



# Conservation Education

SUMMER TERM

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## Food

Do you like food? If you do then you are not alone! Eating food is very enjoyable, yet it is also an important and serious business. When you feel hungry, your body is telling you that you need fuel. Just as a car needs petrol to keep the engine running, we all need food to keep us going.

### What is food?

Food contains **nutrients**, which are our source of **energy**, and if we don't have enough food we become weaker and eventually we would grind to a halt like a car running out of petrol. Energy keeps us warm and enables us to move. It also helps our bodies build, repair and maintain our organs and tissues. Without energy we would not be able to get out of bed, walk to school, play football, dance or even breathe, blink or swallow. Everything we do requires energy and therefore food.

Put simply, nearly all the food we eat comes from other living things - mainly plants or animals. The plants we eat (e.g. potatoes, bananas) get their energy from the sun and **nutrients** (goodness) in the soil and water. They can make their own food from these sources by a process called **photosynthesis**. Most of the animals we eat (e.g. chicken, beef, lamb) get their nutrients from the plants that they eat, and some animals get their energy by eating other animals that in turn eat plants! We humans are part of the **food chain** just like any other animal and we therefore all rely on plants to produce the nutrients for our food in the first place.

### Where does our food come from?

Have you ever stopped to think about where the cheese and bread in your sandwich, the cereal you had for breakfast, or the sausages and mash you had for dinner actually came from and how they ended up on the supermarket shelf and then your plate? Let's take a closer look at what we are actually eating and how it is produced.

**Activity:** Why don't you investigate the ingredients for your favourite meal and then work out what plants and animals it was before it ended up on your plate?

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Where did the bread for your sandwich come from?

# Here are a few common foods and what they actually are:

## Beef

meat from cows

Milk/Cream/Yogurt/Cheese/Butter  
(*'dairy produce'*)

made out of milk from cows

## Bacon/Ham/Pork

meat from pigs

## Lamb/Mutton

meat from sheep

## Tuna

a large fish that lives in the sea

## Cereal

seeds from wheat/barley/corn  
(maize)/rye/oat plants

## Pasta

made using seeds from cereal  
plants (see above)

## Baked Beans

seeds from the haricot bean  
plant

## Bread

uses flour, which is crushed  
cereal grains (seeds)

## Tomatoes

fruits of the tomato plant

## Potatoes

underground stems of the  
potato plant

## Chips & crisps

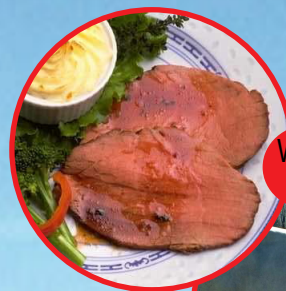
cut up potatoes

## Sugar

comes from the sugar cane  
plant

## Chocolate

from the seedpods of the cocoa  
plant



We get beef  
from cows



Lamb/mutton is  
meat from sheep



We get pork  
from pigs



potatoes



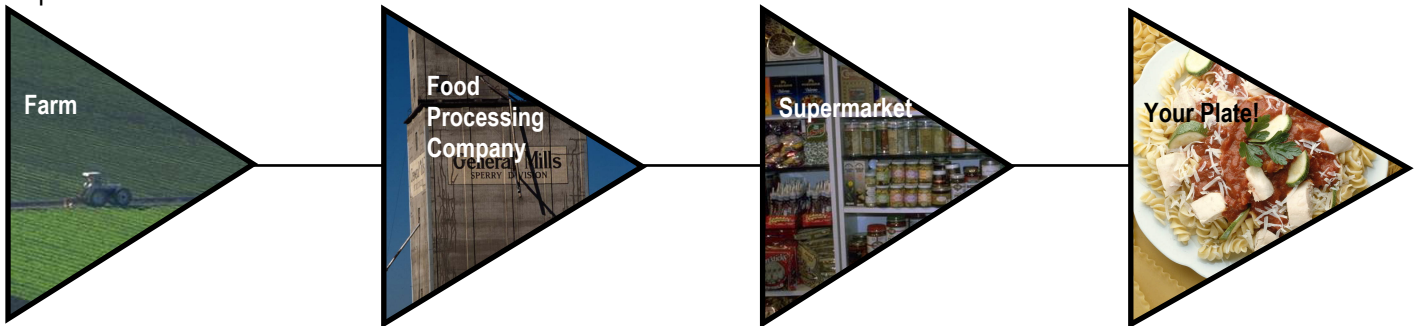
chips are cut up potatoes  
that are then fried



Lasagne is made up of, among other things, beef (meat from cattle), pasta sheets (made from cereal plants), vegetables from a variety of plants and cheese sauce (using cows' milk).

