Dimensions of Questioning

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Questioning is done in classrooms for many purposes. We could say that it crosses nearly all the areas of performance in teaching. There are four main points about questioning that we want to highlight in this chapter. Each has large implications for practice:

- Questioning is not a unitary skill; it is an entire toolbox, and the tools selected should be matched to the instructional purpose. Figure 9.7 shows a variety of purposes for asking questions. Table 9.4 includes sample questions designed for each purpose.
- All children need to be engaged in conversation with higher-level thinking questions. This is especially important for children who are low in academic proficiency. Students who are three or four grade levels behind in literacy skills are still perfectly capable of higher-level thinking: inference, analysis, connection making. Furthermore, teachers need to engage them in this kind of thinking if they want to keep these children engaged in school.
- Questions should be planned when we are planning lessons, and planned with more specificity and detail than many of us are used to doing. Don't just plan the activities and topics for discussion and then wing it on what questions to ask as we go.
- Students should be taught to ask questions.

Purposes of Questions

Questions are tools for accomplishing tasks. It is the tasks that matter, and being deliberate about what we are trying to accomplish with the question and having the repertoire of tools for accomplishing them. Question asking is not an independent and self-contained skill. A question is a tool, and not the only one, for stimulating many important student cognitions: framing, activating, connection making, analyzing, extending, applying, inferring, conjuring implications, checking for understanding, identifying points of confusion, implementing a model of teaching, summarizing, and other tasks. Rather than trying to develop questioning generically as some kind of skill, it is more productive to focus on what mental act we want to generate in students at a given moment and what move (perhaps a question) we will make to provoke it.

Higher-Level Thinking Questions

Here are some interesting statistics about teacher questions. Quite consistently studies show that about 60 percent of questions are recall or factual questions. The figure can rise to 80 percent recall in some classrooms (Cotton, 2000). Only 20 percent are higher level, and the remaining 20 percent are procedural. These are not good statistics for preparing students adequately for a twenty-first-century world.

Students who get instruction without higher-order questions score in the fiftieth percentile on tests compared to the seventy-fifth percentile if the same students engage in lessons where there are many higher-order questions (Gall and others, 1978). The reason for this is that higher-order thinking is inherently more interesting and it causes cognitive processing and organization of information that builds more elaborate mental structures. The point that matters is that all students should be brought to high levels of thinking with academic material through an appropriate balance of higher and lower-level questions. To stretch students, teachers have to make sure all the students are invited equally into the thinking club, not just some.

Research on questioning does not say simply that the more high-level questions, the better. It does not say that low-level questions are useless:

> The popular belief that lower level questions are less effective . . . has not been upheld. Achievement is related to the use of a variety of questions designed to accomplish specific purposes. For example, a pattern of factual questions, student responses, and teacher feedback has been found to be the most functional mechanism for student achievement in basic skills. . . . [Furthermore] successful responding to lower level questions is a prerequisite for higher-level learning. Students need a firm base of factual knowledge when they are engaged in higher level thinking activities. It is impossible to summarize or evaluate information that a person does not know or understand [Bellon, Bellon, and Blank, 1992, pp. 315–316].

At the conclusion of an exhaustive review of the research on questioning, Bellon, Bellon, and Blank (1992) concluded that teachers should plan questions

and write them down in advance as part of the planning process to accomplish the learning objective of the lesson. If the objective of the lesson calls for analysis and application of information, the may need to ask quite a few recall questions first.

As always in skillful teaching, the balance of higher- to lower-level questions must be a match to the situation. But overall, there should be a high portion of higher-level questions for all students. Here is a summary of the research findings on higher- and lower-cognitive questions (Cotton, 1988, p. 5):

