



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:

Glossary	Key terms used in the lesson plans and their definitions
Lesson 1 overview:	Introduction to the Millennium Development Goals
Lesson 2 overview:	Introduction to environmental issues
Lesson 3 overview:	Case study on farming in Malawi
Lesson 4 overview:	Simulation game on subsistence farming
Lesson 5 overview:	Acting for Rio +20

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 too 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. Humans 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 1 – Introducing the Millennium Development Goals

Outline: Using writing and matching activities to explore the Millennium Development Goals

Learning outcomes

The children will:

- Understand the origins of, and reasons for, the Millennium Development Goals (MDGs)
- Be able to describe the Millennium Development Goals in their own words

You will need

- Millennium Development Goals Teacher Information Sheets (for your information)
- The MDGs: In my own words worksheet (see following pages)
- MDG Linking work sheet (see following pages)
- 8 Dictionaries
- Pens/pencils
- Whiteboard/blackboard

Learning experience

- 1. Introduce the MDGs:** Explain to your class: In 2000, 189 countries including Ireland, signed up to achieve the Millennium Development Goals (MDGs). The MDGs are 8 goals to help the world's poorest people meet their needs. The aim of the Goals is try to overcome the biggest problems that face the world's poorest people. We are going to learn what these Goals are.
- 2. Writing activity (a) – The MDGs In my own words:**
 - a. Divide your class into 8 teams. Give each team an MDG from the MDGs 'In my own words' worksheet (on the next page).
 - b. Ask each team to put their MDG into their own words. They can use dictionary to find out what the words mean. While your pupils put the MDGs into their own words, write the full MDGs list – with logos – on the board.
 - c. Ask each group to feed back to the other groups. Each group reads out their own explanation which is written up as a parallel list on the blackboard/whiteboard.
- 3. Writing activity (b) – linking problems to the MDGs:** This activity can be done in groups, or each pupil can do it individually.
 - a. **Hand out the MDG Linking worksheet (one per group/per pupil).** Ask each group/pupil to link each problem to an MDG. (e.g. PROBLEM: OVER HALF THE WORLD'S CHILDREN ARE BORN INTO POVERTY = MDG 1)

WRITING ACTIVITY (a):
THE MDG's in your own words



My/Our MDG is:

My/ Our MDG means in my/own own words:

**WRITING ACTIVITY (b):
THE MDGs linking worksheet**

Match the problem with the correct MDG. On this worksheet there are 8 problems. Meeting the MDG targets would help to solve these problems. Match the problem with the right MDG. Here's one example to get you started...

Over half of the world's children are born into poverty

1 child under 5 years of age dies every 4 seconds due to hunger or preventable

In developing countries almost 3 million people die every year from TB (a lung disease) and malaria. Hundreds of millions more

72 million children around the world are out of school

 <p>1 ERADICATE EXTREME POVERTY AND HUNGER</p>	 <p>2 ACHIEVE UNIVERSAL PRIMARY EDUCATION</p>
 <p>3 PROMOTE GENDER EQUALITY AND EMPOWER WOMEN</p>	 <p>4 REDUCE CHILD MORTALITY</p>
 <p>5 IMPROVE MATERNAL HEALTH</p>	 <p>6 COMBAT HIV/AIDS, MALARIA AND OTHER DISEASES</p>
 <p>7 ENSURE ENVIRONMENTAL SUSTAINABILITY</p>	 <p>8 GLOBAL PARTNERSHIP FOR DEVELOPMENT</p>

A woman in sub-Saharan Africa is over 200 times more likely to die when having a baby than a woman in Ireland

The world's poorest people are the least powerful. They can find it difficult to get governments and rich countries to listen to them

Women grow most of the food in poor countries, but women only own 1% of the land

1 in 3 of the world's people don't have proper toilets or washing facilities and almost 1 in 3 children in developing countries has no clean water to drink

Lesson 2 – Introduction to environmental issues and MDG 7: Ensure environmental sustainability

Outline: *In groups, your class will examine photos and text relating to environmental issues or problems, in a way that demonstrates that the effects of environmental problems can be felt here in Ireland as well as in other countries. In their groups, they will participate in a round-robin discussion to explore the issues in more depth. This allows the groups to focus their discussion, and compare their ideas with others in the class.*

