Science

Introductory Statement

Scientific investigation is concerned with the development of knowledge and understanding of the biological and physical aspects of the world. Science education plays a key role in promoting a healthy curiosity about the world around us and a personal sense of responsibility for local and wider environments, and so fosters the concepts of people as custodians of the earth now and for future generations.

Rationale

The study of Science enables children to construct, modify and develop a broad range of scientific concepts and ideas. Science education equips children to live in a world that is increasingly scientifically and technologically orientated.

In keeping with the guidelines laid down by the DES (1999) we focussed on this area of planning to ensure that the revised curriculum for Science was introduced in our school in a well-planned and organised manner. This plan will benefit teaching and learning within our school.

Aims

We endorse the aims of the Primary School Curriculum for science

- to develop knowledge and understanding of scientific and technological concepts through the exploration of human, natural and physical aspects of the environment
- to develop a scientific approach to problem-solving which emphasises understanding and constructive thinking
- to encourage the child to explore, develop and apply scientific ideas and concepts through designing and making activities
- to foster the child's natural curiosity, so encouraging independent enquiry and creative action
- to help the child to appreciate the contribution of science and technology to the social, economic, cultural and other dimensions of society
- to cultivate an appreciation of, and respect for, the diversity of living and non-living things, their interdependence and interactions
- to encourage the child to behave responsibly to protect, improve and cherish the environment and to become involved in the identification, discussion, resolution and avoidance of environmental problems and so promote sustainable development
- to enable the child to communicate ideas, present work and report findings using a variety of media

Broad objectives

When due account is taken of intrinsic abilities and varying circumstances, the science curriculum should enable the child to

- develop an interest in and curiosity about the world through the exploration and study of living and non-living things
- develop a knowledge and understanding of scientific ideas through the study of living things and the environments in which they live, energy and forces, materials and processes of change

- observe, ask questions, discern patterns, hypothesise, plan, experiment, design, make, measure, discuss, analyse and evaluate results and so develop a scientific approach to problem-solving
- develop and apply constructive thinking in scientific investigations
- understand the application of some basic scientific ideas and concepts in everyday situations
- apply and use scientific knowledge, skills and resources in designing and making tasks
- explore and appreciate the influence that scientific and technological developments have on societies, life-styles, economic activities and the environment
- communicate and record observations, evidence and results of experiments and investigations using a variety of oral, written and graphical forms and other media
- explore the environmental repercussions of human actions on physical, natural and human environments
- understand the interdependence of a wide variety of living things and their environments, recognise the importance of conserving habitats and environments, and begin to understand that all life now and in the future depends on the sustainable development of the planet
- become actively involved in the discussion, exploration and resolution of environmental issues
- understand and apply a safety code in scientific and technological investigations and activities.

Working scientifically involves

- Observing.
- Questioning.
- Predicting.
- Investigating and experimenting.
- Estimating and measuring.
- Analysing – sorting and classifying.
- Recording and communicating.

Designing and Making involves

- Exploring.
- Planning.
- Making.
- Evaluating.

First hand investigation is central to the way in which children learn science.

Curriculum Planning

Living things: Content for Junior & Senior Infants

Myself	Plants and animals

Variety and characteristics of humans
• identify parts of the male and female body
• recognise and measure physical similarities and differences between people
  o Seán is smaller than Jan
  o both Robert and Sinéad have blue eyes
Human life processes
• become aware of some changes that occur as children grow and mature
  o height, foot size
  o design and make a slipper or shoe for self or an imaginary character
• become aware that people have a variety of needs for growth (exercise, food, clothing, shelter)
• develop an awareness of human birth
  o that a baby grows and is nurtured in the mother's womb until ready to be born
• use all the senses (touch, smell, sight, taste, hearing) to become aware of and explore environments
  o examine a muesli, identify and taste the ingredients, what else could be in a cereal?
  o design a tasty cereal from a base of oat flakes and/or wheat flakes.
	Variety and characteristics of living things
	• observe, discuss and identify a variety of plants and animals in different habitats in the immediate environment
	  o common trees and other plants
	  o common birds and other animals
	  o in habitats such as ponds, trees, hedges, grass, rocks, soil
	• become aware of animals and plants of other environments
	• sort and group living things into sets
	  o flowers, leaves, trees, birds, fruit and vegetables
	• recognise and identify the external parts of living things
	  o flower, leaf, stem, root
	  o tail, leg, beak, feathers
	Processes of life
	• observe growth and change in some living things
	• explore conditions for growth of bulbs and seeds
	  o in soil, damp moss, wet paper
	• become aware that animals and plants undergo seasonal change in appearance or behaviour
	  o colour change, leaf fall, appearance of buds and shoots, hibernation.

