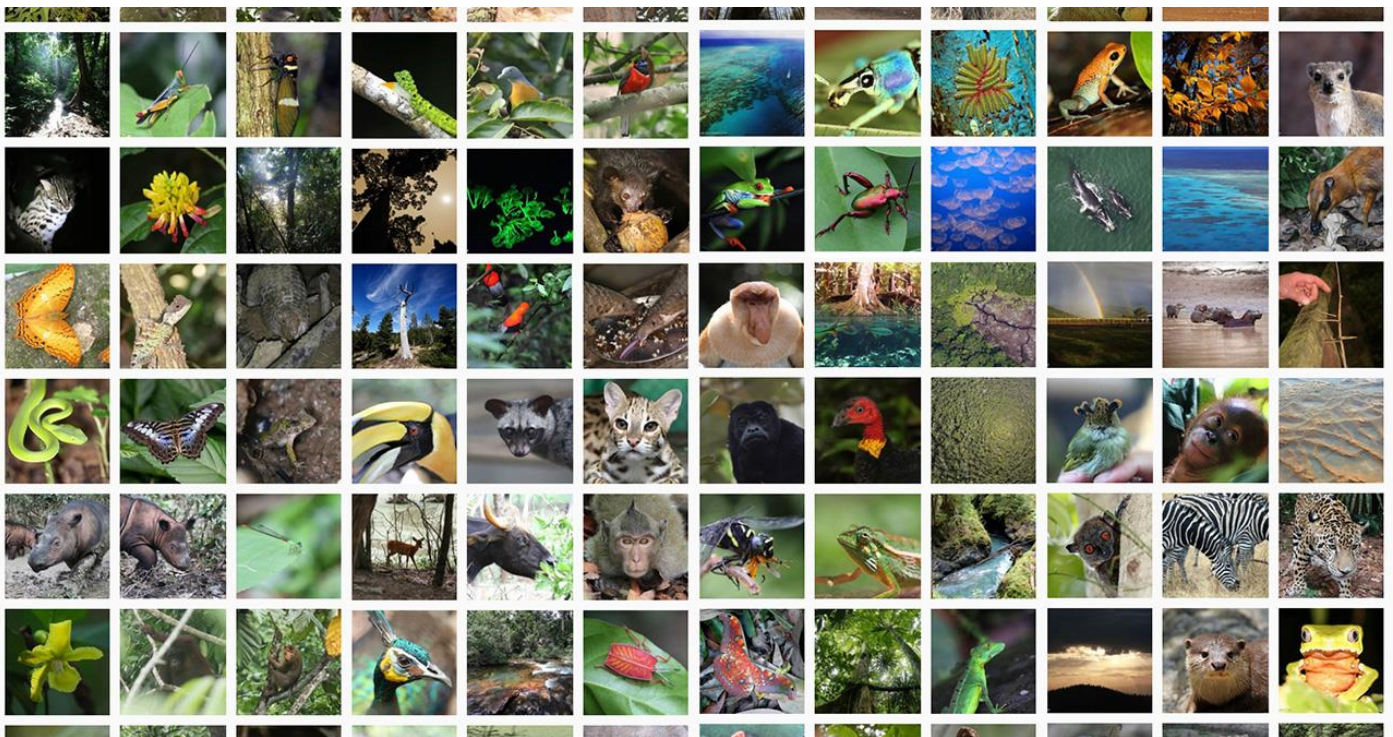


# Year 4 Science

## Biodiversity



Name \_\_\_\_\_

Class \_\_\_\_\_

Prior learning

Year 3: Air pollution

Spring 1: Living things and their habitats

# Biodiversity

Core learning of this unitWhat is biodiversity?

- All life is linked, and each habitat has its own ecosystem. A small change to an ecosystem can have a huge impact.

Impact of climate change:

- Biodiversity loss happens when species become extinct. Extinction is when the last animal/plant of a species die out.
- Extinction can happen for many reasons eg the mass extinction of the dinosaurs; habitat loss and climate change.
- Conservationists work to stop animals from becoming extinct, by campaigning and by setting up nature reserves and breeding programmes.

Impact of habitat loss:

- Habitat destruction can be natural or caused by humans.
- When their habitats are destroyed, animals have less food and shelter and so their numbers decline.
- There are lots of things we can do about it, from making changes to our lifestyles to campaigning and putting pressure on political leaders.

Impact of invasive species:

- Other causes of biodiversity loss are the introduction of invasive species.
- Invasive species in the UK include grey squirrels, muntjac deer, Japanese knotweed and rhododendrons

Impact of hunting and overfishing:

- Loss of biodiversity is also caused by hunting and over-fishing.
- Hunting was originally for food but is now mostly a sport, though some traditional medicines also use products such as rhino horn.

Impact of pollution:

- Land, air and water pollution affect biodiversity.
- Soil pollution is caused by chemical pesticides and fertilizers.
- Organic farming uses sustainable methods

Balanced argument on the pros and cons of HS2

- Environmental debates are complex - we want to protect biodiversity but also need to build homes and generate electricity.
- Write a balanced argument for or against HS2.

Eco/PSHCE links

Identifying the threats to biodiversity, the impact loss of biodiversity has and what can be done to protect it.

Significant person

Vandana Shiva is an Indian activist who campaigns against the use of chemical pesticides in farming.

Vocabulary:

**Environment:** everything that is around us.

**Biodiversity:** the variety of life on Earth.

**Eco-system:** a community of living things, together with their habitat.

**Habitat:** the place where an animal or plant lives.

**Extinction:** when the last animal/plant of a species dies out.

**Endangered species:** an animal or plant at risk of becoming extinct.

**Conservation:** protecting habitats and endangered species.

**Invasive species:** a plant or animal not originally part of the eco-system in which it now lives.

**Pesticides:** chemicals sprayed on crops to kill small insects.

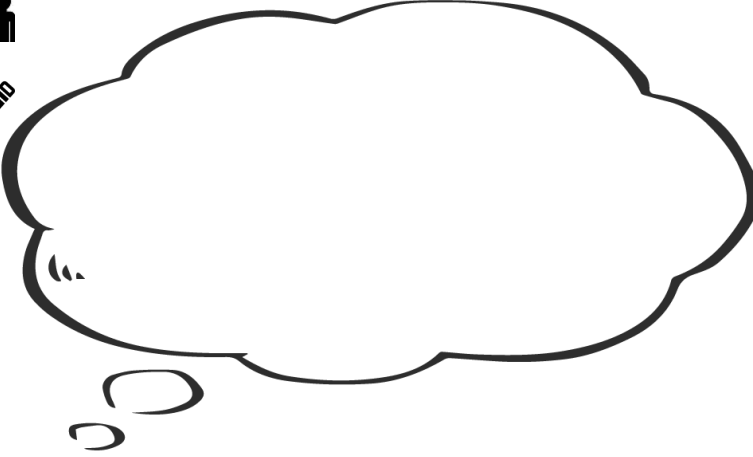
**BIODIVERSITY: GLOSSARY**

<b>Environment</b>	Everything that is around us.
<b>Biodiversity</b>	The variety of life on earth.
<b>Ecosystem</b>	A community of living things, together with their habitat.
<b>Habitat</b>	The place where an animal or plant lives. The habitat provides food and shelter for the life forms.
<b>Extinct/extinction</b>	When the last animal or plant of a species dies out.
<b>Endangered species</b>	An animal or plant at risk of becoming extinct.
<b>Conservation</b>	Protecting habitats and endangered species.
<b>Invasive species</b>	A plant or animal not originally part of the ecosystem in which it now lives. They are often introduced from abroad as pets or for farming, which then escaped and bred.
<b>Displacement</b>	Forcing animals to move away from their preferred habitat, or disappear completely.
<b>Hunting</b>	Capturing or killing animals for food or sport.
<b>Over-fishing</b>	Catching so many fish that not enough are left to breed.
<b>Bycatch</b>	Other unwanted animals caught along with the desired fish.
<b>Game reserves</b>	Large areas of land where hunting is illegal. They aim to protect wildlife from hunters.
<b>Pollution</b>	The introduction of harmful substances into the atmosphere.
<b>Pesticides</b>	Chemicals sprayed on crops to stop insects from eating them.
<b>Organic farming</b>	Farming without the use of pesticides and other chemicals.
<b>HS2</b>	Stands for 'High Speed 2'. A very fast rail link linking London, Birmingham, Manchester and Leeds.
<b>Debate</b>	An argument used to persuade the other person to your point of view, using evidence to back-up statements.

