

Using Questioning Guides

Students should be challenged by the questions they are asked, and they should assume much of the responsibility for the discussions and explanations that take place in the classroom.

Questioning Guide for Problem Solving

The effective use of formative assessment lessons depends on the quality of feedback given by teachers to students. One important way of moving students' thinking forward is to prompt them to reconsider their reasoning by asking carefully chosen questions. Below are some general common issues that arise when students are engaged in a problem-solving task and suggested questions for prompting their thinking.

Common Issue	Suggested Questions
Student has trouble getting started.	<ul style="list-style-type: none"> • What do you know? What do you need to find out? • Can you describe in words what happens? • What problems that you have solved before are similar to this one?
Student has difficulty developing a suitable representation for the problem.	<ul style="list-style-type: none"> • Can you make a drawing, diagram, or table to show what is happening? • What ideas have we learned about showing our thinking that might be useful for this situation? • How can you show what you are describing?
Student's work is unsystematic.	<ul style="list-style-type: none"> • How can you break the task into workable chunks? • Could you start by _____? What would you do after that?
Student makes unreasonable assumptions or does not make assumptions explicit.	<ul style="list-style-type: none"> • What have you assumed here? • Why do you think your assumptions are reasonable? • Are there other factors you need to consider?
Student has made a successful attempt.	<ul style="list-style-type: none"> • Does that always work? Why? • Can you find a different way to approach the solution? Which way is clearer? • How can you explain to someone else why your answer is reasonable?

Questioning Guide to Promote Mathematical Practices

Questioning should require students to use mathematical practices, not simply to give rote answers. Below are question prompts to promote students' use of the mathematical practices.

<p>Make sense of problems, formulate solution strategies, select reasonable representations (MP1, MP2, MP4, MP5)</p>	<p>What ideas have you learned before that might be useful in this problem?</p> <p>What is known and what is unknown?</p> <p>How could you simplify this problem in order to make sense of it?</p> <p>What assumptions might you have to make?</p> <p>What questions might you ask yourself?</p> <p>What ideas do you have for getting started?</p> <p>Would a diagram, picture, or table help?</p> <p>Can you represent the idea numerically or algebraically?</p> <p>What tools might help you?</p>
<p>Reason logically, construct conjectures and arguments, compute accurately (MP2, MP3, MP6)</p>	<p>Can you suggest a different way to do this?</p> <p>Is your strategy moving you toward a viable solution?</p> <p>Can you think of a counterexample?</p> <p>What claims can you make from your data?</p> <p>How can you verify your results?</p> <p>Is your solution reasonable?</p> <p>Does that always work? How could you prove that?</p>
<p>Interpret and analyze results (MP1, MP4, MP7, MP8)</p>	<p>How can you display your data so you can see patterns or trends?</p> <p>What patterns do you see?</p> <p>What reasons can you give for these patterns?</p> <p>What are some possibilities?</p> <p>Can you predict the next one? What about the last one?</p>