



Conservation Education

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Migration

Aaah, the sounds of summer.... sizzling barbecues, squealing children splashing in paddling pools, a distant lawn mower and the song of the inexhaustible chiff chaff 'chiffing and chaffing' from nearby bushes.

Well we have occasionally had the weather to hear the first three this year! But the chiff chaff has been singing his little heart out for weeks now so summer must have arrived quite a while ago.

How do we know? Because the chiff chaff is just one of dozens of species of birds that fly into Britain every summer from other countries around the world to raise their young here, to return again to their other home country in the autumn. Along with other species like the swallow, they are a sign that summer is at least on its way. The arrival in summer and departure in autumn of many species of birds is one example of something called *migration*.

Why do creatures migrate?

Animals migrate so that they can survive; it is a form of *adaptation*. So why do some animals move around from one place to another at different times of year?

- Many habitats have wet/dry or cold/hot seasons and are therefore difficult to survive in all year round so the animals have to either move away (migrate) or *hibernate* in the winter.
- Other areas may have more food or shelter or water available at certain times of year so the animals need to move there in order to survive.
- Some species (eg elephants and wildebeest) need to eat special minerals which are only available in certain places so they need to go there regularly to get them.



What is migration exactly?

Migration is a specific journey, and usually a very important one, that an animal takes regularly for a particular reason, usually at a particular time of year. It is more than just a simple trip from 'A to B'.

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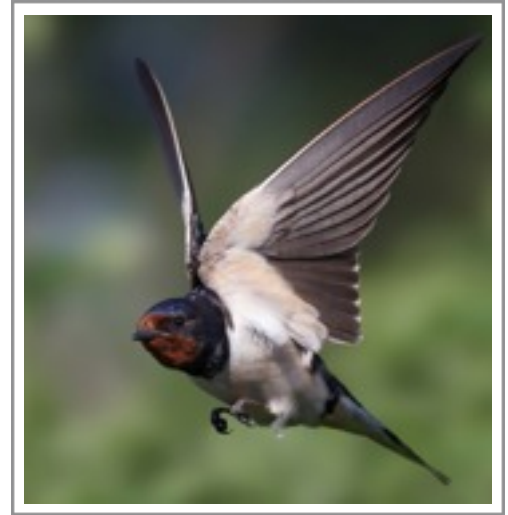
Invertebrate Migration

Bird Migration

Bird migration is *'the regular seasonal return journey undertaken by many species of birds'*. Many species of birds that migrate are *insectivores*, which helps us understand why they migrate.

Summer visitors

Birds that arrive in the UK in the summer travel to us from countries further south; some come from countries in Africa, such as the **chiff chaff** mentioned above. They come here to breed and in the autumn they and their grown young return south again. Other summer visitors include **swallows**, **flycatchers**, **ospreys** and **terns**. Some species, such as **puffins** and **shearwaters** arrive on our shores having spent the winter out at sea.



Winter visitors

These are birds that travel to the UK from colder climates in the north to spend winter here instead, where there is more food available for them. They return north again to breed at the beginning of spring. Many duck and goose species are winter visitors, as are **whooper swans**, **fieldfares** and **bramblings**.



Passage migrants

Some birds have to stop off in the UK during migration for a rest on the way to their final destination. While here they eat a lot of food to 'refuel' (like a car filling up with petrol at a service station!) before continuing on their journey north or south. They are often seen here in both spring and autumn.

Why did birds start migrating to the UK?

To understand why birds first chose to visit here, we need to go back 10,000 years to the end of the last **Ice Age**. New land that had been buried under ice for thousands of years began to appear as the ice melted away, as the climate became milder and wetter. This made a good place for the *invertebrates* that many birds feed on to live. The number of bugs increased over time and birds on the search for food decided that this new land was a good place to find it. Also, there were fewer predators and not much competition for food as few species had yet arrived on the new land. This was therefore an ideal home and a great place to lay eggs and raise their young!