Learning outcomes

The children will:

- Be able to name different environmental problems
- Understand that many environmental problems happen across the world because of human activities; and also, that changing environment has impacts on people
- Recognise that governments and people make decisions on the environment
- Understand MDG 7 and its targets

You will need

- Photos of environmental issues (see following page)*
- Text boxes (see following page)*
- MDG 7 targets (see below)
- Pens/crayons
- 5 large sheets of paper (e.g. flip chart paper; A2 size)
- 5 black markers
- 10 sheets of stickers; 2 different colours
- Whiteboard/blackboard

**you will need to photocopy one set of images and one set of text boxes per group*

Learning experience

- 1. Divide your class into groups of 5 and distribute one set of photos and one set of text boxes to each group.** Ask the group to discuss what is happening in each picture and match the images with the text boxes.
- 2. Now, the groups find out if they have matched the right picture and text box. Taking one picture at a time, go through images and text boxes as they appear on the following pages.**

If you want, the groups can count up the number they have got correct. **Note:** The groups may have very good reasons for matching a different text to a picture and, if so, this should be acknowledged. **Ask the class to rearrange the images as shown on the following pages.**

3. **With all the photos matched to a text box, ask the groups if they can group the different photos together.** Which pictures are similar? Why? Give the groups 5 minutes to do this. Ask each group to call out how they grouped their pictures and why they grouped them this way. Explain that the photos and text can be grouped in a number of ways:
 - i. According to place: England/Ireland and the rest of the world
 - ii. According to different environmental problems e.g. air pollution, water pollution, climate change, slums and poverty, species loss
4. **Presentation exercise:** Ask each group to present the way that they grouped their photos and texts, and the reasons for this, to the rest of the class.
5. **Round robin group discussion – linking cause and effect.** Using 5 large (A1) sheets of paper, write one environmental problem (air pollution, water pollution, climate change, slums and poverty, species loss) at the top of each sheet
6. **Draw a line down the middle of the paper (vertically).** At the top of the sheet write 'Cause' on the other half write 'Effect'. Place the five sheets of paper around the room. Place a marker and 2 sheets of different coloured stickers at each sheet of paper.
7. **Ask each group to stand at one sheet of paper taking their pictures and texts with them.** Explain that each group will get 3 minutes at each environmental issue (each piece of paper) to write down as many causes and effects that they can think of. They may need to read the texts again for clues. After 3 minutes the groups will swap over to another environmental issue, and so on until they have visited all 5 environmental problems.
8. **At each subsequent environmental problem they have 3 minutes to read what the previous group has written.** They can add in additional comments if they wish. They must agree on what they consider is the most important 'cause' and 'effect' of each environmental problem and give each a tick. If they disagree with what the previous group(s) have written, they can put an X.
9. **Choose one colour of stickers to represent 'local' and the other 'global'.** Ask the groups to place a 'local' or 'global' sticker beside each of the causes and effects. NOTE: there is no right or wrong answer to aspect of the activity, as environmental problems can have both local and global causes and effects. This is the point to make once the activity is finished.
10. **Once the round robin has finished, ask each group to return to their first environmental issue.** Ask each group to read through what has been written by the other groups. Look for where other groups agreed and disagreed; and the causes and effects which were considered local and global. Ask each group to present back: 1. their original cause and

effects 2. The cause and effects which were considered most significant. 3. The local and global linkages. 4. Any additional comments made.

11. Linking to MDG 7: Ask the groups to sit down/ return to their class places. Teacher reminds students that MDG 7 is about protecting the environment. To meet this Goal all the countries that signed up to the MDGs are trying to meet some targets. When the teacher reads out the targets below, the groups must choose which of their pictures corresponds to which target and hold it up. The teacher should stress that protecting the environment is an important way to reduce the number of people living in poverty.

Targets for MDG 7:

- i. Reduce the loss of plants and animals
- ii. Reduce by half the proportion of people without long term access to safe drinking water and basic sanitation
- iii. Achieve a better life for at least 100 million slum dwellers, by 2020
- iv. Integrate the protection of the environment into all the things that governments do. Including, reducing the amount of carbon dioxide emissions and solid fuel use.