### Lesson 1: I know that living things are connected to each other



What would happen if aliens stole all our bees?



Can you list different places where local wildlife lives?

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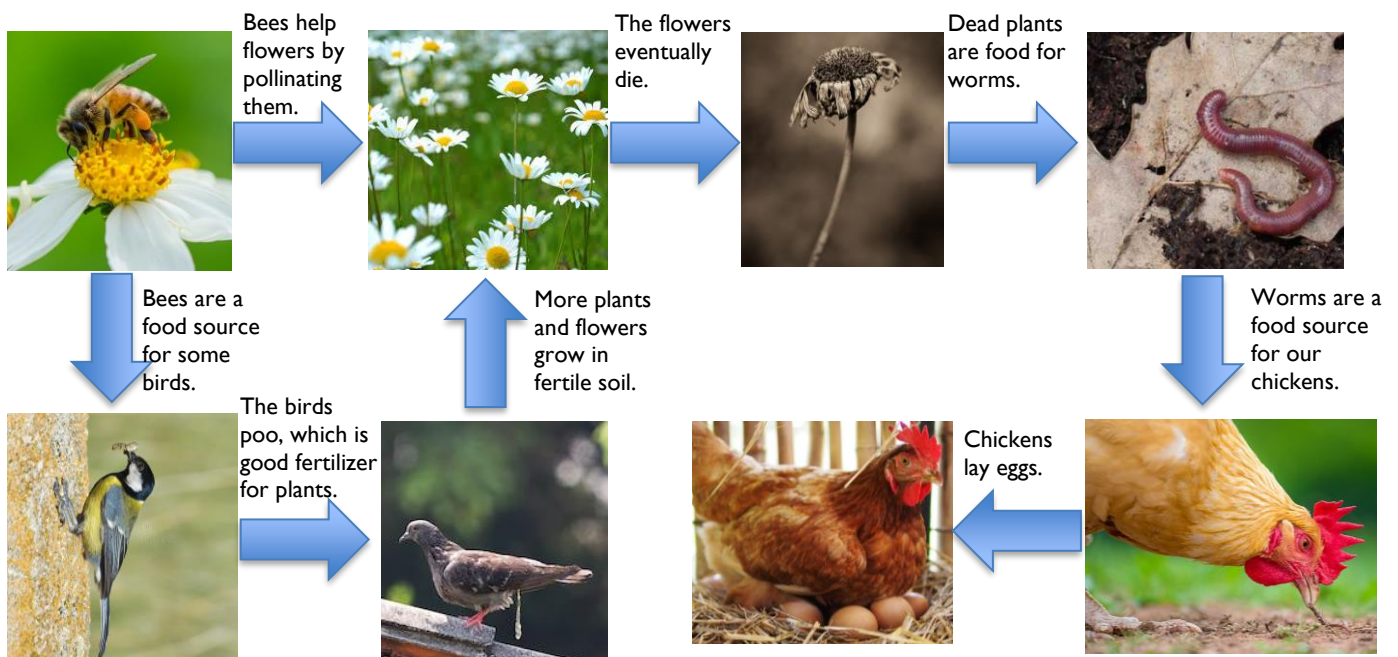


What is an ecosystem?

A community of animals, plants and other living things, together with their habitat, is called an **ecosystem**. For example, a pond ecosystem may consist of a pond **habitat**, inhabited by aquatic plants, microorganisms in the mud at the bottom, fish in the water and a heron on the bank.

If one part of an ecosystem is changed, this may affect other living things in the ecosystem. For example, if a disease suddenly wipes out the plants in a pond, it might affect the fish and heron because they have less food to eat.

## The ecosystem of our school garden



### Why is biodiversity so important?



**Biodiversity**, short for biological diversity, is the term we use for the variety of animals, plants, fungi, bacteria, and other connected life forms within any ecosystem.

Biodiversity is important because the more biodiversity there is, the stronger an ecosystem is because small changes will have less of an effect on it. For example, if there are hundreds of species of flower in an ecosystem, one of them going **extinct** won't affect the worms too much as they will have plenty of other species to eat.

All species are interconnected. They depend on one another. Forests provide homes for animals. Animals eat plants. The plants need healthy soil to grow. Fungi help decompose organisms to fertilise the soil. Bees and other insects carry pollen from one plant to another, which enables the plants to reproduce. With less biodiversity, these connections weaken and sometimes break, harming all the species in the ecosystem.

Biodiversity is important to people in many ways. Plants, for example, help humans by giving off oxygen. They also provide food, shade, materials, medicines, and fibre for clothing and paper. The roots of plants also help prevent flooding. Plants, fungi, and animals such as worms keep soil fertile and water clean. As biodiversity decreases, these systems break down.

Sometimes, removing just one small part of this complicated, fragile system can have a huge impact on all the other parts of the ecosystem.



**For example, look at the diagram above. What could happen to our garden if we removed bees?**



Draw a picture of what our garden looks like now, then one of what it might look like if bees suddenly disappeared. Label your drawings to show the differences.

### With bees

### Without bees



Let's watch this video for more information about how connected different species are, and how humans have had an impact on the **environment**. There is also a fun game to play on this website!

<https://www.bbc.co.uk/bitesize/topics/zp22pv4/articles/z2md82p>



For more information about how important insects are, let's watch another video!

<https://www.bbc.co.uk/newsround/47195749>

## Lesson 2: I know that climate change has an impact on biodiversity

### Part 1: Quick Quiz

1. Why is biodiversity so important?

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2. Give some examples of how different species are connected.

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### Part 2: The Ice Age



Watch this clip from Ice Age 2: Meltdown.

<https://www.youtube.com/watch?v=uxJqyRiGhBQ>



An Ice Age is when the temperatures on earth reduce for a long time. The last time this happened was about 2.6 million years ago! But don't worry, this is a part of nature and doesn't just happen suddenly – it happens over many thousands and millions of years. During an Ice Age, the earth's polar caps grow and there are many more glaciers and icebergs. Species of animal and plant adapt to these new, much colder temperatures. Examples of creatures that have lived during an Ice Age are:



