

Migration: Key Stage 3

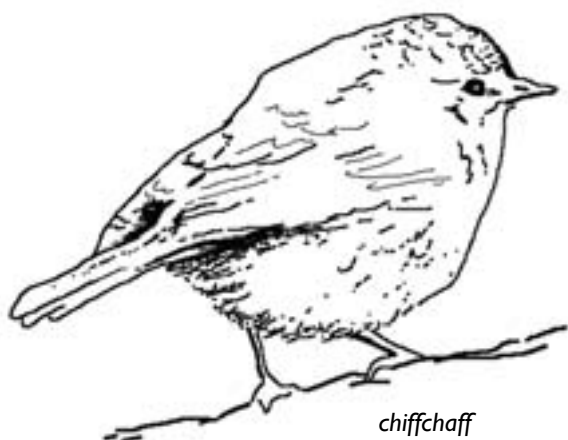
SI – S3 in Scotland

Migration

Every year many millions of birds make amazing journeys, often over thousands of miles, from winter feeding grounds to summer breeding grounds. This yearly 'movement' is called migration. Birds undergo amazing feats of endurance, they cross mountains, deserts and oceans; encounter rough weather, predators and human-made obstacles. All this to find food and a good place to meet a mate and raise their young.

Migration happens when birds move from one place or country to another at the change of the season. In the UK, there are quite a lot of birds who do not live here all year round. They move, or migrate, to and from the UK at different times of year. Chiffchaffs migrate from countries in the south, for example northern Senegal in West Africa, to summer breeding grounds in UK woodland.

It is uncertain what triggers cause birds to migrate. Scientists believe there are a range of factors including:



- Genes/DNA
- Weather – temperature, sunshine hours
- Food supply
- Day length

However, what is certain is that scientists have discovered some interesting patterns emerging in spring time in the UK over the last few years.

Discovery

Here are some data showing when the first migrating chiffchaff appeared in the UK between 1880 and 2000

Year	Days after New Year
1880	90
1885	84
1891	95
1895	77
1900	92
1905	78
1910	85
1915	84
1922	84
1925	87
1931	82
1935	83
1945	76
1948	74
1960	65
1969	68
1976	81
1980	82
1984	82
1990	63
1996	84
2000	69

Table 1

- Q1.** Now draw a graph illustrating the data from Table 1.
The x axis should show the year
The y axis should show the 'days after New Year' that the birds arrived in the UK for each of these years.
- Q2.** Once you have drawn the graph, try and fit a 'line of best fit' through the points you have plotted.
- Q3.** Are birds generally arriving earlier or later in the UK in recent years compared to earlier years?

