



eco detectives

WORKBOOK FOR
FIRST & SECOND CLASS

**ENVIRONMENTAL & CLIMATE CHANGE
INVESTIGATIONS FOR PRIMARY SCHOOLS**

RESOURCE CARDS

These Resource Cards are available in the Eco-Detectives Education Pack for use where indicated in this workbook, or for any associated class use.

1. **Arable Farmland, Wexford**
© Image courtesy of John Kennedy
2. **Rapeseed Field, Carlow**
© Image courtesy of Susan Pike
3. **Oil refinery, Scotland**
© istockphoto.com - Stephen Wilson
4. **Dairy Farm, Wexford**
© Image courtesy of John Kennedy
5. **Traffic, Galway**
© istockphoto.com - Bradley Anderson
6. **Tolka River, Dublin**
© Image courtesy of Susan Pike
7. **Meadow, Westmeath**
© Image courtesy of John Kennedy
8. **Greenhouse, Botanic Gardens**
© Image courtesy of John Kennedy
9. **Community Garden, De Courcy Square, Dublin**
© Image courtesy of Susan Pike
10. **Bus, Dublin**
© Image courtesy of John Kennedy
11. **Plane, Belfast**
© istockphoto.com - Matteo Barili
12. **Wind Turbines (Windmills), Aran Islands**
© istockphoto.com - Anne Connor
13. **Pie chart of Contributors to CO₂**
Information courtesy of the Environmental Protection Agency
14. **Eco House**
© Marcus Stewart, Earth Horizon Productions
15. **'Normal' House**
© Marcus Stewart, Earth Horizon Productions
16. **Farmers Market**
© Image courtesy of Bord Bia
17. **Supermarket**
© istockphoto.com - Don Bayley
18. **Cloughjordan Eco Village, Mixing Clay, Sand and Straw to Build Eco House**
© Albert Bates
19. **Greenhouse Effect Diagram**
© Department of the Environment, Heritage and Local Government
20. **M6 Galway-Ballinasloe Motorway**
© Image Courtesy of the National Roads Authority
21. **Children walking to school/undertaking a walkability audit for Green Schools**
© An Taisce, by kind permission Gaelscoil Ó Doghair, Newcastlewest
22. **Recycle Centre, Co Kildare**
© Image courtesy of Kill Tidy Towns Committee
23. **Franz Josef Glacier, New Zealand**
© istockphoto.com - Daniel Breckwoldt
24. **Enquiry Process - Student Guide**
© Department of the Environment, Heritage and Local Government
25. **Enquiry Process - Teacher Guide**
© Department of the Environment, Heritage and Local Government
26. **Enquiry Planning for Students**
© Department of the Environment, Heritage and Local Government



All materials in the ECO-Detectives Pack, including digitised Interactive Investigations, Workbooks and Resource Cards, are also available on the CD-ROM attached to the pack or online on the Primary Schools section of www.enfo.ie.

Change.ie and **Changeblog.ie** are part of the National Climate Change Awareness Campaign administered by the Department of the Environment, Heritage and Local Government.

© Department of the Environment, Heritage and Local Government 2010

Design: Roomthree Design

introduction

This Workbook is aimed at 1st and 2nd Class pupils. The enquiries and activities are appealing to children who, at this age, are inquisitive, more receptive to practical work, developing citizenship and are developing cognitive abilities through language.

Make the children feel as if they are real **eco-detectives** through examining their local environment by exploring school grounds, learning about the origins of packaging and how we dispose of packaging; and learning about their own effects on the environment.

Encourage the children to describe everything they see through class discussions and drawings. It is best to take the children outside when the weather is dry – it makes the whole experience much more pleasant for all concerned.

