ECLIPSE 2015 – NOTES FOR SCHOOLS

A very rare solar eclipse will be visible from the UK during the morning of Friday 20 March 2015. Because eclipses can also affect the weather, the Department of Meteorology at the University of Reading is running NEWEx, the National Eclipse Weather Experiment, a citizen science project to collect weather data during the solar eclipse for detailed analysis. We welcome participation and lesson inclusion from schools across the country. Schools planning to submit data are encouraged to let BBC Stargazing Live know via email to stargazing.schools@bbc.co.uk.

WHAT IS A SOLAR ECLIPSE?

A solar eclipse occurs when the Moon passes between the Sun and Earth, and as a result the Moon’s shadow crosses the surface of the Earth. In a total eclipse, the disk of the Sun is completely blocked by the Moon: in a partial eclipse, only part of the Sun is obscured. This eclipse is a total eclipse, although only parts of the north Atlantic including the Faeroe Islands will see the Sun completely obscured. In the British Isles, this eclipse will be a ‘deep partial eclipse’ - most but not all of the Sun’s disk will be covered by the Moon. This will be the largest solar eclipse visible from the British Isles since 11 August 1999, which was a total eclipse in south-west England. There will not be a larger solar eclipse in the United Kingdom for another 11 years - until 12 August 2026.

WHAT CAN I EXPECT TO SEE ON THE MORNING OF THE ECLIPSE?

A lot depends upon the weather! If the sky is clear, you will see the Moon beginning to creep across the face of the Sun, which will be in the south-eastern sky. In Reading, this ‘first contact’ starts at 8.24 a.m., although it may not be obvious for several minutes. The Moon will cover more and more of the solar disk until it covers 85 per cent of the Sun – this is ‘peak eclipse’, which in Reading will happen at 9.30 a.m. After that, the solar disk will gradually reappear, until the edge of the Moon finally moves off at 10:40 a.m. (The amount obscured and the times differ slightly across the country - you can find details for other locations at the link below.)

If the sky is clear, the Sun at peak eclipse will look like this

You can see an animation of what the eclipse will look like given clear conditions at http://www.timeanddate.com/eclipse/solar/2015-march-20.

If the sky is cloudy, you will notice the sky getting darker, so that at peak eclipse it may look more like sunset or before a big storm.

IMPORTANT: You must never look directly at the Sun, even very briefly: doing so can cause permanent damage to your eyes - and can lead to blindness. Use special eclipse glasses (NOT ordinary sunglasses) or make a pinhole camera. Normally, the Sun is so bright that it is difficult to stare at it directly. However, even during an eclipse, with so much of the Sun covered, it is easier and more tempting to stare at it. Looking at the Sun during an eclipse is as dangerous as looking at it under normal conditions. Looking directly at the Sun's disk through any kind of optical aid (binoculars, a telescope, or even an optical camera viewfinder) is very dangerous and can cause irreversible eye damage within a fraction of a second.
WHAT CHANGES IN THE WEATHER MIGHT HAPPEN DURING THE ECLIPSE?

Because a solar eclipse reduces the intensity of sunshine, usually the temperature falls. During the August 1999 eclipse in Reading, the temperature fell about 2 degrees Celsius (see graphic). Sometimes there are also changes in clouds (both amounts and types) and a reduction in wind speed. The National Eclipse Weather Experiment is looking for as many measurements as possible to track the effects of this eclipse.

WE HAVE WEATHER INSTRUMENTS AT SCHOOL: CAN WE USE THESE TO MEASURE THESE CHANGES?

Yes, you can. Make observations every few minutes before, during and after the eclipse – every 2-3 minutes is ideal. You can submit your observations at this web address (which will be live from 8.00 a.m. on the eclipse morning):
http://www.met.reading.ac.uk/outreach/newex_2015/index.html

Temperature The temperature is a measure of how hot or cold the air is, in degrees Celsius (°C). It can be measured by a thermometer (a standard liquid-in-glass thermometer, or a digital sensor), but to measure the air temperature the thermometer sensor must be in the shade (not in sunlight) and not wet.

Humidity The relative humidity of the air indicates how much water vapour it holds, as a percentage of the maximum. This can be derived from the readings of two thermometers, one with a wetted wick (a dry-bulb and wet-bulb), or indicated from a electronic sensor with a digital readout combination.

Wind speed and direction Wind speed can be estimated using the Beaufort Force, or directly using an anemometer: the units are metres per second (to convert from mph to metres per second, multiply by 0.45). The direction of the wind (where the wind is coming from, not where it is going to) can be estimated by eye with a compass, or by using a suitable wind vane. The wind direction and speed vary rapidly, so try to take an average over a period of a minute or so.

Cloud cover The extent of cloud cover is estimated using four categories – clear (less than one-quarter of the sky covered by cloud), broken cloud (one-quarter to half of the sky covered), cloudy (more than half the sky covered, but not completely) and overcast (sky completely covered by cloud). Don’t forget even thin, high cloud counts as cloud cover!

Don’t forget to look around for other effects during the eclipse. Look at shadows under trees – what shape are they? Why? What about effects on birds? Animals? Traffic? Street lights? Does the air feel colder? Is the sky darker? You might like to look around and write down what you think and feel during this big eclipse, then compare notes as a class afterwards.

HOW DO WE SUBMIT OUR INFORMATION TO THE NATIONAL ECLIPSE WEATHER EXPERIMENT?

Please use the webform which can be found at
http://www.met.reading.ac.uk/outreach/newex_2015/index.html

WHAT WILL HAPPEN TO THE RESULTS FROM THE NATIONAL ECLIPSE WEATHER EXPERIMENT?

Some of the results from this experiment are likely be featured as part of a BBC Stargazing Live event on the day of the eclipse, and will also be analysed by scientists in more detail afterwards.