

# The Cayman Islands

## National Curriculum 2008

### Science, design and technology Programme of study and attainment targets for Key Stage 1

## Acknowledgements

The overview document sets out the guiding philosophy and principles of the new Cayman Islands curriculum. It guides all the subject documents and approaches to teaching and learning in the revised curriculum.

The overview document was the result of substantial teamwork on the part of many stakeholders who contributed their time, expertise and resources. Their assistance is greatly appreciated.

The documents were prepared by groups of teachers led by the curriculum development officers, Clive Baker, Curriculum Development Officer (secondary) and Favourita Blanchard, Curriculum Development Officer (primary). They were guided in their work by the chair of the curriculum review, Helena McVeigh, Chief Inspector of schools, Schools' Inspectorate, who also edited all of the documents.

The members of the subject groups, including teachers and inspectors, must be thanked for their helpful insights and suggestions to the curriculum documents.

The subject panel members for science, design and technology were as follows:

Sharon Austin, Teacher, Cayman Brac High  
Julie-Ann Blake, Teacher, George Town Primary  
Tania Chung-Harris, Teacher, John Gray High  
John Gray, Teacher, John Gray High  
Maureen Hewitt, Teacher, Leading Edge, George Hicks Campus  
Martin Keeley, Teacher, Cayman Brac Schools  
Selvon McCall, Deputy Principal, Savannah Primary  
Kiva Powell, Teacher, Savannah Primary

The work of the curriculum review team was overseen by the Curriculum Steering Committee, whose members comprise:

Helena McVeigh, (Chair)  
Herbert Crawford, Senior Education Officer, Education Department  
Brian Chapell, UCCI  
Jordana Clarke, IT trainer, Walkers (former teacher)  
Jacqueline Ebanks, Teacher, Montessori-by-the-Sea  
Peter Embleton, Principal (Years 7-13), St. Ignatius Catholic School  
Alan Hewitt, Deputy Principal, John Gray High School  
Willeen Hill, Librarian, George Town Primary School  
Vikki Myrie, Teacher, Creek and Spot Bay Primary School  
Kiva Powell, Teacher, Savannah Primary School  
Malcolm Saunders, Teacher, George Hicks Campus  
Pachent Smythe, Senior Inspector, Schools' Inspectorate  
Annette Vaughan, Teacher, John A Cumber Primary School  
Mark Scotland, Chair of the Savannah PTA  
Wil Pineau, CEO, Chamber of Commerce  
Pat Bell, Water Authority, representing HR personnel

## Aims

Learning in and about science, design and technology contributes to achievement of the curriculum aims for all young people (the 'Educated Caymanian') to become:

- Enthusiastic and motivated about learning, and willing to continue to extend his/her knowledge and skills after leaving school
- Well rounded, good at finding solutions to problems, flexible and adaptable to changing circumstances and demands
- Literate, numerate and adept at using information and communication technology
- Aware of global issues affecting life in the 21<sup>st</sup> century
- Confident individuals who are able to live safe, healthy and fulfilling lives
- Responsible citizens who make a positive contribution to society

The programme of study for science, design and technology aims to help students develop a number of important attitudes, in particular: Curiosity, safety awareness, creativity, integrity, open-mindedness, cooperation, perseverance, commitment, initiative, critical thinking, scientific and technical reasoning, confidence, interest, and an appreciation of the contribution of science, design and technology to everyday life.

## Overview

The Cayman Islands national curriculum integrates the disciplines of science, design and technology for students in the primary years. The subjects are recognised as fundamental areas of the curriculum, but share an approach that involves solving practical problems through experimentation and investigation.

Science exists because it serves an innate human desire to make sense of the world. Science is a collection of theories and knowledge about the physical and natural world and a system of inquiry involving a variety of investigative skills.

Technology is a creative, purposeful activity aimed at meeting needs and opportunities through the development of products, systems, or environments. Knowledge, skills, and resources are combined to help solve practical problems. Technological practice takes place within, and is influenced by, social contexts. People have always adapted resources to meet their needs, from such fundamental, far-reaching innovation and invention as the development of the wheel, to innumerable and equally significant uses of resources such as shaping bone to create a hook for fishing, pressing wool fibres into felt, or applying heat to make foods more edible. In the context of our islands the need to 'turn a hand' to a variety of tasks, to be creative and adaptable in using what is available continues to be a significant feature of the Caymanian spirit.

