ST. MARY'S NATIONAL SCHOOL, ATHLONE

WHOLE SCHOOL PLAN FOR

SCIENCE

Science

ST. MARY'S NATIONAL SCHOOL, ATHLONE, SCIENCE PLAN

.

■ Introductory Statement and Rationale

(a) Introductory Statement

We, the staff and principal of St. Mary's N.S. , have formulated a user-friendly plan, outlining the approach, methodologies, timetable, content and resources necessary to implement the primary school curriculum for science. We formulated this plan following in-school planning days, by completing evaluation sheets involving good practice for Science in our school and following Discover Primary Science tutor visits.

(b) Rationale

We recognise Science as an integral element of Social, Environmental and Scientific Education. In St. Mary's we acknowledge that SESE provides opportunities for the child to explore, investigate and develop an understanding of the natural, human, social and cultural dimensions of local and wider environments, to learn and practice a wide range of skills and to acquire open, critical and responsible attitudes.

SESE enables the child to live as an informed and caring member of local and wider communities. We recognise the distinct role Science has to play in helping children come to terms with the biological and physical world.

It is intended that over a two-year period we would provide a coherent approach to Science across the whole school. We have devised this plan to benefit teaching and learning in our school and to ensure pupils are given the adequate opportunities, as mentioned above, to develop scientific skills.

■ Vision and Aims

(a) Vision:

Our school aims to foster the childrens' natural curiosity by enabling them to take an active part in their own learning. We aim to guide them to working scientifically. This will involve the development of a wide range of skills of enquiry, the cultivation of important attitudes and the acquisition of scientific knowledge and concepts about biological and physical aspects of the world.

(b) Aims:

We endorse the aims of the Primary School Curriculum for Science:

- **To develop a scientific approach to problem solving which emphasises understanding and constructive thinking**
- **To foster the child's natural curiosity, so encouraging independent enquiry and creative action**
- **To encourage the child to explore, develop and apply scientific ideas and concepts through designing and making activities**
- **To develop knowledge and understanding of scientific and technical concepts through the exploration of human, natural and physical aspects of the environment**
- **To help the child to appreciate the contribution of science and technology to the social, economic, cultural and other dimensions of society**
- **To cultivate an appreciation and respect for the diversity of living and non-living things, their interdependence and interactions**
- **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 using a variety of media**

■ Content of Plan

Curriculum

The skills and content to be covered in Science are as stated in the Curriculum

Infant Classes pgs 14-28
1st and 2nd pgs 30-48
3rd and 4th pgs 50-70
5th and 6th pgs 74-92

1. Science Programme:

(a) Strands and Strand Units

Teachers are familiar with the Strands and Strand Units and content objectives for their Class Level and , also , for other class levels. We feel this is important in order to ensure a coherent programme for Science throughout the school. As children move from one class to the next we liaise with each other so that there is continuity in progression.

Strands	Strand Units Infants-2nd Class	Strand Units 3rd-6th Class
Living Things	Myself Plants and Animals	Human Life Plants and Animals
Energy and Forces	Light Sound Heat Magnetism & Electricity Forces	Light Sound Heat Magnetism & Electricity Forces
Materials	Properties & Characteristics of Materials Materials & Change	Properties & Characteristics of Materials Materials & Change
Environmental Awareness & Care	Caring for my Locality	Environmental Awareness Science & the Environment Caring for the Environment

Science Long Term Plan Junior and Senior Infants 2 year cycle

	Living Things	Energy and Forces	Materials	Environmental Awareness and Care
Sept	**Myself (3)** *Myself (face) (1)*	**Light (1, 2)** *Light (3, 4)*		
Oct	**Plants and animals (1, 4, 7)** *Plants and animals (3)* *Myself (3,6)*			
Nov	**Myself (hands) (1,2)**		**Properties and characteristics of materials (1, 3, 4)**	
Dec	**Plants and animals (1,2,7)**	**Light (5)** *Magnetism and electricity (3,4,5)*	*Materials and change (1, 2, 3)*	
Jan	**Plants and animals (1)** **Myself (4)** *Plants and animals (1, 2, 7)*	**Heat (1,2)**	*Materials and change (4)*	
Feb	**Myself (4)** **Plants and animals** *Myself (4)*		*Properties and characteristics of materials (1,2,3,4,5)*	*Caring for my locality (3,4)*
Mar	**Plants and animals (1, 2, 4, 5)** *Plants and animals (4)*	*Forces (1,2)*		
Apr	**Myself (hearing) (6)** *Plants and animals (4)*	**Sound (1,2)** *Magnetism and electricity (1,2)* *Sound (1)*		
May	**Plants and animals(1,2, 4, 5, 6)** *Plants and animals (1)* *Myself (4)*	**Magnetism and electricity (1,2)** *Forces (3)*		
June	**Plants and animals (5,7)** **Myself (6)** *Plants and animals* *Myself(3)*			

Bold writing: Junior Infants content *Italic writing: Senior Infants content.* Both Junior and Senior Infants classes are following suggested yearly plans set out on 'Small World' resource book.

