

SCIENCE TASK ANNOTATION

ANNOTATION KEY

| EQUITY | SCENARIOS | SEPs | DCIs | CCCs | SENSE-MAKING | ASSESSMENT PURPOSE |
|--|--|---|--|--|---|--|
| Supporting a wide range of diverse students. | Information provided to elicit performances. | Opportunities to demonstrate science and engineering practices. | Opportunities to demonstrate understanding of disciplinary core ideas. | Opportunities to demonstrate understanding of crosscutting concepts. | Opportunities for reasoning about phenomena and problems. | Highlights how the task features connect to intended assessment use. |

OIL SPILLS SHORT PERFORMANCE ASSESSMENT

Huge ships, called tankers, carry oil across the ocean. Sometimes the oil in the tankers spills into the ocean. Oil spills harm plants and animals that live in the ocean. Scientists are trying to find ways to collect the oil to remove it from the ocean.

This scenario uses simple, short language to establish a real-world, meaningful scenario that has global relevance. The scenario includes text, video, and images of the oil spill that can help support student understanding of the scenario, as well as introduce the experiment students will be considering in the task. This enables students whose reading and writing abilities are emerging to better understand and engage with the task.

SCENARIOS

EQUITY



Oil spill in the ocean



Oil moving towards plant life



Bird covered in oil

Your teacher will show you a video of a scientist, Dr. Warner, doing an experiment. He is testing the **research question: Can magnets be used to move oil in water?** He follows these steps:

1. Places water in a large plastic tub.
2. Pours oil into the water.
3. Puts black powder on the oil.
4. Places a large magnet on the side of the plastic tub.
5. Observes the magnet pull the oil and powder together to the side of the tub.

This scenario explicitly identifies for students an intriguing research question and focuses students on the scientific ideas they will need to access to pursue the task—ideas about magnets.

SCENARIOS

This text box emphasizes the salient points in the video, providing additional scaffolding for students without influencing the sense-making required.

EQUITY

OIL SPILLS SHORT PERFORMANCE ASSESSMENT (CONTINUED)

1. Dr. Warner put a black powder on the oil during his experiment. What do you think would happen if he did his experiment without the powder? Explain why.

Explain Why:

This question provides students with a scaffold to begin critically thinking about the experiment and to help focus student attention on the relevant aspects of the experiment. While it doesn't explicitly assess a targeted SEP, DCI, or CCC, it does provide important on-ramping and prompts to help students begin sense-making about the experiment.

EQUITY

SENSE-MAKING

Dr. Warner used a magnet to pull powder (and oil) to the side of the tub. One student asks, "How can a magnet pull something without touching it?"



Dr. Warner holds the magnet and some of the oil and powder move toward the magnet.

The text and image included here help break the driving scenario into digestible chunks by focusing student attention and thinking on the most relevant aspect of the scenario. This can help scaffold students toward demonstrating the targeted student performance.

EQUITY

OIL SPILLS SHORT PERFORMANCE ASSESSMENT (CONTINUED)

2. Explain how the magnet caused the powder to move without touching it

Successfully responding to this question requires that students develop a written description that demonstrates the understanding that magnets can cause objects to move without being in contact with each other if the objects are magnetic. This most closely connects with part of the **3rd grade DCI element PS2.B "...magnetic forces between a pair of objects do not require that the objects be in contact...the [size] of the force depends on properties of the objects..."**. This question requires application of part of the DCI, but can largely be answered by stating the DCI, rather than requiring its application.

It should be noted that the scoring rubric suggests that this question assesses more of the DCI, part of the SEP #1 Asking Questions, and the CCC Cause and Effect. These are not assessed here because:

- Students do not need to bring an understanding of how distance influences the size of the forces to bear to respond to this task [note: this could easily be modified to target the DCI more comprehensively];
- Students are not themselves asking questions; and
- While a correct student response is an example of a cause and effect relationship, students do not need to bring their understanding of cause and effect relationships to the table to respond to the question, since the DCI is sufficient.

DCIs

SEPs

CCCs

CONNECTION TO ASSESSMENT PURPOSE

OIL SPILLS SHORT PERFORMANCE ASSESSMENT (CONTINUED)

Dr. Warner’s experiment answered his research question. He was able to use a magnet to move some of the oil in the water. But he is not sure if he can use magnets to remove all of the oil from the water.



Dr. Warner putting black powder on the oil

3. What other research questions could he test to see if he can remove all of the oil in the water? Write one research question and explain how it will help him decide if he can remove all of the oil.

Because the questions are constrained to removing all the oil with magnets, students must 1) use an understanding of the properties of magnets (e.g, that magnetic forces between objects depend on properties of those objects and distance) to make sense of the scenario and what would provide relevant information, 2) understand what makes a good and relevant research question, and 3) be able to articulate their reasoning. This question requires students to sense-make with an SEP and DCI.

This most closely connects with:

- part of the 3-5 SEP asking questions and defining problems element “ask questions that can be investigated...”
- part of the 3rd grade DCI element PS2.B “...the sizes of the forces in each situation depend on the properties of the objects and their distance apart...”

It should be noted that this question could elicit student understanding of CCCs. While open-ended and difficult to target specifically, student questions could very meaningfully reveal CCC understanding in both the questions they pose and the rationale for how that question will help Dr. Warner.

SENSE-MAKING

DCIs

SEPs

CCCs

OIL SPILLS SHORT PERFORMANCE ASSESSMENT (CONTINUED)

Dr. Warner has already tested his research question by doing an experiment in his lab. Now he needs to design a new experiment that he can test on an oil spill in the ocean.



Oil Spill in the Ocean — brown color depicts the oil

He knows that the black powder can be used to remove oil from a tub of water in his lab.

4. Describe one way his experiment will need to change to test his research question on a real oil spill. Then explain how that change will help him decide if magnets can be used to remove oil from the ocean

Explain:

This part of the prompt requires students to sense-make by 1) evaluating the experimental design as well as the two situations provided, and 2) think about what is different between a real oil spill and what we see in the lab (e.g., size of the spill). Successfully answering this question would likely elicit student understanding of how magnets work (parts of 3-PS2.B identified above) to evaluate and modify the experimental design.

While the scoring rubric suggests that this requires students to use the Defining Problems SEP element “define a simple problem...”, students are not defining a problem because they are not describing a situation people want to change or identifying criteria and constraints for solutions to that problem—instead, they are evaluating a design (the current experimental approach). This more closely connects to the 3-5 SEP Planning and Carrying Out Investigations element “evaluate appropriate methods and/or tools for collecting data.”

SEPs

DCIs

SENSE-MAKING

CONNECTION TO ASSESSMENT PURPOSE