

How Warm Is Too Warm?



The scientists in this program created computer models to calculate the thickness of Venus's lithosphere (solid rock layer) and to develop hypotheses about how Venus loses its heat. Creating computer models to predict atmospheric and geologic processes is difficult, because many factors affect the results. The following scenario can help you think about the challenges of analyzing these models.

Scientists use computer models to predict warming trends on Earth over the next 100 years. Some models show that the temperature of Earth will increase by less than 2°C, while others show that the temperature will increase by as much as 5°C. These increases may seem small, but they would cause significant changes on the planet.

Two models of the greenhouse effect

Small Temperature Increase	Large Temperature Increase
The temperature will increase by one or two degrees centigrade over the next century. This increase would cause more evaporation from the surface of the planet. The water vapor would condense in the atmosphere, creating more clouds. If the extra cloud cover is uniformly distributed in the atmosphere, the extra clouds would reflect some of the sun's rays back into space, thereby reducing some of the greenhouse effect.	<p>The temperature will increase by two or three degrees centigrade over the next 50 years and by four or more degrees by the end of the next century. The increased temperature would change wind, rain, and ocean currents, causing the agricultural lands of North America to dry out and become deserts.</p> <p>Extra cloud cover would trap heat within the Earth's atmosphere. Polar ice caps would melt, raising ocean levels and causing floods in coastal cities. Organic matter in the soil would decay more quickly, releasing more carbon dioxide into the atmosphere, thus accelerating the greenhouse effect.</p>

A With your team, discuss the following:

- 1 What do you think?
- 2 What assumptions are built into these arguments?
- 3 How can scientists assume or conclude such different scenarios based on the same starting point?

B To practice gathering information and presenting a scientific argument, conduct a debate about the greenhouse effect with your class. With your team, gather information to support one of these two arguments.

- 1 Based on the arguments presented here and information you gather from outside sources, what seems to be the most likely scenario about the future temperature of the Earth?
- 2 Will the Earth be warmed permanently, or can the trend be reversed?
- 3 What evidence helps you support your argument?
- 4 What additional information would help you make a more conclusive decision?