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Bord Oideachais agus Oiliúna na Gaillimhe agus Ros Comáin
Galway and Roscommon Education and Training Board

Cuan na Gaillimhe CNS
- a Steiner education

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Science Curriculum Policy for Infants to 6th Class

1 INTRODUCTION AND AIMS

Principles for Science

> "Science Education fosters a respect for the evidence of scientific enquiry, while the collaborative nature of its activities can also help children to acquire social and co-operative skills. Investigations and problem-solving tasks nurture the inventive and creative capacities of children. Science education plays a key role in promoting a sensitivity to, and a personal sense of responsibility for, local and wider environments." p.6 Science Curriculum.

In our school, the aim of science is to enable the children to explore, describe and understand the world in which they live by exploring the local environment in a hands-on and active way. This ensures the children develop their scientific skills in a realistic and meaningful manner. We also find wholeness in science in our classes by showing science's own development, and by telling stories of its discoveries and discoverers.

We aim:

- To cultivate the appreciation and respect for the diversity of living and non-living things, their interdependence and interactions
- To encourage the child to explore, develop and apply scientific ideas and concepts through designing and making activities
- To foster the child's natural curiosity, so encouraging independent enquiry and creative action
- To encourage 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
- To enable the child to communicate ideas, present work and report findings in a variety of ways
- Understand the application of some basic scientific ideas and concepts in everyday situations
- 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 the sustainable development of the planet.

2 STRANDS & STRAND UNITS

In our school we will present the Science curriculum to all classes under two headings: *Skills* and *Strands.*

Skills

- The children will be taught to work scientifically.
- The children will be afforded the opportunity to carry out Design and Make activities.
- The children will be afforded the opportunity to carry out scientific investigations.

Strands

- Living things
- Energy and Forces
- Materials
- Environmental Awareness and Care

Skills

The children in our school will learn to work scientifically. Scientific activity differs from other forms of enquiry in the process through which ideas are developed. A scientific approach is a process by which;

- Observations are made
- Hypotheses are constructed
- Predictions are formed
- Investigations are planned and carried out with an emphasis on fair testing
- Results are recorded and analysed
- Findings and conclusions are shared and discussed
- Previous knowledge and conceptual understanding accommodate new findings.

Children learn by doing. They bring different ideas and experiences to the learning process. By interacting with objects and materials, they "create" new knowledge and concepts that in turn become part of their base for future learning. This constructivist approach will be used in our school as the children explore scientific topics.

3 METHODOLOGIES

Design and Make

In our school the Design and Make section of the Science Curriculum will invite the children to provide a practical solution to everyday problems. This will involve children in exploring and assessing everyday objects in terms of their functionality, their component materials and their design, and using this information in the design, production and evaluation of their own artefacts or models. Such activities harness and nurture the creative and imaginative capacities of children as they engage in a four-stage process that involves a range of scientific skills.

- Exploring
- Planning
- Making
- Evaluating

Scientific Investigation

As part of working scientifically the children in our school will be encouraged to carry out scientific investigations. These investigations will involve changing something and measuring the effect of that change on something else.

The children will be exposed to the concept of a fair test. They will learn that it is important to change just one thing and then to measure the effect of that change while keeping everything else the same.

Children are encouraged to pose their own questions. During scientific activities children are encouraged to discuss, question, listen and problem solve through activities that 'try out', challenge, change or replace ideas.

4 DIFFERENTIATION

The multi-grade nature of our school informs our planning. However, while teachers' planning reflects their mixed class grouping there is equal emphasis upon individual abilities. Teachers will endeavour to adapt and modify activities and methodologies in music education to encourage participation by all children. Teachers may differentiate by learning objective, by support, resource, outcome, teaching style, task or by pace.

5 CURRICULUM CONTENT

5.1 JUNIOR INFANTS, SENIOR INFANTS AND FIRST CLASS

> "For the young child, the distinctions between subjects are not relevant: what is more important is that he or she experiences a coherent learning process that accommodates a variety of elements". –p. 16 Primary Curriculum

In our school, the subject of science is integrated wholly with other subjects and aspects of the school day in these classes.

Living Things

Strands and strand units as per the Primary School curriculum	Activities
Myself	Through Circle Time (Singing, Poetry & Games), lunches, arts and crafts, baking and daily walks. -Recognise and measure similarities and differences between people. -Changes that occur as children grow and mature; height, foot size etc. -What people need in order to grow; exercise food, clothing and shelter.

