

Science Plan

Science Plan

■ **Introductory Statement and Rationale**

Introductory Statement

This plan was originally formulated by the principal and staff on 6th January '03 and completed on 18th March '04, following in-service provided by the PCSP.

We aim through this plan, drawn up in accordance with the science curriculum, to set out our approaches to the teaching and learning of science. It will form the basis for long and short-term planning. It will also inform new and temporary teachers of the approaches and methodologies used in our school. The plan was reviewed during the 2017/18 school year. As we are focusing on our Local Environment in our School Improvement Plan there will be an emphasis on integrating learning in science with our local environment.

Rationale

This plan is a record of the whole school decisions taken in relation to Science and in line with the Primary School Curriculum, 1999. Its purpose is to support and guide a consistent and coherent approach to the teaching and learning of Science in our school. This plan will direct individual planning for Science to ensure appropriate coverage of all aspects of the curriculum from Infants to 6th Class.

■ **Vision and Aims**

(a) Vision:

Through our school's science program, we aim to help pupils both to come to an understanding of and take an interest in the world and environment around them, both physical and biological. We seek to develop a broad range of skills of enquiry and cultivation of important attitudes with the acquisition of scientific knowledge and concepts about the biological and physical aspects of the world. We encourage practical investigation keeping in mind that this is central to science enquiry. 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. We aim to develop a sense of respect and responsibility amongst the pupils towards their local area.

(b) Aims:

We endorse the aims of social, environmental and scientific education as outlined in the Primary School Curriculum, 1999. In addition, the following short term aims are incorporated into our school approach to the teaching and learning of SESE for our pupils:

- Continued participation in the Green School Program
- Integrate other specifically designated days and weeks into our school calendar e.g. science week, national tree week, energy awareness week, WOW, COW etc
- Visit, explore and investigate places of interest in our locality e.g. Local hedgerows, nearest seashore and other areas for habitat studies
- Organize speakers / exhibitions of interest
- School Newsletter and class blog ensures parental awareness of science activities.
- Involve Student Council in promoting science in the school.

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■ Curriculum Planning:

Following SSE in the area of SESE, we are engaging with the theme *Our Local Environment* and knowledge of the locality will form part of our planning.

1. Strands and Strand Units:

Teachers will ensure within their individual planning that there will be progress from class to class as regards content and skills development of the science program. We are aware that the strands of the science curriculum are covered each year and the strand units and a full range of objectives are covered over a two year period. Equal emphasis will be given to each strand and strand unit.

Teachers will ensure that children's learning relates to everyday life through the study of science relating to our local environment and through the Green School's programme. The study of human growth, development and reproduction is taught in line with the school's RSE policy.

2. Children's Ideas:

We use the children's ideas as a starting point for all scientific activity.

Strategies such as talk and discussion, questioning, listening, problem-solving tasks, annotated drawings, concept-mapping and teacher-designed tasks and tests will be used as appropriate to initiate scientific activity.

Open-ended investigations are used to encourage children to pose their own questions.

Children's ideas are challenged in a positive manner to enable modifications and thus learning.

3. Balance between Knowledge and Skills

Science is not only concerned with the acquisition of knowledge but also the understanding of concepts. Scientific skills which we develop through the content of the science curriculum include:

- Questioning
- Predicting
- Observing
- Investigating & Experimenting
- Estimating & Measuring
- Analyzing
- Recording & Communicating

Children will work in a scientific way, questioning, observing, predicting, investigating, analyzing and recording during science class. The skills of the science curriculum will be developed through the teaching of the content of the strand units, with children actively participating in science discovery. Children are given opportunities to play with and explore science materials. Pupils will be given opportunities to engage in design and make activities in each class appropriate to their ability and area of study. Design and make usually occurs through the study of the strand units of the curriculum

eg. design and make a lighthouse, design and make a boat, design and make percussion instruments, design and make an electric circuit etc. This will be reflected in teachers planning. Through design and make activities the children will employ the following skills: exploring, planning, making and evaluating.

The knowledge, understanding and the range of scientific skills the children are encouraged to use

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in scientific investigations will be developed and extended at each class level, as stated in the Curriculum. (Infants pages 20-21, First & Second pages 36-38, Third & Fourth pages 55-56 and Fifth & Sixth pages 78-80).

