

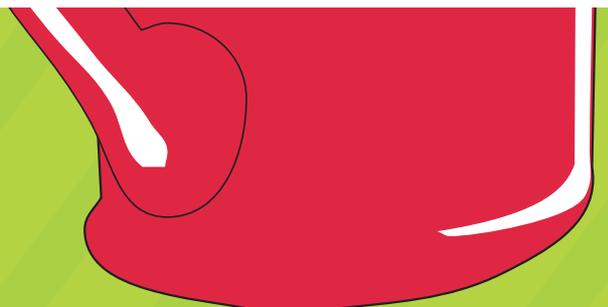
Organic Gardening for Primary Schools

Curriculum Linkages and Lesson Plans
Teachers' Resource



Growing the success of Irish food & horticulture

Bord Bia
Irish Food Board



Acknowledgements

This teacher's resource has been developed on behalf of Bord Bia by Agtel. The resource was written by Finbarr O'Regan (former Principal of Carnaun National School in Athenry and currently Education / Curriculum Advisor working with Agtel), and in consultation with Geraldine Carroll (Programme Manager, Agtel), Ian McGrigor (Organic Gardening Expert, Kerry Earth Education Project), and Niamh Ní Dhúill (Organic Gardening Expert, Kerry Earth Education Project). We would like to thank Michael Maloney (Director of Quality and Food Dudes Programme at Bord Bia) for his ongoing support and consultation.

Relevant organisations listed in the resource notes include; Bord Bia, Coillte, the Environmental Protection Agency, Sustainable Energy Ireland, Enterprise Ireland, The Henry Doubleday Research Association, Discovery Kids, the Franklin Institute, Ed Helper, and many other websites which are a rich source of lesson plans and worksheets and which can be incorporated into the Organic Gardening Project. The funding for this project was provided by the Department of Agriculture, Fisheries and Food.

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Section One - Introduction & Integration Overview

1.1 The Organic Gardening for Primary Schools Project

The vision of education can be expressed in the form of three general aims:

- To enable the child to live a full life as a child and to realise his or her potential as a unique individual;
- To enable the child to develop as a social being through living and co-operating with others and so contribute to the good of society;
- To prepare the child for further education and lifelong learning.

The primary school curriculum is learner-centred. It emphasises the importance of literacy, numeracy, and language, while at the same time responding to changing needs in science and technology, social, personal and health education, and citizenship.

The Organic Gardening for Primary Schools Project is child-centred and cross-curricular and incorporates the three pedagogical principles of activity and discovery methods, integrated curriculum and environment-based learning. It is an ideal project to help achieve the aims of the Primary School curriculum.

Working on its main topics - Design, Plan and Create Garden, Organic Gardening, Food Production, Soil, Water, Healthy Eating, the Eco System and Sustainable Development, will in a very enjoyable and practical way awaken the child's sense of wonder and natural curiosity. It will give him or her scope to express fully his or her individual talents and expertise; it will make him or her an active agent in his/her own learning; and it will be an excellent base for further knowledge. The rich experience of such environment-based learning will add enormously to the relevance and effectiveness of the child's learning. It is ideal for children with special needs. The use of language, talk and discussion in all aspects of the project will be a central strategy. The project will enhance the pupil's information, communication and technology skills. The collaborative project work will stimulate the children by hearing the opinions, ideas and problems of others and will facilitate the child's social and personal development. This practical project, that parents and the school community can easily identify with, will make the child more self-aware as a learner and facilitate assessment of his or her own progress as a student.

A spiral approach is used. This is a technique where first the basic facts of a subject are learned, without worrying about details. Then as learning progresses, more and more details are introduced, while at the same time these details are related to the basics, which are re-emphasised many times to help get them into long-term memory.

This package is structured to include:

1. a series of Worksheets which are designed to help teachers get out into the school grounds with their class; and to involve the children in planning, creating and using the school grounds as a 'living classroom';
2. this Teachers' Resource Book which shows some of the ways that this project links to the formal school curriculum;

3. a DVD which can be used as a continuous hour-long programme, or divided into modules. The DVD illustrates aspects of this organic gardening project for students and teachers alike.

The most important thing to remember is that there is not just one way of creating and managing a garden. Use your combined imaginations & skills to create an interesting and productive landscape for the whole school community.

1.2 Integration Overview

The integration of the 'Organic Gardening for Primary Schools' project into primary schools can easily justify time spent teaching and working in the garden. The School Garden Project now has a place in the overall school plan and any aspect of the work being done in the garden is in reality developing skills in a structured but relaxed way for most of the school curriculum subjects, while at the same time educating students in a very practical way for a healthy and rewarding future. The 'Introduction' section can form the basis of a School Policy on the 'Organic Gardening for Primary Schools'.

Section Two – Activity Planner

This Section consists of tables linking the worksheets, the DVD and this resource book, helping the teacher to plan activities based on:

- age group
- time of year

and gives an overview of curriculum areas and subject strands.

Section Three - Direct integration of topics

All topics in the Organic Gardening Project are ideal for integration across the primary school curriculum. This section takes eight topics and demonstrates their direct integration into the curriculum.

Topic	Topic	Curriculum Area	Subject
1	Design, Plan and Create Garden	Languages	English
2	Organic Gardening	SPHE	SPHE
3	Food Production	SESE	Science
4	Soil	SESE	Geography
5	Water	SESE	Geography
6	Healthy Eating	SESE	Geography
7	The Eco System	SESE	Science
8	Sustainable Development	SPHE	SPHE

Section Four – Integration of other subjects

This section shows how other subjects can also be integrated into the Organic Gardening Project. Subjects examined in this section are:

1.Gaeilge 2.Maths 3.Art 4.History

Section Two – Activity Planner

Indicative School Year Outline

'Worksheets Only' means that this particular topic is only covered in the worksheets.

*All the text in green identifies the topics that are covered under the Special Features section on the main menu of the DVD.

	Worksheet	DVD Module	Junior Infants	Senior Infants	1 st class	2 nd class	3 rd class	4 th class	5 th class	6 th Class
Sept – Feb	Audit, Plan & Design School Garden & Grounds	1						√	√	√
Sept-Mar	Making Raised Beds, Pathways & Making Signs for the Garden	2							√	√
Oct-Feb	Planting Vegetables in Winter	7	√	√	√	√	√	√	√	√
Oct-Feb, also Sept	Planting an Orchard and Strawberries	2	√	√	√	√	√	√	√	√
Oct-Feb	Planting a Native Hedgerow or Woodland	Worksheets Only					√	√	√	√
Nov/all year	Fruit Bushes and Rhubarb	2			√	√	√	√	√	√
Mar-Apr Sept-Oct	Sowing Seeds directly – Heritage Grains	*Basic Gardening Techniques			√	√	√	√	√	√
Mar-Jun also Oct	Sowing Seeds - in classroom & seeding outside	*Basic Gardening Techniques	√	√	√	√	√	√	√	√
Mar-Jun also Oct	Planting Outside, Soil & Rotations	Worksheets Only	√	√	√	√	√	√	√	√
Mar-Jun	Saving Seeds	6	√	√	√	√	√	√	√	√

		Module	Junior Infant	Senior Infants	1 st class	2 nd class	3 rd class	4 th class	5 th class	6 th Class
Apr-Jun	Moving plants from classroom to Garden	Worksheets Only	√	√	√	√	√	√	√	√
May-Oct	Harvesting and Cooking	6					√	√	√	√
Jun-Aug	Weeding and Summer care	5, 10	√	√	√	√	√	√	√	√
All Year	Wildflower Meadows	Worksheets Only	√	√	√	√	√	√	√	√

General resources										
All year	Year Round Garden Plan	11	√	√	√	√	√	√	√	√
All year	Allocating Projects – Class by Class	11	√	√	√	√	√	√	√	√
All year	Community Involvement	11	√	√	√	√	√	√	√	√
All year (winter)	Setting up composting systems	*Composting					√	√	√	√
All year	Pests & Predators - Making an Insect Hotel	4	√	√	√	√	√	√	√	√
All year	Making a Wildlife Pond	5			√	√	√	√	√	√
All year	Polytunnel	8							√	√
All year	Health & Safety and Basic Materials required	*Health & Safety	√	√	√	√	√	√	√	√
All year	Watering / Water Conservation	*Water Cycle			√	√	√	√	√	√
All year	Urban Gardening - small spaces	10	√	√	√	√	√	√	√	√
All year	Herb Planting & Useful Plants	3	√	√	√	√	√	√	√	√

Curriculum Areas and Subject Strands

This **Organic Gardening for Primary Schools Project** is ideal for integration in the Primary School curriculum.

Irish Primary School Curriculum										
Curriculum Areas	Language		Social, Environmental and Scientific Education (SESE)			Mathematics	Physical Education	Social, Personal & Health Education	Arts Education	
Subjects	English	Gaeilge	Geography	Science	History	Mathematics	Physical Education	SPHE	Arts Education	
Strands	Receptiveness to language, competence and confidence in using language, developing cognitive abilities through language, emotional and imaginative development through language Éisteacht, labhairt, léitheoireacht, scríbhneoireacht		Human environments, natural environments, environmental awareness and care	Living things, energy and forces, materials, environmental awareness and care	Myself and my family, story, early people and ancient societies, life, society, work and culture in the past, eras of change and conflict, politics, conflict and society, continuity and change over time	Early mathematical activities: number, algebra, shape and space, measures, data	Athletics, dance, gymnastics, games, outdoor and adventure activities, aquatics	Myself, Myself and others, and Myself and the wider world	Visual Arts Drawing, paint and colour, print, clay, construction, fabric and fibre Drama Drama includes just one strand which is concerned with using drama to explore feelings, knowledge and ideas, leading to understanding	Music Listening and responding, performing, composing

Reference: Primary School Curriculum – 1999 <http://www.curriculumonline.ie>

Section Three

Topics and Curriculum Integration

All topics of the Organic Gardening Project are ideal for integration in the language area in the Curriculum, in all strands and strand units. Topic 1 is an example of this!

3.1 Topic 1: Design, Plan and Create a School Garden		
Curriculum Area: Language		
Subjects: English Gaeilge		
Strand: Developing cognitive abilities through using language		
Strand Units: language ability to think		
Oral – developing cognitive abilities through oral Reading – developing interests, attitudes and the Writing - clarifying thought through writing		
Level by Level:		
Infants	Oral	Discussion stimulated by the garden topic, providing further information, asking questions and focusing on some detail, will stimulate the development of cognitive abilities.
	Reading	Through reading, retelling and recalling stories, the child will develop interests, attitudes and the ability to think and will be aware that text “says something”.
	Writing	The child will clarify thought through writing. Draw a picture of a garden and write about it with naming words & descriptive words.
1st and 2nd Classes	Oral	Discuss the proposed garden in more detail through the use of language – explain, persuade, enquire, report, debate, discuss a point of view and justify opinions.
	Reading	Reading accounts of gardens independently and interpreting the views of others, questioning, assimilating facts, retelling stories.
	Writing	Start to write in a variety of genres – express opinions on how the garden should look – adding detail to the plan, and a progression of events.
3rd and 4th Classes	Oral	Discuss the proposed garden and predict future events. Discuss different possible solutions to problems. Justify personal likes and dislikes. Argue your point!
	Reading	Read about a garden independently. Develop comprehension strategies – assimilation, deduction, inference, analysis, prediction, evaluation, summarising. Use ICT.
	Writing	Write your garden proposal and explain it to the class. Justify your ideas! Write why you find various ideas attractive. Write directions on how to do an aspect of the plan.

5th and 6th Classes	Oral	Use a discussion of a draft garden plan as the basis of a more formal or objective grasp of the topic. Argue your point of view from the perspective of agreement or disagreement. Respond to arguments presented by teacher.
	Reading	Access a wide variety of garden plans from resources – books, magazines and reference material, some through ICT media.
	Writing	Record all aspects of the Garden Plan - list of materials, help needed, sequence of events, letters of request for sponsorship, letters of thanks, and proposed diary of events.

