

**Science Policy**

**2019+**

**Board of Management Scoil Bhríde Nurney**

**2019+**



**Scoil Bhríde**

**Science Policy**

**Introductory Statement**

This Science Plan was drawn up in consultation and collaboration with staff members and its preparation involved review of current practice, research of Curriculum documents, NCCA materials and references to other materials and resources available in our school.

**Rationale**

Our plan has been designed to benefit the teaching and learning of Science throughout our school. It provides an overview of the Science curriculum and outlines our general aims and goals with regard to this subject. Our plan also provides frameworks for long term and short-term classroom planning for teachers. This plan is also designed to inform teachers (full time and temporary), our Board of Management and our parents and guardians of the approaches and methodologies used in teaching Science.

**Vision**

We seek to assist the children in our school in achieving their potential. Our school hopes to promote a coordinated approach to the planning and teaching of Science so as to ensure development and continuity and can facilitate the evaluation of learning, teaching resources and approaches and methodologies.

**Aims**

To provide the pupils of Scoil Bhríde Nurney with a science programme that is developmentally appropriate and socially relevant.

To support the aims of the primary curriculum for science by:

* developing knowledge and understanding of scientific and technological concepts through the exploration of human, natural and physical aspects of the environment
* developing a scientific approach to problem-solving which emphasises understanding and constructive thinking
* encouraging the child to explore, develop and apply scientific ideas and concepts through designing and making activities
* fostering the child's natural curiosity, so encouraging independent enquiry and creative action
* helping the child to appreciate the contribution of science and technology to the social, economic, cultural and other dimensions of society
* cultivating an appreciation and respect for the diversity of living and non-living things, their interdependence and interactions
* encouraging 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
* enabling the child to communicate ideas, present work and report findings using a variety of media.

 The scheme covers the three strands of the science curriculum –

* Living things
* Energy and forces
* Materials
* Environmental awareness and care

 The following skills span the content of each of these four Strands

* Working scientifically
* Designing and making

The content of the Science Scheme builds on the work at each prior level and will consolidate and develop the pupils’ experience, skills and scientific knowledge in an environment that promotes enthusiasm, curiosity and creativity in the child.

**Linkage and Integration**

At each class level the teachers will seek to integrate Science with other curricular areas. Teachers will make provision for this linkage in their short-term planning.

**Methodologies**

A variety of methodologies is an important aspect of the geography programme as it helps children with differing learning styles to access the curriculum.

The following approaches will be employed to enhance each child’s science education;

* **Talk and discussion-**includes discrete teaching of discussion skills such as**:** turn –taking, active listening, positively responding to peers, clarity and confidence in giving opinions
* **An active learning hands on approach-** Practical activity is encouraged with the free exploration of materials and ideas in an attempt to develop skills through content whether working scientifically or designing and making
* **Guided and Discovery learning –** by working scientifically based on an explorative and investigative approach through open questioning, observing, predicting, investigating and experimenting, estimating and measuring, analysing, recording and communicating
* **Collaborative and cooperative learning –** Children have an opportunity to work together, share ideas and communicate their findings in pairs or groups, linking with other schools or project work
* **Scientific Language-**for example whilstpresenting the findings of research to the class or school
* **Free exploration of materials –** through open ended explorations and questions such as what happens to things in water?
* **Investigative approach -** Children’s ideas are the starting point for science activities firstly finding out the children’s ideas, helping children to test and develop their own ideas and questions through open ended investigations and then assessing the extent of change in their ideas and skills
* **A teacher directed approach -** for example demonstrating the effect of heat on soldering metal
* **Problem Solving-** for example what helps seeds to grow? Do seeds sprout faster when it is warmer?
* **Use of Environment-** throughinvestigativefield work or fostering links with the environment where children can apply scientific concepts to everyday situations
* **Technology**- to be used as a tool/ aid throughout third class .**Classroom P.C.-** to be used as a teaching tool/ aid to create data bases, to create spread sheets and to access supplementary materials and information from the internet. **Websites**- <http://www.primaryscience.ie> (for more see below)

