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| **Extreme weather in the UK** |

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| * **Lesson one**
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This lesson introduces what a database is, and how to use the TEMPEST database of extreme weather

**Key Questions**

* What is an extreme weather event?
* What kind of weather might be involved in an extreme weather event?
* What kind of impacts might a severe weather event have?
* What is a data base?

**Key ideas**

Extreme weather is when a weather event is significantly different from the average or usual weather pattern. This may take place over one day or a period of time.

Extreme weather can have impacts on people and environments. The Tempest Database has documented accounts of extreme weather going back over hundreds of years from a rich variety of diverse sources that include: newspaper reports; diaries, letters and postcards, as well as official meteorological records. This data base can be searched using dates, types of weather and impacts as queries and the results mapped.

You can listen to an interview with Professor Georgina Endfield about the data base here <https://soundcloud.com/rgsibg/weather-extremes-with-professor-georgina-endfield>

**Downloads**Tempest Slide Slow (PPT)

**Additional resources**

* World maps / atlases
* Internet
* Digital mapping software access

**Web links**

* ArcGIS [www.arcgis.com](http://www.arcgis.com)
* Digimap for Schools [www.digimapforschools.edina.ac.uk](http://www.digimapforschools.edina.ac.uk)
* Meteorological Office Severe winter events <https://www.metoffice.gov.uk/learning/learn-about-the-weather/weather-phenomena/case-studies/severe-winters>
* Tempest database <https://www.nottingham.ac.uk/geography/extreme-weather/search/>

**Learning objective**

To be able to locate, describe and explain some of the impacts of a severe weather event (UK) using maps.

**Starter**Ask the class to come up with a definition of a severe weather event and ask them to work in groups to gather ideas of types of extreme weather that might be encountered in the UK. Discuss each groups’ contribution and agree a working definition.

Make a list of some of the weather types suggested and identify any suggestions which might be particularly unusual for a UK context, such as tornadoes.

* Has anyone heard about or experienced a severe weather event?
* What is it that makes a weather event dangerous?
* What kinds of impacts might a severe weather event cause?
* Are some weather events associated with a time of year? Why?

**Main teaching**

Introduce the **Tempest website** and explain that it is a data base of recorded weather events from the 18th to the 21st Century. Weather events in the UK can be searched for using dates, place names, and regions.

Use the PowerPoint provided to talk through what it can tell us, using the example of a significant snowfall event on Christmas Day.

* **Slide 2. What is Tempest?** Linking to the opening activity, clarify what is meant by an extreme weather event and what a data base is.
* **Slide 3. Christmas Day Snow?** Wondering whether it will snow on Christmas Day is a popular question each year and one which some people even place bets on. Whereas, according to the Meteorological Office, it is enough for the records if just a few flakes fall on a designated weather station, remind the class that they are thinking about an extreme event with blizzards and considerable snow.

The search terms used for this search are:

* Case study region - left open
* Place location - left open
* Weather event selected - ‘Snowstorm / Blizzard’.
* Date selected - 25th December as opening date and all else is left open.

The results from this search produce 11 records from 1808 to 1981. Clicking on the ‘map’ tab will then map the results as shown in Slide 3. Ask the class what they notice about the pattern of markers. They are quite close. Does this evidence indicate an area of the UK particularly at risk of snow on Christmas Day? Take some ideas why / why not.

* **Slide 4. Christmas Day 1927**. Selecting one of the markers on the map will reveal details such as date of event and type of record as shown on this slide. Clicking on the date will reveal more information. Use the headline information shown on the slide and discuss using the question prompts. You could record useful questions from the class if they can’t be answered immediately. Ask the class to think about what kind of impacts this type of event might have.
* **Slide 5. Christmas Day 1927**. This slide explores the information in more detail by looking at the main ‘Impacts’ and documented ‘Impact statements’. Look at this and discuss if that was what was expected. Ask the class if they are surprised that in 1927 food was brought into villages by aeroplane. What do they do today when villages get cut off? They would probably use air drops or helicopters.
* **Slide 6. Christmas Day 1927.** Did other places in the UK experience extreme weather associated with this event such as extreme rainfall or flooding? Ask the class how they could find out about any more extreme weather events on that particular date across the UK. The answer would be to clear the search term on ‘weather events’ so that all types of weather are searched for but keep the date as 25th December 1927.
* **Slide 7. Christmas Day 1927**. Maps the results of a search for all extreme weather in the UK on Christmas Day 1927. Apart from one outlier in North Wales, the events occupy much the same region. Look at the individual markers on the map to see what they tell us about the weather and its impacts.
* **Slide 8. Christmas Day 1927 Bardney Lincs**. This slide shows some of the information from the British Sugar Corporation Ltd about the weather at Bardney. It seems the weather was so bad that it shut down the local factory for some time before and after Christmas.
* How would it feel to be a factory worker there with no work just before Christmas?
* Do you think workers would still be paid?
* Do you think the extreme weather affected the price of sugar?
* Does bad weather affect the price of food today?

If there is time and the class have a good grasp of the search process, you could discuss widening the search dates to either the whole of December 1927 or to meteorological winter 1927-28 (1st December to the end of February) and investigate the pattern of weather across the country*.*

* **Slides 9 and 10. December 1927 and Winter 1927-8**. These show searches at different time scales and reveal that apart from a few outliers, the focus on extreme weather events remains in that part of the country.
* **Slide 11.** If you have access to Digimap for Schools, show the different map layers for the 1890s, 1950s and the present day and ask the class to consider which map might be most appropriate to illustrate their report with.

**Main activity**

Suggest children work in pairs or small groups. Ask each group to imagine they are writing a news report about a severe weather event in the UK as though they were living at the time that it happened. They must include:

* The date
* The location
* The name of the type of weather event
* A description of what happened and of some of the impacts.
* They should include a map with the location clearly shown (an extension activity could be for them to annotate the map with additional information).

Suggestions are given below for search and reporting contexts, each increasing in difficulty.

You could:

* Focus on the events modelled in the teaching session i.e. Christmas Day in 1927. Children should work together to mine information using that search and decide which location they will focus on to look at in more detail for their report.
* Widen the search to give children the option of investigating all Christmas Day severe weather events before deciding which one to focus on in depth.
* Choose one of two severe winters identified as case studies by the Meteorological Office: 1947 and 1963. Use the dates provided in the case study to help with the search. Ask children to consider whether the data base provides more, or less, information than they expected.

**Plenary**Have each group present a brief overview of their weather report. Identify some common impacts. Ask children if they think the impact of a severe weather event such as extreme cold and snow might be the same for people living in urban and rural settings and explain their answers. What about people with a better income and those with less? How might the impacts affect them in different ways?

**Further study**

* Give children time to play with the resource and explore it using their own search terms. Use it for home work and ask children to research something that interests them. They could also ask their parents or grandparents for their memories of a severe weather event and use that as the basis of an enquiry.
* Repeat a similar enquiry but with weather events more usually associated with hot weather, such as drought and heatwaves. Compare hot and cold weather impacts.
* Search for extreme weather events in your home town or county. Map them using Digimap or Arc GIS.
* Choose one weather event at one place which is well documented and create an infographic using maps, text and graphs.