



# Whole School Plan For Science



AN ROINN  
OIDEACHAIS AGUS SCILEANNA  
DEPARTMENT OF  
EDUCATION AND SKILLS



**1. Introduction**

This policy was reviewed in 2013 by the whole teaching staff of St. Colman's National School, in accordance with the guidelines set out in the Primary School Curriculum 1999. Through the formulation of this policy, a common understanding of the purpose of the subject and how it will be implemented in this school has been created among the staff. Therefore, it will form the basis for teachers' long and short term planning. It will also inform new and temporary teachers of the approaches and methodologies used in the teaching of Science in our school.

**2. Rationale**

SESE and Science in particular, is concerned with the development and understanding of the biological and physical aspects of the world. Science and technology can make a vital contribution to the holistic development and education of the child by providing opportunities for the development of:

- (i) A broad and balanced understanding of the properties and interactions of the physical universe.
- (ii) Scientific ways of investigating and exploring the world.
- (iii) Positive attitudes to science and an appreciation of the contribution of Science and technology to society.
- (iv) We recognise that the curriculum is Spiral in nature and this shall be borne in mind when planning.

**3. Vision**

Pupils will be enabled to:

- (i) Develop an interest in and curiosity about world through the exploration and study of living and non-living things.
- (ii) Develop and apply constructive thinking.
- (iii) Observe, ask questions, hypothesise, plan, experiment, design, make, discuss, analyse and evaluate results.
- (iv) Communicate and record observations, evidence and results of experiments
- (v) Become actively involved in the discussion, exploration and resolution of environmental issues.
- (vi) Understand and apply a safety code in scientific and technological investigations and activities.
- (vii) Understand the interdependence of a wide variety of living things and their environments, recognise the importance of conserving habitats and environments and begin to understand that all life now and in the future depends on sustainable development.

**4. Broad Objectives**

The purpose of this policy in Science is to compile a user –friendly document outlining the approach, methodologies, timetable, content and resources necessary to implement the subject as per The Primary Curriculum 1999. It is hoped that this plan will ensure that children will experience a broad and balanced curriculum in which undue repetition and significant gaps are avoided. 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 in the application of investigative skills.

## 5. **Aims**

The aims of science education are:

- (i) To develop knowledge and understanding of scientific and technological concepts through the exploration of human, natural and physical aspects of the environment.
- (ii) To develop a scientific approach to problem-solving. To encourage the child to explore, develop and apply scientific ideas and concepts.
- (iii) To foster the child's natural curiosity.
- (iv) To aid the child to appreciate the contribution of science and technology to the wider world.
- (v) To appreciate and respect diverse living and non-living things.
- (vi) To encourage the child to become environmentally responsible and aware.
- (vii) To enable the child to communicate ideas, present ideas and report findings using a variety of media

## 6. **Approaches and Methodologies**

It is essential, no matter what our collective experience in teaching the subject that we use a range of teaching methods and approaches when teaching Science. Lessons "should not be work card or textbook based". Our main aim is to get the children "thinking scientifically" and not memorising facts to be regurgitated at a later stage. The approaches adopted should create a learning environment where:

- Practical activity is encouraged (Hands- on discovery)
- Links with the environment are fostered
- Children have an opportunity to work together, share ideas and communicate their findings
- Children's ideas are the starting point for science activities (Concept mapping)
- Children should be allowed the excitement of finding out for themselves
- Children are encouraged to pose their own questions

The use of a variety of approaches and methods will facilitate the efficient implementation of the science curriculum. The nature of the strands and strand units themselves necessitates the use of a variety of teaching methods. The approaches chosen should enable the children to work scientifically in a variety of contexts, to undertake practical activities and to tackle open-ended investigations. Different methods are outlined as follows:

Whole-class work. This is effective in introducing a topic and concept-mapping. It is also useful in providing background information that may be required for an activity.

Small groups.

This can be in many forms:

- Several groups working on the same activity
- Small groups rotating around different activities (circus of experiments)
- Small groups working on independent activities

**Individual work.**

This is where children pursue their own studies and carry out investigations that allow them to pursue their own interests and ideas.

**7. 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:

**i. Plants and Animals**

Teachers should be aware of the possible dangers when investigating plants or handling birds or animals. Handwashing should be encouraged after handling plants and animals. Teachers should warn pupils of any possible danger they may encounter on environment investigations

**ii. Electricity**

Children should only use low-voltage battery powered devices. Mains electricity should never be used by children 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.

**iii. Equipment**

The use of glass apparatus and sharp-edged tools should be avoided except under the 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 at all times.

**iv. Eyes**

Children should be warned of the dangers of using lenses, binoculars or other lenses devices to look directly at the sun or other intense source of light. This includes dark glass and plastic.

**v. Chemicals**

Chemicals should be labelled, sealed and safely stored. Try to avoid any chemical containing bleach. Use safety goggles where possible.

**Polythene Bags**

Children should be warned of the dangers of using these bags as they may cause suffocation.

**vi. 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. Lighted candles should never be moved. Care should be taken to avoid situations where children may be tempted to lean across a lighted 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.