The children can draw pictures of what they see, find and examine; these pictures can then be displayed in the classroom or around the school for all to enjoy!




contents

- enquiry 05: **Our Local Environment**
 > Investigation 05: What is it really made of?
- enquiry 06: **What is it really made of?**
 > Investigation 06: Making Bread
- enquiry 07: **Packaging, Packaging, Packaging**
 > Investigation 07: Packaging, Packaging, Packaging
- enquiry 08: **Products we use**
 > Investigation 08: Food Investigation Planning Sheet
- enquiry 09: **What do I do...What could I do?**
 > Investigation 09: What can I do?

fun stuff: 

useful websites

- > www.change.ie
- > www.enfo.ie
- > www.epa.ie
- > www.noticenature.ie
- > www.greenschoolsireland.org
- > www.recyclemore.ie/recycle_at_school
- > www.erp-recycling.ie
- > www.weeeireland.ie
- > www.changeblog.ie
 register here to receive a monthly environment eZine 

key enquiry question

How do we affect the environment?

key focus

Investigating consumption habits

key questions

1. What is our local environment like?
2. How do we use our environment?
3. What do we use?
4. What are things made of?
5. How much packaging do we use?
6. What happens to packaging?
7. What do we do?
8. What could we do to take better care of the environment?

concepts

- Inputs, processes and outputs
- Natural and human environments
- Environmental awareness and care

skills

- Investigation / Enquiry
- Observation
- Sorting and sequencing
- Drawing places
- Expressing opinions
- Working as a group
- Sharing opinions

resources

- School grounds
- Resource cards
- Products used by children: e.g.
 - > Bread: from bakers, from supermarket, etc.
 - > Packets of crisps: Multi-packs, large packs, etc.

WEBSITES

- www.recyclenore.ie/recycle_at_school
- www.erp-recycling.ie
- www.weeireland.ie

curriculum overview

Geography

- A sense of place and space.
- Geographical investigation skills.
- Maps, globes and graphical skills.
- Human environments: Living in the local community; People and places in other areas.
- Natural environments: The human natural environment.
- Environmental awareness and care: Caring for my locality.

Science

- Working scientifically.
- Materials: Properties and characteristics of materials; Materials and change.
- Environmental awareness and care: Caring for my locality.

SPHE

- Myself and others.
- Myself and the wider world: Developing citizenship.

English

- Receptiveness to language
- Developing cognitive abilities through language.
- Emotional and imaginative development through language.

learning activities

- Children consider what aspects of the local environment are good and what aspects could change for the better.
- Children consider particular features and people in the locality and consider how they impact on the local environment.
- Children investigate what products are made from.
- Children discover the processes involved in making bread.
- Children carry out an investigation to find out how much packaging their favourite foods have. They discuss alternatives for using packaging.
- Children discuss the extent to which items in their lunchbox might decay. Children consider their actions and the impact of their actions on the environment.

favourite environments in our school



key questions

- What is our local environment like?
- How do we use our environment?

outline

In this activity children will observe their local environment. They will consider particular features and people in the locality and consider how they impact on the local environment.

preparation

These activities are best done on a day when the children can take their time and do most of the tasks outdoors.

learning outcomes

On completing these activities all children will be able to:

- observe their local environment;
- decide whether objects are made by Nature, People or Both; and
- describe some of their own impacts on the locality.

resources

- School grounds
- Sheet (optional)
- A3 paper / scrap paper
- Items from childrens' bags, lunches, etc

learning activities

1. Children go outside and talk about their surroundings, including:
 - > features made by nature;
 - > features made by people; and
 - > features that are a mixture of both.
2. If the children have not completed the infant activities, they should also go to the places they like the best and discuss why they like them.
3. Children complete the 'What is it really made of?' Investigation sheet to record their findings (Investigation 05).
4. Children talk about how they themselves affect the environment.

NOTE

- Teacher / children could use any resources they already use in schools with these activities. For example, using mirrors to observe the environment works very well as the children literally see their environment 'from a different angle'.

What is it really made of?