Learning about and through science, design and technology should help children to make sense of and interact with their increasingly technological world. Technology affects our environment, our standard of living, and quality of life. Students need to start considering the ethical and social issues to which the advance of science, design and technology gives rise. Learning in this subject will develop attitudes, skills and knowledge that will help students solve problems and be more prepared for life, further study and future careers in this rapidly changing world. Tomorrow's citizens will need special knowledge and skills if they are to evaluate and deal with this change. The subject will also encourage students to seek scientific explanations of natural phenomena, build their confidence and ability to effect changes and improvements in their environment and most importantly develop their critical thinking ability.

## How teachers should use the programme of study and attainment targets

The programme of study identifies the experiences and opportunities that students must be given to enable them to achieve the knowledge, skills and understanding specified in the attainment targets.

### The strands

The programme for science, design and technology is divided into four strands:

- i. Investigating, designing, carrying out and making
- ii. Living things
- iii. Materials
- iv. Physical processes

This division into strands is a convenient way of emphasising the outcomes for science, design and technology education in schools. It does not mean that learning in each strand has to be developed independently. In Key Stage 1, students should mainly be taught the knowledge and ideas of the subject through a practical, hands-on, process-approach. As their ideas evolve, they should be acquiring an understanding of the nature of science and its relationship to technology. Consequently, when planning and implementing a science, design and technology programme, the first strand of investigating, designing, carrying out and making should be interwoven within the other three strands.

Progression in this subject requires students to develop skills in investigating, designing, carrying out and making alongside the development of knowledge and understanding.

They should start with activities linked to themselves and their immediate environment

and move on to less familiar situations and contexts.

Each strand has been divided into a number of sub-headings. It should not be felt, however, that this sub-division should dictate the way teachers should plan their teaching schemes.

**Design and technology** – Elements of technology in strand i are identified by the use of (T). These elements should be integrated with work in science. When planning activities, teachers should identify opportunities for design and technology from strands ii, iii and iv. There should be opportunities for science investigations to develop into design and technology activities.

During the key stage, students **should be offered opportunities** to enhance their learning, understanding and enjoyment of the subject, through:

- Relating their learning to everyday, real life examples
- Researching, experimenting, discussing and developing arguments
- Independent inquiry or research into aspects of science, design and technology of personal interest
- Studying science, design and technology in local, national and global contexts and appreciate the connections between these
- Experiencing science, design and technology outside the school environment including in the workplace, where possible

- Using creativity and innovation in science, design and technology and appreciating their importance in enterprise
- Recognising the importance of sustainability in scientific and technological developments
- Exploring contemporary and historical scientific, design and technological developments and how they have been communicated
- Making links between science, design and technology and other subjects and areas of the curriculum

**Progression** in this subject requires students to develop their skills in investigating, designing, carrying out and making, living things, materials and physical processes. They should start with activities linked to themselves and their immediate environment and move on to less familiar situations and contexts.

**The attainment targets** specify the knowledge, understanding and skills that students should acquire through the key stage. More detail is given about how to interpret them in appendix 1. Exceptionally gifted students will need to be given work from the Key Stage 2 programme of study so they can access levels 4 and above.

# Science, design and technology programme of study for Key Stage 1

## Introduction

The first few years of primary school- Key Stage 1- are important in laying the foundations for developing the basic skills in science, design and technology.

During these years students should be given opportunities to develop the language associated with science, design and technology by talking with their teachers and other students during play and in other planned activities, and by listening to this language modelled by their teacher and other adults.

**Students should be given opportunities, during structured play and in other experiences, to:**

- Explore and experiment
- Make observations and begin to develop questions related to them
- Use a range of materials to build and construct
- Become aware of the importance of science, design and technology in everyday life. This understanding should arise from experiences with everyday objects, in school, at home and in their local environment
- Develop an awareness of the need to conserve the natural environment. They should appreciate the need for the sensitive collection and care of living things that are used as the subject of any environmental study

As students get older, ie during Years 2 and 3, they will need to begin to learn about the nature of science, design and technology.