- In most classes above the primary grades, a combination of higher- and lower-cognitive questions is superior to the exclusive use of one or the other.
- Students whom teachers perceive as slow or poor learners are asked fewer higher-cognitive questions than students perceived as most capable learners.
- Increasing the use of higher-cognitive questions (to considerably above the 20 percent incidence noted in most classes) produces superior learning gains for students above the primary grades and particularly for secondary students.
- For older students, increases in the use of higher-cognitive questions (to 50 percent or more) are positively related to increases in on-task behavior, length of student responses, the number of relevant contributions volunteered by students, the number of student-to-student interactions, student use of complete sentences, speculative thinking on the part of students, and relevant questions posed by students.
- For older students, increases in the use of higher-cognitive questions (to 50 percent or more) are positively related to increased teacher expectations about children's abilities, particularly the abilities of students whom teachers habitually regarded as slow learners.
- The degree of improvement resulting from increases in both higher-cognitive questions and wait time is greater than an increase in either of these variables by itself. Indeed, those who have examined the relationship between these factors tell us that, in a sense, they cause one another.
- Redirection and probing are positively related to achievement when they are explicitly focused on the clarity, accuracy, plausibility, and so on of student responses.

Bloom's Taxonomy

All students need to be invited and supported to do higher-level thinking, no matter what their literacy level. To do this requires a clear framework for understanding what higher-level thinking is. Benjamin Bloom and his colleagues (1956) created the original framework for this understanding. Bloom and Krathwohl originally listed these levels for cognition:

- Recall
- Comprehension
- Analysis
- Application
- Evaluation
- Synthesis

Many grids, like the one in Table 9.5, illustrate the different levels of thinking with specific question stems and lists of verbs found at different cognitive levels. Anderson and Krathwohl (2001) updated the original Bloom framework by adding the four kinds of knowledge to be learned to the picture: factual knowledge, conceptual knowledge, procedural knowledge, and meta-cognitive knowledge (Table 9.6). In addition, they redefined Bloom's "synthesis category" as "creating," by which they mean "putting elements together to form a coherent or functional whole: reorganizing elements into a new pattern or structure through generating, planning or producing." They define the other basic cognitive processes as follows. (The verbs at the core of each type of question are from Fisher, 2005, p. 4).

- Remembering (the old "recall" category): Retrieving, recognizing, and recalling relevant knowledge from long-term memory.
- Understanding (the old "comprehension" category).
- Constructing meaning from oral, written, and graphic messages through interpreting, exemplifying, classifying, summarizing, inferring, comparing, and explaining.
- Applying: Carrying out or using a procedure through executing or implementing.
- Analyzing: Breaking material into constituent parts, determining how the parts relate to one another and to an overall structure or purpose through differentiating, organizing, and attributing.
- Evaluating: Making judgments based on criteria and standards through checking and critiquing.
- Creating: Putting elements together to form a coherent or functional whole: reorganizing elements into a new pattern or structure through generating, planning or producing [Reprinted with permission from Dianna Fisher, 2005].

Tools like this are useful for planning lessons. The implication of the research on questioning for lesson planning is that we must be deliberate about our questions and plan a route so we use them to get all our students into higher levels of thinking. We also have to prepare ourselves for how students respond to

the questions.

"The odds are only about 50–50 that an analysis,synthesis, or application question will be responded to with an answer reflecting analysis, synthesis, or application" (Mills, Rice, Berliner, and Rosseau, 1980). Therefore an equally important part of balancing higher- and lower-order questions is listening carefully to the students' answers to see if we got what we wanted . . . and following up to elicit the kind of thinking desired.

Thinking Routines

Another approach to higher-level questioning is the one captured by Ron Ritchart and colleagues (Ritchart, Palmer, Church, and Tishman, 2006). Here the goal is not only a classroom where thinking is always present, but a deliberate approach to teaching all the students explicit thinking routines—for example: What do you see? What do you think about that? What does it make you wonder?"

The teacher takes charge of making sure that these patterns of questions are regularly present in classroom discourse and seep into the culture of daily life. Thus, students slowly learn the habits of mind of good inquirers and active thinkers. These are the qualities of "intellectual character" that Ritchart writes about in his 2002 book. We highly recommend these thinking routines as a clear and accessible way to make questioning for higher-level thinking an organic part of classroom life. Quite different from using Bloom's taxonomy as the guide, teachers use a set of routines that can be conceptualized as powerful packages for provoking worthwhile thinking and engaging student interaction. (See the Project Zero Web site for details: www.pz.harvard.edu/visiblethinking.)