Teachers Notes:

See also:

Exemplar 4	“Using experience charts as a basis for children’s early contact with reading” Ref: <i>English Teacher Guidelines</i> page 55
Exemplar 7	Mini lessons in writing Ref: <i>English Teacher Guidelines</i> , page 88
Exemplar 10	Simple maps of the environment Ref: <i>Geography Teacher Guidelines</i> , page 132
Approaches to Poetry	Encompassing seasons, festivals, nature Ref: <i>English Teacher Guidelines</i> page 69
The Computer	The computer is a valuable resource in language learning Ref <i>English Teacher Guidelines</i> page 91

Other resources on planning a garden:

Creating a school wildlife garden:

<http://4hwildlifestewards.org>

http://www.rspb.org.uk/advice/gardening/wildlife-friendly_garden.asp

Garden word search:

http://www.gardenorganic.org.uk/schools_organic_network/fun_stuff/wordsearch_wildlife_garden.htm

<http://lancaster.unl.edu/hort/youth/ws2.shtml>

Garden Projects for the School Year

<http://www.blackrockec.ie/environment/gdnprojs.htm>

3.2 Topic 2: Organic Gardening		
Curriculum Area: SPHE		
Subject: SPHE		
Strand: Myself Myself and the wider world		
Strand Units: Food and nutrition Environmental care		
Level by Level:		
Infants	Food and nutrition	Become aware of the importance of food for growth and development. Explore food preferences and their role in a balanced diet.
	Environmental care	Appreciate the environment and realise that each individual has a responsibility for protecting and caring for the environment.
1st and 2nd Classes	Food and nutrition	Explore the importance of food for growth, health and energy. Appreciate that balance, regularity and moderation are necessary. Identify some foods derived from plants and animals.
	Environmental care	Understand the role of synthetic fertilisers and pesticides and alternatives.
3rd and 4th Classes	Food and nutrition	Differentiate between a healthy and an unhealthy diet. Recognise the wide choice of food available and categorise food into the four main food groups and their place on the food pyramid. Discuss the importance of proper food hygiene.
	Environmental care	Discuss the role of compost and farmyard manure in crop production.
5th and 6th Classes	Food and nutrition	Realise and take personal responsibility for making wise food choices and adopting a healthy balanced diet. Explore and examine the food pyramid. Discuss illnesses associated with food intake or special health conditions.
	Environmental Care	Care for the soil - discuss crop rotation and its benefit to the soil and the production of good food. Discuss the pros and cons of plant growth regulators and genetically modified organisms. Discuss organic status for the garden and apply for the symbol.

Note: The strand-unit Environmental Care can be integrated in SESE – Geography and Science.

Teachers Notes:

Organic horticulture is the science and art of growing fruits, vegetables, flowers, or ornamental plants by following the essential principles of organic agriculture in soil building and conservation, pest management, weed, and disease control, and heritage-species preservation.

It is a form of agriculture which excludes the use of synthetic fertilisers, pesticides, plant growth regulators, and genetically modified organisms. Organic gardeners rely on crop rotation, green manure, crop residue and compost to maintain soil productivity and control pests.

It is an ideal way to teach children to respect the environment and introduce them and their families to healthy eating.

Crop rotation – care for the soil

An example of a simple crop rotation table:

Year 1		Year 2	
1 Potatoes	2 Roots	1 Brassica	2 Potatoes
4 Brassica	3 Peas and Beans	4 Peas and Beans	3 Roots
Year 3		Year 4	
1 Peas and Beans	2 Brassica	1 Roots	2 Peas and Beans
4 Roots	3 Potatoes	4 Potatoes	3 Brassica

Notes:

Peas and beans add nitrogen to the soil.

A fifth plot can be added to the rotation to include a green manure in order to add nutrients and organic matter to the soil and to provide forage for pollinating insects.

Compost can also be used to feed the soil.

Other resources on organic gardening:

Compost

<http://www.compostguide.com/>

IOFGA – Irish Organic Farmers and Growers Association: Gardening tips:

<http://www.organicmattersmag.com/gardeningtips.php>

<http://www.organicmattersmag.com/whattodoabout.php>

HDRA – Henry Doubleday Research Association – working with schools:

<http://www.schoolsorganic.net/>

Links with the curriculum:

http://www.gardenorganic.org.uk/schools_organic_network/nat_curr/index.htm

Carnaun National School - Awarded the Organic Symbol

<http://homepage.eircom.net/~foregan/carnaun/gardenreport2003.html>

Carnaun National School composting successfully:

<http://homepage.eircom.net/~foregan/carnaun/compostbins05.html>

The Edible Schoolyard

<http://www.edibleschoolyard.org/homepage.html>

3.3 Topic 3: Food Production		
Curriculum Area: SESE		
Subject: Science		
Strand: Living things		
Strand Unit: Plants and animals		
Sub-Strand Unit: The processes of life		
Level by Level:		
Infants	Plants and animals	Observe, discuss and identify a variety of vegetables in the garden and sort into sets. Recognise and identify some external parts of vegetables.
	Process of life	Explore conditions for growth of bulbs and seeds – in soil, damp moss, wet paper. Seasons – Spring for planting – Summer / Autumn for harvest.
1st and 2nd Classes	Plants and Animals	Recognise and describe the parts of some garden vegetables. Sow some seeds, water them, watch them grow.
	Process of life	Appreciate that living things have essential needs for growth. Be familiar with the lifecycle of some common garden plants. Sow seeds in a box or in the garden and care for them.
3rd and 4th Classes	Plants and animals	Observe and explore some ways in which plants are influenced by or adapt to environmental conditions – shaded / damp / wet / dry conditions. Understand that plants use light energy from the sun.
	Process of life	Investigate the factors which affect plant growth – water / light / types of soil / temperature. Understand the importance of tilling the soil prior to sowing Sow some seeds and plants in the garden and care for them. Examine how weeds and pests affect the growth of vegetables.
5th and 6th Classes	Plants and animals	Become aware of the sun as a source of energy for plants through photosynthesis. Study the concept of food chains and pests' behaviour on plants.
	Process of life	Learn how to till and sow a variety of garden vegetables – soil depth, length apart, rotation areas, proper sowing times, best weather conditions. Study some basic life processes in plants – nutrition, reproduction, movement in response to light, use of oxygen and carbon dioxide.

Teachers Notes:

See also:

Exemplar 20: *Science Teacher Guidelines*, page 84 (Infants)

Exemplar 21: *Science Teacher Guidelines*, page 85 (3rd and 4th Classes)

Other resources on food production:

Bord Bia – The Irish Food Agency

<http://www.bordbia.ie/>

Information on every plant in the garden (Bord Bia)

http://www.bordbia.ie/consumers/_gardening/index.html

The International Year of the Potato

<http://www.internationalyearofthepotato.ie/>

Irish Organic Farmers and Growers Association (IOFGA)

<http://www.iofga.org/>

Gardening tips:

<http://www.organicmattersmag.com/gardeningtips.php>

Organic Matters

<http://www.organicmattersmag.com/whattodoabout.php>

Food Dudes Seedlings Pack

http://www.fooddudes.ie/Junior_Senior_Infant_Seedlings_Pack_Lessons.pdf

Seedsavers

<http://www.irishseedsavers.ie/>

3.4 Topic 4: Soil		
Curriculum Area: SESE		
Subject: Geography		
Strand: Natural environments		
Strand Units: The local natural environment (all classes) also Rocks and soils (3rd – 6th class)		
Level by Level:		
Infants	The local natural environment	Observe, collect and investigate a variety of natural materials in the local environment. Examine soil, mud, sand, pebbles, stones and rocks. Investigate qualities of materials – hard, soft, colour, texture, wet or dry. Record experiences.
1st and 2nd Classes	The local natural environment	Observe, collect and investigate a variety of natural materials in the local environment. Examine soil, mud, sand, pebbles, stones and rocks. Investigate qualities of materials – hard, soft, colour, texture, wet or dry. Record experiences.
3rd and 4th Classes	Rocks and soils	Observe, collect and examine different soil samples in the school environments. Sort and group in samples – rock, pebbles, sand, plant material. Compare and contrast materials focusing on certain criteria - colour, texture, strength, hardness, weight. Begin to explore influences of soils and rocks on plant life. Learn about the importance of soil and its functions. Living creatures in the soil – study the role of the earthworm.
5th and 6th Classes	Rocks and soils	Compare soil samples from different parts of the locality. Compare constituent parts, colour, water retention. Examine the key role of soil micro-organisms. Soil testing – investigate ways of changing / improving soil structure. Explore the type of rock in the locality. Also fossils, drainage, underground streams. Examine different types of wall building locally and erosion and weathering of rock locally.

Teachers Notes:

Further curriculum integration :

Visual arts – colour, texture, strength, hardness, weight

Science – living things; materials

Notes on Soil:

Soil

The soil is a living entity, not just a substrate in which to grow plants. A living soil is teeming with life, from earthworms, centipedes and beetles to fungi and bacteria. Healthy soil has food, air and water to help plants grow. The more nutrients available in the soil, the more the plant can take up. The more nutrients in the plant, the more available for animals and humans. Some scientists believe that for this reason human health is affected by the health of the soil.

Most of a plant's nourishment comes from the soil. The nutrients are made up of minerals from the earth. Other nutrients come from dead plants and animals, also broken down over time by insects and organisms which live in the soil. Plants cannot use most of the minerals and other essential elements in the soil directly, so they have to be converted into a useable form by these creatures. The plants in turn help these organisms by secreting sugars and enzymes back into the soil.

Soil forms slowly but can be lost rapidly through erosion. It can also be contaminated by pollution.

Functions of the soil:

The soil performs many vital functions for the environment and society. A healthy soil is important for:

- maintenance of the basic resources for food production: soil, clean water and stable climate; maintenance of terrestrial and aquatic biodiversity (soil life is the basis of much over-ground life; healthy soil minimises water and nutrient runoff).
- regulating the flow of water on the planet, including reducing flooding.
- reducing water clean-up costs (through leaching).
- reducing climate change (soil is a major carbon store and it reduces atmospheric methane; carbon dioxide and methane are major greenhouse gases).
- reduction in the need for water for irrigation in agriculture.
- improvement in animal and human health through an increase in the nutrient content of food.

The key role of soil micro-organisms

Soil is often considered simply in physical or chemical terms. But this overlooks the most important component: the life in the soil. It is the soil biological life which delivers the soil's main functions.

Soil micro-organisms create the soil's structure: they convert organic matter into humus which gives soil its physical properties of particle aggregation, protection against erosion, water retention, good drainage, aeration, and compaction

resistance.

Biological activity is responsible for soil fertility: it mediates the organic nutrient cycle, releases minerals from the sub-soil, fixes nutrients from the air, makes nutrients accessible and transports nutrients directly into roots. A rich soil microbial life substantially contributes to the health and nutrient levels of crops.

Soil microbes also add to the capacity of the soil to combat climate change by oxidising methane, a more potent greenhouse gas than carbon dioxide. Soil microbial life is encouraged by the addition of organic matter, particularly composts.

Recommendations

To protect and improve the functions of the soil, it is necessary that the fundamental role of soil life is widely recognised and that soil biological activity is maintained and developed through;

- (i) Increasing the biological activity of soils and the level of organic matter, in particular humus.
- (ii) The development and adoption of indicators of soil micro-biological activity.
- (iii) The use of new guiding principles for agricultural soil protection to optimise soil biological activity, including:
 - greater reliance for crop nutrition on the maintenance of inherent soil fertility (the organic nutrient cycle)
 - regular addition of organic matter to the soil, especially composts
 - avoiding the reduction of soil nutrient content by using less intensive cropping practices
 - practices which reduce soil exposure to wind and water (e.g. hedgerows, less autumn sowing, overwintering cover crops and green manures)
- (iv) Research and new projects which:
 - build on the work of the organic movement in understanding the role of soil life and the organic nutrient cycle in plant nutrition and plant health
 - quantify the extent to which organic farming can contribute to a reduction in greenhouse gases by building up soil carbon levels and improving soil methane oxidation rates.

Care for the soil - “Don’t treat soil like dirt”

Ref: The Soil Association

See also:

Experiments with rocks and soil – Geography Teacher Guidelines, page 113.

