5TH GRADE LIFE SCIENCE: MODELING THE MOVEMENT OF MATTER

Introduction:

In this task, students are asked to engage in a three-part process: first, develop a model that helps them describe the relationships between parts of an ecosystem in Australia (part 1), then consider what happens when rabbits are introduced to this ecosystem (part 2), and finally consider the role of decomposers in the system. The task scaffolds students through showing their understanding of ecosystem dynamics, providing them with opportunities to practice and demonstrate aspects of the three dimensions.

This task is a classroom-based assessment that is designed independently of any particular curriculum or instructional sequence.

STANDARDS:

This task is intended to assess progress toward the following NGSS Performance Expectation (PE):

5-LS2-1: Develop a model to describe the movement of matter among plants, animals, decomposers, and the environment.

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.

✓ STRENGTHS

The questions in the task (particularly part 2) are **centered around a specific, real-world occurrence** that students can likely relate to without it being literally local—this is a nice model of being able to expand beyond a specific student's local experiences while still being relatable.

The **second part of the task involves a more specific phenomenon**—the introduction of rabbits into the Australian ecosystem being considered.

The **task scenario uses real-world images and simple, grade-appropriate language** to convey parts of the scenario, which may help the task both be more engaging and comprehensible to a wide range of students.

The **scoring guide clearly breaks down how the targeted PE is represented in each question.**

The task routinely asks students to **demonstrate their understanding of ecosystem dynamics,** providing multiple ways for students to make their thinking visible. Additionally, the task provides **meaningful learning opportunities in addition to windows into students' current understanding.**

! OPPORTUNITIES FOR IMPROVEMENT

The **first part of the task is not grounded in a specific phenomenon**—this limits both coherence as well as student engagement.

Sense-making is backgrounded in parts 1 and 3 of this task—in many questions, students are sharing previously learned disciplinary ideas by describing them, rather than using them to make sense of a phenomenon or address a problem. Because sense-making was not the focus, it was difficult for students to have opportunities to use the three dimensions together. This also posed challenges for how all dimensions were engaged, including:

- **Students are often practicing/developing modeling skills**. This can be a meaningful learning opportunity, and does surface whether students understand the mechanics of modeling—how to add new information, how to show relationships, etc—but provides fewer opportunities to determine whether students can use the SEP to make sense of phenomena (5th grade target).
- **DCIs were required to respond to the task, but were often elicited as factual knowledge, not knowledge-in-use** to make sense of a phenomenon or problem.

The rubrics and scoring guidance often suggest 1) more detailed student responses than would be expected based on the prompt, and 2) that student work can be used as evidence of progress with the three dimensions **without clarifying the limitations**--what aspects of the three targeted dimensions are not assessed.

How does this task support all students?

✓ The scenario is based on a true story that took place in Australia—while this might not be immediately relevant to students, it is a context that they can likely become both familiar and engaged with. Additionally, the task includes several features of explicit attention to equity, including that the task offers students regular opportunities to make their thinking visible in both diagrams and written explanations; includes helpful scaffolding throughout, building in on-ramps for students to show what they understand and can do; and regular opportunities for students to show how they are thinking about ecosystem dynamics, in addition to providing the "right answer."

What are the major takeaways?

SUMMARY POINTS:

Overall, this task is most useful in surfacing student understanding of the targeted DCI using mechanics of the SEPs, with opportunities to develop further proficiency with modeling and systems and system models. Because the task offers ample opportunities for students to share their understanding of ecosystem dynamics, the task can elicit helpful information about facets of student understanding of the DCI.

SUGGESTED IMPROVEMENTS

The task would be improved if:

- The task was focused on or driven by a phenomenon with more uncertainty associated with it—this would help provide the opportunity for students to bring sense-making more to the foreground while still surfacing student thinking with the DCI, and would make the opportunities to model and use DCIs more effective. This could involve data that could be used to choose between different explanations or claims, the introduction of new information that would push students to refine or modify their model, etc.
- The task included more opportunities for students to make their own ideas and decisions meaningful parts of completing the task.

How should this task be used?

This task could be useful in the classroom to formatively reveal student progress in their knowledge of the DCI targeted while offering students opportunities to practice modeling and develop further ideas with the crosscutting concept of systems and system models. This task is most useful for making inferences about students' understanding of ecosystem dynamics, surfacing facets of students current understanding of the DI. Teachers using this task should make sure students are given additional opportunities to demonstrate that they can use the DCI, SEP, and CCC to make sense of phenomena and problems before making any claims about student proficiency with the performance expectation.