



Castleplunkett NS

SESE Science Whole School Plan

Science

■ Title: Whole School Plan for SESE Science – a work in progress

■ Introductory Statement and Rationale

(a) Introductory Statement

This plan was formulated by the teaching staff in the school during 2018/2019 school year.

(b) Rationale

This plan conforms with the revised Primary Curriculum 1999 and will improve the teaching and learning by informing class planning and teaching and will provide the pupils with adequate opportunities to develop skills and understanding of concepts as envisaged by the science curriculum.

■ Vision and Aims

(a) Vision:

Through our school's science programme, we aim to help pupils to come to an understanding of and take an interest in the physical and biological world and environments around them. We believe that science should be a practical subject with opportunities to engage in hands-on investigative work. To this end, we will consciously develop children's scientific skills as well as their scientific knowledge. Environmental activities will foster a positive attitude and a sense of responsibility among our pupils for the natural and human environments.

(b) Aims:

The aims of social, environmental and scientific education are:

- to enable the child to acquire knowledge, skills and attitudes so as to develop an informed and critical understanding of social, environmental and scientific issues
- to reinforce and stimulate curiosity and imagination about local and wider environments
- to enable the child to play a responsible role as an individual, as a family member and as a member of local, regional, national, European and global communities
- to foster an understanding of, and concern for, the total interdependence of all humans, all living things and the Earth on which they live
- to foster a sense of responsibility for the long-term care of the environment and a commitment to promote the sustainable use of the Earth's resources through personal life-style and participation in collective environmental decision-making
- to cultivate humane and responsible attitudes and an appreciation of the world in accordance with beliefs and values.

(b) In addition we aim to:

- Engage with the Green Flag Programme on an annual basis
- Participate in Discover Primary Science
- Develop and Maintain Science resources

Curriculum Planning

1. Strands and Strand Units:

We have included work from each strand for each year and will cover all strand units over a 2 year period.

In the plan we have included a range of habitat studies based on our immediate environment for each class grouping. We will use a balanced mix of theme-based approach to SESE, cross-curricular work and subject-centre focus.

Junior Infants

Term	Strand Unit	Content	Curriculum	Teacher Guidelines
Autumn	Myself Caring for my Locality	Body – similarities/differences Body – changes as we grow Observe and appreciate attributes of our locality Develop a sense of responsibility for its care Implement simple strategies for its improvement and care	Page 24	Page 118 121
Winter/Spring	Magnetism and Electricity Forces	Purposeful play with magnets to observe effect Use of electricity at home/school Dangers of electricity Investigate the effects of pushing and pulling of various objects	Page 26 26	Page 38, 108, 109, 136, 138
Summer	Properties and Characteristics of materials	Investigate and compare a variety of materials, e.g. water, metal..... Identify uses for these materials Grouping of these materials according to different criteria	Page 27	Page 124

		Observe floating and sinking of objects		
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Senior Infants

Term	Strand Unit	Content	Curriculum	Teacher Guidelines
Autumn	Plants and animals	Investigate living things in various habitats, e.g. trees, ponds..... Investigate parts of living things, e.g. flower, stem, leaf.... Observe growth and change of living things Explore conditions of change – need for growth etc Explore seasonal change	Page 24	Pages 26, 62, 64, 66, 68, 70, 78, 82, 84
Winter/Spring	Light Sound	Identify and name items in relation to colour Explore various colours and group objects accordingly Explore shadow and colour in our natural environment Explore sound and difference of sound, high/low etc Explore making sound - percussion	Page 25 25	Page 90
Summer	Heat Materials and Change	Investigate hot/cold through our weather/bodies Explore how to maintain heat/cold Observe the effects of water on objects/materials Observe the effects of heating/cooling objects/materials	Page 25 Page 27	Page 124

Rang1

Term	Strand Unit	Content	Curriculum	Teacher Guidelines
Autumn	Myself	Body – identify	Page 41	Page 121