Many of the cognitive acts we are setting as tasks of clarity can be stimulated by statements and other prompts just as well as by questions. "Tell me how this is like something you read in Cry the Beloved Country" accomplishes the same thing cognitively as the question, "Does this remind you of anything in Cry the Beloved Country?" Dillon (1981) established long ago that statements can sometimes be more powerful than questions in stimulating student intellectual engagement with material.

Planning Questions

Good planning considers the kind of thinking the teacher wants the students to engage in as well as the sequence of factual and higher-order questions.

Suppose a teacher is doing a lesson with eighth graders on the separation of powers in the U.S. Constitution. Last night the students read the chapter in the textbook explaining how the Constitution sets this separation up and why the founding fathers wanted it. This morning, the class will begin a discussion of this topic. The teacher is planning questions to meet the objective: students will be able to explain the founding fathers' rationale for the separation of powers across the three branches of the U.S. government. Let's eavesdrop on the teacher planning her questions to meet this objective:

"Let's see. This is an objective at the comprehension level in Bloom's taxonomy. To understand the reason for the separation of powers, however, they need to have a clear idea of what powers the different branches have to begin with. So maybe the clearest way to start is with some factual questions about the nature of each branch and then its powers. I'll ask:

1. What is the purpose of the legislative branch of the U.S. government? (recall question)
2. What are its powers? (recall question: enumerate the powers)

I should repeat this for the judicial and executive branches too (questions 3 to 6), probably recording or having students record the powers on charts as we go. This is review, but I better be sure they are all clear on the differences. [recall question: enumerate the powers]

7. What are the similarities and differences between the judicial and the legislative branch powers? (Understanding [comprehension] question: compare and contrast)

This question will allow me to highlight how both the judicial and legislative branches deal with legislation, but one branch makes it, while the other reviews it if it is challenged . . . I should run similar comparisons for other pairs. (questions 8, 9)

10. What do you think the phrase checks and balances means? (Understanding [comprehension] question: interpret)

It might be good to have a visual here.

11. What are some examples of how one branch checks the power of another? (application question)

If they can't give good examples, we may have to stop here and use current events to go deeper. We'll see. I think I'll bring in newspapers from the past few days

to have as a resource here.

12. Is checking different from balancing? (analysis question: differentiate)
13. Once we get understanding here, I think I can ask them, What do you think the founding fathers' rationale was for setting it up this way? (analyzing/inferring question: explain)
14. If we get this far I'd like to move them into application, like: How do you think the separation of powers will play out with the current bill before the state legislature to legalize gay marriages? (understanding question: prediction; also evaluate: conclude) I doubt we'll get that far tomorrow, however.
15. It would be good to go beyond the text and compare our system of checks and balances to other countries. Let's see, which countries might they know enough about? Oh . . . I can ask them to each pick one they're interested in and research it for the way checks and balances are present there, if at all, and then compare it to the United States. That will make a nice follow-up project and check for understanding. (application question; comprehension question calling for compare and contrast)

This teacher has planned a series of questions that establish the factual background students need to ask the higher-level questions later. Then she has deliberately alternated between comparison and contrast questions and analysis questions. Next she's asked an application question and finally has asked a large comparison question in the follow-up assignment that also invites evaluation.

Planning questions specifically and in detail can make a big difference in the quality of a class discussion and the development of student understanding and higher-level thinking. In fact, it's the only way to ensure those things happen.

Other Dimensions of Questioning

In this section, we take a brief excursion into three domains of questioning not treated elsewhere in this book: invitational language, teaching inquisitiveness, and connecting with students' own inner needs for purpose and meaning.

Invitational Language

Art Costa and Bena Kallick (2000) investigate the psychological effect of word choice and syntax in the way people frame questions. The point is that certain language forms in questions invite students to engage the question and other forms intimidate or close down thinking. Following are some examples:

Making Questions Invitational

- Use plurals: "What are some of your insights?" "What ideas do you have?"
- Express tentativeness: "What inferences might you draw?" "How might you address the problem?"
- Embed positive presuppositions: "As you think about the project, what will be some indicators you are progressing and succeeding?" "What are some of the benefits you will derive from engaging in this activity?"

