# Why is carbon dioxide so important

## Introduction

It is widely accepted that an increase in carbon dioxide is responsible for the rising average global temperatures. This activity looks at some of the evidence behind this explanation and asks students to reflect on different types of evidence.

This activity is available from the climateprediction.net web site in the sections offering resources for Science for Public Understanding:

http://climateprediction.net/content/science-public-understanding

In working through this activity students should be able to appreciate that there is a considerable body of evidence linking global climate change (particularly temperature changes) to rising carbon dioxide levels. They should also learn that no single piece of evidence is conclusive and that carbon dioxide is not the only factor involved.

Questions for the students are included in the 'Notes' window of the PowerPoint slides.

Three files are available: teachers' notes (pdf) and a presentation (either pdf or ppt).

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**How Science Works**

**Ba** If something happens only when a factor is present, we say there is a correlation between the factor and the outcome. If one variable increases (or decreases) steadily in value as the value of another variable increases, this is even stronger evidence that the two variables are correlated. If both variables increase together, the correlation is positive; if one goes down as the other goes up, the correlation is negative.

**Bc** A correlation between a factor and an outcome suggests that the factor *may* be a cause of the outcome, but does not prove a causal link. The outcome could be the cause of the factor, or both could be caused by another factor.

**Cd** Scientists test an explanation by seeing if specific predictions based upon it are in agreement with data from observation or from an experiment (a deliberate intervention to generate data). If data agree with predictions that are very novel or unexpected, this is particularly influential. The aim is to rule out alternative explanations, and so reach a single explanation that most scientists can agree about.

**Ce** Scientists are more confident about theories that include a plausible mechanism for causing the events observed. It is also important that a new theory is consistent with existing theories that are well-established and generally accepted.

**Cf** Comparing data with predictions is often not straightforward. It may be possible to interpret data from complex equipment in more than one way. Interpretations need to be checked and discussed with others working in the field. Lack of agreement may be because the data are incorrect, rather than because the theory is wrong.

**Ch** A scientific theory should lead to predictions that are precise and detailed enough for it to be possible that they can be shown to be false (falsification). A theory is 'non-scientific' if it does not make any predictions that could possibly be falsified.