**Science Plan**



**St Benignus NS, Balscadden**

1.0Introduction

Primary science is a way of thinking and doing. Science in primary school is concerned with asking questions and finding ways of answering them through practical activities. The main reason for teaching primary science is to extend the children’s innate curiosity and natural urge to explore their immediate environment. The emphasis is on developing a way of exploring and thinking in order to investigate ourselves and the environment (Skerrington, 1998; O’Doherty, 1994). It allows children to see an experimental world, where everything they encounter can be subject to scientific exploration (O’Doherty, 1994). Scientific investigations and active exploration are fundamental characteristics of primary science which assist pupils in this process (DES, 1999).

Our approach is one of Inquiry-based Science Education with the goal of scientific literacy. This is a social constructivist model of instruction using testable questions, fair test investigations and hands on activities.

## 2.0Rationale

We focussed specifically on the following areas in developing this plan: Benefitting the teaching and learning of Science in our school and conforming to the principles outlined in the primary curriculum.

#### 3.0Aims

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

3.1To develop knowledge and understanding of scientific and technological concepts through the exploration of human, natural and physical aspects of the environment.

3.2To develop a scientific approach to problem solving which emphasises understanding and constructive thinking.

3.3To encourage the child to explore, develop and apply scientific ideas and concepts through designing and making activities.

3.4To foster the child’s natural curiosity so encouraging independent enquiry and creative action.

3.5To help the child to appreciate the contribution of science and technology to the social, economic, cultural and other dimensions of society.

3.6To cultivate an appreciation and respect for the diversity of living and non-living things, their interdependence and interactions.

3.7To 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.

3.8To enable the child to communicate ideas, present work and report findings using a variety of media.

**4.0Children’s ideas**

Children will begin from their ideas about how things are and they change and develop these ideas by testing them in practical investigation.

The children will be provided with opportunities to try out, challenge, change or replace ideas.

Children’s knowledge of an area will be elicited in class by:

* Talk and discussion.
* Questioning/Prediction.
* Tender designed tests and tasks (middle and senior classes).
* Drawing (Junior classes).

**5.0Classroom Management**

5.1As a staff we agree that the use of a variety of approaches and methods will facilitate the efficient implementation of the science curriculum. The approaches chosen will enable the children to work scientifically in a variety of contexts, to undertake practical activities and to tackle open-ended problems and investigations.

The methodologies and approaches that we have chosen will accommodate the different learning styles of the children and will:

* Allow the children the excitement of finding out for themselves.
* Enable them to work on their own problems as far as possible.
* Encourage the children to pose their own questions, using their ideas as a basis for activities.

Teachers at each class level will use a combination of:

* An investigative approach.
* Teacher directed approach during the science activities.

Teachers will endeavour to use a combination of closed and open ended activities in their approach.

Teachers will plan for closed activities by using:-

* Teacher developed worksheets.
* Commercially produced work cards and textbooks.

Those materials will provide comprehensive instruction for the pupils, the equipment required and the measurements to be taken.

* Open Investigation – the teacher will provide opportunities for the pupils to undertake open-ended activities.
* Teachers will ask broad or open questions to encourage children to develop an investigative approach – the responsibility for thinking will be placed on the pupil.
* Children will have access to materials associated with the topic.
* Children will be encouraged to record what they discover.
* Children will work in small groups – the stimulus for investigation comes from the pupil’s observations, experiences, questions and interactions in small groups.
* The teacher will guide (by asking questions) and observe the children’s activities.
* At the end of the investigation the class will regroup to clarify and share ideas. In this way the children will be encouraged to reflect on the diverse approaches adopted by different groups in approaching the same task.

5.2Teachers may also occasionally use a teacher-directed approach.

The teacher-directed approach involves the teacher telling or showing the children what to do and in observing their progress. This method may be adopted as part of the teacher’s approach in a wide range of lessons, for example:

* Demonstrating skills using thermometers.
* Separating substances.
* Heating materials which may involve potential hazards.

**6.0Safety in Science**

Safety will permeate all aspects of the teaching of science and children will be encouraged to observe safety procedures during all tasks. Science activities will not involve the use of chemicals or any other hazardous materials.

6.1Outdoor Safety

Outdoor work will be based in areas that are accessible for children. Preliminary visits by teachers to the site can be used to identify potential hazards. Teachers will also be aware that some children may be allergic to some animals and plants and may have accessibility issues.

6.2Safety and Light

When working on a unit re: light. Teachers will ensure that the children adhere to the following procedures:

* Children should not look at the sun, very bright beams of light e.g. projector beams.
* Children will only use plastic mirrors for investigations.
* Children will not look at the sun through lenses.
* Children will be made aware of the dangers of sunburn.

6.3Safety and Electricity

The following safety procedures will be observed.

* Batteries will not be cut open.
* Batteries will be disposed of in our battery recycling area.
* When leads composed of length of wire will be required for making circuits, an adult will strip the plastic covering from the leads. Children will not be permitted to undertake this task.

6.4 Safety and Magnetism

Magnets will be stored with their keepers (a small metal bar placed across the poles of a magnet).Children will be informed that heating, hammering or repeatedly dropping magnets will cause them to use their magnetic properties – so they should be treated with care.

