

Fixing Jordan's Hazard Fact Sheet: Tidal Waves, Due Floods and Soggy Slopes

Learning target: I can find and explain errors in claims about tsunamis, floods and landslides, and rewrite each one so it is scientifically accurate.

Error analysis

About 40 min

Individual

MS-ESS3-2 · practice

writing

independent practice

Name _____

Date _____

Period _____

Directions

Jordan, a seventh grader, wrote a hazard fact sheet for a coastal California town. Read all eight statements before you write anything. In Part A, decide whether each statement is correct, partly correct or incorrect. In Part B, explain each error and rewrite the statement so it is accurate, keeping Jordan's topic. One statement is completely correct; explain why it is right instead of rewriting it. Part C asks you to find the pattern behind the mistakes.

You will need: This worksheet, Pencil, Calculator (optional)

Jordan's fact sheet

1. A tsunami is a giant tidal wave. The pull of the Moon makes the ocean rise up into one huge wave.
2. Tsunamis are tallest far out in the deep ocean, so ships at sea are in the most danger. The wave shrinks as it reaches the beach.
3. Once the first tsunami wave has come and gone, it is safe to go back down to the harbor.
4. A bigger earthquake makes a faster tsunami, so a tsunami from a magnitude 9 earthquake would reach our town sooner than one from a magnitude 8 earthquake in the same place.
5. Our river had a 100-year flood in 2023, so the town is safe from a flood that big until about 2123.
6. A little water makes sand stick together, so a hillside soaked by a week of rain is safer than a dry one.
7. Gravity moves the soil and rock in every landslide. Rain, earthquakes and road cuts only make it easier for gravity to win.
8. The wildfire last summer already burned the hills above our town, so the danger is over now that there is nothing left to burn.

Part A: Diagnose

1. Complete the table for all eight statements. If a statement is partly correct, say which part is right and which part is wrong.

Correct, partly correct or incorrect?	The idea that went wrong (a few words)
Statement 1	
Statement 2	
Statement 3	
Statement 4	
Statement 5	
Statement 6	
Statement 7	
Statement 8	

Part B: Explain and rewrite

2. Statement 1: Explain what really causes a tsunami and why 'tidal wave' and 'one huge wave' are both wrong. Rewrite the statement.
- _____
- _____
- _____
3. Statement 2: Explain how a tsunami's height changes from the deep ocean to the shore, and why. Rewrite the statement.
- _____
- _____
- _____
4. Statement 3: In 1964, an earthquake in Alaska sent a tsunami to Crescent City, California. The first waves arrived about four hours later, and the fourth wave was the largest and most destructive. Use that history to explain the error, then rewrite the statement.
- _____
- _____
- _____

5. Statement 4: Explain what sets a tsunami's speed and what the size of the earthquake does change. Rewrite the statement.

6. Statement 5: Explain what '100-year flood' actually means. Rewrite the statement.

7. Check statement 5 with numbers. What is the chance of a flood at least as big as the 2023 flood next year? What is the chance of at least one such flood in the next two years? (Hint: the chance of no such flood in one year is 99 percent; multiply for two years, then subtract from 100 percent.)

8. Statement 6: Which part is right? Explain what changes when the soil goes from damp to saturated. Rewrite the statement.

9. Statement 7 is correct. Explain why, and give one example of a trigger that 'makes it easier for gravity to win' and how it does so.

10. Statement 8: Explain how a wildfire changes the hillside so that a new hazard appears in the rainy season. Rewrite the statement.

Part C: The rule behind the mistakes

11. Several of Jordan's errors (statements 3, 5 and 8) come from the same kind of thinking: treating a hazard as if it happens once and then is 'used up' or 'over.' Write a rule Jordan could follow to avoid this kind of error, and explain how the rule would change what the fact sheet tells people to do.

Three checks for any hazard claim

For each statement ask: (1) Cause: what really starts this hazard, and what really controls how it behaves? (2) Time: does the statement treat a hazard as a single event or a schedule, when really it is a series of events or a chance that repeats every year? (3) Place: does the danger really sit where the statement says (deep ocean or shore, dry slope or soaked slope)? Write C, T or P next to each statement for the check it fails.

Write the corrected fact sheet

Turn your rewrites into a one-page fact sheet for the town, with one short section each for tsunamis, floods and landslides. Every section must include one forecast stated as a chance or a time window (not a date) and one mitigation the town has done or could do. Then add a 'Myth or fact?' box that uses two of Jordan's errors, because people remember corrections better when they see the myth named.