Energy and forces: Content for Junior & Senior Infants

Light	Sound	Heat	Magnetism and electricity	Forces
• identify and name different colours • sort objects into sets according to colour • observe colours in the local environment • at school, in the home, in the street, in animal and plant life • explore dark and bright colours and become aware of different shades of colour • colour tables, coloured light • discuss differences between day and night, light and shade • explore how shadows are formed.	• recognise and identify a variety of sounds in the environment • identify and differentiate between high and low sounds, loud and soft sounds • explore ways of making different sounds using a variety of materials • tins, metals, bottles and paper.	• recognise the difference between hot and cold in terms of weather, food, water and the body • identify ways of keeping objects and substances warm and cold • wrapping and covering (e.g. cosy on teapot, cool-box, clothes, shade from sunlight) • design and make a suitable cover to keep a hot drink warm.	• use magnets of different shapes and sizes in purposeful play to explore their effects on different materials • investigate the fact that magnets attract certain materials • design and make a container (incorporating a magnet) that will keep all teacher's paper clips together • become aware of the uses of electricity in school and at home • identify some household appliances that use electricity • become aware of the dangers of electricity.	• explore, through informal activity with toys, forces such as pushing and pulling • explore how the shape of objects can be changed by squashing, pulling and other forces • investigate how forces act on objects • through experimenting with different materials • group objects that will float or sink • push objects into water.

Materials: Content for Junior & Senior Infants

Properties and characteristics of materials	**Materials and change**

• observe and investigate a range of familiar materials in the immediate environment
  o water, wood, textiles, food, plastic, metal, rock
• describe and compare materials, noting the differences in the colour, shape and texture
• know about some everyday uses of common materials
• group materials according to certain criteria
  o strength, colour, texture, flexibility
• investigate materials for different properties, for example
• materials that are attracted by magnets
• materials that keep us warm
• materials that absorb water and those that are waterproof.
	• explore the effects of water on a variety of materials
	• observe and describe materials when they are wet and when they are dry
	• soil and paper
	• identify some materials that are waterproof
	  o raincoat, umbrella, boot, feather, skin
	  o suggest materials suitable for rainy days
	  o design and make a waterproof outfit for a toy character or doll
	• explore the effects of heating and cooling on everyday objects, materials and substances
	  o ice-cream, butter, chocolate, water.

Environmental awareness and care: Content for Junior & Senior Infants

Caring for my locality
• observe, discuss and appreciate the attributes of the local environment o beauty and diversity of plants and animals in a variety of habitats o attractive elements of physical, natural and human features • appreciate that people share the environment with plant and animal life • develop a sense of responsibility for taking care of and improving the environment • identify, discuss and implement simple strategies for improving and caring for the environment o things I can do ▪ caring for clothes, toys and other possessions ▪ keeping home, garden, classroom and street clean and tidy ▪ caring for living and non-living things in the locality o things we can do together ▪ keeping classroom, school and play spaces clean, tidy and safe ▪ disposing of litter appropriately ▪ collecting paper or cans for recycling ▪ caring for living and non-living things in the locality.

Living things: Content for 1st & 2nd Classes

Myself	Plants and animals

Variety and characteristics of living things
• name and identify external parts of the male and female body and their associated functions or senses
• become aware of the role of each sense in detecting information about the environment and in protecting the body
• recognise and/or measure physical similarities and differences between individuals
  o height, colour of hair, eye colour
  o design and make a measuring chart of heights, including a 'pointer' to show and record heights
 	
Human life processes
• recognise that all living things grow and change
• recognise that physical growth has taken place since birth
  o differences between milk teeth and permanent teeth
  o physical size
  o in a range of abilities and skills
• identify some requirements for growth and development in the human
  o food, sleep, exercise
• begin to identify the main phases of the human life cycle
• use all the senses to become aware of and explore environments.
	Variety and characteristics of living things
	• observe, identify and explore a variety of living things in local habitats and environments
	  o identify
	  ▪ common trees and other plants
	  ▪ common birds and other animals
	  ▪ common insects and minibeasts of habitats such as
	  ▪ forest, waste ground, hedge, pond, rocks, stream, seashore
	• develop some awareness of plants and animals from wider environments
	• recognise and describe the parts of some living things
	  o root, leaf, stem of plants
	  o trunk and branches of trees
	  o head, leg, wing, tail, skin covering of animal
	• recognise that trees are plants
	• group and sort living things into sets according to certain characteristics
	  o hibernation
	  o migration
	  o farm animals
	  o animals and plants that provide food
	
	Processes of life
	• appreciate that living things have essential needs for growth
	• explore, through the growing of seeds, the need of plants for water and heat
	  o design, make or adapt a suitable container for growing seeds
	• investigate how plants respond to light
	• understand that seasonal changes occur in living things and examine the changes in plant and animal life during the different seasons
	• become familiar with the life cycles of common plants and animals.