**vii. 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.

**8. Skills Development**

**Working Scientifically**

Working scientifically will involve children in:

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

An important aspect of 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)

#### 9. **Parental Involvement/Community links.**

General parent meetings will be used to make parents aware of the nature and purpose of the school curriculum. Parents will be informed of the availability of publications such as "The Essential Parents guide to the Primary School Years." We recognise the importance of Parental involvement from time to time, some parents may have particular talents or expertise in this area which they may be willing to share with the children.

Members of the local community with specific interests may also be asked to contribute to the science programme. The school will also avail of the services of Laois Partnership and become involved in the design & creation of a Community Allotment in the village.

In accordance with the Green Schools Programme science will be at the core in the teaching of the skills involved at each of the five stages ( Litter, Energy, Water, Transport and Biodiversity) across all class groupings. The school will also work with other National organisations such as Coillte and An Taisce.

Pupils may be encouraged to participate in science related activities such as Science Week and Discovering Primary Science project. We will explore the possibility of establishing links with the Science and Technology Department of Portlaoise College. Classes may use school tours to visit locations such as The Natural History Museum, Castlecomer Discovery Park and other Science Exhibitions that may occur during the school year.

#### 10. **Children with different Needs**

- 1) Laminated work cards, science related library books, science software, websites etc will be used to challenge the child of exceptional ability.
- 2) Class teachers will take into account different ability and reading levels when implementing their science programme. It may be necessary to employ differentiated programmes within the classroom.
- 3) Every effort will be made to ensure that science will be timetabled in a suitable manner with children with special needs.

On evaluating the resources in the school at present supplies were extremely low. Therefore we hope to acquire some of the following resources over the next three years using school funds and donations from pupils .

2013/2014 Ensure that the following Science resources are in stock

#### 11. **Resources required for the Science Programme**

Living Things: Myself/Human Life

- Mirrors – plastic
- Metre sticks (in each classroom)
- Height chart
- Measuring tape
- Bathroom Scales,

- Kitchen Scales
- Thermometers

**12. Living Things: Animals and plants**

- Flower pot
- Insect cages
- Small trowels
- Old spoons
- Sheets of Perspex or plastic
- Watering can
- Hand lenses
- Nature viewers
- Microscope
- Plastic Magnifying Glasses

**13. Energy and Forces: Magnetism and Electricity**

- Magnets – including bar, button, horseshoe
- Screw in light bulb holders
- Bulbs and batteries
- Crocodile clips
- Wires
- Compasses
- Electric buzzers
- A range of magnetic materials
- Electric bells
- Electric motor
- Wire stripping pliers
- Screwdrivers
- Iron Filings,
- needles,
- more magnetic materials,
- Selection of metals,
- steel wool,
- batteries,
- bulbs

**Energy and Forces : Light -**

- Torches
- Curved mirrors and Plane mirrors
- Glass blocks and triangular prism
- Shiny objects that will act as mirrors; spoons, biscuit tin lid, sheet metal
- Transparent, translucent and opaque materials
- Colour filters
- Candles



**School Year 2014/2015****Energy and Forces: Sound**

- Needed: Tuning forks and restock
  - Rubber bands – different sizes and thickness
  - Sounds in action boxes and cd's
  -

**Energy and Forces: Forces****Need:**

- wheeled toys
- Oil, grease, polish, wax
- Inclined plane
- Sandpaper
- Springs
- Mechanisms: tongs, pliers, nutcrackers, toys, old clock etc

**Have:**

- Weights
- Marbles
- Balls
- Construction sets such as Knex
- Plastic syringes
- Needed: Timers, Balloons, Meccano, Knex, Pulleys

**Materials****Need the following: Need**

- Funnels
- Polystyrene sheets, blocks, balls and beads
- Sieves, plastic, various meshes
- samples of fabrics and fibres
- Food colouring
- Samples of soap and detergent
- Dyes
- Materials from the kitchen or bathroom such as sugar,
- salt, soda, chalk, oil, soda water, lime water, tea, coffee, bath salts, flour
- Samples of different metals
- Pebbles, stones, bricks and rocks
- Samples of different woods and wood products
- Samples of different papers, blotting paper, tissue paper, paper towels, waxed paper, greaseproof paper, newsprint
- Corks

**Equipment and materials required for designing and making need**

- Construction kits such as Lego Technic, K'Nex, Fischer Technik, Meccano, Master Builder

- Mechanisms – egg beater, bicycle pump, jack, hinges, toys etc

#### **Consumable Materials**

- Plasticine
- Plaster of Paris
- Clay
- A range of fabrics and fibres
- Fasteners – bulldog clips, paper clips, hair clips, clothes pegs
- Soft woods
- Foil
- Metals
- Acetate
- Plastic
- Rubber
- Dowels of various lengths and thickness
- Thin wire
- String and threads
- Adhesives
- Paints

#### **Domestic Reclaimable Waste**

**Each class to have a supply which may include:**

- plastic bottles of various sizes
- plastic straws
- aluminium foil
- thread spools
- tins
- range of empty boxes, lids, containers and tubes
- coat hangers
- polystyrene block and beads
- scrap cord and board
- corks of varying sizes

Class teachers should request the principal to obtain any extra required materials well in advance of experiment date.

