***Whole School Plan for Science***

***St Fergus’ National School.***

***Glin.***

***October 2015***

**Introduction**

This plan was drafted by the staff of St Fergus’ N.S. during the school year 2014/2015. This plan will form the basis of each teacher’s long and short term planning in Geography and so will influence the teaching and learning in individual classrooms. It will also inform new or temporary teachers of our approaches and methodologies in this subject area. This plan was drafted in accordance with the guidelines set out by the Primary School Curriculum (1999) in consultation with all the staff. The drawing up of this policy has helped to formulate a common understanding of the purpose of Geography and how it will be implemented in our school.

**Rationale**

This plan is a record of whole school decisions in relation to Science in line with the Primary

Curriculum 1999. It is intended to guide teachers in their individual planning for science. We

aspire to a broad and balanced curriculum in which children are enabled to experience

Science.

**Our Vision for the Teaching of Science in St Fergus’ National School**

In St. Fergus’ National School a whole school approach to the teaching of science is

encouraged. We endeavour to foster positive attitudes to Science and to encourage pupils

to develop an appreciation of the contribution of Science and technology to society.

We promote scientific investigations which involve the child in observing, questioning,

predicting, analysing, exploring, investigating and experimenting.

The children of St. Fergus’ National School are fully aware that Science education plays a key

role in promoting a sensitivity to, and a personal responsibility for, local and wider

environments.

**Aims of Science Education**

The aims of Science education in St Fergus’ National School 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
* To encourage the child to explore, develop and apply scientific ideas and concepts
* To foster the child’s natural curiosity
* To aid the child to appreciate the contribution of science and technology to the

wider world

* To appreciate and respect diverse living and non-living things
* To encourage the child to become environmentally responsible and aware
* To enable the child to communicate and present ideas, and report findings using a

variety of media.

**Broad Objectives**

When due account is taken of intrinsic abilities the Science curriculum should enable the

child to:

* Develop an interest in and curiosity about the world through the exploration and

study of living and non-living things

* Develop a knowledge and understanding of scientific ideas through the study of

living things and the environments in which they live, energy and forces, materials

and processes of change along with environmental awareness and care

* Observe, ask questions, discern patterns, hypothesise, plan, experiment, design,

make, measure, discuss, analyse and evaluate results and so develop a scientific

approach to problem solving

* Develop and apply constructive thinking in scientific investigations
* Understand the application of some basic scientific ideas and concepts in everyday

situations

* Apply and use scientific knowledge, skills and resources in designing and making

tasks

* Explore and appreciate the influence that scientific and technological developments

have on societies, life-styles, economic activities and the environment

* Communicate and record observations, evidence and results of experiments and
* investigations using a variety of oral, written and graphical form and multi-media
* Explore the environmental repercussions of human actions on physical and human

environments

* Understand the interdependence of a wide variety of living things and their

environments, recognise the importance of conserving habitats and environments

and begin to understand that all life now and in the future depends on the

* sustainable development of the planet
* Become actively involved in the discussion, exploration and resolution of

 environmental issues

* Understand and apply a safety code in scientific and technological investigations and

Activities

St Fergus’ National School has been involved for a number of years in the Heritage in

Schools scheme. Environmentalist and Wildlife Expert, Geoff Hunt, visits each class in the

school during the school year and involves them in exploring the environs of the school and

that of the surrounding area, including exploration of the shore along the Shannon and the

Glencorbry River. Every year he focuses on different aspects of the environment and animal

and plant life such as wintering birds, native birds, butterflies, mini-beasts and bio-diversity

in conjunction with our Green Schools environment program.

As part of National Tree Week, an area of the school grounds was set aside to plant a variety

of tree species with the children. This provides a valuable resource for scientific and habitat

exploration. As part of National Tree Week the children of the school take an annual trip to

Curraghchase where they get a hands on experience of exploring various species of treesand mini-beasts and get to meet some of the Coillte staff as they guide them around thepark.

St Fergus’ National School is very fortunate in that we have a wide variety of habitats in Glin,

many of which are very close to the school. We have the woods of Glin Castle along with its

meadows and fields on our door step. The habitats of the Shannon Estuary and the

Glencorbry River are also within walking distance. We also have the built up environment of

the village and school to investigate.

The school has also set up a wildlife garden as another habitat plus a flower and herb

garden in which children receive invaluable experience on horticulture and habitat

exploration.

The school incorporates the Green Flag programme into the Environmental Awareness

strand. We have a very active Green Flag committee made up of children from every class

who work tirelessly to enable their classmates to adopt a more conscientious approach to

the environment and world around them.

Along with the Green Flag programme, the school has incorporated the Active Flag

programme into our Science programme, specifically the stand Living Things, and it plays an

intrinsic part in our school. The programme has been taken on whole heartedly by staff and

children alike with “Funky Friday” being one of the highlights of the week.

