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School Plan

Science

September 2021

Science Plan

Implemented In September 2021

Reviewed in September 2024

Introductory Statement

This plan has been reviewed by the Science Co-ordinator and is informed by an action plan review carried out by the co-ordinator and following a consultative process with all school staff and the Science team.

Rationale

The plan was written to benefit the teaching and learning of science in our school, to provide opportunities for the pupils to understand and develop scientific concepts and to provide a whole school approach to the teaching of science. Together with the curriculum outlines it will form the basis for teachers' long and short term planning and inform new members of staff of the content, approaches and methodologies used in the school.

Vision and Aims

Vision

Our science programme will provide an opportunity for the pupils to develop scientific skills and attitudes to the study of themselves, other life forms and the physical environment around them. We will seek to foster the pupils' natural curiosity by enabling them to observe, question, discuss, predict, analyse, explore, investigate and experiment. We aim to help our pupils reflect critically so as to make sense of new information and experiences

Aims

- To develop knowledge and understanding of scientific and technological concepts, through human, natural and physical environmental exploration.
- To develop a scientific approach to problem solving.
- To encourage the application of scientific ideas and concepts to other areas of the curriculum.
- To foster the child's natural curiosity and encourage independent learning.
- To encourage the child, from an early age to explore develop and apply scientific ideas and concepts through Design and Make activities
- To help the child to appreciate the contribution of science and technology in their lives.
- To encourage respect for the diversity of life and the interrelationships that exists between them.
- To encourage active participation in and responsibility for the environment by encouraging the child to protect, improve and cherish the environment and to become

involved in the identification, discussion, resolution and avoid environmental problems and so promote sustainable development

- To promote the communication of ideas using different media.
- To enable the child to communicate ideas, present work and report findings using a variety of media
- To develop the grounds of the school - planting bulbs, trees and caring for the existing plant life- Biodiversity Trail

(see also pp 11 – 12 of Curriculum Science)

Additional Aims

- To encourage our pupils and school community to support and maintain our six Green Flag awards
- To develop and widen knowledge and skills through participation in Science week/ SAEI workshops/ Energy Workshops

Science programme

Science Planning Overview

Strand	Strand unit	Total 40 weeks in school year	
		4 weekly of each Strand Unit	8 weeks of content
Living Things	Myself Plants and Animals	4 weekly of each Strand Unit	8 weeks of content
Energy and Forces	Light Sound Heat Magnetism and Electricity Forces	4 weeks of each Strand Unit	20 weeks of content
Materials and Change	Properties of materials Materials and change	4 weeks of each Strand Unit	8 weeks of content
Care and Awareness of Environment	Care of my locality	4 weeks of each Strand Unit	4 weeks of content
4 Strands	10 Strand units = 4 lessons per strand		40 Weeks

The content of the strands is based on a two-year module: Junior/Senior Infants and First/Second Class. The content objectives are cross checked and divided ensuring balance in strands and strand units across the infant cycles and undue repetition is avoided.

- A thematic approach will be used, one new theme per month
- The content and methodology will be based on the children's experiences in their day-to-day lives and will take a discovery approach, involving class and group teaching with provision for pupils of all ability levels.
- The content of the science programme is outlined in the four content strands and through the study of these areas, scientific and technological skills are developed.

- Teachers select the topics from the menu curriculum objectives in their class levels- consideration is given to the calendar challenges of changing Easter holidays where flexi-objectives are laid out with options for practical activities are available.
- The content themes are linked directly with the English Wonderland themes, and this is highlighted in the monthly plans- and in some months, with Geography/SPHE and Maths.
- The content and objectives makes good use of the local environment and outdoor learning and is integrated with the principals and aims of sustainability in our Green Schools Programme
- Through outreach programmes, children will experience a meaningful and contextual engagement with SAEI and Science Week.

Third - Sixth Class

Living Things	Energy and forces	Materials	Environmental Awareness and Care
Human life	Light	Properties and characteristics of materials	Environmental awareness
Plants and animals	Sound	Materials and change	Science and the environment
	Heat		Caring for the environment
	Magnetism and Electricity		
	Forces		

SESE programme in use in classes 3rd to 6th:

3rd class: Explorers: Geography and Science 3rd class, Folens

4th class: Explorers: Geography and Science 4th class, Folens

5th class: Explorers: Geography and Science 5th class, Folens

6th class: Explorers: Geography and Science 6th class, Folens

Skills Development

Working Scientifically

- Questioning
- Observing
- Predicting
- Investigating and experimenting

- Estimating and measuring
- Analysing: Sorting and classifying, Recognise patterns, Interpreting
- Recording and communicating

Designing and Making

- Exploring
- Planning
- Making
- Evaluating

The Science skills above will be developed as work is completed on the strands and strand units in the curriculum outlined above in Strand/ Strand unit grid.

