

# ASSESSMENT SUGGESTIONS

## Anticipated Student Outcomes

1. Students improve their ability to observe, hypothesize, and experiment with a new substance to determine its properties.
2. Students are able to critically discuss, analyze, and modify their initial list of properties in light of comments and questions from other students.
3. Students recognize that substances cannot simply be classified as a solid or liquid, and that a given substance may exhibit solid or liquid properties under different conditions.
4. Students apply their understanding of a substance's properties to design a spacecraft that will land on an ocean of Oobleck.
5. Students learn about the fields of science and engineering and become aware of the many processes and skills used by scientists and engineers.

Additional outcomes for optional sessions:

- Students improve their ability to design models that can provide an explanation for the solid/liquid properties of Oobleck.
- Students are able to design and conduct a full investigation.

## Embedded Assessment Activities

**Lists of Properties:** In Activity 1, student teams investigate Oobleck and list its properties. This provides information about whether or not students understand the concept of a property, and the degree to which they have analyzed their list to assure its accuracy. (Outcome 1)

**Scientific Convention:** In Activity 2, students critically discuss and compare the properties of their substances. During the discussion, the teacher can notice whether students move beyond their initial statements to listen to each other, consider various points of view, and try to reach consensus about the most accurate statement. (Outcomes 2, 5)

**Is Oobleck a Liquid or Solid?:** During the convention, teachers can look for statements that describe the liquid or solid properties of Oobleck. They can observe whether students can articulate the conditions under which Oobleck acts as a solid or as a liquid. (Outcome 3)

## What insights have I gained?

This assessment can be used to guide instructional decisions about how to structure scientific explorations or future implementation plans for the *Oobleck* unit.

If appropriate, this assessment can be evaluated for use with a traditional grading system. Teachers can evaluate the responses and assign point values to each section of the assessment.

COMPLETE = 3 points

PARTIAL = 2 points

MARGINAL = 1 point

NO RESPONSE = 0 points

Thus, the total number of possible points for this assessment would be six (three for each section). Performance levels could be established with a range of “6” (exemplary) to “0” (no response) and assigned a percentage or letter grade value.

For example, some students may score well on one section but need improvement on another section. This student might develop a comprehensive list of the properties of sand, and score a “3” on Part I of the assessment. However, their analysis in Part II may need additional justification and thus would score a “2.” The total for this student would be a “5” of a possible six points which could translate to an 83% score.

Although this method of assessment can be used as the basis of a traditional grade, it is far richer in the feedback it provides for the teacher and student. The activity shows how the students apply their abilities to explore new substances in a real-life situation. It shows how they use their senses, apply concepts and reflect on their discoveries to support their conclusions. The students will gain more information about their progress from a detailed analysis of what they did well than from a letter grade alone. For all students, the concepts and skills involved in the Sand Task assessment go far beyond letter grades, the narrow definition of what a “property” is, or physical science understandings of matter. As with *Oobleck*, this seemingly simple observation and analysis of a substance (in this case, sand), exemplifies the essence of the nature of science, or “what scientists do.” As students plan, conduct, record, and discuss their explorations, they gain a direct, tactile, yet also quite sophisticated and practical understanding of how a scientist approaches the real world. Because student abilities and conceptual understandings grow and develop over time, explorations such as the Sand Task can be evaluated on many levels and presented at different grade levels.