Whole School Science Plan
For
Doolin NS

Introductory Statement and Rationale

Introductory Statement
Doolin National School recognizes the importance of the study of Science as an essential element in a full balanced education. This plan was developed by the principal and teaching staff of our school following introductory science in-service days, in-school planning days, environmental audit, SEAI workshop & Discovery Science Workshop. It has arisen after a process of staff consultation and curriculum research.

Rationale
We, at Doolin National School, focus on Science and the importance of teaching Science:

- To benefit teaching and learning in our school
- To conform to the principles outlined in the Primary School Curriculum
- To review the existing plan for Science in light of the 1999 Primary School Curriculum.

Vision and Aims

Vision
We seek to enable the children to:

- Develop an interest in and curiosity about 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 an 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 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 Doolin National School we hope to:

- Continue to develop our school garden
- Participate in Science Week, The Young Scientist Exhibition, Discover primary Science Competition
- Continue to hold exhibitions during the year so parents can evaluate and see the children's work.
- Continue on from last year's win of the science award for excellence in the Discover Primary Science Competition.
- Purchase additional science equipment
- Avail of future cuiditheoir support regarding the demonstration of practical science activities in our classrooms.

Curriculum Planning

Strands and Strand Units

We at Doolin NS 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 approach to SESE, cross-curricular work and subject-centre focus.

Junior/Senior Infants

Strands	Strand Units
Living things	• Myself • Plants and animals
Energy and forces	• Light • Sound • Heat • Magnetism and electricity • Forces
Materials	• Properties and characteristics of materials • Materials and change
Environmental Awareness and care	• Caring for my locality

First/Second Class

Strands	Strand Units
Living things	• Myself • Plants and animals
Energy and Forces	• Light • Sound • Heat • Magnetism and electricity • Forces
Materials	• Properties and characteristics of materials • Materials and change
Environmental Awareness and care	• Caring for my locality

Third/Fourth Class

Strands	Strand Units
Living things	• Human life • Plants and animals
Energy and Forces	• Light • Sound • Heat • Magnetism and electricity • Forces
Materials	• Properties and characteristics of materials • Materials and change
Environmental awareness and care	• Environmental awareness • Science and the environment • Caring for the environment

Fifth/Sixth Class

Strands	Strand Units
Living things	• Human life • Plant and animal life
Energy and forces	• Light • Sound • Heat • Magnetism and electricity • Forces
Materials	• Properties and characteristics of materials • Materials and change
Environmental awareness and care	• Environmental awareness • Science and the environment • Caring for the environment

Children's Ideas

The children at Doolin National School will begin Science from their ideas about how things are perceived. They will be given opportunities to change and develop these ideas from testing them in the 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 Doolin National School will be given opportunities for their ideas to be challenged and modified by ensuring that the curriculum is always child-centered.

Practical Investigations

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

In the Infants 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 Doolin National School, 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 Science. Teacher-developed worksheets and commercially produced work cards and text books will provide valuable resources for the staff at St. Michael's Primary School. Open activities will involve the teachers in 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 at St. Michael's Primary School 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.

We, at Doolin National School, 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 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, or the less able child.

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 Doolin National School.
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 encourage both the investigative approach and the teacher-directed approach.
The school is well equipped for all scientific exploration and all equipment is stored in a central location for easy access for all staff.
Each term, the classes are encouraged to display their work in the classroom. Senior classes will also be given the opportunity to arrange an exhibition so that parents can evaluate their work.

Key Methodologies

As a staff we endeavor 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
- Co-operative learning
- Talk and discussion

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 particularly important here where there are varying degree of abilities within the classroom. For integration and linkage to work successfully, 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 Doolin NS, many opportunities exist for valuable links to be made between geography, science and history. Although many content elements have close links with other curricula.

Junior/Senior Infants

Strands	**Strand Units**	**Integration**
Living things	Myself	**S.P.H.E.** – Myself
	Plants and animals	**History** – Local studies
Energy and Forces	Light	**Geography** – Natural environments **Art/Handwork**
	Sound	**Music** **Geography** – Natural environments
	Heat	**Geography** – Natural environments **English** – written poetry and stories
	Magnetism and Electricity	**Geography** – Natural environments **S.P.H.E.** – Stay Safe Programme
	Forces	**Geography** – Natural environments
Materials	Properties and characteristics of materials	**Materials** – Materials and Change **Design and Technology** **Art and Handwork**
	Materials and change	**Geography** – Weather
Environmental Awareness and care	Caring for my locality	**History** – Local Studies **English** – Creative writing

First/Second Class

Strands	Strand Units	Integration
Living things	Myself	**S.P.H.E.** – Myself
	Plants and animals	**History** – Local studies
Energy and Forces	Light	**Geography** – Natural environments **Art/Handwork**
	Sound	**Music** **Geography** – Natural environments
	Heat	**Geography** – Natural environments **English** – written poetry and stories
	Magnetism and Electricity	**Geography** – Natural environments **S.P.H.E.** – Stay Safe Programme
	Forces	**Geography** – Natural environments
Materials	Properties and characteristics of materials	**Materials** – Materials and Change **Design and Technology** **Art and Handwork**
	Materials and change	**Geography** – Weather
Environmental Awareness and care	Caring for my locality	**History** – Local Studies **English** – Creative writing

