

climate

teacher

## THE KYOTO PROTOCOL: WHAT SHOULD WE DO?

Students learn about the Kyoto Protocol and discuss whether the United States should ratify the Kyoto Protocol. They use the information presented in the *EHP* news article “**Continental Divide: Why Africa’s Climate Change Burden is Greater**” to learn how scientific data may be organized to frame the debate on controversial issues.

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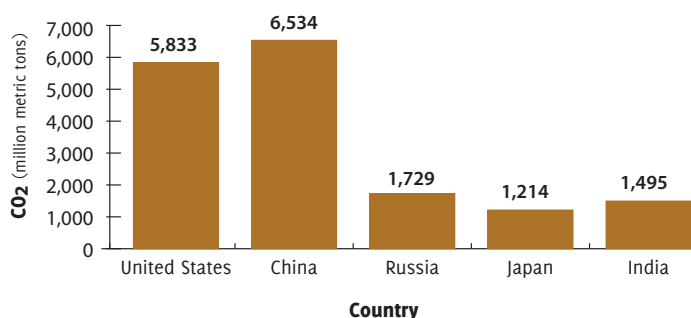
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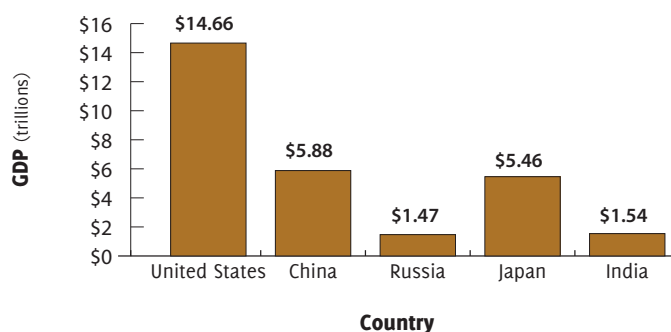
### Step 1

The Kyoto Protocol is an amendment to the United Nations Framework Convention on Climate Change that addresses global warming by requiring countries to control emissions of greenhouse gases. Industrialized countries that ratify the treaty must commit to reducing their emissions of carbon dioxide (CO<sub>2</sub>) and five other greenhouse gases. The treaty became effective 16 February 2005, but the United States never ratified the treaty and therefore is not subject to its requirements. The United States objected to the treaty in part because the treaty exempts some developing countries such as China and India from reducing their greenhouse gas emissions. Figure 1 below shows the top five countries that emit CO<sub>2</sub> into the atmosphere—China is the largest producer of CO<sub>2</sub> and India the fifth. Figure 2 shows that China and India are also strong economic competitors of the United States, having strong gross domestic products (GDPs). The GDP is a measure of total economic output. The U.S. position is that the treaty is unfair because it ignores large contributors to the problem and forces the United States to pay for reducing emissions while its economic competitors do not, thereby placing the United States in a noncompetitive position in the global marketplace.

**Figure 1: CO<sub>2</sub> emissions in 2008 for the five countries releasing the most CO<sub>2</sub>**



**Figure 2: GDP in 2010 for the five countries releasing the most CO<sub>2</sub>**

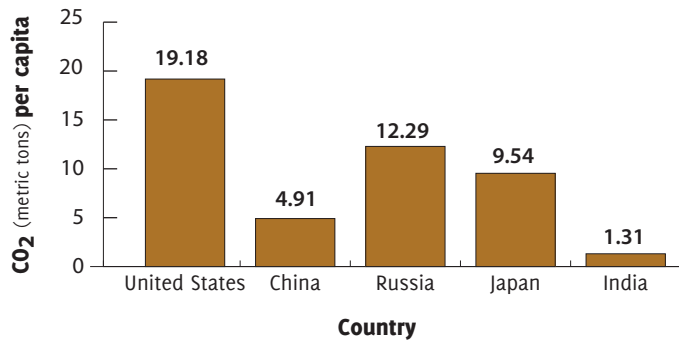


Using this information, do you agree or disagree with the position of the United States that the Kyoto Protocol is unfair? Explain.

**Step 2**

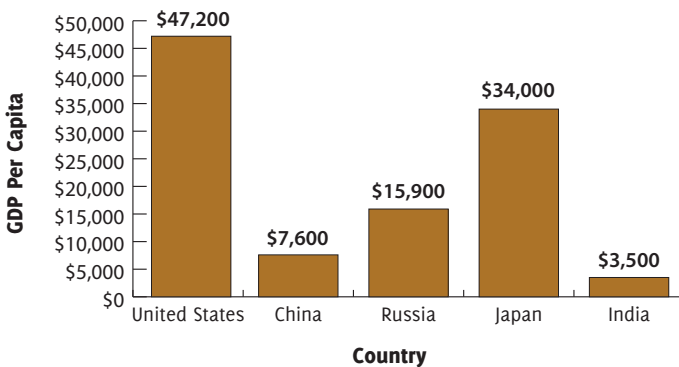
Supporters of the Kyoto Protocol argue that the treaty is fair because when you look at CO<sub>2</sub> emissions and GDP on a per-capita basis, China and India are no longer significant contributors to the problem (see Figures 3 and 4).

