Caring for the Planet, Feeding Our World

The Environment

MDG 7: ENSURE ENVIRONMENTAL SUSTAINABILITY

The aim of these lesson plans is to enable teachers to explore the relationship between the environment and people, particularly those living in poverty, with 5th and 6th class pupils.

This lesson plan will:

1. Introduce your pupils to global environmental issues
2. Examine the links between the environment and people
3. Introduce your pupils to the Millennium Development Goals (MDGs)
4. Highlight the links between MDG7 and the other MDGs, particularly MDG1 (reducing poverty and hunger).

STRUCTURE OF THE LESSONS:

There are four lesson plans. Each lesson takes between 40 minutes and 1.5 hours. They can be adapted to your pupils' abilities, knowledge and experience. It is not necessary to use all of the lesson plans but they have been developed to lead you through the topics, each lesson building on the one before. They can be done separately or together in a way that fits into your schedule.

CONTENTS OVERVIEW:

PLEASE NOTE:
A good way to help your pupils remember the MDGs is to put up a poster of the MDGs in the classroom. Here are different posters for you to choose from:

- Change the World in 8 steps: downloaded from the MDGs Resources section of Oxfam http://www.oxfam.org.uk/education/resources/change_the_world_in_eight_steps/?37
- Caritas Australia: downloaded from: http://www.bemore.org.au/attachments/db/bmp/140.pdf

GLOSSARY

Where words in the glossary appear in the lesson plans they are marked in by a blue surround

Agriculture	Growing crops and raising livestock (e.g. cows and sheep).
Agro-forestry	Growing crops and trees together. This helps the crops to grow better. It creates healthy soils and land, and allows the land to be farmed for longer.
Climate change	The changing temperature, rainfall, and wind of a particular place over a long time. Changes in the climate are happening now because of humans and our use of fossil fuels (see below). The changing climate is causing drought in some places and flooding in others. The world's poorest people are most affected by climate change.
Deforestation	The cutting, clearing, removal of forest to make way for other land uses, like farming or building.
Environment	The area where something/someone lives.
Fossil fuel	Oil, coal, or natural gas found in the earth; Made from dead plants and animals which would have lived millions of years ago and now used for fuel.
Grafting	Taking a bud or shoot from one plant, and putting it into a stem of another plant, in which it continues to grow. Doing this makes a better plant, which can provide more food.
Greenhouse effect	The air around the earth does a very important job. It lets the sun's warmth in and traps it, like a blanket. The gases which trap the sun's rays are carbon dioxide, water vapour, and methane. But now, there are two many of these gases in the air and they are trapping too much heat causing the earth's temperature to rise, and causing climate change.
Greenhouse gases	Gases that cause the greenhouse effect e.g. carbon dioxide, water vapour, and methane. Human have put too much of these gases into the air by burning fossil fuels, causing climate change.
Interaction	A two – way action that occurs as two or more objects have an effect upon one another.
Irrigation	Bringing water to land or soil.
Malaria	A disease which causes a high fever and affects the red blood cells. The disease is given to humans by the bite of a type of female mosquito found in tropical countries.
Nutrients	Ingredients in food which are nourishing and healthy; that is, used by a body to grow and be healthy e.g. vitamins.
Nutrition	Food which provides the body with all the nutrients that is needed for growth and repair.
Undernutrition	When a person does not have enough food to eat and goes hungry.
Malnutrition	Malnutrition can occur when a person does not have good quality, nourishing food to remain healthy; the person can be either overweight or underweight.
Pollution	The damage to soil, water, or the air by harmful substances such as bacteria, chemicals and waste

Sanitation	What we use for getting rid of body waste safely or hygienically, e.g.: a toilet.
Siltation	The pollution of water by very fine (small) pieces of soil
Slum	Area of very poor and overcrowded housing in a city.
Soil erosion	The way that soil is removed from the earth's surface by nature e.g. rivers or by people e.g. when the soil is over used and the rain washes it away.
Soil fertility	Soil which has the right conditions, including nutrients, for growing plants
Smog	Fog that has become mixed and polluted with smoke
Species	A category of a particular plant or animal.
Subsistence farming	Farming that focuses on growing enough food to feed families.
Sustainability	The idea of living within the limits of the environment, so that it can support humans now, and in the future.

Lesson 4 – Farming simulation game

Outline: A maths based simulation game.