**They should be given opportunities to:**

- Try things out for themselves
- Explore, manipulate and experiment
- Develop questioning skills such as "What if?", "Why does?", "I wonder if?"
- Suggest ideas
- Record observations
- Draw pictures to record what they have done or made
- Try to explain what they have seen or done
- Put things together and take things apart
- Make things (construct)
- Plan and adapt as they construct
- Begin to evaluate their finished product

## **i Investigating, designing, carrying out and making**

Activities in this strand should be introduced through the other strands of the programme of study. Students should be encouraged to adopt safe practices when undertaking science, design and technology activities. They should be made aware of potential hazards and the appropriate actions necessary to avoid risks.

### **Investigating and designing**

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

#### **Students should be given opportunities to:**

- Respond to questions, *for example, how can this box be moved along the floor or what will happen if this stone is put into the water?*
- Talk about what they are going to make and the materials they will use, *for example, suggest ideas for making a fire truck* (T)
- Ask questions, discuss ideas and make predictions, *for example, suggest what will happen if you hold chocolate in your hands, or predict how far a toy car will travel*
- Recognise a fair test, *for example, know that when testing the bounce of balls they must keep some things the same, such as the same height and/or same surface*
- Suggest ideas that can be investigated and make predictions, *for example, find out which material is best for keeping ice cubes frozen*
- Choose appropriate materials and components when planning what to make, *for example, choose cartons, doweling,*

*wheels and tape, when planning how to make a toy vehicle* (T)

### **Carrying out and making**

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

#### **Students should be given opportunities to:**

- Make observations using their senses, *for example, describe objects in a 'feely box' using terms such as bumpy, soft, hard or pointy*
- Assemble and rearrange materials, *for example, construct using building blocks* (T)
- Make observations noting similarities and differences, *for example, sort each other into groups by hair or eye colour*
- Record observations in a simple form, *for example, draw a group of animals and a group of plants*
- Explore different ways of joining materials, *for example, join materials using tags, string, fasteners, folds, stitches, adhesives or staples, or construct a model swing using straws, pipe cleaners and blue tack* (T)
- Reinforce measuring skills using non-standard measures and progress to using standard measures, *for example, use string to measure the distance travelled by a toy car*
- Develop manipulative skills using a range of materials and simple tools, *for example, use scissors or snips to cut paper, card, straws or string* (T)
- Record what they have done or observed using appropriate methods, *for example, use a simple table to record substances that do*

*or do not dissolve in water, or record findings using a computer database*

### **Evaluating and reporting**

Students should participate in practical activities that provide them with opportunities to develop skills in reporting, presenting and interpreting results and evaluating what they have found out or made.

#### **Students should be given opportunities to:**

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

## ii Living things

### Ourselves

#### Students should be given opportunities to:

- Recognise and name the main external parts of the human body, *for example, hand, elbow or knee*
- Observe seasonal changes and talk about how these affect them
- Explore similarities and differences between themselves and other children, *for example, compare eye colour, hair colour, height or weight*
- Develop ideas about how to keep healthy, through exercise, rest, diet, personal hygiene and safety, *for example, receive a visit from the dental hygienist, sort food into healthy/unhealthy food or discuss the dangers of some household substances*
- Be introduced to the main stages of human development, *for example, sequence pictures from birth to old age*
- Find out about themselves including how they grow, move and use their senses

### Animals and plants

#### Students should be given opportunities to:

- Find out about the variety of animal and plant life both through direct observation and by using secondary sources, *for example, draw and name living things seen on the way to school, in and around school or on a school visit*
- Sort living things into the two broad groups of animals and plants, *for example, use a concept keyboard with appropriate overlays to sort living things*
- Recognise and name the main parts of a flowering plant including root, stem, leaf and flower
- Sort living things into groups using observable features
- Find out about animals and their young, *for example, match a kitten to a cat, a foal to a horse or a pup to a dog*
- Find out about some animals, including how they grow, feed, move and use their senses

- Observe similarities and differences among animals and among plants
- Discuss the use of colour in the natural environment, *for example, in camouflage, discuss how animals adapt to their surroundings*
- Find out ways in which animal and plant behaviour is influenced by seasonal changes, *for example, find out about leaves falling in the dry season and migration of animals to and from the Cayman Islands*

