

MY TARGET GRADE IS .....

THE IMPACT OF HUMAN  
ACTIVITY ON THE  
ENVIRONMENT

BIOLOGY 1

# HUMAN POPULATIONS

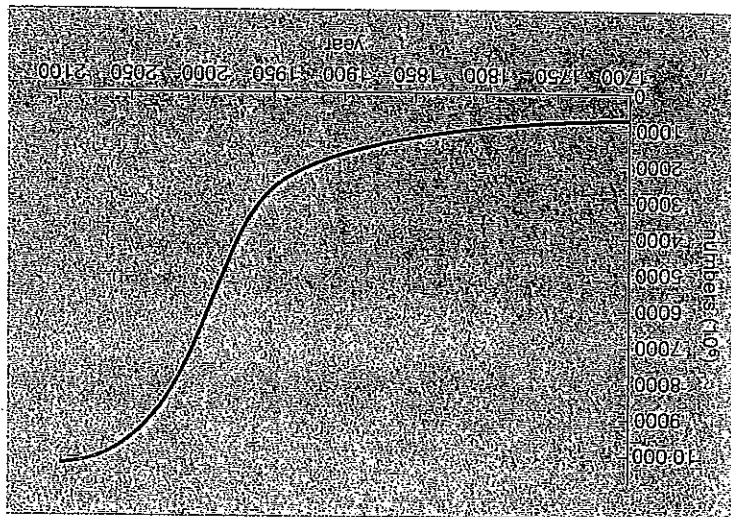
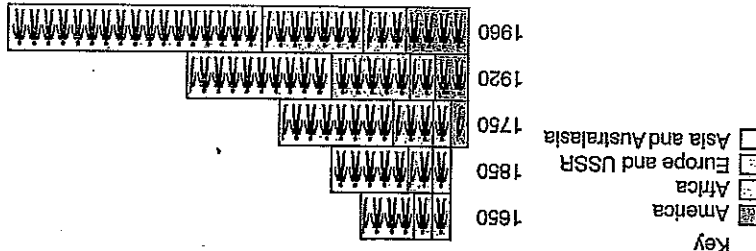
## THE POPULATION EXPLOSION

The world's population is growing at a frightening speed and is undoubtedly the main environmental influence on problems relating to overcrowding and pollution.

What factors influence the size of populations?

- BIRTH RATES
- DEATH RATES
- STARVATION/FAMINE
- DISEASE
- WARS AND CONFLICT

Each column represents the population for the parts of the world shown. Little human figures indicate roughly the number of people - each were 550 million people. The Americas then had 3000 million people with over 400 million in the Americas.



In addition to this problem of a population explosion, there are the many problems of pollution that come with the use of a limited space by an ever-increasing number of people.