Energy and forces: Content for 1st & 2nd Classes

Light	Sound	Heat	Magnetism and electricity	Forces

• recognise that light comes from different sources
• recognise that light is needed in order to see
• investigate the relationship between light and materials
  o sort materials according to whether or not they allow light through (transparent/ opaque)
  o explore materials that do not allow light to pass through (opaque) and thus form shadows
  o design and make a model glasshouse using a plastic bottle that will allow light to pass through
  o design and make a pair of shades using different combinations of coloured film or plastic
• recognise that the sun gives us heat and light, without which we could not survive
• become aware of the dangers of looking directly at the sun.
	• recognise and identify a variety of sounds in the environment
	• identify and differentiate between high and low sounds, loud and soft sounds
	• explore ways of making different sounds using a variety of materials
	  o tins, metals, bottles, paper
	• design and make a range of simple percussion instruments
	  o investigate how changes in materials, volume and beaters affect the sound produced.
		• become aware of different sources of heat energy
		  o sun, fire, radiator
		• learn that temperature is a measurement of how hot something is
		• measure and compare temperatures in different places in the classroom, school and environment.
			• use magnets of different shapes and sizes in purposeful play to explore their effects on different materials
			  o design and make a fishing game using a magnet
			• investigate that magnets attract magnetic materials, such as iron and steel
			• investigate that magnets attract certain materials through other materials
			  o magnets attracting materials through water, glass, plastic
			• explore the effects of static electricity
			• become aware of the uses of electricity in school and at home
			• identify some household appliances that use electricity
			• become aware of the dangers of electricity.
				• explore how objects may be moved by pushing and pulling
				• become aware of and explore how moving water and moving air can make things move
				  o design and make a land yacht that can be used for carrying toys for a set distance
				  o observe and investigate the movement of objects such as toys on various materials and surfaces
				  o level and inclined surfaces
				  o rough and smooth surfaces
				• investigate how forces act on objects
				  o investigate floating and sinking with a wide range of materials and objects
				  o make and test predictions about objects that will sink or float
				  o group objects that will sink or float
				  o investigate how some objects may be made to float by hollowing them out.

Materials: Content for 1st & 2nd Classes

Properties and characteristics of materials	Materials and change

• identify and investigate a range of common materials used in the immediate environment
  o food and its ingredients
  o materials used to construct buildings
  o materials used to make furniture
  o materials used to make clothes
  o materials used to make tools
  o materials used to make toys, school equipment
• describe and compare materials, noting the differences in colour, shape and texture
• begin to distinguish between natural and manufactured materials
• group materials according to their properties
  o flexibility, transparency, magnetism, strength
• identify and investigate materials that absorb water and those that are waterproof
  o investigate the absorbency factor of various fabrics and materials and design and make a new kitchen cloth or roll
• begin to explore how different materials may be used in the construction of homes suited to their environments
  o homes, homes of animals, models, structures.
	Heating and cooling
	• explore the effects of heating and cooling on a range of liquids and solids
	  o water, toffee, syrup, Blu-tack
	• become aware of and investigate the suitability of different kinds of clothes for variations in temperature
	  o recognise that some fabrics keep us warmer than others
	  o design and make or assemble an outfit for someone who is going on holiday to a very warm or cold place
	• explore ways in which liquids and solids may be kept hot or cold
	  o effect of wrapping or covering using different materials, such as paper, fabrics, foil
	  o use of vacuum flasks.
	
	Mixing and other changes
	• begin to investigate how materials may be changed by mixing
	  o mixing paints to make new colours
	  o mixing water and sugar or salt
	  o ingredients mixed in baking a cake or making biscuits
	  o design and make different varieties of chocolate buns using mixing, heating or cooling (e.g. cereal and chocolate buns)
	• investigate the characteristics of different materials when wet and dry.

Environmental awareness and care: Content for 1st & 2nd Classes

Caring for my locality

• identify, discuss and appreciate the natural and human features of the local
• environment
• observe and develop an awareness of living things in a range of habitats in local and wider environments
• observe similarities and differences among plants and animals in different local habitats
• develop an awareness that air, water, soil, living and non-living things are essential to the environment
• begin to recognise that people, animals and plants depend on one another
• realise that there is both an individual and a community responsibility for taking care of the environment
• identify, discuss and implement simple strategies for improving and caring for the environment
  o caring for clothes, toys and other possessions
  o caring for living things in the locality
  o keeping home, classroom, school and play spaces clean, tidy and safe
• identify and help to implement simple strategies for protecting, conserving and enhancing the environment
  o planting trees, flowers
  o developing a school garden
  o engaging in anti-litter campaigns
• become aware of ways in which the environment can be polluted or harmed
  o litter, pollution, vandalism.

