CHANGING THE WAY You Teach

IMPROVING THE WAY Students Learn

Giselle Martin-Kniep
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Gene R. Carter, *Executive Director;* Nancy Modrak, *Publisher;* Julie Houtz, *Director of Book Editing & Production;* Deborah Siegel, *Project Manager;* Reece Quiñones, *Senior Graphic Designer;* Mike Kalyan, *Production Manager;* Valerie Younkin, *Desktop Publishing Specialist;* Sarah Plumb, *Production Specialist*

PAPERBACK ISBN: 978-1-4166-0807-3 ASCD product #108001 n5/09

Also available as an e-book through ebrary, netLibrary, and many online booksellers (see Books in Print for the ISBNs).

Quantity discounts for the paperback edition only: 10–49 copies, 10%; 50+ copies, 15%; for 1,000 or more copies, call 800-933-2723, ext. 5634, or 703-575-5634. For desk copies: E-mail member@ascd.org.

Library of Congress Cataloging-in-Publication Data
Martin-Kniep, Giselle O., 1956–
Changing the way you teach, improving the way students learn / Giselle Martin-Kniep and Joanne Picone-Zocchia.
p. cm.
Includes bibliographical references and index.
ISBN 978-1-4166-0807-3 (pbk. : alk. paper) 1. Effective teaching. 2. Motivation in education. 3. Curriculum planning. I. Picone-Zocchia, Joanne. II. Association for Supervision and Curriculum Development. III. Title.
LB1025.3.M33746 2009
371.102—dc22
2009000931

20 19 18 17 16 15 14 13 12 11 10 09 1 2 3 4 5 6 7 8 9 10 11 12

Changing the Way You Teach

Improving the Way Students Learn

Acknowledgments

We are greatly indebted to the teachers and students whose work and ideas inspired us and touched us deeply and without whom we could not have written this book. We also thank the schools, districts, and other organizations that graciously invited us to facilitate professional learning experiences and allowed us to develop the insights and experiences that infuse the content of this book.

Introduction: What Supports Effective Teaching?

Effective teaching looks effortless. Students are actively engaged in thinking, making sense of ideas, applying beginning understandings, and tackling increasingly complex tasks. Teachers are coaching, providing clear and descriptive feedback that supports and extends student learning. They are illustrating, elaborating, explaining, modeling, guiding, and assessing. They are reaping the fruits of well-choreographed lesson plans that were informed by or are sensitive to the specific needs and talents of the class in which they are used.

Effective teaching is inspiring and memorable. It is etched in the insights and memories of students who witness and experience it. I can still remember the teachers whose craft revealed landscapes I had never witnessed and made me discover I could do something of significance, who made me feel smart and confident enough to take previously unimaginable risks, and who showed me how to reap the benefits of false starts and missed steps. Effective teaching is deeply personal because students feel as though they are coconstructing their understanding with each other and with their teacher. Effective teaching is as much about planning lessons and responding to student work as it is about performing. Much of its success lies in what happens before and after the teacher leaves the classroom rather than in the actual lesson implementation itself, although one should not underestimate the power of engaging and enthusiastic performances. Effective teaching is hard work and deep thinking. It incorporates planning, assessing, interpreting data, and responding to the data in ways that support individual students while at the same time attending to the classroom community.

This is not a book about the type of leadership that promotes teacher effectiveness or about the school cultures that enhance the development and sharing of effective practice. Although I recognize the critical importance of the organizational contexts in which teachers work, this book has a different but significant goal—namely, to help teachers teach more effectively. It is written for two primary audiences: (1) teachers who have an interest in best practices but who lack access to ongoing and substantive professional development opportunities that enable them to fully understand best practices, experiment with them, or even internalize them; and (2) teachers who cultivate best practices but who are searching for a coherent framework around which to connect them and to think about themselves as professionals.

Much of what is characterized as effective teaching is presented in isolation. For example, it's common to have books or workshops on rubrics, portfolios, authentic assessment, or integrated curriculum. In this book, these isolated innovations are presented as part of a coherent framework that organizes effective learner-centered practices into three questions:

- Through what lenses should we teach?
- How can we diagnose, monitor, and evaluate student learning?
- How can we facilitate and support learning for all students?

To set the context for the book's framework and the three questions that structure it, let's begin with another important question: What results from effective teaching? The most compelling results from effective teaching lie in the insights, work, and performance of students who experience it. Following is an illustration from a 6th grader, stemming from her engagement in an extended unit of study and evidenced in the Dear Reader letter she wrote for her showcase portfolio.