#### **14. Books**

**Junior Infants**

**Senior Infants**

**1<sup>ST</sup>/2<sup>ND</sup> Class**

**3<sup>rd</sup>/4<sup>th</sup> Class - Discover Primary Science**

**Window on the World 3 & 4 also use the ebook which supplies web links**

**Science Quest 3 & 4**

**5<sup>th</sup>/6<sup>th</sup> Class**

**Websites – [www.makemeagenius.com](http://www.makemeagenius.com)**

**[www.bbc.co.uk/primaryscience](http://www.bbc.co.uk/primaryscience)**

**[www.science.ie](http://www.science.ie)**

[www.rte/mooneygoeswild.ie](http://www.rte/mooneygoeswild.ie)  
[www.birdwatchireland.ie](http://www.birdwatchireland.ie)  
[www.enchantedlearning.com](http://www.enchantedlearning.com)  
[www.teachingideas.co.uk](http://www.teachingideas.co.uk)  
[www.scoilnet.ie](http://www.scoilnet.ie)

## 15. 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 following are among the assessment tools that teachers can use.

### I. 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.

### II. 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 and 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

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)

The child's initial ideas must be explored if they are to form a starting point for learning. This will help enormously to see what pre-conceived ideas the children may have. It is also useful as an

assessment tool at the end of a unit to see if there has been any progression.

### **III. Work samples, portfolios and projects**

A wide range of samples of a child's work is compiled to form a science portfolio. This should document and assess progress over a school year. The samples chosen should demonstrate achievement in a range of areas. Samples of work in one area may be included to show progression of ideas and skills. A scrap book or folder may be used for there. Digital camera can be used to record experiments etc.

Written accounts or drawings, photographs of stages of an investigation, graphs, samples of worksheets or audiotapes of children's reports of investigations may be enclosed.

#### **16. Equality of Participation and Access**

All children will be treated equally in relation to participation in and access to the science programme. We recognise that some of our pupils may not have easy access to scientific materials in their homes and our prescription of homework will reflect this.

#### **17. Homework**

Homework will be at the discretion of the class teacher and in line with the school's homework policy. We recognise that some of our pupils may not have easy access to scientific materials in their homes and our prescription of homework will reflect this. Teachers are aware of the need to strike a balance between observing, discussing, investigating, recording and learning.

We recognise that it is not essential that all pupils be assigned for the same homework. Special consideration shall be given in some cases.

#### **18. Linkage and Integration**

It is our intention to link activities and concepts to other areas of the Science curriculum and to integrate science with other curriculum areas.

It is also a policy of ours to utilise Science lessons as opportunities to develop children's language competence and confidence. This new vocabulary should allow the children to engage with and challenge other Scientific Challenges in their environment.

#### **19. Use of the Environment**

A number of trails in the children's immediate environment which include use of Sstradbally Lake, Oakvale woods and the new Community Garden in conjunction with Laois Partnership have been devised by teaching staff and are currently in use. We will

also take the opportunity to use parents with particular knowledge in this area as a resource should they wish.

Procedural issues with regard to class outings will conform on our Health and Safety statement. We also intend to undertake good environmental practices.

There will be a dedicated time for Science in teacher's weekly timetable. All strand/strand units will be taught the yearly period

Infants 45 min/week

1<sup>st</sup> –6<sup>th</sup> 1 hour/week

#### **21. Teacher's planning and reporting**

The teaching staff will recognise that it is important that teachers should liaise on an ongoing basis, but particularly at the beginning of the school year to plan for the year ahead.

Teachers from Junior to 2<sup>nd</sup> class teach Science in their weekly plans with the allotted time. Teachers in the remaining class groupings team teach the SESE programme with one teacher specialising in each subject.

#### **22. Staff development**

The teaching staffs have agreed that should opportunity arise, they would be willing to attend courses which will develop their expertise in the area of Science. They have also agreed that should a teacher need to be supported in developing required knowledge and skills in this area; this support shall be provided, if possible, by other staff members within the school.

#### **23. Green Schools**

We have been awarded 4 Green Flags to date. We intend to continue with our Green Schools Programme renewal of these flags (Litter, Energy & Water) and strive for the next flag - Transport.

#### **24. Review**

This plan is a collaboration of Stradbally BNS and Scoil Anoghusa developed in 2010. This plan was reviewed in 2013 by the school staff. The next review will take place in 2015.

### **Ratification and Communication**

The Board of Management ratified this policy on the \_\_\_\_\_ of \_\_\_\_\_ 20\_\_\_\_

Signed: \_\_\_\_\_ , (Chairperson, BOM)

St. Colman's N.S. does not have adequate resources to disseminate all of its policies to all the concerned members of the wider school community. The policy is communicated to the members of the BOM and is available to the wider school community through the parents' representatives on the BOM. All St. Colman's N.S. policies are available for inspection in the school and shortly on the website [www.stcolmansns.ie](http://www.stcolmansns.ie)