6.5 Safety and Forces

Teachers will take care during work on forces because of the risk of injury resulting from moving objects.

6.6Safety and Heat

Children may use their sense of touch initially to compare water at different temperatures – from cold to hot. Teachers will take care in the organisation of tests involving the use of hot water.

**7.0Textbooks**

Textbooks will be used during science lessons to support active investigative work. These resources will be evaluated by the staff during June each year. It is our policy to select activities from a variety of textbooks and workcards that will assist children in undertaking open-ended tasks.

**8.0Assessment in Science**

As a staff we agree that assessment is an integral part of teaching and learning. The aim of assessment in Science is to enhance the learning experience of the child. It is concerned with the child’s mastering of knowledge and understanding of the strands of the science programme and the development of skills and attitudes. Assessment will be a continuous process and will be part of the normal teaching and learning situation. Assessment in Science will help the teacher.

* Evaluate the effectiveness of educational resources, methodologies and approaches.
* Communicate with parents or other teachers.
* How the learning experience could be improved for the child.

As a staff we have decided to adopt the following methods of assessment in our school:

8.1Teacher observation.

Observations made by the teacher during practical science tasks provide opportunities to assess the development of process skills and attitudes and to establish the extent to which children have mastered the knowledge aspects of the science programme.

Observation will focus on:

* Individual discussion.
* How a child carries out investigation as part of a group.
* Observing how individuals interact within a group.
* The responses from the child to the teacher’s questions / suggestions.
* The participation of the child at different stages of investigation – planning, identifying variables and evaluating.

8.2Teacher – designed tasks and tests.

* Written records, drawings, report of investigation / observation, sculptor and models will provide children with a record of their own work (self-assessment).
* Practical tasks – these tasks will supply the teacher with the information required about the level of skill used and the way in which children work.
* The ability to use measuring instruments in tasks.
* The ability to identify and control variables.
* Model making.
* Exploration in an outdoor environment.
* Displaying and reporting on project work.

8.3Work samples, portfolios and projects.

Work samples, projects and portfolio samples are all useful way to assess progress in Science. Science samples can be included in the class Portfolio Boxes.

**9.0Integration in Science.**

9.1SESE

Many opportunities exist for links to be made between Science and Geography e.g. during geographical investigation. The study of Living Things will link to and complement the topics in natural environments (Geography). The Strand Environmental Awareness and Care is common to Science and Geography.

9.2Mathematics

The child’s mathematical ability can be developed while working scientifically and Designing and Making. The problem-solving skills that children develop in mathematical contexts are relevant to the scientific approach to investigating the world.

9.3Visual Arts

The skills outlined in Designing and Making and the tasks outlined in the Science Curriculum are equally dependent on the child’s aesthetic awareness and craft handling skills.

9.4Language

Recording and communicating play an integral role in all stages of the scientific process. The children should present their ideas and findings clearly and precisely in oral and written form.

9.5ICT

* Data handling programs can be used by children to record and analyse records or bodies of information, and produce their findings in graphical form.
* Word processing and drawing programs provide pupils with another means of communicating and presenting their scientific information and findings.
* The internet provides children with a range of sources of scientific and technological information by visiting web sites and apps e.g. museums, Government departments, meteorological agencies etc.
* We can also use the internet as a communication tool to link schools and pupils nationally and internationally. Details of projects may be shared via email.

**10.0Local areas available for exploring various habitats**

* Gormanston College: Woodlawn / flowers/ animals e.g. squirrels / stream.
* Cloísín: Trees / pump/ wild flowers / animals / hedgerows / badger / stables / horses.
* Commons: Trees / wild flowers / animals / logs / stones / ‘waste’ ground.
* Gormanston Beach: Sand / shells / rocks / cliffs / fish / birds / nesting habits / pools etc.
* Bog of the Ring: Marshy area / wild flowers / plants / animals – hares, rabbits, fox? Peatland / straw etc.
* Church: Tone / plants / graveyard etc.
* Wells:- water / insects / frogs etc.

# 10.1Animals that can be observed locally

## Squirrels / rabbits / hares / dogs / cats / sheep / rats / mice / donkeys / horses. See also Survey of Breeding Birds of Balscadden and the Mammal Assessment of Balscadden Village.

### 10.2Trees available locally for observation

Oak, horsechestnut, beech, ash, sycamore, larch. Children can study/examine stems, leaves, bark, fruit, buds and flowers from trees listed above. See also the Balscadden Flora Survey.

### 10.3Flowers available locally for observation

Daisy, buttercup, daffodil, tulips and flowering shrubs. Children can study petals, roots, stems.

10.4Buildings available locally for investigation

The Old Church remains / Balscadden graveyard / stables / farm buildings /Community hall / cottage remains / modern houses / Balscadden House.

Children can study: Bricks/steel girders/pebble dash/whitewash/concrete/thatch/corrugated iron/roof tiles/slate/wood/aluminium/PVC and glass etc. They can also study the following types of buildings – bungalow / two-storey buildings / old buildings and recently constructed buildings using the buildings listed above. The following topics can also be explored – buildings that enhance your area / buildings that have a negative impact. Children will discuss with their teacher strategies for improving and caring for the environment that they could implement e.g. waste management, recycling, growing plants, encouraging birds by erecting a bird table etc.

