Science Policy

Introductory Statement:

This policy was formulated following a consultative process which took place over a period of months. The Principal and teachers were involved in drafting this policy which was drawn up in September 2010. The policy was reviewed again in February 2012 and again April 2018

Rationale:

This policy has been drawn up:

- To benefit the teaching and learning of Science in our school.
- To conform to principles outlined in the 1999 Curriculum.
- To provide a coherent approach to the teaching of Science across the whole school.

Vision and Aims:

a) Vision

At D.P.E.T.N.S. we believe that children of all abilities and all backrounds will benefit from the study of Science. Science in D.P.E.T.N.S. should help the children to develop a broad range of skills of enquiry, cultivate important attitudes and encourage the acquisition of scientific knowledge and concepts about the biological and physical world.

The school will promote a shared understanding of the purpose and nature of science and promote a coordinated approach to the planning and teaching of Science throughout the school so as to ensure development and continuity and this will also facilitate the evaluation of teaching resources and methodologies.

b) Aims

The aims of Science education are:

- 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 which emphasises understanding and constructive thinking
- 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 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

Skills Development for Junior Infants- Second Class

Working scientifically	• Questioning • Observing • Predicting • Investigating and experimenting • Estimating and measuring • Analysing • Recording and communicating
Designing and making	• Exploring • Planning • Making • Evaluating

Junior Infants

	Strand Unit:	Content:	Curriculum Page	Teacher Guidelines Page
1	Myself	Body: • Similarities/ differences. • Body Changes as we grow	P24	P118
	Caring for my locality	• Observe and appreciate attributes of our locality. • Develop a sense of responsibility for its care. • Implement simple strategies for its improvement and care		P121
2	Magnetism and Electricity	• Purposeful play with magnets to observe effect. • Use of electricity at home/ school. • Dangers of electricity.	P26	P38, 108, 109, 136, 138
	Forces	• Investigate the effects of pushing and pulling various objects		
3	Properties and characteristics of materials	• Investigate and compare a variety of materials. • Identify uses for these materials. • Grouping of these materials according to different criteria. • Observe floating and sinking	P27	P124

Senior Infants

Term:	Strand Unit	Content	Curriculum Page	Teacher Guidelines Page
1	Plants and Animals	• Investigate living things in various habitats eg trees. • Investigate parts of living things eg flower, stem. • Observe growth and change of living things. • Explore conditions of change- needs for growth. • Explore seasonal growth	P24	P26, 62, 64, 66, 68, 70, 72, 82, 84
2	Sound	• Explore sound and difference of sound; high/ low etc. • Explore making sound- percussion.	P25	P90
	Heat	• Investigate heat or the cold through weather/ bodies. • Explore how to maintain heat or the cold.	P25	
3	Light	• Identify and name colours. • Explore colours and sort objects according to colour. • Explore shadow in our environment.	P27	P124
	Materials and Change	• Observe the effects of water on objects/ materials. • Observe the effects of heating/ cooling on materials.	P27	P124

First Class

Term:	Strand Unit	Content	Curriculum Page	Teacher Guidelines Page
1	Myself	Body: • Identify external parts. • Locate senses and links to body parts. • Measure body changes and identify requirements needed for growth.	P41	P121
2	Properties and characteristics of materials Caring for my locality	• Investigate materials and their uses in our surrounding. • Grouping materials under different criteria- include magnetism, absorbency. • Investigate the uses of materials in construction. • Identify and discuss the basic elements; air, soil, water etc. • Introduce co- dependence (food chain). • Pollution- causes and prevention	P46 P48	
3	Magnetism and Electricity Forces	• Purposeful play with magnets. • Observe effects. • Observe attraction to different materials. • Observe attraction through different materials; water, card etc. • Dangers of electricity at home/ school. • Investigate pushing and pulling of various objects. • Pushing power of air and water.	P44, 45	P99, 106 P136, 138