Children's ideas

- The children's own ideas will be the starting point and development and understanding will take place through investigation and experimentation.
- The teacher will discover at what stage the children are at through play, talk and discussion, questioning, listening, problem solving tasks, tests and concept mapping.
- The children will be encouraged to ask their own questions and will be given opportunities to test, challenge and change or replace ideas.

Practical investigations

In carrying out practical investigations the children will be involved in

- Questioning
- Observing
- Predicting
- Investigating and Experimenting
- Estimating and Measuring
- Analysing
- Recording and Communicating.

In developing children's conceptual understanding, teachers use either an investigative approach with a combination of closed and' open ended activities or a directed and managed approach with hazardous material (T.G. P54/55)

(See pp 2/3 and 52/55 of Teacher Guidelines)

- Practical investigation is the cornerstone of the science programme and will use the techniques of observing, hypothesizing, predicting, investigating and experimenting, testing and analysing. Each topic will begin at the level of the children's direct experience or ideas and will be 'hands on'.
- A large range of equipment suitable for use in the science programme exists in the school resource room- Stored according to Strands/Strand units
- A variety of approaches and methodologies will be used ranging from class work through group work to individual work. The children will be set open and closed tasks, problems or topics and will be allowed directed and undirected investigation of them.
- Pupils will be encouraged to use the scientific skills of observing, questioning, predicting, hypothesizing, investigating and experimenting, interpreting results and recording and communicating results to other areas of the curriculum.

Classroom management

- Health and safety and Child safeguarding are a priority for class management
- Differentiation for AN pupils will be incorporated into planning and outcome expectations
- A teacher's direct approach might be required for handling hazardous or scarce resources, which might put children in danger. It also has a role in clarifying concepts.
- Whole class teaching will be used for introducing new topics, demonstrating new methods, conducting discussions, furthering investigations and concluding lessons and experiments.
- Small group work is suited to activities where the pupils are all working on the same topic or on a circuit of topics or one small group investigating a topic. There is also a place for individual work by pupils on a topic of interest to them.
- Teachers may also use the outdoor environment and ICT
- Projects and data can be displayed in classrooms or corridors.
- Work will be completed in copybooks, workbooks and folders.
- Choice of approach will depend on the topic, the available resources and health and safety considerations.
- The Junior and Senior infant teachers use active learning/ play to teach and consolidate science topics such as Force/ magnetism and Design and Make can be woven into small world and construction

Key methodologies

(See Teacher Guidelines pp. 52 – 145),

The staff recognise the following key methodologies in teaching science:

- Using children's' ideas as starting point for science activities.

- Use of the environment.
- Active learning.
- Guided and discovery learning.
- Children can apply science concepts to everyday situations.
- Free exploration of materials.
- Spiral nature of the curriculum – opportunities to return to earlier learning and to extend and enhance it.
- Learning through language.
- Children have the opportunity to work together, share ideas and communicate findings.

Teachers select appropriate methodologies to accommodate the differing learning styles and needs of the children. These methodologies should

- Allow children the excitement of finding out for themselves
- Enable children to work on their own problems as far as possible
- Encourage children to pose own questions
- Use children's ideas as a basis for activities
- Encourage children to use their own ideas, test and change their hypothesis

Linkage and integration

(Exemplars 6+7 Teacher Guidelines pp.46-47 for samples of integrated themed units of work

- Science is linked primarily to our Wonderland programme from Junior Infants to Second Class
- The development of oral language skills is a key requirement of the New Primary Language English curriculum and this will be integrated into science through discussion, questioning, predicting and communicating and evaluating.

Using the Environment

- The immediate environment will be the starting point for environmental education. Nature walk takes Plants, Animals, Seasons, Pollination and Sensory aspects of science into its remit.
- First and second classes visit Rathcoole park twice a year
- Teachers and pupils engage in activities to promote environmental awareness and care
Activities- class litter picks
- Guest speakers such as Science Week visitors must be approved by the principal before being invited/ child safeguarding protocols ongoing

Balance of Knowledge and skills

The teaching of Science encourages the development of two types of understanding

- The development of Scientific knowledge through the four strands
- The development of scientific skills:

questioning, observing, predicting, investigating and experimenting, estimating and measuring, analysing, recording and communicating.