Woolly Mammoth



Woolly Rhino



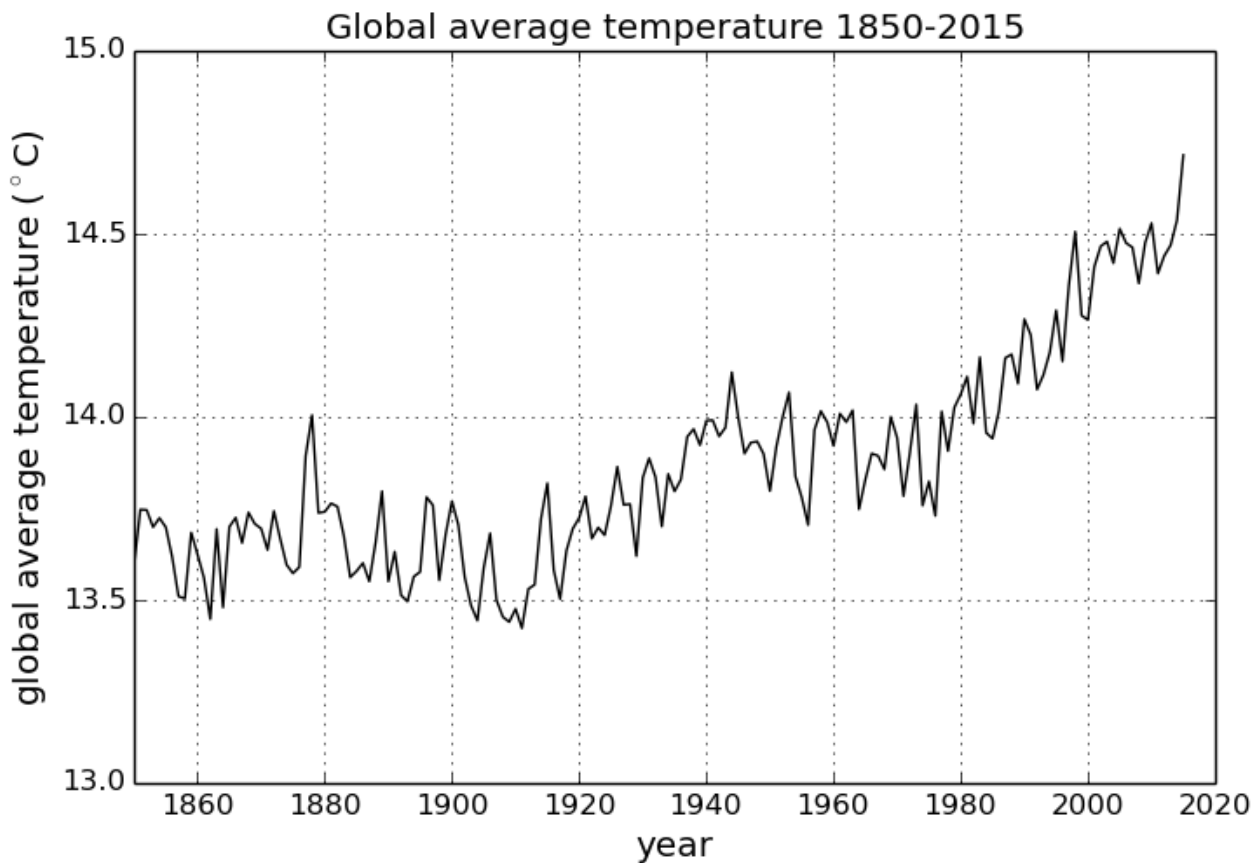
Sabre-toothed Tiger

At the end of the Ice Age, the earth started to warm up. This was great news for the humans, who preferred a warmer climate. However, many of the animals such as the ones pictures were too used to the colder temperature and they became extinct.

This is an example of climate change, but it was not caused by humans.

However, we are now living in a time of climate change that has been partly caused by human activity. One example is how the amount of carbon dioxide in the atmosphere has increased. In Year 3, you will have studied rainforests and how important they are in reducing the level of carbon dioxide in the atmosphere. Carbon dioxide is a greenhouse gas which means it causes the earth to heat up. This happens because the gas allows sunlight in, which heats us up, but stops the heat from going back out in space. Think of the carbon dioxide as like a big, warm blanket keeping all the heat in!

The rises in temperature we are seeing are what we call 'climate change'. This graph shows how the earth's temperature has increased over the last century.



Remember our woolly mammoths, woolly rhinos and sabre-toothed tigers? They became extinct because the earth got too warm for them. We are starting to see the same thing happen to species we know and love today, even ones in the UK, but this time it's all because of human activity.



### Part 3: Climate change in the UK



In the UK, we are lucky enough to have incredibly rich biodiversity (yes, even dolphins!). We have over 600 different species of bird alone! How many of these species can you name?



Climate change is having an impact on UK species because of human activity.

Let's use **hedgehogs** as an example.



Hedgehogs hibernate in winter. This means they sleep to save energy. They do this from November to March – that's four months! They do this because food is harder for them to find in winter.

However, our winters are starting to get warmer. Warmer weather is like an alarm clock to a hibernating hedgehog! Because of this, the hedgehogs are waking up from their hibernation early. Unfortunately for them it is still winter, meaning there is not enough food for them. They then waste all their energy trying to find food! Imagine waking up from a four-hour nap only to find there's no food in the house and all the shops are shut for another two months – that's how hedgehogs feel!

In the 1950s, it was estimated that there were around 36 million hedgehogs in the UK. Now, we estimate that there are only around 1 million left. This decline is partly because of human activity causing climate change.

Lots of people are working really hard to try and help creatures such as the hedgehog. An example of this is the many hedgehog sanctuaries around the country. The biggest one is called Tiggywinkles. Here is their website: <https://www.sttiggywinkles.org.uk/>


There is lots of information here about how to help a variety of different creatures, including what to do if you find that a hedgehog has woken up from its hibernation too early.

### Part 4: UK species affected by climate change



It's time for you to do some research! Use the internet to find out about other UK species affected by climate change, and fill in this table. One has been done as an example.

To help, visit this website: <https://www.wwf.org.uk/updates/9-uk-species-affected-climate-change>

Name	Habitat	Current population	Threat	Appearance (sketch of the creature)
Hedgehog	Lots of places, including woodlands.	About 1 million.	Warmer winters waking them from hibernation early.	

### Lesson 3: I know the impact of habitat loss on biodiversity

#### Part 1: Quick Quiz

1) Match the words to the definitions:

Habitat	A community of living things, together with their habitat.
Ecosystem	When the last animal or plant of a species dies out.
Extinction	The variety of life on earth.
Biodiversity	The place where an animal or plant lives

2) How has climate change affected hedgehogs?

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#### Part 2: What is the impact of deforestation?



In Geography, we studied the impact of deforestation on the Amazon rainforest. Can you remember some of the effects chopping down the rainforest is having on our planet?

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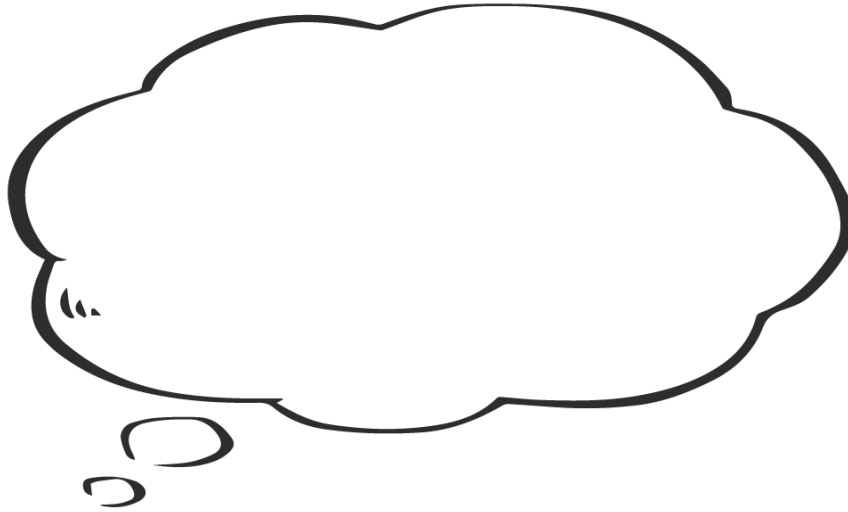
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Now think of the wildlife. What impact do you think deforestation has on the wildlife in the Amazon?



### Part 3: Habitat loss due to human activity



Last week, we studied how climate change is a threat to hedgehogs as the warming temperatures disturb their hibernation. As well as climate change, habitat loss is also a threat to them.

The main problem hedgehogs have comes from farming. Farming has been destroying their natural habitat as farmers remove hedges and trees (which is where hedgehogs like to live) in order to make way for more, larger crops.

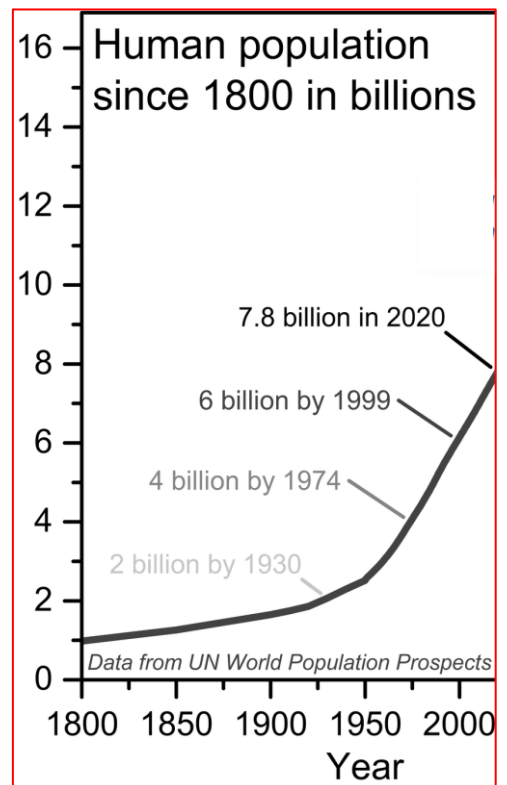
Another problem is that of increasing **pesticide** use, which kills off the hedgehog's natural diet of insects and invertebrates such as worms and slugs.

Other threats to hedgehogs include increases in road construction as well as walls and fences that stop them from migrating. This harms their long-term survival as it makes meeting other hedgehogs more difficult, which reduces their ability to reproduce.

