

# Oylegate NS

## Science Policy

### **Introductory Statement:**

The purpose of this draft 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. It is intended that over a two-year period all strand units from each strand should be covered. There should also be a balance between the development of scientific knowledge and understanding and the processes of working scientifically. This draft should ensure continuity and progression in the development of scientific ideas and in the application of investigative skills.

### **Rationale:**

This policy was devised:

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

### **Vision and Aims**

#### **a) Vision**

We seek to assist the children in our school in achieving their potential.

#### **b) Aims**

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

This Geography Policy will be addressed under the following headings

### **1. 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 workcard 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.

### **2. 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:

#### **A. Plants and Animals**

Disposable gloves to be used when investigating hedgerows. Children should never handle unknown or unfamiliar plants, especially fungi. Gloves to be worn also when handling birds or animals. Hand washing should be encouraged after handling plants and animals.

#### **B. Electricity**

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

### **C. Equipment**

The use of glass apparatus and sharp-edged tools should be avoided except under the direct 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 where possible.

### **D. Eyes**

Children should never use lenses, binoculars or other lenses devices to look directly at the sun or other intense source of light. This includes dark glass and plastic.

### **E. Chemicals**

Household chemicals should be purchased to meet the requirements of the experiment and any surplus disposed of on completion of experiment. Try to avoid any chemical containing bleach. Use safety goggles where possible. These chemicals will **not** be stored in the science resource boxes.

### **F. Polythene Bags**

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

### **G. 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.

### **H. 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.

## **3. Skills Development**

### **A. Working Scientifically**

Working Scientifically will involve children in:

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

## **B. 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)

## **4. Notes on Timetable**

The timetable will allow all classes to follow similar themes simultaneously. It is spread over two years: **Year One** and **Year Two**.

Our science plan is based on a spiral approach as per the curriculum. For this reason, it is not intended that all strand units will be taught in each class. The units may be supplemented by extension work at the discretion of the class teacher.

## **5. Resources**

Textbooks and workcards can be used during science lessons to support active investigative work. However, “Science lessons **should not be workcard or textbook based**” *cf* Curriculum Guidelines

To this end, it has been decided to create a resource boxes for each class level to support the teaching of each strand. These boxes are to include:

- Photocopiable Masters
- Laminated Workcards
- Relevant equipment (excluding consumables)

The use of these science boxes should prevent any significant overlap and repetition of strand units.

We shall also keep a library of resource books, videos and cd-roms in the resource area. It is hoped that all resource material will be included in the evaluation of the science plan.

## **Books, videos and cd-roms available in school**

### **CDs:**

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### **DVDs/Videos:**

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### **Books:**

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## 5.1 Resources required for the Science Programme

### Living Things : Myself/Human Life

- Mirrors – plastic
- Metre sticks
- Height chart
- Thermometer
- Measuring tape
- Bathroom scales

### Living Things : 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
- Microscope
- Binoculars
- Magnispectors
- Bird table

### Energy and Forces : Magnetism and Electricity

- Magnets – including bar, button, horseshoe
- Screw in light bulb holders
- Bulbs and 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

### 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
- Old spectacle lenses
- Projector

#### **Energy and Forces : Heat**

- Thermometers
- Candles
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#### **Energy and Forces : Sound**

- Tuning forks
- Rubber bands – different sizes and thickness
- Guitar strings

#### **Energy and Forces : Forces**

- wheeled toys
- Oil, grease, polish, wax
- Inclined plane
- Sandpaper
- Springs
- Mechanisms: tongs, pliers, nutcrackers, toys, old clock etc
- Weights
- Marbles
- Balls
- Construction sets such as Meccano, wheels, pulley, axle rod, gears
- Timers
- Stop clock and watches
- Balloons
- Plastic syringes
- Pulleys