> Dear Reader,
>
> My name is Kristen. I am 12 years old, an Agent of Change and an Inventor of the Future. At the beginning of the year, I didn't even know what that meant. If you read my first journal entry, you will see what I mean. I couldn't even think about it.
>
> 10/18
>
> "What kind of future will we invent?" Future? … inventing …? We can't invent the future. We're kids. Nobody listens to kids. Maybe

> when we grow up, we can do something. We can invent things that will go in the future. Those are things, though. They aren't the future. Can we invent a time? …

You see? I really didn't get it. But now, I not only know what the words mean, I know that they describe what I am. How? Because I've been able to figure out how to make a change that will really help to solve the problem of people getting the information they need in order to be prepared for emergencies.

How could a 6th grader do this? If you asked me this back at the beginning of the year, I would have said it was impossible, or that only adults, or maybe the government could really do anything. But now, I know better. First of all, I didn't do it alone. My whole class decided on the problem and worked together to find out as much as we could about it—about why it was a problem, and what some other related problems were. I want to tell you a little about how we did this so you can understand the pieces in my portfolio.

First, we talked a lot about community and what it meant to be a citizen and how citizens have rights but also responsibilities. That was OK, and I guess it was important, but I really liked when we picked the problem and got to work. That's when I really started to feel like we really might be able to invent the future.

At first, we all had different ideas about problems in the community. We sure found a lot of them! But we had to decide on just one, so we looked at some of the things that all of our problems had in common, and we came to consensus. Next, we asked a lot of questions about the problem that we picked and discovered that the problem that we thought we were going to try to solve (people not being prepared for emergencies) was really a problem that was the result of other problems. That was important, because we could have been spending a lot of time and energy working to fix something that would never really be fixed because there were other problems causing it that we hadn't done anything about, and they would keep making the problem happen, unless we did something about them too. So, basically, we discovered that our problem wasn't alone, it was made up of lots of situations that led up to it and made it the big problem that it was.

Next, we had to figure out which of these other situations would be the best ones to solve or change and what actions we could take

that would help most. Those were our leverage points, or entry points. Some were things that we could really do something about, and some were things that needed more thinking or someone besides us to deal with it. It made a lot of sense to spend time on the things that we really could change.

We did research about the problem, not just in books but in newspapers and TV/radio reports, etc., and we also tried to find out what other people had tried to do about it. We interviewed people in the community too, to see what they knew and what they thought about the problem we had chosen. To make sure that our interview would give us the information we needed, we brainstormed what we thought made good questions and came up with a scoring rubric. Everything we learned helped us to narrow down the parts of the problem that we would focus on. Later on, when we had ideas of actions to take, we interviewed people again to see what they thought about them.

We researched ourselves too, and learned about our intelligences and learning styles so that we could use that information to help us pick the best way for us to contribute to a solution. I learned that I am a visual learner and that my preferred intelligences are linguistic, intrapersonal and mathematical in that order (the last one surprised me, until I read that one of the traits was being organized, which I am). That really helped me when it came to planning my own action. I designed a buddy system that matched kids in my school with one or two people each who can't get the kind of information they need in order to prepare for or respond to an emergency.

My buddy system was a really good idea because it dealt with two problems that were feeding the big problem. It helped people in the community, at first the kids, to have a chance to do something good and behave like responsible citizens of the community. I say "at first" because it didn't take long for some parents to want to get involved too, and so the buddy list is now kids and adults. There are even a couple of businesses that want to get involved now. One car dealer in our town wants to be a "transportation buddy" and is assigning cars and salesmen as drivers to go pick up their buddies in case they have to be evacuated—wow!

The other problem that my buddy system helped with was that some people in our community weren't really part of the community, for a lot of reasons. The buddy system helped them by giving them ways to participate in the community again. Our research showed us

that people don't really like charity, so with the buddy system, it works both ways. Buddies keep in touch with each other. They figure out together how to make good communication happen, and they decide how they can be buddies to each other. For example, with kids, sometimes the buddies help with homework or listen to problems and help them figure out what to do. They share their own stories about the community or their past and that helps the other buddy get a different point of view. Some of the buddies are babysitting or working in local shops or at day care centers or the hospital. Since we started the buddy system two months ago, it has created really good friendships.