Notes on earthworms:

Importance of earthworms

Certainly what earthworms do isn't simple in ecological terms. The great naturalist Charles Darwin, after making a careful study of them, wrote this: "...it may be doubted if there are any other animals which have played such an important part in the history of the world as these lowly organized creatures."

How do earthworms work?

Earthworms plough the soil by tunnelling through it. Their tunnels provide the soil with passageways through which air and water can circulate, and that's important because soil micro-organisms and plant roots need air and water just like we do.

One study showed that each year on an acre (0.4 hectare) of average cultivated land, 16,000 pounds (7200 kg) of soil pass through earthworm guts and are deposited atop the soil - 30,000 pounds (13,500 kg) in really wormy soil! Charles Darwin himself calculated that if all the worm excreta resulting from ten years of worm work on one acre of soil were spread over that acre, it would be two inches thick (5.08 cm).

This is something we should appreciate because earthworm droppings - called castings when deposited atop the ground - are rich in nitrogen, calcium, magnesium, and phosphorus, and these are all important nutrients for healthy, prospering ecosystems. In your own backyard you might be able to confirm that grass around earthworm burrows grows taller and greener than grass just inches away.

5.3.6 How do earthworms travel through the soil?

The secret to earthworm travel lies in two things you can't see just by looking. Though earthworms have no bones, their complex system of muscles enables them to not only wriggle like crazy but also to alternate very quickly between being stubby and thick, and long and slender.

Earthworms possess tiny, practically invisible bristles, called setae (pronounced SEE-tee; singular form, seta, pronounced SEE-tah), which usually are held inside their bodies. When the worms want to stay in their burrows, they jab their setae into the surrounding soil, thus anchoring themselves in place. This comes in handy if a bird nabs a worm's head and tries to pull the worm from its burrow. The setae anchor the worm so well that it may break before coming out.

In order to move forward, it first must use its complex musculature, makes itself long. Then it anchors the front of its body by sticking its front setae into the soil. Now it pulls its rear end forward, making itself short and thick. Once the rear end is in place, the front setae are withdrawn from the soil, but setae on the rear end are stuck out, anchoring the rear end. Now the front end is free to shoot forward in the burrow as the worm makes itself long and slender. Then the whole process is repeated.

Other resources on soil and earthworms:

Soil:

<http://soil.gsfc.nasa.gov/>

http://soil.gsfc.nasa.gov/app_soil/hmsoil.htm

The Soil association UK - The importance and functions of a living soil

<http://www.soilassociation.org>

<http://www.urbanext.uiuc.edu/gpe/index.html>

http://landscaping.about.com/cs/cheaplandscaping1/f/three_soils.htm

<http://library.thinkquest.org/J003195F/newpage4.htm>

Who lives in the soil?

<http://www.tqnyc.org/NYC040803/buglife02.html>

http://greenpack.rec.org/soil/about_soil/03-01-01.shtml

<http://www.zephyrus.co.uk/animalsinthesoil.html>

<http://www.zephyrus.co.uk/soil1.html>

<http://www.k5geosource.org/activities/invest/soil/q5/pg1.html>

Earthworms

<http://yucky.discovery.com/flash/worm/pg000102.html>

<http://www.learner.org/jnorth/search/Worm.html>

Eddie earthworm interview

<http://yucky.discovery.com/flash/worm/pg000216.html>

3.5 Topic 5: Water		
Curriculum Area:	SESE	
Subject:	Geography	
Strand:	Natural environments Environmental awareness and care	
Strand Units:	The local natural environment Weather / Weather, climate and atmosphere Caring for my locality / Caring for the environment	
Level by Level:		
Infants	The local natural environment	Observe, discuss and investigate water in the local environment – rainfall, puddles and streams, water, sand and stones in streams, ponds, lakes and at the seashore.
	Weather	Observe weather conditions – rainy, sunny, foggy days. Recognise how weather patterns are associated with seasons – Summer / Winter.
	Caring for my locality	Discuss simple strategies for caring for the environment – dispose of litter properly.
1st and 2nd Classes	The local natural environment	Observe, discuss and investigate water in the locality – relationships between rainfall, puddles, drains and streams. Investigate how water can move materials. Discuss water and its uses.
	Weather	Observe and record weather conditions Associate different cloud cover with different types of weather. Identify seasonal changes and their influences on people, animals and plants.
	Caring for my locality	Develop an awareness that water is essential to the environment. Be aware that water can be polluted.
3rd and 4th Classes	The local natural environment	Observe and explore the relationship between streams, ponds, rivers and lakes and animals and humans. Research the story of the river, from source to sea.
	Weather, climate and atmosphere	Record, display and discuss simple weather observations - cloud types, temperature, rainfall and wind direction.
	Environmental awareness	Identify the interrelationship of the living and non-living in local and other environments – plants, animals,

		water, air, and soil in their habitats.
	Caring for the environment	Participate in the resolution of an issue – pollution of a waterway etc., design a poster, write a letter.
5th and 6th Classes	The local natural environment	Investigate and learn about streams, rivers and lakes. Observe and develop simple understanding of links between run-off and drainage in the locality, e.g. drains in the schoolyard, street or farmland linked to tributaries, rivers and flood plains.
	Weather	Study the water cycle. Examine problems associated with run-off.
	Environmental awareness	Foster an appreciation in which people use water and be aware of the need to conserve and recycle water.
	Caring for the environment	Investigate the state of a local stream, river, pond or lake and if there is a pollution issue suggest possible actions and participate in the resolution.

Teachers Notes:

Further curriculum integration :

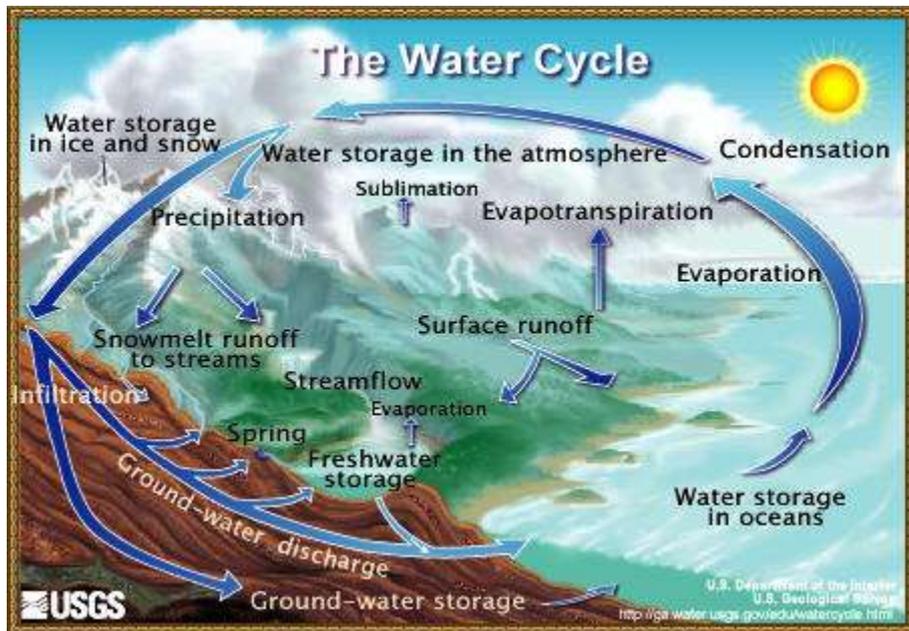
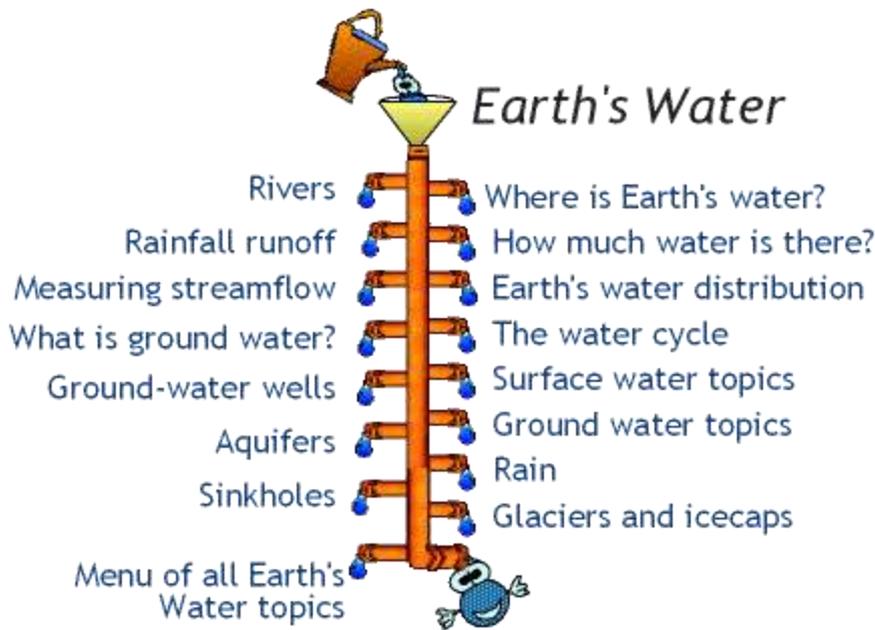
- Visual arts** colour, texture, strength, hardness, weight
- PE** Outdoor activities
- Science** Living things; materials

Notes on water

Water is a common chemical substance that is essential to all known forms of life. In typical usage, water refers only to its liquid form or state, but the substance also has a solid state, ice, and a gaseous state, water vapour. About 1,460 teratonnes (Tt) of water covers 71% of the Earth's surface, mostly in oceans and other large water bodies, with 1.6% of water below ground in aquifers and 0.001% in the air as vapour, clouds (formed of solid and liquid water particles suspended in air), and precipitation. Some of the Earth's water is contained within man-made and natural objects near the Earth's surface, such as water towers, animal and plant bodies, manufactured products, and food stores.

Saltwater oceans hold 97% of surface water, glaciers and polar ice-caps 2.4%, and other land surface water such as rivers and lakes 0.6%. Water moves continually through a cycle of evaporation or transpiration, precipitation, and run-off, usually reaching the sea. Winds carry water vapour over land at the same rate as run-off into the sea, about 36 Tt per year. Over land, evaporation and transpiration contribute another 71 Tt per year to the precipitation of 107 Tt per year over land. Some water is trapped for varying periods in ice caps, glaciers, aquifers, or in lakes, sometimes providing fresh water for life on land. Clean, fresh water is essential to human and other life. However, in many parts of the world – especially developing countries - it is in short supply. Water is a solvent for a wide variety of chemical substances.

Reference: U.S. Geological Survey – Science for a changing world



Reference: U.S. Geological Survey – Science for a changing world

Other resources on water:

See also:

Water, an integrated science and geography topic - *Science Teacher Guidelines*, page 48

Check out water at:

<http://ga.water.usgs.gov/edu/>

<http://ga.water.usgs.gov/edu/mearth.html>

Water - The hydro cycle

<http://observe.arc.nasa.gov/nasa/earth/hydrocycle/hydro1.html>

<http://www.epa.gov/OGWDW/kids/cycle.html>

<http://h2o.usgs.gov/public/realtime.html>

Recycled water

http://en.wikipedia.org/wiki/Reclaimed_water

Reed beds

<http://en.wikipedia.org/wiki/Reedbed>

3.6 Topic 6: Healthy Eating		
Curriculum Area:	SPHE	
Subject:	SPHE	
Strand:	Myself Myself and the wider world	
Strand Units:	Food and nutrition Environmental Care	
Level by Level:		
Infants	Food and nutrition	Become aware of the importance of food for growth and development. Explore food preferences and their role in a balanced diet. Discuss and explore some qualities and categories of food.
	Environmental care	Realise the importance of good hygiene during meals. Realise that we all have a responsibility towards the environment.
1st and 2nd Classes	Food and nutrition	Explore the importance of food for promoting growth, keeping healthy and providing energy. Appreciate that balance, regularity and moderation are necessary in a diet. Identify foods that are derived from plants and from animals.
	Caring for the environment	Which waste foods can be composted? Can your food packaging be recycled?
3rd and 4th Classes	Food and nutrition	Differentiate between a healthy and unhealthy diet and appreciate the role of balance and moderation – identify nutrients that are necessary in a balanced diet, explore how diet promotes growth, performance and development. Recognise the wide choice of food available and categorise food into the four main food groups and their place on the food pyramid – bread, potatoes and cereals; fruit and vegetables; milk, cheese and yogurt; meat, fish and alternatives. Examine the dietary needs of the child's age group and other groups in society. Explore the factors which influence the consumption of different food products.
	Environmental Care	Discuss the importance of good food hygiene. Realise that we all have a responsibility towards the environment in caring for it and in protecting it for future generations.