**Equality of Participation and Access**

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 insure learning for all pupils. 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. We provide an equal educational experience for both boys and girls as we recognise that stereotyped expectations of gender roles can inhibit children’s educational achievements. Children with special needs will be included in all activities

**Differentiation**

Whole class teaching of science will include a range of differentiation strategies by

* Differentiating learning objectives
* Differentiation by teaching style – using a combination of whole class teaching and focused group work or starting with the child, his/her ideas and level of understanding or using investigations as the basis for practical work
* Differentiation by resource – for example using manipulatives and concrete materials or audio/visual resources or encouraging use of Science websites for further investigation / study or starting with the child, his/her ideas and level of understanding
* Differentiation by task – for example involving weaker / less interested pupils in setting up work stations etc. to stimulate interest and develop vocabulary
* Differentiation by outcome – for example modifying exercises to match the ability levels of pupils, for example opportunities for further investigation work
* Differentiation by grouping – for example using a ‘Buddy’ system to increase involvement of weaker pupils and give a sense of responsibility and caring for the more able or rotating group leaders when engaging in group work
* Differentiation by support – for example a list of the terminology used in science is given to the Support teacher

**Assessment**

Assessment is a continuous, dynamic and often informal process. Assessment in Science will assess the child’s knowledge and understanding of scientific matters, the acquisition of scientific concepts and skills, competence in the application of experimental and investigative skills and the development of important attitudes and values

The following assessment tools will be used;

* **Teacher observation-**thisis ongoing and will be used to assess
* individual discussion
* how a child carries out an investigation as part of a group
* the group, and the interaction of individuals within the group
* the responses the child makes to the teacher's questions and suggestions
* the participation of the child at different stages of investigation, for example planning, identifying variables and evaluating
* the way the child reacts to tasks and to the identification and solution of problems in a variety of environments.
* a specific practical skill or process skill, for example the ability to use measuring instruments in a scientific investigation or the ability to make observations
* a number of skills being used at the same time
* open-ended investigations, for example the ability of the child to identify and control variables
* model-making in problem-solving contexts
* explorations and investigations in the outdoor environment.
* **Teacher designed tasks and tests-**including
* observing both inside and outside the classroom
* recognising patterns in observations and evidence
* analysing objects and processes and hypothesising about how models and systems work or are made
* predicting outcomes of an investigation
* collecting information from sources such as direct observation in the environment and in the classroom using books and other materials
* asking questions
* providing oral, written and pictorial accounts of investigations or stages of investigations and experiments
* completing and displaying projects and reports of topic work
* using work cards or activity sheets that guide children to apply process skills
* designing, making and evaluating models and structures that provide solutions to problems
* evaluating the evidence generated by an investigation
* using interactive multimedia computer programs enabling the child to explore scientific themes/topics and complete a range of tasks and problems
* exploring and engaging in practical investigations in the environment
* completing teacher-designed revision tests on a unit or units of work
* evaluating the outcomes of design-and-make activities displaying and reporting project work in progress or when completed
* estimating, measuring or comparing
* making drawings of the evidence of visual observations, plans for investigations or methods to be used in investigations. The value of expressing ideas through drawing with labels is greatly increased if the teacher discusses the drawing with the child and annotates it as a result of asking questions.
* **Concept mapping**-pictorial and word-based relationship charts
* **Work samples-**written work or digitally stored samples usedto affirm children’s progress and development, such as
* Science diaries
* Models and artefacts
* Photographs of models constructed and areas visited
* Science copybooks
* The results of project work
* Graphs
* Samples of worksheets
* Record sheets from experiments and explorations
* **Pupil profiles-**compilation of test results and work samples, kept in folder in classroom and used for reporting to parents and other teachers.
* **Curriculum profiles**-used to record progress as children demonstrate mastery of indicators such as
* The child can make careful measurements of shadows and represent these in a line graph
* The child can construct and make drawings of simple working circuits and explain why some circuits work and others do not
* **Standardised testing-** Micra –T and Sigma – T administered to all pupils according to the school’s assessment policy
* **Diagnostic testing-**administered by the support teacher, subsequent support strategies devised in consultation with class teacher etc.

