

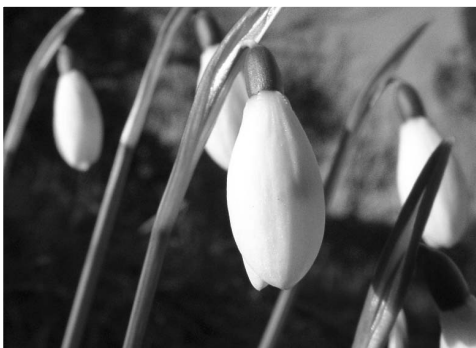
# Investigating Nature's Calendar: Key Stage 4

## S4 – S5 in Scotland

### Phenology

Phenology is the study of the timing of natural events, such as when trees come into leaf or when the first ladybird or butterfly is seen each year. The UK Phenology Network collects information about a variety of species to help scientists understand how they might be responding to climate change.

One important set of data looks at when the first snowdrop flowers in a particular place. This is seen by many as one of the key indications as to when spring starts.



Roy Battrell

Snowdrops



Margaret Barton

For over 50 years a phenologist in Newcastle has been recording the date of the first snowdrop (*Galanthus nivalis*) flower that he saw growing in a “wild” location. Some of these results are shown in the table below.

Year	Date of Flowering Days after 31st December (Newcastle data)
1960	56
1965	53
1970	37
1975	38
1980	47
1985	40
1990	31
1995	19
2000	25

### Questions

- Q1.** Plot a fully labelled graph using the data from the table above.
- Q2.** Draw a straight line of best fit on your graph.
- Q3.** What is the **date** of the first flowering in 1980?

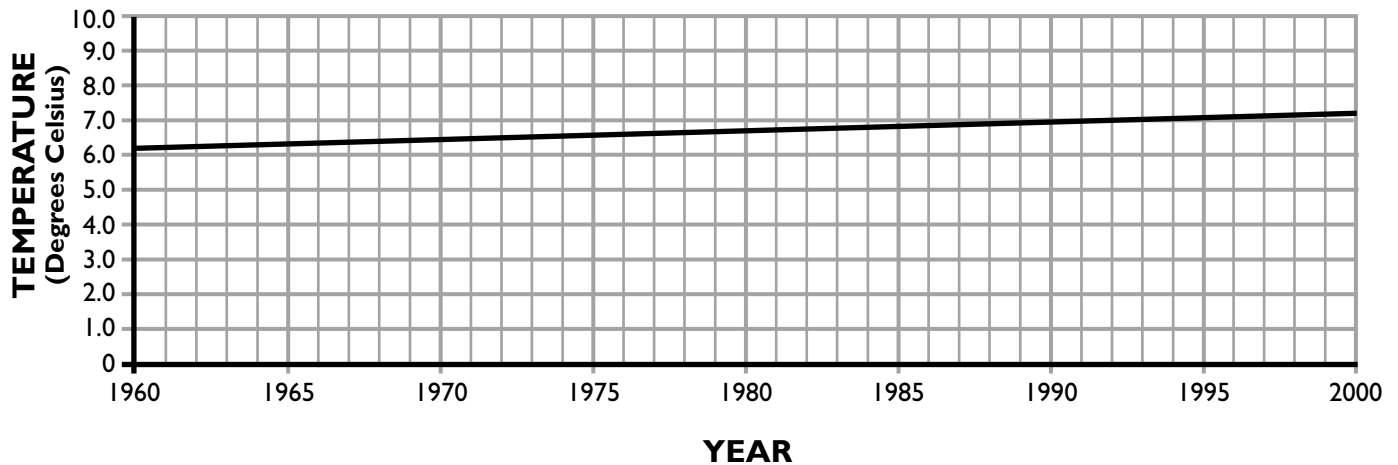
Use the **line of best fit** to answer the next two questions **DO NOT** use the values from the table.

- Q4.** By how many days has the date of first flowering moved between 1960 and 2000?
- Q5.** Describe the pattern that the graph is showing and what it tells you about the flowering of snowdrops.

Looking at changes in temperature gives good indications about the changes in the climate and can help explain any patterns in nature. The line on the graph below shows how the trend of average temperature in the UK has changed over the same time period as the snowdrop data.

The points for individual years are not shown but are worked out as an average over the first five months of the year

### AVERAGE UK TEMPERATURE (JAN – MAY)



**Q6.** Try and describe the pattern that the temperature graph above is showing.

In your answer write about;

- what these results tell you about average spring temperatures in the UK
- what might happen to these temperatures in the future

In your answer try and include the following;

- comments on both the snowdrop and temperature data
- comment how the two patterns might be related
- what might be causing these changes to happen

On the right is part of the website [www.phenology.org.uk](http://www.phenology.org.uk) run by the Woodland Trust. It is the sister website of Nature Detectives and is aimed at adults who send in phenology records.

**Q7.** The website states that spring is arriving sooner. Does your evidence support this statement?

**Nature's Calendar** - The UK Phenology Network - seeking to collate and store all UK data on Nature's Calendar

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#### Spring events and trends

Over the past 30 years phenology has provided biologists with clear evidence that spring is arriving earlier.

Trees have been coming into leaf sooner. Migrant birds are arriving earlier with swallows now a week ahead of their dates in 1970. Frogspawn is being spotted before Christmas in the south-west, while comma and holly blue butterflies have been sighted as early as March.

**Analysis of spring results 1996-2004**

The UKPN now has 7 years of spring results, in addition to the historical data contained in the database.

The bumble bee was once again our most recorded event. The warm start to the year made for a flurry of very early sightings in January, following hard on the heels of the first frogspawn sighted before Christmas in Cornwall.

**A closer look at temperatures**

January and February 2004 were warmer than 2003, February in particular was 1.3°C warmer than 2003. However March and April were cooler, March being 1°C cooler than 2003 (though still over 1°C warmer than 2001, our phenological benchmark). This demonstrated the importance of March temperatures for the timing of many spring events as despite a warmer January and February, 2004 event dates were later than 2003's.

Graph showing 2001-2004 spring temperatures (°C)

Click here to set this calendar picture as your background.

Click here for a short report containing regional phenological