Living things: Content for 3rd & 4th Classes

Human life	Plant and animal life

Variety and characteristics of humans
• become aware of the names and structure of some of the body's major external and internal organs
Human life processes
• develop an awareness of the importance of food for energy and growth
  o need for a balanced and healthy diet
  o structure and function of teeth
  o design and make a nutritious sandwich for lunch
  o design and make a clay model of a set of teeth (or part of a set of teeth)
• understand the physical changes taking place in both male and female during growth to adulthood
• become aware of and investigate breathing
  o appreciate the need for oxygen from the air
  o understand that air is drawn in through
  o mouth and nose and passes through windpipe to lungs
  o investigate breathing rate before and after exercise
  o recognise dangers of smoking and air pollution
• explore and investigate how people move
  o body supported by a skeleton
  o actions of muscles, bones and joints.
	Variety and characteristics of living things
	• observe, identify and investigate the animals and plants that live in local environments
	  o local stream, river or pond, seashore
	  o aspect of a local rural landscape (e.g. road or laneway verge, hedgerow, peatland, field)
	  o aspect of a local urban area (e.g. areas around school, park, waste ground)
	• develop an increasing awareness of plants and animals from wider environments
	• observe and explore some ways in which plant and animal behaviour is influenced by, or adapted to, environmental conditions
	  o suitability of plants for shaded/damp/dry/wet conditions
	  o use of colour and camouflage by animals
	• sort and group living things into sets according to observable features
	  o animals that have fur, feathers, scales
	  o flowering and non-flowering plants
	• use simple keys to identify common species of plants and animals
	• understand that plants use light energy from the sun
	• come to appreciate that animals depend on plants and indirectly on the sun for food
	• discuss simple food chains
	Processes of life
	• become aware of some of the basic life processes in animals
	  o feeding, breathing, growing, moving, reproducing (life cycles), using their senses
	  o design and make an animal home that provides for growth, exercise, feeding of the animal
	• investigate the factors that affect plant growth
	  o water, light, types of soil, temperature.

Energy and forces: Content for 3rd & 4th Classes

Light	• learn that light is a form of energy
	• recognise that light comes from different natural and artificial sources
	• investigate that light can be broken up into many different colours
	    o use prism to create spectrum
	• investigate the relationships between light and materials
	    o sort materials according to the degree to which they allow light through (i.e. transparent, translucent, opaque)
	    o explore materials that do not allow light to pass through (opaque) and thus form shadows
	    o design and make a light shade for bedroom
	• investigate how mirrors and other shiny surfaces are good reflectors of light
	    o effects of flat shiny surface, curved shiny surface
	• recognise that the sun gives us heat and light, without which people and animals could not survive
	• be aware of the dangers of looking directly at the sun.

Sound	• learn that sound is a form of energy
	• recognise and identify a variety of sounds in the environment
	• understand and explore how different sounds may be made by making a variety of materials vibrate
	    o skin of drum, plastic ruler on table, string of an instrument, ÔseedÕ in referee’s whistle
	• design and make a range of simple string instruments using an increasing variety of tools and materials
	    o investigate how changes in length, tension, thickness and types of materials affect sound produced
	• explore the fact that sound travels through materials
	    o air, water, wood, metal.

Heat	• learn that heat can be transferred • recognise that temperature is a measurement of how hot something is • measure changes in temperature using a thermometer • measure and compare temperatures in different places in the classroom, school and environment and explore reasons for variations • understand that the sun is the Earth’s most important heat source • identify ways in which homes, buildings and materials are heated o cookers, kettles, electric radiators.
Magnetism and electricity	• learn that magnets can push or pull magnetic materials • explore how magnets have poles and investigate how these poles attract and repel each other • explore the relationship between magnets and compasses • examine and classify objects and materials as magnetic and non-magnetic • investigate that magnets attract certain materials through other materials o magnets attracting materials through water, glass, plastic • explore the effects of static electricity

	o plastic ruler, comb, glass rod • observe the effects of static electricity on everyday things in the environment o use of lightning conductor on buildings o use of earthing strips for cars • learn about electrical energy • investigate current electricity by constructing simple circuits o use wire, bulbs and batteries o experiment with simple switches o design and make a marine warning system (e.g. buoy with light or buzzer, lighthouse) • examine and group materials as conductors (those that conduct electricity) and insulators (those that do not allow electricity to pass through) • become aware of the dangers of electricity.
Forces	• explore how objects may be moved o by pushing and pulling o by twisting and stretching o by machines (e.g. rollers, wheels, pulleys) o design and make a pulley system to help a Norman builder to carry stone to the top of a castle • explore how some moving objects may be slowed down o a bicycle wheel by a brake o a falling object by a parachute o design and make a parachute to help transport a small object (e.g. marble, square of chocolate, matchbox) • explore the effect of friction on movement through experimenting with toys and objects on various surfaces o tiled surface, carpet, concrete, grass, table-top • investigate falling objects • explore how levers may be used to help lift different objects o design and make safe see-saws • investigate the pushing force of water o compare floating and sinking in fresh and salty water o design and make a boat or raft using an increasing variety of materials, tools and craft-handling skills.

