Science Policy

Broad Objectives

The purpose of this draft policy in Science is to compile a user –friendly document outlining the approach, methodologies, timetable, content and resources necessary to *implement the subject as per* ***The Primary Curriculum 1999.*** *It is hoped that this plan will ensure that children will experience a broad and balanced curriculum in which undue repetition and significant gaps are avoided. It is intended that over a two-year period all strand units from each strand should be covered. There should also be a balance between the development of scientific knowledge and understanding and the processes of working scientifically. This draft should ensure continuity and progression in the development of scientific ideas and in the application of investigative skills.*

Aims

The aims of science education are:

- 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
- To encourage the child to explore, develop and apply scientific ideas and concepts
- To foster the child's natural curiosity
- To aid the child to appreciate the contribution of science and technology to the wider world
- To appreciate and respect diverse living and non-living things
- To encourage the child to become environmentally responsible and aware
- To enable the child to communicate ideas, present ideas and report findings using a variety of media

Approaches and Methodologies

It is essential, no matter what our collective experience in teaching the subject that we use a range of teaching methods and approaches when teaching Science. Lessons "should not be workcard or textbook based". Our main aim is to get the children "thinking scientifically" and not memorising facts to be regurgitated at a later stage. The approaches adopted should create a learning environment where:

- Practical activity is encouraged (Hands- on discovery)
- 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 use of a variety of approaches and methods will facilitate the efficient implementation of the science curriculum. The nature of the strands and strand units themselves 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 undertake practical activities and to tackle open-ended investigations. Different methods are outlined as follows:

Whole-class work This is effective in introducing a topic and concept-mapping. It is also useful in providing background information that may be required for an activity.

Small groups. : .
This can be in many forms:

- Several groups working on the same activity
- Small groups rotating around different activities (circus of experiments)
- Small groups working on independent activities

Individual work. This is where children pursue their own studies and carry out investigations that allow them to pursue their own interests and ideas.

Safety

During practical work teachers should be aware of the safety implications of any exploratory or investigative work to be undertaken. Children should be encouraged to observe safety procedures during **all** tasks. There are many safety issues to consider including:

Plants and Animals
Disposable gloves to be used when investigating hedgerows. Children should never handle unknown or unfamiliar plants, especially fungi. Gloves to be worn also when handling birds or animals. Hand washing should be encouraged after handling plants and animals.

Electricity
Children should only use low-voltage battery powered devices. Mains electricity should **never** be used for electricity and magnetism experiments. If mains-powered equipment is used then it should be connected and operated by the teacher only. Children should be repeatedly warned about the danger of mains electricity.

Equipment
The use of glass apparatus and sharp-edged tools should be avoided except under the direct supervision of the class teacher. Use plastic where possible. Thermometers should be handled carefully. If a thermometer breaks and mercury is spilt it should be carefully gathered up by the teacher and buried in a place where the ground will not be disturbed. Spirit thermometers should be used where possible.

Eyes
Children should never use lenses, binoculars or other lenses devices to look directly at the sun or other intense source of light. This includes dark glass and plastic.

Chemicals
Household chemicals should be purchased to meet the requirements of the experiment and any surplus disposed of on completion of experiment. Try to avoid any chemical containing bleach. Use safety goggles where possible. These chemicals will **not** be stored in the science resource boxes.

Polythene Bags
Children should be warned of the dangers of using these bags as they may cause suffocation.

Heat
Under no circumstances should the children themselves handle matches or lighters. If using candles during an experiment, please ensure that they are securely fastened. Lighted candles should never be moved. Care should be taken to avoid situations where children may be tempted to lean across a lighted candle. Long hair should be tied back and loose sleeves secured.
Any heating can be done with hot water from a tap or from a kettle held by an adult. Flammable liquids should never be used. Small portable gas burners are relatively

safe provided that they can be securely mounted to prevent them from toppling over. If they are used, they should be sited clear of curtains, noticeboards and busy areas.

Cleanliness and Hygiene
Random sniffing and tasting should be discouraged. The teacher should explain that anything the children are asked to smell or taste has been carefully chosen for that activity. The sharing of spoons or other utensils should not be permitted. Hand washing should be encouraged before food activities.

