Signals Beneath Ash Point

Use earthquake and ground-rise data to assess volcanic risk.

ESS.4.3 "Analyze earthquake and volcanic data to determine patterns that can lead to predicting such hazards and mitigating impact to humans."

NAME _____ DATE _____

1 READ AND MARK

Read it twice

YOUR JOB Underline the two measurements the team tracks, then circle the check-in rule. Number the places in the passage that explain what the data can and cannot predict.

Watching Ash Point

1. At fictional Ash Point, a volcano rises above a busy harbor. Sensors count small, shallow earthquakes each day, and a ground station measures how far the surface has risen since a quiet baseline. Rising rock and gas can disturb the ground, but other processes can also cause small changes. One signal alone is not proof of an eruption.

2. The table reports invented measurements from four observation periods at Ash Point. Each quake count is a daily average for that period; ground rise is measured from the baseline, not added anew each week. The local team has set a check-in rule: if daily quakes exceed 10 and ground rise exceeds 5 millimeters, it reviews the readings more often.

ASH POINT SENSOR READINGS

Period	Shallow quakes per day	Ground rise since baseline (mm)
Baseline	2	0
Week 1	6	3
Week 2	18	8
Week 3	35	14

3. Extra checks can lead to earlier warnings, but no pattern gives an exact eruption date. Ash can irritate lungs, and thick deposits can strain roofs; blocked roads could slow an evacuation. Residents can reduce harm by planning routes and keeping suitable masks available. Officials combine sensor readings with other observations before deciding whether to issue a warning.

2 ANSWER WITH EVIDENCE

Use the passage

1. In which period is the team's check-in rule met for the first time? Use both measurements to support your answer.

2. How do both measurements change from the baseline to Week 3? What might the combined pattern suggest?

3. Which interval has the largest increase in shallow quakes per day? Calculate the increase.

4. Why should the team avoid announcing an exact eruption date from these readings, even after its check-in rule is met?

3 YOUR TURN

Your own words

Write a four-sentence advisory to families near Ash Point. Use two numerical trends from the table, explain what they suggest without claiming an eruption is certain, and propose two distinct steps that could reduce harm from ashfall or an evacuation.

ANSWER KEY

Signals Beneath Ash Point

HIGH SCHOOL · ESS.4.3

PART 1 · READ AND MARK

Underline the two measurements the team tracks, then circle the check-in rule. Number the places in the passage that explain what the data can and cannot predict. Accept any marking that follows this job and points at the right text.

PART 2 · ANSWERS

#	QUESTION	ANSWER
1	In which period is the team's check-in rule met for the first time? Use both measurements to support your answer.	**Week 2. The daily average is 18 shallow quakes, which exceeds 10, and ground rise is 8 mm, which exceeds 5 mm.**
2	How do both measurements change from the baseline to Week 3? What might the combined pattern suggest?	**Shallow quakes rise from 2 to 35 per day, and ground rise increases from 0 to 14 mm. Together, the increases suggest growing volcanic unrest, not a certain eruption.**
3	Which interval has the largest increase in shallow quakes per day? Calculate the increase.	**Week 2 to Week 3 has the largest increase: 35 minus 18 equals 17 shallow quakes per day.**
4	Why should the team avoid announcing an exact eruption date from these readings, even after its check-in rule is met?	**Other processes can cause small changes, and the passage states that no pattern gives an exact eruption date. The rule calls for closer review, not a prediction that an eruption will occur.**

PART 3 · YOUR TURN (SAMPLE ANSWER)

Shallow quakes rose from 2 to 35 per day between the baseline and Week 3. Ground rise increased from 0 to 14 mm, which could signal growing volcanic unrest but does not guarantee an eruption. Families should keep suitable masks available in case ash falls. They should agree on an evacuation route and meeting place in case officials issue an order.

Accept other accurate comparisons that use two numerical trends and describe increased unrest without treating an eruption as certain. The advisory should include two distinct, practical steps tied to ashfall or evacuation.