As a result, hedgehogs, Europe's only spiny mammal, are on a range of endangered species lists.

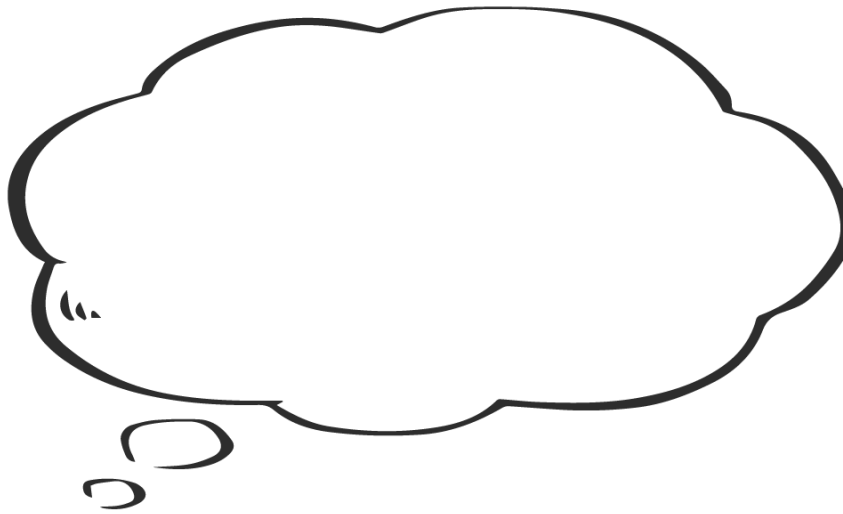
It's not just hedgehogs that are at risk; species across the world are affected by habitat loss for similar reasons. As the world's population grows, we need more and more food and shelter which we often take from places that affects a variety of plants and animals.

The graph to the right shows how the world's population has almost doubled in less than 50 years, increasing our need for food and other natural resources.



#### Part 4: Habitat loss due to natural reasons

Not all habitat loss is caused by humans. Can you think of any natural events that can cause it?



Some of these causes of habitat loss do happen naturally – we can't do anything about them. However, sometimes they are partly our fault. For example, although we don't always start forest fires, the hotter summers due to climate change make it more likely that they will burn more.

#### Part 5: Habitat loss and coral reefs

Coral reefs are underwater ecosystems home to an enormous variety of marine creatures who rely on it for food and shelter. They are also one of the most endangered ecosystems on the planet.

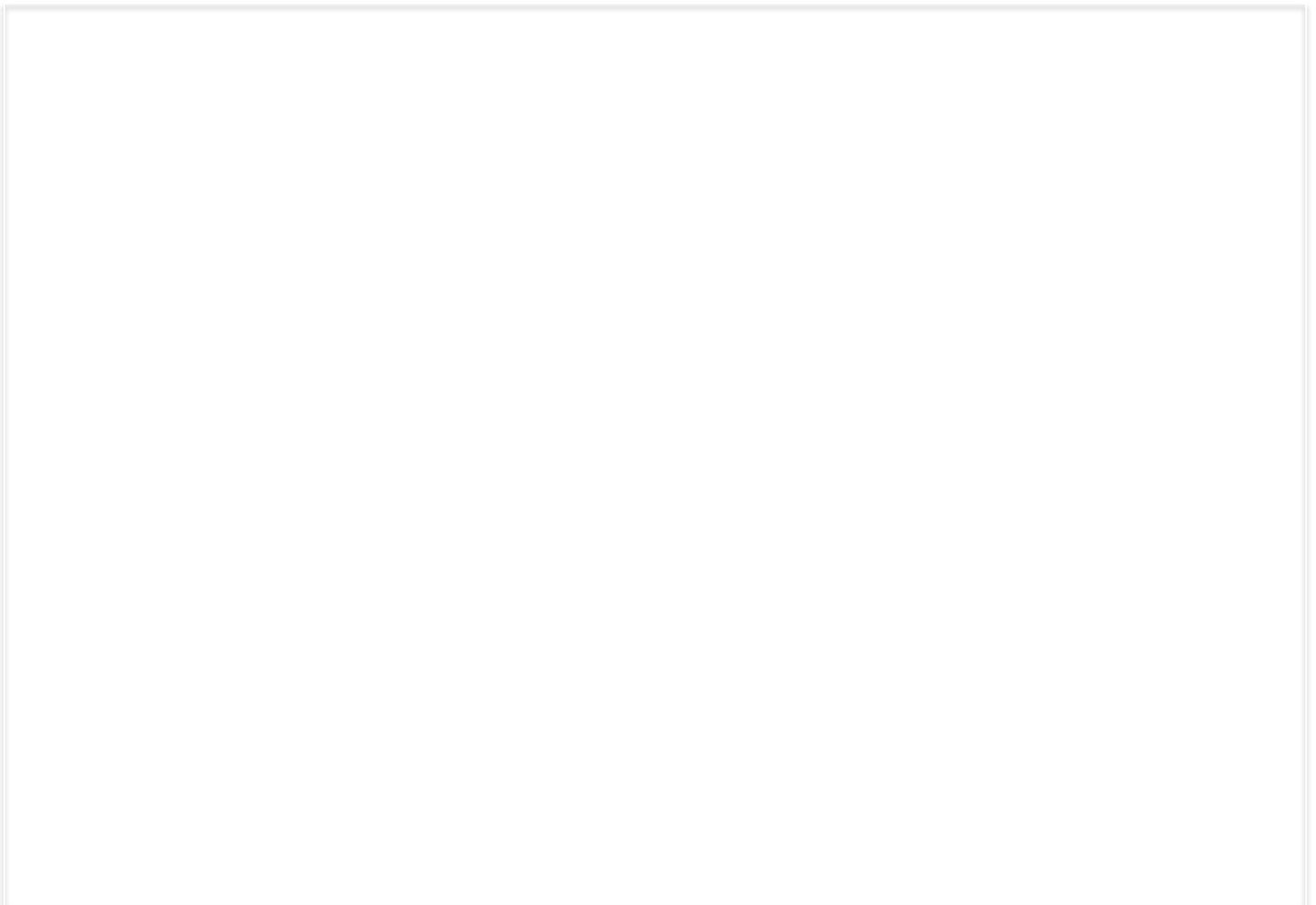
Watch this guide to coral reefs, paying close attention to the actions we can do to protect marine habitats.

<https://www.youtube.com/watch?v=6lRzwbaSoeU>



Now, list all the actions Jess says we can do to help protect marine habitats. Remember, it's never too late to make a difference!


Using what you have discovered, design a small poster to convince people of the importance of marine habitats and what we can do to save them.



## Lesson 4: I know the impact of invasive species on biodiversity

### Part 1: Quick Quiz

1) List all the causes of climate change you have learnt about so far.

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2) List all the causes of habitat loss you have learnt about so far.

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### Part 2: What is an invasive species?



An **invasive species** is an animal or plant that has been introduced to a new habitat that it didn't originally live in. The species then spreads and damages the local ecosystem by affecting some of the plants and animals that are native to that ecosystem.

These invasive species have often been introduced to their new habitat by humans for farming or other reasons.

A well-known example of an invasive species is the cane toad.

When beetles began devouring sugar cane fields in Queensland, Australia, in the 1930s, farmers got desperate. Back then, pesticides were too dangerous for farmers to use in such large quantities so they tried to find another solution. They heard stories of a toad that loved nothing more than to dine on cane beetles. The thinking went that a few hundred cane toads (which can grow as large as dinner plates and weigh up to 2 kilograms) would gobble up all the cane beetles so that farmers could get back to farming.



In 1935, two suitcases of South American cane toads made the journey from Puerto Rico to Australia. Rather than hang out in the cane fields though, those original 102 toads set out across the continent and have since exploded in number to more than 1.5 billion.

Instead of controlling the pests, the toads themselves have become the pests! What has made them pests?

- They completely failed to kill the beetles, preferring instead to lazily feed on other, slower, easier-to-catch insects. These insects would previously have been the diet of other native creatures.
- They mate and reproduce all year round, with females laying up to 30,000 eggs at a time so they multiplied and spread incredibly quickly.
- Not limited to wet, tropical climates, they can live on dry, desert land too as their bodies are good at storing fat and water. This allows them to travel great distances and so they have invaded 1 million square kilometers of Australia.

