

Science Probes—a Strategy to Uncover Student Ideas in Science



Purpose: To identify and address several of students' learning difficulties identified in the science resource literature. Each probe is designed to target one or more related concepts that cut across grade spans.

Format: Each probe consists of two parts—an engaging prompt (usually an 'enhanced' selected-response question) about familiar phenomena or objects AND an opportunity for students to describe their thinking or provide an explanation for the thinking that led to their answer.

Suggested Approach:

1. Select a probe that related to a specific GE or learning goal that aligns with your lesson/unit.
2. Elicit student responses
 - Have students write their ideas in response to initial prompt, followed by sharing and discussion of ideas.
 - Use the probe during small-group or whole-class discussions and listen carefully to responses.
 - Use probe to interview an individual student.
 - Use probe prompt as you have informal conversations with students during non-structured times.
3. Utilize good Questioning techniques to encourage discussion.
 - Avoid the 'right answer' approach. Allow students to discuss what they think...and respond to other students' ideas. The explanations are designed to help identify what the most scientifically acceptable answers are, as well as to clarify any misunderstandings that might exist.

4. Accommodate for differences in students' background knowledge.
 - Allow students to cross out any item in the list that they are unfamiliar with.
 - You may choose to show an example of one or more of the objects in the list.
 - Some probes may be used as a card-sort. In small groups students sort cards listing each item into two groups, meeting the criteria of the probe.
 - Some items may even be eliminated from the list for younger students who may not be familiar with certain words or examples (e.g. *weight vs mass*)

5. Application of Probe-determined insights.
 - Analyze class data to determine the general level of understanding about the concept.
 - Analyze class data to determine the extremes and the variety of (mis)understanding about the concept .
 - Then it is up to you to decide upon the interventions that you might use for your particular curricular and instructional context. (Some suggestions are offered for each of the published probes.)

Citation Information:

Keeley, Page, et al. 2005. *Uncovering Student Ideas in Science—25 Formative Assessment Probes*. Arlington, Va.: NSTA Press.

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