		<p>external parts</p> <p>Locate sense and link to body parts</p> <p>Measure body changes and identify requirements needed for growth</p> <p>Identify and discuss the basic elements – air, soil, water etc</p> <p>Introduce co-dependence, e.g. food chain</p> <p>Pollution – causes and prevention</p>	Page 48	
Winter/Spring	<p>Caring for my Locality</p> <p>Magnetism and Electricity</p> <p>Forces</p>	<p>Purposeful play with magnets – observe effects</p> <p>Observe attraction <u>to</u> different materials</p> <p>Observe attraction <u>through</u> different materials, water, card etc</p> <p>Static electricity</p> <p>Uses/ dangers of electricity at home/school</p> <p>Investigate pushing and pulling of various objects</p> <p>Pushing power of air/water – current, wind</p> <p>Floating/sinking of objects in various substances</p> <p>Friction of surfaces – observe rolling distances</p>	<p>Page 44-45</p> <p>Page 106 99</p> <p>136, 138</p>	
Summer	Properties and characteristics of materials	<p>Investigate materials and their uses in our surroundings</p> <p>Grouping materials under different criteria – include</p>	Page 46	Page 126

		magnetism, absorbency, etc Investigate the uses of these materials in construction		
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Rang 2

Term	Strand Unit	Content	Curriculum	Teacher Guidelines
Autumn	Plants and Animals	Investigate living things in various habitats Investigate parts of living things Grouping living things by characteristics, e.g. migration Explore the conditions needed for growth and change, e.g. heat, light.. Explore life cycles of plants and animals	Page 42	Page 48, 62, 64, 68, 70, 73, 78, 80, 82
Winter/Spring	Light Sound	Explore sources and importance of light Observe transparency of materials to light Importance of the sun for light, heat Learn dangers of the sun, eyes, skin etc Investigate various sounds and how to make these sounds Develop percussion instruments	Page 43	Page 38, 108, 109, 136, 138
Summer	Heat	Explore various sources of heat: sun, fire, radiator Investigate how to measure heat Measure and compare temperatures Observe effects of heating/cooling solids and	Page 44	Page 125, 126

	Materials and change	liquids Explore how to maintain temperature Mixing materials and the effects, eg paint		
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Rang 3

Term	Strand Unit	Content	Curriculum	Teacher Guidelines
Autumn	Human Life	Body – name external and internal organs Discuss need for balanced diet Examine the breathing system, lungs, smoking Examine the skeletal system, muscles, bones, joints	Page 61	Page 119, 122
	Environmental Awareness	Observe, discuss and record elements of our local environment Renewable/non-renewable resources Conservation of our environment	Page 68	
	Caring for the environment	Implementing anti-pollution schemes Identify issues and responsibilities through debate/action	Page 68, 70	

Winter/Spring	Magnetism and Electricity	<p>Push/pull effects- terms attract/repel are introduced</p> <p>Classification into magnetic/non-magnetic</p> <p>Link magnets to the compass</p> <p>Static electricity</p> <p>Uses/dangers of electricity at home/school</p> <p>Construction of simple circuits</p> <p>Identify conductors/insulators</p>	Page 64	Page 102-103
	Forces	<p>Movement of objects – push, pull/stretch, pulley, roll...</p> <p>Slowing moving objects due to friction, e.g. ball on carpet</p> <p>Investigate gravity</p> <p>Levers- designing levers, see-saw</p> <p>Floating/sinking of objects</p>	Page 65	Page 112, 114, 136, 138
Summer	Properties and Characteristics of materials	<p>Investigate properties of various materials</p> <p>Discuss solids, liquids, and gases</p> <p>Raw v. manufactured materials</p> <p>Grouping of materials under specific criteria, include insulators/conductor, magnetic, absorbency</p> <p>Discuss uses of these materials in construction</p>	Page 66	Page 127

Rang 4

Term	Strand Unit	Content	Curriculum	Teacher Guidelines
Autumn	Plants and	Investigate living things	Page 62	Page 48, 62, 64, 68, 70.

