

Introduction:

In this task, students are asked to consider whether mixing and heating two substances caused a chemical reaction to occur, based on data and students' understanding of chemical reactions. This task is a [classroom-based assessment](#) that is designed to be independent 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-PS1-2. Analyze and interpret data on the properties of substances before and after the substances interact to determine if a chemical reaction has occurred.

MS-PS1-5. Develop and use a model to describe how the total number of atoms does not change in a chemical reaction and thus mass is conserved.

MS-PS1-1 (support PE). Develop models to describe the atomic composition of simple molecules and extended structures.

LPs: Construct a scientific explanation about whether a reaction has occurred using properties of substances before and after the substances interact

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 set of observations.**
- The task **meaningfully requires students to use SEPs and DCIs together in service of sense-making.**
- The task has a clearly **specific focus, and the question addresses this target explicitly.**
- The task **includes scaffolding to help students make their thinking clear without impeding their sense-making.**

! OPPORTUNITIES FOR IMPROVEMENT

- The **task phenomenon is not engaging or problematized**—this limits student engagement and more authentic sense-making.
- While MS elements are targeted, **the task elicits student understanding at the 3-5 level** without this being made explicit to users.

How does this task support all students?

✓ The scenario uses simple language that is easily understood, and does not include additional information that is not related to the task. The scenario includes a diagram to illustrate the experiment described in the text, and clear data table for students to interpret. The task questions themselves are well-scaffolded, cueing students toward the ideas and practices that they should consider when answering the questions while still allowing them to show their facility with those ideas.

! This task would better serve all students if the scenario was more engaging and problematized, which would support better engagement and may surface richer student sense-making.

What are the major takeaways?



SUMMARY POINTS:

Overall, this task is a multi-dimensional task that requires students to use the [SEPs](#) and DCIs in service of [sense-making](#)—and [CCCs](#) are likely to be engaged as part of students' reasoning.



SUGGESTED IMPROVEMENTS

The task would be improved if the [scenario](#) was amended to include more sophisticated data—specifically, data that might illustrate more nuanced relationships that would require students to 1) use grade-appropriate SEPs and DCIs in order to make a well-supported claim, and 2) that would require CCCs more explicitly to connect the data to the claim as evidence.

How should this task be used?

This task could be used as intended—as a formative check of student understanding of chemical reactions. If modified to better elicit 6–8 SEPs, CCCs, and DCIs, it could be used as part of an assessment at the end of instruction that focused on the targeted PEs. This task could also be used as part of a larger assessment to help place students' performance on a learning progression.