### iii Materials

#### Properties

**Students should be given opportunities to:**

- Work with a range of everyday materials in a variety of activities, *for example, know, through playing with playdough or dough, that it can be pushed, pulled, squashed, stretched, rolled or flattened*
- Sort a range of everyday objects into groups according to the materials from which they are made, *for example, sort objects into sets of metal, wood, paper and plastic*
- Explore the properties of materials including shape, colour, texture and behaviour, *for example, sort materials or objects and explore whether they stretch, bend, tear, pour, and whether they are magnetic or non-magnetic*
- Find out some everyday uses of materials, *for example, find out that furniture can be made from wood and sweaters can be made from wool*
- Investigate similarities and differences in materials and objects and sort them according to their properties, *for example, sort plastics into those that are transparent and those which are opaque*

#### Change

**Students should be given opportunities to:**

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

#### Environment

**Students should be given opportunities to:**

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

### iv Physical processes

#### Forces and energy

**Students should be given opportunities to:**

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

#### Electricity

**Students should be given opportunities to:**

- Find out about some uses of electricity in the home and classroom, *for example, identify household and school appliances that use electricity*
- Know that electricity can be dangerous
- Know about the safe use of mains electricity and its associated dangers

## Sound

### Students should be given opportunities to:

- Listen to and identify sources of sounds in their immediate environment, *for example, traffic noise, animal sounds, or a door slamming*
- Explore ways of making sounds using familiar objects, *for example, make sounds by striking, plucking, scraping, blowing or vocalising*

- Investigate how sounds are produced when objects vibrate, *for example, find out that vibrations caused by plucking an elastic band make sounds or make instruments which produce sounds*

## Light

### Students should be given opportunities to:

- Find out that light comes from a variety of sources, *for example, the sun, a flashlight or a light bulb*

- Explore the use of light including colour in relation to road safety, *for example, find out which colours can be most easily seen in the dark*
- Explore how light passes through some materials and not others, *for example, use a flashlight to sort a variety of papers into those that allow light to pass through and those that do not*

## Appendix 1 Attainment targets

The learning outcomes or attainment targets are expressed at eight levels of increasing difficulty. These levels are the same for all key stages and are not age or year-group-dependent, which will make it easier to see how a student progresses as he/she moves up the year groups and from primary to secondary school.

Students learn at different rates and, therefore, individual students or groups of students of the same age could be working towards different levels within and across the key stage boundaries. By the end of a key stage, **most** students should be performing at the '**expected**' level, but some will be above this level and others will be below.

The range of levels covered by the key stage and the 'expected' levels for the end of each key stage are given in the table below:

Key Stage	Year Groups	Range of levels covered by the programme of study	Expected level at end of the Key Stage
1	1 - 3	1-3	2
2	4 - 6	2-5	4
3	7 - 9	3-7	5 or 6

Teachers will be expected to make judgements about the levels attained by each of their students, particularly at the end of a key stage. In deciding on a student's level of attainment, teachers should judge which description in the attainment targets best fits the student's performance. When doing so, each description should be considered alongside those for adjacent levels. It is not necessary for a student to have satisfied the entire range of a particular level to be awarded it.

It can be helpful to divide levels into three sub-levels to support tracking of progress and target setting.

For example:

- 3a – Represents a performance that demonstrates a good understanding of all the descriptors in level 3
- 3b – Represents understanding of the majority of level 3 descriptors
- 3c– Represents understanding at level 2a (ie the full understanding of the previous level) plus an understanding of some of the descriptors at level 3

## Appendix 2            The design and technology process

The design and technology process, as shown on the next page, is cyclical. Often the reporting phase will give rise to new problems or projects that will allow the process to begin again.

Students should become skilled in moving through the process within each of the strands. The process can be applied sequentially, where students move directly from investigating to designing, producing and evaluating. Alternatively, students might have to return to any of the phases in order to solve a problem: for example, students continually evaluate during each phase and therefore will often have to return to a preceding phase, as they apply their learning to real world problems and projects, generated by teachers and students.

In implementing the science, design and technology curriculum, students should be encouraged to engage in the process fully and teachers should try to use all of the outcomes relevant to a strand in planning a design and technology learning experience.

The strand organisers are illustrated in the diagram on the next page and described below.

**Investigating** - Investigation involves the identification of a particular problem and the broad analysis of a variety of possible solutions. Often the analysis calls for further exploration to gain knowledge about materials, information or systems required to analyse possible solutions to the problem.

