

## Introduction:

In this task, students are asked to evaluate an experiment and support or refute a provided hypothesis about heating two different colors of sand. This task is a [classroom-based assessment](#) that is designed independently of any particular curriculum or instructional sequence, and is intended to be used as a formative check of student understanding of an unpacked "part" (learning performance) of a performance expectation (PE).

### STANDARDS:

This task is intended to assess a learning performance (LP) that was derived from the following NGSS PEs:

**MS-PS1-4.** Develop a model that predicts and describes changes in particle motion, temperature, and state of a pure substance when thermal energy is added or removed.

**MS-PS3-4.** Plan an investigation to determine the relationships among the energy transferred, the type of matter, the mass and the change in the average kinetic energy of the particles as measured by the temperature of the sample.

**LPs:** Evaluate an investigation procedure that addresses a scientific question about how the type of matter influences the change in temperature of a given sample when energy is transferred from or to a sample.

### 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.

### ✓ STRENGTHS

The task is **centered around a specific question**, grounded in implicit observations of a phenomenon. ■

The task **meaningfully requires students to use grade-appropriate SEPs and DCIs together in service of sense-making.** ■ ■

The task has a clearly **specific focus, and the question addresses this target explicitly.** ■

There are opportunities within the task for students to **make their own ideas visible**. This allows students ownership over the task and helps ensure all students can demonstrate facets of their understanding of the targeted SEP and DCI. ■ ■ ■

### ! OPPORTUNITIES FOR IMPROVEMENT

The **task is not driven by a specific phenomenon that is engaging or problematized**—this limits student engagement. While a phenomenon is implicitly included—that there are different kinds of sand that might have different responses to heating—it is not made clear to students why this needs to be explained or why this is puzzling. ■

## How does this task support all students?

✓ The scenario uses simple language that is easily understood, and does not include too much additional information that is not related to the task.

! This task would better serve all students if it included images or a little more background on black and white sand. The task might be confusing or unfamiliar to students who haven't had a lot of experience with sand—including what it is, where it can be found, and why there are multiple kinds.

## What are the major takeaways?



### SUMMARY POINTS:

Overall, this is a multi-dimensional task that requires students to use the [SEPs](#) and DCIs in service of [sense-making](#), with an opportunity to [engage and practice the CCCs implicitly](#) as well.



### SUGGESTED IMPROVEMENTS

The task would be improved if the [scenario](#) was amended to 1) include supports (e.g., photographs) for students to understand the phenomenon, and 2) create a "need to know" by giving students information about why this is a puzzling issue that needs to be figured out.

## How should this task be used?

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This task could be used as intended—as a formative check of student understanding. It could also be used as part of an assessment at the end of instruction that intends to surface how well students can use their understanding of transfers of energy with planning and carrying out investigations to make sense of phenomena. This task could also be used as part of a larger assessment to help place students' performance on a learning progression.