**Figure 3: CO<sub>2</sub> emissions per capita in 2008 for the five countries releasing the most CO<sub>2</sub>**



**Figure 4: GDP per capita in 2010 for the five countries releasing the most CO<sub>2</sub>**

Using this new information, has your position changed or remained the same in regards to the United States considering the Kyoto Protocol unfair? Explain.

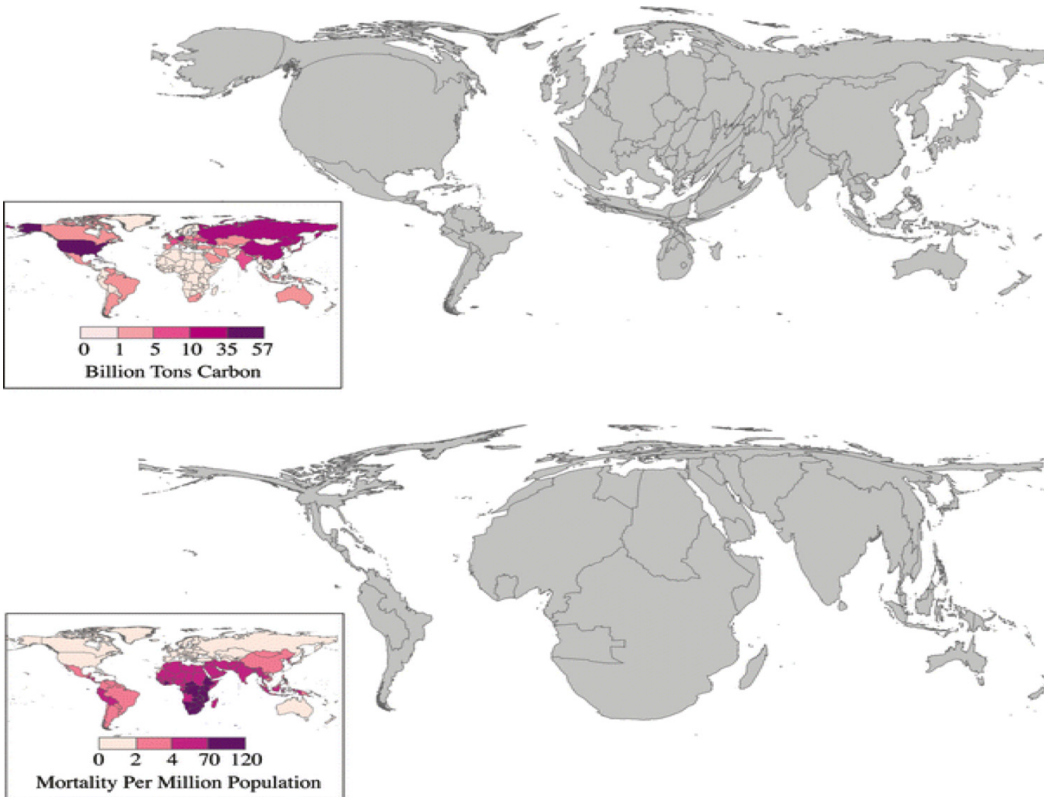


**Step 3**

Read the article **Continental Divide: Why Africa's Climate Change Burden Is Greater**.

**Step 4**

Examine Figure 5 (Patz et.al). According to this figure, which regions of the world are the largest emitters of CO<sub>2</sub>? Which regions of the world are likely to be affected most by global climate change?

**Step 5**

Based on the article, how many metric tons of carbon dioxide did Africa produce in 2002?

**Step 6**

Based on the article, what are the potential health effects in Africa attributed to global climate change?

**Step 7**

What potential health effects in the US can be attributed to global climate change?

**Step 8**

One estimate states that \$200 per year per person is how much it would cost to reduce CO<sub>2</sub> levels by 3% over 1990 levels, the amount necessary to bring the United States into compliance with the Kyoto Protocol. Would you be willing to pay an extra \$200 per year to reduce CO<sub>2</sub> levels by this amount? Explain why or why not.

**Step 9**

If you wanted to defend the United States for not ratifying the Kyoto Protocol, would you present CO<sub>2</sub> emissions data per country or per capita? Explain why.