5th and 6th Classes	Food and nutrition	<p>Appreciate the importance of good nutrition for growing and developing and staying healthy.</p> <p>Realise and accept some personal responsibility for making wise food choices and adopting a healthy, balanced diet.</p> <p>Examine the food pyramid.</p> <p>Recognise some of the important nutrients that are necessary in a balanced diet and the food products in which they are found - Macro-nutrients: protein, carbohydrate, fat. Micro-nutrients: vitamins and minerals.</p> <p>Explore the factors that influence food choices: cost, advertising, demand, peer pressure, advertising and packaging, value for money, time for shopping and for cooking, ideal body images.</p> <p>Explore and examine some of the illnesses particularly associated with food intake or special health conditions: celiac, diabetes, anorexia, bulimia, the dietary needs of different age groups and individuals.</p> <p>Become aware of the importance of hygiene and care in the preparation and use of food by consuming before sell-by date, reading contents, not chopping cooked foods and uncooked foods on the same board.</p> <p>Be aware of the practicality of making your own compost from scratch for use in the school garden and in your own garden at home.</p>
	Environmental Care	<p>Dispose of leftover fruit and vegetable waste by composting.</p> <p>Packaging: Reduce, re-use and recycle and compost if possible. Discuss biodegradable and non-biodegradable waste from food packaging.</p> <p>Investigate the impact of local food industries on the environment.</p> <p>Explore foods from different parts of the world.</p> <p>Designate the school and its environment as a litter-free area.</p>

Teachers Notes:

See also:

Exemplar 9 Food - *Science Teacher Guidelines*, page 49

Exemplar 14 Classifying and Setting – *SPHE Teacher guidelines*, page 77

Notes on healthy eating

Good nutrition and a balanced diet help children grow up healthy.

No matter what the age of the child or teenager, here are five of the best strategies families can adopt to improve nutrition and encourage smart eating habits:

1. Have regular family meals;
2. Serve a variety of healthy foods and snacks;
3. Be a role model by eating healthy yourself;
4. Avoid battles over food;
5. Involve children in the process.

But it's not easy to take these steps when everyone is juggling busy schedules and convenience food, such as fast food, is so readily available.

Here are some ways families can incorporate all five strategies into their routine.

Family meals

Family meals are a comforting ritual for both parents and kids. Children like the predictability of family meals and parents get a chance to catch up with their children.

Children who take part in regular family meals are also:

- more likely to eat fruits, vegetables, and grains
- less likely to snack on unhealthy foods

In addition, family meals offer the chance to introduce the child to new foods and to act as a role model for healthy eating.

Teens may turn up their noses at the prospect of a family meal — not surprising because they're trying to establish independence. Yet studies find that teens still want their parents' advice and counsel, so families can use mealtime as a chance to reconnect.

Also, they could consider trying these strategies:

- Allow the older children to invite a friend to dinner.
- Involve older children in meal planning and preparation.
- Keep mealtime calm and congenial — no lectures or arguing.

What counts as a family meal?

Any time the family eats together — whether it's takeaway food or a home-cooked meal with all the trimmings. Strive for nutritious food and a time when everyone can be there. This may mean eating dinner a little later to accommodate a child who's at sports practice. It can also mean setting aside time on the weekends, such as Sunday brunch, when it may be more convenient to gather as a group.

Stocking up on healthy foods

Children, especially younger ones, will eat mostly what's available at home. That's why it's important to control the supply lines — the foods that you serve for meals and have on hand for snacks.

Families should follow these basic guidelines:

- Work fruit and vegetables into the daily routine, aiming for the goal of at least

five servings a day.

- Be sure fruit or vegetables are served at every meal.
- Make it easy for the child to choose healthy snacks by keeping fruits and vegetables on hand and ready to eat. Other good snacks include low-fat yogurt, peanut butter and celery, or whole-grain crackers and cheese.
- Serve lean meats and other good sources of protein, such as fish, eggs, beans, and nuts.
- Choose whole-grain breads and cereals so kids get more fibre.
- Limit fat intake by avoiding deep-fried foods and choosing healthier cooking methods, such as broiling, grilling, roasting, and steaming. Choose low-fat or non-fat dairy products.
- Limit fast food and other low-nutrient snacks, such as chips. But don't completely ban favourite snacks from your home. Instead, make them "once-in-a-while" foods, so kids don't feel deprived.
- Limit sugary drinks, such as soda and fruit-flavoured drinks. Serve water and low-fat milk instead.

How to be a role model

The best way to encourage healthy eating is to eat well yourself. Children will follow the lead of the adults they see every day. By eating fruits and vegetables and not overindulging in the less nutritious stuff, you'll be sending the right message.

Another way to be a good role model is to limit portions and not overeat. Talk about your feelings of fullness, especially with younger children. You might say, "This is delicious, but I'm full, so I'm going to stop eating." Similarly, parents who are always dieting or complaining about their bodies may foster these same negative feelings in their children. Try to keep a positive approach about food.

Don't battle over food

It's easy for food to become a source of conflict. Well-intentioned parents might find themselves bargaining or bribing kids so they eat the healthy food in front of them. A better strategy would be to give kids some control, but to also limit the kind of foods available at home.

Kids should decide if they're hungry, what they will eat from the foods served, and when they're full. Parents can control which foods are available to the child, both at mealtime and between meals.

Here are some guidelines to follow:

- ✓ Establish a predictable schedule of meals and snacks. It's OK to choose not to eat when both parents and kids know when to expect the next meal or snack;
- ✓ Don't force kids to clean their plates. Doing so teaches kids to override feelings of fullness;
- ✓ Don't bribe or reward kids with food. Avoid using dessert as the prize for eating the meal;
- ✓ Don't use food as a way of showing love. When you want to show love, give kids a hug, some of your time, or praise.

Get children involved

Most kids will enjoy deciding what to make for dinner. Talk to them about making choices and planning a balanced meal. Some might even want to help shop for ingredients and prepare the meal. At the shop, teach kids to check out food labels to begin understanding what to look for.

In the kitchen, select age-appropriate tasks so the child can play a part without getting injured or feeling overwhelmed. And at the end of the meal, don't forget to praise the chef.

School lunches can be another learning lesson for children. More important, if you can get them thinking about what they eat for lunch, you might be able to help them make positive changes. Brainstorm about what kinds of foods they'd like for lunch or go to the grocery store to shop together for healthy, packable foods.

There's another important reason why children should be involved. It can help prepare them to make good decisions on their own about the foods they want to eat. That's not to say that the child will suddenly want a salad instead of chips, but the mealtime habits you help create now can lead to a lifetime of healthier choices.

Other resources on healthy eating:

Check out some healthy recipes for kids of all ages.

Healthy eating for parents:

http://www.kidshealth.org/parent/nutrition_fit/nutrition/habits.html

Food dudes Healthy eating programme;

http://www.fooddudes.ie/html/parents_what.html

Bord Bia Quality mark

http://www.bordbia.ie/consumers/recipes/qas_pork_new.html

Bord Bia Recipes

<http://www.bordbia.ie/Consumers/Recipes>

Irish Organic Farmers and Growers Association – advice: on Organic food in Ireland; benefits and where to buy organic food; <http://www.iofga.org/consumers.htm>

The Slow Food Movement

<http://www.slowfood.com/>

Seedsavers

<http://www.irishseedsavers.ie/>

Schools' Recipes:

Schools International Cookbook –

<http://www.eat-online.net/english/cookbook/cookbook.htm>

Carnaun National School Cookbook:

http://www.eat-online.net/english/cookbook/irish%20_recipes.htm

3.7 Topic 7: The Eco System		
Curriculum Area: SESE		
Subject: Science		
Strand: Living things Environmental awareness and care		
Strand Units: Plants and animals Caring for my myself and my locality / Caring for the environment Environmental awareness (4 th to 6 th class) Science and the environment (4 th to 6 th class) Caring for the environment (4 th to 6 th class)		
Sub-strand: The processes of life		
Level by Level:		
Junior and Senior Infants	Plants and animals	Observe, discuss and identify a variety of plants and animals in different habitats in the immediate environment - common trees and other plants - common birds and other animals in habitats such as ponds, trees, hedges, grass, rocks, soil. Become aware of animals and plants of other environments. Sort and group living things into sets: flowers, leaves, trees, birds, fruit and vegetables. Recognise and identify the external parts of living things; flower, leaf, stem, root, tail, leg, beak, feathers.
	Processes of life:	Observe growth and change in some living things. Explore conditions for growth of bulbs and seeds in soil, damp moss, wet paper. Become aware that animals and plants undergo seasonal change in appearance or behaviour e.g. colour change, leaf fall, appearance of buds and shoots, hibernation.
	Caring for my locality	The child should be enabled to: observe, discuss and appreciate the attributes of the local environment, the beauty and diversity of plants and animals in a variety of habitats, and the attractive elements of physical, natural and human features. Appreciate that people share the environment with plant and animal life. Develop a sense of responsibility for taking care of and improving the environment. Identify, discuss and implement simple strategies for improving and caring for the environment.

		<p>tidy and safe.</p> <p>Identify and help to implement simple strategies for protecting, conserving and enhancing the environment, planting trees, flowers, developing a school garden, engaging in anti-litter campaigns.</p> <p>Become aware of ways in which the environment can be polluted or harmed by litter, pollution, vandalism.</p>
3rd and 4th Classes	Plants and animals	<p>Variety and characteristics of living things:</p> <p>Observe, identify and investigate the animals and plants that live in local environments, local stream, river or pond, seashore aspect of a local rural landscape (e.g. road or laneway verge, hedgerow, peatland, field) aspect of a local urban area (e.g. areas around school, park, waste ground).</p> <p>Develop an increasing awareness of plants and animals from wider environments.</p> <p>Observe and explore some ways in which plant and animal behaviour is influenced by, or adapted to, environmental conditions; suitability of plants for shaded/damp/dry/wet conditions; use of colour and camouflage by animals.</p> <p>Sort and group living things into sets according to observable features: animals that have fur, feathers, scales; flowering and non-flowering plants.</p> <p>Use simple keys to identify common species of plants and animals.</p> <p>Understand that plants use light energy from the sun.</p> <p>Come to appreciate that animals depend on plants and indirectly on the sun for food.</p> <p>Discuss simple food chains.</p>
	Processes of life	<p>Become aware of some of the basic life processes in animals - feeding, breathing, growing, moving, reproducing (life cycles), using their senses design and make an animal home that provides for growth, exercise, and feeding of the animal.</p> <p>Investigate the factors that affect plant growth water, light, types of soil, temperature.</p>
	Environmental awareness	<p>The child should be enabled to:</p> <p>Identify positive aspects of natural and built environments through observation, discussion and recording colours, textures and shapes in rural and urban areas, diversity of plant and animal life, range of materials, buildings, walls and other features, places that people enjoy and the reasons for these preferences.</p> <p>Identify the interrelationship of the living and non-living elements of local and other environments - plants, animals, water, air and soil in habitats.</p> <p>Become aware of the importance of the Earth's renewable and non-renewable resources.</p>