INSTRUCTIONS: What's in your lunchbox? Do you have fruit, sandwiches, juice, crisps or a bar of chocolate maybe? Is it made by people? Is it made by Nature? What is in it? Use good detective work to answer the questions below!

name:

class:

Item	Where is it from ?	Who makes it?	What is it really made of?

making things

key questions

- What do we use?
- What are things made of?



outline

In this enquiry children investigate what goes into a product.

preparation

'Making bread' photographs (Investigation 06) will need to be cut up, the children can do this.

learning outcomes

On completing these activities all children will be able to:

- describe the stages in producing bread;
- begin to appreciate that all production involves inputs, processes and outputs – even if not using such terms; and
- begin to appreciate that making and using products has an impact on the environment.

resources

- Blank paper
- Products from the classroom, e.g. items from lunch boxes or pencil cases
- Pictures of stages of making bread (Investigation 06)
- Scissors

learning activities

1. The children choose an item to examine and think about what it is made from. The children stick the item into the centre of a blank page and brainstorm everything they can think about which went into that product:

Example:



Teacher input will be needed to consider further items, such as the oil used to power transport trucks, steel used in machinery, etc.

2. Children sort the cards to sequence the process of making bread in Investigation 06. They then discuss the stages of making the product. This activity promotes the concept that there are many factors that impact on the environment in the production of modern foodstuffs - transport is a major factor, but also electrical energy and packaging.
3. Children talk about how they themselves affect the environment – in good and not so good ways.

NOTES

- Children could use any resources they already use in schools with these activities.
- **Origins of Irish Products**
Where products used in Ireland are generally from:

■ Milk – Ireland, Europe	■ Sugar – in the past Ireland, but now elsewhere in Europe
■ Cocoa – Ghana, Ivory Coast	■ Plastic – oil, probably from Middle East
■ Paper – China	■ Wood – Malaysia, Indonesia
■ Fruit and Vegetables – Ireland, but may be transported from as far away as New Zealand	

making bread

INSTRUCTIONS: Copy and cut out images and message boxes below. Put all stages in order and discuss these stages and the various processes involved; e.g. wheat is planted (when the soil is ready), watered, heated by sun - perhaps fertilisers are used if not organic, etc.



Wheat is grown



Wheat is harvested



Wheat is taken to the factory



Wheat is milled into flour

making bread

INSTRUCTIONS: Copy and cut out images and message boxes below and use as described on page 1 of this investigation.



**Bread is made from flour,
salt, water and yeast**



Bread is eaten



**Leftover bread is
thrown away**



**Bread bags are
thrown away**

packaging, packaging, packaging

key question

➤ How much packaging do we use?

outline

The children will carry out an investigation to find out how much packaging their favourite food has. They will discuss alternatives for using packaging.

preparation

Possible foods:

- Crisps: individual packs, large bags and multipacks
- Biscuits: individual packs, large packs and multipacks
- Fruits: packaged and unpackaged

learning outcomes

On completing these activities all children will be able to:

- estimate the amount of packaging in items they buy; and
- discuss choices relating to foods they buy.

resources

- Range of foods
- Rulers
- 1 cm acetate grids – if possible
- 'packaging, packaging, packaging' worksheet (Investigation 07)

learning activities

1. The children unwrap the foods, measure the packaging and work out the dimensions of the wrapping noting them on the 'packaging, packaging, packaging' worksheet (Investigation 07).
2. Children work out which items have the most packaging.
3. Children make posters encouraging their classmates to make purchases that involve less packaging.
4. Children assign a score to the packaging from 1 (light) to 5 (heavy).



packaging, packaging, packaging

INSTRUCTIONS: Use your detective powers to see which of the things you buy has the most packaging. With a ruler, measure all the packaging on the product. Look at your results and give a score for the most packaging. 1 for the lowest amount, up to 5 for the highest. How might it's weight, thickness or what it's made of affect the score?