Science Long Term Plan 1st and 2nd Class 2 year cycle

Month	Living Things	Energy and Forces	Materials	Environmental Awareness and Care
Sept	*Plants and animals (1,9,10)* **Plants and animals (1,3)**	*Forces (1,2,3)*	**Properties &Characteristics of Materials (1,2,3,4)**	
Oct	*Plants and animals (1,2,6)* **Plants and Animals (5,6,7,8,9)**	**Light (4)**		
Nov	*Myself (1,2,4,5,6)* *Plants and animals (1,2,5,6,7,10)*		**Properties& Characteristics of Materials (6)**	
Dec	*Plants and animals (1,3,4,5,9,10)* **Plants and animals (2,5,9)**		*Properties& Characteristics of Materials (1,2)*	
Jan	*Plants and animals (2,5,6,10)* **Plants and animals (1,3,4)**	**Forces (4)**		*Caring for my Community (4,5,6,7)* **Caring for my Community (2,5,8)**
Feb	*Plants and animals (1,2,3,5,9,10)* **Plants and animals (1,3,9)** **Myself (2,7)**		*Materials and Change (1)*	
Mar	*Plants and animals (2)*	**Heat (1)**		*Caring for my locality (2,3)*
April	**Plants and animals (2,5)**	*Magnetism& Electricity (1,2,3)*		
May	*Plants and animals (1,3,5,9,10)* **Plants and animals (1,3,5)**	**Light (1,2,3,4,5)**	**Materials and Change (2)** **Properties and characteristics of Materials (1,2,3)**	
June	*Plants and animals (2,5)*	*Heat (2,3)* *Sound (2,3,4)* **Light (4)** ***Magnetism& Electricity (4,5)***	**Properties and characteristics of materials**	

Bold writing: 2nd class content *Italic writing: 1st class content* Both 1st and 2nd class are following suggested yearly plans set out on 'Small World' resource book.

Science Long Term Plan 3rd and 4th Class 2 year cycle

Month	Living Things	Energy and Forces	Materials	Environmental Awareness and Care
Sept	*Plants and animals*			
Oct	*Plants and animals* **Plants and animals**			
Nov	**Plants and animals**			
Dec				
Jan			**Properties& Characteristics of Materials**	*Science and the Environment*
Feb				*Rainforests* **Science & the Environment**
March	*Human Life*	*Sound* **Magnetism& Electricity**		
April		*Magnetism& Electricity* **Forces**		**Environmental Awareness**
May			*Heat (Materials and Change) Properties & Characteristics of Materials* **Materials & Change**	
June	**Human Life**	**Light**		

Bold writing: 4th class content

Italic writing: 3rd class content

Both 3rd and 4th class are following suggested yearly plans set out on 'Small World' resource book.

Science Long Term Plan 5th and 6th Class 2 year cycle

Month	Living Things	Energy and Forces	Materials	Environmental Awareness and Care
Sept	*Plants and animal life*		**Materials and change: mixing materials**	*Plants and animal life*
Oct	**Plants: rainforest** *Plants and animal life*			**Caring for the environment: rainforest** *Plants and animal life*
Nov				
Dec	*Human life*	**Light**		
Jan		*Gravity*		**Caring for the environment: conserving resources**
Feb	**Animals**	*Electricity*		
March		*Sound*		
April	**Human Life: The eye**	*Heat*		
May		**Magnetism**	*Materials*	
June			**Properties and characteristics of materials**	

Bold writing: 6th class content
Italic writing: 5th class content
Both 5th and 6th class are following suggested yearly plans set out on 'Small World' resource book.

(b) Methodologies

Childrens' ideas are used as a starting point for all scientific activity. We elicit what children already know about an area of science.

The methods we use include:

- **Talk and discussion**
- **Open questions and problem-solving activities**
- **Active Learning**
- **Annotated drawings**
- **Concept maps and brainstorming**
- **Teacher designed tests and tasks**
- **Free exploration with materials**
- **Use of everyday objects found in the environment**
- **Outdoor habitat work**
- **Content spiralling from class to class**

We promote the development of good questioning in our classes, with pupils, as well as teachers, being given the opportunity to pose their own questions and set of investigations to find answers.

(c) Practical Investigations

Investigations are encouraged with the use of scientific equipment. Group work ensures the needs of each child is catered for.