	Materials and change	<p>Effects of heating/cooling on solids, liquids and gases</p> <p>Conductors and insulators of change</p> <p>Mixing and separating of materials</p> <p>Testing of materials under different criteria, e.g. use of water, forces</p>	Page 66	
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Rang 5

Term	Strand Unit	Content	Curriculum	Teacher Guidelines
Autumn	Human Life	<p>Body Identify structure of internal and external organs</p> <p>Discuss need for a balanced diet – food pyramid</p> <p>The breathing system effects of smoking</p> <p>Immune system – protecting our bodies</p>	Page 83	Page 119, 122
	Environmental Awareness	<p>Observe, discuss and record elements of our local environment</p> <p>Renewable/non-renewable resources</p> <p>Conservation of our environment</p>	Page 90	
	Caring for the environment	<p>Implementing anti-pollution schemes</p> <p>Individual/community/national and global responsibility</p>	Page 92	
Winter/Spring	Magnetism and Electricity	Push/pull, attract/repel, lift/hold	Page 86	Page

	Forces	<p>effect of magnets</p> <p>Investigate making magnets – the electromagnet</p> <p>Construct a variety of simple circuits</p> <p>Uses/dangers of electricity</p> <p>Movement of objects – push, pull, pulley, wind, water..</p> <p>Effects of friction – slowing objects and generating heat</p> <p>Introduce gravity as a force</p> <p>Use of levers to lift, turn</p> <p>Design</p>	Page 87	<p>102,103, 104</p> <p>Pages 40-41</p> <p>114, 116, 136, 138</p>
Summer	Properties and Characteristics of materials	<p>Solids, liquids, gases, their properties</p> <p>Investigated and group different materials, including oxygen</p> <p>The decay of various materials</p> <p>Composition of our air – its properties</p> <p>Different gases in our environment and everyday uses</p>	Page 88	Page 127

Rang 6

Term	Strand Unit	Content	Curriculum	Teacher Guidelines
Autumn	Plants and Animals	<p>Investigate living things in various habitats</p> <p>Explore conditions of growth and how animals adapt to environments</p> <p>Uses of keys in the identification of species</p> <p>Explore food chains and life cycles</p> <p>Explore characteristics of specific groups, e.g. mammals, birds, fish</p> <p>Explore conditions of growth in detail including reproduction</p>	Page 84	Page 62, 64, 66, 68, 70, 78, 82

		Explore technology in the everyday context Identify the positive/negative effects of technology on our environment Look at technology and important scientists/inventions in our world	Page 91	
	Science and the Environment			
Winter/Spring	Light Sound	Characteristics of light – energy form, spectrum, reflection, refraction Uses of lens. Importance of sight Importance of the sun – photosynthesis Dangers of sunlight Characteristics of sound – vibration, energy, travel, travel through materials Making of sound through percussion, vibration Importance of hearing	Page 85 Page 85	Page 95
Summer	Heat	Use/explanation of terms conduction, convection, radiation Transfer of heat, sources, renewable, non-renewable heat Use of thermometer Effects of heating/cooling on solids.	Page 86	Page 128

	Materials and change	liquids and gases Conductors and insulators of change Mixing, separating and dissolving of materials Testing of materials under different criteria, e.g. use of water, force Fire triangle – oxygen, fuel, heat. Heat at home	Page 89	
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2. Children's Ideas:

We will use childrens' ideas as a starting point for all scientific activity

Strategies we will use to elicit children's ideas are

- Talk and dicussion
- Open and closed questioning
- Annotated drawings
- Concept maps
- Concept cartoons
- Brainstorming
- Free play with materials

3. Practical Investigations:

When planning practical investigations, we will use;

- **Open Investigations:** Pupils are given or may suggest an open question for which they have to design their own investigation.
- **Closed Investigations:** Pupils will engage in activities where the end result is obvious and there are not many variables.
- **Fair Testing:** Pupils develop a sense of what should be kept the same and what should be variable to ensure that an investigation is fair.