Second Class

Term:	Strand Unit	Content	Curriculum Page	Teacher Guidelines Page
1	Plants and Animals	• Investigate characteristics of a variety of habitats. • Investigate parts of living things. • Grouping plants/ animals by characteristics eg. Migration • Explore the life cycles of plants and animals. • Explore requirements needed for growth.	P42	P48, 62, 64, 68, 70, 73, 78, 80, 82
2	Light Sound	• Explore sources and importance of light. • Observe transparency of materials. • Importance of sun for light and heat. • Learn dangers of sun. • Investigate various sounds and how to make these sounds. • Create percussion instruments.	P43	P38, 108, 109, 136, 138
3	Heat Materials and Change	• Explore various sources of heat. • Investigate how to measure heat. • Measure and compare temperatures • Observe the effects of heating/ cooling, solids and liquids. • Explore how to maintain temperature. • Mixing materials eg paint.	P44	P125, 126

Skills Development for Third- Sixth Class

Working scientifically

- Questioning
- Observing
- Predicting
- Investigating and experimenting
- Estimating and measuring
- Analysing
  Sorting and classifying
  Recognising patterns
  Interpreting
- Recording and communicating

Designing and making

- Exploring
- Planning
- Making
- Evaluating

Third Class

Term:	Strand Unit	Content	Curriculum Page	Teacher Guidelines Page
1	Human Life	Body • Name internal and external organs. • Discuss the need for a balanced diet. • Examine the breathing system. • Examine the skeletal structure; muscles, bones, joints	P61	P119, 122
	Environmental Awareness and Care. Caring for the Environment	• Observe, discuss and record elements of our local environment. • Renewable and non- renewable resources. • Conservation of our environment. • Design anti- pollution schemes. • Identify environmental issues, resolutions and responsibilities through debate and action.	P68, 70	
2	Forces	• Movement of objects; push, pull, stretch, pulley, roll. • Explore friction; rolling a ball on carpet • Investigate gravity. • Designing levers. • Explore floating and sinking • Explore the effects of push and pull. • Repelling and attracting are introduced.	P65	P112, 114, 136, 138
	Magnetism and Electricity	• Classification into magnetic and non- magnetic objects. • Explore the links between magnets and the compass. • Explore static electricity. • Uses/ dangers of electricity	P64	P102, 103

3	Properties and characteristics of materials	• Investigate properties of various materials. • Discuss solids, liquids and gases. • Examine raw versus manufactured materiasl. • Grouping of material under specific criteria including insulators, conductors, magnetic and absorbent. • Discuss the different materials used in construction.	P66	P127

Fourth Class

Term:	Strand Unit	Content	Curriculum Page	Teacher Guidelines Page
1	Plants and animals	• Investigate living things in a variety of habitats. • Explore conditions needed for growth and how animals adapt to environments. • Use of keys in the identification of species. • Explore food chains and life cycles.	P62	P48, 62, 64, 68, 70, 73, 78, 80, 82, 85
	Science and the environment	• Explore technology in the everyday context. • Identify the positive/ negative effects of technology on or environment	P69	
2	Sound	• Explore sound as a form of energy. • Explore the creation of sound through vibration. • Explore how sound travels through different materials.	P63	P94
	Light	• Explore light as a form of energy. • Explore transparency of materials. • Explore natural and artificial light. • Observe the light spectrum. • Observe reflection of light. • Identify the importance and dangers of the sun.	P63	
3	Materials and Change	• Effects of heating and cooling on solids, liquids and gases. • Conducting and insulating heat. • Mixing and separating of materials. • Carrying out tests on a variety of materials.	P66	

	Heat	• Use of a thermometer to measure heat. • Explore how heat transfers through materials. • Use of heat in the home and school. How to save energy. • Identify the significant dangers of the sun and heat	P64	P127