**11.0Conservation Code**

* Children will be made aware of the importance of conserving the natural flora and fauna in the environment.
* The collection of plants and animals will be carried out under the direct supervision of the teacher or an adult.
* Children will be advised to search carefully and cause as little disturbance as possible.
* Children will be encouraged to handle animals and plants with care.
* Children will be encouraged to replace stones and logs that are turned over.
* Children will be encouraged to observe, draw and record if possible, rather than handling.
* Arrangements will be made to return all animals to their habitats as soon as possible.

**12.0Science resources**

There are a range of science resources to support the teaching of the curriculum available in the school. These resources are stored in Support Room 2.

**13.0Review dates**

20/11/2005

120/6/2006

September 2019

**14.0Ratification**

This policy was adopted by the Board of Management on \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ (date)

Signed:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Signed:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Chairperson of the Board of Management Principal

Date:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Date:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**Science Plan**

**Infant Classes**

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| --- | --- | --- | --- |
| **Strands** | **Strand Units** | **Content** | **Activities/Experiments** |
| Living Things | MyselfPlants and animalsLocal faunaMini-beastsSea lifeAfrican plains/ Wild Animals | Parts of the body/sensesRecognising and measuring physical similarities between people.Looking after my bodyGrowing and changingTrees in the environmentPlant GrowthArctic animalsFarm animalsLife cycle of the frog (JI)Collect local mini-beasts.Observe, sort and classify (e.g. have legs, don’t have legs)Naming/sorting and describing sea creatures.Naming, sorting and describing animals | Explore touch/taste/hearing/sight/smell. Kim’s Game.Ice Balloons (SI)Measuring height/eye (SI)And hair colour (JI)/ pictogram and graphs.Discussion on healthy eating /hygiene/classroom display/ dental care/ visit to the doctor.Personal timeline/ physical changes and skills changes.Collect seasonal leaves, flowers or fruits from local trees. Observe similarities and differences, sort and classify. Naming parts of the tree (JI) and flower (SI)Explore conditions of growth of seeds.Concept Cartoon, growing beans, does orientation of seed affect how the plant grows? (SI)Identify and name arctic animals. Discuss physical characteristics and adaptation to the environment.Identify and name farm animals. Characteristics, identifying and naming young and their role on the farm. Discuss life cycle of the chick (SI)Grow frog spawn if available. |
| **Energy and forces** | LightSoundHeatMagnetism and electricity | Day and night/ dark and light/ shadows.Recognise and identify a variety of sounds.Identify and differentiate between high and low sounds.Explore ways of making different sounds using a variety of materials.Identify ways of keeping objects and substances warm and cold.Recognise the difference between hot and cold in terms of weather, food, water and the body.Use magnets of different shapes and sizes in purposeful play to explore their effects on different materials.Become aware of the uses of electricity in school and at home. | Discussing difference between day and night. Classify activities into day and night. Comparing dark and light colours/ colour mixing.Exploring shadows (SI). Colour mixing (JI/SI). Sorting activities into day and night time.Sounds in the environment/ listening walk.Identifying pitch (reference The Right Note activities).Composing sounds for story books (e.g. We are going on a Bear Hunt (SI)/ Peace at Last (JI). Playing percussion instruments, Ref. The Right Note).Concept Cartoon: The Snowman’s Coat. Junior Infants use one material. Extend in Senior Infants using a range of materials chosen by the children.Sorting clothes into those worn in the different seasons.Test a range of materials (selected by the children) for magnetic properties.Sorting things that do and do not require electricity. |
| **Materials** | Properties of materialsMaterials and change | Observe a range of familiar materials in the immediate environment.Investigate and group materials according to different properties.Explore the effect of heating and cooling on everyday objects. | Story: The Three Little Pigs. Investigating different materials from the story. See Concept Cartoon in the Heat strand unit ‘Snowman’s Coat’.See Magnetism and Heat activities.What happens when chocolate is heated and cooled (JI). Does ice weigh the same when it melts? (SI).Concept Cartoon ‘Materials and Change-Melting Ice’. |
| **Environmental awareness and care** | Caring for my locality | Develop a sense of responsibility for taking care of and improving the environment. | Taking care of the classroom. Green schools. Junk art, upcycling. |

**Skills development for Infant classes**

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| **Working scientifically:** | Questioning, observing, Predicting, Investigating & experimenting, estimating & measuring, analysing, recording & communicating and evaluating. |
| **Questioning** | What is it? Where does it live? What do you see, hear or smell? How does it move? What helps these plants to grow? |
| **Observing** | Use the senses to observe animals, plants, objects and events in the immediate environment.Observe characteristics, differences and similarities. |
| **Predicting** | Guess and suggest what will happen next in structured situations. |
| **Investigating and experimenting** | Carry out simple investigations set by the teacher, make observations and collect data. |
| **Estimating and measuring** | Describe mass and length using non-standard units and informal language.Compare and estimate.Match objects of equal length. |
| **Analysing** | Sorting and classifying: Sort and group objects according to observable features. |
| **Recording and communicating** | Describe observations orally using an increasing vocabularyRepresent findings pictorially and in other media. |
| **Designing and making** |
| **Exploring** | Handle and manipulate a range of materials and objects in structured and unstructured situations.Observe, investigate and describe familiar objects. |
| **Planning** | Imagine and suggest a possible object to be made.Choose appropriate material, from a given limited range. Talk about the plan and communicate it to others. |
| **Making** | Make simple objects. Understand that materials can be linked together.Cutting and tearing, assembling, sticking, moulding or modelling, tying knots, folding. |
| **Evaluating** | Talk about own work during design and making tasks.Report to others what has been done.Discuss the work of peers in a positive way.  |

