

Questioning Strategies

The goal of an inquiry-based classroom is to help students learn to ask and answer their own questions about the scientific world. The questions that teachers ask and how they ask them can either promote or inhibit the development of inquiry practices.

In her research, Chin (2006) divided teacher questions into two categories—authoritative and dialogic. The purpose of an authoritative question is to present information, and the question is merely a rhetorical device for identifying what students should know. Answers are usually short and easily identified as correct or incorrect. Teachers often use this type of question to monitor student attention and to learn the state of student understanding. This strategy also sometimes results in a series of questions designed to correct student misconceptions and move them toward a preconceived right answer.

Dialogic questions, on the other hand, serve a different purpose. Teachers use them “to elicit what students think, to encourage them to elaborate on their previous answers and ideas, and to help students construct conceptual knowledge” (Chin, 2006). An authoritative question can become dialogic when a teacher passes the question back to the student, asking for more clarification or explanation. Questions that promote scientific thinking require answers of several sentences and often generate more questions.

Research suggests several questioning strategies that enhance academic achievement:

- Phrase questions clearly
- Focus questions on academic content
- Encourage students to respond to every question asked, such as with raised hands or taking notes
- Call on both volunteers and random students
- Probe student responses
- Use praise specifically and carefully (ERIC Development Team, 1998)

Perhaps the most important, and hardest, aspect of questioning is waiting for an answer. Rapid-fire questions and answers allow students to avoid thinking about questions they cannot answer and move on to the next topic. Waiting, even until the silence becomes uncomfortable, encourages students to take the time to think of a good answer. This is especially important for those challenging questions that lead to deep learning (Dillon, 1988).

Purposes of Teacher Questions

Teachers ask different types of questions to address different purposes.

Engage Curiosity. Good questions pose intriguing problems, dilemmas, and conflicts. They activate students' natural sense of wonder at the world around them and focus that curiosity on targeted scientific content. As students become more proficient at conducting scientific inquiries, these questions foster new ideas for possible investigations.

Assess Understanding. Asking students to explain their thinking gives teachers a window into how students are understanding scientific concepts. Teachers who are aware of misconceptions that their students may have about scientific ideas, learn to ask questions that will reveal any gaps or errors in students' knowledge.

Prompt Scientific Inquiry. The questions that teachers ask students about their work guide them toward effective scientific inquiry practices without giving them explicit directions. Using science inquiry vocabulary, such as *evidence*, *experiment*, and *variables*, in questions helps students see the language of inquiry in an authentic context.

Encourage Metacognition. Thinking about thinking does not come naturally to many students, so teacher questions that prompt metacognition can promote the kind of reflective learners that good scientific inquiry demands.

References

- Chin, C. (2006). Classroom interaction in science: Teacher questioning and feedback to students' responses. *International Journal of Science Education*, 28(11), 1315– 1346.
- Dillon, J. T. (1988). *Questioning and teaching: A manual of practice*. New York: Teachers College Press.
- ERIC Development Team. (1998). *Classroom questioning*. Washington, DC: ERIC Clearinghouse on Assessment and Evaluation.