

## The Enhanced Greenhouse Effect – Teacher Notes

We need accurate data to scientifically measure changes in the forcing factors, which are responsible for the "Enhanced" Greenhouse Effect or Global Warming. Two government bodies, the Bureau of Meteorology and CSIRO have been collecting data that has been used to produce the State of the climate 2014 report. The questions in italics may need to be answered using other sources if student do not already know the answers.

Materials per student

 Access to reference books and the Internet. Copies of the report can be downloaded and printed if necessary.

When we evaluate research we need to first consider the scientific credentials of the authors of the reports and of the accuracy and the validity of data collected.



1. What is the area of responsibility of the Bureau of Meteorology? It provides weather forecasts, warnings and observations for all states and territories. It also reports on natural disasters such as landslides, earthquakes, volcanoes and tsunamis.

2. Is this a world-renowned scientific organisation that has experts who study climate? Yes

3. What do the letters CSIRO refer to and what is the purpose of this organisation? The "Commonwealth Scientific and Industrial Research Organisation" is Australia's national research agency and is one of the largest and most diverse research agencies in the world.

4. Is this a reputable scientific organisation with a good reputation for scientific research? Yes
5. What is an isotope and what are the three most common isotopes of carbon? ? An atom that has the same number of electrons but differing numbers of neutrons in the nucleus. <sup>12</sup>C, <sup>13</sup>C and <sup>14</sup>C

Leading scientists from the BoM and CSIRO worked together to produce the "State of the climate 2014" report.

Visit <u>http://www.bom.gov.au/state-of-the-climate/</u> watch "Behind the science. Our changing atmosphere" and answer the following questions.

6. What did the scientists want to do? They wanted to measure the amount of carbon dioxide in the atmosphere and find where it is coming from.

7. From how many stations is data being collected? 10 to 15 stations around the world

8. Is this primary data, secondary data or proxy data? Explain your answer. Primary data because it was collected by the CSIRO scientists themselves.

9. How has measurement changed since 1970? Many more greenhouse gasses can be measured

10. How can the scientists tell if carbon dioxide comes from the burning of fossil fuels? It has no <sup>14</sup>C.

11. What are the three sources of atmospheric carbon dioxide? The ocean, the biosphere (plants and animals) or from fossil fuels

12. What was the conclusion of this research? The burning of fossil fuels essentially drives the increase of carbon dioxide in the atmosphere.

13. What two factors were compared in the graph at the end of the clip? Carbon dioxide produced as a result of changes in land use and from burning of fossil fuels.

14. Which of these two possible forcing factors demonstrated the greatest increase since 1840? Burning fossil fuels

Why did the graph not extend before 1840? There is no data for Australia.

Students are then asked to bring their findings together in a report. Some students may prefer creating a poster

## Global Systems

Using the information you have collected, write a brief report on these findings by CSIRO's scientists. You will be constructing a report bases on evidence-based arguments. It will need a title, catchy introductory sentence and three paragraphs of information that should convince the reader the findings are meaningful.

Marks allocated

Title and author	(2 marks)
Introductory sentence which explains what will follow	(2 marks)
Key words	(5 marks)
Brevity	(1 mark)
Three paragraphs covering three concepts	(3 marks)
	Title and author Introductory sentence which explains what will follow Key words Brevity Three paragraphs covering three concepts

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