**Scoil Naomh Cualán, Borrisoleigh, Co. Tipperary 20451V**

**Science -Whole School Plan**

Introduction

This plan was formulated by the Principal and staff of Scoil Naomh Cualán, Borrisoleigh.

Rationale

We focussed on this area of planning to ensure that the revised guidelines for science were introduced in our school in an organised, coherent and accountable manner. This plan will benefit the teacher by informing class planning and teaching and will provide the pupils with adequate opportunities to develop skills and understanding of concepts as envisaged by the science curriculum.

Vision

Through our school’s Science programme, we aim to help pupils to come to an understanding of and take an interest in the physical and biological world and environments around them. We believe that science should be a practical subject with opportunities to engage in hands on investigative work. To this end we will consciously develop children’s scientific skills as well as their scientific knowledge. Environmental activities will foster a positive attitude and a sense of responsibility among our pupils for the natural and human environments.

Aims

The aims of social, environmental and scientific education are:

* to enable the child to acquire knowledge, skills and attitudes so as to develop an informed and critical understanding of social, environmental and scientific issues
* to reinforce and stimulate curiosity and imagination about local and wider environments
* to enable the child to play a responsible role as an individual, as a family member and as a member of local, regional, national, European and global communities
* to foster an understanding of, and concern for, the total interdependence of all humans, all living things and the Earth on which they live
* to foster a sense of responsibility for the long-term care of the environment and a commitment to promote the sustainable use of the Earth’s resources through personal life-style and participation in collective environmental decision-making
* to cultivate humane and responsible attitudes and an appreciation of the world in accordance with beliefs and values.

In addition we aim to:

* Continue participation in the Green School Programme
* Take part in local & national science initiatives.
* Integrate other specially designated days and weeks into our school calendar e.g. national tree week, energy awareness week, etc
* Purchase additional science equipment as necessary.

Curriculum Planning

Science Programme

**Strands, Strand Units and Skills Development:**

Junior Infants – Second Class

Skills Development

*Working Scientifically*

* Questioning
* Observing
* Predicting
* Investigating and Experimenting
* Estimating and measuring
* Analysing – Sorting and classifying
* Recording and communicating

*Designing and Making*

* Exploring
* Planning
* Making
* Evaluating

The Science skills above will be developed as work is completed on the strands and strand units in the curriculum outlined below:

Strand 1: Living Things

* Myself
* Plants and animals

Strand 2: Energy and Forces

* Light
* Sound
* Heat
* Magnetism and electricity
* Forces

Strand 3: Materials

* Properties and characteristics of materials
* Materials and change

Strand 4: Environmental Awareness and Care

* Caring for my locality

Third Class – Sixth Class

Skills Development

*Working Scientifically*

* Questioning
* Observing
* Predicting
* Investigating and experimenting
* Estimating ad measuring
* Analysing: Sorting and classifying, Recognise patterns, Interpreting
* Recording and communicating

*Designing and Making*

* Exploring
* Planning
* Making
* Evaluating

The Science skills above will be developed as work is completed on the strands and strand units in the curriculum outlined below:

Strand 1: Living Things

* Human life
* Plants and animals

Strand 2: Energy and Forces

* Light•
* Sound•
* Heat•
* Magnetism and electricity•
* Forces•

Strand 3: Materials

* Properties and characteristics of materials
* Materials and change

Strand 4: Environmental Awareness and Care

* Environmental awareness
* Science and the environment
* Caring for the environment

We will use a balanced mix of theme-based approach to SESE, cross-curricular work and subject-centre focus.

Children’s Ideas

We will use children’s ideas as a starting point for all scientific activity. Strategies we will use to elicit children’s ideas are*:*

* Talk and discussion
* Open and closed questioning
* Annotated drawings
* Concept maps
* Concept cartoons
* Brainstorming
* Free play with materials

Practical Investigations

When planning practical investigations we will use:

* Open Investigations: Pupils are given or may suggest an open question for which they have to design their own investigation
* Closed Investigations: Pupils will engage in activities where the end result is obvious and there are not many variables.
* Fair Testing: Pupils develop a sense of what should be kept the same and what should be variable to ensure that an investigation is fair.
* We will consult the Teacher Guidelines pg 54 in this regard.

