



Whole school plan for

Science

St. Ronan's National School - Clonlloo

Introductory Statement

This plan was formulated by the teachers of St. Ronan's National School. Research, general feedback and resources that are available in the school environment of St. Ronan's were used to devise this policy.

Rationale

- To provide the teachers with a coherent approach to the teaching of science across the whole school, so that all strands and strand units will be developed and expanded as the children progress through their primary school education.
- To provide the children with ample opportunities to explore, investigate and develop an understanding and appreciation of a scientific knowledge and concepts about the biological and physical aspects of the local wider and natural environment.
- To stimulate curiosity about local and wider environments by utilising our natural resources in our surroundings.

Vision and Aims

Science in our school should aim to help children to work scientifically involving the development of a broad range of skills of enquiry, the cultivation of important attitudes and the acquisition of scientific knowledge and concepts about the biological and physical aspects of the world. We hope to foster the children's natural curiosity to enable them to take an active part in their own learning.

Particular Aims

The aims of the science education in St. Ronan's are:

- That the children will develop a natural curiosity and it will be fostered through their immediate environment.
- To 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.

- To 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.
- To develop and apply constructive thinking in scientific investigation.
- To understand the application of some basic scientific ideas and concepts in everyday situations.
- To use well-planned integrated approaches, both within S.E.S.E and between S.E.S.E and other curricular areas such as Maths, English, Art, I.C.T and S.P.H.E, by using a variety of oral, written and graphical forms and other media.
- To use the school garden as a resource to recognise the importance of conserving habitats and environment, and begin to understand that all life now and in the future depends on the sustainable development of the planet.
- To become actively involved in the discussion, exploration and resolution of environmental issues by partaking in the Green Schools Programme on an on-going basis.
- To promote an awareness of STEM Programmes which aim to develop creativity in our children, show them how important STEM is to our everyday lives and more importantly how much fun it can be.
- To understand and apply a safety code in scientific and technological investigations and activities.

Curriculum Planning

The curriculum is delineated at four levels - infant classes, first and second classes, third and fourth classes, and fifth and sixth classes, which are all divided into five strands. It is the aim of St. Ronan's N.S. to teach all strands and strand units of the Science Curriculum over a 2-year period due to the multi-grade nature of the classrooms. See attached a grid table for each room.

Junior Infants - Second Class

Strand	Strand Unit
Living Things	<ul style="list-style-type: none"> • Myself • Plants & Animals
Energy & Forces	<ul style="list-style-type: none"> • Light • Sound • Heat • Magnetism & Electricity • Forces
Materials	<ul style="list-style-type: none"> • Properties & characteristics of materials • Materials & change
Environmental awareness & care	<ul style="list-style-type: none"> • Caring for my locality

Skills Development: Infants - Second Class

Working Scientifically	<ul style="list-style-type: none"> • Questioning • Observing • Predicting • Investigating and experimenting • Estimating and measuring • Analysing <ul style="list-style-type: none"> - Sorting and Classifying - Recognising Pattern (1st & 2nd Class only) - Interpreting (1st & 2nd Class only) • Recording and communicating
Designing and Making	<ul style="list-style-type: none"> • Exploring • Planning • Making • Evaluating

3rd Class - 6th Class

Strand	Strand Unit
Living Things	<ul style="list-style-type: none"> • Human Life • Plants & Animals
Energy & Forces	<ul style="list-style-type: none"> • Light • Sound • Heat • Magnetism & Electricity • Forces
Materials	<ul style="list-style-type: none"> • Properties and Characteristics of materials • Materials and Change
Environmental Awareness and Care	<ul style="list-style-type: none"> • Environmental Awareness • Science and the Environment • Caring for the Environment

Skills Development: 3rd - 6th Class

Working Scientifically	<ul style="list-style-type: none"> • Questioning • Observing • Predicting • Investigating and experimenting • Estimating and measuring • Analysing <ul style="list-style-type: none"> - Sorting and Classifying - Recognising Pattern - Interpreting • Recording and communicating
Designing and Making	<ul style="list-style-type: none"> • Exploring • Planning • Making • Evaluating

Children's Ideas

Teachers can elicit at the start of science lessons what the children know already and use the children's own ideas as a starting point for all scientific activity. Understanding can then be developed at different levels. Teachers use vital tools such as talk and discussion, brainstorming, K.W.L.'s, concept mapping etc. These are used to find out the existing ideas children hold about a particular topic. Finding out the existing ideas of children is important because learning is an active process and what children know or believe influences further learning. Practical investigations are used to change and develop children's ideas. During these scientific activities children should be provided with opportunities to try out, challenge, change or replace ideas. As children progress through the science curriculum, concepts will be redefined as the children work in more demanding contexts and develop more open-ended investigative approaches to solving problems. Children's ideas are formative assessment to inform later teaching.