HINT: Area of Packaging = Length x Width. Measure the packaging in centimetres (cm).

name:

class:

Item	Area of Packaging (cm ²)	Weight and Description	Packaging score

products we use



key question

➤ What happens to packaging?

outline

The children will discuss the extent to which items in their lunchboxes might decay. In groups they will plan and carry out an investigation to test which items decay. During this investigation they will be required to make predictions, plan and carry out an investigation, record their results and draw conclusions from their results.

preparation

Collect the resources required for the investigation (see below)

learning outcomes

On completing these activities all children will be able to:

- plan and conduct an investigation ; and
- record and interpret results and draw conclusions.

resources

- Range of 'typical' foods that might be found in lunchboxes. For example, different types of bread, fruit, wrappers, tin foil, cartons. There should be enough so that each group can test three different items.
Do not use meat or dairy products
- Three or four clear zip-lock bags per group
- Somewhere to store foods for the duration of the investigation, e.g. window ledge, cardboard box, table.
- 'Food and Wrapping Investigation Planning Sheet' worksheet (Investigation 08)

learning activities

1. Each group selects 3 different items, each in its own sealed plastic bag. These bags must not be opened at any stage during or after the investigation.
2. Once the items are placed in three different sealed plastic bags, the children should make a number of predictions about the items and record these predictions on the Food and Wrapping Investigation Planning sheet (Investigation 08).
 - > Which items do you think will decay?
 - > Which item will take longest to decay?
 - > Which item will not decay at all in the three weeks?
3. Over the course of the 3/4 weeks the children should observe the changes that are occurring in the items, at least twice a week. **Safety note: The children must ONLY view the decaying items through the plastic bag. They should NEVER take the items out of the sealed bags.** The children should be encouraged to record their observations on the worksheet. They could do this through drawings or digital photographs at different stages during the investigation.
4. When the investigation is finished the children should discuss their results with the whole class.
5. **Optional: Make a wormery.** Children find worms in the school grounds. They then put soil and leaves into a clean, large sweet jar. Children add the worms. They can then follow a similar process to the investigation above to find out which items rot and or are eaten by the worms. See <http://www.dlrcoco.ie/kids/WORMS.HTM>

NOTE

- The children should be encouraged to place non-decaying materials used in the experiment, which are recyclable, in a green bin to re-enforce the environmental message.

food and wrapping investigation

INSTRUCTIONS: You have some items from your lunchbox and some zip-lock , or airtight, plastic bags. How would you safely investigate if everything decays in the same way? What will happen to fruit, bread, wrappers or foil if they're left for 3 weeks? Complete this experiment to see if your predictions are right!

name:

class:

Name of item:**How we will carry out the investigation:****What we think will happen:****Our results:****Week 1****Week 2****Week 3****What we learned:**

what do i do... what could i do?

key question

- What do we do and use?
- What could we do to take more care of the environment?

outline

In this activity the children work in groups to think about their actions. They prioritise their actions.

preparation

Each Pyramid (Investigation 09, extra boxes are provided) needs to be cut up. Children can do this and include other activities they already do, or could do.

learning outcomes

On completing these activities all children will be able to:

- Outline activities they carry out and describe which ones have a more positive and more negative impact on the environment.

resources

- Blank paper, cut into squares (or use Investigation 09, page 2)
- Products from the classroom, e.g. items from lunches or pencil cases
- Pyramid of Actions (Investigation 09)
- Scissors

learning activities

1. **Using the Pyramid:** Copy and cut out cards on pyramid sheet (Investigation 09) and ask the children to place them in order of importance to the environment, from top to bottom - explaining their decisions.
2. **Brainstorming ideas:** Individually children identify 10 actions they already do, after a time the teacher 'brainstorms' all the ideas onto the board.
3. **Selecting actions:** Children select / record 10 actions they do or could do and these are written on blank pieces of paper.
4. **Prioritising actions:** Children re-arrange the actions in their diagram so that the most important are towards the top of the pyramid, the least important towards the bottom. It is essential that the children explain their choices / ideas.
5. **Categorising:** Children could also categorise the cards into 'home', 'school', and positive/negative effect on the environment, etc.
6. **Concluding:** Children should be encouraged to compare their diagrams, for example:
 - The teacher could ask each student/group to justify why they put a particular action at the top of the diagram, and while others could be asked why they placed the same action at the bottom.
 - Each member of the class should be asked their "most important" action. These could be tallied up on the board against individual actions to get an overall "class view". This information could also be used as the basis of a debate.