Classroom Management

A combined approach of whole class work, small group work and individual work on chosen topics and projects will be used in each class. Children will be given opportunities to work together collaboratively and share their own ideas. We encourage both the investigative approach and the teacher-directed approach Teachers will use their professional judgement to decide which methods and approaches are best suited to the needs of their pupils.

Key Methodologies

We plan to use the key methodologies of the Primary Curriculum in the teaching of Science:

* Active learning
* Problem solving
* Developing skills through content
* Talk and discussion
* Co-operative learning
* Use of the environment.

We have also identified the following as methodologies particular to Science and will employ them where possible:

* Free exploration of materials
* Use of everyday objects and materials in the environment
* Outdoor investigation and Fieldwork
* ICT

Linkage and Integration

We encourage the linkage of strands within the science curriculum and the integration of science with other subject areas.

* Human Life units on growth and reproduction will integrate with SPHE
* Environmental awareness and care is closely integrated with the SPHE and Geography curricula.
* Design and Make activities will also form part of the Visual Arts content.
* Links with the Maths curriculum are many, e.g. graphing results of investigations,
* The strand unit on sound is an integral part of the music curriculum e.g. Sounds in the environment and the designing of musical instruments.
* Various “line of development” studies in History will lend themselves meaningfully to scientific investigation e.g. Clothes over the years and Materials

Using the Environment

We have a completed an environmental audit of the school grounds and the surrounding locality. Each class will engage in designated habitat studies. The following are some examples:

Junior Infants – Second Class

1. Wall in junior yard
2. Grass area in junior yard
3. Spring/Summer flowers in garden
4. Seasonal study of a tree in the school grounds

First/Second Class

1. Minibeasts on concrete surface area
2. Study of a logpile / stonepile in school grounds
3. Birds in our school grounds – Swallow in the school shed/bird tables
4. Trees in our school grounds

Third/Fourth Class

1. Birds in our school grounds
2. Trees in our school grounds.
3. School Garden

Fifth/Sixth Class

1. Wormery studies
2. Nature trails

Balance between Knowledge and Skills

Science is not only concerned with the acquisition of knowledge but the understanding of concepts. We can nurture this understanding by developing skills of ., questioning, observing, predicting, investigating, analysing and recording and therefore acquiring knowledge. Children will explore, plan and analyse materials through Design and Make activities.

***Assessment – Looking at Childrens’ Work***

In Science we will assess:

* Knowledge
* Understanding
* Skills
* Attitudes
* Ability to work collaboratively

Assessment will be in the form of:

* Teacher observation,
* Concept-mapping,
* Annotated drawings
* Teacher-designed tasks and tests
* Portfolio and project work

There will be opportunities for the pupils to engage in self assessment as they analyse the success of Design and Make activities and get an opportunity to view their own work portfolios. Information from assessment will be communicated to parents in the school report at the end of the year and at the parent/teacher meetings.

Children with Different Needs

It is important that all children experience a rounded environmental education. Science plays a pivotal role in this education and so we will do our best to ensure that every child will have opportunities to engage in learning activities appropriate to their abilities**.**

* Teachers will use a mixture of whole-class teaching and group work, with different groups set tasks of various complexities.
* Teachers will develop their questioning techniques spanning from simple recall to more complex and analytical skills so that all pupils will have opportunities for success.
* Different ways of recording and communicating findings will be encouraged: drawing, ICT, written records, oral reports and models.
* All children benefit from active involvement in the environment so all will be encouraged to participate in fieldwork.
* The exceptional ability child will be encouraged to undertake additional research and recording their scientific findings in a variety of ways.
* SNA support for particular children or groups as directed by class teacher.

All teachers will familiarise themselves with the Draft Guidelines for Children with General Learning Difficulties (NCCA).

Equality of Participation and Access

* Boys and girls will have equal opportunities to participate in science lessons and activities.
* Equal opportunity will be given to boys and girls to experience all strands.