4. Key Methodologies:

We use a combination of approaches to meet the needs of all pupils and to suit the objectives of the strand units. These methods and approaches include:

- Using the environment
- Active learning
- Guided and discovery learning
- Problem-solving activities
- Free exploration of materials
- Spiral nature of the curriculum
- Learning through language

5. Practical Investigations

Hands-on, practical investigations are encouraged for all class levels. Practical investigations usually occur during the context of a Science class and through the elements of design and make. We will differentiate investigations to meet the needs of all pupils. We will use a combination of open and closed investigations. Children are encouraged to partake in free exploration of science materials. Practical investigations using the fair test principle are encouraged throughout the school.

6. Linkage and Integration:

Integration is an important principle of our school plan. The science curriculum links easily with Maths, Visual Arts, Oral English, Geography and Music. Strands and strand units link with each other. Teachers are encouraged to develop thematic approaches, where appropriate, when planning for their science lessons. Pages 44-49 Teacher Guidelines give suggestions for integration.

7. Use of the Environment

An environmental audit has been undertaken and these features of the natural and built environment will be used as a resource for lessons within the Science programme. (See Appendix 1 for Environmental Audit) Pupils are given opportunities to observe a variety of living things in their immediate environment. Our habitats include- hedgerow, deciduous trees, evergreen trees, herb & vegetable raised bed, grass, and wall, hedgehog hotel. 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 the school's safety policy.

Pupils are enabled to observe the broader global environment through educational tours, ICT, you tube clips, photographs, visiting Scientists, class eco system eg indoor butterfly garden, relevant exhibitions, a wide range of textbooks, documentaries and other reference materials. Teachers will follow the procedures outlined in the school plan when they wish to invite a visitor to work with pupils or to take the pupils on a trip outside the school premises.

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To date we have participated in Science activities organized by Sligo IT for Science Week and have had science exhibitions in school. We have received seven Green School flags and are currently working towards our eighth flag. We recycle where possible in our school.

8. Assessment

The primary purpose of Science assessment in our school is to provide a picture of pupil achievement, both individual and across class groupings, and thus in turn enhance the learning experiences of the child. Such assessment results contribute to the planning of new areas of Science, the consolidation of earlier lessons, the identification of difficulties and the acknowledgement of pupil achievement. Our assessment techniques focus on pupil's:

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

A broad range of assessment tools and approaches is employed as part of the normal teaching and learning situation, while maintaining both manageability and reliability. They include:

- Teacher observation
- Annotated drawing
- Concept mapping
- Teacher- designed tests and tasks
- Portfolios and project work
- Work samples and displays of work
- SALF Folders

9. Children with Different Needs

Our aim is to provide for children with Different Needs throughout the school. Children with differing needs will be encouraged to participate in all scientific activities and will have the opportunity to work with other children. We provide for individual difference using some of the following strategies:

- Using a combination of whole class teaching and focused group work
- Planning topics that provide opportunities for further investigative work for more/less able
- Planning topics that are based in a familiar context
- Starting with the children's ideas
- Provide opportunities for interacting and working with other children in groups
- Allowing children to work with concrete materials
- Using investigations as the basis for practical work. (p.35 T.G)
- Encouraging the more able child to undertake independent project work

10. Equality of Participation and Access:

Science will be for all children regardless of gender, age or ability. Girls and boys are given equal opportunity to participate in all science activities. The role of women in addition to that of men in science is explored. Science can be used as a basis to broaden the pupils understanding of other cultures and environments e.g. peoples, homes, clothes, weather, food, materials. Parents are made aware of content in relation to the teaching of human growth, development and reproduction in line with our RSE policy. Children experiencing any form of difficulty will have the assistance of the support teacher

■ **Organisational Planning:**

1. Timetable

In keeping with the recommendations in the Primary School Curriculum Introduction (page 70) a minimum of three hours will be allocated to SESE per week, from first class to sixth, and two and a quarter hours with the infant classes. In the Infant classes science is taught as an integral part of the SESE curriculum and will also be supported through the Learning through play / Aistear programme.

