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The Art of Questioning: The Teacher's Role

This issue of *Making the Standards Come Alive!* focuses on the teacher's role in questioning; next month's issue will focus on student generated questions.

The 21st century learning standards are rigorous and require students to be active learners and questioners in the classroom. For instance, in English Language Arts, beginning as early as kindergarten, students are expected to ask and answer questions about key details in a text. Once students reach fourth grade, they are expected to draw inferences and cite textual evidence to support their thinking. Embedded in English Language Arts Standard 1, all the way through twelfth grade, students are questioning the texts they are reading and using a variety of textual citations when generating and responding to questions. Students, therefore, need to be taught how to be metacognitive, in other words, how to "think about their thinking," in order to pose and answer questions that will propel their learning forward.

In mathematics, questioning is critical in supporting meaningful discussions. The National Council of Teachers for Mathematics (NCTM) Standards identify the role questions play in the mathematics classroom. Teachers use questioning in order to:

- Help students work together to make sense of the mathematics
- Help students rely more on themselves to determine whether something is mathematically correct

- Help students learn to reason mathematically
- Focus on helping students learn to conjecture, invent, and solve problems
- Help students connect the mathematics, its ideas, and its applications

In addition, having unanswered questions puts students in the mindset for learning. Questions serve to pique students' interest, and increase motivation for learning. Teachers can prepare their students to pose thought-provoking questions and seek answers through the use of meaningful questioning and discussion techniques themselves. In classrooms that emphasize the use of questions, students share responsibility for their learning and it is their inquiries as well as their responses that cement their understanding.

Classroom teaching practices, including questioning, are critical indicators of teacher effectiveness. When questioning, teachers should focus on posing open-ended questions of a consistent quality that allow students time to reflect and respond. In order to engage students meaningfully, questions should be prepared in advance. By doing so, teachers are able to wrestle with the essential to know content and ensure that questions are purposeful and aligned with the instructional goals for the lesson. Carefully scaffolded questions lend themselves to students' discoveries of new possibilities and important real world connections, while allowing students the opportunity for dialogue with their peers.

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*These open-ended questions are for parents and teachers alike.

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Rationale for Wait Time

- Students have more time to think.
- More students have time to prepare a response.
- More students participate in responding.
- Students can make greater sense of their classmates' responses.
- Teachers are less tempted to answer their own questions.
- Students give longer responses.
- Students spend more time pondering the ideas presented.
- Teachers ask fewer questions, and those they do ask are at a higher level.

Language and Delivery

The clarity of the questions asked is important. Students need to be able to hear a teacher's question and translate it into their own words, therefore showing they understood the purpose for the question in the first place. When posing questions for students to ponder, the question becomes accessible to all learners when it is posted visually along with the oral inquiry.

When asking questions of their students, teachers should bear in mind the diverse learners in their classrooms. For instance, as second language learners are learning English, they should also be acquiring thinking skills. Therefore, when questioning second language learners, it is important to still engage them at higher levels while providing a safety net for when the wording of the questions slows them down.

Teachers need to remember to ask questions of all students, even those who may struggle. When presenting questions, content specific vocabulary should be used and many of the questions asked should be open-ended and elicit a variety of responses from students. By doing so, teachers are communicating high expectations for all students.

Wait Time

Research shows that on average, a teacher waits one second after asking a question or one second after a student responds to a question before talking. In an effort to not make a student feel uncomfortable or to perceivably keep the discussion "moving," teachers have inadvertently missed many opportunities to enrich the learning for all students. To increase student engagement and boost achievement, the use of Mary Budd Rowe's **Wait Time** when questioning is essential.

After posing questions to students, **Wait Time** is critical, as it gives the teacher a chance to measure the students' understanding. If the teacher immediately responds, it may stop any further questioning or reflection on the part of the students. When listening to students' responses, teachers should remain open to the thinking that is being conveyed, rather than focusing on hearing "the right answer." After posing a question, teachers need to provide

Wait Time for students to generate their response. By providing **Wait Time**, students are given the opportunity to think aloud, use supportive evidence, elaborate on their ideas, and/or ask additional questions. **Wait Time** also helps to prevent the teacher from asking multiple questions in succession, and encourages giving students the time to ponder, hypothesize, and think deeply about important ideas.