**Science Plan**

**1st class**

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| **Strand** | **Strand Unit** | **Topics** | **Activities/Experiments** |
| Living things | MyselfPlants and animals | My TeethMy SensesTrees Australian AnimalsSeasonsThe FarmPlanting Seeds The Story of the FrogSahara DesertIrish WildflowersIrish BirdsHatching from an Egg | Labelling teethDifferent teeth do different jobsThe Dentist through playMake a large set of teeth from marshamllowsAnimal teethHerbivore/carnivore/omnivoreExploring each of the sensesTaste test to experiment with the four basic tastesMake sound boxesMake feely bagsConduct a smell testGo on a listening walk.National tree day - trip to ArdgillanThe KoalaAutumn, Winter, Spring, Summer - explore signs of each seasonFarm animals/What do farm animals eat?Seasons on the FarmThe process of MilkingMaking butterSeeds found inside certain fruitsLabelling parts of an apple.Planting cress seedsExperiment with FoodStages of growth of a frogPlants in the Sahara DesertLabelling parts of a FlowerParts of a BirdBird WatchBird CakesStages of an egg hatching |
| Energy and forces | SoundForcesHeatMagnetism | Making sounds louderSounds all around us Pushing and pulling Sources of heatTemperatureMagnets | Investigate high and low soundsMaking instrumentsConcept cartoon – ear trumpet 8.3My Bicycle‘Dancing Raisins’ experimentMeasuring temperatureTake a Paperclip for a Walk |
| Materials | Properties and characteristics of materialsMaterials and change | Houses and homesCompost Parts of an Egg | What are toys made of?PlantingParts of an EggInvestigating Eggshells Concept cartoon – how long does it take things to rot? 7.1 |
| Environmental awareness and care | Caring for my locality | People in our schoolCompost | Occupation surveyDraw and name things that are put in a compost bin |

Science Plan

2nd Class

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| **Strands** | **Strand Units** | **Topic** | **Experiments/activities** |
| Living things | Plants and animalsHuman life | **Term 1**Our school groundsMigrationAutumnWinterHibernation**Term2**Parts of plants and animalsThe crowIrish TreesThe dandelionSpring**Term 3**Africa-WildebeestSummerLife cycle of a butterflyThe butterfly bush**Term 2**Our five senses | Collect materials around school groundsMake a bird feederMake a crystal snowflakeMake a jar/jug accessible for a bird beakBlindfold/block nose when trying to identify fruit. |
| Energy and forces | ForcesHeatLightElectricity | **Term 2**Water-floating and sinkingWhere does heat come from?**Term 3**Where does light come from?The solar systemWhat is electricity?Why do we need electricity? | Adapt materials to see if they might floatWhy do we wear light coloured clothes in summer?Make a pair of sunglasses |
| Materials | Properties and characteristics of materials | **Term 1**Materials in our school groundsBuildings-a badger’s homeA fox’s home**Term 3**What is a shadow? | Compare and contrast badger and fox |
| Environmental awareness and care | Environmental awareness and care | **Term 2**What is a habitat? |  |  |

**Skills development for 1st and 2nd class**

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| **Working scientifically:** | Through completing the strand units of the science curriculum the child should be enabled to: |
| **-Questioning** | -ask questions about animals, plants, objects and events in the immediate environment.-ask questions that may lead to investigations. |
| **-Observing** | -observe accurately both inside and outside the classroom.-use all the senses, separately or combination to explore living things, objects and events in the immediate environment. -differences and similarities in the environment -observe gradual changes in living things and familiar objects and events over a period. |
| **-Predicting** | -suggest outcomes of an investigation based on observations. |
| **-Investigating and experimenting** | -carry out simple investigations where the problem, materials and method are suggested by the teacher-begin to suggest approaches and methods of solving problems-begin to identify one or two variable with guidance from the teacher  |
| **-Estimating and measuring** | -begin to use simple methods to estimate, measure and compare observations-compare and identify differences in measurements-appreciate the need for standard units  |
| **-Analysing** | *Sorting and classifying*-sort and group objects according to observable features-appreciate that there are different criteria for sorting and suggest more than one way of sorting a number of items*Recognising patterns*-begin to look for and recognise patterns and relationships in observations*Interpreting*-draw conclusions from simple investigations. |
| **-Recording and communicating** | -describe and discuss observations orally using an increasing vocabulary-represent findings using pictures, models and other methods |
| **Designing and making:** |  |
| **-Exploring** | -handle and manipulate a range of materials and objects-observe, investigate and describe familiar objects-recognise that people like certain characteristics of objects but not others and investigate the reasons for these preferences. |
| **-Planning** | -Identify a need for new or revised designs; imagine and suggest a possible object to be made-discuss, using appropriate vocabulary what he/she would like to design or make-clarify and communicate through pictures or simple modelling the materials and structures required to build the object-choose materials, from a given range, to comply with the design idea -talk about and communicate a plan of action using appropriate vocabulary |
| **-Making** | -make simple objects.-develop craft-handling skills.-use a variety of simple tools.-use a range of materials-understand that these materials can be linked in simple ways to allow movement. |
| **-Evaluating** | -evaluate design ideas as these develop in the making process-evaluate own work and suggest possible modifications to the designing and making task-evaluate the work of peers and propose possible modifications. |