- Design and make skills : Exploring, Making, planning, Evaluating- when appropriate- (through the Aistear programme in infant classes)

Design and Make

When undertaking investigations children must adopt **safe practices** and always observe safety procedures in designing and making tasks, especially when using tools and materials. (See Primary School Curriculum Science pages 22-23 for Infants and pages 39-40 for 1st/2nd)

Through completing the strand units of the science curriculum the child should be enabled to:

- **Exploring**

Handle and manipulate a range of materials in structured situations.

- **Planning**

Suggest a possible object to be made, choose appropriate materials, communicate the plan to others through pictures and modelling materials. (inf)

Identify a need for new or revised designs; Talk about and communicate a plan of action using appropriate vocabulary, using oral, written or other media and I.C.T. (1st/2nd)

- **Making**

Make simple objects, developing craft-handling skills and techniques needed to make the object, using a range of tools and materials. (Infs. – 2nd)

- **Evaluating**

Talk about your own work during design and making tasks, reporting to others on what has been done. (Inf)

Discuss the work of peers and propose positive modifications.

Evaluate design ideas as these develop in the making process.

(1st/2nd)

Assessment-Looking at Children's work

A selection of the following assessment tools will be used by staff in the school:

- Teacher Observation
- Teacher-designed tasks and tests
- Concept mapping (pictorial form only for infants)
- Work samples compiled to show the child's progression.
- Curriculum profiles
- ICT/Tablets photo documentation.
- Assessment for learning is an ongoing process used by the children and teachers to assess learning needs.

- Parents will be informed of the assessments at Parent/Teacher meetings. Children's homework and copies will also keep the parents informed. All children receive a detailed yearly report at the end of each school year outlining their progress in every subject.
- Children's work is recorded in a variety of ways: copies/drawings/photo stories/Recount writing, as follows:

Concrete Materials

Children will be given the opportunity to work hands on with different materials throughout the year.

Oral Presentation

Children in 1st and 2nd class will be given the opportunity to orally present their thoughts or findings on an experiment or their prediction of the outcome.

Drawing

Children in all classes will be given the opportunity to express their thoughts or findings in picture form.

Written Records

In Junior and Senior Infants, the children will mainly draw and colour activity sheets related to the topic being investigated, higher attainers can label and describe their drawings

In 1st and 2nd class the children will write about their experiments beside their drawings.

The children will also complete worksheets designed by the teacher or photocopied from relevant sources.

Children with different needs

- Every effort will be made to differentiate lessons in order to cater for the wide range of abilities in each classroom.
- Worksheets can be simplified or extended to suit all children.
- Paired or group work can take place to enable children of differing abilities work in a productive manner.
- Gifted children could be encouraged to read extra books on subjects, use the computer to look up extra information and to present information to class orally or with a mini-project – (depending on level of ability).
- Less able children could also be encouraged to use the computer/Tablets to learn about an interesting topic.
- Parents could be asked to help children with an interesting topic at home.

Timetabling

- S.E.S.E is timetabled for 2¼ hours for Junior and Senior Infants and for 3 hours from 1st to 2nd class, per week.

- Junior – Senior Infants allocate approx 5 hours per month to science, spending at least ½ hour per week on the subject.
- Junior Infants use the medium of play/ 'Aistear' to teach and consolidate science topics.
- 1st – 2nd class allocate approx 5 hours per month to science, spending at least 1 hour per week on the subject. Teachers can/may decide to do a block of science once a fortnight over a fortnight should the need arise
- Science Week will be celebrated in term 1