	-Awareness of human birth; baby in womb until born. -Senses; using them to increase awareness.
Plants and animals	-Observe, discuss and identify plants and animals in different habitats at a local level. -Sorting and grouping living things into sets; flowers, leaves, trees, birds, fruit and vegetables. -Recognise and identify external parts of living things. -Observe growth and change in some living things. -Explore conditions for growth of bulbs and seeds. -Awareness of seasonal change for plants and animals. Daily/Weekly walks to the woods Circle Time (Singing, Poetry & Games) Story Time Lunch Gardening

Energy and Forces

Strands and strand units as per the Primary School curriculum	Activities
Light	Sun, moon, stars, day and night Observations Lighting candles and observation on seasonal changes Painting and drawing; difference between light and dark Discussions around festivals e.g. Halloween, Christmas, lantern festival, spiral of light Rhymes and poems Shadows Identify and name colours. Sort according to colour. Observe colours in local environment.

Sound	Recognising and identifying sounds in the environment. Singing and music; High and low, loud and soft sounds. Ways of making different sounds using tins, bottles, metal, paper and other things found in the classroom and environment
Heat	Hot and cold; weather, food, cooking, water and the body. Ways of keeping objects and substances warm and cold Dressing for walks Weather observations Cooking Gardening
Magnetism and Electricity	Awareness of electricity in school and home Awareness of household appliances using electricity Awareness of dangers of electricity
Forces	Pushing and pulling- informal activity with toys and blocks How shapes can be altered by pulling, squeezing and other forces e.g. bee's wax Playing with water at the river; objects that sink or float (throwing different things into the water), Pushing objects into water off the bridge Playing with sand Tidying the yard

Materials

Strands and strand units as per the Primary School curriculum	Activities
Properties and characteristics of materials	Art and crafts, handwork Clothing for different types of weather Exploring different materials from different areas – school, garden, playground, forest, beach….
Materials and change	Art and crafts, handwork Cooking and baking Clothing for different types of weather

Environmental awareness and care

Strands and strand units as per the Primary School curriculum	Activities
Caring for my locality	Leave no trace on walks Tidying up and keeping the school grounds; they keep the school environment clean and tidy Green Schools; Recycling, energy, water conservation Feeding birds Taking care of and respecting school equipment Classroom practise Planting Compost Clean up day; The national Spring clean Learning to be responsible for themselves and belongings

5.2 FIRST & SECOND CLASS

It is in first second class that formal SESE lessons begin to be taught in our school. Up until now, SESE has been integrated into the school day of the younger pupil. In 1st and 2nd class children do gardening throughout the two years, weekly. A lot of science is done as part of this gardening throughout the year.

Living Things

Strands and strand units as per the Primary School curriculum	Activities
Myself	Main Lesson -Gardening Walks SPHE Exercise programme PE, art & music Using the senses; on walks (what we see, hear, smell, what things feel like), eating, during arts and crafts and music Comparing our differences (appearance) My body (integrated with SPHE) Growth (height chart, looking at old photos) Changes since birth (discussion, baby photos)

Plants and animals (link – Geo; The local natural environment)	Main Lessons -Farming -Gardening -Building (e.g. chicken run and hen house) Going to the seashore Harvesting crops Stories of the World Assembly stories

Energy and Forces

Strands and strand units as per the Primary School curriculum	Activities
Light	Main Lesson -Gardening (looking at importance of sunlight) Sun, moon, stars, day and night Observations Lighting candles and observation on seasonal changes Painting and drawing; difference between light and dark Discussions around festivals e.g. Halloween, Christmas, lantern festival, spiral of light Rhymes and poems Shadow
Sound	Environmental sounds Music and singing Sound travelling through materials e.g. construction, scratching, tapping, hammering
Heat	Main Lesson -Gardening (plants need heat to grow), effects of heat on water and impact on plants Cooking Weather
Magnetism and Electricity	Awareness of north, south, east and west Electrical awareness and safety Green Schools- conserving energy

Forces	Main Lesson -Building (moving materials) Pushing and pulling- informal activity with toys and blocks How shapes can be altered by pulling, squeezing and other forces e.g. bee's wax Playing with water at the river; objects that sink or float (throwing different things into the water), Pushing objects into water off the bridge Playing with sand Tidying the yard Practical working in the garden