**Science Plan**

**3rd Class**

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| **Strand** | **Strand Unit** | **Content Objectives** | **Experiments (all accessible on Science Fusion online resources)** |
| Energy and Forces | 1. Light
 | * Exploring different natural and artificial sources of light
* Exploring how the sun help us to survive
* Recognising the sun as a light and heat source
* Exploring Newton’s rainbow/the colour spectrum
* Exploring the relationship between materials and light (translucent, opaque, transparent)
* Exploring mirrors as reflectors of light
 | * Experimenting with Prisms
* How Do Mirrors Work?
* How Does Light Travel?
* **Concept Cartoon:** White Cat
 |
| 1. Sound
 | * Recognising and identifying sounds in the environment
* Exploring volume and pitch
* Investigating how sound is made (vibrations)
* Observing and making musical instruments
* Exploring echolocation/bats
 | * Making an Instrument
 |
| 1. Heat
 | * Identifying sources of heat
* Measuring changes in temperature using a thermometer
* Measuring and comparing changes in temperature in the classroom and school environment, discussing reasons for variations
 | * Measuring temperature in classroom and school environment (\*not on Science Fusion resources)
 |
| 1. Magnetism and electricity
 | * Investigating the magnetic pull: poles, repel, attract
* Classifying objects into magnetic and non-magnetic
* Recognising magnets in real life contexts
* Exploring the relationship between magnets and compasses
 | * Make Your Own Compass
* Walk the Paper Clip
 |
| 1. Forces
 | * Exploring how objects may be moved
* Identifying simple machines in the environment
* Exploring how levers may be used to help lift different object
* Using a wheel-and-axle
* Investigating pulleys
 | * Stretching: using an elastic band to move a toy car
* How do simple machines affect work? (Virtual lab)
 |
| Materials | 1. Properties and characteristics of materials
 | * Recognising that materials can be solid, liquid or gaseous
* Water: freezing point of water, how heating affects water, evaporation, condensation
 | * Let’s Make Ice-Cream!
 |
| 1. Materials and change
 | * Exploring physical changes to matter
* Exploring mixtures and solutions
* Explore some simple ways in which materials may be separated
* Explore chemical changes to matter
* Investigate how materials may be changed by mixing by following a recipe
 | * Investigating Changes
* Separating Mixtures
* The Science Behind Cooking
 |
| Living Things | 1. Human life
 | * Balanced diet: nutrients, food pyramid
* Special nutrients: vitamins and minerals
* The importance of breakfast, designing a healthy breakfast
* Teeth: taking care of your teeth, teeth decay, types of teeth and their functions
 | * An Experiment to Chew On
* How to Make a Healthy Sandwich
* Science and Our Food
 |
| 1. Plants and animals
 | * Observing and exploring adaptations of animals; prey and predators
* Observing and exploring defence adaptations of prey
* Camouflage and mimicry of an animal’s appearance
* Observing and exploring plant adaptations
 | * Bug Hunt
* How do body coverings help animals? (Virtual lab)
 |
| * Observe and identify plant parts
* Explore the functions of plant parts
 | * Let’s Investigate What Plants Need to Grow!
* How do living things change? (Virtual lab)
* How do you use a model? (Virtual labs)
 |
| Environmental Awareness and Care | 1. Environmental awareness
 | * Exploring and recognising the Earth’s natural resources; renewable resources and non-renewable resources
* Identifying how we use natural resources
* Exploring the effects of pollution: land, air and water
* Reduce, reuse, recycle: explore and encourage the responsible use of the Earth’s natural resources
 | * Build a Solar Oven
* Make Recycled Paper
* Wind-Powered Car Race
 |
| 1. Science and the environment
 | * Exploring and identifying technology in familiar contexts
* Identifying differences and similarities of technology over time: trains
* Exploring how technology and society are connected and how technology affects people’s lives: trains
* Recognising how technology affects your life
* Identifying technology changes over time: cameras, cars, phones, computers
 | * Technology at Home
* How do scientists investigate questions? (Virtual lab)
 |
| 1. Caring for the environment
 | * Identifying natural and man-made resources in the environment
* Exploring renewable and non-renewable resources: fossil fuels, ozone layer, solar power, hydroelectric stations
* Recognising the effects of litter on the environment, how long it takes to decompose
* Examining ways in which we can take more care of the environment: reduce, reuse, recycle
 | * Litter Hunt
 |