Complete worksheet 1  
Complete worksheet 2

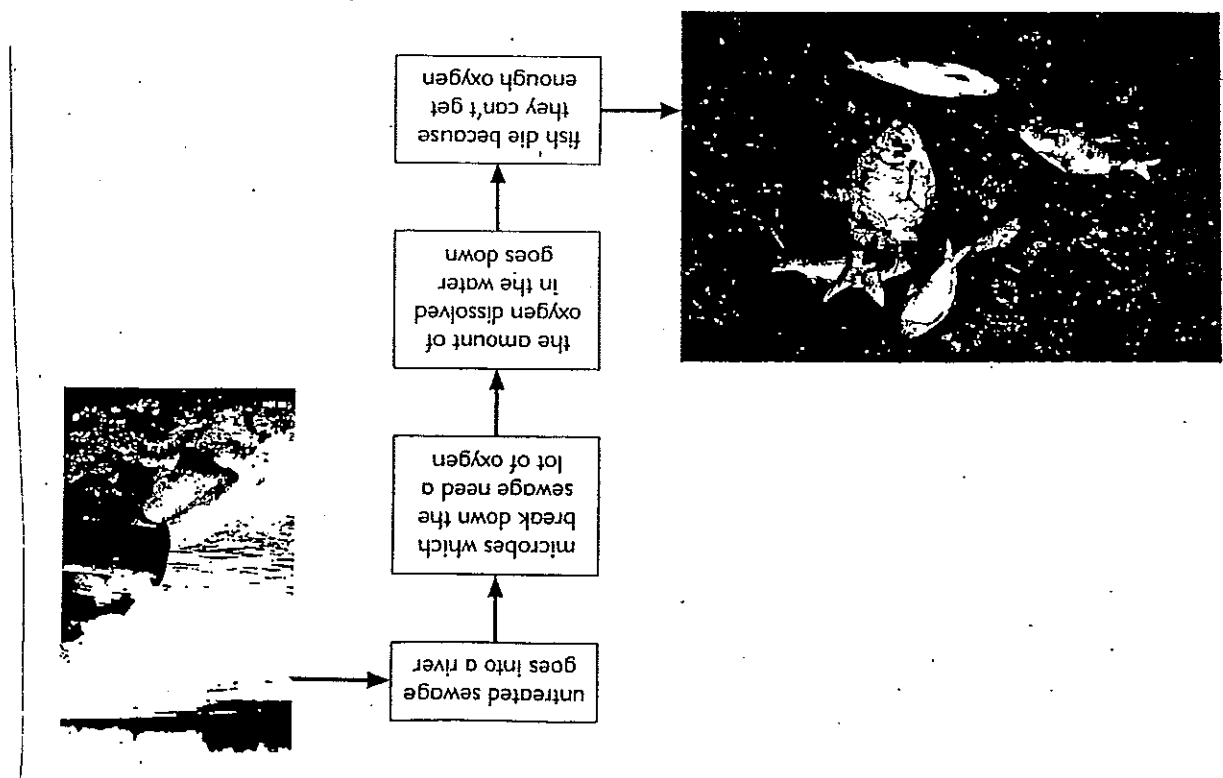
## HOW HUMANS AFFECT WATER

Thousands of different plants and animals live in water. Water life can be killed and our water supplies poisoned if harmful substances called **POLLUTANTS** get into our water supply.

**A POLLUTANT IS A SUBSTANCE WHOSE PRESENCE IN THE ENVIRONMENT IS HARMFUL.**

### 1. SEWAGE

We treat most of our sewage so it does not pollute rivers and seas. The diagram shows what can happen when untreated sewage gets into a river,



(a) What happens to fish in a river polluted with large amounts of sewage?

(b) Why is not there enough oxygen in the water?

## 2. FERTILIZERS

Fertilizers sprayed onto fields can SEEP or LEACH into rivers and lakes where they cause algae to grow quickly. The algae spread over the surface blocking out the light from the plants below. All the plants DIE and are DECOMPOSED by BACTERIA which use up all the OXYGEN. So fish and all other water life die too, because they have no oxygen for RESPIRATION. This is known as EUTROPHICATION.

(a) Draw a flow chart to summarize EUTROPHICATION.

## 3. DETERGENTS

The millions of gallons of detergents reaching drains daily add to water pollution problems. Many contain PHOSPHATES, so they act as fertilizers, leading to more problems with eutrophication.

#### 4. PERSISTANT CHEMICALS

Some toxic chemicals are not DIGESTED or BROKEN DOWN by the cells of living organisms. We say they are PERSISTANT.