The school often has the services of Mr. Scott Ziglinski, a science facilitator who helps the children to discover various strands of the curriculum through hands on activities where each child explores, investigates, discusses and reports a topic.

Groups of children have attended BT Young Scientist in the RDS down through the years and

it has proved to be an enjoyable learning experience for all those involved. These visits may

also be used as fulfilling one of the requirements of the Discovery Science programme.

**Skills & Concepts:**

Working scientifically throughout their science investigations children should be aware of and encouraged to adopt safe practices. They should observe safety procedures in designing and making tasks, particularly when they are using tools and materials.

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 Does light travel in straight lines? How can this be tested?

• ask questions that will help in drawing conclusions and interpreting information

**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

**Approaches & Methodologies:**

Primary teachers employ a variety of methods for organising learning and teaching. These range from children undertaking individual tasks to whole class lessons. During the science lesson the teacher may adopt several approaches, such as group work, whole class work and individual work. The methods the teacher employs to manage the science lesson will depend on the number of children in the class, the resources available, the space available, the activities that are planned and the teacher’s own methodological preferences. Different methods of organising the science lesson are outlined here.

**Whole-class work**

Many teachers work with the whole class at different stages during the science lesson. This method is effective in

• introducing a new science topic or concept

• demonstrating new methods of working

• preparing and discussing with pupils different methods of investigating

• providing background information that may be required for an activity

• directing children’s questions and hypotheses

• drawing the lesson to a conclusion, encouraging different groups to report on their investigations

• helping children identify further scientific investigations. Small groups Many teachers organise the science lesson so that children can work together in small groups. Different methods of managing small groups include:

• several small groups working on similar activities

• small groups rotating around different activities (circus of experiments)

• small groups working on independent activities that contribute to the overall theme

• one small group working on a science investigation.

**Individual work on chosen topics or projects**

Children pursue their own studies and carry out investigations that allow them to pursue their own interests and ideas. This method allows children to work at their own pace and in areas of immediate interest and relevance to them.

The use of a variety of approaches and methods will facilitate the efficient implementation of the science curriculum. The nature of the strands and strand units themselves necessitates the use of a variety of teaching methods. The methods chosen should facilitate the achievement of the objectives of the unit of work as well as taking cognisance of the content and context of the lessons. The teachers will use a combination of approaches to meet the needs of the pupils and to suit the objectives of the unit of work. The approaches chosen by the teacher should enable the children to work scientifically in a variety of contexts, to undertake practical activities and to tackle open-ended problems and investigations.

**Selecting appropriate methodologies and approaches**

The methodologies and approaches chosen by the teacher should accommodate the different learning styles of the children and should:

• allow the children the excitement of finding out for themselves

• enable the pupils to work on their own problems as far as possible

• encourage children to pose their own questions

• use children’s ideas as a basis for activities. Children should be encouraged to use their own ideas, test and perhaps change their ideas. Among the approaches that are particularly appropriate for facilitating practical work in science are

• the investigative approach

• the teacher-directed approach.

**Curriculum Strands in St Fergus’ National School**

The curriculum content is divided between the classes at each level, ensuring that all four

strands are covered each year. The four strands are:

* Living Things
* Forces and Energy
* Materials
* Environmental Awareness and Care

Each strand is sub divided into strand units

* Living Things:

Juniors – 2nd class 3rd – 6th

Myself Human Life

Plants and Animals Plant and Animal Life

* Energy and Forces:

Juniors – 2nd class 3rd – 6th

Light Light

Sound Sound

Heat Heat

Magnetism and Electricity Magnetism and Electricity

Forces Forces

* Materials:

Juniors – 2nd class 3rd – 6th

Properties and Characteristics Properties and Characteristics

of Materials of Materials

Materials and Change Materials and Change

* Environmental Awareness and Change:

Juniors – 2nd class 3rd – 6th

Caring for my Locality Environmental Awareness

 Science and the Environment

 Caring for the Environment

Our Science plan is based on a spiral approach as per the Curriculum. For this reason, not all

strand units will be taught in each class. Units may be supplemented by extension work at

the discretion of the class teacher.

**Inclusion and Differentiation**

The 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.

 **Individual Teachers Planning and Reporting:**

* Teachers will consult the whole school plan and the curriculum documents when drawing up long and short term plans.
* Individual teachers will decide on strands and strand units to be covered in their class each year.
* Where it is meaningful and useful Science will be taught in a thematic way to integrate with other SESE subjects and other areas of the Curriculum.
* Cuntaisí Míosúla will assist in recording work covered in evaluating progress in Science and informing future teaching. It has been agreed to tick short term plans as a means of indicating work covered.
* Parents are informed of children’s progress in Science at Parent-Teacher meetings and in end of year report cards.