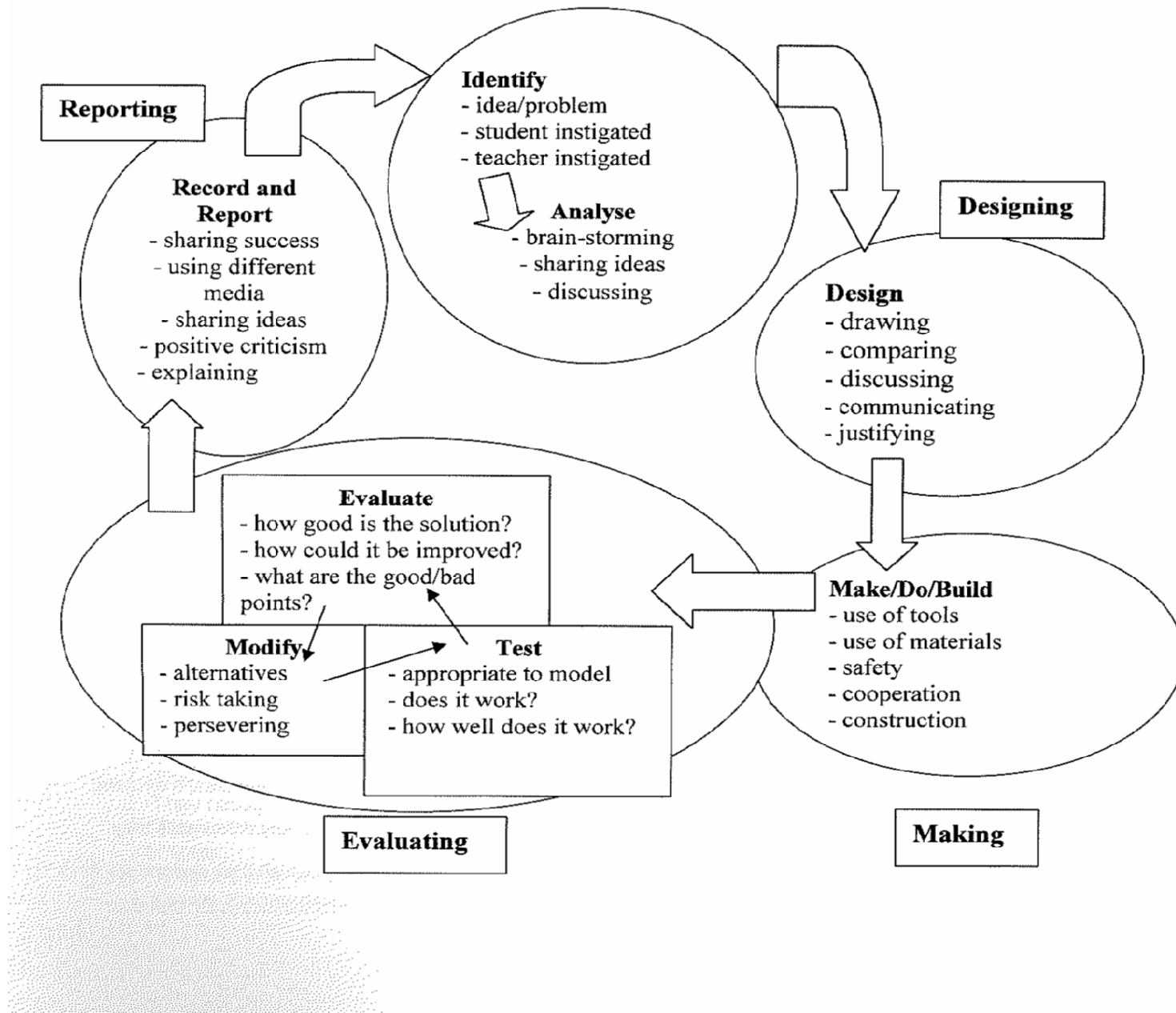
**Designing** - This phase results in the completion of a design brief, which gives a direction for the remainder of the process. A design brief should describe simply and clearly what is to be designed. The design brief involves assessment of design alternatives and decisions about resources and equipment. A design brief may be presented using a combination of text and graphics.

**Making** - Making is the physical manifestation of the design brief. Here students develop skills through a variety of techniques using a range of equipment. Students learn to work cooperatively and discover appropriate levels of safety.

**Evaluating** - Evaluation is a process of testing and modification in which the end result is

measured against the original problem. This testing and modification process can continue through several cycles until the students believe that, within the constraints of the resources available, no further improvements can be made. Students learn to assist others in making evaluations.