		<p>Recognise how the actions of people may impact upon environments - planting and felling trees, removing hedgerows, draining marshes, constructing buildings, roads and bridges.</p> <p>Come to appreciate the need to conserve resources - recycling of materials, use of paper packaging in contrast to some plastic packaging, identifying materials which can be used for a variety of purposes, turning off lights, reducing the amounts of water used.</p>
<p>Science and the environment</p>		<p>The child should be enabled to:</p> <p>Begin to explore and appreciate the application of science and technology in familiar contexts; at home: cooking, heating, vacuum cleaners, refrigerators, washing machines, toasters; at school: design of computer desks, chairs, pens, calculators; in shops: design of trolleys, use of conveyor belts in counters, ways of preserving foods, packaging foods, through designing and making activities.</p> <p>Identify some ways in which science and technology contributes positively to society - transport, buildings, bridges, roads, information and communication technologies, insulation of houses, tools and appliances, toys, farming, medicine.</p> <p>Recognise and investigate human activities which have positive or adverse effects on local and wider environments, enhance the built environment protect flora and fauna, e.g. by creating and maintaining a school garden, produce biodegradable and non-biodegradable waste, affect the quality of air, water and soil.</p>
<p>Caring for the environment</p>		<p>The child should be enabled to:</p> <p>Examine a number of ways in which the local environment could be improved or enhanced e.g. recycling campaigns, helping in anti-litter campaign.</p> <p>Identify and discuss a local, national or global environmental issue such as litter in the area, an incident of pollution, changes in flora and fauna, new roads, buildings, need to protect a habitat and its flora and fauna, proposals for enhancing the environment - (e.g. need for cycleways near school).</p> <p>Investigate the causes of the issue, appreciate the roles and different views of people involved. Suggest and discuss possible actions and consider the effects of these on people and the environment.</p> <p>Realise that there is a personal and community responsibility for taking care of the environment.</p>

	<p>Environmental awareness</p>	<p>The child should be enabled to:</p> <p>Identify positive aspects of natural and built environments: through observation, discussion and recording, colours, textures and shapes in rural and urban areas, diversity of plant and animal life, range of materials, buildings, walls and other features: places that people enjoy and the reasons for these preferences.</p> <p>Explore some examples of the interrelationship of living and non-living aspects of local and other environments, ecosystem of tree, hedgerow, stream, boglands, mountains, lowlands, river, rainforest, grasslands, desert, tundra.</p> <p>Become aware of the importance of the Earth's renewable and non-renewable resources.</p> <p>Foster an appreciation of the ways in which people use the Earth's resources: mining, fishing, forestry, agriculture using wind, water, fossil fuels or nuclear energy to generate power, processing raw materials for manufacturing, using the environment for leisure activities.</p> <p>Come to appreciate the need to conserve resources recycling of materials, use of paper packaging in contrast to some plastic packaging, Identifying materials that can be used for a variety of purposes.</p> <p>Turning off lights, reducing the amounts of water used.</p>
	<p>Science and the environment</p>	<p>The child should be enabled to:</p> <p>Appreciate the application of science and technology in familiar contexts; at home: microwave oven, cooker, dustbin, coffee maker; at school: photocopier, projector, information and communication technologies; in the work-place: conveyor belts and pulleys, in a factory; pneumatic drill, cement mixer and crane on a building site; in hospitals: stethoscope, X-ray, radium treatment through designing and making activities.</p> <p>Examine some ways that science and technology have contributed positively to the use of the Earth's resources, purifying water, mixing materials to produce new materials, medicines, processing food, preserving food, generating electricity, using fertilisers for increased agricultural yields.</p> <p>Recognise the contribution of scientists to society, work of scientists in the past and present.</p> <p>Recognise and investigate aspects of human activities that may have positive or adverse effects on environments, activities that protect flora and fauna, such as creating a wildlife area and planting trees to enhance built environments, to affect the quality of air, soil, water and the built environment.</p>

	<p>Caring for the environment</p>	<p>The child should be enabled to:</p> <p>Participate in activities that contribute to the enhancement of the environment, organise collection of paper, aluminium cans or other materials for recycling.</p> <p>Become aware of the need to use energy wisely in school and at home, compost waste for garden, identify and discuss a local, national or global environmental issue such as the effect of building a new factory, new roads, farming practices, traffic congestion, road safety, suggestions for environmental enhancement, an incident of pollution, deforestation, ozone depletion, nuclear energy, global warming and investigate the causes of the issue.</p> <p>Appreciate the roles and different views of people involved, identify and use ways of assessing or measuring the extent of the problem, suggest possible actions and consider the effect of these on people and the environment and participate in the resolution of the issue, if possible.</p> <p>Come to appreciate individual, community and national responsibility for environmental care.</p> <p>Explore concept of custodianship and its practical implications.</p> <p>Become familiar with the concept of sustainable development.</p> <p>Appreciate the need to protect environments for present and future inhabitants.</p>
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Teachers Notes:**Notes on ecosystems**

An ecosystem is a natural unit consisting of all plants, animals and micro-organisms in an area functioning together with all of the non-living physical factors of the environment. Ecosystems vary in size. They can be as small as a puddle or as large as the Earth itself. Any group of living and non-living things interacting with each other can be considered as an ecosystem.

Habitat

A habitat (which is Latin for "it inhabits") is an ecological or environmental area that is inhabited by a particular species. It is the natural environment in which an organism lives, or the physical environment that surrounds (influences and is utilized by) a species population.

Habitats, then, are specific to a population. Each population has its own habitat. For example, a population of ants has its own habitat.

Several populations may share a habitat. For example, in a small pond several aquatic populations may co-exist in the same water at the same time. An aquarium is a good example of a shared habitat.

Biomes

Biomes are ecosystems where several habitats intersect. The Earth itself is one large biome. Smaller biomes include desert, tundra, grasslands, and rainforest.

What is biodiversity?

There are 3 kinds of biodiversity:

Variety of genes

Collies, poodles, and terriers are all dogs—but they're not the same because their genes are different. It's the difference in our genes that makes us all different.

Variety among species

Scientists group living things into distinct kinds of species - for example, dogs, dragonflies, and daisies are all different species.

Variety of ecosystems

Coral reefs, wetlands, and tropical rain forests are all ecosystems. Each one is different, with its own unique species living in it. Genes, species, and ecosystems working together make up our planet's biodiversity.

To grow, an animal needs to eat lots of grass / plants. To help them grow, the grass / plants needs sun, rain, and healthy soil. Healthy ecosystems need healthy plants and animals. Our world is like a web made up of many strands, all connected together. Break one connection, and the whole web may change.

Other resources on ecosystems:

Department of Agriculture, Fisheries and Food

Biodiversity - http://www.agriculture.gov.ie/ag_env/Biodiversity.doc

Coillte

<http://www.coillte.ie/>

Worksheets on Trees!

http://www.coillte.ie/environment/learn_about_trees/teachers_notes/

The Franklin Institute – Resources for Science Learning

Ecosystems, Habitats and Biomes

<http://www.fi.edu/tfi/units/life/habitat/habitat.html>

Investigating an ecosystem

<http://www.fi.edu/tfi/units/life/habitat/habact3.html>

Frog ponds

<http://www.ipcc.ie/frogfriendly.html>

A study of Carnaun National School

Pond<http://homepage.eircom.net/~foregan/carnaun/pondstudy01.htm>

The Energy cycle- How does energy flow through an ecosystem?

<http://www.fi.edu/tfi/units/life/habitat/habact4.html>

Importance of trees

http://www.missmaggie.org/mission2_parts/eng/teaching/naturesgift.html

Plant worksheets from Ed Helper

<http://www.edhelper.com/plants.htm>

<http://edhelper.com/Plants159.htm>

<http://www.woodlands-junior.kent.sch.uk/revision/Science/index.html>

<http://www.woodlands-junior.kent.sch.uk/teacher/science.html>

Butterflies: http://www.kidssoup.com/Butterflies/Butterfly_Activities.html

Discover Primary Science: <http://www.primaryscience.ie/site/index.php>

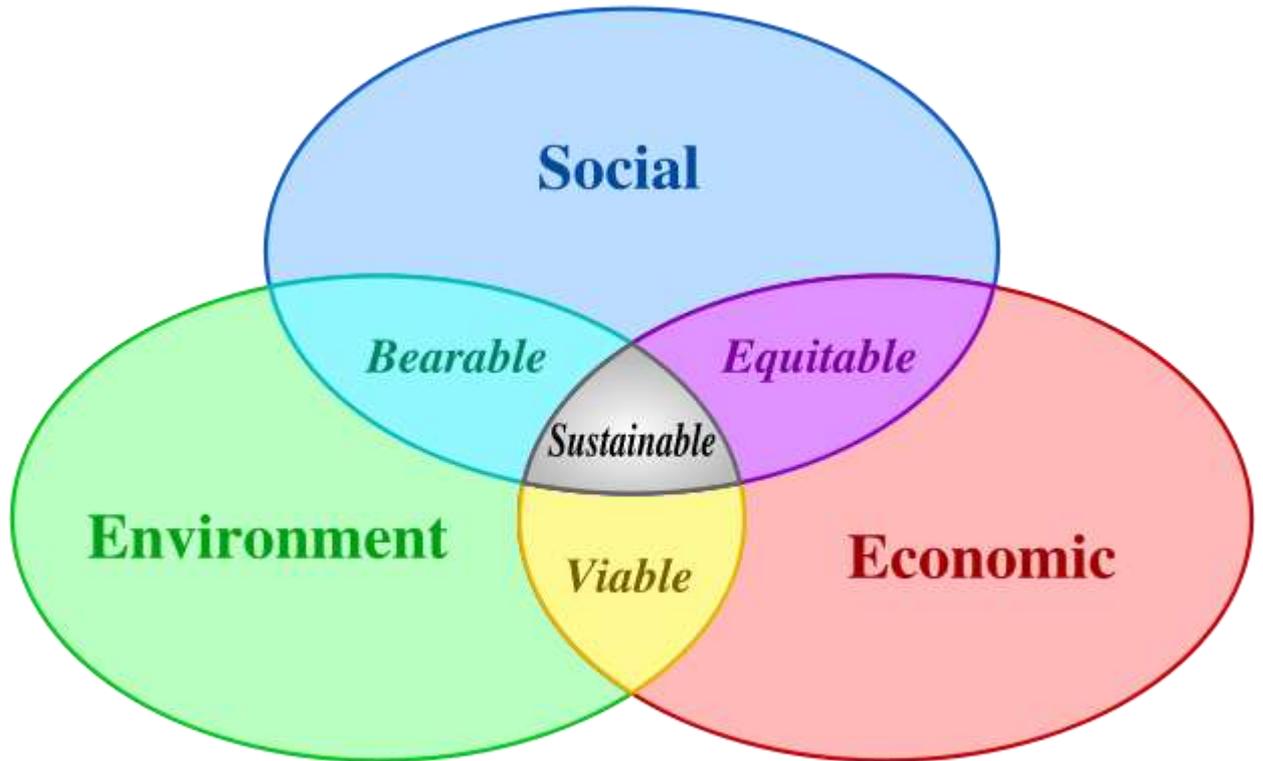
3.8 Topic 8: Sustainable Development		
Curriculum Area: SESE		
Subject: Geography		
Strand: Human environments Natural environments Environmental awareness and care		
Strand Units: Living in the local community Trade and development issues Weather, climate and atmosphere Planet Earth in Space Caring for my locality / Environmental care		
Level by Level:		
Junior and Senior Infants	Caring for my locality	Appreciate that people share the environment with plant and animal life and that people must care for the plants and animals. Keep the classroom litter-free, dispose of litter appropriately and introduce the idea of recycling.
1st and 2nd Classes	Living in the local community	Investigate materials used in the construction of homes and identify materials of local origin.
	Planet earth in space	Recognise the sun as a source of heat and light.
	Caring for my locality	Develop awareness that air, water, soil, living and non-living things are essential for the environment and that people, animals and plants depend on each other. Identify and help to implement simple strategies for protecting, conserving and enhancing the environment. Be aware of ways in which the environment can be polluted or harmed.
3rd and 4th Classes	Weather, climate and atmosphere	Develop some awareness of weather and climate patterns and their relationship with plant, animal and human life in environments in other parts of the world. Introduce “Climate change” and its possible effects.
	Environmental care	Be aware of services to homes and to other buildings (e.g. water supply, sewerage, heating, electricity) the effect of their activities on the environment and how energy can be conserved. Discuss the effects that transport and infrastructure have on the environment. Become aware of some of the Earth’s renewable and non-renewable resources. Recognise how the actions of people may have an impact on the environments – planting or felling trees, removing hedgerows, draining marches, overgrazing of mountains, new buildings, roads, dumps, bridges. Recognise and investigate human activities which may have positive or adverse effects on local or wider