**Staff Development:**

Teachers will have access to reference books, resource materials and websites dealing with Science. Staff will be encouraged to research and try out new approaches and methodologies. Teachers will be encouraged to attend in-service workshops and courses in Geography. All classes have access to Interactive white boards which will have access to the internet so the world wide web can be used for Science resources.

**Specific Safety Guidelines for Science Teaching in St Fergus’ National School**

Generally, the simple equipment that is used for science education in our school carries no

real threat to health. Each teacher has a copy of our comprehensive Health and Safety

Policy. However, during practical work, teachers should be aware of the safety implications

of any exploratory or investigative work to be undertaken.

Children should be encouraged to observe safety procedures during **all** tasks.

This list must not be taken as identifying all the potentially hazardous situations which may

arise.

**Strand 1: Living Things** – human life, plant and animal life

* Children should not handle unknown or unfamiliar plants, especially fungi. Contact

with animals or plants can cause allergies and some plants and seeds are poisonous.

* Children should wear gloves when handling animals or birds and wash their hands

immediately after. Children with cuts or infections should not come into contact with

animals

* Children should never eat or taste anything brought in for study unless provided by

the teacher for tasting purposes. Prior permission with regard to allergies should also

be obtained

* Polythene bags, if provided to collect leaves or other specimens, may cause

suffocation and are potentially hazards. Children should be warned of the dangers of

these bags prior to investigation work.

* In the interest of hygiene it is recommended that stethoscopes be wiped clean with

a steri-wipe after individual use

* Mini-beasts should be collected using bug catchers or plastic tweezers. Pouters should be used under supervision
* The upmost care should be given when children are exploring habitats, especially on

 the shore and river bank. It is of vital importance that children remain under adult

 supervision at all times

**Strand 2:** Energy and Forces

Light

* The use of glass apparatus and sharp edged tools should be avoided except under direct supervision of the teacher or SNA. Plastic should be used instead of glass when

 possible. Some objects such as glass mirrors should have their edges taped to avoid

 sharp cutting edges.

* Children should never use lenses or any devices such as binoculars and telescopes

etc., to look directly at the sun even through dark glass or plastic. Care should be

taken with all pointed pieces of equipment.

Sound

* Due consideration should always be given to tolerable safe noise levels when
* working with large groups of children experimenting with sounds

Heat

* Under no circumstances should the children themselves handle matches or lighters.

When using candles, care must be taken to ensure that they are secure. Lit candles

must never be moved. Care should be taken to avoid situations where children may

be tempted to lean across a lighting candle. Long hair should be tied back and loose

sleeves secured.

* Any heating can be done with hot water from a tap or from a kettle held by an adult.

Direct supervision is also paramount

* Thermometers should be handled carefully. The use of alcohol thermometers is

recommended. If a thermometer breaks and mercury is spilt it should be carefully

gathered up and disposed of by burial where the ground will not be disturbed

Magnetism and Electricity

* Pupils should only use low-voltage battery powered devices. **Mains electricity**

**should never be used** for electricity and magnetism experiments in the primary

school. Where a piece of equipment powered from the mains is used, it should only

be done so by the teacher. Children should be repeatedly warned about the dangers

of electricity

Forces

* Due care should be given to safety when investigating how certain objects work

especially objects with moving parts, gears and motors

**Strand 3:** Materials

* Primary science is likely to make very limited use of chemicals. When required,

chemicals should be purchased only to meet the needs of specific experiments and

any surplus should be disposed of in a careful manner on completion of work

* Household chemicals should be chosen with care. Strong detergents such as

automatic washing powders, toilet cleaners and anything containing bleach should

be avoided. The use of safety goggles should be considered when working with

chemicals

Also see safety notes for Heat above

**Strand 4:** Environmental Awareness and Care

See safety notes for Living Things

**Skills Development:** Designing and Making

* Designing and Making requires children to work with a range of materials and equipment which will raise issues of health, hygiene and safety.
* The teacher must be aware at all times of the potential dangers involved in the use

of all tools and must never allow children to continue using tools while unsupervised

* The use of rubber based adhesives, such as Evostick, is dangerous and must never be

used in the classroom

* Children must never use open bladed craft knives. In normal circumstances only round ended scissors should be used
* Designing with a wide variety of materials is recommended throughout primary

science, this includes lengths of wood for senior classes. It is advised that the children use a vice or a bench hook to hold a length of wood to prevent damage to the work surface and avoiding injury

**Approaches and Methodologies**

It is essential that staff use a range of teaching methods and approaches when teaching

Science. Our main aim when teaching Science is to get children thinking and working

scientifically. The approaches adopted should create a learning environment where:

* Practical activity is encouraged to promote hands-on discovery
* Links with the environment are fostered
* Children have an opportunity to work together, share ideas and communicate their

findings

* Children’s ideas can be the starting point for Science activities
* Children are encouraged to pose their own questions
* The use of a variety of approaches and methodologies will facilitate the efficient

implementation of the Science curriculum. The nature of the strands and the strand units themselves lends to the use of a variety of teaching methodologies. The approaches chosen should enable the children to work scientifically in a variety of contexts, to undertake practical activities and to explore open-ended investigations.