**Science Plan**

**4th Class**

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| **Strands** | **Strand Units** | **Topics** | **Experiments/ Activities** |
| Living Things | Human LifePlant and animal life | What is my body made of?-Your organs are a team-The circulatory system-The respiratory system-The skeletal system How are living things adapted to their environment?-Animals living in trees-Animals living in water environments-Animals living in desert conditions-Animals living in polar environmentsFood chains-Photosynthesis-Producers-Consumers-Predators and prey | -Make a model ball and socket joint-See your fingerprints-Design and make an animal habitat-Explore a local habitat-What’s for dinner?  |
| Energy and forces | HeatMagnetism and electricityForcesLightSound | -Temperature as a measurement of heat-Conduction, convection and radiation transfer of heat-Electrical charges: protons, neutrons and electrons-Static electricity-Electric currents: conductors and insulators-Pulling and pushing-Pulleys-Levers-Gravity-Friction-Light and shadows-Sound is produced through vibrations | -Investigating heat energy-Using a thermometer-Investigating electrical circuits-Stuck on you-Falling objects-The force of water-Creating shadows-Seeing sound |
| Materials | Properties and characteristics of materialsMaterials and change | -Man-made or natural?-Properties: state, shape, hardness, strength, flexibility, transparency and conductivity-Materials for building a house-What are the states of water?-Solids, liquids and gases-Freezing, melting, evaporation and condensation | -Build a bridge-Investigating elasticity of fabrics-Properties hunt-Which material insulates best?-Where does the water come from? |
| Environmental awareness and care | Environmental awarenessScience and the environmentCaring for the environment | -How do people impact ecosystems?-Natural environments-Natural resources-How people change the environment-Caring for our ecosystems-Tools-What is technology?-Technological systems-The good and the bad-Out with the old-What is engineering?-What is the design process?-Design you can use-Prototypes-How can we tackle pollution?-Types of pollution (air, water, land) and causes-Rubbish: reducing, reusing and recycling-Tackling pollution in our local area-Tackling pollution together | -Hedgerow safari-Science in the classroom-Be an engineer-Plastic bag survey-Rubbish survey of Balbriggan beach-Beach clean up |

**Skills development for 3rd and 4th class**

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| **Working scientifically:** | Through completing the strand units of the science curriculum the child should be enabled to: |
| **-Questioning** | -ask questions about animals, plants, objects and events in the immediate environment and their relationships.-ask questions that will identify problems to be solved.-ask questions that will help in drawing conclusions and interpreting information. |
| **-Observing** | -observe and describe natural and human elements and processes in the immediate environment.-observe and describe characteristics such as the shape, size, colour, pattern, texture and interrelationships of elements in the local environment. |
| **-Predicting** | -offer suggestions (hypotheses) based on observations about the likely results of the investigation. |
| **-Investigating and experimenting** | -collect information and data from a variety of sources, including observations in the environment, classroom observations and experiments, photographs, books, maps and information and communication technologies.-design, plan and carry out simple investigations.-identify one or two obvious variables relevant to the investigation.-realise that an experiment is unfair if relevant variables are not controlled. |
| **-Estimating and measuring** | -measure, compare and record mass, weight, capacity, time and temperature using appropriate standard units of measurement and simple equipment. |
| **-Analysing** | *Sorting and classifying*-sort and group data on people, events and natural phenomena using a range of appropriate criteria.-sort and present data in sets and subsets.*Recognising patterns*-look for and recognise relationships when making observations.-select appropriate observations that fit a pattern.*Interpreting*-interpret information and offer explanations.-draw conclusions from suitable aspects of the evidence collected. |
| **-Recording and communicating** | -record and present findings and conclusions using a variety of methods. |
| **Designing and making:** |  |
| **-Exploring** | -explore a wide range of everyday objects and how they work.-explore freely how arrange of shapes, objects, and other constructions could be made using a variety of materials.-recognise that people like certain characteristics of objects but not others and investigate the reasons for these preferences. |
| **-Planning** | -recognise a need to adapt or change an object or surroundings.-become aware that new designs may create an interest and perceived need among others.-communicate and evaluate the design plan using sketches, models and ICT.-work collaboratively to create a design proposal. |
| **-Making** | -make a range of simple objects to solve practical problems, to fulfil a need or preference and to express creative ideas.-develop craft-handling skills and techniques.-use appropriate tools.-use a range of materials. |
| **-Evaluating** | -recognise that modifications to the plan may have to be made throughout the task.-evaluate the effectiveness of the new product and suggest modifications to the designing and making task.-evaluate the work of peers and propose positive modifications. |

Science Plan

5th Class

|  |  |  |  |
| --- | --- | --- | --- |
| Strands | Strand Units | Topics | Experiments/activities |
| **Living Things** | * **Human Life**
* **Plant and Animal Life**
 | **Topics*** Bones and joints
* Muscles
* Circulating blood
* Breathing
* Asthma
* The heart
* The job of each organ for the digestive system
* Examining nutritional labels on food
* The urinary system
* Classification
* Plants and Animals
* Fungi and protists
* Bacteria and Archaea
* Food chains
* You are what you eat
* Food webs and changes that occur
* Vascular and non vascular plants
* Seeds
* Flower to fruit to seed
* How seeds grow
 | \*All experiments on Science Fusion website.**How do our bodies move, breathe and circulate blood?*** Experiment: Smoking bottle; In this demonstration students see first hand evidence of some of the poisonous substances they would expose themselves to if they smoked a cigarette.

**How do our bodies digest food, remove wastes and send messages?*** Activity; Design and make a balanced and nutritious lunch.