Materials: Content for 3rd & 4th Classes

Properties and characteristics of materials	Materials and change

• identify and investigate a range of common materials in the immediate environment
    o water, air, rock, fabrics, paper, metal, wood, plastic, food
• recognise that materials can be solid, liquid or gaseous
• describe and compare materials, noting the differences in colour, shape and texture
• distinguish between raw and manufactured materials
• group materials according to their properties
    o flexibility, transparency, magnetism, conductivity or insulation properties, strength, shape, ability to muffle sounds, perishable and non-perishable, solubility
• investigate how materials may be used in construction
    o homes and other buildings, furniture, models, structures, everyday appliances.
	Heating and cooling
	• explore the effects of heating and cooling on a range of liquids, solids and gases
	    o the effects of heating and cooling on water
	    o heat causing air to rise
	    o design, make and flavour ice-cream
	• investigate the suitability of different kinds of clothes for variations in temperature
	    o recognise that some fabrics keep us warmer than others
	• experiment to establish which materials are conductors of heat or insulators
	    o explore ways in which liquids and objects may be kept hot or cold
	    o design and make a tea-cosy or a cover for a hot-water bottle.
	Mixing and other changes
	• investigate how materials may be changed by mixing
	    o mixing and dissolving materials in water
	    o design and make suitable refreshments for guests at a concert (e.g. iced tea, lemonade, adding fruit juices to water)
	• investigate the characteristics of different materials when wet and dry
	    o experiment with papier-mâché
	• examine the changes that take place in materials when physical forces are applied
	    o when materials are beaten, whisked, mixed, squashed, pulled or bent
	• explore some simple ways in which materials may be separated
	    o using sieves of varying meshes
	    o using magnet
	    o using ruler charged with static electricity
	    o allowing sediment to settle in a jar of liquid
	    o separating water and salt through evaporation.

Environmental awareness and care: Content for 3rd & 4th Classes

Environmental awareness	Science and the environment	Caring for the environment

• identify positive aspects of natural and built environments through observation, discussion and recording
  o colours, textures and shapes in rural and urban areas
  o diversity of plant and animal life
  o range of materials, buildings, walls and other features
  o places that people enjoy and the reasons for these preferences
• identify the interrelationship of the living and non-living elements of local and other environments
  o plants, animals, water, air and soil in habitats
• become aware of the importance of the Earth's renewable and non-renewable resources
• recognise how the actions of people may impact upon environments
  o planting and felling trees
  o removing hedgerows
  o draining marshes
  o constructing buildings, roads and bridges
• come to appreciate the need to conserve resources
  o recycling of materials, use of paper packaging in contrast to some plastic packaging, identifying materials which can be used for a variety of purposes, turning off lights, reducing the amounts of water used.
	• begin to explore and appreciate the application of science and technology in familiar contexts
	  o at home: cooking, heating, vacuum cleaners, refrigerators, washing machines, toasters
	  o at school: design of computer desks, chairs, pens, calculators
	  o in shops: design of trolleys, use of conveyor belts in counters, ways of preserving foods, packaging foods
	  o in designing and making activities
	• identify some ways in which science and technology contributes positively to society
	  o transport, buildings, bridges, roads, information and communication technologies, insulation of houses, tools and appliances, toys, farming, medicine
	• recognise and investigate human activities which have positive or adverse effects on local and wider environments
	  o enhance the built environment
	  o protect flora and fauna, e.g. by creating and
	  o maintaining a school garden
	  o produce biodegradable and non-biodegradable waste
	  o affect the quality of air, water and soil.
		• examine a number of ways in which the local environment could be improved or enhanced
		  o recycling campaigns
		  o helping in anti-litter campaign
		• identify and discuss a local, national or global environmental issue
		  o such as
		  ▪ litter in area
		  ▪ an incident of pollution
		  ▪ changes in flora and fauna
		  ▪ new roads, buildings
		  ▪ need to protect a habitat and its flora and fauna
		  ▪ proposals for enhancing the environment (e.g. need for cycleways near school)
		  o investigate the causes of the issue
		  o appreciate the roles and different views of people involved
		  o suggest and discuss possible actions and consider the effects of these on people and the environment
		• realise that there is a personal and community responsibility for taking care of the environment.

Living things: Content for 5th & 6th Classes

Human life	Plant and animal life

Variety and characteristics of humans
• develop a simple understanding of the structure of some of the body's major internal and external organs
Human life processes
• develop a simple understanding of food and nutrition
  o structure, function and care of teeth
  o the importance of food for energy and growth
  o importance of a balanced and healthy diet
  o design and make a balanced and nutritious lunch menu for self or younger child
• develop an understanding of the reproductive systems of both male and female and of the physical changes taking place in both male and female during growth to adulthood
• become aware of and investigate breathing
  o appreciate the need for oxygen from the air
  o understand structure and function of nose, windpipe and lungs
  o recognise the dangers of smoking and air pollution
  o investigate and/or design and make facial anti-dust mask
• identify and understand ways in which the body protects itself against disease and infection
  o role of external organs: nose and skin.
	Variety and characteristics of living things
	• observe, identify and examine the animals and plants that live in local habitats and environments
	  o local stream, river or pond, rock pool, seashore
	  o aspect of a local rural landscape (e.g. soil, hedgerow, forest, peatland, field); aspect of a local urban area (e.g. areas around school, park, waste ground)
	• develop an increasing awareness of plants and animals from wider environments
	• identify the interrelationships and interdependence between plants and animals in local and other habitats
	  o plants and animals depend on, and compete with, each other
	• concept of food chains and food webs
	• become aware of the sun as a source of energy for plants through photosynthesis
	• observe and explore some ways in which plant and animal behaviour is influenced by, or adapted to, environmental conditions
	  o location factors for plant and animal habitats, including food supply and physical conditions
	  o use of colour and camouflage by animals
	• recognise that there is a great diversity of plants and animals in different regions and environments
	• group and compare living things into sets according to their similarities and differences
	  o similarities and differences between members of the same groups or species
	• become familiar with the characteristics of some major groups of living things
	  o mammals, insects, arachnids, amphibians, fish, birds, reptiles
	  o flowering and non-flowering plants, fungi and bacteria*
	• construct and use simple keys to identify locally occurring species of plants and animals
	Processes of life
	• become aware of some of the basic life processes in animals and plants
	  o animals: nutrition, breathing, growth, movement, reproduction (life cycles), use of their senses
	  o plants: nutrition, reproduction, movement in response to light, use of oxygen and carbon dioxide
	• investigate the factors that affect plant growth
	  o water, light, soil, temperature
	  o design and make a suitable growth environment for a plant that requires some specialised care (e.g. a bottle garden for plants that require much heat and humidity)
	• understand some ways in which plants reproduce