12. Additional follow up activity - Writing and research exercise linking with MDG7:

Ask each group to research and write a page on the environmental issue of their choice.

This could include:

- a. Who they think is most affected by the environmental problem and why
- b. The cause of the environmental problem
- c. Linking with MDG7: Why might it be important to have an MDG about the environment?
- d. Who should help solve environmental problems and why
 - i. e.g. identify how different organisations (and different types or organisations) are helping to solve environmental problems (e.g. government, NGOs, communities).

NOTES FOR TEACHER TO HELP WITH C. ABOVE: Ask the groups, from looking at the pictures, who do they think solves environmental problems? E.g. Why is there no longer smog in Dublin or London? Who might have given the people in Co. Clare water? Who might be able to stop the air pollution in China? Who might be able to stop the tiger becoming extinct? Who might be able to help the people in Ireland and across the world with climate change? We need people in the government to pass laws which help protect the environment for local problems, problems within our own country. But environmental problems like climate change are more difficult. The causes of climate change can take place in one part of the world, but the worst effects of climate change can often affect countries in other parts of the world. Therefore we also need ALL the governments to meet together to solve environmental problems that affect everyone.

AIR POLLUTION:



http://www.eoearth.org/article/London_smog_disaster,_England

Smog in London

This photo is from London, England in 1952 during 'The Great Smog'. Smog gets its name from: 'smoky fog'. The smog was caused by all the homes in London burning coal to heat their houses. Over a few months in 1952, 12,000 people died of lung and breathing problems. In 1956 the government in England passed a law called the 'Clean Air Act' which stopped people burning coal that makes smoke. Smog was a big problem in Dublin until the 1980s when it became illegal to burn smoky coal.



Smog in China

This photo is from Lanzhou, China in 2009. Nearly 3.5 million people live in Lanzhou. It is very small compared with other cities in China. Smog is a big problem in Lanzhou and in other Chinese cities. Scientists think that over half a million Chinese people die each year from diseases caused by air pollution, like smog. Pregnant women, old people and young children are affected most. Smog in China comes from cars and factories. It also comes from power stations that burn coal to make electricity. A lot of the products we buy come from

CONDITIONS FOR THE POOREST PEOPLE LIVING IN CITIES



The Dublin Slums

This photo shows people living in the Dublin slums in 1901. At that time, Dublin had the worst slums in Europe. There were very few jobs and most people had very little money. The houses were overcrowded, with families living in one room, with no running water. These families often had a lot of health problems, from lack of food and clean water, but did not have enough money to go to the doctor. In the 1950's the government began to take action to try to improve the housing problems in the slums.

http://en.wikipedia.org/wiki/File:Dublin_Slum_dwellers_1901_cropped.jpg



The Nairobi Slums

This photo is from a slum area in the city of Nairobi, in Kenya. One billion people now live in city slums across the world. They are overcrowded, polluted and dangerous places. People do not have clean water and toilets (sanitation). People find it hard to get work and feed their families. Many children do not go to school because their families do not have enough money for books and uniforms. People build their houses out of any waste material that they find. Nearly all future population growth will be in the cities and towns of the developing world. The population living in slums is forecast to increase to 1.4 billion by 2020.

http://childrockinitiative.org/?page_id=48

SAFE DRINKING WATER:



Drinking water in Ireland

In 2011 the people of Ballyvaughan in Co. Clare Ireland could not drink the water coming from their taps. It had become polluted. There was bacteria in the water that makes people very sick. The government got big trucks to bring drinking water brought to the village. Later people were allowed drink their tap water, but only if they boiled it first. Boiling the water kills the bacteria.



Irish Aid

Drinking water in developing countries

1.2 billion people in the world do not have access to clean drinking water and 2.6 billion people don't have access to basic sanitation services, such as toilets. In some places, it is dry and water is hard to find. In other places water may be only a few feet below the ground but people do not have the tools to dig down and the pipes to carry the water to the surface. Irish Aid and development organisations work with governments to help people build and repair wells.