In my portfolio, you will find several pieces that show I am what I say I am—an agent of change and inventor of the future. You can read reflections that I have marked in my journal and you will see the self-assessment that I did of myself as an agent of change. I think the piece that really says the most though is my Action Plan, where I describe the Buddy System. I hope that you enjoy my work and that it helps you think about what kind of future you want to invent.

Kristen's work results from effective teaching. This book explores the underlying framework that resulted in Kristen's letter by addressing each of the three questions mentioned earlier. The first question, "Through what lenses should we teach?" proposes three lenses for determining what we should teach—quality, depth, and coherence. Part 1 of this book includes three chapters, each one devoted to one of these lenses.

The curriculum attributes that define quality and enable students to derive meaning from what they learn are the focus of Chapter 1. They are evident in Kristen's letter and are found in the key concepts, ideas, or questions that frame the curriculum and in the rich set of learning and assessment experiences that engaged Kristen. The question that Kristen pondered ("What kind of future will we invent?") supports every learning opportunity and assessment she engaged in. It is a question that has no definitive answer and one that provided a compelling and relevant "hook" into Kristen's and other students' own experience and knowledge base. Supported by engaging and relevant learning experiences that stimulated inquiry and maintained students' interest, it enabled Kristen to understand new material, as well as herself as a learner, while acquiring and refining various skills. These curriculum attributes are described and illustrated in Chapter 1.

Kristen and other students learn more when they engage with lessons that are anchored in key concepts or big ideas, thematic curriculum units, and explicit opportunities to access what they already know and can do before engaging in new experiences that build on them. Chapter 2 addresses the concept of curriculum coherence and integration by describing the kinds of curriculum structures and components that foster meaningful connections and deep learning, such as the one experienced by Kristen.

Chapter 3 grapples with the concept of depth, which, in the context of Kristen's letter, is evident in the relevant, meaningful, research-based, authentic, and standards-based experiences she had in the process of pondering the future she could invent. The problem solving, decision making, scenario planning, and other experiences that demanded hypothesizing and searching for evidence also illustrate depth. This chapter addresses these questions: What does depth mean? What does it look like? How do we negotiate what feels like a tension between depth and breadth? How do we use standards as a foundation and resource for negotiating what we should teach or abandon?

The question "How can we diagnose, monitor, and evaluate student learning?" is the subject of the three chapters that make up Part 2 of this book. These chapters foster an understanding and use of classroom assessments as tools to measure and improve student learning through ongoing and diversified measures; the identification of clear expectations for student learning; the coconstruction and use of explicit criteria; and the use of classroom portfolios to capture and celebrate students' efforts, achievements, and growth.

Chapter 4 helps readers understand and implement ongoing and diversified classroom assessments. It includes strategies for using diagnostic, formative, and summative tests and tasks to measure students' growth and achievement, such as answering the same question at the beginning and end of a unit. Other examples include the portfolio Kristen compiled and her Dear Reader letter itself. This chapter shows ways of employing formative assessments to monitor and adjust teaching practices, such as the journal that Kristen kept on her experiences and her thinking related to identifying, analyzing, and addressing community problems. It also explains how teachers can use authentic tasks, such as the creation of the buddy system Kristen described, to help students grapple with real and plausible problems.

Chapter 5 discusses how teachers can define, articulate, and translate their expectations in ways that help students understand and attain them, and it provides teachers with tools and strategies for helping students understand and produce quality work. Kristen's reference to her participation in the development of criteria for good interviews is an example of these strategies.

Chapter 6 describes how portfolios can be used to unpack, understand, and communicate student learning. It describes different kinds of and uses of student portfolios, such as the one that Kristen compiled; provides readers with guidelines for initiating the use of portfolios; and helps them use portfolios as communication tools with parents, teachers, and others.

Part 3 of this book addresses the question "How can we facilitate and support learning for all students?" This section includes three chapters that focus on the instructional processes that facilitate and maximize students' learning through the use of scaffolding, questioning, and self-regulatory and strategic learning processes.

Chapter 7 uses the concept of scaffolding to help teachers address the needs and experiences of diverse learners. It describes various strategies for assisting the learning of all students. It includes a review of different instructional techniques and materials such as graphic organizers and various types of modeling, which teachers can use to help students engage with complex material or acquire multifaceted skills. An example of such scaffolding is evident in Kristen's reference to the way in which her teacher guided her through the problem identification process.

