MEI Introduction to Data Science

Lesson 6: The data science cycle
Activity 1 – Suggest Student Responses

Activity 1a explores whether 2015 was a hotter year than 1987.

Checkpoint 1

How can the statistics and charts produced be used compare the temperatures for the two years?

> *The time series plots show that there appear to be more periods in May-October when the 2015 mean daily temperature is higher than the corresponding one for 1987. This also borne out by the statistics with mean for 2015 being half a degree warmer and with less variation in 2015.*

Checkpoint 2

Was the difference in temperature for the two years similar for the different weather stations?

> *For all the weather stations the mean of the 2015 daily mean temperature is greater than of 1987 and the standard deviation is smaller, suggesting that 2015 is warmer on average and there is less variation. The greatest difference is in Heathrow which is one degree different. Leeming only showed a 0.2 degree difference.*

How do the statistics and charts help you answer this question?

> *The means give an average value for the temperatures and the standard deviation displays the variation/spread. The pairs of line graphs are useful to display the patterns over the years.*

Checkpoint 3

Use the results to answer the initial problem: Was 2015 a hotter year than 1987?

> *So using the above it seems reasonable to conclude that 2015 was warmer than 1987 during May-October at these five locations in the UK.*

Activity 1b explores whether the temperature has been higher at UK locations since 1990.

Checkpoint 1

Why was it valid to remove the asterisk from the temperature and not just ignore this field? You might want to refer to the original data at:
https://www.metoffice.gov.uk/research/climate/maps-and-data/historic-station-data

> *This is an estimated value but it appears appropriate and there is no strong reason to reject it.*

Which other months have you chosen to explore the maximum temperature for? Why have you chosen these months?

> *A useful comparison for this would be a winter month such as December, January or February.*

Which other months have you chosen to explore the minimum temperature for? Why have you chosen these months?

As above: a winter month would be useful.

Checkpoint 2

Which has shown the greater change for pre and post-1989: maximum or minimum temperature?

For Hurn in August the change is the maximum and minimum temperatures has been similar.

Is the change similar for different months or different weather stations?

This answer will depend on the months and weather stations.

Is maximum temperature more variable pre or post-1989?

This answer will depend on the months and weather stations. For Hurn in August the change is the maximum and minimum temperatures has been similar.

Checkpoint 3

Use the results to answer the initial problem: Has the temperature been higher at UK locations since 1990?

This answer will depend on the months and weather stations but it is likely that an increase will have been observed.