Science will be for all children regardless of gender, age or ability.

Organisational Planning

Timetable

In keeping with the recommendations in the Primary School Curriculum Introduction (page 70) a minimum of two and quarter hours per week is devoted to SESE in infant classes and a minimum of three hours per week for classes from first to sixth. One hour of this time will be spent on Science:

On occasion, time will be blocked as appropriate. This might occur when:

* working on a integrated project
* exploring the local environment

Teachers will use discretionary curriculum time (2 hours per week) for SESE as appropriate.

Resources and Equipment

* We have attached a list of our current resources for science to this plan.
* Equipment and resource materials have been allocated to an appropriate boxfor each strand. A list of the contents of the box is attached to the lid.
* The equipment will be checked and updated at the end of each year.
* Any equipment purchases will be organised by the science co-ordinator in conjunction with the Principal and in consultation with the staff needs and requirements. Science boxes are stored in the hall. Boxes must be returned to storage area after use. Science coordinator should be alerted if there is a need to replenish consumables.
* The school encourages the use of science websites providing this is within the safe use of the internet guidelines.
* We will use textbooks as a resource
* Environmentalists in the community are asked to talk to the children and share their knowledge with them.

Safety

We have a Health and Safety policy in place in our school which covers safety concerning the handling of equipment and out of school activities such as fieldwork,*(See Geography Teacher Guidelines p.g. 74 – 78 for guidance on such a policy)*. Teachers will consult the Principal whenever it is proposed to engage in fieldwork. During practical work teachers will be aware of the safety implications of any exploratory or investigative work to be undertaken. Successful and enjoyable investigations require sensible planning, good supervision and adherence to safety rules.

Outdoor work will be based in areas that are accessible for children, teachers and helpers and that are safe. Preliminary visits by teachers to the site will be necessary to identify potential hazards. If there are apparent dangers then a more suitable habitat will be selected for study. Habitat studies involve children in working with plants and animals, and teachers will be made aware that some children may be allergic to some animals and plants.

When designing investigative activities teachers will find useful safety advice in the *Teacher Guidelines for Science*and in *Safety in School Science (An Roinn Oideachais 1996).*

Individual Teachers’ Planning and Reporting

Teachers will consult this Whole School Plan and the curriculum documents for Science when they are drawing up their long and short term plans.

Teachers will include all the strands and strand units every year and will select objectives within the strand units each year. Staff teaching the same class level will decide collaboratively on objectives chosen and will inform subsequent teachers of content covered to ensure continuity in our spiral curriculum.

Where it is meaningful and suitable Science will be taught in a thematic way to integrate with the other SESE subjects of History and Geography. Cúntas Míosúil will assist in recording work covered, in evaluating progress in Science and in informing future teaching.

Staff Development

* Teachers will have access to reference books, resource materials and websites dealing with Science.
* Staff will be encouraged to research and try out new approaches and methodologies.
* The SESE postholder will be responsible for keeping resource material up to date and will arrange for opportunities for resources to be assessed for purchase and for new approaches to be piloted in the school.
* Teachers will be encouraged to attend in-service workshops and courses on Science in order to enhance their understanding and teaching of the subject. They will upskill other staff in what they have learned by sharing the expertise acquired at these courses during staff meetings.
* The culture in our school is one that encourages the sharing of experience and good practice.
* We have secured support from an SESE cuiditheoir in both our previous schools and will use the advice obtained with regard to the planning and implementation of the Science curriculum.

Parental Involvement

Parents are encouraged to come to the school to help out in the delivery of this programme by helping out in supervision of fieldwork when/if needed or taking part in whole school science activities. Parents are invited to celebrate and view results of projects, surveys, investigations in the school or read about them in the school newsletter.

Parents will be advised to study the 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 (2006).

Community Links

* People in the local community who have an interest and knowledge in the environment are invited to speak to the children.
* The local library will be a source of knowledge for the children.
* The work of some national agencies relates to aspects of the Science programme. As well as accessing materials produced by these agencies for schools, we will welcome visits by speakers from these organisations.
* Tree Council, Sustain Energy Ireland, Green Schools, E.N.F.O.