So all was well during the summer months. However, in the winter the invertebrates died in the cold temperatures and it was too cold for many of these newly arrived birds to survive so they flew back to the warmer countries that they had originally come from. The ones that fled survived better than any that stayed, so they ended up making the journey every year and still do today.

But why leave their southern countries? Food doesn't run out there so why fly all the way over here? It's because Britain has fewer predators, more space, less competition from other species and longer days in the summer, which means more time in the day to find food. All these are important to birds when they are trying to raise babies and find enough food for them.



U.S. Fish and Wildlife Service-
Northeast Region- CC BY 2.0

So migratory birds fly backwards and forwards each season between the best place for feeding and the best place for breeding as the seasons change. Let's check out some amazing examples.....

Wow!

The **ruby-throated hummingbird** travels non-stop for 24 hours across 965km of open ocean from the US Gulf Coast to the Yucatan Peninsula in Mexico. It only weighs 4.8g!

Bar-tailed godwits fly 11,000km (one did this non-stop!) from Alaska to New Zealand.

When to go....

How do birds know when to start their journeys? Well it depends on the type of migration, but generally speaking in Britain there are seasonal clues such as the weather getting colder and the days getting shorter towards autumn time which tells the birds when to leave.

However, at the **Equator**, where there are no seasons and the temperature is fairly consistent throughout the year, it could be the number of days that the birds have been there that makes them restless at about the right time.

For other types of migration, food perhaps becomes harder to find, overcrowding begins to become a problem, or the birds' fat reserves run low (they get thin and hungry) and they know it is time to move to a new area to find food.

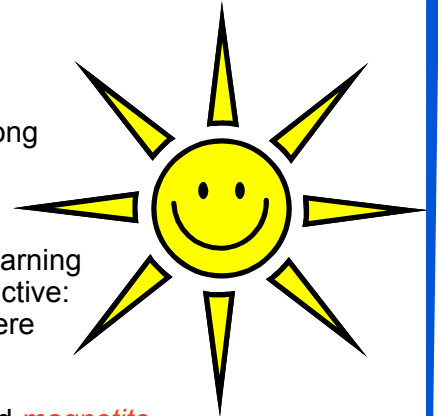
The American wood thrush (which flies 300 miles per day during migration) flies 6 times faster in the spring on the way north to their breeding grounds in North America than on the way back south to South America. Perhaps this is because the first pairs to arrive at the breeding sites get the pick of the best nesting sites!

Wow!

Some birds arrive in exactly the same breeding sites in the UK within a day or two of the same date every year!

How do they find their way?

One of the amazing things about bird migration is how the birds know where they're going. They can't read maps or use compasses and it's a very, very long way, so how on earth do they navigate?



1. One of the main ways they do it is by learning the route from their **ancestors**; it is instinctive: it is in their genes that they just know where to go. Amazing!

2. Some bird species have a mineral called **magnetite** above their nostrils. This helps them to use the Earth's **magnetic field** to navigate.

3. Scientists also believe that they use a combination of the **landscape** features – such as a coastline or mountains.

4. Some use the position of the **sun** (starlings) and the **stars** (mallards).



Wow!

Whooping cranes that have been bred in captivity then released into the wild don't know where to migrate to as they have no parents to show them. They have to be taught by humans dressed in crane costumes! They are taught to follow small aeroplanes with the human "parents" in to teach them the 2000km journey directions.

When do they travel?

- Soaring birds like **hawks** fly during the day – there are more thermals (warm air currents) so they don't have to flap as much.
- Insectivores like **swallows** and **swifts** also fly by day, feeding on the wing.
- Flocking birds like **finches** and **starlings** fly by day.
- Most **songbirds** (e.g. **warblers**) fly at night when the air is stiller. They feed and rest in the day.



How do they survive? Adaptations for migration.

