

Where's the Impact?

An interactive activity to explore the footprint of items we buy

Introduction

In this activity students will look at consumer items and think about all the stages of their production and what that involved in energy and land use. You can then use it to discuss related issues. This is a very flexible resource with a core activity (for which there is a set of photocopiable cards) and then a number of add-ons which raise more issues. There are resources (prompt and information cards) for these add-ons.

The **purpose** is to get a sense of all the various impacts resulting from the making and using of items and from our actions. It can be used just to get a general sense of that or to increase understanding of how the ecological footprint is calculated (see *What is the Eco-footprint* for an explanation).

It has been successfully used with groups from KS2 to adults.

Approach

The introduction could simply be on the idea that that the things we buy have an impact on the planet.

You could then move on to do the activity with minimal explanation and then use it as an introduction to talking about the Eco-footprint and how it works. It is much easier for pupils to understand what it is and the way it works when they have done a 'concrete' activity.

It can be used to address the following issues:

- Energy use in all aspects of production and distribution

- Energy sources

- The ecological footprint of materials, transport and energy sources

- Global poverty and inequality

- The volume of materials wasted in the production of any item

- The value of recycling

- Pollution

- The relationship between our consumption and the state of the Planet, Climate Change and other people's lives

At any point a wide ranging discussion bringing in some of these issues may take off, even with eleven year olds.

Activity and how to organise it

Stage 1

They will work in groups of 3-6 and you will need one object and a set of cards per group.

Prepare beforehand –

A - A set of objects for them to consider.

You could use the same object with each group or choose a set of objects that are related.

Suggestions –

- a canned drink with sugar in it
- a locally grown potato (preferably organic)
- processed, frozen potato product (minus the contents, unless it is straight from freezer)
- small chocolate egg with toy inside
- Pringle type crisps
- item of clothing
- newspaper or magazine
- a music CD
- chocolate bar
- fresh fruit or veg imported
- fresh fruit or veg local
- package from a frozen convenience food

B World map (with scale) and long ruler / tape

This is useful for looking at where products come from and how far they have travelled.

C - Sets of cards with images.

The pack contains images laid out eight to an A4 page so that you can photocopy them (preferably on coloured card) and cut them out. You might want to enlarge a set to use when introducing the activity to a group. Below you will find a guide to the numbers each group are likely to need and suggested colours.

The images have been chosen to try to represent all the stages in the production, use and disposal of an item or all the stages involved with an activity. The aim at the end is to relate all these stages to land used. With some of them the link with land use is obvious from the beginning, with others not quite so much so. This does not seem to present any difficulty for pupils.

Always have some blank cards in case they want to include stages that do not fit the existing cards.

When doing the activity each group will need room to lay them all out so practise to see how much room you need - it could spread all over the classroom floor.

<i>The cards</i>	<i>number of images per group</i>	<i>suggested colour</i>
Cropland	3	beige
grazing land	2	pale green
woodland	2	dark green
tractor	4	orange
quarry	2	grey
oil rig	2	orange
road and parking spaces	3	grey
factory (used also for refinery, smelter, incinerator)	14	grey
big lorry	25	red
freight ship	6	blue
aeroplane	1	red
shop	2	grey
fridge in shop	1	orange
fridge in the home	1	pink
rubbish truck	1	orange
landfill site	1	grey
landfill site producing methane	1	orange
car	2	red
Bike	1	pale green
Train	1	pale green
Reservoir	2	blue
compost bin	1	pale green
supermarket	1	grey
cooker	1	red
microwave	1	orange
electric plug in a socket (on)	1	red

Introduction to the group

Explain that they are to choose cards to tell the story of the object from beginning to end. Demonstrate with an object and a set of large cards (A4 or A5).

Lay the cards out one by one where the pupils can see them. With a table you would run out of space pretty soon so you may need to do it on the floor or blutac them to a wall. Do the example with the pupils, asking them to suggest the next stage as you lay them out. This enables you to go over some of the issues that they will meet which they are unlikely to know answers to. For example, using the drink can as an example enables you to make sure that they know where aluminium comes from before they do the wrapper for the small chocolate egg with the toy.

Students do stage 1 themselves

Then they can work it out themselves for a different object and feed back to the rest of the group.

Make sure you have got plenty of space - it could spread all over the classroom floor.

Get pupils to read all labels, lists of ingredients, countries of origin etc.

Detailed example 1 - a can of soft drink

There are at least two possible starting points, the can itself and the drink inside.

Words underlined represent a card.