We will consult the Teacher Guidelines pg 54 in this regard.

4. Classroom Management:

A combined approach of whole class work, small group 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.

Each class will have a science display area.

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

5. Methodologies:

We plan to use the key methodologies of the Primary Curriculum in the teaching of Science:

- **Active learning**
- **Problem solving**
- **Developing skills through content**
- **Talk and discussion**
- **Co-operative learning**
- **Use of the environment.**

Methodologies we have identified for development are:

- **Outdoor investigation and Fieldwork**
- **ICT**

6. Linkage and Integration:

We encourage the linkage of strands within the science curriculum and the integration of science with other subject areas.

- **Human Life units on growth and reproduction will integrate with SPHE**
- **Environmental awareness and care is closely integrated with the SPHE and Geography curricula.**
- **Design and Make activities will also form part of the Visual Arts content.**
- **Links with the Maths curriculum are many e.g graphing results of investigations,**
- **The strand unit on sound is an integral part of the Music curriculum e.g. Sounds in the environment and the designing of musical instruments.**
- **Various “line of Development” studies in History will lend themselves meaningfully to scientific investigation, e. g Clothes over the years and Materials**

7. Using the Environment

We have completed an environmental audit of the school grounds and the surrounding Locality.

Each class will engage in designated habitat studies

Also used for Geography: Natural Environment: the local natural environment

8. Balance between Knowledge and Skills:

Science is not only concerned with the acquisition of knowledge but the understanding of concepts. We can nurture this understanding by developing skills of questioning, observing, predicting, investigating, analysing and recording and therefore acquiring knowledge. Children will explore, plan and analyse materials through design and make activities. Pupils will be given an opportunity to engage in Design and Make activities appropriate to their ability and area of study.

9. Assessment – Looking at Children's' Work:

In science we will assess;

- **Knowledge**
- **Understanding**
- **Skills**
- **Attitudes**
- **Ability to work collaboratively**

Assessment will be in the form of

- **Teacher observation**
- **Concept-mapping**
- **Annotated drawings**
- **Teacher-designed tasks and tests**
- **Portfolio and project work**
- **Self- Assessment Learning Folders**

There will be opportunities for the pupils to engage in self-assessment as they analyse the success of design and make activities and get an opportunity to view their own work portfolios. Information from assessment will be communicated to parents in the school report at the end of the year and at the parent/teacher meetings.

10. Children with Special Educational Needs:

It is important that all children experience a rounded environmental education. Science plays a pivotal role in this education and so we will do our best to ensure that every child will have opportunities to engage in learning activities appropriate to their abilities.

- **Teachers will use a mixture of whole-class teaching and group work, with different groups set tasks of various complexities.**
- **Teachers will develop their questioning techniques spanning from simple recall to more complex and analytical skills so that all pupils will have opportunities for success.**
- **Different ways of recording and communicating findings will be encouraged: drawing, ICT, written records, oral reports and models.**
- **All children benefit from active involvement in the environment so all will be encouraged to participate in fieldwork.**

All teachers will familiarise themselves with the Guidelines for Children with General Learning Difficulties (NCCA)

11. Equality of Participation and Access:

- **Boys and girls will be having equal opportunities to participate in science lessons and activities.**
- **Equal opportunity will be given to boys and girls to experience all strands.**
- **Provision will be made for children experiencing any form of disadvantage or whose first language is not English**

Organisational Planning

12. Timetable

In keeping with the recommendations in the Primary School Curriculum Introduction (page 70) a minimum of two and quarter hours per week is devoted to SESE in infant classes and a minimum of three hours per week for classes 1st to 6th.

45 minutes of this time will be spent on Science in infants per week.