- Most migratory birds have **hollow bones** which make them lighter and therefore better at flying up high in the winds to help carry them along.
- Some birds develop larger, more **powerful breast muscles for flying** and have smaller non-essential organs to lighten the load!
- Many fly in the **prevailing winds or thermals** (warm air spirals) to help gain distance and height.
- Geese fly in a '**V**' shape, changing the leader at the front regularly, to reduce drag. They fly in each other's slip stream so it's not such hard work.
- Most will build up **extra fat reserves** in the weeks leading up to the long journey (some double their body weight) so they have spare 'food' as many don't eat during migration.
- Many migratory birds travel in **large numbers** so they are safer from predators.
- Stop-offs (**short breaks**) en route for a rest are common.



Arctic Terns

- * **Arctic Terns** are famous for their extraordinary migration distances. Every year they fly from as far north as Greenland or Iceland way up near the North Pole, all the way to the Weddell Sea in Antarctica – near the South Pole. That's a journey from the very top to the very bottom of the world and back again!
- * The **distances** involved are mind-blowing: The average round trip distance is 70,900km but the furthest recorded was a staggering 81,600km by one bird.
- * The total distance **an arctic tern travels in its lifetime** (they do the trip every year) can exceed 800,000km. On average they take 90 days to reach the Weddell Sea but only 40 days to fly north.

Wow!

The bar-headed goose holds the record for the highest migration - 9,000m (5 miles) above sea level - that's 6 times higher than Ben Nevis and higher than Mt Everest.

The Amsterdam Albatross is the rarest migrant. There are only 70 or 80 or so adult birds left in the world.



Mammal Migration

What's the longest walk you've ever been on? Fancy walking 1500km *each way* to go on your summer holidays or to get some good food?! Well some mammals travel these incredible distances on foot every year, to find better areas for feeding or breeding at different times - further than you'll probably ever walk in your lifetime!

Most mammals that migrate overland are *herbivores* (plant eaters) and they move as the weather changes over the seasons and the grass growth changes. No *carnivorous* (meat-eating) land mammals regularly migrate, although packs of wolves may travel with *caribou* herds if food is scarce in their home territory.



Caribou/reindeer

Wow!

Caribou (reindeer) undergo the longest overland mammal migration. 3 million of them travel across the Arctic Tundra to find greener pastures and therefore more food. Some cover more than 3,000km each year.

Wildebeest

One of the most famous mammal migrations is the great wildebeest migration across the Serengeti in Africa. Zebra and Thompson's gazelle also travel with these grunting, horned animals in vast numbers. The images people remember tend to be the ones where they have to cross big rivers where hungry crocodiles lie in wait to catch the weak and young animals.

Wow!

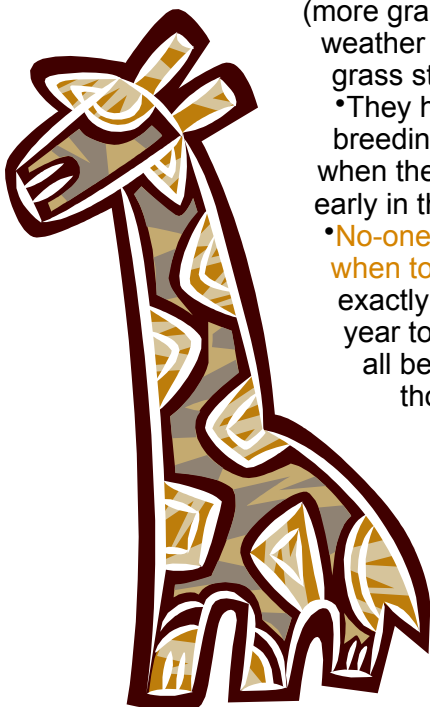
It is estimated that 200,000 zebra, 500,000 Thompson's gazelle and 1.5 million (1,500,000) wildebeest make the annual return journey of 3200 km across the Serengeti in Tanzania to the Masai Mara reserve in Kenya and back again a few months later.