The can -

Quarry - Ask pupils what aluminium is made from (bauxite) and where it comes from (various places around the World, including Australia and Jamaica, but not Britain or the rest of Europe) Bauxite is quarried as a powder and is smelted to produce the metal, often being transported a long way across globe to find a cheap electricity source because the process uses so much of it. So -

Transport to a port lorry (optional)

Freight ship to transport the bauxite to the smelter (optional)

Factory (used for any sort of processing plant)

Transport to a port lorry

Freight ship to transport the metal to the UK (or wherever the can is to be made)

Lorry to factory where cans are made

The drink -

Various ingredients (get them to look at the list) cropland for sugar (beet or cane sugar?) If beet

Tractor then lorry to sugar processing factory and

If cane Tractor (possibly) then lorry to sugar processing factory and lorry to port and freight ship or lorry to factory where the drink is made

other ingredients.....

water - reservoir

lorry to factory where the drink is put in the can

lorry to shop

people drive to the shop - car and parking spaces

The coke is drunk - then 2 possible paths

Goes in the bin - rubbish truck - landfill site

Goes in the recycling unit - lorry to recycling factory to shop (*and on and on with the aluminu*

They should always consider the alternative endings or recycling or landfill site (or others).

Other possible stages they might include -

Factories to produce fertilisers, pesticides, herbicides for growing sugar

The paint / ink on the can

The design process

Cardboard boxes to transport sets of cans - wrapped in plastic?

Further factories and other processes for the construction of the machinery used in the quarry, tractors, cars, lorries etc.

Every lorry also means more road and parking space needed

Most food sold in supermarkets (even small ones) has made another trip to a big distribution warehouse rather than direct to the shop

Even a can of soft drink might be kept in a fridge in a shop or the home

Shopping might be done on foot or by bike (ask the class what they think)

Shopping bag

Another possible waste stream is incineration

Detailed example 2 - Chocolate egg with toy

whole small chocolate egg (65mm long) wrapped in aluminium foil and containing an plastic "egg" which in turn contains a small toy

They need to have a whole egg because then they have -

Aluminium foil wrapper (printed/dyed)

Chocolate

Plastic egg

Paper insert

Plastic toy, sometimes with metal parts (steel axle?)

So via this one little object you can explore a very wide range of issues, including grazing animals because of the milk.

The aluminium foil -

Same as for the can (see above)

Chocolate(all these different ingredients could have their own set of processes) -

Sugar - same as for the soft drink (see above)

Milk powder - grazing land by lorry to factory (creamery) by lorry to chocolate processing factory

Cocoa - cropland and tractor by lorry to port and by freight ship to port and by lorry to chocolate processing factory (already there)

You could leave out these ingredients (too much detail) -

Soy lecithin - cropland and tractor by lorry to port and by freight ship to port and by lorry to chocolate processing factory (already there)

Vanilla - cropland and tractor by lorry to port and by freight ship to port and by lorry to chocolate processing factory (already there)

Butter - grazing land by lorry to factory (creamery) by lorry to chocolate processing factory

Plastic egg and toy -

Oil rig possibly by freight ship and lorry (tanker) to factory (refinery) by lorry to factory where both egg and toy may be made. As this is probably in the Far East then lorry to freight ship and lorry to the factory where the chocolate has been processed.

Paper insert/instructions

woodland and tractor by lorry to factory where the paper is made and then by lorry to a factory (print works) where it is printed and then by lorry to the factory where it is all put together

Then the whole thing goes by lorry to a shop and is bought by someone in a car who eats the chocolate and

Either throws everything else in the bin so that it goes by rubbish truck to the landfill site

Or only throws the plastic away and recycles the aluminium foil so that it goes in a lorry to a factory where it is sorted, cleaned and reprocessed and sent in a lorry to a reprocessing plant

.....

And puts the paper waste in their compost bin

Or keeps the plastic toy to play with it

Additional notes for other items

Locally grown, unwashed potato, bought loose (preferably organic)

packaged into sacks (paper)

potatoes probably put into plastic bag when bought in the shop

What happens to the potato peelings and left over bits? A surprisingly large number of pupils said they ate the peel. Otherwise, it is either the rubbish truck to the landfill site producing methane or the compost bin.

Processed, frozen potato product

You almost certainly have to do the activity with just the packaging, though it would be more effective to have the soggy, unfrozen stuff there. They should read the ingredients and look for where the potatoes were grown.

The microwaveable oven chips are an interesting example. There's a thin layer of plastic packaging on the outside and a lot of cardboard inside.

It will have been kept frozen through all stages after the factory, including in the lorries.

Pringle type crisps

These provide the same range of materials as the small chocolate egg with the toy inside –

- Plastic lid

- Card tube

- Steel base

- Aluminium foil seal

- Thin plastic wrapper

- 'Crisps' with a very long list of additives

Item of clothing

Many pupils do not realise that sometimes they may be dressed entirely in plastics and sometimes entirely in plant and animal materials.

Stage 2

Where is Energy used?

You will need:

- A lot of energy cards (the ones that say *Energy - using electricity or a fuel*)

The students have the cards laid out on the floor. Get them to identify where energy has been used in the process. Give them 'energy' cards to add to the other cards.

You could have different sizes of energy cards and get them to guesstimate which bits use a lot of energy and which a little. Point out that footprinting research can do this accurately.