Practical Investigations

We encourage practical investigations through teacher demonstrations and both whole class and small group STEM investigations and experiments. By working in pairs or groups both of mixed and similar abilities, children's varying needs are catered for. Product, process, content and questioning as well as teacher expectations are all differentiated. It is important for teachers to encourage children to observe what is in their immediate and local environment and to continuously create links as to how everyday living relates to science. We use a combination of closed activities as well as open investigations to facilitate scientific learning.

Classroom Management

Teacher-directed approach is very important when demonstrating skills to the children as well as during their own preparation and planning. This approach is also vital for clarifying concepts being investigated and in ensuring safety practices are being applied. Pupils are also enabled to work on their own problems through well-managed teacher-designed tasks which will be carried out in established small groups, pairs or individual

work. The school is well equipped for scientific exploration and all equipment is stored in the hall in boxes clearly labelled under the Strand Units. Any experiments or science projects that are carried out in class will be documented, discussed and displayed when necessary. Teachers may have a science area in their classroom in which they can display their classes science findings.

Key Methodologies

These key methodologies are outlined in the Curriculum Guidelines (pages 52-142).

- Using the Environment
- Aistear & Active Learning
- Guided and Discovery Learning
- Free Exploration of Materials
- Spiral Nature of the Curriculum - opportunities to return to earlier learning and to extend and enhance it.
- Learning through Language
- Exemplars
- Closed activities
- Open activities
- Experimenting
- Designing and Making
- Outdoor investigation and fieldwork
- Talk and Discussion
- Group Work
- Questioning
- Use of digital technologies
- Linkage and Integration

Linkage and Integration

Every opportunity will be used to ensure linkage within the Science Curriculum and cross-curricular integration. A thematic approach will be used by all teachers to ensure this

integration. In particular, in Junior and Senior Infants the teaching of all SESE subjects may be integrated to the monthly Aistear theme. The use of well-planned integrated approaches both within S.E.S.E. and between S.E.S.E. and other curricular areas, will have an important part to play in the teaching of the primary curriculum at all levels.

Using the Environment

The range of habitats and features of the local natural and built environment incorporated into the Science programme are:

- Each class group undertakes a study of local habitats, flora & fauna relevant to the natural environment.
- Our school is a member of Green Schools' Project and we are continuously working to protect the future environment of our school and the broader community.

Visitors to St. Ronan's National School

All visits by external bodies to the school are always undertaken with full knowledge and consent of the principal.

Balance between knowledge and skills

It is important to ensure the balance between knowledge and skills is created in Science. Our planning will ensure that the science programme achieves a balance between the different aspects of the curriculum. There will be a balance between the strands and strand units of the curriculum. Each year the children will experience topics from each strand unit. There will also be a balance between the development of scientific knowledge and understanding and the processes of working scientifically. S.E.S.E. is also concerned with the cultivation of important attitudes and values. It fosters an appreciation of the interrelationships of all living things and their environments and encourages children to become active agents in the conservation of environments for future generations. Through their investigations, children develop informed, critical and scientific perspectives.

Multi-Grade Teaching

St. Ronan's N.S. is a two teacher rural DEIS school. We use a thematic approach occasionally in the study of SESE throughout our classes, however we also teach the subjects individually. Most strand units are taught together to the four classes. We will differentiate the work for the different ages by expecting the older children to cover more ground in depth and content and presentation. Textbooks are selected after consultation with staff and are a whole staff decision. Textbooks are used as a resource.