		<p>environments: biodegradable / non-biodegradable waste, quality of air or water, activities which effect flora or fauna, the role of recycling.</p>
<p>5th and 6th Classes</p>	<p>Human environments</p>	<p>Come to appreciate how the design of buildings and the materials used in various buildings can effect the conservation of energy.</p> <p>Learn about methods of transport and transport routes: road, rail, air, sea, and discuss their advantages and disadvantages and their effect on the environment.</p>
	<p>Trade and development issues</p>	<p>Explore, through the study of some major world commodities, trade issues commodities used by people in Ireland (e.g. sugar, tea, coffee, bananas, rubber, oil), where and how they are produced, the environment where they are produced, the work of people who produce these products, trading of these products, manufacturing, sale and distribution in Ireland terms of trade, fair or unfair trade conditions.</p> <p>Become aware of the causes and effects of famine: i.e. causes, environmental factors, natural disasters, social and economic factors, unequal distribution of land, resources or food, effects on families and communities, on land and environment, on population movements.</p> <p>Examine the work of relief agencies and become aware of Irish involvement in them.</p> <p>Discuss possible short and long-term solutions to famine.</p> <p>Compare the experience of famine in Ireland with that of other countries.</p> <p>Come to appreciate the inequalities between the developed and the developing world.</p> <p>Explore some of the issues and problems associated with aid: the effect on recipients, appropriate technology: acquire some knowledge of the origins, work and Irish involvement in some major international organisations.</p>
	<p>Environmental awareness</p>	<p>The child should be enabled to:</p> <p>Identify, discuss and appreciate attractive and unattractive elements of natural and human environments - buildings and elements of the human environment which use natural and other materials in an attractive way and are in keeping with the scale of immediate surroundings.</p> <p>Explore some examples of the interrelationship of climate, natural features, flora, fauna and human life in different environments in Ireland and in some of the main climatic regions of the world in locality: ecosystem of tree, hedgerow, stream in Ireland: boglands, mountains, Burren, rivers in other areas: rainforest, grasslands, desert, tundra.</p> <p>Recognise and investigate aspects of human activities which may have positive or adverse effects on environments - enhancement of the beauty of built environments, protection of flora and fauna, excess</p>

		<p>waste or non-biodegradable waste, activities which affect the quality of air or water, deforestation or desertification, changes to buildings or streetscapes in towns, recycling and reuse of materials.</p> <p>Become aware of the importance of the Earth's renewable and non-renewable resources.</p> <p>Foster an appreciation of the ways in which people use the Earth's resources: mining, fishing, forestry, agriculture, using wind, water, fossil fuels or nuclear energy to generate power, using the environment for leisure activities, processing raw materials in manufacturing.</p> <p>Come to appreciate the need to conserve the Earth's resources.</p> <p>Be aware of and discuss the Irish Government's policy on sustainable farming and of the Rural Environmental Protection Scheme (REPS).</p> <p>Be familiar with and discuss topical sustainable development issues e.g. overexploitation of natural resources, food miles, carbon foot-prints, energy audit, bio fuels, green low carbon renewable energy sources.</p>
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Teachers Notes:

Sustainable development topics are invaluable for enhancing language skills.



*Scheme of sustainable development - at the confluence of three preoccupations.
Source – Wikipedia, the free encyclopedia*

Notes on environmental sustainability

Environmental sustainability is defined as the ability of the environment to continue to function properly indefinitely. This involves meeting the present needs of humans without endangering the welfare of future generations. The goal of environmental sustainability is to minimize environmental degradation, and to halt and reverse the processes they lead to. An "unsustainable situation" occurs when natural capital (the sum total of nature's resources) is used up faster than it can be replenished. Sustainability requires that human activity only uses nature's resources at a rate at which they can be replenished naturally.

Consumption of renewable resources	State of environment	Sustainability
More than nature's ability to replenish	Environmental degradation	Not sustainable
Equal to nature's ability to replenish	Environmental equilibrium	Steady-state Sustainability
Less than nature's ability to replenish	Environmental renewal	Sustainable development

Development is sustainable where it "meets the needs of the present without compromising the ability of future generations to meet their own needs."

Green building

Green building is the practice of increasing the efficiency with which buildings use resources – energy, water and materials - while reducing building impacts on human health and the environment, through better siting, design, construction, operation, maintenance, and removal — the complete building life cycle.

A similar concept is natural building, which is usually on a smaller scale and tends to focus on the use of natural materials that are available locally. Other commonly used terms include sustainable design and green architecture. The related concepts of sustainable development and sustainability are integral to green building.

Policy on sustainable farming

Over the past twenty years there has been a growing concern about the threats to our general environment. In response to this, the Irish government has developed a national environment policy and new legislation and organisations have been put in place in order to implement this policy.

This policy is based on European Union treaties, directives and regulations, and a key element is the concept of sustainable development.

Sustainable farm management

"Sustainable Farm Management" is just one piece in the inter-linking jigsaw of sustainable development, and it may be defined as the day to day decisions, practices and activities that:

- Seek to reduce the impact on the environment both inside and outside the farm gate (e.g. water quality, air quality, waste management, wildlife diversity, noise pollution etc.)
- Seek to maintain both the short and long term productivity of the farm (soil fertility, water availability, stocking rates, fertiliser and pesticide use, energy efficiency, etc) and have a high regard for animal welfare.

In practice this means the day-to-day farm management is guided by the need to:

- Recycle materials on the farm
- Use renewable sources of energy
- Reduce off-farm inputs
- Manage pest and weed control in an environmentally friendly fashion.
- Conserve water, soil, energy and biological resources
- Value the overall health of the farm ecosystem rather than a particular crop.

Implementing these basic guidelines will go a long way towards developing a sustainable method of farming.

Rural environment protection scheme

REPS (Rural Environment Protection Scheme), is a Scheme designed to reward Farmers for carrying out their farming activities in an environmentally friendly manner and to bring about environmental improvement on existing farms.

The objectives of the Scheme are to:

- Establish farming practices and production methods which reflect the increasing concern for conservation, landscape protection and wider environmental problems;
- Protect wildlife habitats and endangered species of flora and fauna;
- Produce quality food in an extensive and environmentally friendly manner.

Participants in REPS must:

- Carry out their farming activities for a five year period in accordance with an agri-environmental plan prepared in accordance with the Scheme document and agri-environmental specification;
- Have a plan, specific to their own farm, prepared by a Planning Agency approved by the Department of Agriculture, Fisheries and Food.

Comply with eleven basic measures as follows:

1. follow a farm nutrient management plan prepared for the total area of the farm;
2. adopt an appropriate grassland management plan for the total area of the farm;
3. protect and maintain all watercourses and wells;
4. retain wildlife habitats;
5. maintain farm and field boundaries;
6. cease using herbicides, pesticides and fertilisers in and around hedgerows, lakes ponds, rivers and streams, except with the consent of the Minister;
7. protect features of historical and/or archaeological interest;
8. maintain and improve the visual appearance of the farm and farmyard
9. produce tillage crops: without burning straw or stubble; leaving a specified field margin uncultivated where no nutrients or sprays are applied;
10. become familiar with environmentally friendly farming practice;
11. prepare, monitor and update agri-environmental plan and keep such farm and environmental records as may be prescribed by the Minister.

Education for global citizenship is:

- Asking questions and developing critical thinking skills;
- Equipping young people with knowledge, skills and values to participate as active citizens;
- Acknowledging the complexity of global issues;
- Revealing the global as part of everyday local life, whether in a small village or a large city;
- Understanding how we relate to the environment and to each other as human beings.

Other Resources on sustainable development:

Department of Agriculture, Fisheries and Food – Agri-Environment

<http://www.agriculture.gov.ie/index.jsp?file=areasofi/environment.xml>

Rural Environment Protection Scheme

<http://www.agriculture.gov.ie/index.jsp?file=areasofi/reps.xml>

SEI - Sustainable Energy Ireland - Renewable energy office

<http://www.managenergy.net/actors/A1668.htm>

SEI Educational resources:

<http://www.managenergy.net/actors/A891.htm#>

What is Carbon Footprint?

Sustainable energy Ireland: <http://www.sei.ie/index.asp?locID=1503&docID=-1>

Food Miles

http://www.lifecyclesproject.ca/initiatives/food_miles/

Food miles and the potential effect this has on the environment

EPA – Environment Protection Agency

<http://www.epa.ie/>

Activity worksheets:

http://www.epa.ie/downloads/pubs/other/education/primary/naturalresources/epa_education_natural_resources_food_miles.pdf

Calculating food miles:

<http://www.organiclinker.com/food-miles.cfm>

How far is it? – Travel distance calculator <http://www.mapcrow.info/>

INTO – Heritage in schools programme:

www.into.ie/html/development/her_directory.htm

Section Four - Integration of other Subjects

4.1 Gaeilge

An Ghaeilge sa gháirdín

Má bhaineann an páiste taitneamh as an gceacht agus má bhíonn sé/sí saor ó bhrú agus ó strus is fearr a fhoghlaiméoidh sé/sí an Ghaeilge. Níl áit níos fearr ná an gáirdín chun atmaisféar fabhrach don teanga a chruthú agus chum cumas cumarsáide a fhorbairt.

Má tá an múinteoir ag iarraidh béim a chur ar thaitneamhacht an ábhair theagaisc agus ar an gcaoi a gcoinneoidh sé seo an páiste gafa le linn na foghlama is í an gháirdín an áit is fearr a bheith leis na páiste.

Beidh na feidhmeanna teanga i gceist i ngach snáithe den churaclam: Éisteacht, Labhairt, Léitheoireacht agus Scríbhneoireacht.

Catagóirí feidhmeanna:

- **Caidreamh sóisialta a dhéanamh**
- Eolas a thabhairt agus a lorg
- Dearcadh a léiriú agus a lorg
- Dul i gcion ar dhuine
- Struchtúr a chur ar chomhrá
- Soiléiriú a lorg i gcomhrá

Topic: Ag obair sa gháirdín		
Strand – Caidreamh sóisialta a dhéanamh		
Ranganna Naíonán	Éisteacht, labhairt	Rainn agus amhráin le hathrá a aithris: 'Is maith liom bainne' 'Damhán alla' Scéalta gearra a insint ag úsáid sraith briathra: "Chuaigh mé amach sa gháirdín. Bhí mo chara Seán liom. Chonaic mé bláthanna agus glasraí. Is maith liom ..."
Ranganna 1 agus 2	Éisteacht, labhairt	Ba chóir go gcuirfí ar chumas an pháiste: Úsáid a bhaint as leideanna éagsúla chun cabhrú le cumarsáid éifeachtach a dhéanamh - <i>geáitsí, béim agus tuin</i> Nuacht shimplí phearsanta a thabhairt - labhairt faoi/fúithi féin, a c(h)aitheamh aimsire agus faoina g(h)náthshaol laethúil Scéalta gearra a insint ag úsáid sraith briathra "Bhí mé amuigh sa pháirc inné. Bhí mé ag piocadh sméara dubha. Bhí canna agam. Phioc mé smear. D'íth mé an smear sin. Rug mé ar smear eile. Chuir mé sa channa í. Líon me an channa. Bhí áthas ar Mhamaí." Caint faoi rudaí a tharla: <i>thóg mé, chonaic tú, bhí sé</i> Caint faoi rudaí atá ar siúl: <i>tugann sé, feiceann sí,</i>

