



SESE: Science

Introduction

This draft policy was formulated in January 2020 by the teaching staff of Rathcoole Educate Together NS in accordance with the guidelines set out in the Primary School Curriculum 1999. Through the formulation of this policy, a common understanding of the purpose of the subject and how it will be implemented in this school has been created among the staff. Therefore, it will form the basis for teachers' long and short term planning. It will also inform new and temporary teachers of the approaches and methodologies used in the teaching of Science in our school.

Rathcoole Educate Together N.S. recognises the importance of the study of Science as an essential element in a fully-balanced education.

Rationale

We recognise Science as an integral element of Social, Environmental and Scientific Education. In our school, SESE provides opportunities for the child to explore, investigate and develop an understanding of the natural, human, social and cultural dimensions of local and wider environments, to learn and practice a wide range of skills, and to acquire open, critical and responsible attitudes. SESE enables the child to live as an informed and caring member of local and wider communities.

We recognise the distinct role science has to play in helping children come to terms with the biological and physical world. This plan has been drawn up in response to the 1999 Primary School Curriculum, to conform to the principles outlined in this curriculum and to review our practices in the light of these principles. As a whole school plan it guides and organises the teaching and learning for Science in our school. It will benefit the teachers by informing classroom planning and will ultimately benefit pupils by ensuring science activities are balanced and well-planned.

Vision

We seek to enable the children to:

- Develop an interest and curiosity in 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 through 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, recognize 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

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
- Develop a scientific approach to problem-solving which emphasizes understanding and constructive thinking
- Encourage the child to explore, develop and apply scientific ideas and concepts through designing and making activities
- Foster the child's natural curiosity, so encouraging independent enquiry and creative action
- Help the child to appreciate the contribution of science and technology to the social, economic, cultural and other dimensions of society
- Cultivate an appreciation of, and respect for, the diversity of living and non-living things, their interdependence and interactions
- 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
- Enable the child to communicate ideas, present work and report findings using a variety of media.

At RETNS we intend to:

- Continue to develop the school garden and bug hotel.
- Purchase additional science and ICT equipment.

Curriculum Planning

Strands and Strand Units

We at RETNS have prepared a two-year plan for each class level. 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. In the plan we have included a range of habitat studies based on our immediate environment for each class grouping. We will use a balanced mix of theme-based approaches to SESE, cross-curricular work and subject-centred focus.

See appendix for curriculum breakdown.

Children's Ideas

The children at RETNS will be given opportunities to form, change and develop perceptions through testing them in practical investigations. During their scientific activities, the children will be encouraged to try out, challenge, change or replace their ideas.

The teaching staff will use the following strategies to decide what the children already know about Science:

- Play scenarios
- Talk and discussion
- Questioning
- Listening
- Problem solving tasks
- Annotated drawings
- Teacher designed tests and tasks
- Concept mapping

Strategies used to encourage the children to pose their own questions are:

- Exploring
- Planning
- Making and evaluating objects that have practical purposes
- Observations
- Discussions
- Listening

The children at RETNS will be given opportunities for their ideas to be challenged and modified by ensuring that the curriculum is always child-centred.

- Practical Investigations

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- Investigating is the systematic search for evidence that tests an idea or explanation.

In the infant and junior classes:

- Simple investigations that are structured by the teacher will help children to think about how to approach solving problems practically.
Pupils will be able to identify the materials required and may suggest approaches that will help them carry out investigations.
- They may realise that some things have to be controlled or kept the same in an investigation.

For children in the middle and senior classes:

- Investigating and experimenting will involve them in planning and conducting fair tests of ideas and predictions.

At RETNS, children will be encouraged to practically investigate and apply scientific concepts to everyday situations by:

- Observing
- Classifying
- Recognising Patterns
- Estimating and measuring
- Questioning
- Making and testing hypotheses
- Predicting

A combination of closed activities as well as open investigations will be used. Closed activities and problems will assist children in discovering or learning a pre-determined idea or procedure. This approach will be used when the teacher wants to guide the children through the processes and content of various topics. Teacher-developed worksheets and commercially produced work cards will provide valuable resources for the staff at RETNS. Open activities will involve the teachers providing opportunities for the children to undertake scientific work which will raise their own ideas and questions. The children will then be encouraged to test and investigate these ideas. The teachers will ask open questions to encourage children to develop an investigative approach to solving problems. The extent to which the teachers choose to adopt an open-ended investigative approach will depend on the:

- Age and maturity of the children
- The number of pupils in the class
- The willingness of the teacher to work in an unstructured environment.

The staff at RETNS will ensure that the children understand the concept of fair testing by using a 'control' during experiments.

Due to the exploratory nature of Science, we feel that the participation of all students at all levels of ability is paramount. Differentiation is mainly the responsibility of each class teacher. It is most frequently evident in the different modes of representation and communication of ideas at the beginning and end stages of the investigation (Realistic Transfer of Knowledge). We also look at inviting parents or support staff to work with mixed ability groups.

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 at RETNS. Children will be given opportunities to work together collaboratively and share their own ideas. The safety of the children should always be kept in mind.

