

TAKE A STANCE (a position)**QUESTION: "Is Human Activity a Substantial Cause of Global Climate Change?"**

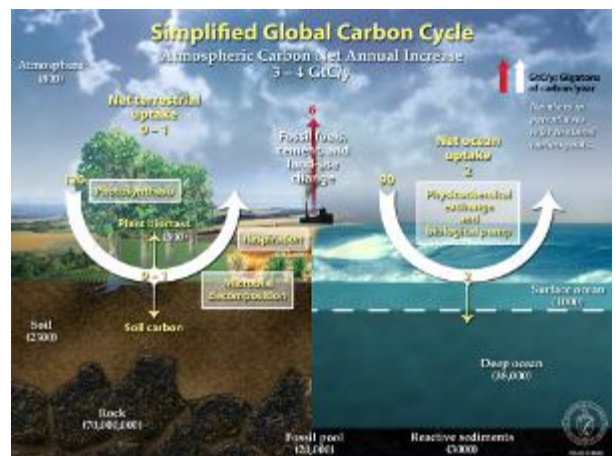
Step One: Read the following article, look at the diagrams/cartoons/charts, and annotate. LOOK for arguments **FOR** and **AGAINST** the question: Is Human Activity a Substantial Cause of Global Climate Change?"

The US National Academies of Science, the National Aeronautics and Space Administration (NASA), and the National Oceanic and Atmospheric Administration (NOAA), and many others, say that greenhouse gas levels are rising due to human activities such as burning fossil fuels and deforestation which are causing significant climate changes including global warming, loss of sea ice, glacier retreat, more intense heat waves, stronger hurricanes, and more droughts. They contend that climate change requires immediate international action to prevent dire consequences.

The Heartland Institute, the Heritage Foundation, and the American Association of Petroleum Geologists, and many others, argue that human-generated greenhouse gas emissions are too small to substantially change the earth's climate. They contend that our forests and oceans are capable of absorbing these small increases, and that 20th century warming has resulted from natural processes including fluctuations in the sun's heat and ocean currents. They say that global climate change is based on bunk science and scare tactics.

Human activities release greenhouse gases such as carbon dioxide (CO₂), methane (CH₄), and nitrous oxide (NO₂), into the atmosphere. As of Apr. 2010, CO₂ levels were 389 parts per million (ppm) - reportedly higher than at any time in the last 650,000 years when levels fluctuated between 180 and 300 ppm. This rise took place alongside a 20th century global temperature increase of between 1°F and 1.4°F. Although there was a period of cooling from 1940 to 1970 and uncertainty exists in computer climate models, many researchers think the earth will continue to warm by 3-10°F over the 21st century

Predictions about how climate changes will affect civilization range from an Oct. 2003 Department of Defense report detailing catastrophic weather events and a "significant drop in the human carrying capacity of the Earth's environment," to a Fall 2007 Oregon Institute of Science and Health report detailing "an increasingly lush environment of plants and animals."



Scientists have known of the heating potential (greenhouse effect) of gases such as CO₂ since at least Jan. of 1859, when British physicist John Tyndall first began experiments leading to the discovery that CO₂ in the atmosphere absorbs the sun's heat. On Feb. 16, 1938, engineer Guy S. Callender published an influential study suggesting increased atmospheric CO₂ from fossil fuel combustion was causing global warming. Many scientists criticized the study arguing that CO₂ had a negligible effect on temperature compared to water vapor and atmospheric circulation changes.

In March 1958, US climate scientist Charles Keeling began measuring atmospheric CO₂ at the Mauna Loa observatory in Hawaii for use in climate modeling. [27] Using these measurements, Keeling became the first scientist to confirm that atmospheric CO₂ levels were rising rather than being fully absorbed by forests and oceans (carbon sinks). In 1977, the US National Academy of Sciences issued the report "Energy and Climate" concluding that the burning of fossil fuels was increasing atmospheric CO₂, and that increased CO₂ was associated with a rise in global temperatures.

On June 23, 1988, National Aeronautics and Space Administration (NASA) scientist James Hansen presented testimony to the US Senate stating directly that increases in CO₂ were warming the planet and "changing our climate." The testimony was based on Hansen and colleagues' Aug. 1988 peer-reviewed study on Global Climate Change. Many scientists, including MIT Meteorologist Richard Lindzen, criticized Hansen's findings arguing that his climate models were unreliable, and that negative feedback loops would balance out any warming caused by increased CO₂. Also in 1988, the Intergovernmental Panel on Climate Change (IPCC) was created by the World Meteorological Organization (WMO) and the United Nations Environment Programme (UNEP) to review research on global climate change (as of June 2010, there were 184 IPCC member countries). The IPCC issued its first assessment report in 1990 stating that "emissions resulting from human activities are substantially increasing the atmospheric concentrations of the greenhouse gases," resulting in "an additional warming of the Earth's surface."

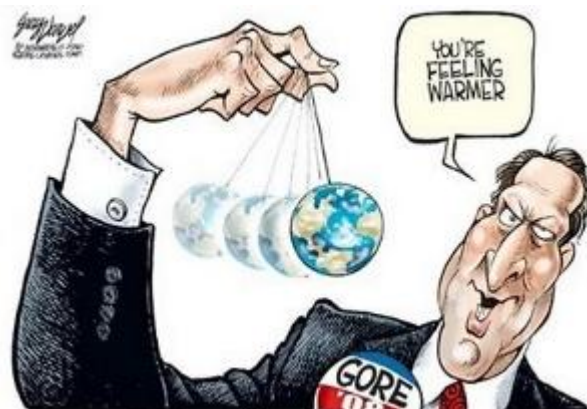
On Oct. 13, 1992, US President George Bush signed the United Nations Framework Convention on Climate Change (UNFCCC). The goal of the convention was the "stabilization of greenhouse gas concentrations in the atmosphere at a level that would prevent dangerous anthropogenic interference with the climate system."

