

Science

Planning Template: Science

■ Title:

Whole School Plan for SESE Science for

■ Introductory Statement and Rationale

(a) Introductory Statement

Having attended In-service training in the SESE Science curriculum, and having reviewed current practice in science in our school in the light of the key messages imparted on the In-service days and having considered the other SESE areas, we are now embarking on the implementation of the curriculum and have reached consensus as to how science will be taught in our school and the programme that will be followed going forward as part of the wider SESE programme.

(b) 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 practise 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 SESE Science in our school. It will benefit the teachers by informing classroom planning and will be of ultimate benefit to pupils by ensuring science activities are balanced and well-planned.

■ Vision and Aims

(a) Vision:

In the school charter of St. Mary's National we state that we endeavour to promote the full and harmonious development of all aspects of the pupil. Our commitment involves educating our pupils in the fullest sense so that each one matures spiritually, morally, emotionally, intellectually, physically, socially and culturally. As a school community, we aspire to enable each and every child to reach his/her potential. We recognise the contribution SESE can make to achieving this. Through our school's science programme, we aim to help pupils to come to an understanding of and take an interest in the world and environment around them, both physical and biological. It is our aspiration that science in our school will be a practical subject as much as possible with hands-on activities that give an opportunity to develop scientific skills. The skills learned through science activity are also skills for life. As science is a subject that many pupils will encounter at second level, we hope that exposure in Primary school will make our pupils more familiar with and interested in science at the next level. Environmental activities encouraged in our school will foster a positive attitude and sense of responsibility among our pupils for the natural environment and its relationship with the human environment.

Aims: Aims:Page 11 of curriculum statement

The aims of social, environmental and scientific education are:

- to enable the child to acquire knowledge, skills and attitudes so as to develop an informed and critical understanding of social, environmental and scientific issues
- to reinforce and stimulate curiosity and imagination about local and wider environments
- to enable the child to play a responsible role as an individual, as a family member and as a member of local, regional, national, European and global communities
- to foster an understanding of, and concern for, the total interdependence of all humans, all living things and the Earth on which they live
- to foster a sense of responsibility for the long-term care of the environment and a commitment to promote the sustainable use of the Earth's resources through personal life-style and participation in collective environmental decision-making
- to cultivate humane and responsible attitudes and an appreciation of the world in accordance with beliefs and values.

In addition we aim to:

- Take part in activities during National Tree Week and Energy Awareness Week.
- Organise existing and purchase additional science equipment as required.

Curriculum Content:

<u>Strands</u>	<u>Strand Units</u> Infants-2nd class	<u>Strand Units</u> 3rd-6th classes
Living Things	<ul style="list-style-type: none">• Myself• Plants and animals	<ul style="list-style-type: none">• Human life• Plants and animals
Energy and forces	<ul style="list-style-type: none">• Light• Sound• Heat• Magnetism and electricity• Forces	<ul style="list-style-type: none">• Light• Sound• Heat• Magnetism and electricity• Forces
Materials	<ul style="list-style-type: none">• Properties & characteristics of materials• Materials and change	<ul style="list-style-type: none">• Properties & characteristics of materials• Materials and change
Environmental Awareness and Care	<ul style="list-style-type: none">• Caring for my locality	<ul style="list-style-type: none">• Environmental awareness• Science and the environment• Caring for the environment

- We have prepared a two-year plan for each class level from Infants to Sixth.
- We have included work from each strand for each year and we aim to give equal emphasis to each strand.
- We aim to cover a full range of objectives during the two-year cycle.

Balance between Knowledge and Skills:

We agree that Science is not only concerned with the acquisition of knowledge but also the understanding of concepts. Real understanding can only take place when pupils have been given the opportunity to experience hands on activities. Our pupils will be given an opportunity to engage in Design and Make activities appropriate to their ability and area of study.

Our children will work in a scientific way, questioning, observing, predicting, investigating, analysing and recording and therefore acquiring knowledge. They will be exploring, planning and analysing materials through design and make activities. This hands on, practical approach will facilitate understanding of scientific topics.

WORKING SCIENTIFICALLY means our pupils will be:

- QUESTIONING:
 - Asking questions is an essential part of exploring and developing an understanding of the environment.
 - The means by which the child forms links between previous and past experiences
 - Encourage open ended questions
 - Some questions will initiate new investigations

-Samples of questions that identify problems to be solved:

- Does light travel in straight lines?
- Which material will charge the balloon best?
- Do all small things float?

