Signals Beneath Earth

Graph four months of tectonic activity and consider how communities respond

WG.3.5 "Illustrate and graph with precision the occurrence of earthquakes and tsunami and volcanic activity on Earth over a given period of time (at least several months) and draw conclusions concerning regions of tectonic instability..."

NAME _____ DATE _____

1 READ AND MARK

Read it twice

YOUR JOB Number the months in order, underline each nonzero tsunami or eruption count in the table, and circle the tools in the passage that detect hazards early.

Four Months of Tectonic Activity

1 A disaster team compares four consecutive months, January through April, in a simulated monitoring log for coastal Japan and Iceland. The numbers are invented for practice, not a record of actual disasters. Each cell counts events during that month. An earthquake is sudden ground movement; a tsunami is a series of ocean waves often triggered by an undersea earthquake.

SIMULATED MONITORING LOG: NUMBER OF EVENTS

Month	Japan earthquakes	Japan tsunamis	Iceland earthquakes	Iceland eruptions
January	2	0	1	0
February	4	1	2	0
March	3	0	2	1
April	5	0	1	0

2 Japan sits near convergent plate boundaries, where one plate moves beneath another; undersea earthquakes there can generate tsunamis. Iceland straddles a divergent boundary, where plates move apart and magma can rise. To graph the record, place months in chronological order on the horizontal axis and event counts on the vertical axis. Compare patterns without assuming every earthquake causes another hazard.

3 Even accurate detection cannot stop plate motion. Seismometers register shaking, and offshore pressure buoys detect changes in water pressure that can signal a passing tsunami. GPS instruments track ground deformation near volcanoes, which may indicate moving magma. Warning systems, evacuation routes, and stronger buildings can reduce harm, but a detected hazard does not guarantee an eruption or tsunami.

2 ANSWER WITH EVIDENCE

Use the passage

1. On a graph of Japan's earthquakes, what points would you plot for February and April? Write each as (month, count).

2. Total the earthquakes in each region across the four months. Which region has more in this simulated log, and by how many?

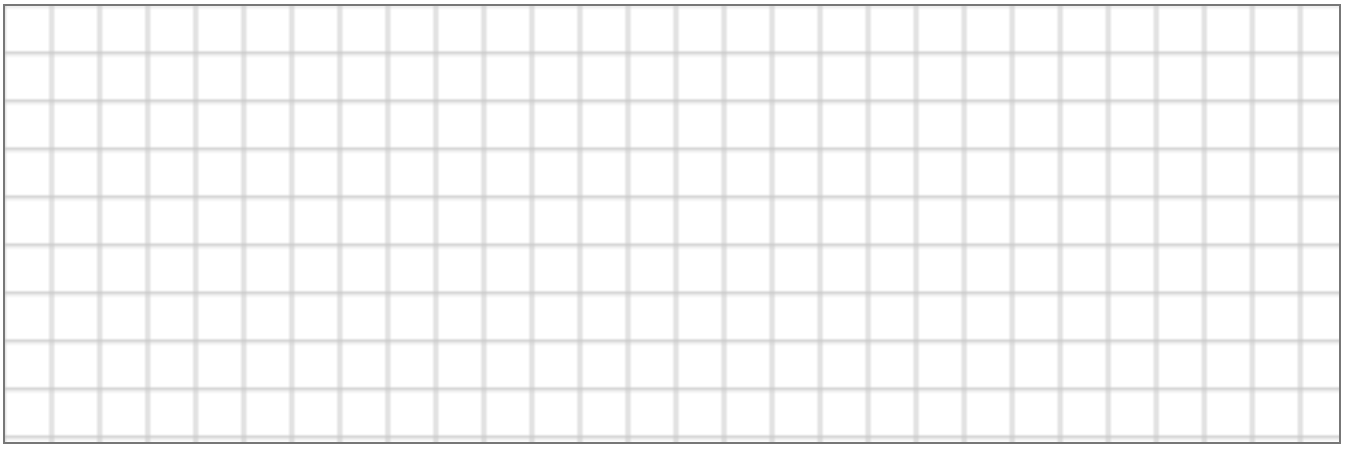
3. Which month has a tsunami in the log, and how many Japan earthquakes were recorded then? What do the other months show about assuming every earthquake causes a tsunami?

4. Name one tool in the passage for detecting a possible tsunami and one for detecting possible volcanic activity. Name one measure that can reduce harm.

3 YOUR TURN

Your own words

On the grid, graph all four event series from January through April. Label both axes, use a different symbol for each series, and add a key. Then write two sentences comparing the regions' activity and naming one early-detection tool and one way to reduce harm.



Signals Beneath Earth

PART 1 · READ AND MARK

Number the months in order, underline each nonzero tsunami or eruption count in the table, and circle the tools in the passage that detect hazards early. Accept any marking that follows this job and points at the right text.

PART 2 · ANSWERS

#	QUESTION	ANSWER
1	On a graph of Japan's earthquakes, what points would you plot for February and April? Write each as (month, count).	**(February, 4) and (April, 5).**
2	Total the earthquakes in each region across the four months. Which region has more in this simulated log, and by how many?	**Japan has 14 and Iceland has 6. Japan has 8 more.**
3	Which month has a tsunami in the log, and how many Japan earthquakes were recorded then? What do the other months show about assuming every earthquake causes a tsunami?	**February has one tsunami and four Japan earthquakes. Earthquakes also occurred in January, March, and April without a recorded tsunami.**
4	Name one tool in the passage for detecting a possible tsunami and one for detecting possible volcanic activity. Name one measure that can reduce harm.	**Offshore pressure buoys detect a possible tsunami; GPS instruments track ground deformation near volcanoes. Evacuation routes can reduce harm.**

PART 3 · YOUR TURN (SAMPLE ANSWER)

Horizontal axis: January, February, March, April; vertical axis: number of events, 0 to 5; key and plotted values: Japan earthquakes (●) 2, 4, 3, 5; Japan tsunamis (○) 0, 1, 0, 0; Iceland earthquakes (▲) 1, 2, 2, 1; Iceland eruptions (△) 0, 0, 1, 0.
Japan had more recorded earthquakes than Iceland, while the only tsunami was in Japan and the only eruption was in Iceland. Offshore pressure buoys can detect a passing tsunami, and evacuation routes can reduce harm.

Accept any clearly distinguished symbols or line styles if every point is placed at the correct month and count. For the written conclusion, accept another accurate comparison, detection tool, or harm-reduction measure from the passage.