- **The animals move to find better grazing** (more grass) and water as the weather becomes drier and the grass stops growing.
 - They have to move off from their breeding grounds in the Serengeti when the dry weather approaches early in the year.
 - **No-one knows how they know when to leave** and it is never exactly the same time from one year to the next. But gradually they all begin to move off in their thousands and head north to the wetter Masai Mara over the border in Kenya



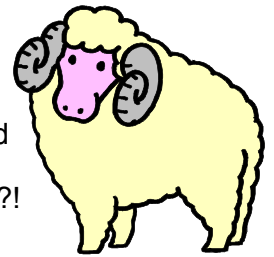
Wildebeest

- **Their journey is far from easy.** They have to cross two big rivers during their journey, the Grumeti and the Mara, where enormous hungry crocodiles pick off the exhausted, weak, diseased or young ones.
 - **Finally arriving in the Masai Mara in about July**, they remain there until October when they head back to the Serengeti as the rains return there.
 - **As many as 200,000** will die along the way, either from **predation**, disease, old age or exhaustion.



Sheep migrate too!

There is a type of sheep in Alaska, the Dall sheep, which migrate. They live in the mountainous Noatak Nature Preserve and are what's known as *altitudinal* migrants. This means they head up to the top of the mountains in the summer when there is good grazing and better weather, and retreat to the lower slopes in the winter where there is less snow and more chance of finding food. So perhaps sheep aren't so stupid after all?!



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Whales

Many species of whale (which don't forget are mammals) also migrate vast distances to find food.

Baleen whales such as the Gray, Blue, Right, Minke and Humpback whale feed on *krill* which is shoals of tiny animal larvae floating in the oceans. Krill thrives in cool waters so the whales head north in the northern hemisphere and south in the southern hemisphere to feed, and then head back to warmer waters to give birth.

Humpback Whales

- * These gentle giants travel from Costa Rica and Hawaii to Antarctica to feed in the krill-rich cooler waters there
- * Their young are born in the warmer waters further north in Costa Rica when they return in the autumn.
- * This journey is more than 8,000km.

Wow!

The blue whale is the world's largest migrant at up to 27m long! In fact it's the largest animal on the planet!

Reptile Migration

The best known migratory reptiles are turtles.

Turtles live most of their lives in the sea, except for when it is time for the females to lay their eggs.

They then head to their breeding beaches, haul themselves out of the water, lay and then bury their eggs in the sand before heading back to the sea once again. These beaches can be thousands of miles from the turtles' feeding grounds.

When the tiny baby turtles hatch, they immediately make their own way all the way down the beach to the safety of the sea without the guidance of their parents. Amazing!

Wow!

A leatherback turtle made the longest recorded water journey: 20,558km in 647 days!



Loggerhead turtles

- **Baby Loggerhead turtles** can find their way along a 13000km migration route without guidance from their parents.
- Even when scientists have **led them off course**, they found their way back without any problem.
- But when they were exposed to a variety of **magnetic fields** that were different to the Earth's magnetic field, they went off course, only to go the correct way when the Earth's magnetic field was restored!

Fish Migration

Many species of sharks, eels and other fish also undertake massive journeys, usually for breeding purposes. And people think that fish have rubbish memories! Read on and then decide for yourself if you think they have!

Atlantic Salmon

Salmon are well known for their migratory habits. They migrate in order to breed somewhere safer than their main feeding areas. This is known as *reproductive migration*.



- The adult salmon live in the open seas of the **Atlantic Ocean** but return to the freshwater streams and rivers where they were born, to lay their eggs.
- They use their **sense of smell** to find their way (I bet you didn't know that water smells!).
- Young salmon wouldn't have such a **good chance of survival** in the open sea – there are too many predators and other hazards; it is safer to start life in a river.
- Once they are in the stream or river, the **adults stop eating and lay their eggs** before returning to the sea once again.
- The young salmon hatch and spend **up to 5 years in the rivers** before making their way out to sea. Here they stay until they are old enough to return up the river.
- **Pacific salmon** have a similar migration pattern but they don't return to the sea once they have **spawned** (laid their eggs); they die in vast numbers once their eggs are laid.

