# TASK OVERVIEW

# ELEMENTARY PHYSICAL SCIENCE: SURVIVORS STRANDED

## Three-Dimensional Claim

Students can apply their understanding that matter is conserved when it changes form, even if it appears to vanish to develop and use a model that explains the changes of the physical states of matter and the conservation of matter within a system.

Disciplinary Core Ideas   Crosscutting Concepts   Science and Engineering Practices

## Tennessee Academic Standards for Science

**This task is intended to elicit student learning of the following Tennessee Science Standard:**

**5.PS1.1:** Analyze and interpret data from observations and measurements of the physical properties of matter to explain phase changes between a solid, liquid, or gas.

**5.PS1.2**: Analyze and interpret data to show that the amount of matter is conserved even when it changes form, including transitions where matter seems to vanish.

## Next Generation Science Standards

**This task is intended to elicit student learning of the following NGSS elements for each of the three dimensions:**

### Science and Engineering Practices

**Developing and Using Models**

- *Grade 3-5 Element*: Develop and/or revise a model based on evidence that shows the relationship among variables for frequent and regular occurring events.
- *Grade 3-5 Element*: Develop and/or use models to describe and/or predict phenomena.

### Crosscutting Concepts

**Systems and System Models**

- *Grade 3-5 Element*: A system can be described in terms of its components and their interactions.

### Disciplinary Core Ideas

**PS1.A: Structure and Properties of Matter**

- *Grade 3-5 Element*: Matter of any type can be subdivided into particles that are too small to see, but even then the matter still exists and can be detected by other means. A model shows that gases are made from matter particles that are too small to see and are moving freely around in space and can explain many observations, including the inflation and shape of a balloon; the effects of air on larger particles or objects.
- *Grade 3-5 Element*: The amount (weight) of matter is conserved when it changes form, even in transitions in which it seems to vanish.

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| | STRENGTHS | OPPORTUNITIES FOR IMPROVEMENT |
|---|---|---|
| **SCENARIO** | The phenomenon in the scenario is central to the task, compelling for students, grounded in a real-world occurrence, and includes multiple modes for introducing the scenario. | Part E is topically related to the task, but in a different context. This may make the task slightly less coherent from the student perspective. |
| **SENSE-MAKING** | Students have multiple opportunities to make their thinking visible through models and explanations. Part D allows students to apply their understanding of water changing states of matter to a new design. | None. |
| **INTEGRATED DIMENSIONS** | Students have multiple opportunities to show their understanding of the targeted science and engineering practice and disciplinary core idea elements. | The references to the crosscutting concept, systems and system models, are implicit throughout the task. In the optional extension Part E, however, it is elicited explicitly. |
| **EQUITY** | The scaffolds in the task give students clear guidance to show what they know, and the task is coherent from a student's perspective. It also includes multiple options for students to respond across the task. | For those who decide to use the optional Part E extension, consider how the first question can better fit into the flow of the task. As currently written, it seems out of place and may negatively affect coherence. |
| **FEEDBACK SUPPORT** | The supporting materials are well designed. They include multi-dimensional scoring guidance using color coding, which is helpful to see where the specific pieces of the disciplinary core ideas, science and engineering practices, and crosscutting concepts should show up in student responses. | Consider providing scoring guidance for the engineering extension. |

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## Suggestions for Use

The teacher guidance document suggests using this task at the end of a sequence of instruction to reveal a student's ability to apply their ideas about conservation of matter and change of states within open and closed systems by developing and using models. The task could be used for these purposes and should not be used to assess student understanding of crosscutting concept elements unless Part E is included. *Note: This is because the crosscutting concept element is not specifically focused on open and closed systems. To assess the element, the task needs a prompt focused on how a change to the system would impact the components and interactions in that sys*tem.

## What Are The Major Takeaways?

| SUMMARY POINTS | SUGGESTIONS FOR IMPROVEMENT |
|---|---|
| This is a strong task. The task integrates the disciplinary core ideas and science and engineering practices well and gives students an opportunity to engage in sense-making by applying their ideas to explain how a solar still works. The task is also well scaffolded, which will provide students of all ability levels with opportunities to show what they know and can do. Finally, the supporting materials for teachers are well designed and will help users of this task interpret student responses and give meaningful, learning-focused feedback to their students. | To explicitly elicit student understanding of the crosscutting concept, consider making Part E Question 2 in the task required rather than optional. In addition, consider reframing Part E Question 1 so it fits more naturally into the flow of the task. |

**What Should I Do Before Using This Task?**

Users should review the provided guidance to familiarize themselves with instructions and disclosures before using these tasks.

**How Were These Tasks Developed?**

The tasks were developed and revised by teacher work groups from participating districts in the Tennessee District Science Network (TDSciN), which was launched in early 2019 and managed by NextGenScience. Tasks were evaluated using an adapted version of the Science Task Screener. Teachers worked collaboratively across districts to develop and revise these tasks after attending multiple professional learning sessions. Find out more about the development process here.

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