**Parental/Guardian Involvement**

Some ways in which our parents/guardians can get involved include:

* Take a walk outside with your child outside of school time. Invite your child to bring along a science journal and show them how to use a magnifying glass. They record their observations.
* Helping their children to gather batteries, magnets, seeds and other resources to support the teaching of science.
* Looking at & discuss work in science on the websites listed on the school website
* Getting other people involved in the science curriculum: helping to organise visitors with a science background to speak e.g. grandparents, retired teachers & other members of the community
* Our Parents Association is helping to fund some of our field trips.

**Health & Safety**

We are cognisant of the need to keep everyone and everything safe as we explore our environment. We teach children the rules and procedures for health & safety before and during walking trips and bus trips (this integrates with SPHE). The need to listen, respect and do as others tell us while is strongly emphasized)

**Staff Development**

* Teachers have access to reference books, resource materials, and websites dealing with Science.
* Each teacher is responsible for keeping these resources up to date and to have these available to share.
* At times there may be appropriate SESE courses available. Teachers are encouraged to attend.
* Teachers are encouraged to share the expertise acquired at these courses as well as other aspects of the subject. This is organised at staff meetings.
* Working with local people who have good geographical knowledge of the area benefits teachers and children alike.

**Individual Teacher’s Planning and Reporting**

Teachers will base their yearly and short-term plans on our whole school plan for Science. Please refer to the attached whole school SESE planning guide for each class.

Teachers will consult this whole school plan and the curriculum documents for Science when they are drawing up their long and short-term plans, ensuring that the correct strand units under each strand are taught.

Each teacher's Cuntas míosúil will assist in recording work covered and in evaluating progress in Science and informing future teaching and learning.

Parents are informed of children’s progress in science at parent teacher meetings and in end of year report cards.

**Organisational Planning**

* **Timetable**

As per curriculum guidelines – SESE

* Infant Classes ***(2 hours 15 minutes*** *per week****)***
* 1st – 6th Classes ***(3 hours*** *per week****)***

**SESE Project Fair**

A simple project Fair is held annually in the school Hall (during the month of \_\_\_\_\_\_\_\_\_\_) with a different focus on one SESE subject project per year. All classes participate and the Fair is open to the public and other classes within the school (e.g. year 1 – Science, year 2 – History, year 3 – Geography etc.)

**Resources**

The following resources will be made available and used in the delivery of the Science Programme *(this list will be updated after each review when possible):*

|  |  |
| --- | --- |
| Equipment and materials for designing and making | Resources |
| Exploring | construction kits such as Lego Technic, K'Nex, Fischer Technik, Meccano, Master Builder mechanisms - egg beater, bicycle pump, jack, hinges, toys |
| Making | hammer and nails nuts and bolts hacksaws and spare blades wood glues clamp sandpaper screwdriver and screws craft knife  | hand drill rulers and scissors clips spanners needle rotary cutter G clamp |
| Consumable materials | Domestic reclaimable waste |
| Plasticine Plaster of Paris clay a range of fabrics and fibres fasteners - bulldog clips, paper clips, hair clips, clothes pegs corriflute soft woods foil metals acetate plastic rubber dowels of various lengths and thicknesses thin wire string and threads adhesives paints | plastic bottles of various sizes plastic straws aluminium foil thread spools tins range of empty boxes, lids, containers and tubes coat hangers polystyrene blocks and beads scrap cord and board corks of varying sizes. |

|  |  |
| --- | --- |
| Strand and strand units | Resources |
| Living things |   |
| Myself/Human life | mirrors (plastic) metre sticks height chart thermometer measuring tape bathroom scales |
| Animals and plants | flower pot insect cages small trowels aquarium tank old spoons sheets of perspex or plastic watering can plastic tubing hand lenses nature viewers binocular microscope pooters binoculars magnispectors bird table |
| Strand and strand units | Resources |
| Energy and forces |  |
| Magnetism and electricity | magnets (selection to include bar, button, horseshoe) screw-in bulb holders bulbs and appropriate batteries iron filings crocodile clips needles wires compasses  | electric buzzers a range of magnetic materials electric bells electric motor a selection of metals wire stripping pliers steel wool screwdrivers |
| Light | torches curved mirrors 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 old spectacle lenses projector |
| Heat | thermometers candles |
| Sound | tuning forks rubber bands (different sizes and thicknesses) guitar strings |
| Forces | wheeled toys oil, grease, polish, wax inclined plane sandpaper springs mechanisms: tongs, pliers, nutcracker, toys, old clock etc. weights marbles  | balls construction sets such as Meccano: wheels, pulleys, axle rods, gears timers stop clocks and watches balloons plastic syringes pulleys |