**How are living things grouped?*** Activity; Interactive activity, sorting by body coverings.

**What are food chains?*** Activity ‘Forest Food Pyramid Project’.

**How do plants grow and reproduce?*** Experiment; The importance sunlight. What types of environment do plants need to grow?
 |
| **Energy and Forces** | * **Sound**
* **Magnetism and Electricity**
* **Forces**
 | * Sound Waves
* Sound travels
* Understanding the properties of sound and how to control it
* Understanding electricity
* Insulators
* Conductors
* Electric circuits
* Uses of electricity
* Magnets
* Electro magnets
* How to generate electricity
* Friction
* Air resistance
* Gravity
* Gravity and the Universe
* What is water power
* How to water wheel works
* Hydraulics
* Hydropower – in Ireland and abroad
 | * **What is sound?**

Experiment; Design ear muffs (integration with properties of materials)* **What are electric circuits, conductors and insulators?**

Experiment; Test conductivity of 5 different items from the classroom.* **How do we use electricity?**

Experiment; Design a circuit to create a simple traffic light system* **What are fiction and gravity?**

Experiment; ‘Get a grip!’* **What is water power?**

Experiment; Design and make a water wheel. |
| **Materials** | **Properties and Characteristics of Materials****Materials and change** | * What are properties of materials
* Matter
* Gas
* Air
* Classifying change
* Swelling and Shrinking
* Temperature it’s affect on matter
* Mixtures and solutions
* Proportions and properties
 | * **What are the properties of materials?**

Experiment; Design and build a stage out of recycled materials (integrate with earmuffs experiment – Sound).* **How does matter change?**

Experiment; ‘How do materials change?’* **What are mixtures and solutions?**

Experiment; Liquid layers |
| **Environmental Awareness and Care** | * **Environmental awareness**
* **Science and the Environment**
* **Caring for the Environment**
 | * Natural resources
* Sourcing natural resources
* The affect of using resources on the environment
* How technology improves our lives
* The risks and benefits of technology in our lives
* Conservation of resources

Renewable energy | * **How do people use resources?**

Activity; Sort, label and discuss prototypes for environmentally friendly packaging.* **How does technology improve our lives?**

Activity; Explore uses for a dichotomous key.* **How do people conserve resources?**

Activity; Green School investigation – What does being a Green School really mean? |

**Science Plan**

**6th Class**

|  |  |  |  |
| --- | --- | --- | --- |
| **Strand** | **Strand Unit** | **Content** | **Experiments and activities** |
| Energy and Forces | 1. Light
 | **Interactions with Light*** Shedding light on the matter
* Colour me impressed
* Matter scatter

**Mirrors and Lenses*** Mirror image
* Under a lens

**Light waves and Sight*** Let’s focus
* Out of sight
 | * Indoor rainbows- Create a rainbow using a shallow glass of water and a mirror
* Reflections- Examine various surfaces to see which reflect the most light
* Optical Illusions- Children create optical illusions
 |
| 1. Sound
 | **Noise Control*** Vibrations
* Loud sounds
* Soft sounds
* Natural and man made sounds
 | * Design a wind experiment
 |
| 1. Heat
 | **Thermal Energy*** Heat and temperature
* Convection, Conduction and Radiation
* What is Geothermal Energy
 | * Analyse various materials for their ability to conduct heat
 |
| 1. Magnetism and electricity
 | **Magnets and Magnetism*** Stuck on you
* When everything lines up
* Polar Opposites
 | * Design and make a magnet game
 |
| 1. Forces
 | **Wind and Levers*** Identify and explore how objects and materials may be moved using wind energy
* Explore how levers may be used to help lift different objects
 | * Harness wind power by making a simple pin-wheel
 |
| Materials | 1. Properties and characteristics of materials
 | **Chemistry in the Kitchen*** To test whether a solution is an acid, base or neutral
 | * Checking if a chemical is a bas, acid or neutral using red cabbage.
 |
| 1. Materials and change
 | **No smoke without Fire*** What is in that smoke?
* Fire extinguisers in school
* Fire at home
 | * What makes a candle burn
 |
| Living Things | 1. Human life
 | **The Immune System*** Playing Defence
* Search and destroy
* Shields up!

**Nutrition and Fitness*** Nutrient Power
* Let’s eat
* Let’s Stay healthy
* Let’s get fit

**The Reproductive System*** Puberty
* Reproduction
* Chromosomes
 | * Research Illness
* Design a Balanced Diet
* Outline the changes in the male and female bodies through puberty
* Puberty quiz
 |
| 1. Plants and animal life
 | **Physical and Behavioural Adaptations*** Adaptations
* Form and Function
* Eat or be Eaten
* On your best behaviour
* The circle of Life
* Living things change

**Ecosystems*** Environments
* Populations and Communities
* Find your Niche
* Diversity
 | * Plant adaptations to stream life
* Study the ecosystem of a tree
 |
| Environmental Awareness and Care | 1. Environmental awareness
 | **Land Biomes*** Home Sweet Biome
* Life in a Biome

**Managing Resources*** Useful Stuff
* Best Practices
* Pluses and minuses
 | * Design and make an animal
* Make a blubber glove
* Deforestation research project
 |
| 1. Science and the environment
 | **Science and Society*** A mighty Impact
* It takes all kinds
* Let the games begin