		<p><i>bím, suím, éirím</i></p> <p>Caint faoi rudaí a tharlóidh: <i>tógfaidh mé, feicfidh mé, beidh tú</i></p> <p>Caint faoi rudaí atá ag tarlú anois: <i>ag rith, ag léim, ag súgradh, ag éirí</i></p> <p><i>ag dul a chodladh, ag ní, ag scríobh</i></p>
	Léitheoireacht,	<p>Ba chóir go gcuirfí ar chumas an pháiste: Léitheoireacht a shamhlú le taitneamh trí éisteacht leis an múinteoir mar dhealéitheoir ag léamh scéalta agus dánta tarraingteacha</p> <p>taithí a fháil ar an bhfocal scríofa sa timpeallacht, go háirithe sa seomra ranga, agus é a léamh go tuisceanach</p> <p>Fógraí sa seomra ranga, lipéid le haghaidh rudaí sa seomra ranga, ainmneacha plandaí sa gháirdín, i bpictiúir agus ar shaothair ealaíne</p>
	Scríbhneoireacht	<p>Ba chóir go gcuirfí ar chumas an pháiste: pictiúir a tharraingt de rudaí sa gháirdín agus liosta de rudaí atá ag fás ann</p> <p>Dathanna sa gháirdín</p> <p>Abairt simplí aonair a scríobh</p>
Ranganna 3 agus 4	Éisteacht, labhairt	<p>Ba chóir go gcuirfí ar chumas an pháiste:</p> <p>An Ghaeilge a labhairt go teagmhasach neamhfhoirmiúil sa seomra ranga agus sa scoil agus sa timpeallacht (sa gháirdín) agus sa bhaile</p> <p>Úsáid a bhaint as leideanna éagsúla chun cabhrú le cumarsáid éifeachtach a dhéanamh - geáitsí, béim, tuin na cainte</p> <p>Nuacht shimplí a thabhairt - an teaghlach, an scoil, timpeallacht na scoile</p> <p>Scéalta a aithris, a athinsint ina f(h)ocail féin, ceisteanna fúthu a fhreagairt, agus codanna díobh a léiriú i rólghlacadh</p> <p>Foclóir níos leithne a úsáid - cluichí foclóra, tóirfhocal, focail fhrithchiallacha</p> <p>Focail cháilitheachta a úsáid</p>
	Léitheoireacht,	<p>Ba chóir go gcuirfí ar chumas an pháiste:</p> <p>Léamh i gcomhpháirt le daoine eile - páistí, an múinteoir, tuismitheoir, duine fásta eile</p> <p>Léitheoireacht fheidhmiúil a dhéanamh - treoracha a leanúint, mím, dathú, tarraingt treoracha do chluichí boird a leanúint, puzail</p> <p>Ábhar céimnithe léitheoireachta a léamh os ard agus go ciúin</p> <p>Léamh i gcomhthéacsanna cultúrtha: scéalta gearra béaloidis, rainn, dánta dúchasacha.</p>
	Scríbhneoireacht	<p>Ba chóir go gcuirfí ar chumas an pháiste:</p> <p>Scéalta simplí a chríochnú</p> <p>Scríobh faoi/fúithi féin agus faoina g(h)náthshaol</p>

		<p>laethúil - dialann phearsanta a choimeád – “Obair a rinne mé sa gháirdín”, eachtraí taitneamhacha agus greannmhara, rudaí a chuir as dó/di, rudaí a chuir eagla air/uirthi</p> <p>Scríobh i gcomhthéacsanna cultúrtha - scéal béaloidis a scríobh, Lá Fhéile Pádraig—cártaí chuig páistí i scoil eile</p> <p>Feabhas a chur ar a c(h)uid iarrachtaí pearsanta trí athdhréachtú, athléamh, ceartú, athscríobh, poncaíocht, peannaireacht</p>
Ranganna 5 agus 6	Éisteacht, labhairt	<p>Ba chóir go gcuirfí ar chumas an pháiste:</p> <p>Éisteacht leis an nGaeilge á labhairt go fíorchumarsáideach ar na hócáidí céanna gach lá chun nathanna cainte agus foirmlí teanga a dhaingniú - gnásanna na maidine, ag dul abhaile, ag imirt cluichí, sa gháirdín</p> <p>Cluichí spreagúla a éilíonn éisteacht agus tuiscint a imirt - éisteacht agus tomhas, éisteacht agus pictiúr a tharraingt, éisteacht agus mím a dhéanamh, cluiche bingo tráth na gceist</p> <p>Éisteacht leis an múinteoir agus gníomhaíochtaí a dhéanamh a bhaineann leis na céadfaí agus na mothúcháin - boladh, blaiseadh, feiceáil, cloisteáil, sásamh, míshásamh, gliondar croí, díomá</p> <p>Cluichí a imirt chun taithí a fháil ar ghramadach na Gaeilge - Cé mise? nó Fiche ceist, an chopail ‘is’ agus an briathar ‘tá’, Cén post atá agam?, na gairmeacha Beatha, Cé leis?, mo, do, a, ár, bhur, a</p> <p>Úsáid a bhaint as na suímh agus na treonna i gcluichí páirce - ar an, idir, in aice, trasna, isteach, istigh, amach, amuigh, thuas, thíos, suas, síos, anuas</p> <p>Caint faoi rudaí a tharla, a tharlaíonn agus a tharlóidh - dhún/níor dhún mé, thit sé, nigh sé, d’éirigh/níor éirigh tú, fuair/ní bhfuair mé, rinne/ní dhearna tú, bhí/ní raibh sé dúnfaidh/ní dhúnfaidh sé, titfidh tú, nífidh, mé, éireoidh tú, ní bheidh sé, dúnaim, titeann sí, níonn sé, éiríonn/ní, éiríonn sí, faigheann/ní faigheann sí, bím/ní bhím, ní thugann sé.</p> <p>Ceisteanna a chur agus a fhreagairt</p>
	Léitheoireacht,	<p>Ba chóir go gcuirfí ar chumas an pháiste:</p> <p>Léitheoireacht a shamhlú le taitneamh trí éisteacht leis an múinteoir mar dhealéitheoir ag léamh ábhar spéisiúil léitheoireachta</p> <p>Brí a bhaint as an bhfocal scríofa sa timpeallacht, go háirithe sa seomra ranga agus sa gháirdín - lipéid, fógraí, comharthaí, scríbhneoireacht ar an gclár dubh, siopaí, oifig an phoist, an banc, comharthaí, bóthair</p>

		<p>Sracfhéachaint ó am go ham ar réimse leathan d'ábhar léitheoireachta, scéalta nuascríofa, miotais, finscéalta, iris eolaíochta, ailt faoi leith as nuachtáin Ghaeilge</p> <p>Tréimhsí taoiléitheoireachta a chaitheamh i gcomhair pléisiúir, irisí, scéalta, comhaimseartha, leabhair eolais: an timpeallacht, stair agus, tíortha eile.</p>
	Scribhneoireacht	<p>Ba chóir go gcuirfí ar chumas an pháiste:</p> <p>Cur síos ar phictiúir</p> <p>Tuairiscí, ailt, aistí gearra, scéalta simplí a scríobh agus a chríochnú</p> <p>Ord a chur ar scéal - ar dtús, ansin, tar éis tamaill, ar deireadh, mar a dúirt mé ..., ar an lámh eile de ..., ach, agus ...</p>

Comhtháthú le hábhair eile:

Na hamharcealaíona: Péint agus dath: Péinteáil – na dathanna i nGhaeilge, cur síos simplí ar an ábhair ealaíne

Ceol: Ag éisteacht agus ag freagairt: Amhráin Ghaeilge

OSPS: Mé féin agus daoine eile: Mo chairde agus daoine eile, an domhan leasmuigh díom

Stair: Staidéar áitiúil—nósanna ón traidisiún béil, leigheasanna, piseoga, scéalta áitiúla

Tíreolaíocht: Tuiscint d'áit: Logainmneacha áitiúla

Eolaíocht – Ag dearcadh agus ag déanamh – ag pleanáil sa gháirdín

4.2 Maths

Curriculum Area:	Mathematics
Subject:	Mathematics
Strands:	Early mathematical activities
	Number
	Algebra
	Shape and space
	Measures
	Data

Topic: Mathematics in the garden

Mathematics enables the child to think and communicate quantitatively and spatially, solve problems, recognise situations where mathematics can be applied, and use appropriate technology to support such use. The Mathematics Curriculum emphasises the development of the child's estimation skills and problem-solving skills using examples which are relevant to the child's experience. Discussion, hands-on experience with materials, and active learning are encouraged from infants to sixth class, and the importance of the development of mathematical language in communicating ideas is also stressed.

There are great opportunities for teaching maths formally and informally in the relaxed setting of this project. Opportunities for using mathematics in interesting and real situations include:

- working scientifically and using problem-solving approaches,
- using appropriate methods of recording,
- analysing results of investigations and
- identifying variables in designing a fair test.

Subject Strand: Early mathematical activities

All children come to school with some mathematical knowledge and language, which they have gained at home and through play. It is through play that young children learn to share ideas and co-operate, to share toys and express ideas. Play in the classroom / schoolyard develops these early mathematical skills by providing structured situations for the child to explore.

Example:

Junior / Senior Infants: Mathematics activities using objects in the garden.

Strands units:

Classifying – sorting collections of objects

Matching – match equivalent and non-equivalent sets using one-to-one correspondence

Comparing – compare objects according to length, width, height, weight, quantity, thickness or size

Ordering – Order objects according to length or height, order sets without counting.

Subject Strand: Numbers

All number work should be based as much as possible on the children's own experiences and real-life examples used. It is essential that children see mathematics as relevant to their own lives.

Example:

3rd and 4th classes -Problem solving in the environment

Strand Units:

Operations – Addition and Subtraction; Multiplication, Division - Solve and complete practical tasks and problems involving divisions of whole numbers e.g. if we put up to 4 plants in each pot, how many pots do we need to hold 27 plants?

Fractions - Identifying fractions - Rotation of crops – four divisions – $\frac{1}{4}$ each

Subject Strand: Shape and space

The strand "Shape and Space" lends itself to the project as it explores spatial awareness and its application to real-life situations. Here the child's experience of location and special relationships will be a practical one.

Shape and space is particularly suited to integration, as children will enjoy finding shapes and angles in the environment and creating tessellating patterns in art.

Example:

1st and 2nd classes - Spatial awareness in the garden

Strand Units:

Spatial awareness - The child should be enabled to:

Explore, discuss, develop and use the vocabulary of spatial relations between, underneath, on top of, around, through, left, right; explore closed shapes (e.g. circle), so that one walks from one point back to the same point without having to turn around;

Give and follow simple directions within classroom and school settings: from desk to window, from classroom to school hall, from classroom to school yard, explore and solve practical problems.

2-D shapes - explore open shapes (e.g. V-shape), where one has to turn around to get back to the starting point

3-D shapes - make body shapes.

Subject Strand - Measures

The garden is the ideal environment to explore measures. In this strand children are given frequent opportunities to undertake practical activities. These activities are particularly useful in facilitating linkage within the strand units. Fractions, decimals, percentages and operations can be applied in measuring activities.

Problems set in these strands should be mainly practical, with the totals easily verified by measuring. Children should be taught from an early age to estimate the weight, length or capacity of an object.

Example:

3rd and 4th classes – Measuring in the garden

Strand Units:

Length - The child should be enabled to estimate, compare, measure and record lengths of a wide variety of objects using appropriate metric units (m, cm) e.g. everyday objects, furniture, heights of children; Estimate length and height without unit of measurement present and then measure to check estimates.

Weight - Estimate, compare, measure and record the weight of a wide variety of objects using appropriate metric units (kg, g) e.g. everyday objects, books, piles of copybooks lighter and heavier than 1 kg. Use objects which demonstrate that there is no constant relationship between weight and size. Handle and compare objects as an aid to estimation.

Subject Strand – Data

The project provides ample opportunities for using mathematics in a practical way by the recording of project activities. Infant classes collect personal information and represent it on a pictogram; older children create and interpret bar charts and pie charts. Interpreting and understanding visual representation is essential, as the child needs to be enabled to interpret data in an increasingly technological world, and it is hoped that, where available, information technology will be used by children in data-handling exercises.

Collecting data for analysis is an important feature of the project which provides the child with real-life examples of data with which to work.