#### CHEMICALS WE USE ON FARMS

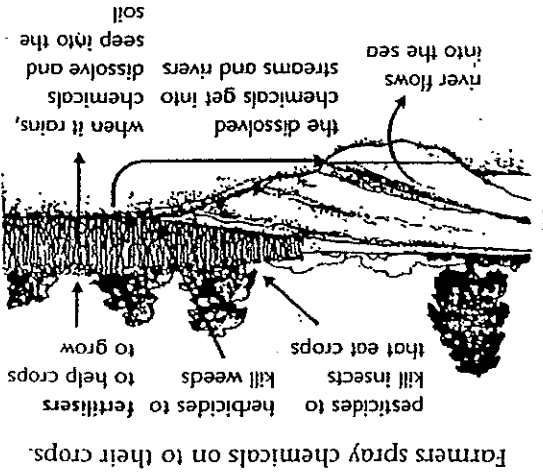
Farmers spray chemicals on to their crops. PESTICIDES and HERBICIDES are two examples of these chemicals.

Pesticides kill insects and other animals that feed on their crops and herbicides kill weeds.

(a) Why do farmers want to kill weeds?

(b) Organic farmers try not to use chemicals on their crops. Why is this?

The diagram shows what can happen to pesticides and herbicides that farmers spray on their crops.



(c) How do these chemicals get into rivers and streams?

(d) What other chemicals can also get into rivers and streams?

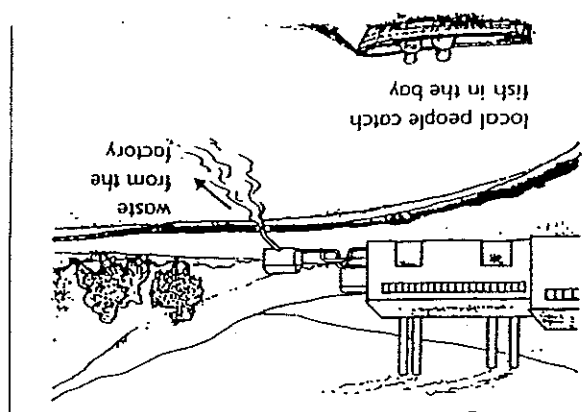
(e) Where do the chemicals eventually end up?

## INDUSTRIAL WASTE

The most important long-term form of water pollution is due to industrial wastes such as cyanide or heavy metals, e.g. mercury and lead. These are often by-products of manufacturing processes in paper mills, steelworks, refineries and car factories.

Non-biodegradable substances called polychlorinated biphenyls (PCB's) are used in the manufacture of paint and electrical equipment.

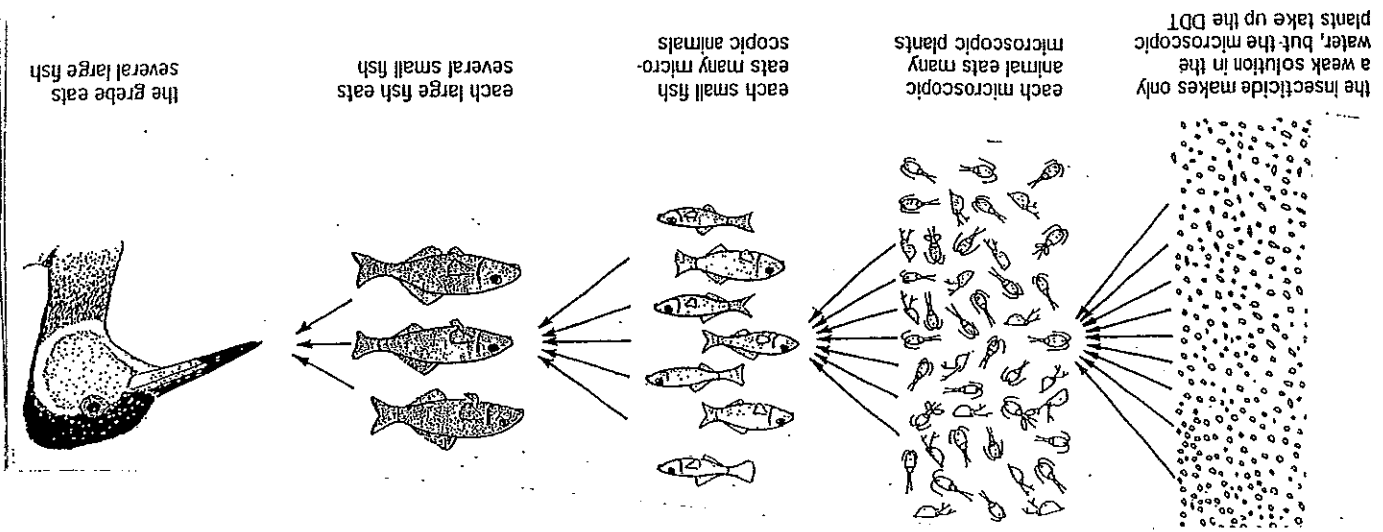
In the 1960's a chemical factory in Minamata Bay, Japan, let out poisonous waste containing mercury into the sea. By 1969 many people were ill and 68 people died.