In Dec. 1997, over 161 nations met in Kyoto, Japan, to negotiate a treaty to limit greenhouse gas emissions and work toward the objectives of the UNFCCC. The resulting Kyoto Protocol set binding targets for 37 industrialized countries and the European Union to reduce greenhouse gas emissions roughly 5% below 1990 levels by 2012.

In Mar. 2001, President George W. Bush withdrew the US from the Kyoto Protocol due to Senate opposition and concerns that limiting greenhouse gas emissions would harm the US economy. From July 16-27, 2001 the COP 6 took place in Bonn, Germany, and the final amendments to the Kyoto Protocol were made. 179 countries reached a binding agreement without the participation of the US.

In 2006, Al Gore's documentary *An Inconvenient Truth* premiered and was seen by over 5 million worldwide. The film argued that human caused climate change was real, and that without immediate reductions in greenhouse gas emissions, catastrophic climate changes would severely disrupt human societies, leading to a possible collapse of industrial civilization.

In 2007, the IPCC released its fourth assessment report stating that "warming of the climate system is unequivocal" and that "most of the observed increase in global average temperatures since the mid-20th century is very likely [90% confidence] due to the observed increase in anthropogenic [man-made] greenhouse gas concentrations." The IPCC and Al Gore received a Noble Peace Prize for their climate science work in Oct. 2007. [



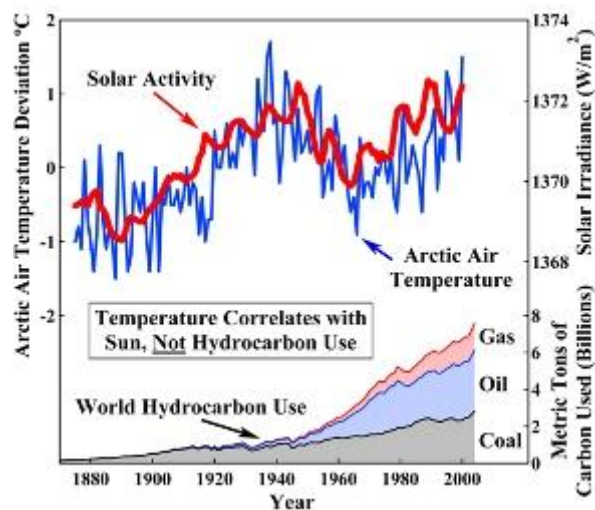
In response to the IPCC findings, a group of scientists formed the Nongovernmental International Panel on Climate Change (NIPCC) to compile a report challenging the science behind man-made climate change. The Mar. 2, 2008 report, "Nature, Not Human Activity, Rules the Climate" was published by the Heartland Institute. On Mar. 2-4, 2008, Heartland held its first international conference attended by over 400 scientists, economists, and other experts questioning human-caused global warming. At the conference, 98 speakers including PhD climate scientists from major universities argued that global warming was most likely a natural event.

On Dec. 7, 2009, the US EPA announced their findings on greenhouse gases determining that they "threaten public health" and are "the primary driver of climate change." This statement was in response to the US Supreme Court ruling (5-4) in *Massachusetts v. EPA* that greenhouse gases met the criteria to be considered pollutants under the Clean Air Act.

In Dec. 2009 the COP 15 conference took place in Copenhagen, Denmark. The Copenhagen Accord created by the US, China, India, Brazil, and South Africa, called for a rise of no more than 2°C, to be achieved by "deep cuts in global emissions" greenhouse gases.

From 1998-2009, the US government appropriated \$99 billion for work related to climate change. \$35.7 billion (36%) of that total came in 2009 as part of the American Recovery and Reinvestment Act of 2009.

In Apr. 2010, Bolivia hosted an alternative to the UN COP conferences. The World People's Conference on Climate Change and the Rights of Mother Earth was attended by representatives from nearly 130 countries. The People's Agreement reached at the conference demanded that developed countries lower CO2 levels back to 300 ppm (from 389ppm), and rejected the Copenhagen Accord for its "insufficient reductions in greenhouse gases." It stated that "[c]limate change is now producing profound impacts agriculture and the ways of life of indigenous peoples and farmers throughout the world."



As of 2010, the US had 4.5% of the world's population but was responsible for about 28% of all global greenhouse gas emissions.

Step Two: Now go back to the article and complete the table below – be sure to give details. You may also use your background knowledge and notes from class.

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YES they do!	NO they don't

STEP 3: Watch the following clips and add to the table.

1. <http://www.youtube.com/watch?v=ROZJmX73FF> from NASA
2. The founder of The Weather Channel speaks out against global warming <http://www.youtube.com/watch?v=Lk8SSqc7ekM>
3. A debate on FOX News - both sides given <http://www.youtube.com/watch?v=nDv-zgJTLRs>

STEP 4: Write a clear argument paragraph answering the question. You must provide three (3) reasons from the text or other materials that support your opinion. You can use the space below or the back of this page. This will be collected.

Your paragraph should have:

- A topic sentence
- Reason #1 and support
- Reason #2 and support
- Reason #3 and support
- Wrap-up sentence

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