- See those bulging eyes? They hide a secret... glands that contain an extremely strong venom. This means they have no natural predators, as any animal that eats them will get poisoned and may die.
- They may look like a juicy meal to predators, but they are poisonous enough to take down even a large crocodile. The Australian outback is littered with the corpses of dead animals who have tried to eat a cane toad.
- All attempts by the Australian government to reduce the population has failed – they just multiply too quickly.



The blue regions are where cane toads are native, and the red regions are where they have invaded.

### Part 3: Tudor explorers and the dodo



Cane toads have had a huge impact on the ecosystems of Australia, but an even more dramatic example is that of the dodo.

The dodo was a flightless bird, related to pigeons and doves. They were large birds, about 1 metre tall, but their tiny wings meant they couldn't fly. They could grow to over 20 kilograms – that's around the same as a four-year-old child! They had a huge, powerful beak that was probably their only way of defending themselves.

Many millions of years ago, they were exploring the Indian Ocean and discovered paradise in the island of Mauritius.







Here they found a place with unlimited food and no natural predators, so they never left. Over the years, they grew bigger and heavier, with even smaller wings.

Life was great for the dodo, right up until humans discovered their paradise island.

The 1400s saw humans much more able and interested in exploring the earth. Before this time, many places were undiscovered. During Elizabeth I's reign (1558-1603), many sailors went in search of unknown lands. England and many other countries were sending out explorers in search of adventure and money.

Humans eventually discovered Mauritius in the late 1500s. They found that dodos were not afraid of them at all, because dodos hadn't had a predator for many millions of years. As such, they were easy prey. The birds and their eggs were eaten by sailors and by invasive species such as rats and cats and brought on the ships in cages, their numbers began to decline. Humans also cleared forests rich in fruits, removing their main food source.

It is estimated that the last dodo died in 1690. The dodo went extinct so quickly that very few scientists could study it while it was alive. We don't even have a full skeleton to study, and so we can't even be sure exactly what they looked like!



This is an example of a dodo skeleton. It is the most complete skeleton we have and was put together by a scientist who spent 40 years trying to find the bones! It is 95% complete and was sold at an auction in 2016 for almost £300,000.



This skeleton is the best evidence we have of what the dodo looked like. Can you use this skeleton to sketch what you think a living dodo might have looked like?



## Part 4: Invasive species in the UK



Humans have introduced many invasive species to the UK.



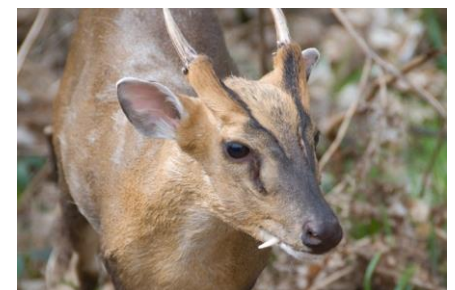
**Japanese knotweed** is a plant with extremely strong stems growing from roots deep underground. As such, it is extremely hard to control. It is highly destructive – in the photo you can see it breaking through concrete! It was brought to the UK by Victorian plant collectors due to its interesting appearance but has since invaded local ecosystems. It is so damaging that if it is discovered growing on someone's property, that property will be almost impossible to sell! It costs the UK economy £166 million per year.

The **rhododendron** may look familiar. This invasive plant was introduced as a pretty-looking garden feature in 1763, but it causes serious problems for our native species. It is very thick and grows quite high meaning it blocks light, preventing other species below it from growing. Where it grows, only trees are tall enough to grow above it. As if that wasn't enough, it even carries diseases that can wipe out the trees!



The **grey squirrel** is also a familiar sight across the UK, but it too is an invader! They are originally from North America and were deliberately released into the wild in 1876. Our native squirrel is actually the red squirrel, and unfortunately their grey cousins carry a virus that badly affects them. Red squirrels have now been mostly wiped out, mainly by this virus, and only a few populations remain. This is an example of **displacement**. The good news is that many people are working hard to save the remaining red squirrels.

The **muntjac deer** is a small deer from China and Taiwan, brought to England to be kept in collections. Some escaped and bred, and they are now a very common sight across most of the UK. They love to graze, but this has an enormous impact on local ecosystems as they clear shrubs and stop trees from growing, which destroys bird and butterfly habitats.





Choose any one of the invasive species from this lesson, and draw a diagram showing the effect this species has had on the local ecosystem.

A large, empty rectangular box provided for the student to draw a diagram showing the effect of an invasive species on the local ecosystem.

## Lesson 5: I know the impact of hunting and over-fishing on biodiversity

### Part 1: Quick quiz

1) Explain what an invasive species is, using an example.

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### Part 2: Over-fishing

Do you like fish-fingers? Or fish and chips?

Both these tasty meals obviously contain fish, and that fish has to be caught. In the UK, we eat around 400,000 tonnes of fish per year – that's about the same weight as 40 Eiffel Towers!



However, we actually catch more than double that amount then export most of it to other countries. We also then buy a lot of fish from other countries! That's a lot of fish, and it has to come from somewhere!

We have around 6,500 fishing boats in UK waters and they catch around 150 different species. How many different species of fish have you eaten? Struggling to name many? The reason for this could be that most people in the UK eat only 5 species, even though we catch over 150! Most of the species that are not popular in the UK (for example crab, mackerel, langoustine) are exported to other countries.

This all means that all the Eiffel Towers of fish we eat are mostly just made of five different species! In fact, we love some of these species so much (cod, haddock), that we can't catch enough of it alone so we import it from other countries, even though we have so much of our own fish in our own waters!

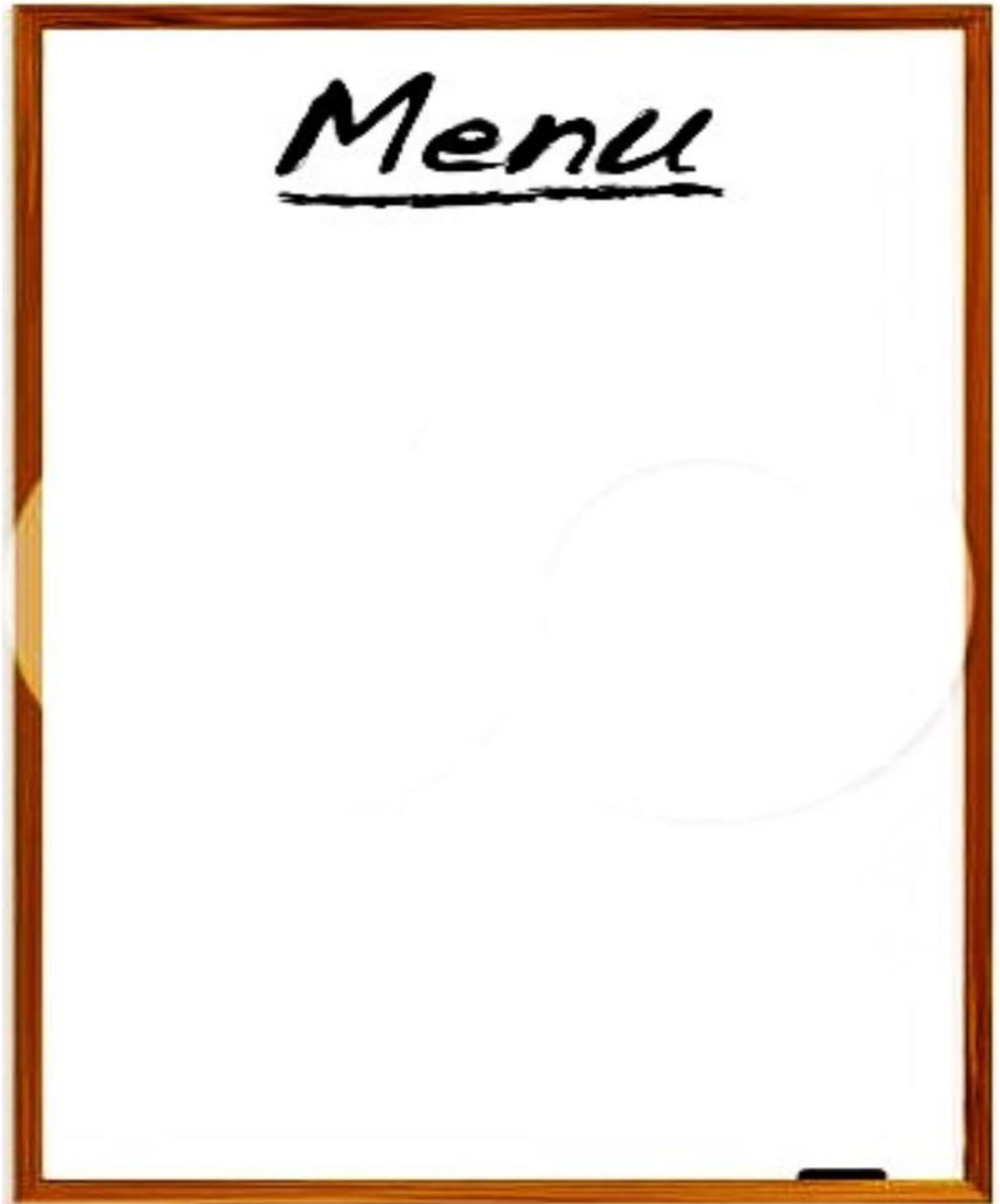
Fish is a very important part of the human diet and so we cannot just stop fishing. However, often we are not careful enough and catch too many of one type of fish. This is called **overfishing**. When we catch too many, there aren't enough left to reproduce so their numbers drop significantly. The list of species at risk from overfishing is getting longer. In the last 50 years, the fish stocks that are overfished has tripled, meaning one out of three of them is at risk of disappearing altogether.