CLIMATE CHANGE



<http://www.epa.ie/whatwedo/climate/climatechangeresearch/imp>

Flooding in Ireland

This photo is from Cork City. Scientists now think that the world's climate is changing and that people are contributing to climate change. Most of the warmest years in Ireland have happened since 1990. We are also getting more rainfall. Burning **fossil fuels** for transport or heating homes, like coal, gas and oil, puts gases in the air which trap the sun's heat. This is called the **greenhouse effect** and it causes the earth's temperature to rise. When we use energy it helps to create **greenhouse gases** and causes the climate to change.



<http://endtimesigns.wordpress.com/2011/08/21/over-2-million-affected-by-monsoon-rains-flooding-in-pakistan/>

Flooding in Pakistan

Climate change is damaging Pakistan's environment and affecting millions of people. Climate change has caused flooding. In 2010 there were very bad floods. In some places 30cm of rain (the length of a standard ruler) fell in one hour. The floods covered one-fifth of the country, about the same size as England, and left millions homeless. Millions of people, more than the population of Ireland, needed food, drinking water and medicine. The effects of climate change are worse in countries like Pakistan where a lot of the people are very poor. Ireland and other countries have sent aid to help people affected by the flood in Pakistan.

For more information about climate change check out the Department of the Environment, Community and Local Government website:

<http://www.askaboutireland.ie/learning-zone/primary-students/3rd-+-4th-class/3rd-+-4th-class-environment/climate-change/>

Information on climate change for teacher:

Causes – burning fossil fuels e.g. coal, gas, oil for transport, electricity, home heating, manufacturing.

Consequences – changing weather patterns, more severe weather events e.g. flooding and droughts

Problem – developed/industrialised countries (e.g. Ireland, U.S.A. China) have caused climate change, but people in poor countries will experience the worse effects

Solution – energy saving; switching to renewable energy sources

SPECIES LOSS



<http://www.hdw-inc.com/lgtigercub.htm>

The Indian Tiger

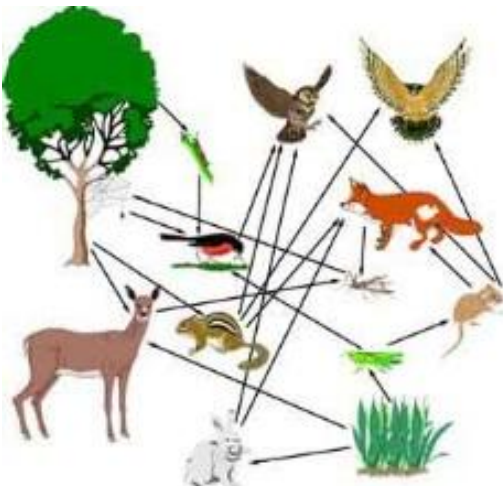
The Tiger is the National animal of India. Scientists think that there are between 3,000 and 4,000 left. Tigers are hunted for sport, trophies, their skins, and sources of traditional medicines. Tigers are also hunted by farmers to stop them killing farm animals like cows and goats. Tigers need a lot of room. Humans have started to move into forests where tigers live. They have cut down trees, polluted the water and air, and also hunted the animals tigers like to eat.



<http://www.noticenature.ie> (Richard Mills)

The Irish Hen Harrier

The Hen Harrier is a bird of prey, which eats small birds and mammals. In 2008 there were just over 300 hen harriers left in Ireland. Numbers of this bird have fallen in Europe because the places where it nests and hunts have been changed by humans. Hen harriers need boggy areas on mountains and hills to nest. In Ireland many of these areas have been turned into farm land to produce food.



http://www.bigelow.org/edhab/fitting_algae.html

Plants and animals are very important for people. Each plant and animal is part of a big jigsaw that makes up our environment. The interactions between animals and plants provide us with everything that we need to live. The environment provides us with food, water, air and shelter. Our environment is important because humans need a clean, healthy environment to survive.