Phenology

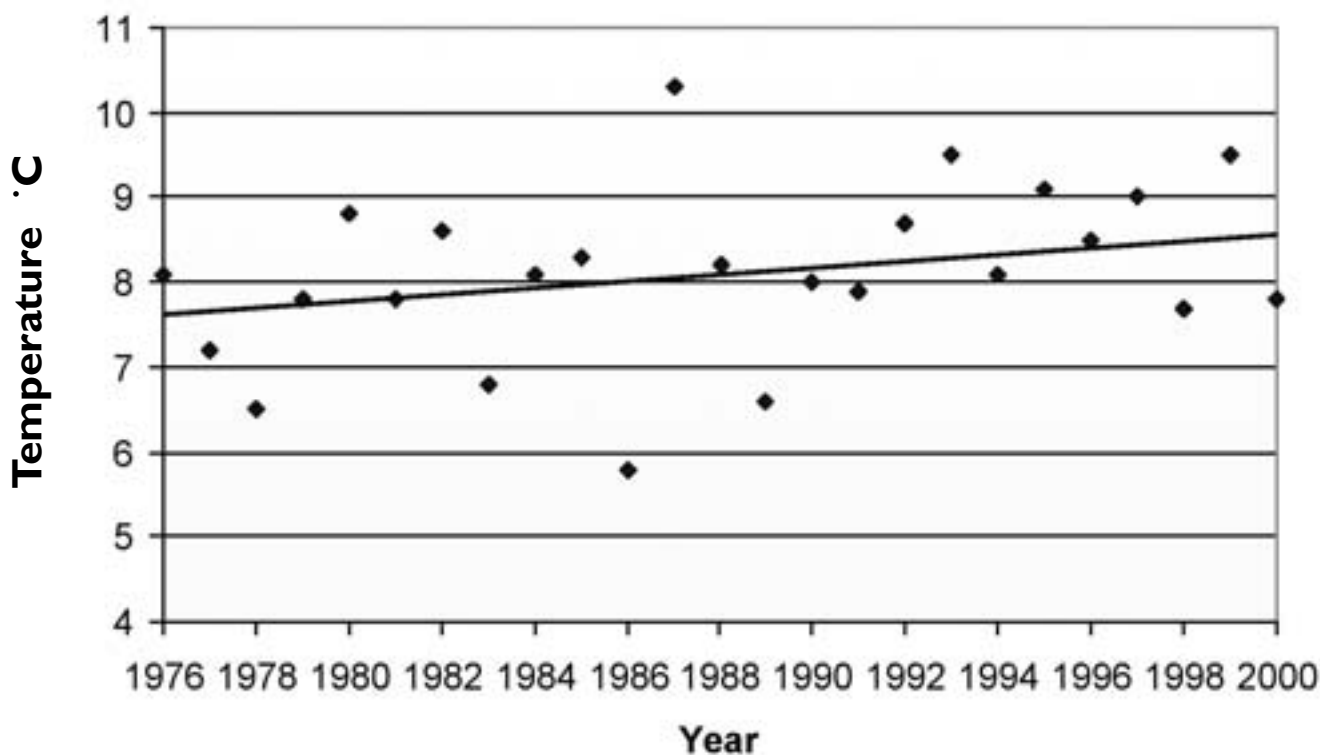
You have had a look at changing trends in the date that chiffchaffs arrive in the UK every year. The study of the time

these birds arrive is part of a science called phenology.

A few questions first: Do you look forward to when the first conkers are falling from the trees in autumn? Can you remember the date you saw the first snowdrop of the year? What about the first swallow arriving? If you measured when these events happened every year, then you would be studying phenology and you would be called a phenologist. Phenology is a science that studies the change in seasons by looking at certain different events that happen each year.

There are quite a few phenologists out there. Some of them have been keeping records for many years. Have a look at the graph below. It shows the average temperature in central England in April for the years from 1976 to 2000.

Average temperature in April, in Central England



- Q4.** What does the graph show? Describe how the temperatures in central England in April have changed since 1976.
- Q5.** Do you think that the change in temperature could be linked to a change in migration time for the chiffchaff?
- Q6.** What additional climate data or other evidence might you need to back up your ideas?

Climate Change

We have had a look at the changing times of arrival of a species of migrating bird in the UK. This is an example of studying phenology, which measures the change in the timing of natural events in relation to climate. We have also had a look at changing temperatures in the UK.

