

Scoil Mhuire U.R. 11894I

Science Policy

The process of planning for a school is a work constantly in progress, comprising research, practice and evaluation at all times. The initial stage of drawing up or customising the curriculum to suit our own needs was perhaps the most valuable and while we have updated the programmes since then, we have not completely deleted all of our original work. Rather we have sought to develop each of our policies and subject programmes, to create a framework from which each teacher can draw, a rich source of topics and methodologies rather than a rigid programme from which no one can deviate. Our approach has been that we must first and foremost value and acknowledge what is already established good practice or content and not bring in change merely for the sake of change.

We hope in this way to remain responsive to the needs of each child, the dynamics of each class group, the talents of each teacher, the current events of each year and the rich tapestry of life as it affects Scoil Mhuire.

The Cuntas Miosúil remains the tool with which we plan for each year and avoid unnecessary overlap and repetition.

In this way we hope to keep adding to or altering our Plean Scoile through constant evaluation and enthusiastic teachers meetings, thereby maintaining an energy and freshness in everything we do.

Introductory Statement and Rationale

This plan was formulated by the Principal and staff of Scoil Mhuire and describes our agreed approach to the teaching of Science in the school. It is intended primarily as a plan for ourselves as a staff, and for any new teachers who may join the school. It is also intended as a reference document for our partners in the education process. This plan was agreed by all 2004, reviewed in 2009 and again in 2014.

We focused 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 and Aims

Through our school 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 and for girls to encourage greater uptake of STEM subjects in the future by good preparation in these at primary level.

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.

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 pay particular attention to STEM subjects and encourage their uptake given the alarming research showing poor uptake by girls in STEM subjects and avail of every opportunity to address this
- To enable children to learn through the experience of being an investigative scientist
 - 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 science through the Green Schools Projects
- 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 participation in collective environmental decision-making
- To cultivate humane and responsible attitudes and an appreciation of the world in accordance with beliefs and values.

We at Scoil Mhuire GNS believe that :

- Science provides motivation to learn by stimulating a child's natural curiosity and love of asking questions.
- Scientific investigation allows a child to reflect more deeply on previously held ideas and the way of research as form of learning.
- STEM subjects are for all
- Interaction with the environment, together with a consideration of the ideas and opinions of others, aids intellectual development.
- The skills and knowledge gained through science activity will help our children develop confidently within a scientific and technological society.
- Children will appreciate the contribution science makes to society.
- Through school based projects like the Green Schools and local projects such as Tidy Towns, children see Science as part of real life
- In a rapidly changing world with many far-reaching effects, a scientific understanding helps children to see the implications of change and apply principles to new situations.
- Scientific understanding prepares to an active part in debates about issues that affects their lives such as alternative energy resources, pollution and conservation.
- It develops useful skills and positive attitudes necessary for education across the curriculum.
- Science highlights the purposeful use of mathematical skills, providing the opportunity to develop concepts further.
- It gives children the opportunity to work co-operatively, share ideas and stimulate oral and written communication.
- School science is a reflection of science in the 'real world' where scientists learn from each other and extend the boundaries of knowledge by research.
- Children will learn to appreciate the powerful but provisional nature of scientific knowledge and explanation.
- The children will have access to careers in science, design and technology.

In addition we aim to:

- Develop small areas for growing or gardening according to the choice of teachers and the topics being covered and with a plan including maintenance during the holidays.
- Continue with our own *Science Weeks according to the ability of the children and the choices of teachers.*
- Continue participation in the Green School Programme and apply for our second flag
- Participation in relevant school competitions such as
 - i. Intel Science Fair
 - ii. UNESCO projects
 - iii. Erasmus Projects where appropriate
 - iv. the Young Scientist where appropriate
- Create a nature trail based on the trees in the school grounds
- Take part in local Science Week activities
- Invite visitors including parents, with scientific expertise
- Integrate other specially designated days and weeks into our school calendar e.g.
 - i. national tree week
 - ii. national spring clean week
 - iii. Maths Week
 - iv. Engineering week
 - v. energy awareness week
- avail of future curriculum support regarding the demonstration of practical science activities in our classrooms.

CURRICULUM PLANNING

Strands and Strand Units:

Teachers will divide the curriculum for each class level ensuring that the required strands are covered in a balanced manner.

We have included work from each strand unit for each year.

We have selected a range of content objectives from each strand unit to ensure breadth and balance in science throughout the class levels.

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

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
- Problem Solving
- Concept cartoons
- Mind mapping
- 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 a variable to ensure that an investigation is fair.