Skills Development

Working Scientifically

Working Scientifically will involve children in:

- Observing
- Questioning
- Predicting
- Hypothesising
- Investigating and experimenting
- Interpreting results
- Recording and communicating results

An important aspect of scientific activity is **Designing and Making**. Children are to be encouraged to design and make artefacts and models that will provide solutions to practical problems. The skills to be developed for this facet are:

- Exploring
- Planning
- Making
- Evaluating

As children learn to apply these skills they will learn to deal with more complex concepts in a scientific way. (See Teacher Guidelines pp17-21)

Notes on Timetable

The words odd/even refer to the year in which the school year begins, For example, the school year begins in September 2014. The year number is odd, therefore the programme followed for the **whole** school year until June 2015 is the odd programme. This timetable will allow all classes to follow similar themes simultaneously.

Our science plan is based on a spiral approach as per the curriculum. For this reason, it is not intended that all strand units will be taught in each class. The units may be supplemented by extension work at the discretion of the class teacher.

Resources

Textbooks and worksheets can be used during science lessons to support active investigative work. However, " Science lessons **should not be worksheet or textbook based**" *cf* Curriculum Guidelines

3rd, 4th, 5th and 6th use the programme "Unlocking Science with Science Fusion" by Folens. Whiteboard resources for this programme are used, not text books.
Junior, Senior Infants, First and Second classes use a variety resources as are available to them as outlined below.

We shall also keep a library of resource books, and cd-roms in the resource area. It is hoped that all resource material will be included in the evaluation of the science plan.

Books, videos and cd-roms available in school

Junior Infants;

Books:
Earthlink
All around me
What a wonderful world
Window on the world
Look around
Nature study for infants
Switch on science

Equipment:
Posters
Use of websites/videos etc on whiteboard
Selection of books in class library related to Nature and Science
Various items used to investigate sinking and floating eg, toys/feathers
Toys used to explore forces-push and pull
Stuffed squirrel
Feely box
3D model of Lifecycle of Frog

Senior Infants:

Books:

Switch on Science

Primary Science

Unlocking SESE

What a wonderful world

Windows on the world

The magic Fountain

Equipment:

Posters

Selection of books in the classroom

library relating to Nature and Science.

3D model of the Butterfly

Pictures of various animals

Use of interactive whiteboard

Materials for sinking and floating

Powerpoints

First Class:

Books:
It Science-
Forces, hearing, sounds
Earthlink
!st/2nd Primary Science
Windows on the world
Switch on science

Second Class

Books:
Earthlink
Windows on the world
Switch on science
Look around
What a wonderful world
Science Quest2

Third Class
Books
Science Fusion
Developing science year3
Green school project
Health promoting project

Equipment:
Food Pyramid chart
Healthy eating booklet
Science Fusion whiteboard resource
Related websites on Interactive whiteboard
Compost
Containers
Construction toys
Use of scratch technology programming to record experiments

Fourth class
Books:
Science Fusion
Switch on science
Science Quest
Small world Geography and Science

Equipment:
Human model of internal organs
Accompanying chart
Water gauge
Science fusion whiteboard resource
Websites on interactive whiteboard

Fifth class
Books:
Science Fusion
Earth link

Equipment:
Science Fusion whiteboard resources
Websites on interactive whiteboard

Sixth class
Books:
Science Fusion
Small World
Science Quest
Science all around me
Switch on science
Window on the world

Equipment
Discover Primary Science activity pack
Food and Healthy eating
Energy
Planet earth
A guide to Irish wildlife
Birds of Killarney National park
Special species of county Kerry
Understanding your senses

Science in the A.S.D. unit
Health promotion- healthy eating
Reduce /Reuse/Recycling
Taking care of our environment

Resources required for the Science Programme

Living Things : Myself/Human Life

Mirrors – plastic
Metre sticks
Height chart
Thermometer
Measuring tape
Bathroom scales

Living Things : Animals and plants

Flower pot
containers
Small trowels
Bulbs and seeds
Old spoons
Sheets of Perspex or plastic
Watering can
Plastic tubing
Hand lenses
Nature viewers
Magnispectors

Energy and Forces : Magnetism and Electricity

Magnets – including bar, button, horseshoe
Screw in light bulb holders
Bulbs and batteries
Iron filings
Crocodile clips
Needles
Wires
Compasses
Electric buzzers
A range of magnetic materials
Electric bells
Electric motor
A selection of metals
Wire stripping pliers
Steel wool
Screwdrivers

Energy and Forces : Light

Torches
Curved mirrors and Plane mirrors
Glass blocks and triangular prism
Shiny objects that will act as mirrors; spoons, biscuit tin lid, sheet metal
Transparent, translucent and opaque materials
Colour filters
Candles
Old spectacle lenses
Projector