(f) Look at the diagram. How did the mercury poison kill people?

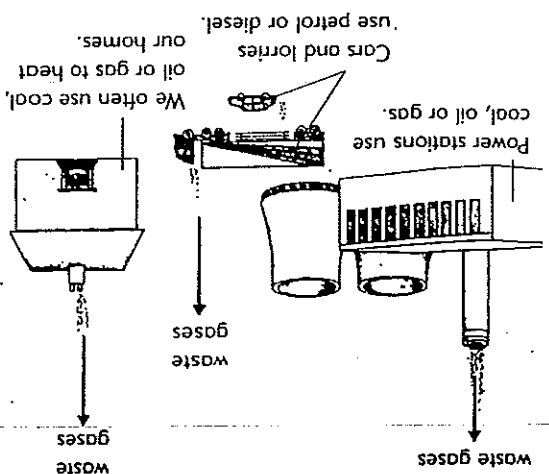
Persistent chemicals do not get broken down therefore they enter FOOD CHAINS.

The further along a food chain an organism is, the more CONCENTRATED these chemicals are likely to become in its tissues. This is known as BIOACCUMULATION.



## HOW HUMANS AFFECT THE AIR

We are constantly putting waste gases into the air around us.



1. Write down three places where we produce waste gases.

- a) \_\_\_\_\_
- b) \_\_\_\_\_
- c) \_\_\_\_\_

2. How are these waste gases produced?

Acid Rain

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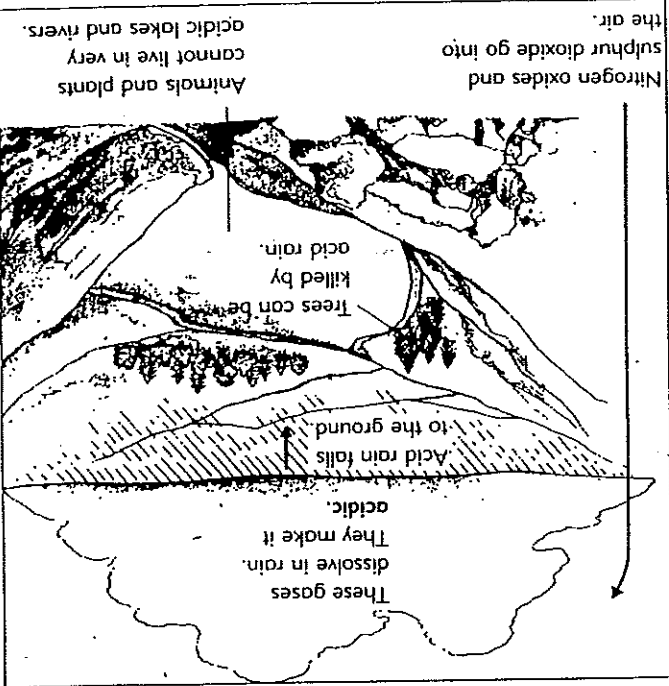


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### What causes acid rain?

Fuels often contain sulphur. When fuels are burnt, this sulphur produces a gas called sulphur dioxide.