# Farming - from Pasture to Plate

How do all these plants and animals end up on the shop shelves? **Farming**, or **agriculture** is the process of growing the plant foods (**crops**) or rearing the animals for their meat, eggs or milk. The farmer sends these plants and animals to the food processing factories, where they are turned into food that is ready for us to eat or cook, before being sold to the supermarkets.



Farms that grow cereal crops are called **arable farms** and those that have animals such as cows, sheep and chickens are called **livestock farms**.

Humans have been farmers for thousands of years, but there have been many changes since the early days of 'hunter-gathering' when people used to get all their food by hunting wild animals and picking berries and fruits from the forests. Nowadays we have farms with fields, tractors and barns as well

as very different animals and plants than in the past. Today's cereal crops are 'tamed' varieties of wild plants and the cows and sheep are the modern domesticated varieties of ancient wild animals. There are high-tech machines and better systems for growing, watering and harvesting the crops. Some farms in the world are fairly small and produce only enough food for the farmers and their families; others produce food on a huge scale and are big businesses providing food for supermarkets and other countries.

It is estimated that there are now nearly 6.5 billion people in the World and we all want lots of cheap food and plenty to choose from. Sadly, not everyone in the world has the option of shopping in a supermarket or even access to enough food. But *everyone* in the world depends on farms and farming of some sort. Without farming, everyone in the world, including you and me, would have to grow our own food or starve.

## Different types of farming

### Intensive Farming

The big business farms carry out what is known as **intensive farming**. Here are some facts about intensive farms:

- They produce as much food as they can in the space available, as quickly and efficiently as possible.
- Most of the big farms in the UK are intensive farms.
- Intensive arable farms spray chemical **pesticides** on the crops to kill unwanted creatures like slugs and caterpillars, **herbicides** to kill the weeds, and artificial **fertilisers** to make the plants grow bigger and better.
- Intensive livestock farms also use fertilisers and herbicides. They often feed the animals concentrated food containing extra artificial (man-made) nutrients, chemical antibiotics to prevent disease, and growth hormones to make the animals grow more quickly.
- The animals are often kept in large numbers in barns or fields to maximise production and efficiency.
- Battery chicken farms and most dairy cattle farms are examples of intensive livestock farming.
- Intensive farming enables food to be produced more cheaply, so that it is cheap for us to buy.

However, many people are concerned about the effect that intensive farming has on the farmers' livelihoods, the local wildlife and environment and our health. Let's look at the drawbacks of intensive farming:

- Supermarkets are very powerful and often pay the farmers very little for their food. The farmers have to rely on money (**subsidies**) from the government to support them. Many farmers cannot afford to farm anymore because they get paid so little for their crops and animals.
- The pesticides, herbicides and fertilisers can get washed into nearby rivers and lakes by the rain, which causes poisoning of the water (**pollution**) and can harm the wildlife living there.
- The chemicals used on the farms get into the **food chain** and can affect animals like otters and birds of prey that have eaten poisoned fish.
- If the pesticides kill slugs and other minibeasts, it means that there is less food available for the insect-eating birds and mammals in the area.
- Many thousands of kilometres of hedgerows have been removed from intensive farms since the 1940s to make the fields bigger and the farms more efficient. This means that many hedgerow farm animals have nowhere to live anymore.

- The soil on intensive arable farms becomes 'exhausted' as all the goodness is used up by the growing crops. This means that more chemical fertilisers are required to replace the lost nutrients.
- You and I eat the food that has been sprayed or fed with chemicals! Although safe to eat at the time, no one really knows the long-term effect that eating these pesticides has on our health. There are fears that there may be links between these chemicals and health problems, such as cancer.
- The animals are not necessarily kept in a comfortable and humane (kind), natural way. When the farm has an emphasis on producing as much food as possible (e.g. eggs) cheaply, the animals' welfare can be less important, and the animals are often kept indoors in small cages or pens with no access to open fields at all. They are more likely to get ill when they live so close together, and they need lots of chemical antibiotics to try to stop this happening.
- Many people think that food produced intensively does not taste as good or is as nutritious and healthy for us as if it were grown on a smaller, less intensive farm, or even in a garden.