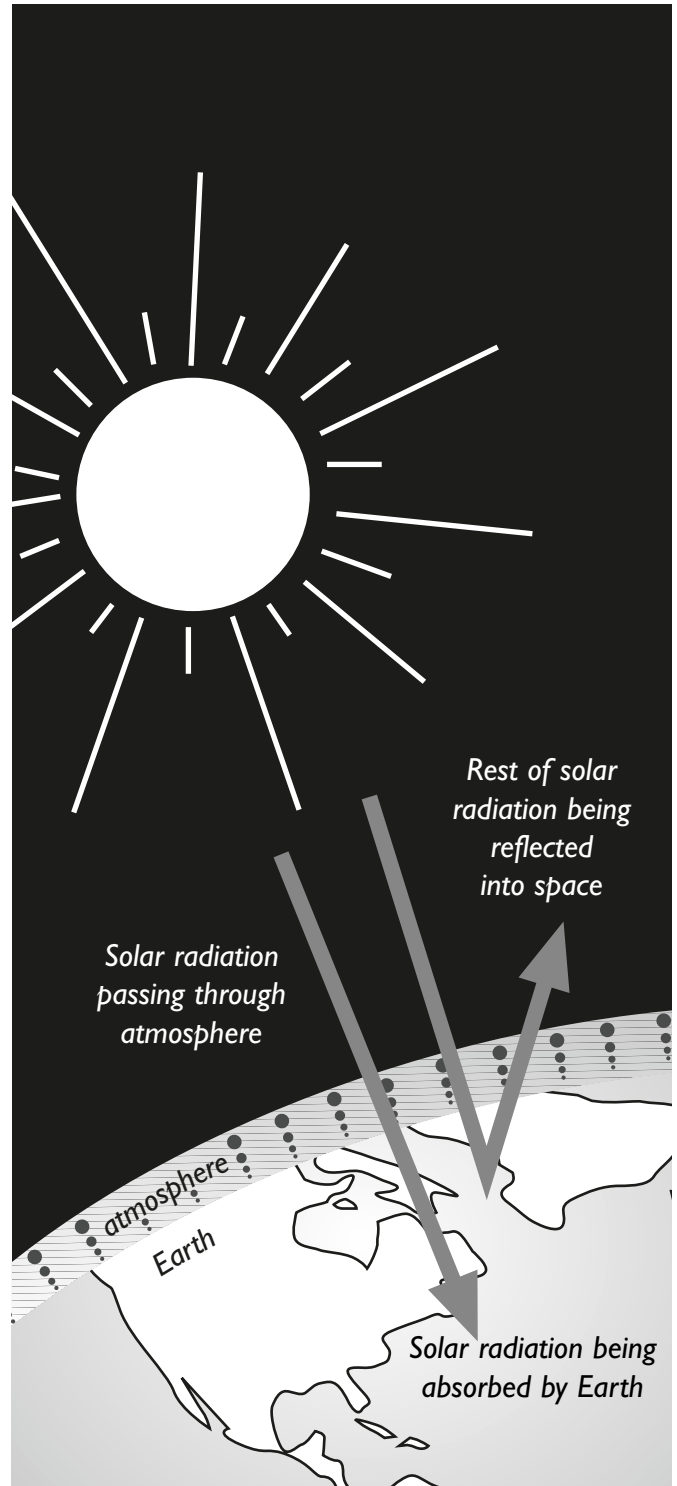
But why are there changes?

Many people think that the answer to this question is 'climate change'. There is no doubt that climate change is happening. For example, 2002 was the second warmest year on record, beaten only by 1998.

Climate change will see greater variability in the weather, with heavier rainfall events and storms, but generally a move towards warmer conditions, known as global warming.

Lets have a look at what climate change actually is.

First we have to have a look at the Earth, its atmosphere and how the sun affects us. Normally, the sun's rays (solar radiation) enter the Earth's atmosphere and warm the Earth. Most of the solar radiation is absorbed by the Earth's surface and the rest is reflected back into space by the Earth and its atmosphere.





Let's now look at what happens as an effect of global warming.

Global warming is caused by an increase of 'greenhouse gases' in the atmosphere.

Q7. Do you know which of the following is NOT a greenhouse gas?

