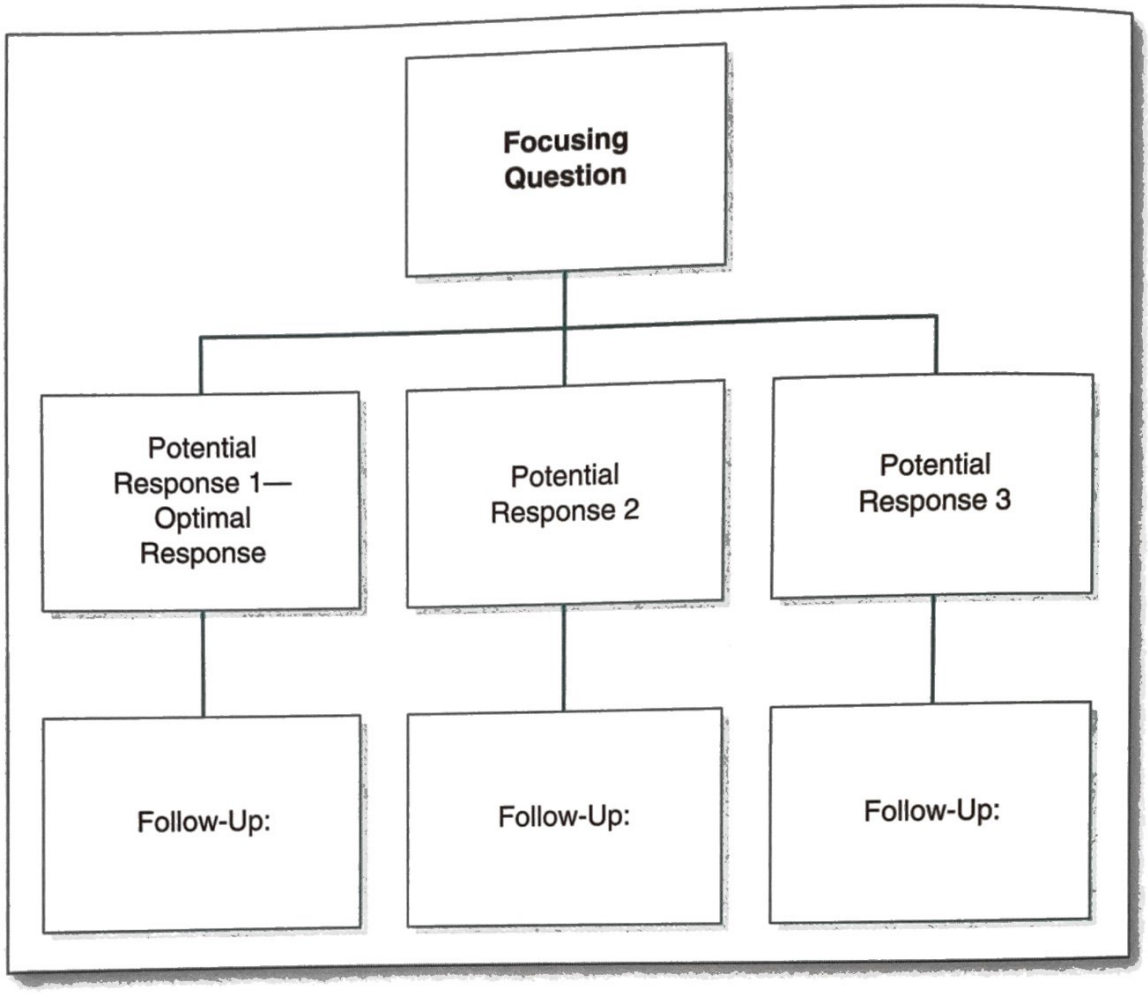
Figure 3.7 A Tool for Generating Expected Student Responses



What kinds of follow-up questions assist students in thinking and learning? It depends on both the initial focusing question and the student answer. The following are some general guidelines that apply to all cases:

- **Hold the student accountable for responding with her best answer.** This aligns with the norm *expect thoughtful responses.* If a student answers *I don't know* or is simply silent, tell the student you want to hear her best thinking about the topic. Tell her that you need something to work with if you are to help her learn through the questioning and thinking processes.
- **Honor the student's answer by stating clearly whether it is right or wrong.** Avoid such comments as *Good try* or *This is a good beginning, but let's see if someone can help you out* or *That's not exactly what I was looking for.* These types of comments are given with the best of intentions, often to encourage a reticent speaker or low-achieving

student. The reality is that students know when a teacher is being less than honest with them or their classmates. Over time, as students receive such comments, they may come to believe that they are not truly capable of answering and that this is the teacher's way of dismissing them.