**Step 10**

Consider the information in the article, including the potential effects of global warming and possible contribution of CO<sub>2</sub> to global warming. Next, consider the CO<sub>2</sub> emissions and GDP data. Using this information, decide whether or not you are in favor of the United States ratifying the Kyoto Protocol. As part of a class discussion, be prepared to defend your position.

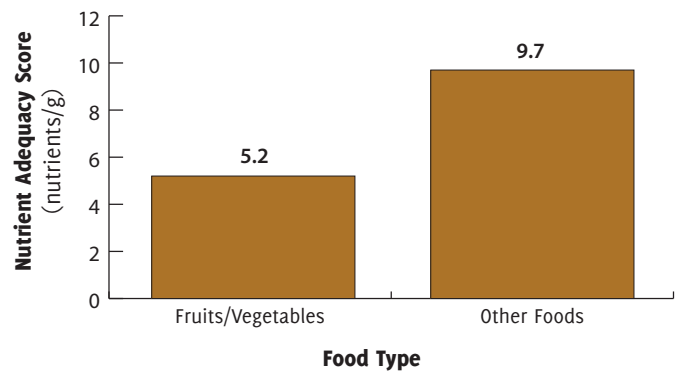
**Step 11**

The Kyoto Protocol is set to expire in 2012. Do you think the Kyoto Protocol should be extended? Do you think a new treaty should be implemented to monitor global greenhouse emissions? Should the new treaty differ from the existing treaty? Explain why or why not.

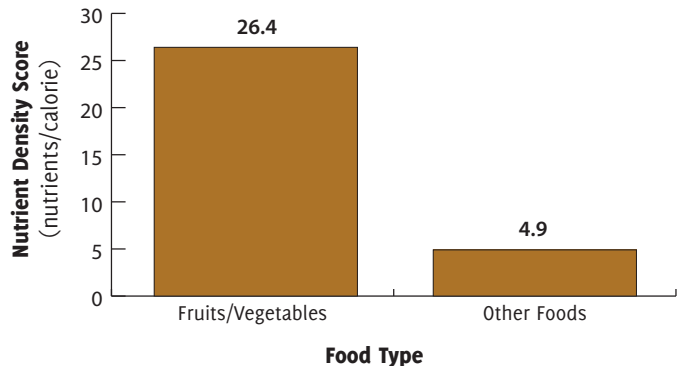
**Step 12**

Examine Figures 6 and 7 (Darmon et.al). Which representation of the data would you chose to show if you were an owner of a cereal manufacturing company? A dairy farmer? A vegetable grower?

**Figure 6: Nutrients per gram for various foods**



**Figure 7: Nutrients per calorie for various foods**



## REFERENCES

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Patz J, Gibbs H, Foley J, Rogers J, Smith K. Climate Change and Global Health: Quantifying a growing ethical crisis. *EcoHealth*. Dec 2007;4(4): 397 - 405.

Darmon N, Darmon M, Maillot M, Drewnowski A. A Nutrient Density Standard for Vegetables and Fruits: Nutrients per Calorie and Nutrient per Unit Cost. *J. Am. Diet. Assoc.* 2005, 105: 1881-1887.

## RESOURCES

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Environmental Health Perspectives, News by Topic page. <http://ehp03.niehs.nih.gov/article/browsenews.action>  
Choose Climate Change/Global Warming.

A human health perspective on climate change. <http://www.niehs.nih.gov/health/docs/climatereport2010.pdf>

CIA, The World Factbook, Gross Domestic Product information, By country. <https://www.cia.gov/library/publications/the-world-factbook/rankorder/2004rank.html>

Energy Information Administration, U.S. Department of Energy, Summary of the report on the impact of the Kyoto Protocol on the U.S. energy markets & economic analysis. <http://www.eia.doe.gov/oiaf/kyoto/kyotobrf.html>

Energy Information Administration, U.S. Department of Energy, International Energy Annual 2006 World Carbon Dioxide Emissions from Use of Fossil Fuels. <http://www.eia.doe.gov/emeu/iea/carbon.html>

Global Warming: Early Warning Signs, clickable map of weather records and extremes across the world. <http://www.climatehotmap.org/>

International Energy Agency, CO<sub>2</sub> emissions from fuel consumption. <http://www.iea.org/co2highlights/CO2highlights.pdf>

U.S. Environmental Protection Agency, Climate Change. <http://www.epa.gov/climatechange/>

Union of Concerned Scientists, Global Warming. [http://www.ucsusa.org/global\\_warming/](http://www.ucsusa.org/global_warming/)

UN Framework Convention on Climate Change. <http://unfccc.int/2860.php>

UN Framework Convention on Climate Change. Kyoto Protocol, [http://unfccc.int/kyoto\\_protocol/items/2830.php](http://unfccc.int/kyoto_protocol/items/2830.php)