We at RETNS encourage both the investigative approach and the teacher-directed approach.

Key Methodologies

As a staff we endeavour to use the key methodologies highlighted in the curriculum:

- Investigative approach
- Closed activities
- Open activities
- Teacher-directed approach
- Use of the environment
- Active learning
- Guided and discovery learning
- Free exploration of materials
- Exemplars
- Cooperative learning
- Talk and discussion

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We have also identified the following as methodologies particular to Science and 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

Integrated learning, both within subjects and between curricular areas, is an important principle of the curriculum. Integration allows blocks of time to be utilised in the most efficient way and is

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particularly important at RETNS where there are varying degrees of abilities within the classroom. For integration and linkage to work successfully at RETNS, a number of factors will be taken into consideration. These include:

- Systematic planning by the teacher in order to ensure continuity and progress
 - Taking careful account of curricular requirements
 - The structuring of topic work
- Whole-school planning to ensure adequate subject coverage and a balanced range of content within each subject.

Linkage

The curriculum is presented in four strands, although almost all the scientific studies will encompass elements from at least two strands

Integration

At RETNS, many opportunities exist for valuable links to be made between Geography, Science and History. All science work will integrate with the English curriculum and many content elements have close links with other curricula also.

Using the Environment

It is important that children realise that the world they live in is precious and needs to be sustained. Every action they make in their local environment has wider-reaching effects. Each class will engage in designated habitat studies. Age appropriate trails will be developed for each class levels.

Recycling and the Environment

We hope to set up a Green committee in Year 2 and attain our first Green Flag Award and, as a result, recycling is a major part of our daily school life. Each class has a recycling bin and each day the bins are removed and emptied.

Assessment and record keeping

The assessment of Science at RETNS will enhance teaching and learning in a number of ways. It will:

- Assist in planning and support future learning for the children
- Indicate positive achievements of each pupil engaged in the scientific topics
- Indicate possible areas of development in the children's learning
- Indicate areas of learning difficulties encountered by the children
- Help the teacher to identify approaches of learning experiences that could help the children improve their learning
- Provide valuable opportunities to gain evidence of a child's progress in areas such as mathematics, language and social development
- Provide an indication of the child's overall achievement in a systematic way at regular intervals

- Help to evaluate the suitability of the Science Programme selected by the teachers at RETNS
- Display a continuity between classes and schools (primary and post-primary) in relation to such procedures
- The procedures will allow for effective communication of relevant information to parents, teachers, the Department of Education and Science, and other agencies.

Assessment in Science must be valid and seek to measure and report on the child's progress and achievements throughout all aspects of the curriculum. The assessment techniques in Science must focus on:

- Knowledge objectives
- Understanding of scientific concepts
- Competence in the application of experimental and investigative skills
- The cultivation of important attitudes

The assessment of Science will be a continuous process and will be part of every normal teaching and learning situation at RETNS. The effectiveness of assessment in Science will be dependent on teacher skills of observation, listening, interacting with the children and scrutinising the outcomes of the learning tasks used in Science.

The following are among the assessment tools that RETNS will use in Science:

- Observation
- Tasks and tests
- Concept mapping
- Work samples, portfolios and projects
- Curriculum profiles

There will be opportunities for senior class children 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.

Children with Additional needs

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

A number of techniques will be used to provide a different range of learning activities appropriate to the individual needs of the pupils.

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 students will have opportunities for success.

Different ways of recording and communicating findings will be encouraged:

- Drawing

- - ICT
 - Written records
 - Oral reports
 - Models

ANA support for particular children or groups as directed by the class teacher

All children benefit from active involvement in the environment so all will be encouraged to participate in fieldwork

Children with exceptional ability will be encouraged to undertake additional research and record their scientific findings in a variety of ways.

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

Children from the Special Class will be integrated when appropriate. The staff will encourage reverse integration to begin with as a means to encourage this process at the child's level. The aim will be that the children will integrate in the mainstream classroom on an increased basis when it is deemed suitable and beneficial to the child.

Equality of participation and access

Provision will be made to ensure that the staff of RETNS will identify and ensure that provision is made, as and where necessary for the following:

- Members of the Traveller Community
- Children experiencing any form of disadvantage
- Children with disabilities
- Families with literacy problems
- Families for whom English is not the first language

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

Organisational Planning

Timetable

An integrated approach will be commonly used at all levels at RETNS. We will concentrate on one aspect of SESE at a time. Time allocations will remain flexible, as work in each area will complement learning in other subject areas, and individual teachers at RETNS will be free to use their professional judgment to adjust the guidelines to suit individual pupil needs and the class circumstances. Some discretionary time may also be allocated periodically for SESE.

Resources and ICT

Access to an adequate supply of suitable teaching materials is essential for the development of a holistic approach to the teaching of Science. At RETNS, we have decided on the following:

- RETNS encourages the use of science websites providing this is within the safe use of the internet guidelines.
- We encourage the use of the immediate locality as a resource.
- Staff members evaluate the materials in use and consult with the principal on the selection of materials, equipment, games and text books.