Carbon dioxide Sulphur dioxide

Water vapour Methane

Nitrous oxides Hydrogen

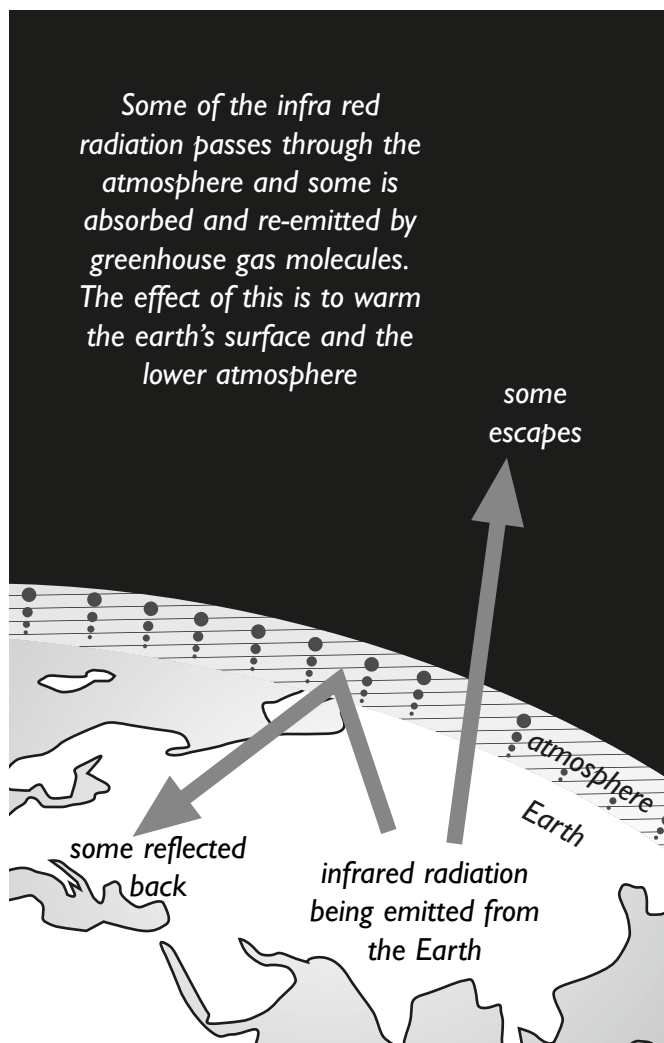
Q8. Give 2 examples of where you think these greenhouse gases are coming from.

Q9. Now have a look at the diagram to the right.

Look at the arrows showing the direction of solar radiation reaching the Earth's atmosphere.

What do you think happens as a result of the presence of increased greenhouse gases in the atmosphere?

Q10. 1998 was the warmest year of the warmest decade of the warmest century of the last millennium. If the volume of greenhouse gases in the atmosphere carries on increasing, what do you think might happen to global temperatures during this century?



Adaptation

During their summer stay in the UK, chiffchaffs feed on insects found in UK woodland. Look at this food chain for a UK wood in spring

Sun → woodland plants → caterpillar →
chiffchaff → hawk

This food chain could be affected by both a change in seasons and a change in the Earth's temperature.

One big problem for animals and plants is that climate change is happening relatively fast compared to events that have happened in past millennia. The problem is not so much that the environment is changing, it is that different animals and plants adapt in different ways and different speeds and some cannot adapt fast enough to the speed at which climate change is affecting the environment. There will be winners and losers.

Q11. In fact, the numbers of chiffchaffs are increasing in the UK in the winter. This is due to more and more birds staying here and not migrating to Africa in autumn. Do you think that these birds are good at adapting to changing conditions? Why/Why not?

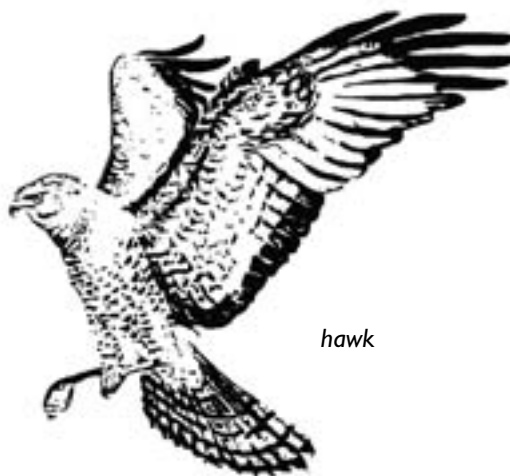
Q12. Woodland can support only a maximum capacity of animals. Do you think that, with the numbers of chiffchaffs increasing, there are negative aspects to climate change for the plants and animals in woods in the UK?

Common sense solutions

"Everybody talks about the weather, but nobody ever does anything about it."

Mark Twain

Q13. Have a discussion in class. Do you think that the change in seasons in the UK and the timing of the arrival of migrating birds are due to the effects of climate change? Discuss ways in which you could all make a positive impact and reduce your contribution to climate change.



hawk