We will consult the Teacher Guidelines pg 54 in this regard and the excellent guidelines available from Intel, for example for their Science Fair Project where the girls learn to

- ✓ Work in groups
- ✓ Work as scientific investigators
- ✓ Record results
- ✓ That science is not only lab based

Classroom Management:

- A combined approach of
 - whole class work
 - small group work
 - 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.
- From time to time and as appropriate classes will display science work and topics covered
- 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/ every day objects
- Use of ICT in all of the above

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 suggested 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, Religion
- Environmental awareness and care is closely integrated with the SPHE, Geography and History
- 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 are very lucky to have huge grounds and we are situated close to the strand where the opportunity to look at marine issues are many.

Balance between Knowledge and Skills:

Science is not only concerned with

- ✓ the acquisition of knowledge, but also
- ✓ the understanding of concepts.

We can nurture this understanding by developing skills of

- ✓ questioning
- ✓ observing
- ✓ predicting
- ✓ investigating
- ✓ analysing
- ✓ recording and therefore acquiring knowledge.

Children will

- ✓ explore
- ✓ plan
- ✓ analyse materials through design and make activities.

Pupils will be given an opportunity to engage in Design and Make activities appropriate to their ability and area of study.

Please refer to;

Infants Curriculum	Pages 20-21
First & Second "	Pages 36-37
Third & Fourth "	Pages 56-57
Fifth & Sixth "	Pages 78-79

Assessment – Looking at Children’s Work:

In science we will assess:

- Knowledge
- Understanding
- Skills – and the ability to take a scientific or research approach to learning.
- Attitudes
- Ability to work collaboratively.

Assessment will be in the form of:

- Teacher observation
- Concept-mapping
- Quiz's or tests
- Annotated drawings
- Teacher-designed tasks and tests
- Parental Reports
- 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 they will 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
 - 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 to further their scientific study

Organisational Planning:

Timetable

In keeping with the *recommendations* in the Primary School Curriculum Introduction, time allocation for SESE will be as follows:

Infant Classes: 2¼ hours per week

First to Sixth Class: 3 Hours per week (One hour of this time will be spent on Science)

NOTE:

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

- working on a integrated project
- exploring the local environment

Resources and Equipment, including ICT:

- Any equipment purchases will be organised by all teaching staff in collaboration according to curriculum needs and requirements.
- Science resources are widely available online and should be in accordance with AUP and Safeguarding policies
 - PC's
 - Interactive whiteboards
 - Visualisers
 - iPads
 - Chromebooks
- the immediate locality, our grounds and the bay are natural resources.
- We will use textbooks as a resource.
- We will make use of kits to enhance our teaching of Science for
 - Sound
 - Water
 - Magnets
 - Electricity
- Environmentalists in the community will be asked to talk to the children and share their knowledge with them (Science Week).

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
- 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:
 - i. sensible planning
 - ii. good supervision
 - iii. adherence to safety rules.
- When designing investigative activities teachers will find useful safety advice in the *Teacher Guidelines for Science, Safety in School Science (An Roinn Oideachais 1996)*, our own *Health and Safety statement* and our *Insurance documents*.

Planning:

- Plans are drawn from the *Whole School Plan* and the curriculum documents for Science.
- Plans are created on a fortnightly basis and used to compile the Cúntas Míósúil.
- 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.
- Teachers' plans will inform subsequent teachers of content covered to ensure continuity in our spiral curriculum and avoid unnecessary overlap while ensuring that we are building year on year what the children are learning
- Where it is meaningful and suitable, Geography, for example, may be taught in a thematic way to integrate with the other SESE subjects of History and Science.

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.
- 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 up-skill 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.

Parental Involvement:

- We encourage and value parental involvement in the children's learning and experience of science.
- From time to time and as appropriate, we invite parents with expertise to visit the school and carry out work-shops with the students.
- Specialist workshops will be invited in for Science week, for example
- Parents may be invited to celebrate and view results of projects, surveys, and investigations in the school.
- Parents are 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) and resources available on Scoilnet.
- Teachers will also provide links and websites for parents as required

Community Links:

- People in the local community who have an interest and knowledge in the environment may, as appropriate, be 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 specifically for schools, we will welcome visits by speakers from these organisations:
 - Tree Council
 - Sustain Energy Ireland
 - Green Schools
 - Marine Institute

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.
- Whether procedures outlined in this plan consistently followed? ie procedures for fieldwork, assessment.
- How methodologies listed in this whole school plan are working in the classroom.
- Whether Science Resources are adequate for delivery of programme.
- How well are scientific concepts being learned by the children.
- How well each child's scientific investigation skills are progressing.
- Evidence of practical activities in classrooms.
- Evidence of indoor and outdoor work.
- Is the Plan updated or static?
- How well will we be able to integrate ICT in the delivery of the curriculum in particular in using the interactive boards.

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.

Review

It will be necessary to review this plan on a regular basis to ensure optimum implementation of the Science curriculum. This review was completed in 2014 with an update ratified by Staff and Board to take account of increased ICT equipment

Signed : _____ Date _____
Ms. J Henry.