to, materials. They use the particle model in a wide range of contexts. They describe what happens in a range of chemical reactions and classify some *for example, oxidation, neutralisation*. They represent common compounds by chemical formulae and use these formulae to form balanced symbol equations for reactions *for example, those of acids with metals, carbonates or oxides*. They apply their knowledge of patterns in chemical reactions to suggest how substances *for example, salts* could be made.

**Exceptional Performance**

Pupils demonstrate both breadth and depth of knowledge and understanding drawn from the key stage 3 programme of study when they describe and explain the nature and behaviour of materials. They use particle theory in a wider range of contexts, recognising that differences in the properties of materials relate to the nature of the particles within them. They recognise, and give explanations for, examples of chemical behaviour that do not fit expected patterns. They routinely use balanced symbol equations for reactions. They interpret quantitative data about chemical reactions, suggesting explanations for patterns identified.

#### **Attainment target 4: Physical processes**

Select a level to trigger a search for pupils' work that illustrates the level.

##### **Level 1**

Pupils communicate observations of changes in light, sound or movement that result from actions *for example, switching on a simple electrical circuit, pushing and pulling objects*. They recognise that sound and light come from a variety of sources and name some of these.

##### **Level 2**

Pupils know about a range of physical phenomena and recognise and describe similarities and differences associated with them. They compare the way in which devices *for example, bulbs* work in different electrical circuits. They compare the brightness or colour of lights, and the loudness or pitch of sounds. They compare the movement of different objects in terms of speed or direction.

##### **Level 3**

Pupils use their knowledge and understanding of physical phenomena to link cause and effect in simple explanations *for example, a bulb failing to light because of a break in an electrical circuit, the direction or speed of movement of an object changing because of a push or a pull*. They begin to make simple generalisations about physical phenomena *for example, explaining that sounds they hear become fainter the further they are from the source*.

##### **Level 4**

Pupils demonstrate knowledge and understanding of physical processes drawn from the key stage 2 or key stage 3 programme of study. They describe and explain physical phenomena *for example, how a particular device may be connected to work in an electrical circuit, how the apparent position of the Sun changes over the course of a day*. They make generalisations about physical phenomena *for example, motion is affected by forces, including gravitational attraction, magnetic attraction and friction*. They use physical ideas to explain simple phenomena *for example, the formation of shadows, sounds being heard through a variety of materials*.

##### **Level 5**

Pupils demonstrate knowledge and understanding of physical processes drawn from the key stage 2 or key stage 3 programme of study. They use ideas to explain how to make a range of changes *for example, altering the current in a circuit, altering the pitch or loudness of a sound*. They use some abstract ideas in descriptions of familiar phenomena *for example, objects are seen when light from them enters the eye at key stage 2, forces are balanced when an object is stationary at key stage 3*. They use simple models to explain effects that are caused by the movement of the Earth *for example, the length of a day or year*.

##### **Level 6**

Pupils use and apply knowledge and understanding of physical processes drawn from the key stage 3 programme of study. They use abstract ideas in some descriptions and explanations *for example, electric current as a way of transferring energy, the sum of several forces determining changes in the direction or the speed of movement of an object, wind and waves as energy resources available for use*. They recognise, and can give examples of, the wide application of many physical concepts *for example, the transfer of energy by light, sound or electricity, the refraction and dispersion of light*. They give explanations of phenomena in which a number of factors have to be considered *for example, the relative brightness of planets and stars*.

##### **Level 7**

Pupils use knowledge and understanding of physical processes drawn from the key stage 3 programme of study to make links between different phenomena. They make connections between electricity and magnetism when explaining phenomena *for example, the strength of electromagnets*. They use some quantitative definitions *for example, speed, pressure* and perform calculations, using the correct units. They apply abstract ideas in explanations of a range of physical phenomena *for example, the appearance of objects in different colours of light, the relationship between the frequency of vibration and the pitch of a sound, the role of gravitational attraction in determining the motion of bodies in the solar system, the dissipation of energy during energy transfers*.

##### **Level 8**

Pupils demonstrate an extensive knowledge and understanding of the physical processes in the key stage 3

programme of study. They use models to describe and explain phenomena *for example, the magnetic field of an electromagnet, the passage of sound waves through a medium*. They use quantitative relationships between physical quantities in calculations that may involve more than one step. They offer detailed and sometimes quantitative interpretations of graphs *for example, speed-time graphs*. They consider ways of obtaining data *for example, of the solar system* and they use their knowledge of physical processes to explain patterns that they find. They consider physical phenomena from different perspectives *for example, relating the dissipation of energy during energy transfer to the need to conserve limited energy resources*.

### **Exceptional performance**

Pupils demonstrate both breadth and depth of knowledge and understanding of the physical processes in the key stage 3 programme of study when they describe and explain physical phenomena. They make effective use of a range of quantitative relationships between physical quantities. They understand how models *for example, the particle model* are useful in explaining physical phenomena *for example, how sweating causes cooling*. They apply their understanding of physical phenomena to a wide range of systems *for example, recognising the role of gravitational attraction in determining the movement of satellites, planets and stars*. They recognise the importance of quantitative data and make effective use of this when they consider questions such as energy efficiency.