The European Eel

A lot of information has recently been discovered about the migration of eels as scientists have managed to attach electronic tags to them so they could follow their journeys on a computer! Here's what they have found out so far:

- The adults go on a journey of between **6000 and 7000km from Europe to the Sargasso Sea** (near the Bahamas) all the way across the Atlantic Ocean.
- This can take up to **3 years**.
- Once there it is assumed that they **lay eggs** and produce young but no-one has ever seen it.
- The transparent **larvae float on ocean currents** back across the Atlantic. By the time they reach Europe they have grown into small eels ('elvers') that swim against the river currents and head upstream.
- Here they carry on growing up to **1m long** and remain until they are ready to breed and head back across the Atlantic again.
- During migration **they swim at night** in the warm water near the surface, and then dive deeper during the day.
- They **do not appear to eat** during this journey.
- **Weird but true:** During the migration, their digestive tract gets shorter, their anus closes, their eyes grow 4 times bigger and their pectoral fins grow longer to make them very efficient swimmers!



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Basking Sharks

- ...are the **second largest shark** in the world.
- They undertake a **1600km migration** journey into the deep waters of the Western Atlantic from New England, USA.
- They head out **beyond the Equator**
- They have never been seen during this migration as they **swim so deep – 200-1000m below the surface**.
- No-one knows why they migrate. There is plenty of food and warm water in their northern home near Florida. Perhaps they are seeking out **new breeding grounds**.



Invertebrate Migration

Yes, even creepy-crawlies migrate! Most die in winter or *hibernate* to avoid the cold winter temperatures, but some migrate instead. Termites and even earthworms migrate. They bury themselves deeper into the soil in the cold winter months to avoid getting frozen!

The most famous *invertebrate* migration is that of the Monarch Butterfly. Let's look more closely at this amazing spectacle:

The Monarch Butterfly



rionpine – CC BY-SA 2.0

Wow!

The Monarch butterfly undergoes the longest insect migration: they fly in their hundreds of thousands up to 4,750km in the autumn!

- As autumn approaches, the butterflies begin to gather in trembling colourful clusters in their thousands throughout North America.
- They then fly south to the warm forests of Mexico – a journey of more than 1600km – returning north again the following spring.
- They rest in trees along the way – using the very same trees every year.
- BUT – the weird thing is that the return journey takes longer than the butterflies life-span, so it is different butterflies that fly home than the ones that flew out! Each migrating butterfly will never make the trip again. In fact 2 or 3 generations have been and gone before the return journey is made!
- The offspring follow exactly the same route and roost in the same trees as their great grandparents on the way over. How on earth do they know??

- The reason they make the journey is probably because it is too cold to stay year round in North America, plus the food the larvae feed on (milkweed) doesn't grow in such abundance in the southern regions so they have to fly north again to where does.

So there we have it. The amazing journeys some species make in order to survive, and to ensure the continued survival of their species. It probably makes your journey to school or your summer holiday look like a walk round the block!

Of course some people migrate too. They might move to another town, county or country to find work, start a family, avoid a war or famine, or if they are lucky enough, simply to have a holiday. Some of course choose never to



come back (*emigration*); others return after their holiday or when it is safe to return. Human migration is a whole new complicated subject which we won't go into here; but humans migrate too.

Why don't you:

- See if you can find out about some of the many other animals that migrate and the reasons why.
- Pick one species and draw their journey on a map of the world.
- Take a walk outside and see how many birds you can find that are just visiting here for the summer! I bet it's not long before you see a swallow or swift. Just think how far it has flown!
 - Draw a picture of your favourite migrant and label the adaptations it has to help it travel long journeys.
 - Write a story about a migrating animal and the adventures it has along the way.



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