|  |  |
| --- | --- |
| Strand and strand units | Resources |
| Materials |  |
| Properties and characteristics of materialsMaterials and change | funnels polystyrene sheets, blocks, balls and beads sieves, plastic, various meshes samples of different fabrics and fibres food colourings samples of soaps and detergents dyestuffs materials from the kitchen or bathroom (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 types of paper (blotting paper, tissue paper, paper towels, waxed paper, greaseproof paper, newsprint corks. |

|  |
| --- |
| **General Resources** |
| * Small World by CJ Fallon
* A variety of textbooks and the Local library
* Seeds, batteries & other resources brought in by children/parents/teachers
* Relevant software
* Visualisers - this allows teacher to use one book with the entire class.
* Science trails - local and further afield.
* Commercial Science kits for experiments
* Use of interactive whiteboard.
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| **Areas of interest (local and further afield)** |
| * Kildoon Woods
* Nurney Stream
* Nurney Playground and gardens
* Pigeon House
* School field
* School Garden
* Nurney Church
* Curragh Plains
* National Stud and Japanese Gardens
* Solas Bhríde grounds
* Saint Brigids Well
* Pollardstown Fen
 |

**Websites**

[Aghina National School, Cork](http://www.iol.ie/~aghinans/scienceweb/index.htm) [Ireland]
This fun-filled site was created by the students of Aghina N.S. in Cork. It shows the students’ excellent science projects, which will help others to learn too!
Mainly for Children but Teachers will find useful.

[BBC Schools Science Clips](http://www.bbc.co.uk/schools/scienceclips/index_flash.shtml) [UK]
Excellent set of resources.
Mainly for Children but Teachers will find useful.

[Biology.ie and Nature Watch Ireland](http://www.biology.ie/) [Ireland]
People of all ages can map and learn about Ireland’s flora and fauna on this interactive website.
Mainly for Children but Teachers will find useful.

[Blackrock Education Centre](http://www.blackrockec.ie/environment/makedo.htm) [Ireland]
Comprehensive set of make and do nature projects using recycled materials.
Mainly for Children but Teachers will find useful.

[Coillte - Learn about trees](http://www.coillte.ie/learn_about_trees/index.htm) [Ireland]
Worksheets on trees for all classes in the primary school. Child friendly, well graded worksheets, simple access.
Mainly for Teachers but Children will find useful.

[Discover Science and Engineering Programme](http://www.science.ie) [Ireland]
science.ie is a resource for people of all ages who are interested in science. It includes information on science, engineering and technology events, activities, news, links and careers in Ireland.
Mainly for Teachers but Children will find useful.

[Enfo](http://www.enfo.ie) [Ireland]
Excellent resource for environmental education.
Mainly for Teachers but Children will find useful.

[EPA](http://www.epa.ie/Education/PrimarySchools/) [Ireland]
Home of Ireland's Environmental Protection Agency, an independent public body which has a wide range of functions to protect the environment.
Mainly for Teachers but Children will find useful.

[ESB](http://www.esb.ie/main/about_esb/education.jsp) [Ireland]
Useful resources for the teaching of electricity.
[Try Smart Spark's challenges](http://www.esb.ie/main/about_esb/smart_spark.jsp)
Mainly for Teachers but Children will find useful.

[Inver National School](http://www.iol.ie/~bmullets/) [Ireland]
The school’s website – lovely science resources, look at the sound walk and the ‘egg’citing experiments and their microscope work.
Mainly for Children but Teachers will find useful.