- **Distinguish between incorrect knowledge and incorrect cognitive processing.** Researchers report that, on average, teachers accept an estimated 50% of student responses that are at a lower cognitive level than the questions being asked (Ornstein, 1988). This may occur because teachers want to reinforce the correct knowledge embedded in the student response. It may also occur because, during fast-paced classroom interactions, the teacher is unable to assess the response and formulate a helpful prompt on the fly. This is the reason we recommend that teachers determine the parameters of an acceptable response as a part of the planning process prior to class. If they have this in mind as they listen to a student answer, they are better prepared to offer an effective reaction. Such a reaction reinforces the correct knowledge but scaffolds a student's reasoning or thinking to the appropriate cognitive level.
- **Following an incorrect or incomplete answer, begin follow-up moves by seeking to get behind the student's thinking, and try to understand why the student answered as he did.** If you are to assist a student in correcting a misconception or clarifying confusion, you need to know where the student's answer is coming from. Only when you understand the source of misinformation or faulty reasoning can you ask questions that will scaffold.
- **Use your best judgment in determining how long to stay with a student.** Teachers will need to determine how many prompts, probes, and assists to offer before providing the answer or moving to another student. When working one-on-one with a student in a coaching role, teachers can gently probe for an extended time—as long as the probing is fruitful. In a whole-class setting, it is important to provide assists. Scaffolding of the responder's thinking can help others in the class—especially when the classroom culture supports other students' listening and processing. However, there is a limit to how long a teacher can productively continue such assistance without losing other class members or embarrassing the spotlighted student.
- **If the student is unable to provide a correct answer, ensure that she hears a correct answer and explanation, and come back to her later in the class period.** The student may hear the correct answer from you or from a peer. The point here is to ensure that the student knows that the teacher will hold her accountable for this knowledge sooner, as well as later.

Thinking Through QQ: Reread the guidelines for follow-up questions designed to scaffold student thinking. Place a checkmark beside the ones to which you consistently adhere. Place a question mark beside any about which you have questions. Place an asterisk beside those that you'd like to incorporate into your practice.

In addition to these general guidelines for questioning to scaffold thinking, there are other ways to handle various student responses to questions posed at different cognitive levels. Here are some specific suggestions and examples.

Helping Students Make Connections to Answer Questions

Classroom questioning provides opportunities for students to review or practice recalling information from long-term memory. The accessing and processing of stored information in working memory promotes long-term recall. The more frequently we retrieve a memory, the more likely we can access it again (Sprenger, 2005, p. 139). You will remember from our review of the Revised Bloom Taxonomy (Anderson & Krathwohl, 2001) that recalling or retrieving is the more difficult form of the remember level.

We advocate asking more questions above the remember level because when we use information, particularly in novel situations, we are building different connections, thereby, strengthening the memory. However, there is a place in classrooms for simple remember questions, and there are strategies for teacher scaffolding of answers to this lowest cognitive level. Cueing and clueing are the most productive.

Cues trigger the brain to remember stored information. They can be communicated as words, symbols, places, or positions. They are simple devices introduced from the external environment (in this case, by the teacher) and designed to connect to a bit of knowledge in the student's long-term memory so as to bring it into the working memory for student response. Typically, a cue seeks to help the student connect something familiar (the cue) with the knowledge being learned—the knowledge elicited by the question. Consider the following example in which a teacher uses a cue to assist a student in learning a new vocabulary word.

Teacher question: "What is the meaning of the word 'extraordinary'?"

Student response: "I guess just common or everyday."

Teacher follow-up: "You've defined *ordinary*, which is part of the word. This is *extra*ordinary. What does extra mean?"

Student response: "Oh, it means more or something added to. So I guess extraordinary must mean more than ordinary. Now I remember—it means different or unusual."

Teacher follow-up: "That's correct. Do you see how you were able to use my questions to think through your answer?"

The teacher questions elicit student knowledge from long-term memory and help the student combine two pieces of knowledge to create a new understanding. Cues can be even more overt. For example, the teacher might remind students of the place in a text where the knowledge appears, the day on which the class first studied a new phenomenon, or the steps that come before and after a step in a procedure. Cues that activate a visual memory can be particularly powerful.

Clues are even more obvious or blatant reminders. Think about this simple example:

Teacher question: "What are human beings' five primary senses?"

Student response: "Sight, hearing, touch, smell."

Teacher follow-up: "Those four are correct. You have omitted one. Think about how you respond to ice cream."

Student response: "Taste. Yes, that's it, taste."

Teacher follow-up: "Correct."

This teacher might also have responded this way: *Yes, sight, hearing, touch, and smell are correct. In fact, when I think of the five senses, I think of being at the beach. I can see the awesome waves, hear them crashing, wade in and feel the water around me, and close my eyes and even smell it. I also know that the water is salty because of my fifth sense. Which sense would let me know about the salt*? Most students would be quick to respond: *Taste!* Think of the picture the teacher drew for his students and the new visual image he gave them for remembering the five senses. It is highly likely that this description will strengthen this knowledge for most of these students.

