

# Abrupt Climate Change: Inevitable Surprises

## Comprehension Questions (for use with *Abrupt Climate Change* report brief):

1. What is an abrupt climate change?
2. Look closely at the graph on page 1 of the report. What was the relationship between temperature changes and snow accumulations in Greenland during the time period represented by the graph?
3. Imagine that a major volcanic eruption has spewed enormous clouds of ash into the atmosphere blocking normal sunlight over large areas of Earth for months. Using the section of the report called “Triggers of Abrupt Climate Change,” predict how such a volcanic eruption might cause climate to change. Explain how the ash clouds would affect the cryosphere, atmosphere, land surface, and oceans.



# Answer Key

## Abrupt Climate Change: Inevitable Surprises

### Comprehension Questions Answer Key (for use with *Abrupt Climate Change* report brief):

1. What is an abrupt climate change? (Define) *[anno: Possible response: An abrupt climate change is a large shift in climate that happens for years over a large area, like a country or continent. The climate shift might mean a change in temperatures, rainfall, or storm patterns. The change happens so rapidly that humans and other natural systems have difficulty adapting to the change.]*
2. Look closely at the graph on page 1 of the report. What was the relationship between temperature changes and snow accumulations in Greenland during the time period represented by the graph? (Analyze) *[anno: Possible response: Snow accumulations rose and fell in accordance with the temperature changes during the time period shown on the graph. Whenever temperatures fell, accumulations fell, and when temperatures rose, accumulations rose.]*
3. Imagine that a major volcanic eruption has spewed enormous clouds of ash into the atmosphere blocking normal sunlight over large areas of Earth for months. Using the section of the report called “Triggers of Abrupt Climate Change,” predict how such a volcanic eruption might cause climate to change. Explain how the ash clouds would affect the cryosphere, atmosphere, land surface, and oceans. (Predict) *[anno: Possible response: Because the ash particles would block sunlight, temperatures on Earth would get colder. It would also be harder for plants and trees to grow. The cryosphere would likely grow and lead to a further lowering of temperatures. The growth of sea ice might contribute to a change in the thermohaline circulation in the North Atlantic, because there would be less melting ice to add cold, fresh water to the cycle. There is also a low probability that these forcings could lead to major climate change such as an ice age.]*
4. The report suggests that some experts believe that recent global warming due to the accumulation of greenhouse gases in the atmosphere could trigger an abrupt climate change. What are two possible effects of an abrupt climate change caused by global warming? (Identify) *[anno: Possible responses: An abrupt climate change from global warming could cause a shutdown of the North Atlantic thermohaline circulation, which would lead to major changes in the climate of Western Europe especially. An abrupt climate change could also cause more severe weather patterns, like storms, flooding, and drought.]*

## Comprehension Questions Answer Key (for use with *Abrupt Climate Change* report brief), continued:

5. In the section called, “Improving Our Understanding,” the writers of this report, the Committee on Abrupt Climate Change, make some suggestions for learning more about abrupt climate changes and predicting them better. From this section, what can you infer is the Committee’s belief about our current ability to react to an abrupt climate change that might take place in the future? (Infer) *[anno: Possible response: The committee thinks that we need better research to be able to understand, and especially to predict, abrupt climate changes in the future so we can possibly reduce the impact of such an event.]*
6. Why does the report say that more studies should be done on the potential impacts of abrupt climate change, instead of simply focusing our research on gradual climate change? (Explain) *[anno: Possible response: More research should be done on abrupt climate change because there is evidence that these events have happened in the past and had serious effects on human society. Also, less is known about abrupt climate change at this time.]*
7. Look at the list of “no-regrets strategies” on page 4 for reducing the impact of an abrupt climate change on human society and natural systems. If you were an elected public official, which of these strategies would you make your priority? Take into consideration the difficulty of implementing each strategy, such as costs and changes in human behavior, as well as the potential benefit of each strategy to society and natural systems. (Make Decisions) *[anno: Possible response: If I were an elected public official, I would make energy policies my priority. I believe that moving away from fossil fuels toward other renewable fuels would slow the onset of an abrupt climate change by reducing greenhouse gas emissions. It also would have an immediate benefit on the environment and human health.]*