

Scoil Íosagáin
Whole School Plan for
Science



■ Title: Science Plan of Scoil Iosagain

■ Introductory Statement and Rationale

(a) Introductory Statement

All teachers met on school grounds to review and discuss the existing plan for science and to formulate a new school plan for science.

An experimental and investigatory approach to science in the Primary School can make a unique and vital contribution to the holistic development and education of the child.

We aim to provide our children in Scoil Íosagáin with opportunities to explore investigate and develop an understanding of the natural, human, social and cultural, local and also wider more natural environments. We hope to give our children the chance to learn and practice a wide range of skills and to acquire open critical and responsible attitudes. By giving our children these opportunities we envisage that they could live as informed and caring members of local, national, European and Global communities.

(b) Rationale

This plan was formulated to benefit teaching and learning in our school, to provide a coherent approach to the teaching of Science across the whole school and to ensure that pupils are given adequate opportunities to develop skills and understanding of concepts as envisaged in the Primary School Curriculum.

Science has a distinct but complementary role with Geography and History within SESE and with SPHE.

■ Vision and Aims

(a) Vision:

We seek to foster the children's natural curiosity by enabling them to take an active part in their own learning. The science programme aims to help the children to work scientifically, developing skills of enquiry, the cultivation of important attitudes and the acquisition of scientific knowledge and concepts of the wider world.

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 policy should ensure continuity and progression in the development of scientific ideas and application of investigative skills.

(b) Aims:

Through the implementation of this plan we endeavour:

- To promote curiosity and enjoyment in science and to develop a lasting interest in the subject.
- To help children to develop knowledge and informed attitudes towards scientific and environmental issues.
- To develop experimental and investigatory skills and problem solving skills through practical investigation.
- To develop the scientific approach of making observations, predicting and carrying out investigations and analysing the results of tests and investigations.
- To develop scientific language associated with each of the strand areas.
- To encourage the child to explore, develop and apply scientific ideas and concepts through designing and making activities.

- To encourage the child to behave responsibly to protect, improve and respect our environment.
- To help the child to appreciate the contribution of Science and technology to the social, economic, cultural, and other dimensions of society.
- To cultivate an appreciation and respect for the diversity of living things, their interdependence and interactions.
- To foster the skills of enquiry by using the children's ideas and questions as a springboard for further lessons and practical investigations.
- In addition we aim to continue participation in Green Schools Programme, take part in local and national science initiatives, integrate other specifically designated days and weeks into our school calendar eg National Tree Week, Tidy Schools

■ Content of Plan

Curriculum:

Refer also to Science Curriculum pp20-92. We teach the S.E.S.E programme as outlined in the Revised Primary Curriculum.

Science Curriculum Strands and Strand Units

Infants to 2nd Class

Living Things	Energy and Forces	Materials	Environmental Awareness and Care
<ul style="list-style-type: none"> • Myself • Plants and animals 	<ul style="list-style-type: none"> • Light • Sound • Heat • Magnetism • Forces 	<ul style="list-style-type: none"> • Properties and characteristics of materials • Materials and change 	<ul style="list-style-type: none"> • Caring for myself and my locality

3rd to 6th Class

Living Things	Energy and Forces	Materials	Environmental Awareness and Care
<ul style="list-style-type: none"> • Human life • Plants and animals 	<ul style="list-style-type: none"> • Light • Sound • Heat • Magnetism and electricity • Forces 	<ul style="list-style-type: none"> • Properties and characteristics of materials • Materials and change 	<ul style="list-style-type: none"> • Environmental awareness • Science and the environment • Caring for the environment

See Appendix: 2 year Plan for Each class level.

1.1 Skills Development

Science education enhances children's knowledge and understanding of themselves and the world in which they live. It involves children in the active construction of their own understanding. This understanding changes in response to the children's broadening experiences through the study of the content strands.

In order to ensure that there is a balance between skills development and acquisition of knowledge throughout the programme, scientific topics are introduced and discussed with increasing levels of detail in each class.