On occasion, time will be blocked as appropriate. This might occur when:

- working on a (integrated) project
- exploring a local habitat
- devising and undertaking a local trail

2. Classroom management:

Our teachers employ a variety of methods for organising the learning and teaching of Science, but individual teachers will use their professional judgement to decide which methods and approaches are best suited to the needs of their pupils. A combined approach of whole classroom 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. Certain aspects of the Science Curriculum may not lend themselves to investigative work by pupils, in these instances a demonstration by the teacher will be appropriate. All children will have access to appropriate materials under the guidance of the teacher.

3. Resources and Equipment

We have equipment available for each strand unit of the curriculum. They are stored in a shelving unit in the 5th-6th classroom. (Appendix 2)). We supplement the teaching of science with textbooks, resources from the internet, and other available resources.

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4. Health and Safety:

Each teacher should be familiar with the school's health and safety policy.

The class teacher must take adequate precautions to provide a safe learning environment.

The children are taught a series of safety procedures and routines when doing experiments.

Pupils should:

- Not taste anything that they are not sure of.
- Exercise caution when using tools and other materials.
- Not use magnets near electrical appliances, computers or watches.
- Not use chemical and other hazardous materials e.g. glass.
- Wear protective clothing e.g. gloves, aprons.
- Report spillages and accidents immediately.

We encourage independent learning and taking responsibility for one's own work. If children endanger or attempt to endanger themselves or others it will be dealt with according to the school's code of behaviour.

Exploration of the School and the locality:

When on field trips:

- Teachers must inform the principal of all outings outside the school premises.
- Teachers should familiarise themselves with the Teacher Guidelines on pages 27, 58-59, 86, 97, 105, 107 and 129.
- Teachers must inform the children of behaviour and safety rules that will be applied on the outing.
- They must ensure that the children are adequately supervised and that appropriate safety precautions are taken e.g. gloves.

5. Individual Teachers' Planning and Reporting

Teachers will report on work completed in the Cúntas Míósúil. These will help inform teachers future planning and review of whole school plan. Teachers will use the Whole School Plan and yearly plans to inform their classroom planning. Teachers will use the Science Curriculum strands and strand units when planning.

6. Staff Development

Teachers are made aware of opportunities to attend science courses and training. Where teachers have expertise in a particular area they are encouraged to share this with each other. From time to time teachers may team teach. Teachers have access to reference books, resource materials, and websites dealing with science. Most classes are equipped with an interactive whiteboard allowing them internet access to science resources.

7. Homework:

Science homework is given at the discretion of each teacher and within the guidelines of the School Homework policy. This may include science homework as part of TOT. Science homework reflects the active learning approach employed in the classrooms e.g. children investigate and collect at home, use of internet at home.

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8. Parental Involvement

Parents are aware of and encouraged to support the school's science programme. Parents encourage their children to be actively involved in science activities particularly in relation to the environment. Parents are an integral part of our school community and regularly attend the school to attend/participate in events e.g. introductory meetings, Green School flag raising, parent-teacher meetings etc . They are made aware of the science activities in school through regular school newsletters and also the class blogs.

9. Community Links

We have identified local people and organisations that can support the science curriculum in our school including local farmers facilitating fowl/hedgehog visits, local horticulturalist, Irish Fisheries Board & Coillte We hope these people will continue to visit the school and support the delivery of the science curriculum. We have strong links with our local Tidy Towns' Committee and have worked with them to plant and maintain the flower bed in our car park.

■ Success Criteria:

We intend to review the plan and measure our success under the following headings.

1. Implementation – teachers planning, cúntas míosúil, use of whole school plan
2. Procedures – consistent following of procedures outlined in this school plan
3. Feedback – teachers, parents, children, DES Inspectorate
4. Evidence – practical activity in classrooms, children's ideas used as starting point, environment awareness amongst pupils, design and make activities, Green Flag display outside school, skill acquisition and language development throughout the school

■ Implementation:

Roles and Responsibilities

The principal will co-ordinate the progress of the plan, encourage and accept feedback on its implementation and report to staff on findings. All staff members are encouraged to report feedback which they receive from pupils, parents and his/her individual opinions.

The Science plan was originally implemented during the School year 2002-2003.

■ Review:

This plan was reviewed during the school year 2017-18. It will be necessary to review this plan on a regular basis to ensure optimal implementation of the Science Curriculum. We aim to review this plan in 2022.