Energy and Forces : Heat
Thermometers
Torches

Energy and Forces : Sound
Tuning forks
Rubber bands – different sizes and thickness
Musical instruments

Energy and Forces : Forces
wheeled toys
Oil, grease, polish, wax
Inclined plane
Sandpaper
Springs
Mechanisms: tongs, pliers, nutcrackers, toys, old clock etc
Weights
Marbles
Balls
Construction sets such as Meccano, wheels, pulley, axle rod, gears
Timers
Stop clock and watches
Balloons
Plastic syringes
Pulleys

Materials
Funnels
Polystyrene sheets, blocks, balls and beads
Sieves, plastic, various meshes
samples of fabrics and fibres
Food colouring
Samples of soap and detergent
Dyes
Materials from the kitchen or bathroom such as sugar, salt, soda, chalk, oil, soda water, lime water, tea, coffee, bath salts, flour
Samples of different metals
Pebbles, stones, bricks and rocks
Samples of different woods and wood products
Samples of different papers, blotting paper, tissue paper, paper towels, waxed paper, greaseproof paper, newsprint
Corks

Equipment and materials required for designing and making
Construction kits such as Lego Technic, K'Nex, Fischer Technik, Meccano, Master Builder

Mechanisms – egg beater, bicycle pump, jack, hinges, toys etc
Hammer and nails
Nuts and bolts

Wood glue
Clamp
Sandpaper
Screwdriver and screws
Craft Knife
Ruler and Scissors
Clips
Spanners
Needle

Consumable Materials

Plasticine
Plaster of Paris
Clay
A range of fabrics and fibres
Fasteners – bulldog clips, paper clips, hair clips, clothes pegs
Soft woods
Foil
Metals
Acetate
Plastic
Rubber
Dowels of various lengths and thickness
Thin wire
String and threads
Adhesives
Paints

Domestic Reclaimable Waste

plastic bottles of various sizes
plastic straws
aluminium foil
thread spools
tins
range of empty boxes, lids, containers and tubes
coat hangers
polystyrene block and beads
scrap cord and board
corks of varying sizes

Assessment

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

Observations made by the teacher during practical science tasks will help to determine the development of process skills and attitudes. They will also help to establish the extent to which the children have mastered the knowledge aspect. The teacher will need to take an active role in science tasks and ask open-ended questions to gain insight into a child's understanding.

Teacher-designed tasks and tests

Some representational record, whether written, drawn, sculpted or modelled, is necessary to build up a picture of the child's achievements. A wide variety of tasks should be provided for the children, including:
Observing
Analysing objects and processes and hypothesising about how systems work or are made
Predicting outcomes of an investigation
Collecting information from books and materials
Asking questions
Providing oral, written and pictorial accounts of investigations
Displaying projects
Using activity sheets
Designing, making and evaluating models and structures
Using interactive multimedia programs to explore themes and complete a range of tasks and problems
Exploring and engaging in practical investigations in the environment
Completing teacher-designed tests on a unit(s)
Displaying and reporting project work
Drawing with labels (teacher can discuss drawing with child and annotate it as a result of asking questions)

Concept-mapping

The child's initial ideas must be explored if they are to form a starting point for l earning. Concept-mapping helps children to record and discuss their ideas(in other words, brain-storming). This will help enormously to see what pre-conceived ideas the children may have. It is also useful as an assessment tool at the end of a unit to see if there has been any progression.

Work samples, portfolios and projects

A wide range of samples of a child's work is compiled to form a science portfolio. This should document and assess progress over a term or longer. The portfolios should contain samples of work in progress or what the child considers to be "best samples" of finished pieces together with teacher's comments. The samples chosen should demonstrate achievement in a range of areas. Samples of work in one area may be included to show progression of ideas and skills.

Written accounts or drawings, photographs of stages of an investigation, graphs, samples of worksheets or audio tapes of children's reports of investigations may be enclosed.