Lesson 3 – Case study of farming in Malawi

Outline: Watch a video on farming and forestry in Malawi and a table quiz

Learning outcomes

The children will:

- Learn about some of the work Irish Aid does in Malawi
- Understand the importance of trees for the environment, but also for farmers in Malawi
- Understand how some of the environmental problems in Malawi are affecting its poorest people
- Recognise the targets for Millennium Development Goal 7 (ensure environmental sustainability)
- Recognise the links between MDG 7 and the other MDGs

You will need

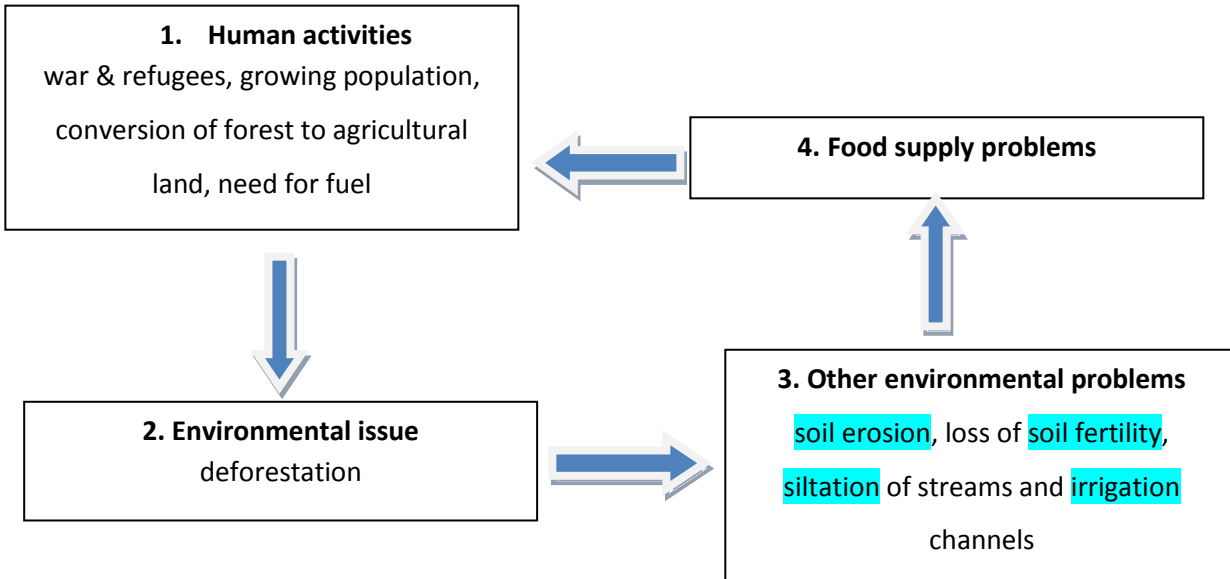
- A video screen/access to the internet to show your pupils a short film about Malawi
Visit the following website to stream the film:
<http://www.irishaid.gov.ie/ourworld/videos.html>
- Table quiz questions (following sheet)
- Poster of the MDGs: e.g.
http://www.oxfam.org.uk/education/resources/change_the_world_in_eight_steps/?37

Learning experience

- 1. Play the video showing the importance of trees in Malawi.** Ask your class to watch it very carefully as you will have a quiz after the video. Once the class has watched the video once, ask if they have any questions or if there was anything they didn't understand. You can watch it a second time if necessary.
- 2. Table quiz.** Divide your class into teams (or pairs). Ask each team to pick a team name. Write a score board on the board with 3 rounds and the names of the teams. There are 25 questions: 10 in Round 1; 10 in Round 2; and 5 in Round 3. The questions get harder in each round. At the end of the quiz the teams add up their scores.

INFORMATION FOR THE TEACHER:

In Malawi there are problems with the soil as a result of **deforestation**. Malawi has also had problems with food supply. The diagram below provides you with some additional information about deforestation and food production problems in Malawi. The arrows represent the links between the issues:



As well as deforestation in Malawi, food supply is hampered by the effects of drought caused by climate change. Irish Aid provides support to the Malawian government and research centres to help farmers produce more food and plant new types of crops which grow in dry conditions. The case study highlights how this support has helped the people of Malawi and their environment.

Table quiz questions – Round 1

WERE YOU WATCHING?

All of the questions in this round relate to things you will have seen in the film.

