

**Teacher Guide**  
**Climate Change: The Debate**  
**A Structured Controversy**

**Developed by:** Dan Shepardson

**Activity Focus:** Students use resources about greenhouse gases, global warming, and climate change to develop and defend a position statement on climate change. They then debate the different positions and construct a consensus position statement.

**Major Concepts:** Carbon dioxide, methane, and nitrous oxide are considered to be the main human-produced greenhouse gases. The burning of fossil fuels is the primary source of carbon dioxide. The Kyoto protocol requires the U.S. to reduce its carbon dioxide emissions in an effort to reduce their impact on the Earth's climate.

**Objectives:** After completing this activity, students will be able to:

- state that greenhouse gases (carbon dioxide, methane, nitrous oxide) have increased substantially since the Industrial Revolution
- explain why or why not the burning of fossil fuels could be causing the Earth's climate to change
- identify the Kyoto protocol as a United Nations' effort to reduce carbon dioxide emissions

**Materials and Preparation:** You will need to prepare the following materials before conducting this activity.

- Copy the *Climate Change: The Debate, A Structured Controversy* (make 1 copy per student).
- For each pair of students provide 1 copy of the following documents:
  - Global Warming and Our Changing Climate*
  - Fact Sheet on the Kyoto Protocol, October 1999*
  - The Science of Climate Change*
  - The U.S. Greenhouse Gas Inventory*
  - Global Warming In Brief - Q&A*
  - Global Warming*
  - Climate Change Glossary*
  - Paleoclimatology: Explaining the Evidence*
  - Straight Talk on Global Warming*
  - What is Global Warming?*
  - Why Care about Global Warming?*

**Procedures:** Students work in groups of fours, (two pairs), to complete the activity.

1. Introduce the activity by telling students that they will be working in groups of fours, (two pairs), to develop a brief (a written argument) that supports a position statement on global warming. Let students know that they do not actually have to agree with or accept the position they take for this activity, but that they must create the best argument possible supporting this position based on the resources provided. They will have an opportunity to express their own position on the issue at a later time.
2. Organize students into small groups of 4, with 2 pairs (partners) in each group. Each pair will be assigned one of the position statements to research and defend. Before making this assignment, distribute the *Climate Change: The Debate, A Structured Controversy* and have students read the background section and have each student explain why they agree or disagree with the position statement. Compare and contrast students' perspective on the position statement.
3. Next have students read and discuss the *Writing the Brief* section to make sure students understand the activity.
4. Assign each pair of partners per group one of the position statements, so that each group of four works on both sides of the argument. Each pair works independently writing their brief in support of the assigned position. Provide each pair of students a copy of each document. You may want to provide each pair with different resources to stimulate the controversy and debate. For example:

<i>Position: Human activity, especially the burning of fossil fuels, is causing the Earth's climate to change.</i>	<i>Position: Human activity, especially the burning of fossil fuels, is not causing the Earth's climate to change.</i>
<i>Straight Talk on Global Warming</i> <i>What is Global Warming</i> <i>Why Care about Global Warming</i> <i>Climate Change Glossary</i> <i>The U.S. Greenhouse Gas Inventory</i> <i>Fact Sheet on the Kyoto Protocol,</i> <i>October 1999</i>	<i>Straight Talk on Global Warming</i> <i>What is Global Warming</i> <i>Why Care about Global Warming</i> <i>Climate Change Glossary</i> <i>The U.S. Greenhouse Gas Inventory</i> <i>Fact Sheet on the Kyoto Protocol,</i> <i>October 1999</i>
<i>Global Warming and Our Changing Climate</i> <i>Global Warming</i>	<i>The Science of Climate Change</i> <i>Global Warming In Brief - Q&amp;A</i> <i>Paleoclimatology: Explaining the Evidence</i>

Alternatively you could also allow students to access and use information from the internet.

5. After the pairs of students have written their brief in support of their assigned position, have each pair present their position and argument to the other pair in the group. After each position and perspective has been presented, the group will discuss the strengths and weakness of each position and record them in the tables.
6. After discussing and recording the strengths and weaknesses of each position, the group needs to reach consensus and write a joint position statement and be able to defend the statement based on the data and information provided in the documents.
7. Each group shares their joint position and argument supporting that position with the class. Students as a class then debate the pros and cons to each position, and reach a class consensus.
8. To de-brief, have students share how doing this activity caused their ideas to change or remain the same, and what particular piece(s) of evidence/information caused their ideas to change or remain the same. Ask students how they felt writing a brief to support a position that with which they did not agree.

**Assessments:** The following rubric may be used as an assessment for this activity. In addition, student cooperation may be assessed. Share this rubric with the class so they understand the criteria being used to evaluate them.

Level	Description
Level 0	Position is not supported by evidence, poorly (or no) written argument presented.
Level 1	Position is supported with little evidence, major points missing, argument not well written, lacking scientific accuracy.
Level 2	Position is well supported with evidence and well written, but argument is lacking in logic and some scientific accuracy.
Level 3	Position is well supported with evidence and is well written; argument is logical and scientifically accurate.

## Bibliography

Consumer Alert (2000). *Global Warming in Brief--Q & A*

Environmental Protection Agency (2000). *Global Warming and Our Changing Climate*, EPA 430-F-00-011

Environmental Protection Agency (2002). *In Brief: The U.S. Greenhouse Gas Inventory*, EPA 430-F-02-008

Environmental Protection Agency (1998). *Straight Talk on Global Warming*

Environmental Protection Agency (Undated). *What is Global Warming?*

Environmental Protection Agency (Undated). *Why Care about Global Warming?*

Environmental Protection Agency (1999). *Fact Sheet on the Kyoto Protocol*

Friends of Science (2005). *Providing Insight into Climate Science.*

NASA Earth Observatory (2006). *Paleoclimatology: Explaining the Evidence*

**Appendix: Data Masters**

Position: *Human activity, especially the burning of fossil fuels, is causing the Earth's climate to change.*

Strengths	Weaknesses

Position: *Human activity, especially the burning of fossil fuels, is not causing the Earth's climate to change.*

Strengths	Weaknesses