Overview: *In teams, your class becomes African villages. The aim of the game is for your class to grow as much as they can for their village. Over 2 rounds, each team decides which crops to grow, and on a roll of dice, find out if they have a good or poor year for their harvest depending on the weather. At the end of each round each team is given a card outlining something which will either increase or decrease their yield. The team with the biggest harvest for their village at the end of the 2 rounds wins the game. The game, including feedback, takes about 1.5 hours.*

Adapted from Salvation or Starvation by Barby and Vic Ulmner http://blank.hypersurf.com/~odw/

Learning objectives

The children will:

- Understand the idea of subsistence farming (subsistence farming means growing enough food for your family)
- Understand the role of the climate in food production and its relationship with farming
- Recognise the links between MDG 7 and food security
- Practise basic maths skills

You will need

- 'Directions for students' information sheet; 1 copy per group of 3-4 students
- Worksheet for students; 1 copy per group of 3-4 students
- Impact and Solution Cards. **Print and cut out cards prior to the game; keep the Impact and Solution cards separate**
- 1 six-sided dice
- ***Optional:*** you may want to purchase examples of the different food to represent crops listed on the worksheet. These can be obtained in most supermarkets. E.g. Dry chick peas, corn on the cob, millet, peanuts etc. **However,** each group will get a copy of the 'Directions for students' information sheet, which has images of each of the crops/foods in the activity.

Learning experience

1. **Tell the class they are going to do an activity to simulate subsistence farming in villages in a country in Africa. Divide your class into groups of 3-4. Explain** that each group represents a village in an African country. Ask each group to choose a name for their village. The village grows subsistence crops. Your aim is to grow as many crops as possible.

2. **Hand out the worksheets one per group.** Provide instructions to students as in 'Game play' below; this provides instructions on how to play the game. You may need to provide clarification to the class on the game play **(a-h)**

3. At **(e-j)** each group must determine the weather for their harvest. Ask each group to roll the dice, one at a time, and make note if they have a dry or wet year.

4. Once the class has calculated their crop output for Year 1, invite each group to choose an **'Impact card'**. This should be done 'blind' so that the village does not see what is written on the card; e.g. put the impact cards in a pile upside down on your desk and ask each village to select a card. Once they have selected a card each village to read it out. You may need to provide clarification to the class on the game play **(i)**

5. Repeat the process to get the Yield for Year 2. At **(i)** in the Game Play substitute Solution Cards for Impact Cards.

6. **At end of the two years calculate total yield over the two years and the village with the biggest yield wins; achieving food security – enough food for the village.**

7. **Feedback discussion topics:**
    1. Ask **one or two groups** to answer the following questions:
        i. How did the Impact Cards affect their yield and how did they feel about this?
        ii. How did the Solution Cards affect their yield and how did they feel about this?
    2. For **class discussion:**

I. What were the main environmental factors affecting the amount of crops the villages could grow?
II. What other factors affected the amount of crops the villages could grow?
III. How does this game relate to the farmer in Malawi in the film?
IV. How is this different from the situation for farmers in Ireland? Where do we get our food from? What happens if a certain food is not available here?

You may want to compare farming in Ireland with that of the African villages. See http://www.askaboutireland.ie/learning-zone/primary-students/3rd-+-4th-class/geography/food-and-farming/what-is-farming/

Game Play

This section describes the process by which the game is played. A summary version is provided for your students on the 'Directions for students' info-sheet. You can explain the process to your students as follows:

Round 1:

a. Each group represents a village. On the left hand side of the worksheet are the crops that you will grow (Yams, Cassava, Maize, Millet, Groundnuts, Peas). **If you have purchased these, present them to the class at this point. If not, encourage students to look at the pictures at the end of the 'Information sheet'*

b. Your village has 10 fields to plant

c. You must plant at least 3 different crops.

d. Decide as a group which crops to grow and how many fields per crop. Fill in the number of fields for each crop in the 'No. of Fields' column on the worksheet. On the worksheet you'll see that some crops grow better in dry conditions, others in the wet conditions. Now roll the dice to find out if you have a wet or dry year. If you get a 1, 2, 3, 4 you have a dry year. If you roll a 5, 6 you have a wet year.

e. If you have a wet year you calculate your yield (the amount of crops your village produces) by multiplying the number in the 'No. of fields' column with the figure in the 'Wet yield' column. Fill in your yield in the 'Total Yield' column.

f. If you have a dry year, you calculate your yield (the amount of crops your village produces) by multiplying the number in the 'No. of fields' column with the figure in the 'Dry yield' column. Fill in your yield in the 'Total Yield' column.

g. To find out how much your village has grown add up your 'Total Yield' column.

h. Now, sometimes other things happen which can affect(have an impact on) your crops. These Impact Cards tell you what happens. Someone from each village in turn comes up to choose an Impact card and reads it out so that all the other villages can hear what has happened.

i. Each village must now fill out the 'Impact loss' line on the worksheet and calculate the 'Total Yield After Impact'. To do this, you subtract the loss on the Impact Card from the Total Yield.

Round 2:

Repeat the process (a-h) for Year Two

j. In Year Two substitute Solution Cards for Impact cards. Solution Cards provide a positive surprise for the villages. Pupils calculate their 'Total Yield After Impact' by adding the gain from the Solution Card with the Total Yield figure.