Materials

Strands and strand units as per the Primary School curriculum	Activities
Properties and characteristics of materials	Art and crafts and handwork Costumes Building materials Different types of clothing for different weather
Materials and change	Cooking, baking – effects of heat Painting – mixing colours Gardening – wet and dry

Environmental awareness and care

Strands and strand units as per the Primary School curriculum	Activities
Caring for my locality	Leave no trace on walks Tidying up and keeping the school grounds; they keep the school environment clean and tidy Green Schools; Recycling, energy, water conservation Feeding birds Taking care of and respecting school equipment Classroom practise and awareness for Green school flag Planting Composting Clean up day; The national Spring clean Learning to be responsible for themselves and belongings

5.3 THIRD AND FOURTH CLASS

In keeping with the integrated approach to teaching SESE in our schoolteachers use opportunities and questions that arise during lessons as a basis for teaching science.
Gardening continues into 3rd class (and 4th class is combined 1st to 4th class)

Living Things

Strands and strand units as per the Primary School curriculum	Activities
Human Life	Main Lessons -Man and Animal -Ancient Civilisations SPHE PE – how we move Cooking; using fresh ingredients vs commercial Healthy eating policy Breathing (why do we see our breath when it is cold?) Exercise programme and circle time
Plants and animals	Main Lessons -Gardening (what plants need to grow) -Man and Animal (life cycles and food chains) -Local geography (exploring some local habitats and how changes have influenced plants and animals) Stories of the World Experiments with light and other factors for plant growth Assembly stories

Energy and Forces

Strands and strand units as per the Primary School curriculum	Activities
Light	Main Lesson -Gardening -History of Man (maths; could also be covered in 2nd class) Sun, moon, stars, day and night Observations and experiments with light and the growth of plants

	Lighting candles and observation on seasonal changes Painting and drawing; difference between light and dark Discussions around festivals e.g. Halloween, Christmas, lantern festival, spiral of light Rhymes and poems Shadows (Sun dial) Making lanterns
Sound	Environmental sounds Music and singing Sound travelling through materials e.g. construction, scratching, tapping, hammering Making instruments Class play – sound effects
Heat	Main Lesson -Gardening (plants need heat to grow), effects of heat on water and impact on plants Cooking Weather Making candles
Magnetism and Electricity	Main lesson Local geography Awareness of north, south, east and west and poles Static electricity (biro picking up paper, shock off car, strip hanging down from back of car) Batteries vs. electricity Electric fences Electrical awareness and safety Green Schools- conserving energy Tie in when it comes up in relation to Green Schools, art and crafts, festivals, safety
Forces	Main Lesson -Building (moving materials) -Ancient civilisations *Good opportunity for design and make; construction of dolmens, pyramids, marble run, clay work.*

	Pushing and pulling Inertia Friction (using sandpaper, grips on shoes etc.) How shapes can be altered by pulling, squeezing and other forces e.g. bee's wax Uses of water, boats (floating and boat making – Vikings) How objects were moved e.g. Ancient Egypt (pulleys), Poulnabrone, New Grange Resistance – cycle training, maths (area which can be linked to gravity and dropping paper, parachutes)

Materials

Strands and strand units as per the Primary School curriculum	Activities
Properties and characteristics of materials	Main Lesson -Local Geography Investigate common rocks/soil in the immediate environment Cooking/baking (solids, liquids and gases) Compare materials Raw vs. manufactured (linked to history) Materials in construction of local buildings past and present Art Graphs
Materials and change	Heating and cooling – weather, frost, ice, melting etc. Appropriate clothing; explore materials for different purposes/temperatures Conductors and insulators in cooking Mixing and changing – water colour painting, wet and dry (soil) Cooking/baking

Environmental awareness and care

Strands and strand units as per the Primary School curriculum	Activities
Environmental awareness	Leave no trace Tidying up and keeping the school grounds Gardening Green Schools; Recycling, energy, water conservation Feeding birds Taking care of and respecting school equipment Classroom practise and awareness for Green school flag Planting Composting Leave no trace on walks
Science and the Environment	Main Lesson Local geography -effects of human activities on the environment
Caring for the environment	Mainly done through Green Schools Responsibility for particular tidying on the school grounds -Walk way into the school and the school yard Gardening

5.4 FIFTH AND SIXTH CLASS

Main Lessons; Geology, botany, air and water (science but links to weather)