Science Equipment

- A nominated teacher, with science as part of their Specials Duties Post, will be responsible for science equipment, currently, Grainne Power. She will also maintain the equipment and source new equipment when needed.
- All science equipment is kept in the Resource room, equipment is placed in boxes labelled per strand which teachers sign out when needed.
- Reference books have been purchased for class libraries and wish lists are set up each year during book weeks Book fair to replenish stocks. resource books, Big Book are stored in the Resource Room
- The local park and pitch areas provide an important resource in the study of science. Trail maps are in each class with a set of differentiated questions listed for each stop on the trail
- Health and Safety issues should be forwarded to the science coordinator, the school's health and safety policy should guide all investigative work.
- Teachers draw from a large range of workbooks and other sources when designing tasks and activities for children, there is currently no science workbook on the school booklists. Children use Wonderland as part of their Science /English curriculum.
- ICT can be integrated into the learning of science through the use of suitable software on tablets and the internet via the IWBs.
- The use of ICT provides an active learning experience. The software is engaging and interesting. There are numerous sites of international and Irish origin appropriate to the children. Below is a sample of some sites.
- Digital cameras and tablets are important tools for teaching and learning in Science.
- Each class level and room has a set of Manuals from various publishers
- Green Schools resources have been integrated into Science along with SAEI Guzzler IWB activities
- Our Staff Share has been organised for staff to access a wide range of resources in the four folders Living things/Energy & forces/Materials/Environmental Awareness and care: each folder is sub divided into class levels and each level has PPTs on all topics and strands/ Activity sheets/ Shortcuts to Youtube clips/ Marvin and Milo experiments from The institute of physics/Esero lessons/SAEI/ Twinkl resources/Science Week. This can be added by teachers at every class level as they see fit.

Safety

- The health and safety of the pupils, staff and visitors is the concern of all members of the school community. The school health and safety policy should be read in conjunction with this section of the science plan. (*Teacher Guidelines pp.27*)
- Teachers must constantly remind pupils to strictly follow safety guidelines.
- Children should wash their hands after handling plants, animals or soil.
- Prior to any field trip, teacher should discuss with the children, how they will care for any animals or plants they will be working with
- Care should be taken when working with heat activities
- Children should be informed of the dangers of looking at the sun when working with light.
- Teacher supervision at all times when working with Science kits
- During practical work teachers should be aware of the safety implications of any exploratory or investigative work to be undertaken. Primary science activities should not involve the use of chemicals or other hazardous materials.

Homework

- Active learning may form part of science homework through data collection, observation and investigations.
- Taking home plants and caring for them during the holidays
- As directed by the class teacher in First and second Class
- Bringing samples as requested by the teacher or as opportunities arise- finding a nest/bringing an interesting shell/rock

Individual teachers planning and reporting

- Teachers co plan in fortnightly blocks during monthly planning meeting
- Work covered is highlighted in their Cuntas míosúil and submitted to the principal
- The yearly planning templates are divided into monthly sections; each monthly section contains the strands and strand units to be covered in that month. The skills and contents of the yearly planning templates are based on a spiral approach, in which some aspects of each strand will be explored at each class level.
- The Cuntas Míosúil will form an important part of the record of skills, strands and strand units explored.

Staff Development

- The nominated teacher for science planning, Loughlin Casey, will co-ordinate the science programme and maintains the science resources. Contact should be made directly to her.
- There are a number of science information books in the resource library. The internet is also available to staff for research purposes.
- CPD relating to the teaching of science are communicated to staff via Aladdin or staff meeting.
- Visitors will be arranged on request to the principal.

- Any staff member may request discussion of the science programme for any staff meeting and the co-ordinator is free to raise any issues or give a report at these meetings.

Parental Involvement

- Parent-teacher meetings are arranged each year. Teachers will discuss the child's progress in the science curriculum at these meetings. Parents with particular expertise or with relevant jobs may be invited to speak to the children.
- Parents can be involved at various levels:
 - In the classroom
 - On field trips
 - During topic or theme weeks- Science Week/School Gardening
 - Homework
 - Collecting pieces for design and make
 - Discussing science topics at home
 - Recycling in the home
- The school has liaised in a positive way to any request or proposals from parents which might further our shared objectives of making science more child friendly_ Merck programme
- Teacher designed information sheets are sent home periodically.
- The school website is used to inform parents of STEM outreach activities for their children.

Community Involvement

- An Taisce –Greenschools
- School Caretaker
- SDCC- Environmental Unit
- SEAI – Energy Workshops
- Rua Red – Engineering Workshops Tallaght
- Local Business Enterprises (Fidelity Investments, etc)

Implementation

- Class teachers are responsible for the implementation of the reviewed Science programme
- The post holder Loughlin Casey is responsible for the implementation of the reviewed programme, resources and Science Week
- Time frame: 2021-2024

Review

- Progress made during above years will be reviewed in 2024
- It will be based on teacher's feedback and suggestions for omissions/additions
- Post Holders will be responsible for review

Ratified: - date 21/6/21

Signed: Miriam Maroz