Fifth Class

Term:	Strand Unit	Content	Curriculum Page	Teacher Guidelines Page
1	Human Life	Body • Identify structure of internal and external organs. • Discuss the need for a balanced diet and the food pyramid. • Explore the digestive system. • Explore the effects of smoking on the breathing system. • Explore the role of the immune system.	P83	P119, 122
	Environmental Awareness and Care	• Observe discuss and record elements of the local environment. • Renewable and non- renewable resources; advantages and disadvantages. • Ways to conserve the environment. • Explore individual, communal and global responsibility for the environment.	P90, 92	
2	Forces	• Movement of objects; push, pull, pulley, wind and water. • Effects of friction- slowing down objects and creating heat. • Introduce gravity as a force. • Explore the use of levers; to lift and to turn.	P87	P4, 41, 114, 116, 136, 138
	Properties and Characteristics of materials	• Explore solids, liquids and gases and their properties. • Investigate and group different materials including oxygen. • Explore the decay of various materials. • Explore the properties of the air we breathe.	P88	P127

		• Identify different gases in our environment and their everyday uses.		
3	Magnetism and Electricity	• Explore push and pull, attract and repel, lift and hold. • Explore the use and properties of magnets. • Investigate the making of magnets (electromagnet) • Construct a variety of simple circuits. • Identify the uses and dangers of electricity.	P86	P102, 103, 104

Sixth Class

Term:	Strand Unit	Content	Curriculum Page	Teacher Guidelines Page
1.	Plants and Animals	• Investigate living things in their natural environment. • Explore conditions of growth and how animals adapt to environments. • Use of keys in the identification of different species. • Explore food chains and food cycles. • Explore characteristics of specific groups eg mammals, birds, fish. • Explore conditions of growth in details including reproduction.	P84	P62, 64, 66, 68, 70, 78, 82
	Science and the Environment	• Explore technology and its everyday use. • Identify the positive and negative effects of technology on our environment. • Look at technology and important scientists, inventors in our world.	P91	
2	Heat	• Use of conduction, convection and radiation. • Explore the transfer and sources of heat. • Identify renewable and non- renewable sources of heat energy.	P86	P128
	Materials and change	• Effects of heating and cooling on solids, liquids and gases. • Mixing, separating and dissolving materials. • Testing materials under different criteria. • Explore the fire triangle; oxygen, fuel and heat. • Identify sources of heat in the home.	P89	

3	Light Sound	• Explore light as a source of energy. • Explore spectrum, reflection and refraction. • Examine the use of lens. • Identify the importance of the sun and the use of photosynthesis. • Revise the dangers of sunlight. • Characteristics of sound- vibration, energy and how it travels through materials. • Exploring sound through percussion instruments. • Explore sound as a source of energy and vibration. • Examine the importance of hearing.	P85 P85	P95

Children's ideas:

Children's ideas may be the starting point for scientific activities. Children will be given opportunities to test these ideas through practical investigations.

A wide range of strategies will be used to explore the children's ideas. These strategies may include discussion, questioning, annotated drawings, concept maps, teacher designed tests and tasks.

Practical Investigations:

Science investigations provide children with opportunities to use and apply concepts while solving problems. A combination of open-ended and closed activities will be used.

To encourage children to suggest their own investigations, opportunities will be provided for the free exploration of materials.

Practical investigations will require the children to have an understanding of the concept of a 'fair test'. Fair testing involves the identification of the conditions that make a difference in an experiment. Pupils will be encouraged to ask:

- *What is being tested?*
- *What will be changed?*
- *What will be kept the same?*
- *What will be measured or compared?*

Classroom Management:

- The use of a variety of approaches and methods will facilitate the efficient implementation of the science curriculum. A combination of approaches will be used to meet the needs of pupils and the nature of the topic.
- Methods used will include whole class, group and individual work.
- The language used will be age appropriate and teachers will identify the vocabulary the children will acquire during the activities in each strand unit.

Key Methodologies:

The teaching methods used in science activities will reflect the key methodologies of the Primary School Curriculum

- Using the environment
- Active learning
- Guided and discovery learning
- Free exploration of materials
- Spiral nature of the curriculum – opportunities to return to earlier learning and to extend and enhance it
- Learning through language
- Talk and discussion
- Collaborative/cooperative learning
- Skills development through content

Activities will be amended as necessary to ensure that all pupils can participate.