[Irish Peatland Conservation Council](http://www.ipcc.ie/bicsciencehome.html) [Ireland]
Curriculum resources on the bog. Good on how to plan a field trip.
Mainly for Teachers.

[Kill o the Grange National School](http://homepage.eircom.net/~kogrange/) [Ireland]
See the work of the children for the Young Scientists over the last few years.
Mainly for Children but Teachers will find useful.

[NASA Kids](http://kids.msfc.nasa.gov/) [USA]
Great site for children interested in space, science, rockets, astronauts and the solar system. There is a teacher's corner.
Mainly for Children but Teachers will find useful.

[Pfizer Science Bus](http://www.dcu.ie/ctyi/bus/activiti.htm) [Ireland]
Activities page for children.
Mainly for Children but Teachers will find useful.

[Physics.org](http://www.physics.org/) [UK]
Great website for physics questions, physics in everyday life. You register and give your level of physics and get answers to questions at the appropriate level.
Mainly for Teachers but Children will find useful.

[Planet Science](http://ww.planet-science.com/under11s/) [UK]
Good site with lots of activities and ideas for children, teachers and parents.
Mainly for Children but Teachers will find useful.

[Roger Frost’s website](http://www.rogerfrost.com/primar.htm) [UK]
Excellent for ideas for ICT and science, good for suppliers of software .
Mainly for Teachers.

[Sci-Spy](http://www.sci-spy.ie/) [Ireland]
This excellent resource has lots of information and activities for 5th and 6th class students.
Mainly for Students but Teachers will find useful.

[SCIcentre Primary Science Self Study Materials](http://www.le.ac.uk/education/centres/sci/selfstudy.htm) [UK]
Useful background science for primary teachers – developed for self-study.
Mainly for Teachers.

[ScoilNet](http://www.scoilnet.ie) [Ireland]
The main Irish website for education.
Mainly for Teachers but Children will find useful.

[Scope](http://www.science.ie/scopetv2/home/index.asp?section_id=767) [Ireland]
SCOPE - the TV show that loves science, engineering and technology. Full details of the show week by week are available here, with loads more information on the events, celebrities and cutting edge technology covered on the show. There are also fun competitions and test-yourself quizzes.
Mainly for Children but Teachers will find useful.

[SEI](http://www.sei.ie) [Ireland]
Home of Sustainable Energy Ireland, the country's national energy authority.
Mainly for Teachers.

[Something Fishy](http://www.somethingfishy.ie) [Ireland]
Learn about water and fish in Ireland.
Mainly for Children but Teachers will find useful.

[Teachernet - Primary Science Resources](http://www.teachernet.gov.uk/teachingandlearning/subjects/science/primaryscience/) [UK]
UK reference site for primary science – an excellent resource for teachers.
Mainly for Teachers.

[Teaching Ideas for Primary teachers](http://www.teachingideas.co.uk/) [UK]
An excellent resource for primary teachers, all subjects including science.
Mainly for Teachers.

[The Exploratorium, San Francisco](http://www.exploratorium.edu) [USA]
The site of the world famous science museum. Plenty of resources for teachers and children – look for the Science Snacks.
Mainly for Teachers but Children will find useful.

[Try Science](http://www.tryscience.org/) [USA]
Great science ideas, good teacher page.
Mainly for Teachers but Children will find useful.

[Using web-based resources in Primary Science](http://www.ictadvice.org.uk/index.php?section=tl&catcode=as_cu_pr_sub_13&rid=3596&wn=1) [UK]
Good portal for primary science and ICT. All resources are matched to the English curriculum.
Mainly for Teachers.

**Success Criteria**

The success of this plan will be measured using the following criteria:

* Teacher observation.
* Teacher designed tasks and tests.
* Samples of children's work e.g. projects, portfolios, art displays.
* Feedback from pupils and parents.
* Inspectors’ suggestions/feedback.
* Staff meetings so that time is given to discuss, review and amend if necessary.

**Roles and Responsibilities**

Class teachers are responsible for the implementation of the Science programme in their own classes.

**Ratification of Science Policy**

This policy was adopted by the Board of Management on \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Signed: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Signed: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Chairperson of Board of Management Principal

Date: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Date: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Date of next review: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_