

Determining what students know

Research Recommendations

Research demonstrates by learning what a student knows a coach can leverage student responses to efficiently diagnose their level of understanding at the start of the session and use this as a launching point for the rest of the session. In addition, asking a student to explain what they already know will also uncover misconceptions they have so that coaches can correct them. Lastly, a coach should ask questions and offer support as a student attempts the problem themselves. This effortful learning is called productive struggle. It's important to empower a student to find the answer themselves based on their prior knowledge and logic before teaching them a concept explicitly. To summarize, researchers suggest a coach should: Assess a student's prior knowledge. Guide the conversation to catch student's misconceptions or errors. Support productive struggle (YUP, 2021).

Tutors' responses need to have elements of the bold phrases above. If the response is asking a specific content-related question, and in particular if it is a yes or no question, they are marked as incorrect. For example, "Do you know what PEMDAS means?" or "Do you know what the tick marks on the triangle indicate?" Tutors' responses can contain questions to students but they must be "open" and not specific to assess student's knowledge of an individual knowledge component. There is an exception- for the order of operation scenario, the student wrote PEMDAS on his paper, therefore, a correct response from a tutor may elude to explaining what it means to gauge student's understanding. See examples below.

Predict Responses

Correct (1): Tutors should use open-ended questions to assess students' prior knowledge, encourage productive struggle, and prompt students to articulate what they already know. If a student explicitly writes a term, tutors can follow up with an open-ended prompt to assess their understanding.

Incorrect (0): Tutors should avoid yes/no content-specific questions and responses that do not help assess the student's existing knowledge. Encouraging remarks alone without assessing understanding or questions that directly teach content without exploration are also incorrect.

Tutor response	Reasoning	Correct (1) or Incorrect (0)?
<i>Cindy, are you familiar with the types of triangles and the relationships of the triangle's sides and angles?</i>	This is a content-specific question, and it is a "yes or no" question. For both of these reasons, it is not a good example of how to determine student's knowledge	0
<i>No problem, let's try to do this together.</i>	Although encouraging the response does not assist with determining a student's prior knowledge.	0
<i>What do you know about the triangle?</i>	This response is an "open" question asking a student what they know and is not specific to a certain knowledge component.	1
<i>Thanks for setting up the problem and sharing the diagram, what have you tried so far? What about the general rules for triangles, is there anything special about this one?</i>	This response asks the student what they have tried so far to gauge the student's knowledge and is "open." The second question is content-specific and a "yes or no", however, if the first part of the response is "correct."	1
<i>Roberto, this is a very good start. You have written PEDMAS, what is that?</i>	Although content-specific, the tutor is asking what PEMDAS is as an open question given the student wrote it on his paper.	1

EXPLAIN RESPONSES

Explained responses for determining what students know

Key: tutor response should ask open-ended questions. (Keywords: reviewing, revisiting, rethinking, going through the problem again and etc.)

Correct (1): The tutor demonstrates that they understand the importance of students explaining what they already know or the importance of asking students open-ended questions to assess their prior knowledge

Incorrect (0): The tutor does not demonstrate that they understand the importance of students explaining what they already know or the importance of asking students open-ended questions to assess their prior knowledge

Tutor response	Correct (1) or Incorrect (0)?
<i>It encouraged the student and also tried to understand what the student's thought process.</i>	1
<i>It makes Roberto feel accomplished about the first step and gives him an opportunity to succeed on the next step without handing him a solution.</i>	1
<i>It gives him a hint on what to do next, while complimenting what he has already done but not giving away the answer.</i>	1
<i>Help him remember what he has learned</i>	0
<i>It gives him a chance to speak.</i>	0
<i>It tells him that he is correct so far, gives him a hint for the next step, and a chance to do it himself.</i>	0