Success Criteria

We shall review this whole school plan in the future under the following headings**:**

* How individual teacher preparation, planning and teaching reflects this plan.
* Are procedures outlined in this plan consistently followed? (e.g. procedures for fieldwork, assessment.)
* How methodologies listed in this whole school plan are working in the classroom
* Science Resources
* How well are Scientific concepts being learnt by the children?
* How well are the children’s scientific investigation skills progressing?
* Evidence of practical activities in classrooms
* Evidence of indoor and outdoor work

Means of assessing the outcomes of the plan will include:

* Revisiting the aims of this plan as a staff
* Teacher/Parent feedback
* Children’s feedback
* Inspectors reports/suggestions
* Results of class assessment

Implementation

Roles and Responsibilities

* The plan will be supported, developed and implemented by all staff members. All staff members will have responsibility for informing the Principal /Deputy Principal re need for purchase, maintenance and storage of resources.

The following will be catered for by individual class teachers where appropriate/ feasible:

* Fieldwork trails and packs.
* Leading the development of new methodologies identified.
* Liaising with community organisations and relevant agencies.
* The development of ICT as a learning tool in Science and the vetting of websites.
* Attendance at upskilling workshops and courses, providing feedback to staff. – Rotated amongst the staff.

Review

It will be necessary to review this plan on a regular basis to ensure optimum implementation of the Science curriculum. This plan was reviewed in May 2016.We aim to further review this plan in May 2019 or earlier if deemed necessary.

On this date we will refer to the tasks in our action plan and check that they have been completed in accordance with the agreed time frame. Those involved in the review will be:

* Principal
* Post holder
* Class teachers
* BOM / DES

Ratification and Communication

This Whole School Plan was ratified by the Board of Management on 20/06/2016

Signed: Jody Spooner, Chairperson, Board of Management.

**Resources**

Textbooks and work cards can be used during science lessons to support active investigative work. However, “Science lessons **should not be work card or textbook based**” *c.f.* Curriculum Guidelines

**Books, videos and CD’s available in school**

N. B. Our current dual location hampers access to resources.

**CDs:**

* Trees
* Sammy’s Science House
* The Ultimate Human Body
* Encyclopaedia of Science
* Junior Science – Vols. 1 & 2

**Videos:**

* Investigator Alligator Series Electricity
* Magnetism
* Bright Sparks (Dangers of Electricity)
* Flashback
* Planet 3 (Water life, Margins of land, Wild Ireland)
* My First Nature video
* My First Science video

**Books:**

* My Science book of Magnets (DK)
* My Science book of Air (DK)
* Further Curriculum Banks Activities in Science -Keystage 1 (Scholastic)

-Keystage 2

* Environmental Studies Series (All class levels – Fallon)
* Simply Science Series (Prim-Ed)
* “Let’s Experiment With”
* Look Around Series
* The Young Oxford Encyclopaedia of Science
* Science Quest
* What A Wonderful World
* Window on the World
* Primary Science
* Science All Around Me Series (Educational Co)
* What do Levers do?
* What do Screws do?
* What do Springs do?
* Marie Curie
* Thomas Edison
* Alexander Graham Bell

***Resources* Required for the Science Programme**

**Living Things - Myself/Human Life:**

* Mirrors – plastic
* Metre sticks
* Height chart
* Thermometer
* Measuring tape

**Living Things - Animals and Plants:**

* Flower pot
* Insect cages
* Old spoons
* Sheets of Perspex or plastic
* Watering can
* Plastic tubing
* Hand lenses
* Nature viewers
* Microscope
* Binoculars
* Magnispectors
* Bird table

**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
* Candles

**Energy and Forces - Sound:**

* Tuning forks
* Rubber bands – Different sizes and thickness
* Guitar strings

**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 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
* Hacksaw and spare blades
* Wood glue
* Clamp
* Sandpaper
* Screwdriver and screws
* Craft Knife
* Hand Drill
* Ruler and Scissors
* Clips
* Spanners
* Needle
* Rotary Cutter
* G Clamp

**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