Variations on the activity

- Provide all or some of the factors in advance to students. They merely come up with a few more to fill the blank boxes.
- Provide all 10 factors for consideration, but make three of them incorrect. Students start by deleting these, then replacing them with their own factors.



what can i do? pyramid of actions

INSTRUCTIONS: Copy and cut out the boxes, or 'blocks' below. Ask the children to re-arrange in a pyramid of 10 blocks with the most important actions on top, least important on the bottom. Some examples indicated here might not be so good - they can be substituted for 'less important' ideas (or examples from the class) if you wish.

Possible Actions:

**Recycle
Glass
Bottles**

**Walk
to School**

**Recycle
Old
Batteries**

**Leave TV
on Standby**

**Fly to your
Cousin's
House**

**Eat
Local
Products**

**Buy Local
Vegetables**

**Plant Some
Flowers**

**Cycle with
Friends**

**Throw
Plastic
in the
ordinary
waste Bin**

**Turn
Lights Off**

**Buy Food
with Less
Packaging**

**Give Old
Games to
Charity Shop**

**Walk to the
Playground**

what can i do? pyramid of actions

INSTRUCTIONS: The children can use these boxes in the same way as on the previous page. These are provided for the children to write their own actions on. This page may also be used as a template to help the children build the pyramid from the 'blocks' on the previous page.

Create your own actions:

The form consists of a pyramid-shaped grid of dashed boxes. The top level has one box. The second level has two boxes. The third level has three boxes. The bottom level has four boxes. Each box is outlined with a dashed line and has a small scissors icon at its top or bottom center edge, indicating where to cut. The boxes are arranged in a symmetrical pyramid shape.

eco detectives game

START

1 you walk to school - march forward 5 spaces!

2 you forgot to turn out the lights last month - the electric bill is huge! go back 3 spaces

3 mum buys you a new bike - race forward 3 spaces

4 the school has a new garden. forward 2 spaces

5 a bunch of neighbours get together to make a vegetable garden. forward 2 spaces

6 your neighbours get some solar panels and tell your parents - forward 3 spaces

7 your house is too warm, go back 3 spaces to reset the thermostat

8 dad offers to carpool with the neighbours on rainy days - forward 2 spaces

9 you buy a bag of individually wrapped sweets skip a turn to dispose the of wrappers

10 your school joins green schools - forward 4 spaces





be an eco-detective!

A game for 2 or more players. Race your friends around the board today and find out all about the good and bad things you, your family and your community can do to help the environment and combat climate change.

you will need:

- 1 Dice
- 1 counter per player

instructions:

1. Everyone rolls a dice - highest number plays first to begin the game.
2. First player rolls a dice and moves forward that number of spaces. If that player lands on a special square, they must do whatever it says in that square.
3. The next player throws the dice.
4. To win, a player must reach the finishing line first, throwing the exact number to win the game.
5. Good luck!

what have you learned from playing the game?

1. What actions were bad?
2. What actions were good?
3. What else would be bad?
4. What good actions could you do?



Comhshaol, Oidhreacht agus Rialtas Áitiúil
Environment, Heritage and Local Government

change.ie



All materials in the ECO-Detectives Pack, including digitised Interactive Investigations, Workbooks and Resource Cards, are also available on the CD-ROM attached to the pack or online on the Primary Schools section of www.enfo.ie.

© Copyright Department of the Environment, Heritage and Local Government 2010

ENVIRONMENTAL & CLIMATE CHANGE INVESTIGATIONS FOR PRIMARY SCHOOLS