	o flowering plants and seeds/non-flowering plants, spores/vegetatively: runners, tubers, bulbs..

Energy and forces: Content for 5th & 6th Classes

Light	• learn that light is a form of energy
	• know that light travels from a source
	• investigate the splitting and mixing of light
	   o use prism to create spectrum
	   o mix coloured light using filters
	• investigate the refraction of light
	• investigate how mirrors and other shiny
	• surfaces are good reflectors of light
	   o effects of flat shiny surface, curved shiny surface
	   o design and make model periscopes
	• explore how objects may be magnified using simple lens or magnifier
	   o investigate use of lens
	   o design and make model telescopes
	• appreciate the importance of sight
	• understand the role of sunlight in photosynthesis and appreciate that the sun gives us heat and light without which people and animals could not survive
	• be aware of the dangers of excessive sunlight
	   o dangers of looking directly at the sun
	   o effect of the sun's rays on skin
	   o design and make a sun canopy or umbrella for toys such as dolls and models.

Sound	• learn that sound is a form of energy
	• recognise and identify a variety of sounds in the environment and appreciate the importance of noise control
	• understand and explore how different sounds may be made by making a variety of materials vibrate
	   o skin of drum, plastic ruler on table, string of an instrument
	• design and make simple woodwind instruments
	   o investigate how the length, thickness, diameter and type of materials used will influence the sound produced
	• explore how sound travels through materials
	   o air, water and solids
	   o identify materials that muffle sounds
	   o design and make a pair of ear muffs
	• appreciate the importance of hearing.

Heat	• experiment with a range of materials to establish that heat may be transferred in different ways o through water, metals or air

	• recognise a variety of sources of heat
	  o renewable sources (e.g. solar energy, heat from burning of bio-mass)
	  o non-renewable sources (e.g. heat from burning of fossil fuels)
	  o friction in mechanical movement
	• know that heat energy can be transferred
	  o in solids (conduction)
	  o in water and air (convection)
	  o from the sun (radiation)
	• measure and record temperature using thermometer.

Magnetism and electricity	• learn that magnets can push or pull magnetic materials
	• investigate how magnets may be made
	  o stroking a piece of iron or steel with a magnet
	  o passing electricity through a coil around a piece of iron or steel (electromagnet)
	• explore the use of magnets to lift and hold objects
	  o how magnets can be used in cranes, door catches
	  o how magnets may be used to sort materials
	• learn about electrical energy
	• investigate current electricity by constructing simple circuits
	  o use wire, bulbs, motors and batteries
	  o use more than one bulb in a circuit
	  o use more than one battery in a circuit
	  o experiment with simple switches
	  o design and make set of traffic lights using a simple circuit and switch
	• become aware of how some common electrical appliances work
	• become aware of and understand the dangers of electricity
	  o dangers of mains electricity in the home and at work
	  o the importance of fuses and circuit breakers for safety.

Forces	• identify and explore how objects and materials may be moved
	  o by pushing and pulling
	  o by machines using rollers, wheels, axles, gear wheels, chains and belts
	  o by pouring and pumping
	  o using trapped air pressure (pneumatics)
	  o using trapped liquid under pressure (hydraulics)
	  o using wind energy
	  o harnessing energy of moving water
	  o design and make a lifting device that uses levers and gears
	  o design and make a windmill, water wheel or wind turbine to spin a coloured disk or turn a flywheel
	• explore the effect of friction on movement and how it may be used to slow or stop moving objects

	o a bicycle wheel by a brake o a falling object by a parachute o air resistance, streamlining • explore how friction can generate heat o rubbing hands • come to appreciate that gravity is a force • become aware that objects have weight because of the pull of gravity o design and make a spring balance • explore how levers may be used to help lift different objects o design and make a toy using a lever.