**Engineering on Our World*** Got Tech?
* Growing and changing
* Going up?
 | * Scientific Priorities
* Scientific development research project
 |
| 1. Caring for the environment
 | **Protecting Earth’s Water, Land and Air*** Keeping it Clean
* Water Wise!
* This land is our land
* Into thin air
 | * How clean is your air?
* Investigating oil spills
 |

**Skills Development**

**5th and 6th Class**

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| **Working Scientifically** |
| **Questioning** | • ask questions about animals, plants, objects and events in the immediateenvironment and their relationships• ask questions that will identify problems to be solved*Does light travel in straight lines?**How can this be tested?*• ask questions that will help in drawing conclusions and interpretinginformation |
| **Observing** | • observe, describe and discuss physical, natural and human elements and processes in the immediate environment *colour of water in stream* *types of materials used in building construction* *flora and fauna to be found in a range of environments* *effect of forces on a variety of materials* • recognise and describe pattern and sequences in observations patterns observed in the adaptation of animals to their habitats sequences in seasonal changes • distinguish between the significant and less significant observations |
| **Predicting** | • offer suggestions (hypotheses) based on a number of observations and data available about the likely results of the investigations • make inferences based on suggestions and observations • propose ideas or simple theories that may be tested by experimentation |
| **Investigating and experimenting** | • collect information and data from a variety of sources, including *observations in the environment, classroom observations and experiments, photographs, books, maps, CD-ROM and computer database* • design, plan and carry out simple experiments, having regard to one or two variables and their control and the need to sequence tasks and tests • realise that an experiment is unfair if relevant variables are not controlled• appreciate the importance of repeating tests and experiments • identify (with guidance) different ways of looking at a problem and compare results of different investigations |
| **Estimating and measuring** | • use appropriate simple instruments and techniques to collect and record data on length, weight, mass, capacity, time and temperature *thermometers, rulers, scales, stop-watches, measuring jugs record sheets, spring balances and forcemeters* • estimate and use appropriate standard units of measurement • decide what should be measured and the degree of accuracy required |
| **Analysing** | **Sorting and classifying** • sort and group data on people, events, natural phenomena, materials and physical processes using a range of appropriate criteria • sort and present data in sets and sub-sets **Recognising patterns** • look for and recognise patterns and relationships when making observations *relationship between the amount of sugar that can be dissolved and the temperature of the water* • identify other instances that fit an observed pattern • use observed patterns to make predictions **Interpreting** • interpret information and offer explanations • draw conclusions from suitable aspects of the evidence collected |
| **Recording and communicating** | • record and present findings and conclusions using a variety of methods *oral and written accounts* *charts, graphs and diagrams**presentations using wordprocessing or publishing programs* |
| **Evaluating** | • review the methods used in investigations and assess their usefulness. |

|  |
| --- |
| **Designing and Making** |
| **Exploring** | * explore a wide range of everyday objects and how they work

*tools and domestic equipment**walls and their construction**gates and hinges**wheelbarrows** explore freely how a range of shapes, objects and other constructions could be made using a variety of materials
* explore how some objects might be improved or adapted
* recognise that people like certain characteristics of objects but not others and investigate the reasons for these preferences

*preferences in shape, colour, texture, structure, material, practicality* |
| **Planning** | * use knowledge and the result of investigations to identify needs and/or opportunities to improve an object or environments in familiar contexts

*knowledge that plants need water could initiate design of watering device; the results of a litter survey could prompt design of new litter bins** understand that while the change may be desirable it may result in problems

*too difficult to make, not pleasing to look at** develop the ability to draw designs showing different perspectives of proposed objects

*side, top, front elevations** communicate their design plan using sketches, models and other media including information and communication technologies
* organise work, taking account of constraints and resources
* present design proposal on a ‘design sheet’

*simple elevations, measurements (scale), equipment required, aesthetic features (e.g. colour)** evaluate the feasibility of the design proposal and possible modifications to it, bearing in mind the resources available
 |
| **Making** | * make objects, applying knowledge that

*structures have distinctive characteristics, including form and stability materials can be permanently linked to allow maximum stability* * identify problems with, or undesirable effects of, a design during construction; propose and implement alterations as the object is made
* develop craft-handling skills and techniques

*tying knots, marking and cutting, joining and fastening, making holes, weaving and plaiting, strengthening structures using struts, linking objects with adhesives, simple card hinges, triangular joining, dowel joints, cut a variety of materials with different tools* * use a range of tools

*hammer, G clamp, hand drill, junior hacksaws, measuring devices, rotary cutter, simple paper clip and drawing pin switch for electric currents* * use a range of material

*wood, lollipop sticks, clothes pegs, various thicknesses of card, sheet plastic, dowels, matchsticks, Lego Technic, Meccano, fabrics, fibres and plastics* |
| **Evaluating** | * evaluate the positive and negative impact of design on surroundings and others
* discuss stability and form of other made objects and evaluate the effectiveness of the group product in the light of this investigation

*compare the joints in a range of objects with those in own design* * justify the ideas, materials, joins, procedures and techniques used and indicate possible improvements

*why a loose dowel joint was used for axle movement and not a tight dowel joint* * discuss and justify modifications that would improve the overall quality and stability of the outcome
* appraise results against group’s initial plan and intentions.
 |