

Y9 Lesson 3

Overview:

This lesson looks into how we can use a model of the atmosphere to make predictions and how we can verify the accuracy and reliability of these predictions.

Lesson Plan:

1. Recover how last lesson students learnt how temperature is dependent on time; explain how this lesson they will look into how temperature varies with the position of a site on Earth.
 - 1.1. Ensure students have completed the homework activity, if not all have, suggest that they can share a forecast – this activity will involve pair-work so ensure there is one forecast between two!
2. Firstly use the board to sketch the globe – a circle with a line at the equator:
 - 2.1. Ask students for the approximate temperature at the equator during the winter (nudge towards 40°C) and the approximate temperature at the North Pole (nudge towards minus 50°C).
 - 2.2. Demonstrate how we could think of 1 degree in latitude representing 1 degC change in temperature, as the equator and the radius from the north pole form a right angle.
 - 2.3. **Worksheet:** Let students work through the Temperature Prediction section of the worksheet, this involves producing a scatter plot and fitting a straight best fit line.
3. Display www.mathmetics.org/cForecast%20Verification/. This shows a scatterplot of the observed and forecast temperatures at 12:00 today against Latitude (an alternative measure of north/south distance) for the 122 Met Office observation sites across the UK.
 - 3.1. Does this support our model?
 - 3.2. Are there any anomalies? [Cairn Gorm Summit at 57.1° should be –due to increased elevation, perhaps this is another factor we should consider when predicting temperature?]
 - 3.3. ****Display** www.mathmetics.org/cForecast%20Verification/, an interactive map displaying the locations of the 122 Met Office observation sites, ask students to name which they think is nearest to the school site and use the latitude-longitude forecast tool to obtain demonstrate how weather forecast websites can select the nearest forecast location.
4. Display www.mathmetics.org/cForecast%20Verification/ which shows the daily observations for the school site, ask students to work in pairs and decide which forecast they are going to consider.
 - 4.1. **Worksheet:** Let students work through the Forecast Verification section worksheet, allow 10 minutes at the end of the lesson for students to feedback their results.
 - 4.2. Questions 3 and 4 can be omitted if necessary.
 - 4.3. Question 5 on this section is more challenging and could be discussed in class, hints:
 - 4.3.1. The forecast can never be perfectly accurate; there are too many different processes and variables to consider.
 - 4.3.2. The forecast location may not be exactly at the school site.
 - 4.3.3. The observations on the school site may not be reliable, could be influenced by local microclimates.
 - 4.3.4. We can use statistics to quantify this uncertainty in the forecasts; this is a main focus in current climate prediction research.