Children can manipulate data in the formulation of simple bar charts and pictograms at quite an early age. Databases allow them to extend this knowledge to the real world by handling larger amounts of information. They will understand how important it is to enter relevant data and ask clear questions if the information we extract from the database is to be of any use.

Example:

5th and 6th classes – Representing and interpreting data in the project

Strand Units:

Representing and interpreting data The child should be enabled to collect, organise and represent data using pictograms, single and multiple bar charts and simple pie charts

Collect data from the environment in tabular form and represent in appropriate format

Discuss and explore modes of representation

Collect, organise and represent data using pie charts and trend graphs e.g. sales or rainfall per month

Read and interpret trend graphs and pie charts.

There are many other examples of how the Organic Gardening for Primary Schools Project can be used as a tool in the teaching of Mathematics in the primary school.

See also

Integration, linkage and cross-strand planning – *Mathematics Teacher guidelines* pg 46

Mathematical trails – can be easily adapted to the project - *Mathematics Teacher Guidelines* pg 47

Using ICT in Mathematics - *Mathematics Teacher guidelines* pg 62.

Other Resources:

Food Dudes Healthy Eating Programme

www.fooddudes.ie

Food dudes UK

<http://www.fooddudes.co.uk/downloads/Teacher%20resources/Maths%20Key%20St%20age%201/KS1Maths.pdf>

Mathematics in the Garden:

http://www.gardenorganic.org.uk/schools_organic_network/nat_curr/keystage_3/mathematics.htm

4.3 Arts

Curriculum Area:	Arts Education
Subject:	Visual Arts Music Drama
Strands:	<i>see below under each subject heading</i>

Integration Topic: Arts in the garden

The Organic Gardening for Primary Schools Project is ideal for the teaching of Arts Education in the primary school.

Children first learn to respond aesthetically to their environment through touch, taste, sound and smell, and their natural curiosity suggests a need for sensory experience. Visual arts education helps to develop sensory awareness, enhances sensibilities and emphasises particular ways of exploring, experimenting and inventing.

Understanding visual imagery opens additional ways of learning for children and enables them to record real or imagined ideas and feelings. Opportunities to explore and investigate the visual elements in their environment help them to appreciate the nature of things and to channel their natural curiosity for educational ends. The confidence and enjoyment that stem from purposeful arts activities can have a positive effect on children's learning in other areas of the curriculum.

Curriculum Area:	Arts education
Subject:	Visual arts
Strands:	Drawing Paint and colour Print Clay Construction Fabric and fibre
Visual Elements:	Line Shape Form colour and tone Pattern and Rhythm Texture and spatial organisation

Education

Children learn to use line, shape, colour and tone, pattern and rhythm and texture expressively and for design purposes through opportunities to look closely at the visual environment. From this they can draw and paint themes that have personal meaning for them. Simple print-making and creative work in fabric and fibre help to further this development.

Children acquire a very immediate sense of form through working with clay. How people, objects or abstract elements relate to each other in space is a primary concern in the art of children as well as in that of artists.

See also

Visual Arts Teacher Guidelines, Page 9 where the examples are all from the “Room Outside” – ideal for integration in the Organic Gardening for Primary Schools Project.

Some ideas:

- Wall mural
- Paintings
- Drawings
- Colour, shape and texture in the garden / smell / feel
- Patterns of plants / paths, gates and fences and entrances, borders of coloured stones and other material
- Wind chimes – timber, bars, and hollow chimes
- Design of flower garden / veg. garden / pond / reed beds
- Shelter screens - wicker
- Gateways and fences, pathways, seats walls
- Garden sculptures
- Sensory garden / herb garden / ritual gardens
- Bark rubbings
- Potato prints
- Pottery with a garden theme
- Photography and film
- Garden parties / Cooking areas / Fires

Identifying different woods / timbers / different burning timber smells

See also

Exemplars 11 and 12 – *Visual Arts Teacher guidelines*, pages 68, 69

Exemplars 26 and 27 – *Visual Arts Teacher guidelines*, pages 125, 126

Curriculum Area:	Arts Education
Subject:	Music
Strands:	Listening and responding Performing Composing

Music in the garden - some Ideas:

- Wind chimes – wood / steel etc
- Outdoor instruments Drums / bag pipes/ Dancing at the crossroads
- Making musical instruments from objects in the garden

Songs and tunes related to gardens and the great outdoors:

- Down by the Sally Gardens
- The Blackbird
- O'Carolan's Concerto
- Crónán na mBeach
- Water Music – Handel – King George 1 - concert on the river Thames

Music and food

There is a well established link between music and food.

In Ireland, it was always the tradition to have musicians at the great feasts. O'Carolan, the harpist, played at the great banquets in the big houses while Antony Raftery, the blind fiddler and poet, was only allowed play for the servants down in the kitchen.

Some of the best known classical composers internationally were well-known gastronomes. Indeed, had Rossini not been the composer he was, history would have ranked him one of the greatest gastronomes of the 19th Century. See:

http://www.eat-online.net/art/english/music/rossini_on_food.htm

See also the following websites for essays on Bizet and Puccini and their love of fine food;

Bizet http://www.eat-online.net/art/english/music/george_bizet.htm

Puccini http://www.eat-online.net/art/english/music/puccini_food.htm

Note:

Background music, especially classical music, is very conducive to learning and good work.

Curriculum Area:	Arts education
Subject:	Drama
Strands:	Using drama to explore feelings, knowledge and ideas, leading to understanding.
Strand Units:	Exploring and making drama Reflecting on drama Cooperating and communication in making drama

The content of drama is real life in all its manifestations, and the method by which it is examined is story. The making of this story is done through the enactment of selected significant moments or scenes; and the selection, enactment and linking of these scenes and reflection upon them comprises the text of the drama class.

Drama provides children with ways to explore our cultural heritage and new dimensions of a changing world. Language plays a critical role in drama. The Drama Curriculum contributes to developing the child's competence and confidence in English, Irish and other languages. In drama the process is just as important as the product!

Some Ideas:

The Irish Kings and chieftains of old always had a seanchaí / storyteller at their banquets

O'Carolan and Raftery in the big house

Eviction of a tenant during the potato famine

The story of different vegetables – role and character

Discussion - Organic farming versus conventional farming

Irish emigration to America – See the Irish American Folk Park, Omagh - <http://www.folkpark.com/>

Gardens, flowers and herbs were regularly mentioned in plays and poems over the years. For poems for children about gardens and planting see:

www.apples4theteacher.com/holidays/spring/kids-poems-rhymes/

4.4 History

Curriculum Area:	SESE
Subject:	History
Strands:	Myself and my family Change and continuity Local studies Early people and ancient societies Life, society, work and culture in the past
Strand Units:	

Integration topic – History in the garden

This Organic Gardening for Primary Schools project can be integrated into the history curriculum through exploration of the humble potato, or of any of the vegetables or plants grown in the garden.

It is very important to let the children know that there is an international (botanical) name for all plants.

The Potato: *Solanum tuberosum Linnaeus*

The history of the potato has its roots in the Andes Mountains of South America. The tough pre-Columbian farmers first discovered and cultivated the potato some 7,000 years ago. Western man did not come in contact with the potato until as late as 1537 when the Conquistadors tramped through Peru. And it was even later, about 1570, that the first potato made its way across the Atlantic to make a start on the continent of Europe.

In about 1780 the people of Ireland adopted the rugged food crop. The primary reason for its acceptance in Ireland was its ability to produce abundant, nutritious food. Unlike any other major crop, potatoes contain most of the vitamins needed for sustenance. Perhaps more importantly, potatoes can provide this sustenance to nearly 10 people on an acre of land. This would be one of the prime factors causing a population explosion in the early 1800s. Of course, by the mid-1800s the Irish would become so dependent upon this crop that its failure would provoke a famine.

For the rest of the 1800s, the history of Ireland could be said to revolve around the potato – tenants and landlords, famine and eviction, emigration to America and deportation to Australia, insurrection and land acts.

The Onion: *allium*

The onion became more than just food after arriving in Egypt. The ancient Egyptians worshipped the onion, believing that its spherical shape and concentric rings symbolized eternity. Of all the vegetables that had their images created from precious metals by Egyptian artists, only the onion was made out of gold. What a prestigious honour for a vegetable with such a humble beginning!

The popularity of the onion eventually carried it into ancient Greece where athletes consumed large quantities because it would “lighten the balance of the blood”. After Rome conquered Greece, the onion became a staple in the Roman diet. Gladiators were rubbed down with onion juice to “firm up the muscles”.

Cabbage: *Brassica oleracea capitata*

The English name cabbage comes from the French caboche, meaning head, referring to its round form. (Irish – Cabáiste). Cabbage has been cultivated for more than 4,000 years and domesticated for over 2,500 years. Although cabbage is often connected to the Irish, the Celts brought cabbage to Europe from Asia around 600 B.C.

Since cabbage grows well in cool climates, yields large harvests, and stores well during winter, it soon became a major crop in Europe. Early cabbage was not the full-bodied head we take for granted today, but rather a more loose-leaf variety. The head variety was developed during the Middle Ages by northern European farmers.

Rhubarb: *Rheum rhabarbarum*

Rhubarb is a very old plant. Its medicinal uses and horticulture have been recorded in history since ancient China.

Earliest records date back to 2,700 BC in China where it was cultivated for medicinal purposes (its purgative qualities). According to Lindley's Treasury of Botany, the technical name of the genus (*Rheum*) is said to be derived from Rha, the ancient name of the Volga, on whose banks the plants grow. There were those who called it Rha Ponticum, and others Rheum or Rha-barbarum. Others derive the name from the Greek rheo ('to flow'), alluding to the purgative properties of the root. One of the most famous pharmacologists of ancient times the Greek Dioscorides, spoke of a root known as "rha" or "rheon", which came from the Bosphorus (the winding strait that separates Europe and Asia).

Pea: *Pisum sativum*

Field pea was among the first crops cultivated by man. Some say the word "pea" came from Sanskrit; however, most concur that the Latin *pisum*, resembling the older Greek *pisos* or *pison*, is the true origin of the word. The Anglo-Saxon word became *pise* or *pisu*, and later in English, "pease". According to the Oxford English Dictionary, by the year 1600 the last two letters were dropped because people believed the word was plural, forming the singular "pea" that we know today.

Herbs:

For thousands of years, humans have used herbs. Herbs have always been used in the following ways:

- in cooking to flavour foods
- as perfumes - to make us smell nice
- as disinfectants - to protect us against germs
- as medicine - to heal us when we are sick
- as currency, instead of money.

Today we still use herbs for the same purposes, but perhaps not as currency! Look in your kitchen cupboard - you may find small jars or pots of herbs. You probably add them to food to give extra flavouring. Look at the labels and make a list of the herbs in your kitchen.

Recipe books are full of suggestions about adding herbs when cooking. Ask if you can try some! Of all the uses for herbs, the most important is as medicine.

Where do herbs come from?

The herbs we use today come from many parts of the world. We have learnt about how to use herbs from people of past times. We know that people of all ages have used herbs because they wrote about what they learnt.

Who are the people who have taught us about herbs?

The Ancient Egyptians wrote their findings on papyrus.

The Sumerians from Mesopotamia (modern day Iraq) used tablets of cuneiform writing.

Hippocrates was a famous Ancient Greek doctor.

The Romans believed Greek doctors were the best.

Galen was doctor to the emperor Marcus Aurelius.

Dioscorides was the Emperor Nero's doctor.

We learnt about the herbs used in Ancient India and Ancient China through a famous Arabic doctor called Avicenna who had read the ancient writings.

Education

Throughout Europe in the Middle Ages, monks in their monasteries grew and used herbs as medicines. In Germany, Hildegarde of Bingen who was an abbess and a herbalist treated the sick with herbs.

Voyages of discovery in the 15thC and 16thC resulted in the Pilgrims taking to America herbs they used in England. Then, over time, herbs native to America came to Europe and other parts of the world.

In Britain, Nicholas Culpeper published a book to help ordinary people make their own herbal remedies instead of paying for expensive ones from doctors. We also learn about herbs that Druids used before the Romans came.