Working scientifically will involve children;

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

An important aspect of the 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)

1.2 Children's Ideas:

We use the children's ideas as a starting point for all scientific activity. We begin with the children's ideas of how things are and these ideas are changed and developed by testing them in practical investigations. Children are provided with opportunities to try out, challenge, change or replace ideas. A wide range of strategies will be used to explore the children's ideas. These strategies may include discussion, questioning, annotated drawings, concept maps, teacher designed tests and tasks.

1.3 Practical Investigations:

Practical Investigations are encouraged in all classes. The teacher facilitates the achievement of the objectives of the unit of work by using a combination of approaches such as closed practical activities, open investigations and teacher-directed tasks. In doing so the teacher encourages an investigative approach to problem solving, placing the responsibility for thinking on the pupil. The child is encouraged to apply scientific concepts and skills to everyday situations in this way. We will ensure that during scientific investigations fair testing applies through questioning, using a control and changing one variable at a time. At infant level an awareness of the conditions which make a difference in an experiment is sufficient. Other class levels will engage in questions such as what is being tested? What will be changed? What will be kept the same? What will be measured or compared?

1.4 Classroom Management:

Teacher-directed approach is used to clarify concepts being investigated and to ensure that safety practices are being applied. Pupils are enabled to work on their own problems as far as possible. Teachers will organise a variety of methods for organising learning and teaching ensuring that the children have an opportunity to work in different grouping (whole class, small group, pairs and

individually) We ensure that the children work collaboratively by assigning roles (recorder, timekeeper, reporter, investigator etc...)

Teachers ensure that all children have easy access to materials that may be needed for each lesson. Children have the opportunity to work collaboratively and co-operatively together, share ideas and communicate their feelings.

Display boards, nature tables, and science corners are used to display models/projects and to present findings to others.

1.5 Key Methodologies:

The science programme aims to help the children to work scientifically in order to develop 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 ensure that the key methodologies of the primary curriculum are used to implement the Science programme.

- Using the environment
- Active learning
- Guided and discovery learning
- Free exploration of materials
- Spiral nature of the curriculum
- Learning through language
- Collaborative/Co-operative learning
- Skills development through content.

Each science lesson is structured in the following way:

- a) Use appropriate methods to elicit the preconceived ideas of the children e.g discussion, brainstorming, questioning, concept mapping, K.W.L.
- b) Practical investigation of their ideas e.g experimenting.
- c) Further exploration of the concept where children may modify their initial ideas.
- d) Conclusive discussion on what was discovered and recording as appropriate.

1.6 Differentiation:

Flexibility in planning and preparation is necessary. It is the teacher's responsibility to differentiate within a lesson, matching tasks to individual needs.

❖ Differentiation by task:

Children engage in the same elements of the programme but are given different, related tasks according to ability level.

❖ Differentiation by outcome:

Children are set tasks which allow for progress to be made through their own knowledge, understanding and effort.

Teachers consider

- ✓ Using a combination of whole class teaching and focused group work
- ✓ Planning topics that provide opportunities for further investigative work for the more able or less able.
- ✓ Planning units of work that are based on familiar contexts
- ✓ Starting with the child, his/her ideas and level of understanding
- ✓ Providing opportunities for interaction and working with other children in small groups
- ✓ Allowing children to work with concrete materials.

1.7 Linkage & Integration:

Opportunity for the use of an integrated approach exists in all levels in the science curriculum within the school. The strands and strand units of the science curriculum are not discrete, work on a topic or investigation may incorporate strands from other curriculum areas. Teachers will make provision for this linkage in their short-term planning.

English:	Procedural writing, Oral language, Aistear in the Jnr Rooms, Building Bridges (making predictions etc,)
Maths:	Problem solving, graphing, measuring
History:	History of scientific discoveries
Geography:	Environmental Awareness and Care, Green Schools work
Art:	Construction – links well with designing and making
Music:	Sound SPHE: Myself and the Wider World

1.8 *Using the Environment*

Learning in the environment is exciting and rewarding for both teacher and pupils. Good preparation is very important and teachers should note the following guidelines:

- Explore and get to know the environment thoroughly
- Identify and note potential hazards
- Ensure First Aid kit is brought along with a Parent Contact List and mobile phone
- Ensure adequate supervision and children with special needs are accompanied
- Complete follow up work and evaluate the learning experience