- Stages that do use a lot of energy (relatively) – processing aluminium, all those lorries

- Stages that use relatively little – on the farm, transport by ship

You could use this to illustrate what embodied energy is – all the energy used in the process of making a product or material.

Stage 3

How the footprint works – brief

You might want to read *What is the Eco-footprint?* Before embarking on this with students.

Explain that the footprint measures land used, that it measures energy land by calculating the woodland needed to absorb the CO₂ produced by that energy source (so the footprint varies according to the energy source).

The footprint adds together energy land and real land (mainly bioproductive or built land).

So producing aluminium uses very little 'real' land but a lot of 'energy land'.

Milk production uses a lot of real land as well as some energy land.

Stage 4

How could you make this product more sustainable?

Replace materials with recycled ones – for some materials this does not reduce the footprint much (see cards).

Change the method of transport used (see cards).

Change where processing happens.

Replace energy sources with ones with a lower footprint (see cards).

Not make the product at all.

Stage 5

The big picture?

This is just one little product. When you look at everything that we consume you see that we consume three times our fair share of the Earth's resources. If everyone on the planet lived like we do in the UK we would need 3 planets to provide for all the stuff we use.

Stage 6

What about issues you cannot measure this way?

Give students a list of other issues to consider –

Where are finite resources used?

What about the workers? (working conditions, wages)

What about other stakeholders?

Can you identify other pollution caused?

Can you see any health issues?

What about aesthetic or social & cultural impacts?

(and see *Follow up discussion*)

Stage 7

How the Eco-footprint classifies land – in detail

You will need:

Coloured paper or card, representing the different types of land that footprint analysis classifies things into –

bioproductive land – yellow/orange

bioproductive sea space - blue

built land - grey

energy land – dark green

biodiversity land – light green

Get them to add these cards to what they already have laid out. Every stage should link to at least one of these cards; most will have energy plus at least one other.

Again they could guesstimate the relative sizes of these.

Considering activities as well as objects

suggestions –

- a holiday in Florida
- going to the pictures
- making a cup of tea

Follow up discussion

There are a variety of issues that can be raised through this activity.

General ones

Why was this product made?

Who benefits from its production?

Does its existence benefit humanity?

Do we consume far more of these things than we need?

What is the impact on the Planet of us using all these resources? (climate change, resources running out) What will life be like for people in the future as a result of us using all this stuff?

Do you think people may have been exploited in the production of this item? If so, how?

Specific issues related to aspects of the particular object

e.g the chocolate egg/toy

All

In all processing along the way materials are discarded as waste, so on average it took 10 times as much stuff in the beginning to produce the the object we buy.

Aluminium

There are issues related to bauxite extraction - pollution of water courses and deforestation in countries such as Jamaica.

A very large amount of electricity is used to produce aluminium from bauxite so its footprint is large. If it is recycled the footprint of the recycled material is much lower (6% of the first use material) but only 40% of aluminium cans are recycled in the UK and we are not even encouraged to recycle things like this wrapper.

Because of the large amount of electricity used in the smelting process bauxite is often transported thousands of miles across the Globe to find cheap hydroelectricity. A hydro scheme is being built in a wilderness area in Iceland just to power a processing plant for imported bauxite. The aluminium produced will then also be transported long distances.

Chocolate

Transporting cocoa from West Africa by sea will not have a large impact. Transporting the product around Europe by truck will have a larger one. There is no indication that the chocolate used is fairly traded. Much of the cocoa that is not fairly traded is produced in conditions of very low wages and often have been described as slavery (see <http://news.bbc.co.uk/1/hi/world/africa/1272522.stm>)

There is a high milk content in this chocolate. Milk has a large ecological footprint because its productivity per hectare is low (land is used to grow grain which is then fed to cows and this is a very inefficient process).

Eating a lot of products with sugar in them leads to obesity and a variety of health problems in later life and obesity in children is sharply on the rise in the UK. However, this particular product actually doesn't

contain much chocolate or therefore sugar. This is a reason why some parents buy it – satisfy the child with small sugar input.

We used to buy most of our sugar from developing countries (cane sugar) but now the EC subsidises the growing of beet sugar, we produce far more sugar than we can consume in Europe and then we dump the rest on developing countries, thus creating problems for their cane sugar producers who do not get subsidised.

Plastic

This nearly all comes from oil and is therefore a finite resource (plastics are much too useful to waste). There are pollution issues relating to some plastics. There is no indication of which plastics are used here (students could test to find out). This is very unlikely to be recycled and, if it was, there would be limited benefit, as the footprint of recycled plastics (when they are completely reprocessed) is about 90% of the first use material. Very, very few children say that they play with these little toys and some say that they throw them away immediately.

Paper

Paper and card are a large part of our footprint. This is, of course, in itself a small amount of paper and the bulk of what we use is newspapers, junk mail and packaging. The footprint of recycled paper is about 30% of the first use. The best thing to do with a small piece like this is to screw it up and pop it in the compost.

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