1. What were the girls carrying on their heads?
 - a. Stones
 - b. Apples
 - c. Branches of trees
2. What did the woman with the children use the wood for?
 - a. Making furniture
 - b. Eating
 - c. Cooking
3. What were the men using the trees for?
 - a. Making fences
 - b. Building
 - c. Making a boat
4. What fruit were people picking?
 - a. Apples
 - b. Bananas
 - c. Lemons
5. What was the woman using to water her trees?
Answer – a watering can
6. What was the woman using to protect her young trees?
Answer – bricks
7. Who or what was being fed the leaves from the trees?
Answer – a cow
8. True or false: scientists in the film were sticking trees together?
Answer – true; this is called **grafting**. They do this to get the best varieties of trees to grow
9. What were the scientists taking out of the ground?
Answer – soil
10. What were the people eating at the very end of the film?
Answer – peas

Table quiz questions – Round 2

WERE YOU LISTENING?

All of the questions in this round relate to things you will have heard in the film.

1. True or false: Malawi is one of the poorest countries in Africa
Answer – true
2. True or false: 25% of households have electricity in Malawi
Answer – false; 5% of households have electricity in Malawi
3. Name three things, other than food, that trees are used for in Malawi
Answer – medicine, building, cooking, helping the soil to grow crops
4. Planting trees helps solve one of the world’s most important environmental problems.
What is it? Answer – climate change
5. Why has Malawi’s natural forest been cut down?
Answer – for **agriculture** to feed a growing population
6. What is the word used to describe the cutting, clearing and removal of forest to make way for other land uses, like farming or building. The first team to re-arrange these letters gets a bonus point. S O R T D A T E O N F I E Answer - DEFORESTATION
7. What has happened to the soil in Malawi?
 - a. It has changed colour
 - b. It has been washed away
 - c. It has started to smell bad
8. Finish this sentence: When the forest is removed, the **soil erodes** (see soil erosion in the glossary) and it loses its ability to..... Suggested answer: grow crops
9. Fill in the blanks. “**Agro-forestry** means growing what? (answer: trees) on a where? (answer: farm)”.
10. What interactions does agro-forestry encourage?
 - a. Between schools and communities
 - b. Between rocks and stones
 - c. Between crops and trees

Table quiz questions – Round 3

WERE YOU LISTENING and WATCHING?

All of the questions in this round relate to LESSONS about the MDGs you can learn

1. The trees being planted on farms do a very special, hidden job. They help the soil. How do they do this?
Answer – they feed the soil making it healthier so that it can grow more crops. The roots and leaves give nutrients to the soil.
2. In the video the farmer talked about the benefits planting trees gave him and his family. The benefits trees provide link back to the MDGs. I'm going to read out what the farmer said. How many MDGs does planting trees help with?

“Before I started planting trees my family was very hungry. (MDG 1) I couldn't let my children go to school (MDG 2). We all had to work for other farmers so that we could buy food (MDG 1). Now with fertiliser trees we have enough maize (MDG 1) and (MDG 7). There is no way I'd let my children miss school (MDG 2).

3. How has Ireland and Irish people helped the farmer?
Answer – Irish Aid helps the Government in Malawi to help the farmers grow more food. (This relates to MDG 8)
4. In the film, fruit trees are being planted that provide people with food and important vitamins that will help them grow and be healthy. What MDGs does this relate to?
Answer – MDG 4 by getting nutritious food young children get stronger and healthy which helps them to fight diseases. MDG 6: Nutritious food helps everyone to fight diseases.
5. Trees are used a lot for firewood in Malawi. Children and women often have to go long distances to collect the firewood. Growing their own trees near their homes means that children and women have more time to do other things like going to school. What MDGs do these relate to? Answer – MDG 2 and 3

BONUS QUESTIONS IN CASE OF A DRAW:

- What human activity is contributing to (adding to) climate change?
 - Answer – burning fossil fuels
- What problems might Ireland face with climate change?
 - Answer – flooding; also sea level rise

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.