When fishing, it's very difficult to only catch the species you are looking for. Very often, other species of fish, amphibian, mammal and bird are also caught accidentally. This is called **bycatch** which is another serious problem leading to the needless loss of many creatures.

The risk is not limited to animals – billions of people around the world rely on fish as a nutritious meal, and millions rely on fishing as a job. It is therefore very important that we continue fishing but try much harder to do so in a sustainable way.

Not all fish are at risk of overfishing. Some are sustainable, which means we can catch them without risking their populations.

Have a look at this website and design a delicious seafood menu (with illustrations!) that contains only sustainable seafood. <https://www.mcsuk.org/responsible-seafood/>



### Part 3: Hunting



Remember the dodo? It went extinct partly due to the introduction of invasive species such as rats, cats and dogs. It also went extinct due to being hunted for food by humans.

Many different animals provide us with a food source, such as chickens. However, chickens are not hunted – they are farmed, as are all our meat sources. In some smaller societies hunting is still an important source of food. In fact, before farming existed, humans were known as ‘hunter-gatherers’, meaning we used to get all our food from the wild.

An example of hunter-gatherer societies still found across the world today is the Inuit, who hunt for walrus on the frozen ice of the Arctic. They are only small groups of people and need to hunt to survive, as do other such societies.

Hunting is also a hobby for some people – they see it as a sport. It’s important to say that this is often legal, even though some people disagree with the idea of killing animals for fun.

Some people hunt for food, and others hunt for sport. However, sometimes hunting can be a serious problem. An example is rhinos. Many species of rhino are endangered, while some are already extinct. While habitat loss is also a reason, the main one is hunting. When hunting is illegal, it is called ‘poaching’.

Rhinos are usually killed to take their horns, one of which can sell for up to £200,000. The trade of rhino horn has been banned for many years, but it still takes place illegally. They are used in some traditional medicines, and in some parts of the world owning a rhino horn is a sign that somebody is rich – a bit like buying a flashy car.

**Game reserves** have been set up in Kenya, Tanzania, Zimbabwe, South Africa, Namibia and elsewhere in order to protect rhinos from hunters and keep them healthy.



**Part 4: Let's adopt a rhino!**

One of the ways we can help is by supporting charities such as the WWF who work really hard to protect animals such as the rhino.

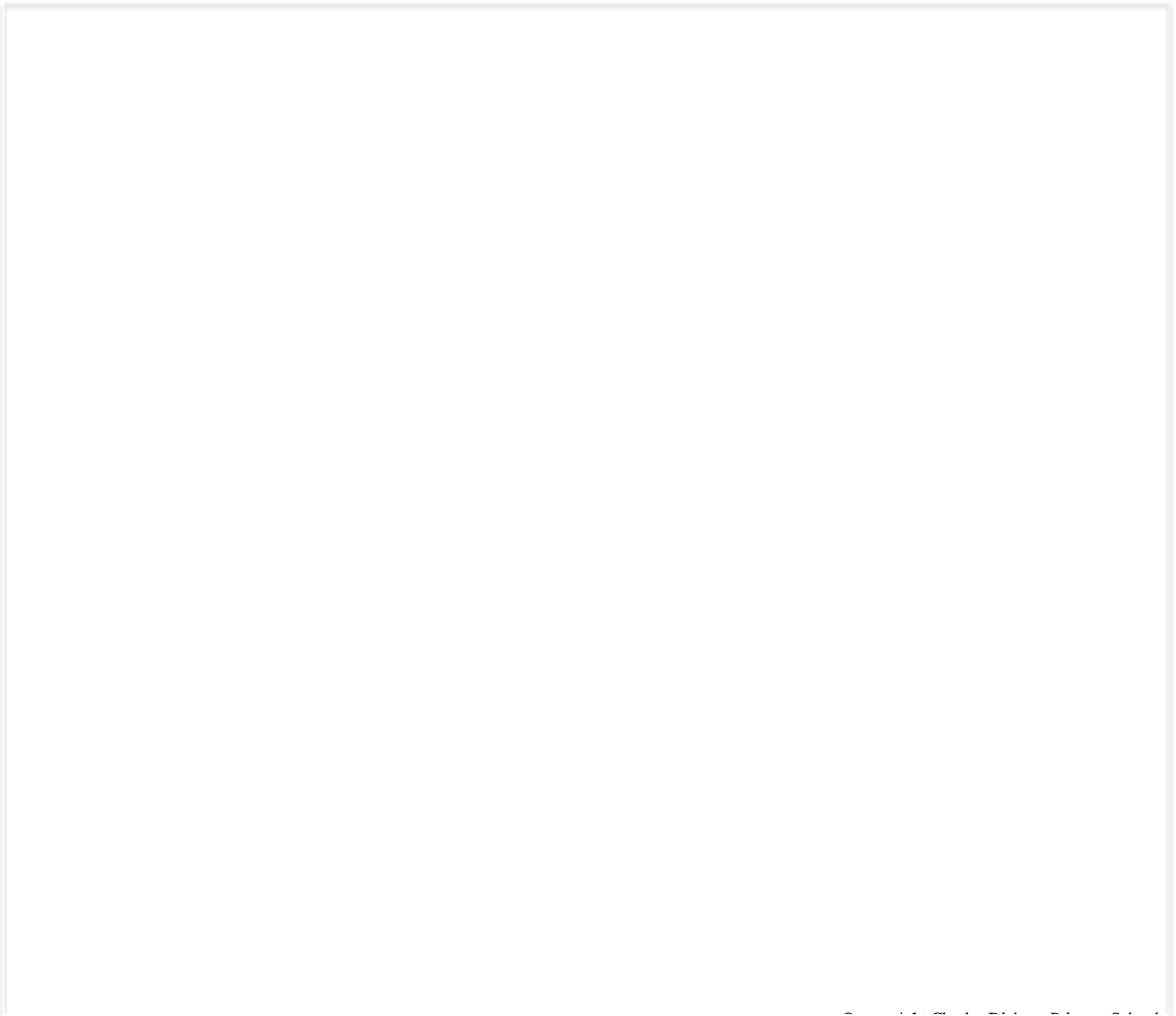
Let's go for a walk! Ask your friends and family to sponsor you, and if all of Year 4 put together can walk the distance from London to Brighton (about 80 miles) we will adopt our very own rhino!



**FOR  
YOUR  
WORLD**

Send us in updates for how far you have walked (it doesn't have to be exact!) and if we can get to 80 miles, you can collect your sponsorship and we will send it to the WWF! In return we get to protect a rhino and we also get send fact pack and certificate to share, as well as regular updates on how our rhino is getting on!

Now, draw a very careful sketch of a rhino. Look up some photos on the internet for inspiration. Don't forget to give it a name – we will then have a vote on our favourite name and give it to the rhino we adopt!