#### **Materials**

- 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**

- Construction kits such as Lego Technic, K'Nex, Fischer Technik, Meccano, Master Builder
- Mechanisms – egg beater, bicycle pump, jack, hinges, toys etc
- Hammer and nails
- Nuts and bolts
- Hacksaw and spare blades
- Wood glue
- Clamp
- Sandpaper
- Screwdriver and screws
- Craft Knife
- Hand Drill
- Ruler and Scissors
- Clips
- Spanners
- Needle
- Rotary Cutter
- G Clamp

### **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**

- 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

## **6. 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 found useful in schools:

### **A. 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.

### **B. 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, which may include:

- 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 workcards or activity sheets
- Designing, making and evaluating models and structures
- Using interactive multimedia programs to explore themes and complete a range of tasks and problems
- 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)

### **C. Concept-mapping**

The child's initial ideas must be explored if they are to form a starting point for learning. Concept-mapping helps children to record and discuss their ideas (in other words, brain-storming). 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.

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

A wide range of samples of a child's work may be compiled to form a science portfolio. This should document and assess progress over a term or longer. The portfolios should contain samples of work in progress or what the child considers to be "best samples" of finished pieces together with teacher's comments. 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.



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

## Plan of work for 1<sup>st</sup> and 2<sup>nd</sup> Class

<b>Strand</b>	<b>Year 1 (Odd/Even e.g. 2015/16)</b>	<b>Year 2 (Even/Odd e.g. 2016/17)</b>
<b>Living Things</b>	<ul style="list-style-type: none"> <li>• Living in the local community – My family and the community.</li> <li>• Living in the local community – People at work – Home, schools and youth clubs, Shops, offices, factories and farms.</li> <li>• Living in the local community – People at play – Family and friends. Dance teachers and drama teachers.</li> <li>• Living in the local community – People and places in other areas – A place in Ireland.</li> </ul>	<ul style="list-style-type: none"> <li>• Living in the local community – Homes and shelter.</li> <li>• Living in the local community – People at work – Garda station, hospital and health centre. Hotels, restaurants and centres for visitors.</li> <li>• Living in the local community – People at play – Park keepers and attendants. Youth leaders and sports coaches.</li> <li>• Living in the local community – People and places in other areas – A place in Europe.</li> </ul>
<b>Natural Environments</b>	<ul style="list-style-type: none"> <li>• The local natural environment – natural features.</li> <li>• The local natural environment - natural materials</li> <li>• The local natural environment - Weather – Observe and record</li> </ul>	<ul style="list-style-type: none"> <li>• The local natural environment – water in the locality.</li> <li>• The local natural environment - Weather – Influence of weather, and contrast with other areas.</li> <li>• Planet Earth in space</li> </ul>
<b>Environmental awareness and care</b>	<ul style="list-style-type: none"> <li>• Caring for my locality</li> </ul>	<ul style="list-style-type: none"> <li>• Caring for my locality</li> </ul>

## Plan of work for 3<sup>rd</sup> & 4<sup>th</sup>

Strands	Year 1 (Odd/Even e.g. 2015/16)	Year 2 (Even/Odd e.g. 2016/17)
<b>Living Things</b>	<ul style="list-style-type: none"> <li>• Human life - Variety and characteristics of humans</li> <li>• Human life - Human life processes – diet and teeth</li> <li>• Plant and animal life – Variety and characteristics of living things – local environment</li> <li>• Plant and animal life – Processes of life - Animals</li> <li>• Plant and animal life – Variety and characteristics of living things –Plant and animal behaviour influenced by environment</li> <li>• Plant and animal life – Variety and characteristics of living things – Sort and group living things</li> <li>•</li> </ul>	<ul style="list-style-type: none"> <li>• Human life - Human life processes – breathing</li> <li>• Human life - Human life processes – skeleton, muscles and joints</li> <li>• Human life - Human life processes – physical changes in growth to adulthood</li> <li>• Plant and animal life – Variety and characteristics of living things – wider environment</li> <li>• Plant and animal life – Variety and characteristics of living things –Simple keys to identify common species</li> <li>• Plant and animal life – Variety and characteristics of living things – Plants use light energy, food chains</li> </ul>
<b>Living Things - Project</b>	<ul style="list-style-type: none"> <li>• Plant and animal life – Processes of life – <b>Design and make an animal home</b></li> </ul>	<ul style="list-style-type: none"> <li>• Plant and animal life – Processes of life – <b>Plant growth</b></li> </ul>
<b>Energy and Forces</b>	<ul style="list-style-type: none"> <li>• Light</li> <li>• Heat</li> </ul>	<ul style="list-style-type: none"> <li>• Sound</li> <li>• Magnetism and electricity</li> <li>• Forces</li> </ul>