Chapter 8 is centered on the use of questions and explores the importance of questioning for lifelong learning. Even though Kristen's letter does not include many of the actual questions her teacher asked her, it would be difficult to imagine 6th graders being able to reach the kinds of insights Kristen demonstrates in the absence of questions that would help them. In the context of the unit she experienced, her teacher probably used a variety of questions, including guiding questions such as "What is a community?" "What are our roles and responsibilities in our community?" "What does it mean to participate in a community?" and "How can we tell the difference between a problem and a symptom?" This chapter describes these and other kinds of questions and their purposes, enabling readers to examine and perhaps expand their questioning repertoire. Readers also learn about the role of questions

in promoting critical thinking and about strategies for helping students answer and generate questions.

Chapter 9 focuses on self-regulation and strategic learning as necessary for helping students understand and manage their own learning. Identifying worthy and attainable goals, such as creating a buddy system in case of a community disaster; developing strategies and actions for attaining their goals; reflecting on the meaning of what we have learned, with questions such as "What was the best part of the interviews you conducted?" "What is the most important thing you learned from this unit?" and "How did you decide on the problem you selected?"; and evaluating the work or learning attained are all key to strategic learning. This chapter describes and illustrates several learning-to-learn strategies and helps readers use reflection and metacognition to increase students' self-regulatory mechanisms and become strategic in their thinking and goal-setting behaviors.

Together, the chapters that make up this book promote the structure, processes, and content of effective practices. Although we have much faith in the practices we include, we also realize that there is much about quality teaching and effective learning that we have not addressed. Personal factors such as one's passion for teaching as a craft and for learning as a phenomenon, knowledge of one's subject and of how people learn, genuine interest in students as human beings and as learners, and sheer inspiration play a role as well. Likewise, we cannot deny the importance of the interplay between a teacher and students. The chemistry between them is not always the same. As teachers, not all of our classes operate as true learning communities, despite our best efforts. Finally, other factors, such as whether the administration values and nurtures professional learning, or a school culture that takes learning more or less seriously, also play a role in supporting effective teaching. These and other matters remind us that teaching and learning are, after all, complex human and social processes worthy of study and recognition.

A Brief Comment on the Book's Voice

This book is a collaborative work involving two people who have learned and worked together for 15 years. Joanne was a participant in the second three-year professional development program I (Giselle) launched in New York. She later became a staff developer in our consulting firm and is now its vice president. She was then, and is now, the kind of

teacher we would all like to have and an even better learner. Including her own thinking and work in this book is a testimony to her talents and a reminder to all of us that there is no greater privilege for a teacher than to see a student become the teacher.

I began this book two years ago and had to interrupt it three times due to several unanticipated and deep personal losses. I resumed work on the book in the spring of 2008, partly because we all need to end some of the chapters in our lives, but in large part because of Joanne's encouragement and faith in the work we do. She played the role of editor, writer, counselor, therapist, and conscience. The book describes experiences that we each had as teachers and that taught us much about what to do and what not to do. We chose to use the first person to describe them without revealing whose experience it was. This choice is less about wanting the writing to flow smoothly and more about asserting the potential of these anecdotes as sources of inspiration and validation to the experiences that imprint the word *teacher* in all of us.

PART ONE

Curriculum

Through what lenses should we teach?

1

Quality as the Infrastructure for Effective Teaching

Knowledge comes, but wisdom lingers.
—Lord Alfred Tennyson

What makes a unit or lesson meaningful? Meaning, like beauty, lies both within and outside us. The same experience might be more meaningful for some students than others because of differences in their interests, personal experiences, readiness, and existing relationship with the teacher and with what is being taught. That said, as learners, we all derive greater meaning from experiences that are engaging, relevant, and authentic.

Engagement relates to the extent to which students are actively involved in their own learning. As described in the introduction, Kristen's active participation and initiative in identifying and prioritizing a problem in her community, developing strategies for addressing it, and engaging her peers and other members of the community illustrate such engagement. Learning experiences that are at the low end of engagement require little thinking or doing on the part of students, as would be the case with having students copy notes that teachers write on the blackboard or complete worksheets that don't demand much thought. In contrast, highly engaging activities require intentionality, focus, and energy, both physical and mental, on the part of students.

When I was a junior high and high school English teacher, I loved to teach Shakespeare—not because I'm particularly passionate about the bard, but because I adored hearing my students' moans at the mere anticipation of reading something written in iambic pentameter and Old English transform first into throaty chuckles as I helped them catch

Shakespeare's earthy humor and innuendos, and then into pleas to read another of his works.