Wait Time is also important to give after a student has responded to a question being asked. This gives the other students a chance to understand the responding student's line of thinking. If a student does not answer the question correctly or completely, the teacher should continue to listen and ask for clarification in the students' thinking. Even if erroneous in its ways, the thinking of all students should be respected. Remember, it is sometimes students' misunderstandings that lead teachers to the greatest understanding of their students.

Managing Students' Responses

Just as important as the questions being asked are thoughts about how you expect the students to respond. There are many important considerations such as if the students will respond orally or in writing, and how you will give all students opportunities to respond. One strategy to get all students engaged in responding is to pose questions that do not have one right answer, ask students to first think about the response on their own, then invite students to talk with a peer or small group about their answers. Their dialogue with classmates will help to shape their thinking; it will either serve to grow their answer or push them to revise their thinking altogether. Other ways to get all students involved in responding to questions include:

- Invite students to show a thumbs up or thumbs down (or some other signal) to indicate agreement
- Use whiteboards and have each student record their response, then hold up their boards
- Provide red, yellow, and green **Signal Cards**
- Invite students to respond chorally
- Use **Numbered Heads Together**, where



Open-Ended Questions for Responding to Reading*

- Why does...?
- What kind of person is (name of character)? What is the evidence from the text to support your thinking?
- What did the author mean when he/she said _____?
- What is the most important lesson the character learns in the story?
- What is the theme of this text?
- What is the main idea of the article?
- The purpose of this text is to...
- Why is _____ important to the story?
- How is the information organized on this website?
- How would the story be different if told from _____'s point of view?
- What background knowledge did the author need to have in order to write this text?

students form groups of four or five, each student takes a number, the group collaboratively responds to the question, and then the teacher chooses one number at random to give the answer

Along with the language of the questions themselves, is teaching students the language of response. Providing “stems” for students’ responses will help to frame their thinking and will encourage the use of evidence in their answers. In addition, students should be taught to listen carefully, think about what is being asked, and consider the answer before sharing ideas out loud.

Stems That Promote Evidence-Based Thinking

- For example...
- For instance...
- Based on what I read...
- The author stated...
- According to the text...
- On page _____, it said...
- From the reading I know that...

After posing questions and giving students an opportunity to respond, there is the hard work of keeping the class discussion moving as you handle student responses. One practice to avoid is that of just gathering students’ comments. Rather, you want to respond in a way that is connecting students’ ideas while keeping their voices at the forefront of the conversation. The goal is to keep students discussing and thinking deeply about an idea, not layering on unrelated comments.

When students respond, invite others to elaborate, build on, or respectfully disagree with others’ thinking. In order to do this, the teacher might turn the discussion back to the students. The teacher might ask questions like:

- What makes you think that?
- How does your answer fit into the big picture of what we are discussing?
- Can anyone say _____’s idea in a different way?

The teacher might also ask for the rationale for

an answer or a solution. Students will become accustomed to the need to provide this evidentiary support if it is a regular part of classroom routines. Finally, to keep the discussion moving, the teacher might elicit alternative ideas and solutions by asking questions like:

- What is another way to approach this problem?
- What are some different ways of thinking about this?

When students have responded incorrectly, it is important to seek the root cause of their incorrect response. Teachers should listen carefully, allow space between the students’ response and their own response, probe the student for elaboration or further clarification, and ask questions that promote further reflection. If a student’s response completely misses the mark, the teacher can manage that response by saying things like:

- Say more about that...
- What do you mean when you say...?
- Can you say that in another way or provide an example?

If the student continues to remain “stuck,” the teacher can invite students to turn and talk with a partner and then pose the question again. Incorrect responses often reveal as much about learners as correct responses. Finding out what influenced a students’ thinking can be revealing and serve as invaluable assessment data for the teacher.