## Here are some worrying facts about intensive farming

**\*In the UK, on average, only 10p in every pound spent by us in a supermarket goes to the farmer. The rest goes to the supermarket, food processing and transport companies.**

**\*More than half of European bird species are threatened with extinction because of pesticide use on intensive farms.**



**Commercial fishing** is a bit like intensive farming but in the sea. Most of the fish we eat as fish and chips or in our fish fingers are caught from the sea by big fishing boats (trawlers) using enormous nets. They catch so many fish every year that there is now concern that there are not enough of some fish species (eg cod) left in the sea and they may become rare or even extinct. Using these huge nets also causes problems for animals like dolphins and turtles, which can get caught up in the nets and drown because they cannot get to the surface to breathe.

Some fishing techniques are destroying fragile underwater habitats and killing other species of animals that live on the sea floor.

**Fish farms** are floating cages in lakes and the sea where fish such as salmon and trout are bred. There are often very large numbers of fish kept in the cages and they are fed concentrated, artificial food and chemical antibiotics to make them grow better without getting ill. The problem with this is that these chemicals get into the surrounding water and affect the wild fish, as well as ending up in our stomachs when we eat them, which could be a health risk. However, eating fish is very good for us as it contains lots of essential vitamins and protein that are harder to get from other foods.

## Extensive farming.

Extensive farms have fewer animals per hectare or don't grow as many crop plants per hectare as intensive farms. Many farms in poorer countries are extensive farms as they have poor quality soil and grassland, which means fewer animals can be reared on the land. However, more and more farms in the UK and Europe are becoming extensive too. They have chosen to have fewer animals on the land and they often use little or no chemicals on the farm. This is because people think extensive farming is better for the animals, wildlife and our health. Some of these types of farms are known as organic farms. You'll have heard the word and seen it in supermarkets, but what does it really mean?

## Organic Farming

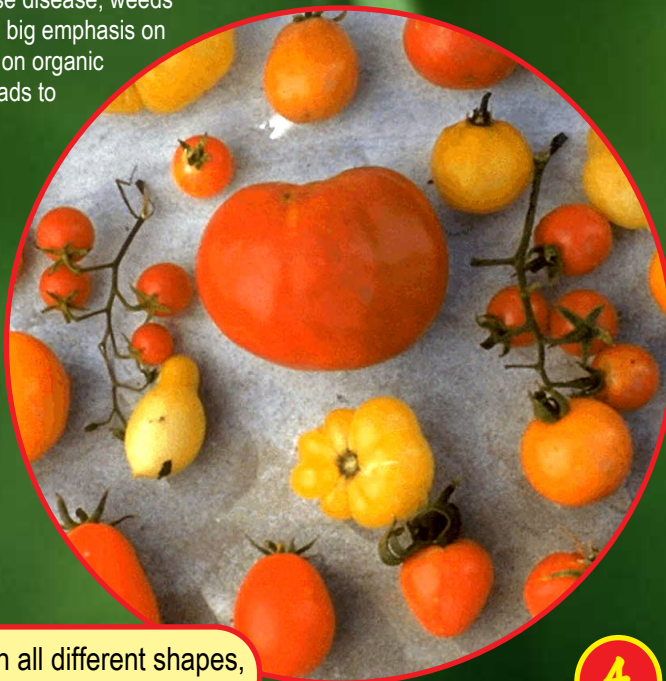
If food is described as 'organic', it means that the crops or animals were grown or reared using very little (if any) amounts of chemical fertilisers, herbicides and pesticides. It also usually means that the animal whose meat you are about to eat was looked after better – perhaps there were fewer of them in the barn or field and they had a more natural lifestyle than those reared intensively. Slugs and other pests are kept away by using natural methods such as encouraging natural predators to eat the pests (e.g. encouraging more ladybirds to live amongst the crops so that they will eat the greenfly) and protecting the hedgerows to provide plenty of places for these useful predators to live.