One hour of this time will be spent on Science from 1st – 6th Class.

*** On occasion, time will be blocked as appropriate. This might occur when**

- working on an integrated project
- exploring the local environment

Teachers will use discretionary curriculum time for SESE as appropriate.

13. Resources and Equipment:

- We have attached a list of our current resources for science to this plan.
- Equipment and resource materials will be held in the Resource Room ‘Science Trays’.
- The equipment will be checked and updated at the end of each year by the teacher with responsibilities for Science
- Any equipment purchases will be organised in consultation with the staff needs and requirements.
- The school encourages the use of science websites providing this is within the safe use of the internet guidelines- see attached list of websites
- We have completed an environmental audit of the immediate locality and have decided how to use it as a resource.
- Scientists & Environmentalists in the community will be asked to talk to the children and share their knowledge with them.

14. Health and Safety

We have a Health and Safety policy in place in our school which covers safety concerning the handling of equipment and out of school activities such as fieldwork (See Geography Teacher Guidelines P 74 – 78 for guidance on such a policy)

Teachers will consult the Principal/Deputy-Principal whenever it is proposed to engage in fieldwork.

During practical work teachers will be aware of the safety implications of any exploratory or investigative work to be undertaken. Successful and enjoyable investigations require sensible planning, good supervision and adherence to safety rules. Each teacher is responsible for risk-assessing their environment.

The consumption of any material by pupils for the purposes of a lesson is prohibited without the prior consent of parent/guardian.

Outdoor work will be based in areas that are accessible for children, teachers and helpers and that are safe. Preliminary visits by teachers to the site will be necessary to identify potential hazards. If there are apparent dangers, then a more suitable habitat will be selected for study. Habitat studies involve children in working with plants and animals, and teachers will be made aware that some children may be allergic to some animals and plants.

15. Individual Teachers' Planning and Reporting:

Teachers will consult this Whole School Plan and the curriculum documents for Science when they are drawing up their long and short term plans.

Cúnais Míósúil will assist in recording work covered, in evaluating progress in Science and in informing future teaching.

16. Staff Development:

- Teachers will have access to resource materials and websites on Science.
- Staff will be encouraged to research and try out new approaches and methodologies.
- The teacher with responsibility for resources will be responsible for keeping resource material up to date and will arrange for opportunities for resources to be assessed for purchase.
- Teachers will be encouraged to attend in-service workshops and courses on Science in order to enhance their understanding and teaching of the subject. They will upskill other staff in what they have learned by sharing the expertise acquired at these courses during staff meetings.
- The culture in our school is one that encourages the sharing of experience and good practice.

17. Parental Involvement:

Parents are invited to celebrate and view results of projects, surveys, investigations in the school. The teacher with responsibility for Science will organise this.

18. Community Links:

- People in the local community who have an interest and knowledge in the environment will be invited to speak to the children.
- The work of some national agencies relates to aspects of the Science programme. As well as accessing materials produced by these agencies specifically for schools, we will welcome visits by speakers from these organisations.

Tree Council

SEAI

Green Schools

Bird Watch Ireland

National Heritage Council

19. Implementation:

(a) Roles and Responsibilities:

The plan will be supported, developed and implemented by all staff members.

The teacher with responsibility for Science will arrange for;

- Scientific audit of school grounds and immediate locality.
- Fieldwork trails and packs.
- Purchase, maintenance and storage of resources.
- Leading the development of new methodologies identified.
- Liaising with community organisations and relevant agencies.
- The development of ICT as a learning tool in Science and the vetting of websites.

20. Review

It will be necessary to review this plan on a regular basis to ensure optimum implementation of the Science curriculum. This Plan will be reviewed on a three-year basis.

21. Ratification

This policy was ratified by the Board of Management at a meeting on October 01st 2019.

Signed: _____

Chairperson

Date: _____

Signed: _____

Principal

Date: _____

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