Signals Before Danger

Compare tools that help communities prepare for natural hazards.

E.8.9B.2 "Compare and contrast technologies that predict natural hazards to identify which types of technologies are most effective."

NAME _____ DATE _____

1 READ AND MARK

Read it twice

YOUR JOB Underline each technology and circle what it measures or detects. Put a star beside sentences that explain when one technology is more useful than another.

Which Warning Tool Fits?

1. At a coastal emergency office, a storm may be days away. Weather satellites track its clouds across wide stretches of ocean, helping forecasters estimate where it may travel. A satellite image, however, does not measure conditions at every point under those clouds. Ocean buoys report local wind, air pressure, and wave height as the storm passes. These measurements help forecasters check and improve storm forecasts, but one buoy cannot show the entire storm. For planning along a long coastline, satellites provide wider coverage; buoys add detailed readings from specific locations.

2. Near a volcano, monitoring tools look for different signs of unrest. Seismometers record small earthquakes beneath the volcano. A cluster of quakes can signal moving magma, but quakes can occur without an eruption. Gas sensors measure gases escaping from vents; a change in gas output can be another sign of magma movement. Gas readings alone may be misleading because wind and weather affect measurements. Together, the two tools provide stronger evidence of unrest than either one alone, yet neither can name the exact day an eruption will occur.

3. Earthquake early-warning networks also use seismometers, but their job is different. Sensors detect the first seismic waves after an earthquake begins and send alerts before stronger shaking reaches places farther away. They cannot predict an earthquake before it starts, and people close to the source may receive little warning. In contrast, satellite images can help track a storm days in advance, while volcano sensors may reveal unrest without a certain eruption date. The most effective technology depends on the hazard, the time available, and whether wide coverage or local detail matters.

2 ANSWER WITH EVIDENCE

Use the passage

1. A storm is far offshore. Which is more useful for tracking its overall movement, a weather satellite or one ocean buoy? Explain your choice.

2. Why do seismometers and gas sensors provide stronger evidence of volcanic unrest together than either provides alone?

3. Volcano monitoring and earthquake early-warning networks both use seismometers. How are their warning goals different?

4. A town wants warning days before a hazard arrives. Which is a better fit for that goal, satellite storm tracking or earthquake early-warning seismometers? Why?

3 YOUR TURN

Your own words

A town near a volcano also faces offshore storms. Choose one technology from the passage for each hazard, then write four sentences comparing what each can and cannot tell officials and why each fits its hazard better than the other.

ANSWER KEY

Signals Before Danger

GRADE 8 · E.8.9B.2

PART 1 · READ AND MARK

Underline each technology and circle what it measures or detects. Put a star beside sentences that explain when one technology is more useful than another. Accept any marking that follows this job and points at the right text.

PART 2 · ANSWERS

#	QUESTION	ANSWER
1	A storm is far offshore. Which is more useful for tracking its overall movement, a weather satellite or one ocean buoy? Explain your choice.	**A weather satellite is more useful because it tracks clouds across a wide stretch of ocean. One buoy reports conditions only at its location.**
2	Why do seismometers and gas sensors provide stronger evidence of volcanic unrest together than either provides alone?	**Seismometers detect small earthquakes, while gas sensors detect changes in gases escaping from vents. Each sign can be misleading alone, so using both gives officials more evidence of unrest.**
3	Volcano monitoring and earthquake early-warning networks both use seismometers. How are their warning goals different?	**At a volcano, seismometers detect quakes that may signal unrest before a possible eruption. In an earthquake early-warning network, they detect waves after an earthquake starts so an alert may arrive before stronger shaking.**
4	A town wants warning days before a hazard arrives. Which is a better fit for that goal, satellite storm tracking or earthquake early-warning seismometers? Why?	**Satellite storm tracking is a better fit because it can follow a storm days in advance. Earthquake early-warning seismometers send alerts only after an earthquake begins.**

PART 3 · YOUR TURN (SAMPLE ANSWER)

I would use weather satellite images to follow storms across the ocean, but they cannot measure conditions at every spot under the clouds. I would use a volcano seismometer to detect small earthquakes beneath the volcano, but those quakes do not guarantee an eruption. The satellite images fit storm tracking better because they show a wide area that a volcano seismometer cannot track. The seismometer fits volcano monitoring better because it detects local quakes that storm-tracking images do not measure.

Accept other supported technology choices if the response compares each tool's useful evidence and limits. Do not accept claims that earthquake early-warning systems predict earthquakes before they begin.