Infants – Odd Years

Strand Unit	**Content**	**Curriculum**	**Teacher Guidelines**
Myself **Caring for my** **Locality**	Body – similarities/differences Body – changes as we grow,internal and external parts of the body.Looking after our teeth. My senses Observe and appreciate attributes of our locality Develop a sense of responsibility for its care, recycling	Page 24	Page 118 121
Magnetism and Electricity **Forces**	Purposeful play with magnets to observe effect, investigating magnetic items Use of electricity at home/school Dangers of electricity transport Investigate the effects of pushing and pulling	Page 26 26	Page 38, 108, 109, 136, 138
Properties and Characteristics of materials	Investigate and compare a variety of materials, e.g. water, metal……. Identify uses for these materials Grouping of these materials according to different criteria Classification of food into groups , Observe floating and sinking of objects	Page 27	Page 124

Infants – Even Years

Strand Unit	Content	Curriculum	Teacher Guidelines
Plants and animals	Investigate living things in various habitats, e.g. trees, ponds,forest,sea.. Investigate parts of living things, e.g. flower, stem, leaf… characteristics of living things . Observe growth and change of living things Explore conditions of change – need for growth etc Explore seasonal change	Page 24	Pages 26, 62, 64, 66, 68, 70, 78, 82, 84
Light	Identify and name items in relation to colour Explore various colours and group objects accordingly. Difference between day and night Explore shadow and colour in our natural environment Mixing primary colours	Page 25	Page 90
Sound	Explore sound and difference of sound, high/low etc Explore making sound - percussion	25	
Heat	Investigate hot/cold through our weather/bodies Explore how to maintain heat/cold.Identifying sources of heat	Page 25	
Materials and Change	Observe the effects of water on objects/materials Observe the effects of heating/cooling objects/materials Investigating how materials change when mixed with water.	Page 27	Page 124

Rang 1& 2 – Odd Years

Strand Unit	Content	Curriculum	Teacher Guidelines
Myself	Body – identify external parts Locate sense and link to body parts Measure body changes and identify requirements needed for growth	Page 41	Page 121
Caring for my Locality	Identify and discuss the basic elements – air, soil, water etc Introduce co-dependence, e.g. food chain Pollution – causes and prevention	Page 48	
Magnetism and Electricity	Purposeful play with magnets – observe effects Observe attraction to different materials Observe attraction through different materials, water, card etc Static electricity Uses/ dangers of electricity at home/school	Page 44-45	Page 106 99
Forces	Investigate pushing and pulling of various objects Pushing power of air/water – current, wind Floating/sinking of objects in various substances Friction of surfaces – observe rolling distances		136, 138

Properties and characteristics of materials	Investigate materials and their uses in our surroundings Grouping materials under different criteria – include magnetism, absorbency, etc Investigate the uses of these materials in construction	Page 46	Page 126

Rang 1 & 2 – Even Years

Strand Unit	Content	Curriculum	Teacher Guidelines
Plants and Animals	Investigate living things in various habitats Investigate parts of living things Grouping living things by characteristics, e.g. migration Explore the conditions needed for growth and change, e.g. heat, light.. Explore life cycles of plants and animals	Page 42	Page 48, 62, 64, 68, 70, 73, 78, 80, 82
Light **Sound**	Explore sources and importance of light Observe transparency of materials to light Importance of the sun for light, heat Learn dangers of the sun, eyes, skin etc Investigate various sounds and how to make these sounds Develop percussion instruments	Page 43	Page 38, 108, 109, 136, 138
Heat **Materials and change**	Explore various sources of heat: sun, fire, radiator Investigate how to measure heat Measure and compare temperatures Observe effects of heating/cooling solids and liquids Explore how to maintain temperature Mixing materials and the effects, eg paint	Page 44	Page 125, 126

Rang 3& 4 – Odd Years

Strand Unit	Content	Curriculum	Teacher Guidelines
Human Life	Body – name external and internal organs Discuss need for balanced diet, food pyramid. Our teeth and their function-tooth decay Examine the breathing system, lungs, smoking Examine the skeletal system, muscles, bones, joints	Page 61	Page 119, 122
Environmental Awareness	Observe, discuss and record elements of our local environment Renewable/non-renewable resources Conservation of our environment Green school flag 1	Page 68	
Caring for the environment	Implementing anti-pollution schemes Identify issues and responsibilities through debate/action	Page 68, 70	
Magnetism and Electricity	Push/pull effects-terms attract/repel are introduced Classification into magnetic/non-magnetic Link magnets to the compass Static electricity Uses/dangers of electricity at home/school Construction of simple circuits Identify conductors/insulators	Page 64	Page 102-103