The Principal and staff will be involved in this review.

■ Ratification and Communication:

This plan was presented to the members of the BOM at a Board meeting on Thursday 22nd April 2004. Parents were informed by letter at the end of the 2nd term.

This reviewed plan was ratified by the BOM on Oct 15th 2018 and is available to view on our school website.

Appendix 1: **Audit of Environment**

- Walls at front of school
- Wild growth area at front of school- bluebells, brambles, primroses
- Concrete/tarmac areas on school grounds
- Grass areas on school grounds
- Deciduous Trees in school grounds - beech, oak, horse chestnut, mallus
- Evergreen Trees in school grounds
- Fruit bushes - blackcurrant bushes, gooseberry bushes
- Other bushes - whitethorn, blackthorn, furze bushes
- Big flowerbed in car park - spring bulbs, bedding plants
- Flowerbeds at front of school - bulbs, bedding plants, spring/summer flowers
- Box Garden at front of school - herbs, potatoes, carrots, lettuce
- Flower pots at front of school
- Willow tunnel
- Birds in our school grounds - swallows nests
- Hedgehog Hotel
- Log Pile
- Field at back of school - farm animals - sheep, lambs
- Indoor Butterfly Garden

Appendix 2: **Science Equipment**

Red Section:

- Flashlights – includes 24 torches and batteries
- Mirrors – tin foil and curved mirrors
- Magnets – iron filings, ball magnets, bag of nails, 10 mini-compasses, metal strips (variety) and a manual on working with magnets
- Bulb Holders – Batteries, bulbs, 24 single bulb holders, 10 clip-end wires, tin foil
- Rock Samples – set Of 6 rocks including manual from geological society, bag of sand.

Green Section:

- Stop watches – need batteries?
- Syringes – 38 syringes & tubes and manual – ‘Move it with Water and Air’
- Thermometers – 18 thermometers, straws, measurement mat, classroom thermometer, garden thermometer and large window thermometer
- Weighing Scales – includes 7 spring weighing scales, rubber bands etc.
- Miscellaneous – 6 timber trays, 9 packets of 10 mini-compasses, tea-lights and holders

Yellow Section:

- Mirrors – 1 large mirror, 15 small mirrors, Primary Science ‘light’ handout
- Fabric – Fabric, tissue paper, balloons and sand paper
- Lollipop Sticks – lollipop sticks, large lollipop sticks & plastic bubble wrap
- Magnifiers – 30+ magnifying glasses
- Insect Magnifiers – 4 X insect catch nets, 4 X large green insect magnifiers, 5 mini-beast pooters & instructions, collection jars with magnifying lids, Pond bug dial to aid identification

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Living Things

1. Skeleton
2. Human Anatomy flip chart – (skeletal system, skin, organs etc.)
3. Model eye
4. Model knee joint
5. Model shoulder joint
6. Model hip joint
7. Model elbow joint
8. Model Heart
9. Human x-ray print set
10. Large Bug Hut
11. Posters: The human skeleton, The Eye, The Teeth, The Ear & The Brain
12. Smart Heart – for recording pulse/heart beat

Materials

1. Sink and Float exploration kit
2. Litmus paper

Energy & Forces

Forces

- Boards – carpeted, smooth rubber-backed & with rough surface
- Geotronics kit
- 50 empty cotton reels (plastic)
- TTS magnetic pack storage tray (red)

Heat

- Expansion ring and ball

Light

- Colour and Light kit (Marks & Spencer)
- 10 X kaleidoscopes

Sound

- Voice changer kit
- 2 X tuning forks

DVDs/Videos:

- DK My First Science Video (experiments)
- SESE Science Video (demonstrations of some experiments esp. Energy/forces & living things)
- The Electrical Detective: ESB video
- Sci-Spy DVD X 2

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Miscellaneous:

1. Box of 28 clipboards
2. Box of plastic containers with red lids
3. Weighing scales
4. Marine viewer
5. Rolls tin foil
6. Roll greaseproof paper
7. Electricity For Life Science Pack: Communications (lighthouses, telegraphs, computers & radios – work cards showing experiments)
8. Work cards/experiment cards etc.(In box with pink lid)
9. Set of small plastic tongs