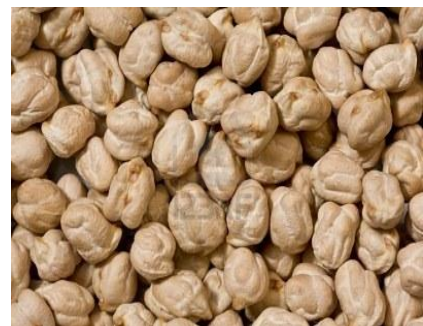
Millet:



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

<p>Water pollution</p> <p>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.</p> <p>Your village loses 50 units</p>	<p>Normal Harvest</p> <p>Your village brings in a good harvest. But your village's food storage has become damp, causing rot in one half of your yield.</p> <p>Your village loses half its crops</p>
<p>Normal Harvest</p> <p>Your village brings in a normal harvest. But a local government official has demanded a bribe from your food supply.</p> <p>Your village loses 40 units</p>	<p>Climate change</p> <p>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.</p> <p>Your village loses 50 units</p>
<p>Malaria outbreak</p> <p>Several villagers have become sick with malaria, reducing the number of workers available to harvest the crops.</p> <p>Your village loses 70 units</p>	<p>War</p> <p>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.</p> <p>Your village loses 75 units</p>
<p>Elephant</p> <p>An elephant has come into the village at night and walked through a field of crops.</p> <p>Your village loses 20 units</p>	<p>Soil problems</p> <p>Deforestation has left the soil around your village lacking nutrients, so your crops don't grow as well as expected.</p> <p>Your village loses 70 units</p>

Solution Cards

<p>Farming CooperativeYour 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.</p> <p>Your yield increases by 50 units</p>	<p>A Community Well</p> <p>Your village has had several years of drought. A development organisation offers to work with your village to build a well.</p> <p>Your yield increases by 60 units</p>
<p>Tree planting</p> <p>You plant your maize fields with fertiliser trees. The trees help the soil; they prevent erosion and provide nutrients to the maize crops.</p> <p>Your yield increases by 60 units</p>	<p>Literacy Class</p> <p>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.</p> <p>Your yield increases by 60 units</p>
<p>New seeds</p> <p>Your village decides to plant a new type of drought resistant seed. These seeds grow better in dry conditions.</p> <p>Your village doubles its dry crop units</p>	<p>Mosquito nets</p> <p>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.</p> <p>Your yield increases by 70 units</p>
<p>Water supply</p> <p>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.</p> <p>Your yield increases by 50 units.</p>	

Lesson 5 – Acting for Rio +20

Outline: Introduction to Rio +20 The United Nations Conference on Sustainable Development

Learning objectives

The children will:

- Recognise the need for co-operation to look after the environment and development
- Begin to recognise that they are citizens of Ireland, Europe and the world
- Recognise that they have a voice in environmental decision making

You will need

- Ideally - an internet connection in the classroom. The following link will stream the speech delivered by 12 year old Severn Suzuki, known as the girl who ‘silenced the world for 5 minutes’. Severn set up E.C.O, an environmental organisation, saved money, and spoke at the Rio 1992 conference <http://www.youtube.com/watch?v=xPx5r35Aymc>
- Alternatively a transcript of the speech is provided here, which could be read by you, or your class.

Learning experience

1. Learning recap:

a. Brainstorm with your class: What have the previous activities shown us about people and the planet? e.g. That people and the planet are connected; that poorest people are affected most by environmental problems

b. Brainstorm with your class: What do we do in our daily lives that are environmentally friendly? e.g. saving water and energy; Recycling , learn more about the environment. **Get the pupils to give specific examples. These are decisions we take to help protect the environment.**

c. Brainstorm with your class: Who makes decisions about protecting environment? E.g. in the previous lessons we learnt that our government makes decisions about helping people care for the environment in Ireland and overseas. Governments have to work together to solve environmental problems.

Teacher explains: One of the most important international agreements about protecting the environment was made at a high level meeting (called a summit) held in Rio de Janeiro, in Brazil in 1992. World leaders, development and environmental organisations and journalists all attended the meeting which was called the Rio Earth Summit. People agreed

that a healthy environment could help move people out of poverty. All the governments, environmental organisations and development organisations agreed to work together to protect the environment. They agreed to try and stop climate change, species loss and deforestation by making sure everyone, businesses, ordinary people and the government became more environmental friendly. Since 1992 Ireland has done a lot. We have energy saving plans to stop climate change, waste plans to make better use of our resources and plans to help nature.

In 2012 it will be 20 years since the Rio Earth Summit. Next year, the world's leaders will meet again to make a new plan to do more to protect the environment and help people living in poverty. The aim is to create a safer world, and make new plan to build a world where the environment is protected so that future generations can have clean water, enough food and decent housing, so that they can have a good quality of life.