Questions That Miscue, Confuse, or Limit the Level of Students' Thinking

- Verification questions: The teacher or students already know the answers. "What is the name of . . . ?"
- Closed questions: These can be answered "yes," "no," or "I can." "Can you recite the poem . . . ?" "Who can remember . . . ?"
- Rhetorical questions: The answers are given within the question or the teacher is not expecting an answer.
- Defensive questions: The questions lead to justification, resistance, and self-protection—"Why didn't you complete your homework?" "Why would you do a thing like that?"
- Agreement questions: The intent is to invite others to agree with an opinion or answer—"This is really the best solution, isn't it?" "Let's do it my way. Okay?"

Teaching Inquisitiveness

Teacher questions are important, of course: they regulate the level of thinking in class discourse. But it may be more important to teach students to ask good questions themselves, not just be good at answering the ones their teachers pose. John Barell (2003) argues that making students inquisitive and giving them the opportunity and the intellectual tools to be so is one of the central purposes of education. Consequently, questions like the following frame curriculum units: "What goes on inside babies' heads?" "Why is music such a pleasure?" "What do collapses of past societies teach us about our own future?" "Why are most individuals and all human societies grossly underachieving their potentials?" Wiggins and McTighe (2005) have called such framing questions "essential" because they get to the center of what is interesting and important in a unit of study.

As an example of how inquisitiveness can be supported in students, Barell borrows from Matthew Lipman (1980) and asks students to identify what they find most interesting in their reading. Their thinking is elicited by these questions:

- What I find most interesting here is . . .
- The big ideas here are . . .
- I wonder why . . .
- What confuses me is . . .
- I can relate this episode/segment to . . .
- This makes me feel . . . [p. 107]

Barell goes on to point out that teachers would assess students on their ability to be inquisitive, that is, their ability to ask questions, if they truly valued that and presents a set of criteria for doing so.

> Inquisitiveness looks like the following: Students
>
> - Look closely at things, explore
> - Observe using a variety of senses (touch, smell)
> - Show enthusiasm in facial expressions
> - Seek out new ways of learning or things to learn about and create own problems to solve.
>
> Inquisitiveness sounds like the following: Students
>
> - Ask a variety of questions: "Why?"; "How come?"; "What if?"
> - Seek additional information: "Tell me more"; "Where else can I get information?"
> - Make analogies: "This reminds me of . . ."; "It's like . . ."
> - Reflect an "I enjoy" attitude: "This is fun!"; "I'd like more time to learn more."; "How exciting!"