Materials: Content for 5th & 6th Classes

Properties and characteristics of materials	Materials and change

• recognise that materials can be in solid, liquid or gas form
• identify and investigate a widening range of common materials in the immediate environment
  o water, air, rock, fabric, paper, metal, wood, plastic, food
• explore the origins of these materials
  o identify natural and manufactured materials
  o understand how some of these materials are processed or made
• group materials according to their properties and/or composition
  o properties (e.g. flexibility, transparency, magnetism, conductivity, insulation, strength, shape, perishable or non-perishable foods, solubility)
  o composition (e.g. foods containing proteins, carbohydrates and/or fats; soil containing clay, silt, sand and/or gravel)
• identify how materials are used
  o relate the properties of the material to its use
  o examine how shape affects the strength of structures
  o design and make a bridge that takes account of flexibility, form, stability and strength
• recognise that a gas, such as air, occupies space, has mass* and exerts pressure
  o investigate evidence for atmospheric pressure
  o explore the effect of air resistance
  o design and make a glider
• recognise that some materials decay naturally while others survive a long time in the environment
  o biodegradable and non-biodegradable waste
  o environmental problems caused by non-biodegradable waste
  o materials that may be recycled
• become aware that air is composed of different gases
  o including oxygen and carbon dioxide
• become aware of some of the practical applications of these gases in everyday life
	Heating and cooling
	• explore the effects of heating and cooling on a range of solids, liquids and gases
	  o temporary changes (e.g. from solid to liquid to gas)
	  o expansion of water on freezing
	  o evaporation of water on heating
	  o permanent changes (e.g. those caused by baking bread in an oven)
	• experiment to establish which materials are good conductors of heat or good insulators
	  o explore ways in which liquids and solids may be kept hot or cold
	• identify ways in which homes and buildings are heated and insulated
	• recognise how heating and cooling can be used to preserve food
	Mixing, separating and other changes
	• investigate how a wide range of materials may be changed by mixing
	  o mixing and dissolving materials in water
	  o solutions
	  o exploring liquids that will not mix
	• investigate the effects of light, air and water on materials
	  o discoloration and fading
	  o rusting of iron and steel
	  o investigate how rusting can be controlled
	  o characteristics of materials when wet and dry
	• examine the changes that take place in materials when physical forces are applied
	  o when materials are beaten, whisked, mixed, squashed, pulled, bent
	• recognise that oxygen is required for burning
	• explore some simple ways in which materials may be separated
	  o using sieves of varying meshes
	  o using a magnet
	  o using ruler charged with static electricity
	  o allowing sediment to settle in a jar of liquid
	  o separation of salt and water by evaporation

o use of carbon dioxide in fizzy drinks and in fire extinguishers.	o separation of water and soil using simple sieves (filtration).

Environmental awareness and care: Content for 5th & 6th Classes

Environmental awareness	Science and the environment	Caring for the environment
• identify positive aspects of natural and built environments through observation, discussion and recording o colours, textures and shapes in rural and urban areas o diversity of plant and animal life o range of materials, buildings, walls and other features o places that people enjoy and the reasons for these preferences • explore some examples of the interrelationship of living and non-living aspects of local and other environments o ecosystem of tree, hedgerow, stream o boglands, mountains, lowlands, river o rainforest, grasslands, desert, tundra • become aware of the importance of the Earth's renewable and non-renewable resources • foster an appreciation of the ways in which people use the Earth's resources o mining, fishing, forestry, agriculture o using wind, water, fossil fuels or nuclear o energy to generate power o processing raw materials for manufacturing o using the environment for leisure activities • come to appreciate the need to conserve resources o recycling of materials, use of paper packaging in contrast to some plastic packaging, identifying materials that can	• appreciate the application of science and technology in familiar contexts o at home: microwave oven, cooker, dustbin, coffee maker o at school: photocopier, projector, information and communication technologies o in the work-place: conveyor belts and pulleys o in a factory; pneumatic drill, cement mixer and crane on a building site o in hospitals: stethoscope, X-ray, radium treatment o in designing and making activities • examine some ways that science and technology have contributed positively to the use of the Earth's resources o purifying water, mixing materials to produce new materials, medicines, processing food, preserving food, generating electricity, using fertilisers for increased agricultural yields • recognise the contribution of scientists to society o work of scientists in the past and present • recognise and investigate aspects of human activities that may have positive or adverse effects on environments o activities that ▪ protect flora and fauna, such as creating a wildlife area and planting trees ▪ enhance built environments	• participate in activities that contribute to the enhancement of the environment o organise collection of paper or other materials for recycling o become aware of the need to use energy wisely in school and at home o compost waste for garden • identify and discuss a local, national or global environmental issue o such as ▪ effect of building a new factory, new roads, buildings, farming practices ▪ traffic congestion, road safety ▪ suggestions for environmental enhancement ▪ an incident of pollution, deforestation, ozone depletion, nuclear energy, global warming o investigate the causes of the issue o appreciate the roles and different views of people involved o identify and use ways of assessing or measuring the extent of the problem o suggest possible actions and consider the effect of these on people and the environment o participate in the resolution of the issue, if possible • come to appreciate individual, community and national responsibility for environmental care o explore concept of custodianship and its practical implications o become familiar with the concept of

be used for a variety of purposes, turning off lights, reducing the amounts of water used.	▪ affect the quality of air, soil, water and the built environment.	sustainable development o appreciate the need to protect environments for present and future inhabitants.

