



Presentation

FULL DETAILS AND TRANSCRIPT

## Using Higher-Order Questions to Help Students Build Explanations

May 2008

Topic: How to Organize Your Teaching

Practice: Higher Order Questions

### Highlights

- Higher-order questions are contrasted with fact-based questions.
- Teachers can pose questions that promote reasoning about principles, theories, and arguments.
- Teachers can create rich contexts for deep explanations to be developed in.
- Having students verbalize or write out their responses helps them clarify their thinking.

## Full Transcript

### Slide #1

Welcome to the overview on Using Higher-Order Questions to Help Students Build Explanations.

### Slide #2

Ms. Gonzales loves to read to her third graders. Her students are interested in the stories, and most of the time they can accurately give information about the characters and the plot. But she also notices that her students give mostly short answers to her questions without fully developing their ideas, or they share opinions without using evidence from the book to back up their ideas. She wants to help her students think more deeply about character traits and motivations, but she isn't sure how.

### Slide #3

Higher-order questions require students to think beyond the surface level facts and consider what lies behind them. They're questions that require explanations, analysis, and synthesis, not just simple answers. For example, a fact-based question would be "What color is the sky?" while a higher-order one would be "Why is the sky blue?"

Once students have attained a high enough level of content mastery, higher-order questions can elicit "deep explanations." These are answers that explore the why's and how's of things. They involve the motivations of individuals or characters, arguments about the causes and consequences of historical events, evidence for particular scientific theories, and justifications for mathematical proofs.

### Slide #4

Research has shown that asking these kinds of questions and encouraging students to develop explanations while reading, listening, or studying improves learning and comprehension. Students become better able to reflect on their learning, identify gaps in their knowledge, understand relationships, and comprehend complex ideas.

### Slide #5

Research suggests several tips for how to most effectively use higher-order questions to help students develop deep explanations.

### Slide #6

Teachers can pose questions that promote reasoning about principles, theories, and arguments. Ask: Why? What caused? Why not? How? What if? How does this compare to that? What is the evidence for this? Why is this important?

### Slide #7

Teachers can create rich contexts for deep explanations to be developed in. When students are presented with an interesting lab activity, an engaging story, or a lively debate, they are motivated to further their understanding, search for cause and effect, develop rich arguments, and come up with questions and explanations of their own.

### Slide #8

Questions that encourage students to explain their thinking can be used across subject areas.

In science, students typically gather data to make claims about particular phenomena. Teachers pose higher-order questions like: “What causes a lightbulb to light?” “What happens when we change this variable?” “How is this animal’s behavior adaptive?”

In mathematics, there are different kinds of problem types that students investigate. Teachers can ask students to speculate as to whether their answers make sense, explain the steps they took to solve a problem, and justify the decisions they made.

In history, have students describe similarities and differences between primary sources, examine the causes of events, and take on the positions of historical figures with differing views and engage in a class debate.

### Slide #9

Having students verbalize or write out their responses helps them clarify their thinking, while feedback from the teacher and other students allows them to refine their thinking as they encounter new evidence and insights. Students need opportunities to work with peers, tutors, teachers, and others. These can be group environments, one-on-one sessions, or interactive computer experiences. Even simply asking students to talk through how to solve a math problem deepens their understanding of the concepts and principles that underlie it. Listening to students’ explanations can also give teachers valuable clues as to how well students are understanding the material.

Slide #11

Higher-order questioning works well when used with teaching techniques like modeling and providing worked out problems as examples. When a teacher demonstrates the thought process involved in a deep explanation, students are better able to develop their own thinking.

Slide #11

Another powerful way to deepen students' understanding is to ask higher-order questions that challenge their assumptions about how things work. Puzzling situations and paradoxes like, "why are forest fires sometimes good for the forest?" stretch student thinking.

Slide #12

Once students begin to formulate deep explanations, teachers will need to allow for more time for them to both formulate and express their understanding.

Slide #13

So, what do we know about the impact of higher-order questions?

Students deepen their understanding about content when encouraged to think about and respond to higher-order questions. This kind of learning is strengthened through working in pairs and groups, grappling with complex and relevant problems, and observing a teacher or peer model effective reasoning.

Slide #14

Ms. Gonzalez began asking her students to describe the characters in their story while she listed their responses on the board. She had them talk in pairs about whether or not they agreed with each other's descriptions, and then she read the story again. Her students were able to listen more carefully as they tried to determine whether or not the story actually supported their descriptions. She could clearly tell that her students were thinking more deeply about what they were reading, learning to use evidence to support their claims, and making stronger connections about the characters' traits and motivations.

Slide #15

To learn more about using higher-order questions to help students build deeper explanations, please explore the additional resources on the Doing What Works website.