**Reporting** - Reporting involves sharing with others the information that has been gathered during the design and technology process. Students may demonstrate their work, report on their success or failure, or outline the reasons for their design choices or modifications. Reporting and recording may use a variety of different approaches and media.



## Strand i Investigating, designing, carrying out and making

Level 1	Level 2	Level 3	Level 4
<p>Students observe and describe simple features of objects, products, living things and events.</p> <ul style="list-style-type: none"> <li>•They communicate their plans and findings in simple ways, such as by talking about their work and what they will do and use, often using drawings or simple charts.</li> <li>•They use tools and equipment with help, where needed.</li> <li>•They describe in simple language how something works and can talk about their own and other people's design products in simple terms.</li> </ul>	<ul style="list-style-type: none"> <li>•Students respond to suggestions of how to find things out, and, with help, make their own suggestions.</li> <li>•They use models, pictures and words to describe their designs and can explain the tools, techniques and materials used.</li> <li>•They use equipment provided to investigate, assemble, join and combine materials and components in a variety of ways.</li> <li>•They compare objects, living things and events they observe.</li> <li>•They make and describe observations related to their task and record them using simple tables where it is appropriate to do so.</li> <li>•They say whether what happened was what they expected, recognise what they have done well as their work progresses, and suggest things they could do better in the future.</li> </ul>	<ul style="list-style-type: none"> <li>•Students respond to suggestions, put forward their own ideas, and, where appropriate, make simple predictions.</li> <li>•They recognise that their designs have to meet a range of different needs and make realistic plans for achieving their aims, thinking ahead about the order of work, choosing appropriate tools, equipment, materials, components and techniques.</li> <li>•They clarify ideas when asked and use words, labelled sketches and models to communicate the details of their designs.</li> <li>•They make relevant observations and measure quantities, such as length, mass or weight, using a range of simple equipment and with some help they carry out a fair test, recognising and explaining why it is fair.</li> <li>•They use tools and equipment with some accuracy to cut and shape materials and to put together components and are aware of safety precautions taken while carrying out experiments.</li> <li>•They record their observations in a variety of ways and provide explanations for observations, recognising, simple patterns where they occur.</li> <li>•They say what they have found out from their work and where evaluation of the design and make process has led to improvements.</li> </ul>	<ul style="list-style-type: none"> <li>•Students generate ideas by collecting and using information, where appropriate, they make predictions.</li> <li>•They take users' views into account, producing step by step plans and can communicate alternative ideas using words, labelled sketches and models.</li> <li>•They recognise the need for fair tests, describing, or showing in the way they perform their task, how to change one variable while keeping the others the same.</li> <li>•They select and work with a range of suitable equipment to use and make a series of observations and measurements that are adequate for the task.</li> <li>•They work with a variety of materials and components with some accuracy, paying attention to function and the quality of finished product.</li> <li>•They present their observations and measurements clearly by using tables, bar charts and simple graphs. They use these graphs to point out and interpret patterns or trends in their data.</li> <li>•They take account of these patterns when they draw conclusions, and begin to relate their conclusions to scientific knowledge and understanding.</li> <li>•They reflect on their experiments and designs as they develop and identify what is working well and what could be improved.</li> </ul>