Questioning to Scaffold Thinking About Responses Beyond the Remember Level

Hopefully, you are asking an increasing number of higher-level questions in your class. As mentioned in Chapter 2, students are more likely to remember knowledge that they have had an opportunity to manipulate at the level of understand or higher. Also, as you may recall, we need to assess two dimensions embedded in higher-level student answers: the knowledge dimension and the cognitive processing dimension. Sometimes these two can bleed into one another: Faulty reasoning can lead to incorrect information, as in the next example. In this situation, a student is generalizing his personal

experience to a particular case. This leads to a misconception, which the teacher addresses through a series of clarifying questions.

Teacher question: "Albany, New York, like many other state capitals, is located on a river. Why are so many state capitals located on rivers?"

Student response: "I think it's because people like to live around rivers because they are nice to look at and because they can do things like go fishing in them."

Teacher question: "Can you tell me why you think this? I'd like to know why you think fishing and scenic views are connected with state capitals."

Student response: "Well, my uncle lives in Nashville. I know that's the capital of Tennessee because he took me to the capitol building when I visited him. And my uncle's house is on the river. My aunt told me that they bought the house because she likes to look at the water and my uncle likes to fish."

Teacher question: "This helps me understand what influenced your answer. But let's take a minute to think about the historic time when states decided on the location of their capitals. For example, the capitol building in Nashville was built in 1859. How many years ago was that?"

Student response: "Um, let me think. That would have been more than 150 years ago. Right?"

Teacher question: "Yes. Now, what do you know about how people traveled and transported food and other goods during the 1800s?"

Student response: "I know that they didn't have automobiles, trucks, and airplanes. I guess they rode horses, traveled in boats, and sometimes by train."

Teacher follow-up: "Now, tell me what happens in a state's capital city."

Student response: "That's where laws are made and where the governor and other people come. Oh, I think I have an idea of why so many state capitals are located on rivers. They needed to be in a place where a lot of people lived and where other people could come and visit. People back then probably wanted to live on a river so they would be able to have boats to carry their goods and to travel. So states probably decided to

build their capitols in places where people already lived and where others could get to kind of easily."

Teacher follow-up: "You did think through your answer. You built on what you already knew and connected knowledge that you had to create a new understanding. Your inference is correct. State capitals were located on rivers for purposes of travel and transportation. The next time you visit with your aunt and uncle you can share your new learning with them—maybe while you're fishing!"

In this example, notice how the teacher gently challenges the student's assumptions and then provides prompts to help the student retrieve relevant prior knowledge in a sequenced fashion. This sequencing of questions assists the student in building a logic chain that will help the student when confronted with similar thinking challenges in the future.

Students do not always need intricate scaffolding to respond better to questions requiring higher-level cognition. Sometimes they only need more time to think and gentle encouragement. A number of prompts are great standbys for teachers when students are on a correct path but haven't moved their thinking to the appropriate cognitive level. In such situations, the following prompts can be particularly helpful:

- *Can you say more about this?*
- *I'm interested in your thinking about this topic. Can you continue to build on what you've said?*
- *You have already said _____, which is correct. Given the correctness of this line of reasoning, where would you go next?*

Sometimes students appear to have the knowledge to answer a question, but they are unable to articulate their thinking clearly. This happens when they overgeneralize and also when they get lost in their own thoughts and offer fuzzy or confusing statements. The following stems provide a beginning point for framing questions that assist students in clarifying and/or narrowing their thinking:

- *Can you tell me what you mean when you say _____?*
- *How are you defining or using the word _____?*
- *Can you express your main idea using different words?*
- *Can you give me an example?*

A widespread problem with student answers to open-ended questions is the tendency of students to offer their opinions without substantiating evidence or to parrot the opinion of someone else without thinking critically; for example, advocating an idea without using criteria to assess the soundness of the logic. We recommend that, prior to offering *evaluate* questions in a

whole-class discussion or collaborative work environment, teachers review with their students the evaluate-level resources (such as the ones presented in Chapter 2). Help students understand what is involved in making judgments based upon criteria or standards. Give students practice in formulating criteria in a collaborative setting. Help them understand the difference between checking and critiquing, the two types of evaluation. Then, hold them accountable for their thinking by posing such questions as these:

- *What evidence do you have to support this judgment?*
- *What standards for assessment are you applying?*
- *Help me understand how this judgment is consistent with Criterion 1.*

Chapter 4 has more to say about how to use student responses to inform a follow-up teacher question to move thinking toward greater clarity, precision, and/or depth. Both scaffolding and feedback for thinking and learning improve when student thinking is visible. As discussed next, there are a variety of strategies for accomplishing this end.

Thinking Through QQ: What are your greatest challenges as you seek to get behind student thinking during a class discussion? What strategies have you found successful to achieve this end? Which of these techniques would you like to add to your repertoire?