When we burn fuels, nitrogen and oxygen from the air also react to produce nitrogen oxides. The diagram shows how these gases make acid rain.



3. Copy and complete the following sentences.

Burning fuels produces waste gases called \_\_\_\_\_ and \_\_\_\_\_

\_\_\_\_\_ in \_\_\_\_\_.

Acid rain \_\_\_\_\_.

\_\_\_\_\_ It also makes lakes \_\_\_\_\_.

\_\_\_\_\_ and rivers too \_\_\_\_\_ for plants and \_\_\_\_\_

\_\_\_\_\_ animals to survive. Acid rain also corrodes \_\_\_\_\_

\_\_\_\_\_ stonework on buildings.

**What can we do about acid rain?**

To make rain less acid we must put less sulphur dioxide and nitrogen oxides into the air. The diagram shows some ways of doing this.

4. Write down two ways of reducing the amount of sulphur dioxide we put into the air.

1. \_\_\_\_\_
2. \_\_\_\_\_

5. (a) How can we remove nitrogen oxides from car exhaust fumes?

- (b) What harmless gases are produced from this?

**Asthma**

Tom has asthma. When he has an asthma attack he cannot breathe in enough air. A serious attack could kill him.

Some scientists believe that pollution in the air could be one thing that can cause these attacks. Children with asthma who live near a main road seem more likely to have serious attacks.

6. Why do you think this could be?

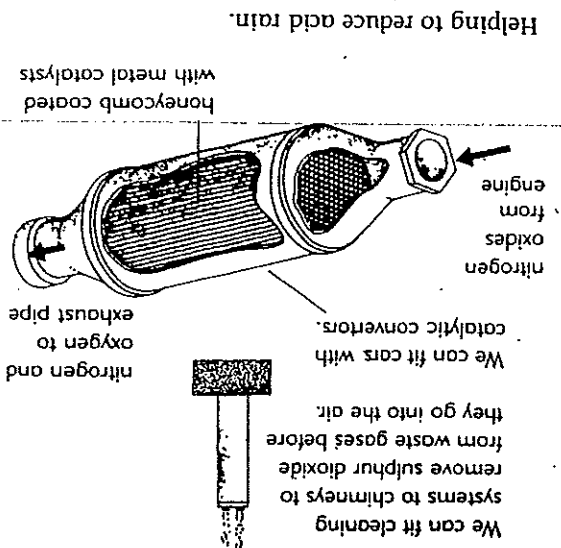
7. Can you think of any other examples of how these gases affect humans.

COMPLETE WORKSHEET 5

COMPLETE WORKSHEET 6

COMPLETE WORKSHEET 7

COMPLETE WORKSHEET 8





## INDICATOR SPECIES AS A SIGN OF POLLUTION

Sometimes the balance of nature is upset by the introduction of harmful materials into the environment, which results in POLLUTION.

When a habitat is polluted, it changes. The organisms that normally live there will either die or move away. Sometimes other organisms move in, these have adaptations which help them to live in polluted conditions.

LICHENS are often used as indicators of SULPHUR DIOXIDE AIR POLLUTION.

~~INVERTEBRATE ANIMALS~~ are often used as indicators of WATER POLLUTION.

Some invertebrates, like mayfly nymphs and rat-tailed maggots, are able to survive in polluted water. Others die as a result of the pollution.

## WHAT HAPPENS WHEN A STREAM OR RIVER BECOMES POLLUTED?

- Pollutant e.g. sewage is added, which kills some living things.
- Bacteria (decomposers) break down the pollutant. They respire and use up the oxygen.
- Lack of oxygen kills other organisms, but a few species survive.
- As the water flows, oxygen levels gradually increase.