Directions for student's information sheet

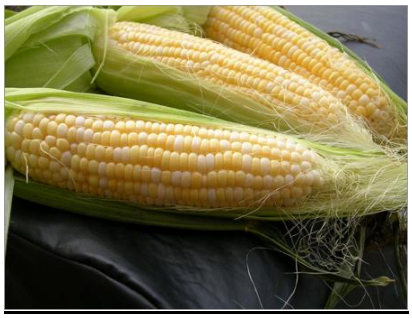
DIRECTIONS for STUDENTS:

1. Your village has **10 fields** to plant; you must plant at least **3 different** types of crop. Fill in the number of fields in the 'No. of fields' column.
2. Crops grow differently depending on the weather. To find out if you have a wet or dry year you roll the dice. If you get a 1, 2, 3, 4 you have a dry year. If you roll a 5, 6 you have a wet year. Multiply the number in your 'No. of fields' column with the number in the wet or dry column for each of your crops. Fill in your answer in the 'Total Yield' column.
3. Add up the numbers in your 'Total yield' column.
4. But – there are other things that can happen to your crops. At the end of year one, you will choose an Impact Card. Impact cards are a surprise for you, your crops and your yield. When you choose an impact card read it aloud Do the same process again for Year 2. At the end of Year 2 choose a Solution Card.
5. At the end of year two add up how much crops your village has produced over the two years. The village with the most crops wins!

Yams:

Cassava:

Maize:



Yams and cassava are root crops which grow under the ground. They are high in carbohydrate which provides energy and are a staple part of the diet in many African countries. While yams are cooked like potatoes, cassava is usually dried and ground into flour to make porridge which is eaten with a sauce.

In Africa maize is ground into flour and made into a thick porridge. It is a staple food for millions of people in sub-Saharan Africa. New varieties of maize are drought resistant.

Millet:

Groundnuts (peanuts):

Chickpeas:

Millet is native to the Ethiopian highlands, and is a main crop in north east Africa. It is seldom attacked by insects and has a protein that other staple foods lack.

Groundnuts and chickpeas provide people with a very important source of protein. Fish and meat are also a good source of protein, but can be expensive for poor communities. Protein is a very important part of the diet to maintain health as it allows the body to grow well and to repair damage.

WORK SHEET

STUDENT NAMES:	**VILLAGE NAME**

Type/Crop	**Wet Yield Units**	**Dry Yield Units**	**No. of fields Year 1**	**Total Yield Year 1**	**No. of fields Year 2**	**Total Yield Year 2**
Yams	70	20				
Cassava	40	60				
Maize	60	30				
Millet	30	60				
Groundnuts	50	30				
Chickpeas	50	30				

Total Yield Year 1 (Before Impact) (add Year 1)	
Impact Year 1 (from the Impact Card) (subtract)	
Total Yield Year 1 (After Impact)	

Total Yield Year 2 (Before Solution) (add year 2)	
Solution Year 2 (from the Solution Card) (add)	
Total Yield Year 2 (After Impact)	

Total Yield After Year 1:

Total Yield After Year 2:

Total Yield _____

Impact Cards

Water pollution Waste chemicals from a factory have leaked into the water. The water comes into your field through your irrigation system. Some of your crops die. **Your village loses 50 units**	**Normal Harvest** Your village brings in a good harvest. But your village's food storage has become damp, causing rot in one half of your yield. **Your village loses half its crops**
Normal Harvest Your village brings in a normal harvest. But a local government official has demanded a bribe from your food supply. **Your village loses 40 units**	**Climate change** Changes in the climate have caused the rain patterns to change. All of the villages experience very heavy rain. But your village is next to a river which bursts its banks and floods your fields. **Your village loses 50 units**
Malaria outbreak Several villagers have become sick with malaria, reducing the number of workers available to harvest the crops. **Your village loses 70 units**	**War** War breaks out in the region and soldiers from both sides overrun fields in your village. They take stored crops and seeds for the following year. **Your village loses 75 units**
Elephant An elephant has come into the village at night and walked through a field of crops. **Your village loses 20 units**	**Soil problems** Deforestation has left the soil around your village lacking nutrients, so your crops don't grow as well as expected. **Your village loses 70 units**

Solution Cards

Farming Cooperative Your village sets up a cooperative with nearby villages to learn and share new farming practices. You have help from a local agricultural scientist whose work is funded by Irish Aid. **Your yield increases by 50 units**	**A Community Well** Your village has had several years of drought. A development organisation offers to work with your village to build a well. **Your yield increases by 60 units**
Tree planting You plant your maize fields with fertiliser trees. The trees help the soil; they prevent erosion and provide nutrients to the maize crops. **Your yield increases by 60 units**	**Literacy Class** Several women in your village join a literacy class. They are now able to read the directions on a natural pesticide sack and find that you need less than you have been using. **Your yield increases by 60 units**
New seeds Your village decides to plant a new type of drought resistant seed. These seeds grow better in dry conditions. **Your village doubles its dry crop units**	**Mosquito nets** An Irish charity has bought mosquito bed nets for each village. This reduces the number of people who get malaria during the year, and it means that everyone is able to work. **Your yield increases by 70 units**
Water supply Your government helps your village to build an irrigation system which brings water to the fields. It also means that the women don't have to carry the water to the fields anymore and can go to a literacy class. **Your yield increases by 50 units.**	