Assessment and Record Keeping

Assessment in Science must seek to measure and report the child's progress and achievements in all aspects of the curriculum. We seek to assess the following:

- Understanding of knowledge
- Scientific skills
- Attitudes towards science and investigation
- Ability to work collaboratively

Assessment will be in the form of:

- teacher observation
- annotated drawing
- teacher-designed tests and tasks
- work samples and displays of work.
- concept mapping

Children are given opportunities to assess their own and each other's work particularly during design and make, they are encouraged to orally present work and accept feedback from their peers. Teacher assessment of progress in Science is ongoing during the study of the Strand Units. This assessment will inform teachers class planning, this in turn will inform our whole school plan. Teachers share information with each other regularly. Information from assessment will be communicated to parents at the parent/teacher meetings, informally during the year and through end of year report cards.

Children with Different Needs

Children with different needs will be catered for through various different techniques i.e. pair work, group work, teacher designed tasks, teacher questioning and teacher expectations. Product, process and content will all be differentiated to facilitate each particular child's needs.

Equality of Participation and Access

All children are given the opportunity to participate in science experiments, discussions, investigations and the sharing of opinions. The programme at each class level will be flexible so that the learning requirements of all children may be addressed.

Organisational Planning

Timetable & Planning

As per curriculum guidelines, it is recommended that teachers spend two hours and fifteen minutes teaching S.E.S.E. in Junior and Senior Infants and three hours from 1st-6th class. An integrated approach is commonly used at all levels in St. Ronan's. The teaching of Science is often integrated with other subjects and also through Aistear for younger classes. There may be times that teachers may need to do further science work, for example Green School flag preparation and presentation, science events or class project work.

Resources and ICT

Resources and Digital Technologies

- There is no core SESE book used in the school, however there is access to a large resource bank of SESE materials in the shared resource presses outside classrooms.
- The teaching of SESE subjects in Junior and Senior Infants is integrated to the monthly Aistear theme where possible.

- The classroom libraries have a "science" section where children and teachers can access more information on topics they are covering in class.
- There is a selection of technologies available in the school, e.g. cameras, video camera, visualiser, interactive whiteboards, computer, laptops and iPads.
- The teaching of SESE subjects in Junior and Senior Infants may be integrated to the monthly Aistear theme, where possible.
- The school is well equipped for scientific exploration and all equipment is stored in the hall in boxes labelled according to the Strand Unit. There is no timetable for use of these resources, but it is suggested that resources be immediately returned to the hall after the Science lesson. Any breakages, replacements or suggested additional resources should be reported to the principal.
- The school library has a "Science" section where children and teachers can access more information on topics they are covering in class.
- The local environment is regularly used for nature walks etc.
- Visitors may come to the school to talk on certain topics relating to Science.
- The school participates in external programmes that are Science related.
- There is a selection of technologies available in the school, e.g. cameras, video cameras, visualisers, interactive whiteboards, computers, laptops and iPads.
- All classes have access to the internet where age appropriate websites can be accessed. Useful websites:

www.usborne-quicklinks.com	www.pcsp.ie
www.primaryscience.ie	www.sdps.ie
www.ecounesco.ie	www.ncca.ie
www.antaisce.ie	www.teachnet.ie
www.meath.ie	www.scoilnet.ie
www.agriaware.ie	www.into.ie
www.enfo.ie	www.seomraranga.ie
www.science.ie	www.prometheanplanet.com

Safety

Safety should permeate all aspects of the teachings of Science and children should be encouraged to observe safety procedures during all tasks.

Outdoor Exploration

Outdoor work should be based in areas that are safe and accessible for children, teachers and helpers. Preliminary visits by teachers to the site can be used to identify potential hazards. Adequate supervision should be given to the children at all times. It will be necessary for a number of adults to accompany each class. These adults should be aware of procedures to be adopted in the event of emergencies.

Light

When planning a unit of work on light the teacher will ensure that the children are aware of and adhere to the following safety procedures:

- Do not look at the sun or very bright beams of light
- Never look at the sun through lens
- Children should be made aware of the dangers of sunburn

Electricity

Work on the topic of electricity and magnetism will provide opportunities for children to learn about the safe use of electricity. It is important that children realise the dangers of mains electricity and become aware of and discuss safety issues associated with use of mains electricity and electrical appliances. Batteries should be used for activities based on electric current. Mains electricity should never be used during science investigations. The children should be aware of the following safety considerations:

- The dangers of touching the bare metal of a plug or a switch especially when hands are wet
- The importance of not using electrical appliances without adult supervision
- The dangers associated with flying kites or using fishing rods near overhead wires
- The risks attached to playing near electricity sub stations

Batteries

With regards to the use of batteries, the following safety procedures should be observed:

- Batteries must not be cut open
- Batteries should be disposed of in a safe manner and put into the battery recycling bin.