Forces	Movement of objects – push, pull/stretch, pulley, roll…simple machines, wheel and axle Slowing moving objects due to friction, e.g. ball on carpet Investigate gravity Levers- designing levers, see-saw Floating/sinking of objects	Page 65	Page 112, 114, 136, 138
Properties and Characteristics of materials	Investigate properties of various materials Discuss solids, liquids, and gases Properties of matter Mixtures and solutions Physical and chemical changes Raw v. manufactured materials Grouping of materials under specific criteria, include insulators/conductor, magnetic, absorbency Discuss uses of these materials in construction	Page 66	Page 127

Rang 3& 4 – Even Years

Strand Unit	Content	Curriculum	Teacher Guidelines
Plants and Animals **Science and the Environment**	Investigate living things in various habitats Explore conditions of growth and how animals adapt to environments Identification of plant parts and their functions Uses of keys in the identification of species Explore food chains and life cycles Explore technology in the everyday context Identify the positive/negative effects of technology on our environment	Page 62 Page 69	Page 48, 62, 64, 68, 70, 73, 78, 80, 82, 85
Light **Sound**	Light as a form of energy, explore transparency of materials Explore natural and artificial light Observe the light spectrum Observe refection of light Exploring sunlight and energy Identity the importance /dangers of the sun Sound as a form of energy Creation of sound through vibration How sound travels through materials Echolocation Music -pitch	Page 63 Page 63	 Page 94

Heat	Use of thermometer Explore heat transfer Uses of heat in the home – energy saving….	Page 64	Page 127

Materials and change	Significance/dangers of the sun's heat Effects of heating/cooling on solids, liquids and gases Conductors and insulators of change Mixing and separating of materials Testing of materials under different criteria, e.g. use of water, forces	Page 66	

Rang 5& 6 – Odd Years

Strand Unit	Content	Curriculum	Teacher Guidelines
Human Life	Body Identify structure of internal and external organs Discuss need for a balanced diet – food pyramid The breathing system effects of smoking Immune system – protecting our bodies	Page 83	Page 119, 122
Environmental Awareness	Observe, discuss and record elements of our local environment Renewable/non-renewable resources Conservation of our environment	Page 90	
Caring for the environment	Implementing anti-pollution schemes Individual/community/national and global responsibility	Page 92	
Magnetism and Electricity	Push/pull, attract/repel, lift/hold effect of magnets Investigate making magnets – the electromagnet Construct a variety of simple circuits Uses/dangers of electricity	Page 86	Page 102,103, 104
Forces	Movement of objects – push, pull, pulley, wind, water.. Effects of friction – slowing objects and generating heat Introduce gravity as a force Use of levers to lift, turn Design	Page 87	Pages 40-41 114, 116, 136, 138

Properties and Characteristics of materials	Solids, liquids, gases, their properties Investigated and group different materials, including oxygen The decay of various materials Composition of our air – its properties Different gases in our environment and everyday uses	Page 88	Page 127

RANG 5 & 6 – EVEN YEARS

Strand Unit	Content	Curriculum	Teacher Guidelines
Plants and Animals	Investigate living things in various habitats Explore conditions of growth and how animals adapt to environments Uses of keys in the identification of species Explore food chains and life cycles Explore characteristics of specific groups, e.g. mammals, birds, fish Explore conditions of growth in detail including reproduction	Page 84	Page 62, 64, 66, 68, 70, 78, 82
Science and the Environment	Explore technology in the everyday context Identify the positive/negative effects of technology on our environment Look at technology and important scientists/inventions in our world	Page 91	

Light **Sound**	Characteristics of light – energy form, spectrum, reflection, refraction Uses of lens. Importance of sight Importance of the sun – photosynthesis Dangers of sunlight Characteristics of sound – vibration, energy, travel, travel through materials Making of sound through percussion, vibration Importance of hearing	Page 85 Page 85	Page 95
Heat **Materials and change**	Use/explanation of terms conduction, convection, radiation Transfer of heat, sources, renewable, non-renewable heat Use of thermometer Effects of heating/cooling on solids, liquids and gases Conductors and insulators of change Mixing, separating and dissolving of materials Testing of materials under different criteria, e.g. use of water, force Fire triangle – oxygen, fuel, heat. Heat at home	Page 86 Page 89	Page 128

REVIEW AND RATIFICATION:

- January 2021
- Staff will review this plan under the guidance of Mrs. R, Moynihan

This school plan was formulated by the principal and staff and approved by the Board of Management of School on _____2019 .

Chairperson of Board of Management: _____

This plan will be reviewed every three years.