When Ash Travels

Trace how one eruption changed places near and far.

ESS.4.2 "Research, assess, and communicate how Earth's systems influence the distribution of life, including how various natural hazards and geologic events (e.g., volcanic eruptions, earthquakes, landslides, tornadoes…"

NAME _____ DATE _____

1 READ AND MARK

Read it twice

YOUR JOB Underline two places where Earth's systems interact. Circle two changes in where plants or people could live, so you can trace how the eruption's effects spread.

Tambora's Reach

1 In April 1815, Mount Tambora erupted on the Indonesian island of Sumbawa. Hot rock and ash swept across nearby land, destroying villages and fields. Falling ash blocked sunlight, coated leaves, and made it difficult for crops to grow. People living close to the volcano faced the most immediate danger, but the eruption did not stay a local event. The eruption blasted gases high into the atmosphere. Winds spread them, and they formed tiny particles that reflected some sunlight. This link between the solid Earth and the atmosphere helped spread the eruption's effects far beyond the island.

2 In 1816, many places in Europe and northeastern North America had an unusually cold growing season. Frost damaged crops in some areas, and poor harvests contributed to rising food prices. The cooling linked to Tambora affected where certain crops could grow successfully that year, but it did not affect every place equally. Local weather, elevation, and planting dates also shaped each harvest. Scientists use temperature and harvest records, along with sulfate preserved in polar ice, to investigate the link. Those records support a widespread effect, not the claim that the eruption caused every failed crop.

3 Food shortages pushed some families in New England to leave their farms and move west, although land prices and other opportunities also shaped their choices. On Sumbawa, destroyed fields and settlements forced people to seek food and safer places to live. These outcomes show how the same geologic event can change the distribution of life at several scales. Near the volcano, ash buried plants and damaged homes. Far away, changes in the atmosphere affected farming through cooler weather. To judge the eruption's role in migration, compare its effects with other reasons people moved rather than assuming a single cause.

2 ANSWER WITH EVIDENCE

Use the passage

1. How did Tambora's eruption change where plants and people could live on Sumbawa? Trace the chain of events.

2. How could an eruption on Sumbawa affect where crops grew successfully in Europe or northeastern North America?

3. Why would it be inaccurate to say that Tambora alone caused every family that left New England to move west?

4. What evidence helps scientists assess Tambora's distant effects, and what limit does the passage place on their conclusion?

3 YOUR TURN

Your own words

Imagine a volcano erupts near a farming town beside a river. Rain washes loose ash toward the river, while winds carry fine ash toward a second farming town. In 4 to 5 sentences, explain two different ways Earth's systems could change where plants or people live in these towns, and name one piece of evidence you would gather to assess a claim.

ANSWER KEY

When Ash Travels

PART 1 · READ AND MARK

Underline two places where Earth's systems interact. Circle two changes in where plants or people could live, so you can trace how the eruption's effects spread. Accept any marking that follows this job and points at the right text.

PART 2 · ANSWERS

#	QUESTION	ANSWER
1	How did Tambora's eruption change where plants and people could live on Sumbawa? Trace the chain of events.	**Hot rock and ash destroyed fields and villages. Ash made crops difficult to grow, and people had to seek food and safer places.**
2	How could an eruption on Sumbawa affect where crops grew successfully in Europe or northeastern North America?	**The eruption sent gases into the atmosphere, where they formed particles that reflected sunlight. Cooling and frost then damaged crops in some distant areas.**
3	Why would it be inaccurate to say that Tambora alone caused every family that left New England to move west?	**Food shortages were one reason some families moved, but land prices and other opportunities also shaped their choices.**
4	What evidence helps scientists assess Tambora's distant effects, and what limit does the passage place on their conclusion?	**Scientists examine temperature and harvest records and sulfate in polar ice. The evidence supports a widespread effect but does not show that Tambora caused every failed crop.**

PART 3 · YOUR TURN (SAMPLE ANSWER)

Rain could wash loose ash into the river, and a muddy flood might cover fields near the first town. If crops die there, some farmers might move to safer land. Winds could carry ash to the second town, coating leaves and reducing crop growth. Some families there might change what they plant rather than move. I would compare harvest records from before and after the eruption in both towns to assess the crop claim.

Accept other supported cause-and-effect chains that connect Earth's systems to changes in plants or settlement. In Part 3, the proposed evidence should be relevant to the student's claim.