## Lesson 6: I know the impact of pollution on biodiversity

### Part 1: Quick Quiz

Match the drivers of biodiversity loss to their definitions:

Habitat destruction	Killing animals in the wild for food or sport.
Climate change	Catching so many fish that not enough are left to breed.
Invasive species	Destroying habitats causing species to move or die out.
Hunting	The earth's temperature rising (or falling).
Overfishing	A species introduced to a new ecosystem, threatening it.

### Part 2: The effect of pollution on biodiversity



**Pollution** is the introduction of harmful substances into the environment. There are many different types of pollution. In this lesson, we are going to focus on land/soil pollution but here's a quick reminder of some other types:

#### Air pollution

This mostly comes from cars, planes, power stations and factories. The UK has more than 32 million cars. When cars burn petrol to run, the fumes they give off contain carbon monoxide, carbon dioxide and nitrogen oxide. This combines with the air we breathe and can be harmful to animals and humans. Our modern lifestyles also need lots of electricity. To supply most of this, fossil fuels (coal, oil, gas) are burnt, and the effect is similar to burning petrol.



#### Water pollution

There are many different types of water pollution, but they often involve waste from rubbish dumps and factories seeping into water sources, or **pesticides** from farming contaminating rivers and oceans. This is harmful not only to plants and animals that rely on these water sources to survive, but also to many humans who need drinking water. Let's not forget the ongoing problem we are having with plastic pollution in our oceans.

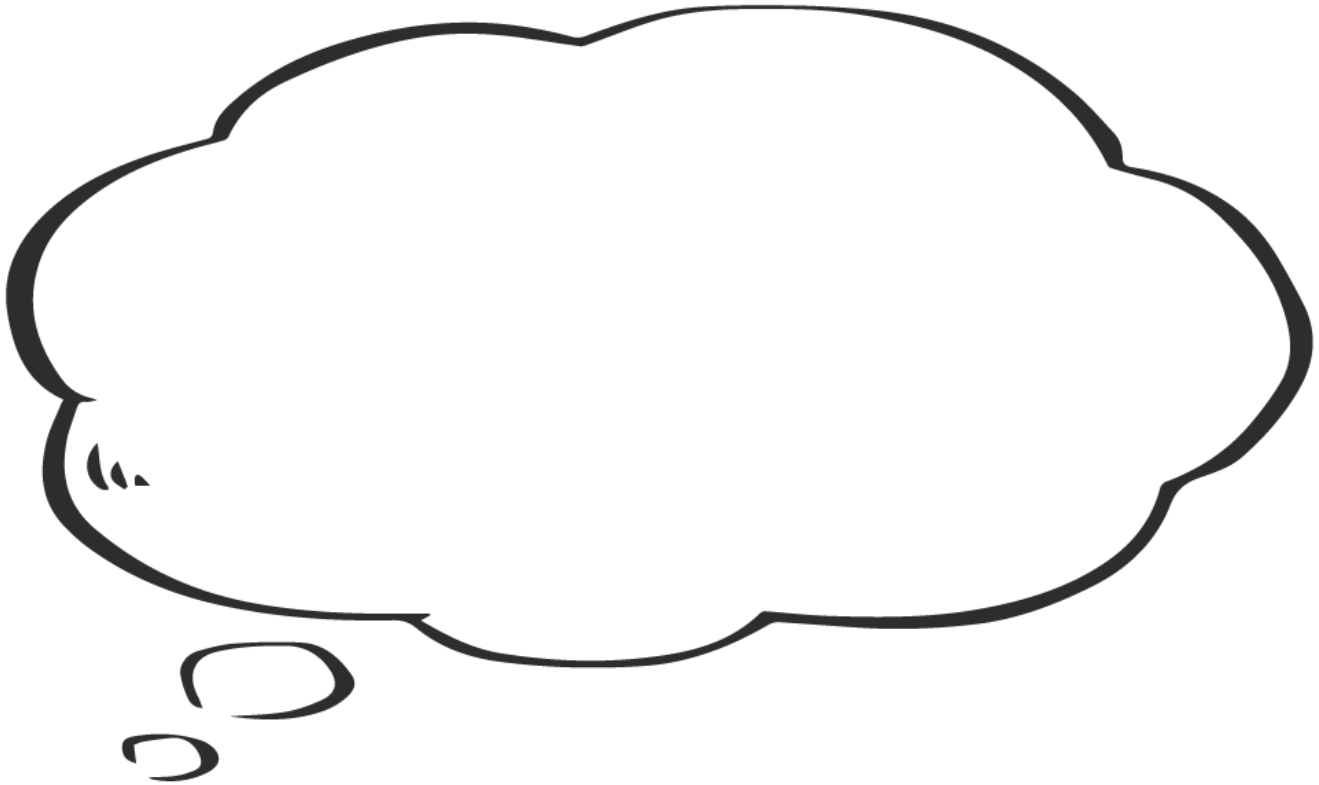


#### Soil pollution

Much of this comes from similar sources to other pollution types, for example pesticides and other chemicals used in farming.



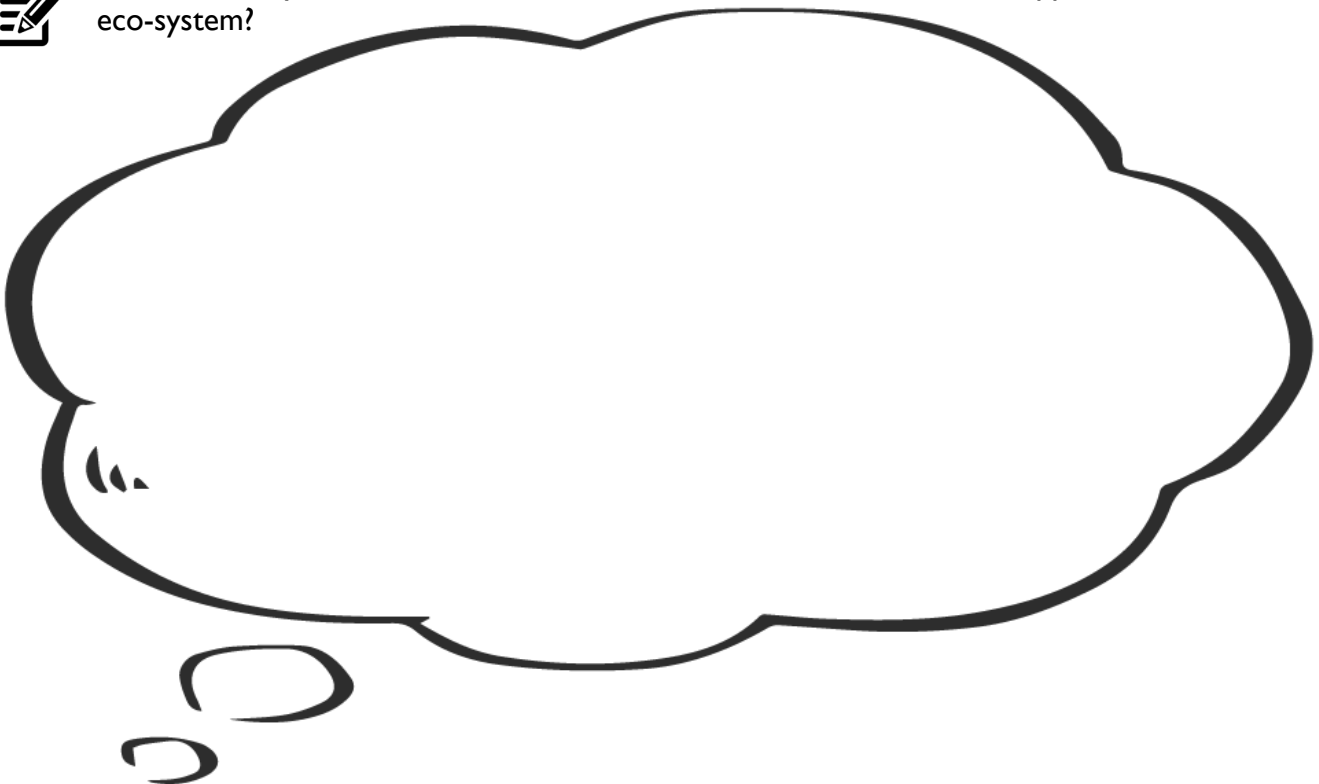
Why do you think farmers use these pesticides and chemicals in their work?



Some farmers use pesticides and other chemicals to help their crops grow. However, these reduce the biodiversity of soils by killing insects. They can also cause water pollution when they are washed into rivers and seas.



