

Suggestions and Considerations for Using Probes

What is a probe?

- A probe is a targeted formative assessment tool designed to elicit common understandings and misunderstandings in a specific topic of mathematics.
- A probe typically contains 3 -8 items. Sample probes are available at go.edc.org/probes.
- Probe items typically include two parts: a selected response and an explanation
 - The selected response choices include the correct response and distractors designed to elicit particular misconceptions and difficulties.
 - The explanation prompt asks students to explain their reasoning for choosing a selected response.
 - This combination is important for gaining insight into students' thinking. Students may have selected the correct response for incorrect reasons or may have selected the incorrect answer but have an explanation that shows understanding.

Why use probes with students?

- The main goal for using probes is to gather formative information on students' understandings, difficulties, and misconceptions in order to plan and provide targeted instruction. Probes are *not* meant to be graded.
- Probes provide useful data that is focused, actionable and has a manageable grain size, allowing teachers to apply the findings to address students' learning needs.
- Probes have multiple items targeting a particular mathematics topic to provide specific, important information to help understand why a student may be having difficulty.

When would you use probes in a sequence of instruction?

- Probes can be particularly helpful when used in the midst of unit or a sequence of instruction as formative assessment of progress on key mathematics content and to plan next steps for instruction. In addition, probes that assess prerequisite content can be administered before a unit to plan targeted instruction.
- Probe information is meant to be used to plan instruction. For this reason, teachers should be selective about how many and which probes will provide them the most useful information for planning instruction. Choose probes on high-priority mathematics topics that are central to a unit or that have posed difficulties for students in the past.

Who would you give a probe to?

A probe can be administered to a whole class or to a subset of students in the class. Here are some suggestions:

- Administer a probe, in written form, to all the students in your class to analyze class patterns, identify areas of difficulty, and to inform groupings and instruction.
- Administer a probe to just a subset of students to assess progress as a result of a targeted intervention or to learn more about why those students may be having difficulty.
- Using a probe to interview individual students is a helpful way to get a fuller picture of their mathematical thinking, particularly for students who have difficulty expressing their ideas in writing on a paper-and-pencil probe.

How is a probe administered?

- Set a relaxed environment and pace for taking the probe.
- Be clear to students about the purpose of the probe and how you will use the information gathered. Here is an example introduction:

"Today you will complete a short activity on your own. This activity will help me learn more about how you are thinking about fractions and number lines. I will use this information to help me plan our next lessons. You will have about ten minutes to work on 3 problems. For each problem, decide which point is the correct location for a fraction and then write an explanation. Because the goal of the activity is to learn more about your math thinking, it's important for you to write an explanation of your ideas. Do your best and don't worry if you feel like you cannot fully answer any of the problems."

- Communicate to students that a probe is not a test or a quiz.
- In order to get a sense of what students can do independently, avoid giving any hints or instruction while they are doing the probe.
- Probes typically take about 10-15 minutes to complete. If it is taking students a lot longer, the probe may not be a good fit to where students are at in a sequence of instruction.
- For students who have difficulty writing, consider scribing their thinking or conduct a follow-up interview with the student to get a fuller picture of their understandings/misunderstandings.
- For students who are not accustomed to explaining their thinking, a probe can be challenging. Support students in building this skill over time. Have students compare examples of explanations that show thinking with explanations, that do not.

What do you do after administering a probe?

- Analyze the student work in a timely way so you can use the findings to plan targeted instruction. Review your students' work to look for strengths, difficulties and possible misconceptions. Use this information to determine ways to target instruction to address the needs identified by the probe. For example, apply the probe findings to make instructional decisions, such as whether to move back to more foundational content, focus on the content assessed by the probe, or move on to different content.
- After providing instruction, consider re-administering the probe or using another approach to learn how students' understanding has changed. Examples:
 - Re-administer the probe for students to complete; upon completion return the students' original probes and have them compare and reflect on the changes in their thinking
 - Return the students' original probe papers and ask them to reflect on what they have learned. For example: *Given what you have learned, would you make any changes to your original responses?* Have students describe their changes or actually mark up their original work using a different color pen or pencil.
 - Develop a similar probe to use as the post-probe. Share with students what you noticed about the differences in responses from pre to post.