Different methodologies are as outlined as follows:

**Whole-class work**

This is an effective means to introduce a topic and concept-mapping. It is also useful in

providing background information that may be required for an activity. It is also effective to

discuss opinions and findings.

**Small groups**

This can be in many forms:

* Several groups working on the same activity
* Small groups rotating around different activities as in a circuit
* Small groups working on independent activities

**Individual work**

Where children pursue their own studies and carry out investigations that allow them to pursue their own interests and ideas.

**Skills Development**

Working Scientifically

Working Scientifically involves children in the following:

* Observing
* Questioning
* Predicting
* Hypothesising
* Investigating and experimenting
* Interpreting results
* Recording and communicating results

In **Designing and Making** children are to be encouraged to design and make models that will provide solutions to practical problems. The following are skills that are developed when working in this area:

* Exploring
* Planning
* Making
* Evaluating

As children are enabled to apply these skills they will learn to deal with more complex

concepts in a scientific way. (See Teacher Guidelines pgs. 17-21)

**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?

**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**

Assessment in Science is concerned with children’s knowledge and understanding of the

strands and strand units of the Science programme along with the development of skills and

attitudes. As a result, a broad range of assessment tools and approaches will be necessary. The following are assessment tools currently used in St Fergus’ National School:

**Teacher Observation**

Observations made by the teacher during the science lesson will help to determine the development of scientific skills and attitudes along with knowledge mastery. The teacher will take an active role in science tasks, observing and asking questions to gain an insight into a child’s understanding and skill development

**Teacher-designed Tasks and Tests**

The teacher will design appropriate tasks and tests in order to gain an insight into a child’s

knowledge acquisition and skill development. A wide variety of tasks should be used

including:

* Observing
* Predicting outcomes of an investigation
* Collecting information from books and materials
* Analysing objects and processes and hypothesising about how systems are made or

work

* Providing oral, written and pictorial accounts of investigations
* Carrying out, displaying and reporting project work
* Using worksheets or activity sheets
* Designing, making and evaluating models and structures
* Using interactive multimedia programs to explore themes and complete a range of

tasks

* Exploring and engaging in practical investigations in the environment
* Completing teacher-designed tests on a topic, unit or units
* Drawing with labels

**Concept-mapping**

Concept-mapping helps children to record and discuss their ideas. It is an effective tool to see what pre-conceived ideas children may have on a given topic. It is also useful at the end of a unit to gauge progression

**Work Samples, Portfolios and Projects**

Children are encouraged to keep personal folders that contain their work. This is a useful a means of collecting and storing information, worksheets and class activities together. These folders can be used by the child as a means of self-assessment as they can observe their own progress throughout the school year

Project work encourages children to focus on a particular aspect of the science curriculum and study it in detail. They can illustrate how much a child has learned and are useful in assessing child’s ability to gather information, to collate and present it and their ability to work and co-operate with others

Information gathered by this assessment will enable the teacher to:

* 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

**Standardised Testing:**

The teachers of St Fergus’s National School will also use the standardised Science test as a means of assessment throughout the school.

**Success Criteria**

We will review this whole school plan for Science in the future using the following criteria:

* How individual teacher preparation, planning and teaching reflects this plan
* How methodologies listed in this plan are working in the classroom
* Resources—adding additional resources as necessary to assist the delivery of this programme
* How well are science concepts learnt by children
* How well are children’s science skills progressing

Its success will be gauged based on the answers of the above questions.

**Implementation**

(a)   Roles and Responsibilities:

This plan will be supported, developed and implemented by all staff members who aim to:

* Lead the development of new methodologies listed in the plan
* Liaising with community organisations and relevant agencies
* Continue with the development of ICT as a learning tool in Science

The Principal will co-ordinate the progress of the plan, encourage and accept feedback on its implementation and report findings to staff.

(b)Timeframe

This plan will be implemented in St. Fergus’ as and from November 2015

**Review**: It will be necessary to review this plan on a regular basis to ensure optimal implementation of the Science Curriculum. We aim to review this plan in January 2018. The Principal and staff will be involved in this review.

**Ratification and Communication**

This plan was ratified by the Board of Management at its meeting on \_\_\_\_\_\_\_\_\_\_\_.

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

 Chairperson of Board of Management