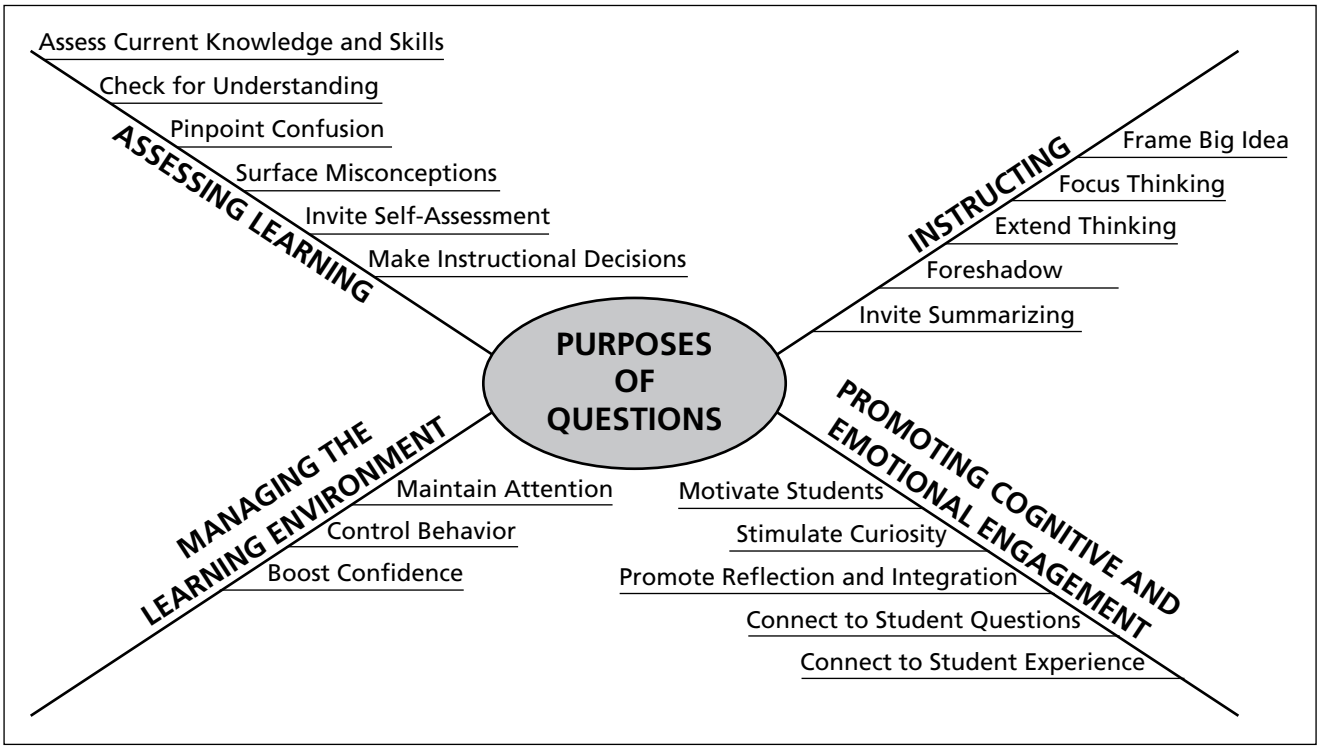
Barell's book contains many scenarios at various grade levels and subject areas that show how teachers can set up conditions for students to develop these indicators of inquisitiveness. The emphasis is on the intellectual, the cognitive, and the curious. The examples are drawn from the fine collection of ideas and strategies in his book for developing curious minds and a particular environment in class to go with it. It's an environment that combines psychological safety so students will risk asking questions with the stimulation of fascinating phenomena students want to explore on their own terms. Barell writes, "Many teachers begin the year with a declaration of what's expected in the classroom . . . This is an opportunity to tell students, 'I expect that you will become experts at asking good questions about what we are studying. Don't ever fear asking a question. Please don't sit there puzzling over some idea thinking everybody else understands it! They don't.'"

There are lots of other questions, however, that students bring to school with them, regardless of what questions teachers choose to pose: questions from their inner life—and important questions about meaning, purpose, and making one's way in the world. We think this should prompt us all to ponder: what place is there in school for those questions to surface and be respected, encouraged, supported?

This excerpt is from:

Saphier, Haley-Speca and Gower. *The Skillful Teacher: Building Your Teaching Skills.* Chapter 9. Acton, MA: Research for Better Teaching, 2008, pp. 204-214.

Figure 9.7. Purposes of Questions



Source: Adapted from Bellon, Bellon, and Blank (1992).