- OBSERVING:

- Using all the senses
- Teachers questions can focus the pupils attention on objects or events
- Children may be asked to observe characteristics – shape, size, colour, pattern or texture
- Observing also involves activities that may require other skills – classifying, communicating

- PREDICTING:

- Pupils forecast or guess what might happen in certain circumstances
- From Infants- Second class predictions will be prompted by the teacher
- From Third to Sixth class children will be encouraged to use previous experience to make a prediction

- INVESTIGATING AND EXPERIMENTING:

- The systematic search for evidence
- Junior classes : simple investigations- structured by the teacher
- Middle/ Senior classes : children required to use their existing knowledge
- Investigation requires children to change something and measure the effect this has on something else.
- Investigating involves ‘ fair testing’.

- ESTIMATING AND MEASURING:

- Infants – Second : This involves describing mass and length using non-standard units and informal language – compare and estimate ‘is bigger, heavier than’, match objects of equal length.
- Third – Sixth : use appropriate instruments to collect and record data on length, weight, capacity, time and temperature – thermometers, rulers, stopwatches etc.

- ANALYSING:

- Infants: Sorting and classifying
- Second-Sixth:
 - Sorting and classifying;
 - Recognising patterns;
 - Interpreting

-Sorting and classifying:

- Sorting what children have learned according to one or more attributes
- Infants-Second: children will recognise properties such as colour, shape and size
- Third/Fourth: children will develop their own criteria and explain why these criteria were chosen
- Fifth/Sixth: sets and subsets (eg. Keys)

-Recognising patterns:

- This involves the pupil looking for and recognising patterns and relationships when making observations
- At Second class level this might involve the pupil recognising that the magnet sticks to the leg of the chair and then it must stick to the leg of the table as it is made of the same materials.
- At Fifth/Sixth class it may involve pupils seeing a relationship between the amount of sugar that can be dissolved and the temperature of the water

-Interpreting:

- This involves the pupils interpreting the findings of an investigation, offering explanations and drawing conclusions

- RECORDING AND COMMUNICATING

- Record findings using a variety of methods
- Infants: oral accounts and sorting and classifying etc.
- Middle classes: data tables
- Senior classes: charts, graphs and IT

DESIGNING AND MAKING

Children are encouraged to design and make artefacts and models that will provide solutions to practical problems. This helps children to become aware of the importance of science in everyday life and it's practical application. In the course of engaging in Design and Make activities children will be exploring, planning, making and evaluating.

- Exploring: Should involve children in structured and unstructured play with materials objects and models. From Infants to Second children should handle and manipulate the materials. They should discuss the need for different designs and shapes of object. From Third to Sixth children should engage in free exploration of materials, objects and construction toys. They should design and make something new/ adapt a built object for a new purpose.
- Planning: This involves the children in imagining, planning and designing an object that they will make. From Infants- Second : children will make simple drawings of models. They will be guided by the teacher in their choice of materials, tools and ways of working. From Third- Sixth: children should be able to create a range of design proposals and compare and consider the merits of different designs; discuss the feasibility of undertaking different design proposals; review and adapt designs to accommodate their skills, resources, materials and time allocated for the activity.
- Making : This involves children making what they have already designed; developing skills of cutting, joining, fastening, weaving and linking; selecting and using appropriate tools (From Infants-Second the range of tools will be limited to those they have encountered in craft activities . From Third –Sixth a more diverse range of materials is introduced plus a wider range of tools.) Careful supervision is required.
- Evaluating: The children will help to suggest improvements to their designs and consider ways of modifying their way of working and planning. Children should have the opportunity to review the designs of other groups- positive criticism- how the finished model matched up design proposal.

Children's ideas:

We will use children's ideas as a starting point for all scientific activity as we realise children have their own understanding of the physical and biological world. We do this to build on the children's previous knowledge and to address any misconceptions they may have.

The methodologies we will use to find out the children's ideas may include:

- Talk and discussion
- Open questions and problem-solving activities
- KWL Charts
- Annotated drawings
- Concept maps and brainstorming

-Free play with materials

We will promote the development of good questioning in our classrooms, with pupils being given the opportunity to pose their own questions and set up investigations to find answers.

Practical Investigations:

We will include the following investigations:

- **Open investigations**- pupils will be given or may even suggest an open question for which they will have to design their own investigation and come up with their own results
- **Closed investigations**-activities where the end result is obvious and there are not many variables
- **Fair testing**-pupils will be encouraged to develop a sense of what should be kept the same and what should be the variable to ensure that an investigation is fair.
(see Teacher Guidelines pg 54)

Classroom Management:

-A combined approach of whole classroom work, class work, small group work, paired work and individual work on chosen topics and projects will be used in each class.

