

# SCIENCE TASK ANNOTATION

## ANNOTATION KEY

### EQUITY

Supporting a wide range of diverse students.

### SCENARIOS

Information provided to elicit performances.

### SEPs

Opportunities to demonstrate science and engineering practices.

### DCIs

Opportunities to demonstrate understanding of disciplinary core ideas.

### CCCs

Opportunities to demonstrate understanding of crosscutting concepts.

### SENSE-MAKING

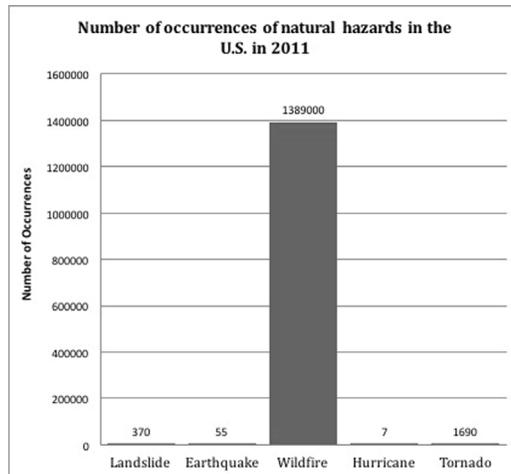
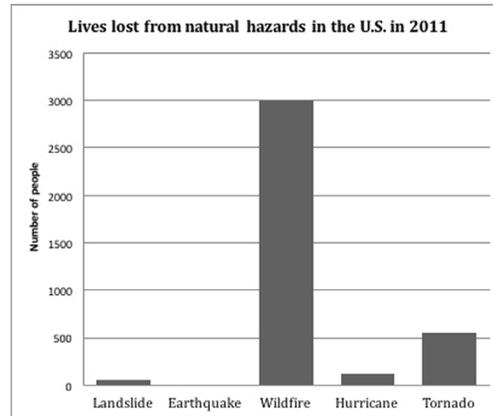
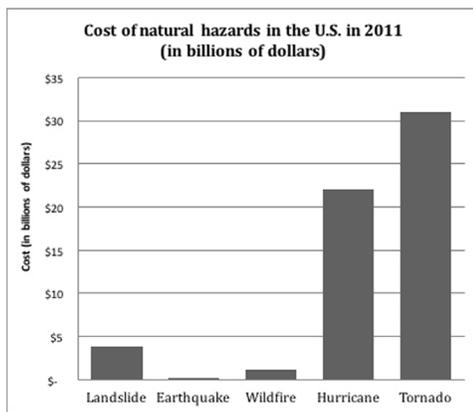
Opportunities for reasoning about phenomena and problems.

### ASSESSMENT PURPOSE

Highlights how the task features connect to intended assessment use.

## NATURAL HAZARDS: HOW CAN DATA HELP? SHORT PERFORMANCE ASSESSMENT

Below are three graphs showing data from natural hazards that occurred in the United States.



These data are national data, which is inconsistent with the questions posed in the task that emphasize a plan for a specific city. This limits how effectively the task can emphasize forecasting, a major component of the DCI associated with the targeted PE. Question 4 in the task offers an opportunity for students to surface this themselves (and for teachers to interpret student responses accordingly), but for those students who do not recognize the disconnect between national data and local plans, this could model poor scientific practice.

### SCENARIOS

## NATURAL HAZARDS: HOW CAN DATA HELP?

### SHORT PERFORMANCE ASSESSMENT (CONTINUED)

Your city needs to create an emergency plan for natural hazards.

An emergency plan describes what a city will do to prepare for the impacts of natural hazards. You have been asked to show city leaders how data can be used to help.

While this might be a real-world scenario, there is no clear phenomenon or problem driving this scenario/task. Students are not asked to attend to something specific, puzzling, or something that clearly needs to be figured out. This limits the amount of engagement and sense-making using specific DCIs from students.

SCENARIOS

DCIs

SENSE-MAKING

1. Describe what the data show across the graphs. For example: *The graphs show that wildfires cost less than hurricanes and tornadoes, but they caused more deaths.* Write TWO more observations using information from more than one graph

1. \_\_\_\_\_

\_\_\_\_\_

2. \_\_\_\_\_

\_\_\_\_\_

While students are asked to consider data across multiple graphs—a sophisticated expectation associated with the SEP Analyzing and Interpreting Data—the provided example limits student thinking by modeling exactly the responses expected.

The rubric suggests that a CCC is assessed here, but this is an example of providing students the opportunity to develop the CCC, not assessing it. Because they were given graphs to look at and were told through the prompt and example that they needed to identify patterns (did not need to show that they understand that graphs can be used to find patterns), this prompt does not assess whether students understand and can use the CCC.