Now that we’ve considered the fundamentals of strong questioning techniques, let’s explore the critical junctures within units and lessons where questions should play a starring role.

With the rigorous 21st century state standards, there is specific content students are expected to know deeply. Teachers need to be ever so thoughtful in how they are introducing new content and using questioning to deepen students’ understanding. As each new piece of learning is introduced, questions help students to process the new content. At the end of each lesson within a unit, students should grapple with ways to summarize the relevance of the learning, make connections to what they already know, and be reflective about what they understand and don’t understand.



Open-Ended Questions for Thinking Mathematically*

- Can you explain how you found your answer?
- Do you agree with _____'s thinking? Why or why not?
- What is a different way to explain the solution to this problem?
- How can you represent the math in this problem?
- Does this make sense?
- Will your theory always work?
- How can you prove your theory?
- What if...?
- What patterns do you notice?
- When have you solved a problem like this before?
- What is known? What is unknown?
- How does this problem relate to other math you've learned?

New Learning in 8th Grade Math

Consider the role of questioning in this vignette in which eighth graders are studying the Pythagorean Theorem, and how to apply the Theorem to determine unknown side lengths in right triangles in real-world and mathematical problems in two and three dimensions (CCSS 8.G.6 and 8.G.7).

- The teacher begins the lesson by asking students to think about the following:
 - What do you know about triangles?
 - Why does $a^2+b^2=c^2$?
- After students bring forth their prior knowledge on the topic, the teacher shows the students a proof “without words” video clip on the Smart Board. Students are then asked to discuss the following question with a peer:
 - Can you explain the proof?
 - What questions do you have about _____'s explanation?
- Students then watch the clip again, thinking about whether they agree or disagree with their original lines of thinking. After further discussion with peers, the teacher asks: “Does anyone have a different way to explain it? Students are then asked the following questions designed to help them reflect on their understanding:
 - Does it make sense?
 - What is clear? What is confusing?
- To end the lesson, the teacher leaves students with a question to ponder. This same question will be used to begin the next class. A possible question is: “Will it always work? Why or why not?”

Practicing Skills and Deepening Understanding in 11th Grade Social Studies

Once students have engaged in learning new content, it becomes time for them to either practice a new skill related to their new knowledge or to gain further depth in their understanding.

In the example below, eleventh graders have just analyzed the Preamble to the Constitution for its themes, purposes, and rhetorical features (CCSS 11.RIT.9).

- To begin the lesson, the teacher asks:
 - What do you remember about our discussion of the Preamble?
 - What emerged as an important theme? What evidence did you cite to support that thinking?
- Students are then asked to review how they annotated the text in the previous class, and discuss it with a peer. The teacher then asks: “After reviewing this information with a peer, how has your thinking been extended or changed?”
- Students are then charged with using the same strategies for analyzing a document they used in the previous class, and given the task of analyzing the Bill of Rights. The teacher asks guiding questions such as:
 - What are some similarities and differences between the Preamble and the Bill of Rights?
 - What do you notice about the language used in each? Why did the authors choose that language?
 - What was new learning for you when you analyzed the Bill of Rights?



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Applying New Learning in 3rd Grade Math

Once students have learned new content, practiced new skills, and deepened their knowledge base, it is then time for them to apply their learning in new and meaningful situations. The teachers' questions at this juncture serve to lift the level of students' thinking and engage them in rigorous work.

In this scenario, third graders have been explaining equivalence of fractions and comparing fractions by reasoning about their size (CCSS 3.NF.3).

Students are asked to come up with as many different ways as they can to explain that a fraction is equivalent to one half.

- With your partner, can you create a hypothesis about when fractions are equivalent to one half?
- How can you prove it?
- What examples can you use to support your hypothesis?

In summary, the art of teaching relies heavily on effective questioning techniques. Questions have the potential to change classrooms and strengthen student achievement. Through our questions, our students become thinkers, and they learn the important traits of perseverance, risk taking, creativity, and flexibility.

*These questions are for teachers and parents alike.

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