Approaches and methodologies

We aim to get the children 'thinking scientifically'. It is essential that we use a range of teaching methods and approaches when teaching Science.

The approaches adopted should create a learning environment where:

- Hands on discovery is encouraged.
- Links with the environment are fostered.
- Children have an opportunity to work together, share ideas and communicate their findings.
- Children's ideas are the starting point for science activities (concept mapping).
- Children should be allowed the excitement of finding out for themselves.
- Children are encouraged to pose their own questions.

The nature of the strands and strand units necessitates the use of a variety of teaching methods. The approaches chosen should enable the children to work scientifically in a variety of contexts, to understand practical activities and to tackle open-ended investigation.

Linkage and integration

Linkage: (Refer to p. 44-45 Teacher Guidelines)

The science curriculum is presented in four strands. The strand Living things will give rise to the links with Environmental awareness and care providing opportunities for the simultaneous development of skills and knowledge.

Science has special links with SPHE, visual arts, mathematics and language. There is also many opportunities for links to be made between science and the two other SESE subjects.

Multi-grade teaching

In multi-grade situations a two or three year cycle is helpful in ensuring that all strands/strand units are covered and not duplicated.

A thematic approach is useful in covering the same topic across class groups.

Assessment and record keeping

(Teacher Guidelines pp. 35)

Assessment in science is concerned with the children's mastery of knowledge and understanding of the strands of the science programme and the development of skills and attitudes. Consequently a broad range of assessment tools and approaches will be necessary. The following are among the assessment tools found useful in schools:

- Teacher observation
- Teacher designed tasks and tests
- Concept mapping
- Work samples

Children with different needs

Our teachers adapt and modify activities so that all children can participate meaningfully in science lessons. This includes varying the pace, content, language and methodologies to try to ensure

learning and success for all children. Where possible, children who have difficulty will have help from a teacher or peer.

Equality of participation and access

We aim to provide an equal educational experience for both boys and girls as we recognise that stereotyped expectations of gender roles can inhibit children's educational achievements. To this end equal opportunities will be given to all children in the school, across all science strands and activities. Children with special needs will be included in all activities.

Organisational Planning:

Timetable

- 2 hours 15 minutes is the minimum time allotted for SESE for infant classes with 3 hours for all other classes
- Time may blocked on occasions for science e.g. field trips, working on experiments.
- Discretionary curriculum time may be used occasionally for Science.

Resources and ICT

- Teachers have access to a selection of scientific materials which are store centrally in the main school store.
- All mainstream classrooms are equipped with Interactive Whiteboards for presentation of scientific material.
- The school plans to acquire additional resources as funds allow

ICT (Refer to p. 140-141 Teacher Guidelines)

- There is a selection of technologies available in the school: IWBs, digital cameras, tablets digital microscope.
- Teachers familiarise themselves with material on websites prior to use by the children.

Health and safety

(Refer to school's Health & Safety Policy)

Teachers always do their utmost to provide safe learning environments across all areas of the curriculum. Consideration is given to the following when planning for music:

During practical work teachers should be aware of the safety implications of any exploratory or investigative work to be undertaken. Primary science activities should not involve the use of chemicals or other hazardous materials. However, safety should permeate all aspects of the teaching of science, and children should be encouraged to observe safety procedures during all tasks. Safety precautions cannot remove all risks but should eliminate unnecessary hazards. Useful safety advice is provided in Safety in School Science (Dublin, An Roinn Oideachais, 1996).

Individual teachers' planning and reporting

- The whole-school plan, core curriculum and the curriculum documents for science provide information and guidance to individual teachers for their long and short term planning

- Teachers plan using the objectives as laid out in the strands and strand units
- Each teacher will record their month's work in their Cuntas Míosúil which will serve in reviewing and developing the whole school plan/individual preparation for following years

Staff development

- Teachers have access to reference books, resource materials, instruments, equipment and websites dealing with SESE Science.
- Teachers are encouraged to attend in-service courses/become involved in Science initiatives/programmes.

Parental involvement

Refer to Primary School Curriculum; Your child's learning, Guidelines for Parents (NCCA); The What, Why and How of children's learning in primary school, NCCA DVD

- There are opportunities for parental involvement e.g. science field-trips, end-of-year science show-and-tell etc.
- Parents with a particular interest in science (e.g. Visiting Speaker as part of Discover Primary Science Programme) are invited to speak to the children.

Community links

To encourage links with the community we make use of the following:

- We make use of local amenities such as Lough Boora Parklands, Loch Clochán, Clara bog, the Grand Canal to investigate certain areas of the science curriculum

Ratification/Review

This policy was made available to parents over a three week period for comment/suggestions etc. It was ratified by the Board of Management on 26/01/2011. It will be necessary to review this plan on a regular basis to ensure optimum implementation of the Science curriculum.