## SEWAGE POLLUTION AND INVERTEBRATES

DISINFECTION down stream from where sewage enters the river (m)	WHAT THE WATER IS LIKE	INVERTEBRATES found (and what to expect)	OXYGEN LEVELS	Sewage enters here 0-10	dark and cloudy very smelly
				rat-tailed maggot Chironomus larva	falling quickly
				mosquito larva	very low
				tubifex worm (sludge worms)	cloudy bad smell
				caddis fly larva Flatworm	slight smell beginning to clear
				stonefly larva mayfly larva freshwater shrimp	100-200
				back to normal	200+
				clear	200+

TABLE 2: The effects of untreated sewage in a river.

Scientists take samples of the animals living in a river to see if it is polluted. They use special nets with a fine mesh. If the holes in the mesh were too big some of the invertebrates would pass through and the scientists would not be able to judge how polluted the water really was.

Complete Worksheet 9

HOW HUMANS HAVE CHANGED THE LANDSCAPE

People don't just affect water and air; they also change the land they live on.

Wherever humans go, they leave behind a trail of waste. Archaeology is dependant on the discovery of materials left behind by previous civilizations.

QUESTION

Write a list of as many land pollutants that you can think of.

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- 
- 
- 
-

## How humans have changed the landscape

People don't just affect water and air. They also change the land that they live on.

After the last Ice Age, 60 per cent of the British Isles was woodland. The maps show how this had changed by the year 1086.

1. Copy and complete the following sentences.

In 7000 BC, \_\_\_\_\_ per cent of Britain was covered with trees. By 1086 AD this had fallen to \_\_\_\_\_ per cent. This means that there were \_\_\_\_\_ times as many trees in 7000 BC as in 1086 AD.

2. Was more woodland lost from the north or south of Britain?

### What happened to the trees?

From 7000 BC The land was cleared of trees for animals to graze and then to grow crops.  
 From 500 BC Wood was first used to make charcoal to get iron from iron ore.

The number of people increased. More land was cleared for farming. More wood was needed for building.

From 1086 AD As the population continued to increase, more land was needed for farming and building. More trees were cut down.

3. Write down three reasons for cutting down trees.

a) \_\_\_\_\_  
 b) \_\_\_\_\_  
 c) \_\_\_\_\_

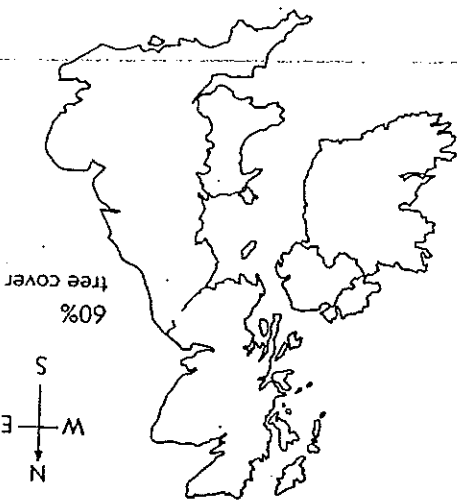
### Twentieth-century forests

Millions of acres of trees were cut down during the First World War. Timber was needed for pit-props in coal mines, paper and building. The war ended in 1918. By this time trees covered only 4 per cent of the British Isles.

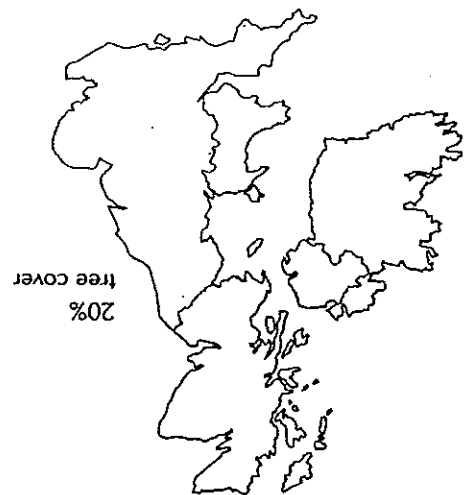
4. What was done, after 1918, to increase the numbers of trees in Britain?