2. **If you got the chance to attend that this big environmental international meeting what would you like to say to the governments, the journalists, the development organisations?** In groups of 3 **write a speech or design a poster** which sends a message to the world's adults about what you would like in the future. You may want to investigate what happened at Rio in 1992 and what will happen at Rio +20.

3. **To help with this activity you could watch the You-Tube video or you could get your class to read the speech** (below) delivered by 12 year old Severn Suzuki, known as the girl who 'silenced the world for 5 minutes'. Severn set up E.C.O, an environmental organisation, saved money, and spoke at the Rio 1992 conference.

Here is Severn Suzuki's speech:

Hello, I'm Severn Suzuki speaking for E.C.O. - The Environmental Children's Organisation.

We are a group of twelve and thirteen-year-olds from Canada trying to make a difference: Vanessa Suttie, Morgan Geisler, Michelle Quigg and me. We raised all the money ourselves to come six thousand miles to tell you adults you must change your ways. Coming here today, I have no hidden agenda. I am fighting for my future.

Losing my future is not like losing an election or a few points on the stock market. I am here to speak for all generations to come. I am here to speak on behalf of the starving children around the world whose cries go unheard. I am here to speak for the countless animals dying across this planet because they have nowhere left to go. We cannot afford to be not heard. I am afraid to go out in the sun now because of the holes in the ozone. I am afraid to breathe the air because I don't know what chemicals are in it. I used to go fishing in Vancouver with my dad until just a few years ago we found the fish full of cancers. And now we hear about animals and plants going extinct every day -- vanishing forever. In my life, I have dreamt of seeing the great herds of wild animals, jungles and rainforests full of birds and butterflies, but now I wonder if they will even exist for my children to see. Did you have to worry about these little things when you were my age?

All this is happening before our eyes and yet we act as if we have all the time we want and all the solutions. I'm only a child and I don't have all the solutions, but I want you to realise, neither do you! You don't know how to fix the holes in our ozone layer. You don't know how to bring salmon back up a dead stream. You don't know how to bring back an animal now extinct. And you can't bring back forests that once grew where there is now desert. If you don't know how to fix it, please stop breaking it!

Here, you may be delegates of your governments, business people, organisers, reporters or politicians - but really you are mothers and fathers, brothers and sister, aunts and uncles - and all of you are somebody's child. I'm only a child yet I know we are all part of a family, five billion strong, in fact, 30 million species strong and we all share the same air, water and soil -- borders and governments will never change that.

I'm only a child yet I know we are all in this together and should act as one single world towards one single goal. In my anger, I am not blind, and in my fear, I am not afraid to tell the world how I feel.

In my country, we make so much waste, we buy and throw away, buy and throw away, and yet northern countries will not share with the needy. Even when we have more than enough, we are afraid to lose some of our wealth, afraid to share. In Canada, we live the privileged life, with plenty of food, water and shelter -- we have watches, bicycles, computers and television sets.

Two days ago here in Brazil, we were shocked when we spent some time with some children living on the streets. And this is what one child told us: "I wish I was rich and if I were, I would give all the street children food, clothes, medicine, shelter and love and affection." If a child on the street who has nothing, is willing to share, why are we who have everything still so greedy? I can't stop thinking that these children are my age, that it makes a tremendous difference where you are born, that I could be one of those children living in the Favellas of Rio; I could be a child starving in Somalia; a victim of war in the Middle East or a beggar in India. I'm only a child yet I know if all the money spent on war was spent on ending poverty and finding environmental answers, what a wonderful place this earth would be!

At school, even in kindergarten, you teach us to behave in the world. You teach us: not to fight with others, to work things out, to respect others, to clean up our mess, not to hurt other creatures, to share - not be greedy. Then why do you go out and do the things you tell us not to do? Do not forget why you're attending these conferences, who you're doing this for -- we are your own children. You are deciding what kind of world we will grow up in. Parents should be able to comfort their children by saying "everything's going to be alright", "we're doing the best we can" and "it's not the end of the world". But I don't think you can say that to us anymore. Are we even on your list of priorities? My father always says "You are what you do, not what you say." Well, what you do makes me cry at night. You grown-ups say you love us. I challenge you please make your actions reflect your words. Thank you for listening.