Linkage and Integration:

Opportunity for the use of an integrated approach exists in all levels in the science curriculum within the school. The strands and units of the science curriculum are not discrete – work on a topic or investigation may incorporate strands from other curriculum areas. Teachers will make provision for this linkage in their short-term planning.

Assessment – Looking at Children's Work:

Children's progress in Science is assessed through:

- Teacher observation
- Teacher designed tasks and tests
- Pupils work samples, projects, portfolios, concept maps and annotated drawings
- Self-assessment
- Conferencing
- Questioning

Information gathered by this assessment will

- Identify areas of difficulty in order to respond to the needs of the pupils
- Establish learning outcomes
- Assist the teachers in assessing their own practice and methodologies
- Assist the teacher with short term planning
- Will form part of the report given to parents in the end of the year reports

Children with Different Needs:

This Science programme aims to meet the needs of all the children in the school. This will be achieved by teachers varying the pace, content and methodologies to insure learning for all pupils and will be recorded in the teacher's yearly notes. The requirements of children with special needs will be taken into account when planning class lessons and related activities. The S.N.A. supports particular children and groups as directed by the class teacher.

Equality of Participation and Access:

We view the Science programme as playing a key role in ensuring equality of opportunity for all children. The programme at each class level will be flexible so that the learning requirements of all children may be addressed. Children with special needs will be included in all activities where possible.

Organisation:

Timetable

As per curriculum guidelines.

S.E.S.E. 3 hours/ 1st – 6th Class

2 hours 15 minutes/ Junior – Senior Infants

Resources and Equipment:

Science resources and equipment will be stored in a designated area in the school and will be updated and maintained by the Science co-ordinator/team.

Safety:

- During practical work teachers should be aware of the safety implications of any work being undertaken. Children should be encouraged to observe safety procedures during all tasks. The following is a summary of safety issues in the different strands of the curriculum:
- Outdoor work should be based in areas that are accessible and safe. Preliminary visit by teachers should be used to identify any possible hazards. When working with plants and animals pupils should wear gloves to protect from allergic reactions. Children should wash their hands after handling animals, plants or soil. Cuts, grazes and skin infections should be covered.
- Prior to engaging in any outdoor work the children and teacher should discuss how they will care for the animals and plants they may collect. Children should draw up their own conservation code before working in the outdoor environment.
- When engaged in work in the strand unit *Light* the pupils should use plastic mirrors, should not look directly at the sun or very bright beams of light.
- When working in the strand unit *Electricity and Magnetism* the children should be reminded of the importance of not using mains current, disposing of batteries properly.
- *Magnets* should be stored properly to preserve their magnetism. They should be stored with their keepers. Hammering, dropping or heating magnets will cause them to lose their magnetic properties.
- When working in the strand unit *Heat* teachers should be careful in organising activities involving hot water.
- During *Designing and Making* activities, teachers should demonstrate and ensure that pupils are able to safely use any tools needed.

Individual Teachers' Planning and Reporting:

Teachers will base their yearly and short term plans on the approaches set out in the whole school plan for Science.

Staff Development:

Teachers will be made aware of any opportunities for further professional development through participation in courses available in education centres or other venues.

Parental Involvement:

Parents and other adult members of the school community may be invited to assist with certain activities e.g. outdoor work, Science Day

Parents and others who have particular knowledge and expertise may be invited to support the class teacher in implementing the science curriculum.

Community Links:

Local specialists may be invited in to share their knowledge with the class.

Implementation:

Roles and Responsibilities

Class teachers are responsible for the implementation of the Science programme in their own class. Teachers should return equipment to the designated Science area as soon as they have finished using it.

Review:

This policy will be reviewed on _____

Teachers, Principal, Science Co-ordinator and BOM will be involved in this review