

Climate Change Clues

Use evidence to trace how natural events can shift climate.

8.11.A “use scientific evidence to describe how natural events, including volcanic eruptions, meteor impacts, abrupt changes in ocean currents, and the release and absorption of greenhouse gases influence climate;”

NAME _____

DATE _____

1 READ AND MARK _____ Read it twice

YOUR JOB Underline each cause-and-effect claim about climate, then circle the scientific evidence that scientists use to support it.

Signals of Natural Climate Change

- ① Climate is not fixed. Natural events can change how much solar energy Earth keeps. When a large volcano erupts, ash and sulfur-rich gases can reach high in the atmosphere. There, sulfur gases form tiny reflective particles. These particles send some sunlight back to space, so the surface cools for a few years. Scientists test this idea by comparing satellite measurements of sunlight with temperature records after eruptions. Layers of volcanic ash in ice cores and lake sediments also identify when past eruptions occurred.
- ② A meteor impact can also affect climate, but its evidence is different. The impact can blast rock dust and soot high into the air. If enough material blocks sunlight, plants receive less energy and global temperatures can drop quickly. At the boundary between rock layers dated to about 66 million years ago, scientists find a thin layer rich in iridium, an element common in some space rocks. They also find shocked minerals formed by intense pressure. Together, these clues support an impact followed by climate disruption.
- ③ Ocean currents move heat around the planet. If freshwater from melting ice or heavy rainfall makes surface water less salty, it can reduce sinking in some regions. That may weaken a current system and shift where heat is released to the air. Scientists compare ocean temperature records and salinity measurements to investigate such shifts. Greenhouse gases work differently. Carbon dioxide and methane absorb infrared energy, which warms the atmosphere. Plants, soils, oceans, and rocks can absorb carbon dioxide. Ice cores preserve air bubbles, helping scientists link past gas levels with temperature.

2 ANSWER WITH EVIDENCE _____ Use the passage

1 How can a major volcanic eruption cause short-term surface cooling? Include the role of sunlight.

2 What two clues in rock layers support the idea that a meteor impact occurred about 66 million years ago?

3 Explain how less-salty surface water could lead to a climate change in a region.

4 How do greenhouse-gas release and carbon dioxide absorption have opposite effects on the amount of greenhouse gas in the climate system?

3 YOUR TURN _____ Your own words

Choose one natural event from the passage. Write exactly three sentences that name the event, identify scientific evidence scientists could use, and explain how the event can influence climate.

PART 1 • READ AND MARK

Underline each cause-and-effect claim about climate, then circle the scientific evidence that scientists use to support it. Accept any marking that follows this job and points at the right text.

PART 2 • ANSWERS

#	QUESTION	ANSWER
1	How can a major volcanic eruption cause short-term surface cooling? Include the role of sunlight.	Sulfur gases can form reflective particles high in the atmosphere. The particles reflect some sunlight back to space, so the surface cools for a few years.
2	What two clues in rock layers support the idea that a meteor impact occurred about 66 million years ago?	A thin layer rich in iridium and shocked minerals formed by intense pressure.
3	Explain how less-salty surface water could lead to a climate change in a region.	Less-salty water can reduce sinking in some regions. This may weaken an ocean current system and shift where heat is released to the air.
4	How do greenhouse-gas release and carbon dioxide absorption have opposite effects on the amount of greenhouse gas in the climate system?	Release adds greenhouse gases to the system, while plants, soils, oceans, and rocks can remove carbon dioxide by absorbing it. Greenhouse gases absorb infrared energy and warm the atmosphere.

PART 3 • YOUR TURN (SAMPLE ANSWER)

A volcanic eruption can cool climate for a few years when sulfur-rich gases form reflective particles high in the atmosphere. Scientists could compare satellite measurements of sunlight with temperature records after the eruption. Less sunlight reaches Earth's surface, so the evidence supports a short-term cooling claim.

Accept scientifically accurate evidence-and-reasoning responses based on any event in the passage. The response should connect a specific natural event, an appropriate type of evidence, and a climate effect.