1.9 *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 assessment tools found useful are:

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 observation might focus on*
- *the ability of the child to co-operate and work in groups or to work independently*
- *the informal interactions between the child and adults and between the child and other children*
- *the quality of presentation of work*
- *particular interests or aptitudes displayed by the child*
- *the participation and interest of the child in a variety of activities*
- *the level of personal or social responsibility exhibited by the child*
- *the reliability of the child in carrying out established routines*
- *the perseverance of the child in carrying out a task*
- *the child's awareness of the difficulties of others and his willingness to help*
- *the questions the child asks and the responses the child makes to questions and suggestions made by the teacher*
- *various behaviours, for example shyness, leadership ability, level of self confidence, the tendency to be anxious, sense of fair play, assertiveness, aggression, readiness to take risks and meet challenges*
- *physical and emotional maturity*
- *the ability of the child to engage in assessing his/her progress and reflecting on his learning.*

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, 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 work cards or 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 learning. Concept mapping helps a child to record and discuss their ideas (in other words, brain-storming). This will help enormously to see what pre-conceived ideas the child 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:

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 kept as a science portfolio. Pupils complete projects on various strands of the curriculum.

1.10 Children with Different Needs:

This Science programme aims to meet the needs of all the children in the school. This will be achieved by teachers varying the pace, content and methodologies to ensure learning for all pupils and will be recorded in the teacher's short term planning. The requirements of children with special needs will be taken into account when planning class lessons and related activities. The S.N.A. supports particular children and groups as directed by the class teacher.

1.11 Equality of Participation & Access:

We view the Science programme as playing a key role in ensuring equality of opportunity for all children. The programme at each class level will be flexible so that the learning requirements of all children may be addressed. Children with special needs will be included in all activities where possible.

1.12 Timetable:

As per curriculum guidelines.

S.E.S.E. 3 hours/ 1st – 6th Class

 2 hours 15 minutes/ Junior – Senior Infants

1.13 Resources and Equipment:

All teaching resources are stored in a central location (old computer room). An audit of resources and equipment available for completion of the science curriculum will be taken annually.

1.14 Individual Teachers Planning:

Teachers will base their yearly and short term plans on the approaches set out in the whole school plan for Science. See appendix.

■ 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:

Children should never handle unknown or unfamiliar plants, especially fungi. 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 lense devices to look directly at the sun or other intense sources 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. 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. Lit candles should never be moved. Care should be taken to avoid situations where children may be tempted to lean across a lit 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, notice boards 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.

■ Homework

Homework in Science can either be formal, informal or a combination of both. The prescribed Science homework will reflect the active learning approach and will reinforce information already taught during class through relevant worksheets, text book or workbook exercises.

■ Staff Development

The school has many books on various aspects of the science curriculum (see appendix). Educational centres offer courses in science for teachers during term time. Teachers share the wisdom of their experiences and ideas.

■ Parental Involvement

Parents and other adult members of the school community may be invited to assist with certain activities e.g. outdoor work, Science Day. Parents and others who have particular knowledge and expertise may be invited to support the class teacher in implementing the science curriculum.

■ Success Criteria

Pupil's progress from year to year will reflect work done in previous classes. The success of the programme will also be evident in pupil's participation and positive feedback. The plan will be reviewed to ensure a balance between all strands and strand units is being achieved.

■ Implementation

Roles and Responsibilities:

Class teachers are responsible for the implementation of the Science programme in their own class. Teachers should return equipment to the designated Science area as soon as they have finished using it.

■ Review

It will be necessary to review this plan on a regular basis to ensure optimum implementation of the Science curriculum. We aim to review this plan every 3 years. Principal and staff will be involved in this review.

■ Ratification and Communication

This plan was ratified by the board of management on June 6th 2017.
Date

Signed P.T. Harrington
Chairperson Board of Management

Signed Alma Quinn
Principal

This plan will be made available as part of the whole school plan. Each teacher will have a copy of this science plan. The science plan is available to parents from the school office.