Organic farmers choose their crop varieties carefully and use special techniques like crop rotation (growing a different crop in the field each year) to minimise disease, weeds and pests. There is also a big emphasis on maintaining a healthy soil on organic farms, as a healthy soil leads to healthy food.

So organic farming appears to be all good news. Many people also believe that organic food tastes better and that organic livestock farming is kinder to the animals than intensive farming. Recent agricultural-related health or welfare worries such as BSE (the so-called 'mad cow disease') and the Foot and Mouth disaster in 2002 are believed to have been largely avoidable if the animals in question had been reared organically.

## So why doesn't every farm use organic methods and why doesn't everyone eat organic food?

1. It costs a lot more money to be an organic farmer as it is not possible to produce as much food as an intensive farm. One reason for the extra cost is that more people are often needed to work on organic farms, which means the farmer has to spend more money on wages. Organic pesticides and fertilisers are more expensive than chemical ones. It also takes longer to plant, grow and harvest organic crops.
2. This means that organic food costs more in the supermarket. These days there is so much other cheap food available that it makes organic food seem expensive.
3. Not everyone believes that organic food tastes better and it often looks less appetising as it can come in all shapes, sizes and colours!
4. Some people argue that organic farming requires more land to produce the food than intensive farming. This means destroying more 'wild' habitats like woodlands and wetlands to create more fields.



Tomatoes in all different shapes, sizes and colours

# GM Food

Another way of producing lots of food is by **Genetic Modification (GM)**.

## So what does this mean?

All living things are made up of millions of cells, which contain **genes**. Genes are the little 'codes' that make every plant and animal different to any other; they make us who we are as individuals; we inherit genes from our parents. Scientists have discovered that they can change genes and even move individual genes from one plant or animal to another. This is known as **genetic modification** or **GM**. Scientists have done a number of GM experiments on food plants to see if they can improve the crops. Let's have a look at some examples:

- The first GM crop to be grown was in the USA in 1996. A crop of tomato plants was genetically modified so that the tomatoes didn't go soft as quickly as ordinary tomatoes. This means that they would stay firm during the time it would take to get from the farm to the shops and fewer tomatoes would be wasted.
- Crops of Soya beans and oil seed rape have had their genes changed so that weed killers do not harm them. This means that more can be grown.
- Maize and cotton plants have been genetically modified to carry a poison that is harmful to pests – this means that pests (like slugs) won't eat the plants and fewer pesticides would be needed.

As genetic modification is a relatively new thing, there is a lot of argument about whether it is a good or a bad thing. Some people are all for it; others worry that it is not safe, sensible or environmentally friendly and these people are against it. Here are some of the arguments for and against GM food:

### GM food could help because:

- GM food could help solve the world's famine problems, because more food can be produced using GM methods. This could help the starving people in developing countries.
- New crops that need little water or that can grow in poor soils could be developed so more people (e.g. in Africa) could grow their own food in difficult places.
- Fewer chemical pesticides are sprayed on the GM crops that are pest-resistant – this is kinder to the environment.
- More food that costs less can be produced.
- Less 'wild' land and habitats would need to be cleared for farming if more crops could be grown in the existing fields.
- Plants could be grown with antibiotics or vaccines in them so it would be easier to treat lots of people all over the world with essential medication. One example is the Cholera vaccine soon to be incorporated into some bananas. This could save thousands of lives every year.
- The quality of the food reaching the shops is more consistent so there is less waste (such as the tomatoes mentioned before).
- Farmers' income (money they earn) could go up.

### People are against GM food because:

- No-one really knows what long-term effect these new plant species could have on the natural environment; for example, what if the herbicide-resistant gene in a GM crop of Soya spreads (in the pollen) to other plants, such as dandelions and thistles – we could be producing 'super-weeds' that no-one can get rid of.
- What effect will these changes have on our own bodies and health? They may be safe to eat now, but what could the result of eating a mixture of a lot of GM crops be?
- Although tests are carried out on all GM foods before being sold to supermarkets, many people are concerned that these tests are not thorough or strictly controlled enough.
- GM crops cause people to have allergic reactions.
- The general public does not always know that they are eating GM food – better food labels are needed.
- Pests and weeds are becoming resistant to the sprays that are used on GM crops and are spreading. As a result GM farmers are using more toxic chemicals and they are spraying more often. This can't be good for the environment.
- People don't like the idea of meddling with nature to this extent.
- Nobody asked the public's opinion before including GM ingredients in some of our foods.