In-class safety guidelines

- Disposable gloves should be used when necessary.
- All Science equipment should be stored safely.
- Fire extinguishers are located around the school hallway.
- Be careful in tests using hot water - children should use water that is safe for them.
- Teachers should demonstrate safe use of tools before allowing use by children.
- Knives should only be used under the strict supervision of a teacher.
- Tools need to be stored in a secure area.

Homework

In the junior end of the school, Science is not usually given as homework. However, little activities and / or project work / research may be occasionally completed at home, at the teacher's discretion. In the senior end of the school more time may be given to project work, research and activities to consolidate learning from that day.

Individual Teacher's Planning and Reporting

- Teachers will consult this whole school plan and the curriculum documents for Science for the purpose of long and short term planning.
- Where appropriate Science will be taught in a thematic way to integrate with other S.E.S.E. subjects.
- Long term plans will be drawn up for each classroom and from these, each teacher will tailor fortnightly/monthly short-term plans according to the individual needs of their own classes.
- In St. Ronan's, the cúntas míosúil is linked to short-term planning. Parents are informed of children's progress in Science at parent-teacher meetings and in end of year report cards.

Staff Development

Teachers have access to reference books, resource materials, Aistear resources and websites dealing with science. School personnel research new approaches and methodologies. At times they arrange for opportunities to try out resources on a pilot basis and assess whether or not they should be purchased. At times there may be appropriate science courses available. Teachers are encouraged to attend. Teachers are encouraged to share the expertise acquired at these courses. This is organised at staff meetings. Times may be allocated at staff meetings to discuss aspects of the science curriculum.

Parental Involvement

At every opportunity, parents are encouraged to get involved in St. Ronan's science projects, such as the Green Schools, the School Garden and various recycling collections such as the recycling of batteries. Parents may be invited into the school for special Science events or to visit the school garden. Parents may also get involved with their children during project work.

Community Links

The local community is very much an important aspect of the teaching of Science in primary schools. Guest speakers may be invited in throughout the year to speak about their field of work. For example, an ecologist, a farmer, an engineer. The guest speaker will link into what is being taught in the classroom at that time. The local library is a source of scientific knowledge for the children. The local library in Boyle has a huge selection of books on any given topic in science. Children will be brought on various different visits to places of local interest for example nature walks.

Success Criteria

The important points to consider are:

- To be aware of the children's past learning experiences
- To select strands and strand units outlined in the curriculum and in the school plan for science for each classroom
- To clarify and identify the detailed content that is to be covered in the unit of work
- To identify the learning outcomes to be achieved
- To specify and undertake the methods of assessment
- To outline the science activities that the children will undertake
- To consider the teaching approaches that can be employed
- To provide for individual differences
- To identify the resources required for the topic and the equipment in the school
- To plan for the communication and recording of work and findings
- To ensure planning is adhered to with other fellow teachers

Implementation

Roles and Responsibilities

The role of the teacher is to facilitate scientific learning in the classroom and to encourage active learning during science lessons. Teacher will ensure safety is implemented at all times during scientific experiments and activities.

The responsibilities of the teacher are as follows:

- To ensure sufficient planning is carried out by all teachers
- To create a balance in order to facilitate practical work using both the investigative approach and the teacher directed approach
- To differentiate the curriculum to cater for the various learning needs within each class.
- To use various methodologies to help learning and employ an integrated approach at every available opportunity
- To allow the children the excitement of finding out for themselves
- To enable the pupils to work on their own problems as far as possible

- To encourage pupils to pose their own questions
- To use children's ideas as a basis for activities

Review

This plan was reviewed in October 2023 and will be updated as required.

Ratification and Communication

Ratified by Board of Management on 25th October 2023

Fr. Joseph Caulfield

Chairperson
Board of Management