- **Open Investigations, where pupils are given or suggest themselves, an open question for which they have to design their own investigation and come up with their own results.**

- **Closed Investigations, where the end result is obvious and there are not many variables**

- **Fair Testing, where pupils will be encouraged to develop a sense of what part of the investigation should be kept the same and what should be the variable, to ensure the investigation is fair.**

(d) Classroom Management

A combined approach of whole class 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.

We encourage the investigative approach and the teacher-directed approach.

Teachers will use their professional judgement to decide which methods and approaches are best suited to the needs of their pupils.

(e) Linkage and Integration

The linkage of Strands with science (pg. 34 Teacher Guidelines), and the integration of Science with other subjects is encouraged in our school. Pupils' view of the world is a holistic one and as such more meaningful learning is achieved in an integrated setting.

Examples of Integration, with other subjects, include:

Growth and Change in Living Things descibed in Science links with this theme in SPHE

Materials in Science links with Visual Arts

Design and Make in Science links with Maths and Visual Arts

Environmental Awareness and Care is closely linked with the SPHE and Geography Curricula

Where there is an opportunity, maths should be linked with Science eg. charting findings, balancing, weighing, measuring, counting, capacity, time, temperature, shape etc. can be used in some science experiments

- **Using the Environment:**

Each class engages in Habitat studies, using the School Environment.

Habitats in our school environment include Compost Heap, Walls, Grass, Wood, Hedgerows, Earth, Trees and Plants

School Garden Trees include Horsechestnut, Oak, Ash, Spruce, Cyress, Holly, Beech

Hedgerow Plants in our School include Hawthorn, Sloe, Rosehips

Composting Area is managed by Thomas

Outdoor Classroom is located at the front of the Junior School

Sensory Tree is located in 6th Class Yard

We take into account Seasonal Study of individual habitats, Outdoor Investigation and Exploration and Sample Collection. In Habitat Studies we will explore Minibeast Studies, Food Chains, Life Cycles, Caring for the Environment

The school environment is also used for Maths Trails, specially designed specific to St. Mary's N.S.

- **Balance between Knowledge and Skills:**

Questioning eg. Are all the materials waterproof?

Observing eg. Look at the effects of heating and cooling on a variety of Substances

Predicting eg. What do you think will happen to the ruler if we put it in water?

Investigating and Experimenting eg. Carry out investigations, make observations and collect data

Estimating and Measuring eg. describe mass and length using non-standard units of measurement and informal language (bigger than)

Analysing eg. sort and group objects according to observable features (set of heavy items)

Recording and Communicating eg. look for and recognise relationships when making observations (relationships between length, tension, type of material used in making musical instruments and sounds produced)

2. Targets and Events:

We have decided that the following main target projects and events would provide a focus for science work during the year

- **Science Open Day:**
  This takes place on the Senior Side of the school in February/March each year. Senior classes get a chance to do a variety of Science experiments. The teacher remains in his/her class, conducts the experiment with their own class and every 30 mins another class joins him/her to participate in the experiment. This allows each class, from 2nd to 6th to experience 10 experiments over 2 days (9.30 to 12.30). Many experiment are from the Discover Primary Science website.
  The Junior Classes enjoy experiments in their own classes during the week.

- **Awards of Excellence in Science and Maths:**
  Each year the School applies for the Plaque of Excellence. Evidence (photos, completed worksheets, childrens' accounts, video footage etc.) of the Science work completed in the school throughout the year is gathered and compiled in a folder. This is submitted in April/May to the Discover Primary Science and Maths Awards.

- **Science Week Activities:**
  Teachers are aware of and participate in Science Experiments on this nationally recognised week. Many activities are suggested on www.scienceweek.ie

- **Engineer Week Activities:**
  Teachers are aware of and particate in Science Experiments that have an Engineering element to them. Experiments usually involve a Design and make element to them eg. Design a Bridge. Suggested activities are on www.engineersweek.ie

- **Maths Week Activities:**
  Teachers are aware of and participate in special Maths Activities. Many activities are suggested on www.mathsweek.ie and our school has its own outdoor Maths Trail, for each class group, that can be enjoyed during the good weather.

- **RDS Science Exhibition:**
  Every second year, on an even year eg. 2018, a senior class applies for entry to the RDS Science Fair in early October each year. The Fair takes place in January.

- **Green Schools Activities:**
  Every second year the school applies for the Green Flag. All Classes are involved in keeping our school a Green School throughout each year and as recognition for this we have received many Green Flags.

- **Scratch IT Competition:**
  IT skills are rewarded in this competition. Some teachers in St. Mary's particate in this,nationally recognised, competition with groups of children. Applications are made to scratch.ics.ie by mid February each year.

(3)Assessment – Looking at Children's Work:

Childrens' Knowledge, Understanding, Skills, Attitudes towards Investigation & Problem Solving and Sense of Responsibility for the Environment, as well as their Ability to Work Collaboratively, are assessed in Science.