<b>Materials</b>	<ul style="list-style-type: none"> <li>• Properties and characteristics of materials</li> </ul>	<ul style="list-style-type: none"> <li>• Materials and change – Heating and cooling</li> <li>• Materials and change – Mixing, separating and other changes</li> </ul>
<b>Environmental awareness and care</b>	<ul style="list-style-type: none"> <li>• Environmental awareness</li> <li>• Caring for the environment</li> </ul>	<ul style="list-style-type: none"> <li>• Science and the environment</li> <li>• Caring for the environment</li> </ul>

## Plan of work for 5<sup>th</sup> and 6<sup>th</sup>

<b>Strands</b>	<b>Year 1 (Odd/Even e.g. 2015/16)</b>	<b>Year 2 (Even/Odd e.g. 2016/17)</b>
<b>Living Things</b>	<ul style="list-style-type: none"> <li>• Human life - Variety and characteristics of humans</li> <li>• Human life - Human life processes - breathing</li> <li>• Plant and animal life – Variety and characteristics of living things</li> <li>• Plant and animal life – Processes of life – Plants, and factors affecting plant growth</li> <li>• Plant and animal life – Variety and characteristics of living things – Major groups of living things – Mammals, insects, arachnids, amphibians, fish, birds, reptiles</li> </ul>	<ul style="list-style-type: none"> <li>• Human life - Human life processes – nutrition</li> <li>• Human life - Human life processes - reproduction</li> <li>• Human life - Human life processes – disease and infection</li> <li>• Plant and animal life – Processes of life - Animals</li> <li>• Plant and animal life – Variety and characteristics of living things – Major groups of living things – Flowering and non-flowering plants, fungi and bacteria</li> </ul>
<b>Project</b>	<ul style="list-style-type: none"> <li>• Design and make one of the following – periscope, telescope, sun umbrella.</li> </ul>	<ul style="list-style-type: none"> <li>• Design and make one of the following – windmill, water wheel, wind turbine, spring balance or lever-based toy.</li> </ul>

<b>Energy and Forces</b>	<ul style="list-style-type: none"> <li>• Light</li> <li>• Heat</li> <li>• Sound</li> </ul>	<ul style="list-style-type: none"> <li>• Magnetism and electricity</li> <li>• Forces</li> </ul>
<b>Materials</b>	<ul style="list-style-type: none"> <li>• Properties and characteristics of materials</li> </ul>	<ul style="list-style-type: none"> <li>• Materials and change – Heating and cooling</li> <li>• Materials and change – Mixing, separating and other changes</li> </ul>
<b>Environmental awareness and care</b>	<ul style="list-style-type: none"> <li>• Environmental awareness</li> <li>• Caring for the environment</li> </ul>	<ul style="list-style-type: none"> <li>• Science and the environment</li> <li>• Caring for the environment</li> </ul>

### **Reference Section**

- Primary School Curriculum: Science (1999)
- Primary School Curriculum. Your Child’s Learning: Guidelines for Parents (*available on the NCCA website [www.ncca.ie](http://www.ncca.ie)*)
- The What, Why and How of children’s learning in primary school, NCCA (2006)