-Children will be given opportunities to work together collaboratively and share their own ideas.

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

-Teachers will use their professional judgement to decide which methods and approaches are best suited to the needs of their pupils.

Key Methodologies:

We have identified the following as the key methodologies for science activity in our school:

- Active learning
- Free exploration of materials
- Use of everyday objects found in the local environment
- Outdoor habitat work
- Content spiralling from class to class
- Talk and discussion

Linkage and Integration:

We encourage the linkage of the strands within science and the integration of science with other subject areas. Pupils' view of the world is a holistic one and as such more meaningful learning takes place in an integrated setting. Examples include:

- Human Life units on growth and reproduction will integrate with SPHE
- Environmental awareness and care is closely integrated with the SPHE and Geography curriculum.
- Design and Make activities will also form part of the Visual Arts content.
- Links with the maths curriculum are many e.g.graphing results of investigations, measuring, colour, shape etc.

- The strand unit on sound is an integral part of the music curriculum

Using the Environment

- See school environmental audit appended
- We will use the habitats available to us in our environment.
- Our habitats include:
 - Wall
 - Concrete
 - Grass
 - Hedgerow
 - Deciduous trees
 - Evergreen trees
 - Birds in the school grounds, bird table
 - Gravel path
 - School garden
- Habitat studies in our school will take into account the following:
 - Seasonal study of individual habitats
 - Outdoor investigation and exploration
 - Sample collection within the school's conservation code
 - Reference will be made to school's safety policy
- In our habitat studies we will explore the following:
 - Minibeast studies
 - Food chains
 - Life cycles
 - Adaptations
 - Caring for the environment

Assessment

Information from assessment will be communicated to parents in the school report at the end of the year and at the parent/teacher meetings.

We will assess :

- Knowledge
- Understanding
- Skills
- Attitudes towards investigation and problem-solving and sense of responsibility for environment
- Ability to work collaboratively

Assessment will be in the form of:

- teacher observation
- concept-mapping
- annotated drawing
- teacher-designed tasks
- portfolios of work
- Parental and pupil feedback

There will be opportunities for the pupils 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 Different Needs:

In the same way as we endeavour to meet individual needs in all aspects of the curriculum, we will do our best to make science accessible to as many children as possible as we recognise the potential science has to help children make sense of the physical and biological worlds in which they live. We are aware of the possibilities for fun and developing a sense of curiosity and wonder that science holds for children.

- Recording will be based on the child's level e.g. brainstorms and annotated drawings.
- Activities will be differentiated according to ability.
- ICT / digital images may be used to record work
- Assistance from Resource teachers or special needs assistants will be availed of when appropriate

Equality of Participation and Access:

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

Organisation:

Timetable:

Science is part of the 3 hours of SESE in the senior classes and 2 1/4 hours SESE in the Junior classes. On occasion teachers may block periods of time. Teachers may use discretionary time as and when needed.

Resources and Equipment:

- We have identified the resources already available in the school and undertake to purchase or collect other resources as and when needed . The equipment will be stored centrally.

Safety

- We have a Safety Statement which we will consider when engaging in scientific activity.

Individual Teachers' Planning and Reporting

- Yearly and short-term plans are based on the approaches and methodologies set out in this school plan. Work covered will be outlined in the cuntas miosuil.

Staff Development:

- Teachers are made aware of opportunities to attend science courses and training.
- We will continue to access the RCSS Cuiditheoir service for science.

Parental Involvement:

-Parents are encouraged to support the school's science programme. Parents with particular expertise may be invited to address classes or accompany field outings when appropriate.

Community Links:

-Local and national agencies may be invited from time to time to work with classes or address pupils. These include: Sustainable Energy Ireland, Green School's Co-ordinator, heritage experts

■ **Success Criteria**

We will measure the success of our plan by monitoring the following:

- Evidence of scientific skills and knowledge development in pupils throughout school
- Increased interest in science and environment throughout the school
- Evidence of practical activities in the classes
- Resources and equipment being used throughout the schools
- Class and school displays
- Evidence of classes engaging in outdoor habitat work
- Formal and informal assessment as outlined in this plan
- Positive feedback from parents and pupils

■ **Implementation**

(a) Roles and Responsibilities:

All teachers are responsible for the implementation of the science programme in their class and the care and maintenance of equipment.

■ **Review**

(a) Roles and Responsibilities:

Review will take place in June 2009 and any necessary amendments will be made.

■ **Ratification and Communication**

This plan was communicated to the Board of Management and was ratified on