**Strand ii Living things**

Level 1	Level 2	Level 3	Level 4
<ul style="list-style-type: none"> <li>•Students recognise and name simple internal and external parts of the body, such as heart, lungs, brain, head, arm, and of plants, using words such as leaf or flower.</li> <li>•They observe and describe a range of animals and plants in terms of features such as colour of coat, or size of leaf.</li> <li>•They recognise and identify a range of common animals, <i>using terms such as fly, goldfish, or parrot.</i></li> </ul>	<ul style="list-style-type: none"> <li>•Students use their knowledge about living things to describe basic conditions, <i>such as a supply of food, water, air, light or shelter, that animals or plants need in order to survive.</i></li> <li>•They recognise that living things grow and reproduce.</li> <li>•They sort living things into groups, using simple features</li> <li>•They describe the basis for their groupings in terms such as number of legs or shape of leaf.</li> <li>•They recognise that different living things are found in different places, <i>such as ponds or woods.</i></li> </ul>	<ul style="list-style-type: none"> <li>•Students use their knowledge of basic life processes, such as growth or reproduction, when they describe differences between living and non-living things.</li> <li>•They provide simple explanations for changes in living things, <i>such as diet affecting the health of humans or other animals, lack of light or water altering plant growth, or seasons.</i></li> <li>•They identify ways in which an animal is suited to its environment, <i>such as a fish having fins to help it swim.</i></li> <li>•They identify ways in which humans interact with their environment.</li> <li>•They describe the conditions necessary to keep healthy.</li> </ul>	<ul style="list-style-type: none"> <li>•Students, through first hand experiences and using a range of resources, identify and classify locally occurring species of animals and plants using observable features.</li> <li>•They relate them to the location in which they were found and describe the conditions necessary for their growth.</li> <li>•They sequence the main stages of a life cycle, <i>such as that of a butterfly or a flowering plant.</i></li> <li>•They name the major organs of the human body, <i>such as brain, heart or lungs</i>, and identify the position of these organs in the human body.</li> <li>•They know that living things are made up of cells.</li> <li>•They identify organs, such as petal, stamen or stigma, of different plants they observe.</li> <li>•They describe feeding relationships between plants and animals in a habitat, using food chains and terms such as predator and prey.</li> <li>•They are able to describe ways in which humans can affect or change the environment.</li> </ul>

**Strand iii     Materials**

Level 1	Level 2	Level 3	Level 4
<ul style="list-style-type: none"> <li>•Students can describe some properties of materials, such as texture or appearance, and group materials according to these properties.</li> </ul>	<ul style="list-style-type: none"> <li>•Students identify a range of common materials, such as metals and plastic, and know about some of their properties.</li> <li>•They describe similarities and differences between materials</li> <li>•They sort materials into groups and describe in everyday terms, such as shininess, hardness, or smoothness, the basis for their groupings.</li> <li>•They describe ways in which some materials are changed by heating or cooling, or by processes such as bending or stretching.</li> </ul>	<ul style="list-style-type: none"> <li>•Students use their knowledge and understanding of materials when they describe a variety of ways of sorting them into groups according to their properties.</li> <li>•They describe how some materials are particularly suitable for specific purposes, <i>such as a metal for making electrical cables, or aluminium cans for recycling.</i></li> <li>•They recognise that some changes, such as the freezing of water, can be reversed, and some cannot, and they classify changes in this way.</li> </ul>	<ul style="list-style-type: none"> <li>•Students demonstrate knowledge and understanding of aspects of materials and their properties drawn from the Key Stage 2 or Key Stage 3 programme of study.</li> <li>•They describe differences between the properties of different materials and explain how these differences are used to classify substances as solids, liquids and gases.</li> <li>•They describe some methods, such as filtration, that are used to separate simple mixtures.</li> <li>•They use scientific terms, such as evaporation or condensation, to describe changes of state.</li> <li>•They use knowledge about some reversible and irreversible changes to make simple predictions about whether other changes are reversible or not.</li> </ul>

**Strand iv Physical processes**

Level 1	Level 2	Level 3	Level 4
<ul style="list-style-type: none"> <li>•Students describe the changes that result from actions such as pushing or pulling objects.</li> <li>•They recognise that sound and light come from a variety of sources and name some of these sources.</li> </ul>	<ul style="list-style-type: none"> <li>•Students describe and compare the way in which devices, such as bulbs, work in different electrical circuits.</li> <li>•They compare the effects of similar phenomena, <i>such as the brightness or colour of lights, or the loudness or pitch of sounds.</i></li> <li>•They compare the movement of different objects in terms of speed or direction.</li> </ul>	<ul style="list-style-type: none"> <li>•Students know that there are different sources of fuels for energy <i>such as oil, gas or coal.</i></li> <li>•They outline the dangers of the misuse of mains electricity and know how to use electrical appliances safely.</li> <li>•They describe how sounds are produced by vibrations. They know that light does not pass through all materials.</li> </ul>	<ul style="list-style-type: none"> <li>•Students describe how forces can affect the movement and shape of objects.</li> <li>•They identify a range of energy sources, <i>such as a battery for a flashlight.</i></li> <li>•They describe how to construct simple series circuits using terms <i>such as switches, bulbs or batteries</i>, and identify whether materials are electrical insulators or conductors.</li> <li>•They know how shadows are formed and what makes them longer or shorter.</li> <li>•They describe the relative movement of the Sun and planets within the solar system.</li> </ul>