Figure 9.8 Map of Pedagogical Knowledge

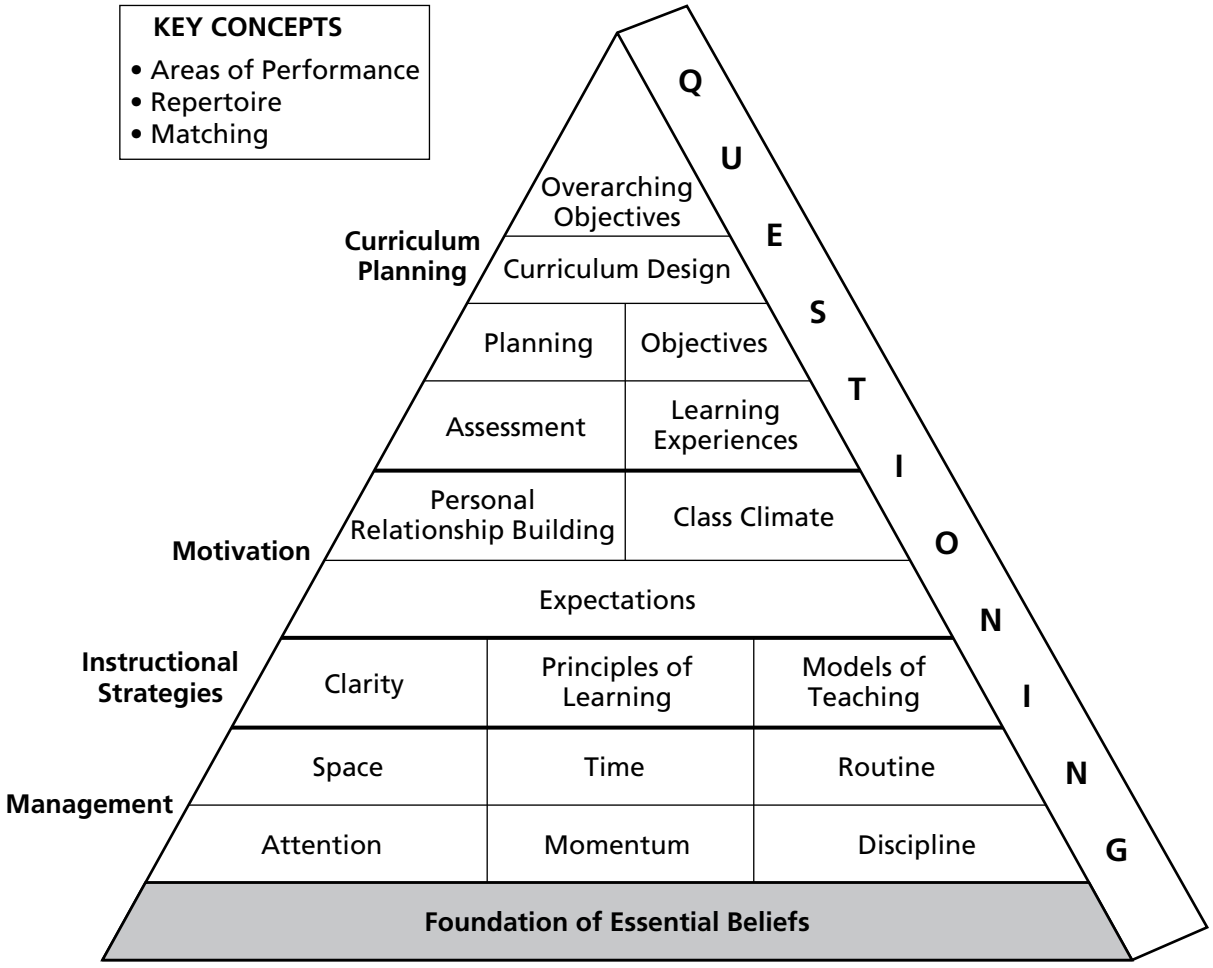


Table 9.4. Sample Questions

Purpose of Questions	Example
Assessing Learning	
Assess Current Knowledge and Skills	"Why do some objects float in water and others sink?"
Check for Understanding	"Can you tell me in your own words how photosynthesis works?"
Pinpoint Confusions	"What did you do after you entered the data?"
Surface Misconceptions	"Why do you think we have winter and summer?"
Invite Self-Assessment	"Which ones do you know well, and which ones do you need to practice tomorrow?"
Make Instructional Decisions	"Do we need more time on this?"
Instructing	
Frame Big Ideas	"What makes humans human?"
Extend Thinking	"Is this similar or different from the situation in Palestine?"
Deepen Thinking	"Go inside that now and tell me why that position might have made sense from his point of view."
Foreshadow	"Based on what we've explored today, why do you think the colonists decided to stay?"
Promote Transfer	"So how could you use this information about evaporation in your everyday practical life?"
Invite Summarizing	"What do you think were the most important points made in the discussion so far?"
Managing the Learning Environment	
Boost Confidence	"How would you do it, Tim?" [Tim is not confident of his math ability, but Mrs. Johnson has heard him propose a novel solution in his group. She wants him to present it to the class, knowing it will be appreciated by them and be a validating experience for Tim.]
Control Behavior	"How would you do it, Tim?" [Tim is starting to distract Millie, and Mrs. Johnson moves toward them while asking a question to get him engaged.]
Maintain Attention	"How would you do it, Tim?" [Tim's attention is wandering and Mrs. Johnson startles him back into focus.]
Promoting Cognitive and Emotional Engagement	
Motivate Students	"What product do you most want to design an ad program for?"
Stimulate Curiosity	"What do you know about voting and elections in this country?"
Promote Active Reflection and Integration	"What are three things you've learned, two questions you have, and one thing you don't understand yet?"
Connection to Students' Own Questions About Deeper Meaning	"What do you think the most important things are about having a family?"
Connect to Student Experience	"In 'Stone Soup,' does the villagers' reaction to the soldiers remind you of anything you've experienced in the neighborhood?"
	"What do you think the crime movie *The Negotiator* might have to do with international affairs?"