A crop of tomato plants was the first GM crop to be grown in the USA in 1996



Maize plants have been genetically modified to stop pests eating them

Here are some interesting facts about GM food.

Fish genes were once put into sweetcorn (in a laboratory) to make it cope with frost!

7 million farmers in 18 different countries grow GM food (2004)

All the main supermarkets in the UK have stated that they do not use GM ingredients in their *own brand* food.

So as you can see, there are different sorts of farms all over the world, producing many different kinds of food. The food in your house and lunch box has probably come from many different countries, flown in by aeroplane or perhaps shipped in by huge boats. Some of our food has travelled thousands of miles from where it was grown or reared before it ended up on our plates.

## Food miles

All this transportation of our food, from the fields to the processing factory, from the factory to the shops, from the shops to your home, has happened using lorries, planes and cars, all of which burn **fossil fuels**, such as petrol and diesel, in their engines. The burning of fossil fuels has a bad effect on our environment, as it releases **greenhouse gases** such as **carbon dioxide** into the atmosphere. Scientists believe that this is causing problems of climate change, such as **global warming**. The idea of food travelling a long way is known as **food miles** and is yet another thing to think about when buying food if you care for the environment and want to help it.

**Activity:** Look in your lunch box. Before you eat your lunch, write down what is in there and then see if you can find out where most of it was grown or reared. You will need to look at the packets or stickers for 'country of origin' if you can (you may need to wait until you get home to complete this activity). Write down the names of the countries you find and see if you can find them in an atlas. Can you find out how far your lunch travelled before it got to your house?



**Activity:** Collect some empty food packets and labels (eg rice, baked beans, tuna fish, milk, cheese etc) and make a display for your classroom around a world map showing where all our food comes from. Can you find out how many food miles each item has travelled?

## The Food Choice Dilemma

It seems that there are a lot of difficult decisions to make when you go food shopping! There are lots of different opinions on what food is the best to buy and eat if you want to help the environment, look after your health *and* do the best for our farmers, whilst getting the best quality food that tastes great and is not too expensive. The best thing you can do is to do further research to help you make up your own mind. But here are some ideas to get you started:

- If you want to reduce your food miles, buy locally produced food - buy British! Most food in supermarkets is now labelled with 'country of origin' to help you. There are also lots of farmers' markets around the country selling their food directly to you so it will not have travelled far. Buying your food from these markets and local grocery shops rather than supermarkets, helps the farmers make a better living.
- Another way to help farmers make a better living is to buy **Fair Trade** food. This food, such as tea, chocolate and bananas, is often produced in poorer countries. Fair Trade means the farmers get a fair price for the crops they produce.
- If you want to reduce the amount of chemicals you eat and help our wildlife and the environment, buy organic food.
- To help animals have a more comfortable life, look for meat, milk and eggs that have the words 'free-range' or 'organic' written on the label.
- If you don't want to eat GM food, buy organic food or look out for the words 'GM free' on food labels. Check whether your local shop has a GM-free policy on its own-brand food.
- Some people believe that being

**vegetarian** (not eating meat) is better for the environment. This is because a large proportion of the world's farmland is used for rearing animals for us to eat, or to grow food for these animals to eat. It is argued that if everyone was vegetarian, this land could be used instead to produce more crops for humans to eat and it would help solve the problem of food shortages around the world.

- To help animals like dolphins and turtles, buy tuna fish that says 'Dolphin Friendly' on the tin. This means that the tuna fish was caught using nets that have been designed to prevent the dolphins and turtles drowning in them.

These ideas may help the environment and your health, but unfortunately they won't solve the problems of world hunger and famine. Is GM food the answer? Maybe the problems of distributing the food to everyone who needs it should be solved first. There is no one simple answer to the problems of food production, world starvation and the damage it is believed to be doing to our wildlife and environment. But we can all at least think about these issues and do our bit to help before it is too late. It may cost us more money and be less convenient, but does that really matter? Which is more important – our health, wealth, wildlife or the starving?

## Should our food cost the Earth?

## Activities

To help you learn more about food, try some of these activities. Always ask an adult before you try some of the tricky ones.