SEPs

CCCs

SENSE-MAKING

## NATURAL HAZARDS: HOW CAN DATA HELP? SHORT PERFORMANCE ASSESSMENT (CONTINUED)

2. City leaders need help understanding how to interpret the data. To help them:

- Choose one of the hazards from the first column below and circle it.
- Use the hazard to complete the table.

This is unscored scaffolding to help students organize their thinking, and one place where scientific understanding is required in the task. It should be noted that this must be connected to either specific instructional experiences or additional research conducted by students; facts about these hazards is not part of the standards and should not be conflated with using DCIs (this is consistent with the scoring guidance).

**DCIs**

By giving students the opportunity to choose a hazard, the task values student ideas and interests without compromising the intended assessment target, and supports student agency by allowing students to direct their thinking throughout the task.

**EQUITY**

Circle the hazard you choose	Describe what the graphs show about this hazard in 2011.	List at least 2 things that you know can cause this hazard.	List ways that you know this hazard impacts (affects) humans and the environment.
Landslide Earthquake Wildfire Hurricane			

## NATURAL HAZARDS: HOW CAN DATA HELP?

### SHORT PERFORMANCE ASSESSMENT (CONTINUED)

3. Describe to the city leaders some ways the hazard you chose could affect their city. Use data from the graphs and other information from the table above to support your description.

This question is asking students to use national data to support a local claim—in this case, this is inappropriate because natural hazards are so environmentally and geographically specific. Students would have to know additional information about which natural hazards are most relevant to them, something that is not supported by this task.

This question requires students to analyze and interpret data to support ideas, but does not rely on focus of MS.ESS3.B DCI understanding. Students do not need to understand that natural hazards can be forecasted based on the history of natural hazards in the region or geologic forces to answer this question (confirmed by the examples and the national data provided).

SEPs

DCIs

EQUITY

*For example, tornadoes are rare and only happen in a few places in the US. When they do happen they destroy everything in their path, including entire towns. This pattern could explain why the cost of tornadoes was the highest of any hazard even though there were fewer than most other hazards in 2011.*

Providing this example limits student sense-making by telling students exactly what information to include and how to include it.

SENSE-MAKING

4. You have found that you need to know a lot more about the natural hazards data than what is shown in the three graphs on Page 1.

Describe additional information about the graphs that city leaders would need before they could use the data to make decisions about solutions. Explain why leaders would need this additional information.

This question requires students to evaluate given information and decide what additional information would be needed to support the city plan. This could elicit some DCI and CCC understanding, if students asked, for example, 1) for mapping the history of natural hazards in the regions to make predictions about likely future natural hazards, or 2) systemic/environmental changes that might increase the likelihood of certain hazards in the future. This is also an opportunity for students to recognize some of the limitations that were intentionally included in the task, like the use of national data to support a local decision.

It is also a great example of eliciting sense-making in a way that values student ideas and agency in the task. However, neither the rubric nor the task set-up/prompts provide support or indication that this is expected.

SEPs

DCIs

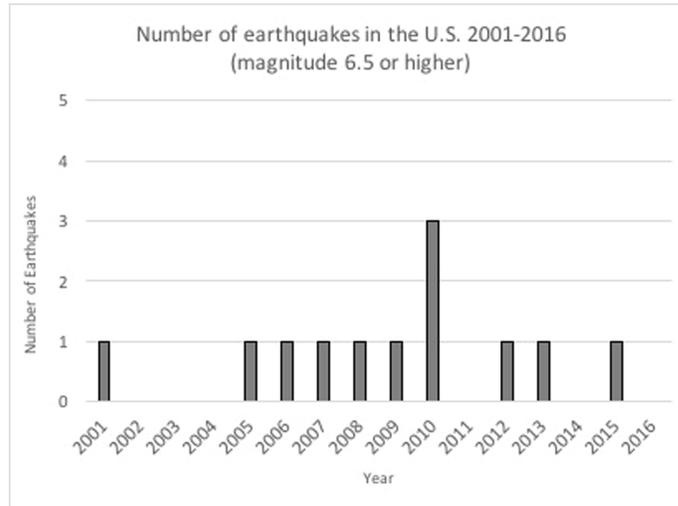
CCCs

SENSE-MAKING

CONNECTION TO ASSESSMENT PURPOSE

## NATURAL HAZARDS: HOW CAN DATA HELP? SHORT PERFORMANCE ASSESSMENT (CONTINUED)

5. One of the city leaders has claimed that the graphs showed that it was not necessary to plan for the effects of earthquakes.



Data source: earthquake.usgs.gov

Do you agree or disagree with the city leader's claim?

Explain why you agree or disagree using data from the graphs and what you know about earthquakes.

Responding to this question requires that students analyze and interpret data provided in graphs to serve as evidence to support or refute a claim. This will likely elicit logical reasoning rather than scientific reasoning because logical interpretation of the graphs, without reasoning with the DCI, is sufficient.

SEPs

SENSE-MAKING

I \_\_\_ agree/ \_\_\_ disagree because