Table 9.5. Thinking Skills Model Categories

Category	*Examples of Trigger Questions*	*Key Words*
Knowledge	Define the word _____. What is a _____? Label the following _____. Identify the _____ in this _____. Who did _____?	Define, repeat, identify, what, label, when, list, who, name
Organizing	Compare the _____before and after _____. Contrast the _____ to the _____. Differentiate between _____ and _____. Classify _____ by _____. Order _____ by _____.	Compare, differentiate, contrast, order, classify, distinguish, relate
Applying	How is _____ an example of _____? How is _____ related to _____? Why is _____ significant? Predict what would happen if _____. Explain. Choose the best statements that apply to _____. Identify the results of _____. Tell how much change there would be when _____.	Apply, demonstrate, calculate, complete, illustrate, show, solve, examine, modify, relate, change, classify, experiment, discover, dramatize, sketch
Analyzing	What are the basic elements (ingredients) in a _____? What is/are the functions(s) of _____? Inventory the parts of _____. Categorize the _____ of _____. Sort the _____. What is the order of steps in _____?	Subdivide, categorize, break down, sort, separate
Generating	Hypothesize what will happen if _____. Predict what would be true if _____. Conclude what the result will be if _____. What if _____ had happened instead of _____?	Deduce, anticipate, predict what if, infer, apply, speculate, conclude
Integrating	What would you predict/infer from _____? What ideas can you add to _____? How would you create/design a new _____? What might happen if you combined _____? What solutions would you suggest for _____?	Combine, integrate, modify, create, design, invent, compose, theorize, develop, devise, originate, revise, synthesize, conceive, project, hypothesize
Evaluating	What you would do if _____ happened? Why? Judge what would be the best way to solve the problem of _____. Why did you select that solution?	Evaluate, argue, judge, recommend, assess, debate, appraise, critique, defend Evaluate whether you would_____ or _____. Why?

Source: Reprinted with permission from Chris A. Carem and Patsy B. Davis, *Kappa Delta Pi Record*, Fall 2005, Kappa Delta Pi, International Honor Society in Education.

Table 9.6. Bloom's Taxonomy Updated

	Knowledge Dimensions: The Kind of Knowledge to Be Learned			
Cognitive Processes	**Factual Knowledge:** Basic elements that students must know to be acquainted with a discipline or solve a problem within it	**Conceptual Knowledge:** The interrelationships between the basic elements within a larger structure that enable them to function together	**Procedural Knowledge:** How to do something: methods of inquiry, criteria for using skills, algorithms, techniques, and methods	**Meta-Cognitive Knowledge:** Knowledge of cognition in general as well as awareness of one's own cognition
Remember	List, recall, recognize	Describe	Tabulate	Identify appropriate use
Understand	Summarize	Interpret	Predict	Execute
Apply	Classify	Experiment	Calculate	Construct
Analyze	Order	Explain	Differentiate	Achieve
Evaluate	Rank	Assess	Conclude	Action
Create	Combine	Plan	Compose	Actualize

Source: Updated from Anderson and Krathwohl (2001).

Source Materials:

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