Assessment is in the form of:

Teacher Observation

- **Teacher-Designed Tasks**
- **Annotated Drawing**
- **Concept Mapping**
- **Portfolios of Work (Work samples)**
- **Pupil and Parental Feedback**
- **Childrens' Self Assessment of Design and Make Activities and Portfolios**

(4) Children with Different Needs:

- **We will endeavour to make science activities accessible to all children, as we recognise the potential science has to help them make sense of the physical and biological worlds in which we live.**
- **We are aware that science offers many opportunities for fun and to develop a sense of curiosity and wonder**
- **Hands on practical work to suit all abilities is used in science lessons**
- **Activities will be differentiated according to ability**
- **ICT/Digital images can be used to record work**
- **Recording will be based on the child's level of understanding eg. brainstorms, annotated drawings etc**
- **Assistance from school personnel will be availed of when appropriate**

(5) Equality of Participation and Access:

Science is for all children

Organisation

(1) Timetable:

Science, Geography and History are the three subjects in SESE. There are three hours allocated to SESE each week for Senior classes, and two and a quarter hours for Junior Classes. This allows one hours per week of Science in Seniors Classes and fifty mins per week in Junior classes. Occasionally teachers may block periods of time (eg. during St. Mary's Science Week when each class gets a block of 5 hours of Science time) and they may use discretionary time when needed.

(2) Resources and Equipment:

Science Equipment Boxes are located in the class rooms. A list is given to teachers listing the location of science boxes eg. Magnets = 2nd Class etc. The class teacher familiarises themselves with this list, displaying it in their classroom.
Science Boxes are in plain view so they are easily located by teachers needing to access them.

An inventory of science boxes is done at the end of each year by the Science post holder with the help of some teachers and students.
Some boxes need to be replenished more often eg. Electricity, Floating and Sinking.

Much of the Discover Primary Science Activities involve household products that need to be stored separately because of potential danger or because they are food products eg. eggs, raisins, vinegar, baking soda, effervescent tablets etc. The Science post holder keeps and supplies these products when requested.

A Science Library in the Senior Staffroom is accessible to all teachers.

(3) Safety:

Teachers are mindful of the safety of pupils at all times when engaged in Science Experiments. Some Science Experiments involve an element of danger, which contributes to the excitement and wonder of science. Examples include.. Designing Simple Rockets where children stand at a safe distance waiting for the chemical reaction to occur and their rochet to launch. Another would be the careful use of sharp cocktail sticks for Designing and Making a tower.

(4) Homework*:*

Science homework is at the discretion of the Class Teacher. It takes the form of workbook activities, worksheets, design and make ideas, observation exercises, gathering eg. autumn leaves etc.

(5) Individual Teachers' Planning and Reporting:

Yearly and short-term plans will be based on the approaches and methodologies set out in the school plan. Templates for yearly plans were compiled by teachers and are included earlier in this Science Plan.

A suggested short term plan is available to teachers.

Work covered will be outlined in the Cuntas Miosuil.

(6) Staff Development:

Teachers are made aware of opportunities to attend science courses.

Discover Primary Science Facilitators are invited to St. Mary's for staff training.

(7) Parental Involvement:

Parents are encouraged to support the school's science programme by helping

with science homework and by encouraging their child's interest in science and looking at nature around them.

(8) Community Links:

We avail of many opportunities from the wider community to support science eg. visiting scientists from the Athlone Institute of Technology are invited to do experiments with our senior classes.
We apply annually to attend local science events and for a visiting engineer.

■ Success Criteria:

We will measure the success of our plan by monitoring the following

- **Evidence of scientific skills and knowledge development in pupils throughout school**
- **Increased interest in science and environment throughout the school**
- **Evidence of practical activities in the classes**
- **Resources and equipment being used throughout the school**
- **Class and school displays**
- **Evidence of classes engaging in outdoor habitat work**
- **Formal and informal assessment**
- **Positive feedback from pupils and parents**

■ Implementation:

(a) Roles and Responsibilities:

All teachers are responsible for the implementation of the science programme in their class and the care and maintenance of equipment.

The science postholder is responsible for inviting visiting scientists/facilitators, applying for Awards of Excellence in Science and Maths, informing teachers of upcoming Science events, keeping an inventory of Science Equipment and ordering new equipment when needed.

(b) Timeframe:

We embarked on the implementation of this plan in September 2017.

■ Review

A review of this Whole School plan will take place in 2020. The postholder will coordinate this review and evaluation. Every two years the content objectives of Strand and Strand Unit for each class pair will be circulated to the appropriate Teachers who will ensure that over the two years they will cover these objectives.

■ Ratification and Communication

This review of the Science Plan was presented to the Board of Management for Ratification in November 2017. It was then recirculated to all staff members for implementation.
A copy of the document will be incorporated into the Whole School Plan.