Third/Fourth Class

Strands	Strand Units	Integration
Living things	Human Life	**SPHE:** Myself **History:** Local Studies
	Plants and animals	**Geography:** Natural Environments
Energy and Forces	Light	**Geography:** Human Environments
	Sound	**Music:** Exploring Sounds
	Heat	**Geography:** Natural Environments – Weather Human Environments
	Magnetism and Electricity	**Geography:** Human Environments
	Forces	**P.E. :** Games e.g. tug of war **History:** Norman builders
Materials	Properties and characteristics of materials	**Geography:** Natural Environments
	Materials and change	**Geography:** Natural Environments
Environmental Awareness and care	Caring for my locality	**Geography:** Natural Environments Human Environments

Fifth/Sixth Class

Strands	Strand Units	Integration
Living things	Human Life	**SPHE:** Myself
	Plants and animals	**Geography:** Natural Environments
Energy and Forces	Light	**Visual Arts:** Construction
	Sound	**Music:** Exploring Sound
	Heat	**Geography:** Natural Environments
	Magnetism and Electricity	**Geography:** Human Environments
	Forces	
Materials	Properties and characteristics of materials	
	Materials and change	**Geography:** Natural Environments
Environmental Awareness and care	Environmental Awareness	
	Science and the environment	
	Caring for the environment	**Science** **Geography** **SPHE:** Myself and the wider world **Visual Arts:** Colours and Textures

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. Luckily, the children live in a lovely country setting and have the benefits of fresh air and open spaces. However, this precious resource must be maintained and never taken for granted.
We have completed an environmental audit of the school grounds and the surrounding locality. Each class will engage in designated habitat studies.

Class	Examples
Junior/Senior Infants	Sensory garden River birds
First/Second Class	Mini-beasts on concrete surface areas Flowers Seasonal study of a tree in the school grounds Study of a logpile/stonepile in school grounds Birds in our school grounds
Third/Fourth Class	Birds in our school grounds Trees Pond Sensory Plants
Fifth/Sixth Class	River bank Wormery studies Wetland Integrated museum visit

Age appropriate trails will be developed for each class levels.

Recycling and the Environment

We are currently working to attain a 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.

Visitors to the School

All visitor/speakers to the school must agree to a time to visit. All parents will be informed and receive a brief outline of the content of the visit. Permission slips will be collected from the children. If the children are participating in an 'out of school' activity, all parents will be informed. Permission slips will be collected and the children will be accompanied by at least two adults.

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

Children will explore, plan and analyse materials through design and make activities. Students will be given the opportunity to engage in Design and Make activities appropriate to their ability and area of study.

Assessment and record keeping

The assessment of Science 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 St. Michael's Primary School
- 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. 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 we will use in Science:

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

There will be opportunities for the children to engage in self assessment as they anayse the success of design and make activities and get an opportunity to view their own work portfolios.

Records of the children's progress will be kept on file to assess further needs of the group and/or the individual pupil. Children who are displaying difficulties in certain areas of the Science curriculum will be written up in the teacher's notes.

Parents will be informed of their children's progress through:

- Parent/teacher meetings
- The homework journal
- Signing of all formal tests

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

We aim:

- 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

- All children the benefit from active involvement in the environment so all will be encouraged to participate in fieldwork.
- The exceptional ability children will be encouraged to undertake additional research and recording their scientific findings in a variety of ways

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

Equality of participation and access

Provision will be made to ensure that the staff 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 disability.

Organisational Planning

Timetable

An integrated approach will be commonly used at all levels . 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 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.
There is no timetable for the use of resources but it is suggested that the resources be returned to the press after the class and that any replacements or additions to the resources be made aware to the post holder for Science.

Resources and ICT

Access to an adequate supply of suitable teaching materials is essential for the development of an holistic approach to the teaching of Science.

- 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.
- Environmentalists in the community will be asked to talk to the children and share their knowledge with them.

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 are highlighted.

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

Homework

Depending on the class level, homework ranges in time from 20 – 60 minutes. Science homework may be content related and in written form. At Doolin National School we try to ensure that there is a balance between skill and knowledge based homework. Research topics may be added as many of the children use the local library. We recommend that differentiation be accommodated in homework e.g., drawing, annotated drawings, comic strip representation, scientists report etc.

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 the content covered to ensure continuity in our spiral curriculum. This will be decided at out staff meetings.
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. Cúnais Míosúil will assist in recording work covered, in evaluating progress in Science and informing future teaching. Each teacher is required to keep termly or yearly notes. These notes are to be presented in a standard format which is provided at the beginning of the year by the principal.

Staff development

- Teachers will 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 Principal will be responsible for keeping resources to be assessed for purchase and for new approaches to be piloted for 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. This will be done at staff meetings.
- The culture in our school is one that encourages the sharing of experience and good practice.
- Staff needs will be assessed and the Clare Education Centre will be requested to provide suitable ongoing training as the need arises.

Parental involvement

- Parents are encouraged when needed, to come to the school, 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 are invited to celebrate and view results of projects, surveys, investigations in the school or read about them in the school news letter.
- Parents will be advised to study the Primary School Curriculum; Your child's learning in Primary School, NCCA DVD (2006).

Community Links

Parents and members of the community who could make a particular contribution to the Science programme are encouraged into the school/classes.
We will also welcome visits by speakers from these organizations

- Tree Council
- Sustain Energy Ireland
- Green Schools
- Bird Watch Ireland

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 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 Doolin National School
- The principal
- The parents/guardians of children
- The staff

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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 in 2016.

Roles and Responsibilities

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

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

Ratification

This school plan for Science will be distributed to all teachers by May 2014 with a view to having it ratified by the Board of management in June 2014.

This plan was ratified by the Board of Management on:

Date: ……...

Signed: ……..