- Teachers are given the opportunity to discuss anything with regards to the Science curriculum at staff meetings.
- Teachers are encouraged to share all materials and ideas with their colleagues.
- Teachers are encouraged to familiarise themselves with the PDST resources for Science and to use Discovery Science through the SFI.

Health and 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.

Teachers will consult with the Principal whenever it is proposed to engage in fieldwork.

Safe outdoor work will be based in areas that are accessible for children, teachers and helpers.

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 work involves children working with plants and animals, and teachers will be made aware that some children may be allergic to some plants and animals.

Safety is a regular concern for all members of the school community. At the beginning of every lesson, safety measures to be taken will be highlighted. If possible, parents and/or SNAs will be asked to assist by overseeing the safety of groups of pupils.

All safety measures/guidelines are highlighted in the Curriculum:

Safety in general	Teacher Guidelines	p27
Outdoor exploration and investigation	Teacher Guidelines	p58-59
Light	Teacher Guidelines	p86
Electricity	Teacher Guidelines	p97
Magnetism	Teacher Guidelines	p105
Forces	Teacher Guidelines	p107
Heat	Teacher Guidelines	p129

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 the strands and strand units listed in the appendix 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 the content covered to ensure continuity in our spiral curriculum. This will be decided at our staff meetings.

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

Staff development

Teachers will access reference books, resource materials and websites relating to Science. Staff at RETNS 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 upskill other staff in what they have learned by sharing the expertise acquired at these courses. This will be done at staff meetings.

The culture in our school is one that encourages the sharing of experience and good practice.

Parental/caregiver involvement

Parents/caregivers are encouraged to come to the school and to help out in the delivery of this programme. This may be in the supervision of fieldwork or taking part in whole-school science activities.

Parents/caregivers are invited to celebrate and view results of projects, surveys, investigations in the school or read about them on the school website and Seesaw.

Parents/caregivers will be advised to study the Primary School Curriculum; Your child's learning in Primary School, NCCA DVD (2006).

Community Links

Parents/ caregivers and members of the community who could make a particular contribution to the Science programme are encouraged into the school/classes.

Success criteria

In future we shall review this whole school plan under the following headings:

- How individual teacher preparation, planning and teaching reflects this plan ● Are procedures outlined in this plan consistently followed?
- How methodologies listed in this whole school plan are working in the classroom
- Science resources
- How successful are the scientific concepts learnt by the children?

- How well are the children’s scientific investigations skills progressing?
- Evidence of practical activities in the 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/ caregivers feedback
- Children’s feedback
- Inspectors reports/suggestions
- Results of class assessment

Implementation

Roles and Responsibilities

The plan will be supported, developed and implemented by:

- The Board of Management of RETNS
- The Principal
- The parents/caregivers of children at RETNS
- The staff of RETNS

The following staff members will have responsibility for the following:

- Scientific audit of school grounds and immediate locality: All staff
- Fieldwork, trails and packs: All staff
- Purchase, maintenance and storage of resources: Designated staff
- Leading the development of the new methodologies identified: All staff
- Liaising with community organizations and relevant agencies: Principal
- The development of ICT as a learning tool in Science and the vetting of websites: ICT Post Holder
- Attendance at up-skilling workshops and courses as well as providing feedback to staff: All staff

Roles and Responsibilities

The following people will be involved in the review of the Science plan:

- The Board of Management of RETNS
- The Principal
- The teachers
- The pupils
- The parents/guardians of RETNS
- Department of Education and Science

Ratification & Review

Date Created	November 2020
Date of Review	March 2023
Date for Next Review	January 2025

Odd Years

Strands	Strand Units
Living things	<ul style="list-style-type: none"> ● Human Life
Energy and forces	<ul style="list-style-type: none"> ● Light ● Sound
Materials	<ul style="list-style-type: none"> ● Properties and characteristics of materials
Environmental Awareness and care	<ul style="list-style-type: none"> ● Caring for the environment ● Environmental Awareness

Even Years

Strands	Strand Units
Living things	<ul style="list-style-type: none"> ● Plants and Animals
Energy and forces	<ul style="list-style-type: none"> ● Heat ● Magnetism and electricity ● Forces
Materials	<ul style="list-style-type: none"> ● Materials and change
Environmental Awareness and care	<ul style="list-style-type: none"> ● Caring for the environment

- Science and the environment

Environmental Awareness and Care Curriculum Breakdown

Junior Infants	Vegetable garden – plant one of the beds in the vegetable garden and care for the vegetables.
Senior Infants	Looking after birds in the school grounds – make feeders, observe birds.
First Class	- Fruiting Plants in the school ground Seasonal study of a tree in the school grounds
Second Class	Birds in our school grounds, Bug hotel Study of a logpile/stonepile in school grounds
Third Class	- Field study if appropriate - Plant and care for flowers in school grounds.
Fourth Class	- Study of bug hotel in school grounds - Birds in our school grounds - Killinthomas Wood field study
Fifth Class	- Vegetable garden – plant and care for vegetables - Bog of Allen field study
Sixth Class	- Wormery studies - Look after hens in school. - Pollardstown Fen – field study



Signed: _____
(Chairperson of Board of Management)



Signed: _____
(Principal)

Date: 30.03.2023