Living Things

Strands and strand units as per the Primary School curriculum	Activities
Human Life	Main Lessons -Ancient Civilisations (Greece, Rome) SPHE & RSE Green Schools and air pollution; lungs Make demonstrative lungs PE – how we move Cooking; using fresh ingredients vs commercial Healthy eating policy Breathing (why do we see our breath when it is cold?) Exercise programme and circle time

Plants and animals	Main Lessons -Botany -Geology Lifecycle of a flower Dissecting flower Photosynthesis Tree Project Planting trees Sketching Exploring habitats Bees and pollination Experiments with light and other factors for plant growth Fossil formation Sediment and sedimentary rocks Assembly stories Stories of the World

Energy and Forces

Strands and strand units as per the Primary School curriculum	Activities
Light	Main Lessons -Geometry (sun and earth's orbit's influence on degrees) -Botany Photosynthesis Sun, moon, stars, day and night Observations Lighting candles and observation on seasonal changes (experiments with fire and what is needed to create a flame) Painting and drawing; difference between light and dark (perspective drawing with charcoal) Explore prism and composition of light Discussions around festivals e.g. Halloween, Christmas, lantern festival, spiral of light Rhymes and poems Shadows Making lanterns and decorations
Sound	Main Lesson -Acoustics

	Creating instruments Experimenting with water to make scales (different notes) Explore sounds in nature and human sounds Body percussion Hearing and balance Integrate with music and families of instruments Sound moving through solids Cymatics (Dr Emoto's rice experiment) Golden Ratio
Heat	Main lessons -Botany -Geology Experiments with light and heat for plant growth Sources of heat Volcanos, magma and rock formations Weather (measuring temperature, graphs) Cooking/Baking to teach convection, conduction and radiation
Magnetism and Electricity	Main Lessons Electromagnetics/Magnetism/Electronics History of electricity Magnetism and compasses (experiments) Simple circuits Make and do (using electronics) Dangers of Electricity
Forces (opportunity for design and make)	Pushing and pulling Inertia Friction (using sandpaper, grips on shoes etc.) How shapes can be altered by pulling, squeezing and other forces e.g. bee's wax Uses of water, boats (floating and boat making) How objects were moved e.g. building medieval castles, Roman temples, ships of explorers Resistance – cycle training, maths (area which can be linked to gravity and dropping paper) Using levers

Materials

Strands and strand units as per the Primary School curriculum	Activities
Properties and characteristics of materials	Main lesson -Air and water

	Practical applications of air and water Solids, liquids and gases using water as an example Explore the fact that air occupies a space Moving air vs stagnant air and its implications Composition of air and water Local materials
Materials and change	Main lesson Geology Air and water Effects of heating and cooling on solids, liquids and gases Conductors and insulators (food and cooking) Explore home heating Mixing materials (painting) Oxygen for burning Separating materials using a magnet Force changes materials e.g. compressing air in relation the Cartesian diver

Environmental awareness and care

Strands and strand units as per the Primary School curriculum	Activities
Environmental awareness	Green School campaign (doing the paperwork etc.) Gardening Leave no trace Tidying up and keeping the school grounds Gardening Green Schools; Recycling, energy, water conservation Feeding birds Taking care of and respecting school equipment Classroom practise and awareness for Green school flag Planting Compost
Science and the Environment	Effects of human activities on the environment
Caring for the environment	Gardening Mainly done through Green Schools Responsibility for particular tidying on the school grounds -Walk way into the school and the school yard

6 SUCCESS CRITERIA

The success of this plan will be evaluated through teacher's planning and preparation, and if the procedures outlined in this plan have been consistently followed. We will also judge its success if the children have been enabled to achieve the aims outlined in this plan.

7 RATIFICATION

Cuan na Gaillimhe - CNS believes that the school community must be involved to successfully implement the Primary Science Curriculum. Therefore, the teaching staff will implement this plan with the support of the Board of Management, Parents and the Local Community.

This school plan was worked on and discussed by staff during March/April 2020 School Closure and presented to the Board of Management of Cuan na Gaillimhe –CNS on 27th April 2020. Once this plan has been ratified by Board of Management, it will be issued to all teaching staff and copies will be made available for inspection by parents/inspectors and other interested parties on request from school office.

Chairperson of the Board of Management 

As a growing school this plan will be reviewed as necessary and in line with Primary Science Curriculum.