About 10 per cent of Britain is now covered by trees. 11

1

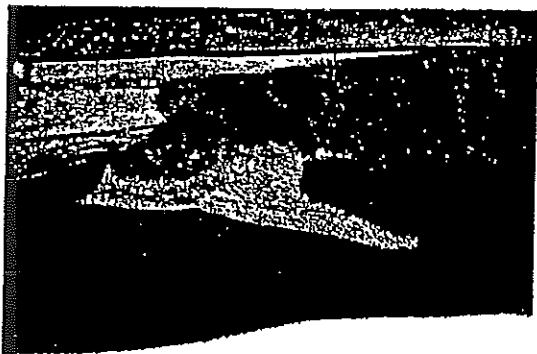


7000 BC - British Isles after the last Ice Age.



1086 AD - Domesday survey.

The Forestry Commission was set up after the First World War. Large areas of new forests were planted.



**Effects of losing the trees**

Many woodland plants and animals can survive only in shady and damp conditions. When woods are cut down, there are fewer places for them to live.

5: Some woodland plants survive in hedges. Why do you think this is?

6: During the last 50 years many hedgerows have been pulled up to make bigger fields. Why do you think many people are worried about this?

**What else do people use land for?**

People use land for other things beside farming. We use land for buildings and roads. We also use land for quarries for stone, and for landfill sites where we dump rubbish.

When land is used in these ways, many plants and animals can no longer live there. We say we have destroyed their habitats.

The map shows land use in a small area.

7. What is most of the land in this area used for?

8. What is shown in square B4?

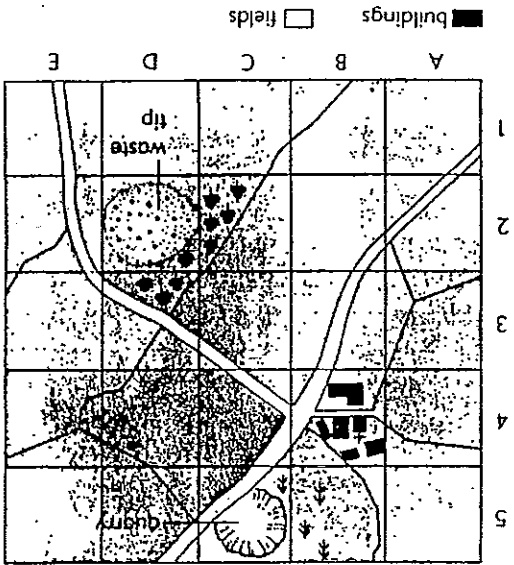
9. Land is also used for quarrying and for dumping waste. In which squares can you find evidence for these activities.



Hedgerows



Open fields



IN SUMMARY

Destruction of the habitat is due to :-

1. BUILDING

2. QUARRYING/MINING

3. DUMPING/LANDFILL

4. AGRICULTURE/FARMING

5. DEFORESTATION

Complete worksheet 10 - 'Deforestation'

Complete worksheet 11 - 'Environmental Impact Assessments'

SUSTAINABILITY

One solution to the problem of land fill and rubbish is **RECYCLING**.

This reduces the production of waste materials that are a source of pollution. It also helps save our non-renewable resources such as minerals and our renewable resources such as trees.

## INTENSIVE FOOD PRODUCTION AND THE ENVIRONMENT

### QUESTIONS

Use the information sheets and the following websites to answer the questions below.

[www.nature.com](http://www.nature.com)

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

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

### KEY WORDS

The Independent Scientific Group on Cattle TB/animal welfare/battery farming/

1. How is crop production kept at a high level?

2. What is 'battery farming'? Why is it useful? Do you have any reservations about it?

3. Do you think managing food production imposes a duty on us? What do the FAWC state that good animal management systems should provide?

4. How is our natural ecosystem affected by food production?

5. Do you think domesticated animals should be treated humanely? Why? What instances are there that domesticated animals are treated inhumanely? (Refer only to food production issues).

6. Complete worksheet 12