- Collect all your fruit and vegetable peelings at home and school and make your own compost! Ask an adult to help you make a compost bin.
- When it's ready, use your compost in your own garden! Try growing your own vegetables – potatoes, lettuce and tomatoes are easy to grow in old tubs and it means you will have healthy, fresh, local vegetables to eat without a guilty conscience.
- Try a blind-folded 'taste test' to see whether you think organic food tastes better than non-organic. Buy similar products eg apples, baked beans or cheddar cheese and ask someone to hide the labels so you don't know which one's which.
- Next time you are bored in the supermarket, have a look at the food labels, especially the fruit and veg, and see how many different countries they have come from. How many are British?
- Set up a class debate on GM food. Research as much as you can on the two sides of the argument and see whether it is easy to make a decision at the end!
- Design a poster to highlight one or more of the issues surrounding food.
- Use your 'pester power' to encourage your parents to buy more healthy and 'ethical' foods, ie those that are better for the wildlife, the environment and our farmers.



Check the food labels on the fruit and veg in your supermarket. How many different countries have they come from?

## Useful Websites

Young People's Trust for the Environment

[www.yptenc.org.uk](http://www.yptenc.org.uk)

Organic Consumers Association

[www.organicconsumers.org](http://www.organicconsumers.org)

The Soil Association

[www.soilassociation.org](http://www.soilassociation.org)

Food and Drink Federation

[www.foodfuture.org.uk](http://www.foodfuture.org.uk)

Friends of the Earth

[www.foe.co.uk](http://www.foe.co.uk)

Monsanto Biotech Food Company

[www.monsanto.co.uk](http://www.monsanto.co.uk)

Greenpeace

[www.greenpeace.org.uk](http://www.greenpeace.org.uk)

European Food Information Council

[www.eufic.org](http://www.eufic.org)

Fairtrade foundation

[www.fairtrade.org.uk](http://www.fairtrade.org.uk)

Dept for Environment, Food and Rural Affairs

[www.defra.gov.uk](http://www.defra.gov.uk)

World Health Organisation

[www.who.int](http://www.who.int)

## Did You Know?

- The Romans used to eat lettuce for pudding!
- A leading supermarket in Britain makes more profit in 5 minutes than the average UK farmer makes in a year.
- One cow can now produce up to 90 glasses of milk per day.
- There are 1.8 billion (that's 1,800,000,000) sheep in the world and 15.4 billion (15,400,000,000) chickens! And there are nearly 6.5 billion (6,500,000,000) people in the world.
- There are approximately 2000 chickens per shed on an organic farm. On an intensive chicken farm there can be up to 40,000 birds in a shed the same size.
- In many battery chicken farms (where eggs are produced), each chicken has a cage with floor space the size of an A4 sheet of paper.
- There are more chickens in the world than any other bird.
- A power station in Norfolk, UK, is fuelled by chicken poo!
- In 1830 it took 300 hours to make up 100 wheat bushels. Nowadays it takes 3 hours (why do you think this is?)
- Some apples are sprayed up to 16 times with approximately 36 different pesticides
- Approximately 25,000 tonnes of pesticides were sprayed on UK farms in 2000.
- The Sahara Desert is spreading southward by more than 100 metres per year, mainly due to overgrazing by livestock.
- Approximately 100 million tonnes of fish are caught from the sea every year
- Rice is grown on every continent except Antarctica



## Try an Environmental Discovery Course in the Lake District - now for as little as £120 per person\*!

We have some late availability weeks for school groups on our Environmental Discovery Courses in the Lake District. Prices are being heavily discounted on the courses, which run from Monday to Friday, and we are able to offer bigger discounts to larger groups of 40+ young people.

To find out more, please contact Morna Stevens, Northern Education Officer on 01768 480503.

\*Price quoted subject to a minimum group size of 40 young people.

## Help us to spread the word!

We have received a great response from our member schools to our appeal for email addresses now that Conservation Education has become a virtual publication.

However, we know that there are many more schools that could benefit from receiving Conservation Education free of charge, so please let all your colleagues know that they can join our emailing list by registering for a school membership online at [www.yptenc.org.uk](http://www.yptenc.org.uk)



### Credits:

This issue of Conservation Education has been written by Morna Stevens, Northern Education Officer for YPTE. Layout and design by Lee du Toit.

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