Think back to your food chain work. If insects are killed off, what will happen to the rest of the eco-system?





**Organic farming** is done without using pesticides and fertilisers. Instead they limit the damage done by pests through:

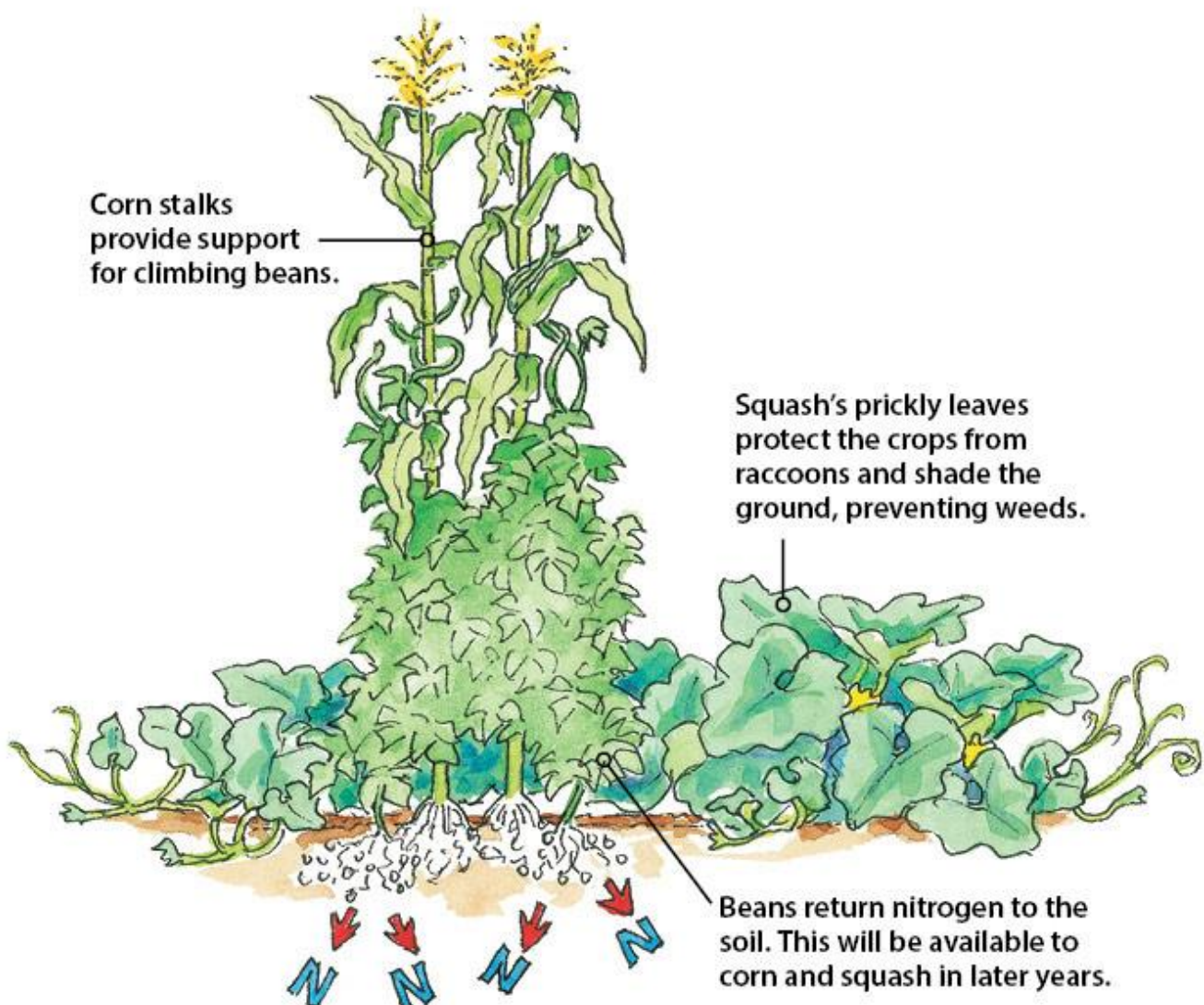
### Avoiding monocultures

Monocultures are huge farms of all the same crop. This means pesticides are essential, as any pests and diseases would otherwise destroy the entire farm. By avoiding this, and instead growing smaller amounts of a greater variety of crops, it is much less likely that one disease or pest will destroy it all. Diseases and pests usually only like certain crops, so any that got in wouldn't destroy everything.

### Companion planting

Planting certain crops next to each other can help them resist disease and reduce pests. For example, to increase their resistance to diseases, you should plant horseradish next to potatoes. Carrot-fly is a pest that affects carrots; however, if rosemary, sage or marigold is planted near the carrot crop, it keeps the carrot-fly away. Corn grows quite tall, and if you plant beans below it the corn not only protects the beans from pests by shielding it, but also gives the beans something to climb!

Here's an example of companion planting corn, beans and squash:

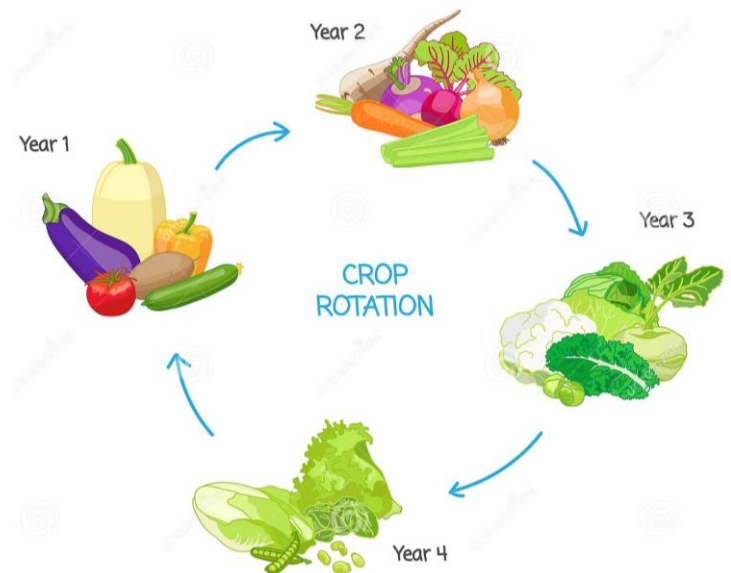


## Crop rotation

If you grow the same crop in the same place year after year, like most large farms do, you will get a build-up of pests and diseases specific to that crop, so pesticides have to be.

Crop rotation means you do not to grow the same thing in the same place two years running. Some organic farms use this technique to reduce losses to pest and disease.

Soil pests and diseases tend to attack specific plant families over and over again. By rotating crops around different parts of land, the number of pests reduces as the crops they need have moved.



Vandana Shiva is an Indian activist who campaigns against the use of chemicals. She also promotes the use of the above organic farming methods.





Now design a poster inspired by Vandana Shiva, encouraging organic farming methods to reduce the impact chemical pesticides have on biodiversity.

A large, empty rectangular box with a thin grey border, intended for the student to design their poster.

## Lesson 7: I can use my knowledge of biodiversity to understand the debate about HS2

### Part 1: What is HS2?

**HS2** is a high-speed rail link between London, Birmingham, Manchester and Leeds.

There are arguments for and against it:

**Pros:** shorter journey times; fewer cars on the road so better for the environment; better transport links and new jobs are good for the economy and for people.

**Cons:** it is very expensive; it won't be ready for a very long time; impact on the countryside and habitats; people's homes will have to be demolished to build the tracks and stations.



### Part 2: Debates about the environment

Environmental **debates** are often quite complicated. Yes, we want to protect the planet, but other things need to be considered too. We want to protect habitats, but need to build homes for people. We want to limit pollution, but we all want unlimited electricity. We want to use organic farming methods, but millions of people in the world are starving.

HS2 will have an impact on the environment, but it could also provide many benefits. The question is, do the benefits outweigh the environmental and financial costs? In this lesson, you will study the arguments for and against, choose your position and write up your argument.

To help you plan this, we are going to do some research and fill in a table with the arguments for and against HS2.

Arguments for HS2: <https://www.youtube.com/watch?v=xwOxwG-od6E>

Arguments for and against HS2: <https://www.bbc.co.uk/newsround/51457276>

Arguments for HS2	Arguments against HS2