The yearly transformation, from groans to giggles to pleas for more, left many of my colleagues wondering and, to be honest, I couldn't have put a name to the experience at the time. Now, I recognize that I had figured out, very early on, how to engage students, how to tickle their antennae in such a way that what was in front of them seemed like a little bit of an adventure rather than a chore. When it came to Shakespeare, I relied on his bawdiness to hook my students, and it worked every time.

I realize now, however, that although I was quite adept in those early years at engaging my students, I didn't always pay as much attention to how meaningful or relevant the work we were doing was, resorting far more often to teacher-directed and prescriptive strategies and tasks than I now would like to admit. Although they paid attention and participated, whether they were making meaning and finding relevance in what they were engaged in is actually questionable. And though many of them returned to visit long after they left my class and even after graduating, they just stopped in to say hi. They never came back to ask about that amazing grammar lesson where we tossed erasers and learned about direct and indirect objects—or even to check on what Shakespearean play that year's students were going to be subjected to.

It wasn't until much later, during the last six or seven years that I taught and after some time learning myself and questioning my own practices, that I honed the skill of high-level engagement. This was my "authentic assessment period," when fully 95 percent or more of my curriculum had been tweaked to include essential questions and real-world skills, problems, purposes, and audiences. My students were still engaged—in fact, I came to judge the merit of a unit by how quickly I had to step away from the door to avoid being trampled by students trying to get into my room and by how many reminders I had to give about it being past the time they should have left—but this was different engagement. It was an engagement that transcended merely attending or having fun, one that involved grappling with questions that defied simple answers, one that didn't leave at the end of a period or a day or even a year, but that often had our minds whirring through weekends and vacations. These students returned to visit, as had their predecessors, but the students of my authentic assessment period returned not only to say hi but to ask about specific learning experiences ("Did anyone

bounce a check paying their bills this year?" "Have you asked them if all children are children yet?" "What do you think they'll decide to market?") and to offer their assistance in facilitating some of the new work that was happening during their free periods or on school vacations.

Meaningfulness and relevance lie primarily in the subject of students' learning, whereas engagement lies primarily in the ways in which students participate in their learning. Engagement can occur in terms of actual physical activity or inside our minds as learners. When teachers ask students to seriously consider questions such as "How far is far?" or "Are humans inherently inhumane?" they are engaging students' minds even if such engagement is physically evident only to the extent to which we can infer students' thinking through their nonverbal communication.

Meaningfulness relates to but is not the same as relevance. It concerns the extent to which students perceive the lesson/unit as significant, even if the material learned or the skills acquired are not immediately relevant. Significant learning experiences promote depth of knowledge and skills related to a theme, problem, or issue; they require students to use what they learn to form opinions, solve problems, make decisions, or create real products or performances. The most meaningful learning experiences are authentic, requiring that students engage with real-life problems and issues for real purposes and an audience that can benefit from their work. Following are some examples of meaningful and engaging learning experiences:

> Students select a specific insect to research and use a variety of nonfiction materials (books, magazines, filmstrips, encyclopedias, pamphlet series) to gather information about the insect chosen. They use graphic organizers to help them take notes about the insect's physical appearance, eating habits, habitat, reproduction, and other interesting information. They keep a research journal about the research process and use their notes to draft and revise a chapter for a class book titled *Insects Galore!*

This is a very engaging activity, involving a variety of resources and, ultimately, the creation of a class book. It is meaningful in that it involves research and the development of a degree of expertise relative to the chosen insect. The activity lacks authenticity, however, because its audience begins and ends with the class. If this book were shared with an

audience that would benefit from the information—for example, if the insects researched were classified as helpful or pests with a section included on how to acquire them or how to get rid of them, and the book was shared with gardeners or farmers—it would shift the audience from the classroom to the real world with a true purpose.

> Students create a Thanksgiving menu for their family. They choose the number of people that they will serve and select foods from the food pyramid to serve a healthy meal based on guests' dietary needs. They hear from a nutritionist and interview a person who has planned and cooked a Thanksgiving dinner, collecting data that will be used to create a shopping list for the foods and ingredients necessary for their own Thanksgiving meal. They look in a grocery circular and find the prices for each item. They record the prices and find the exact cost for the menu.

Especially during November, this activity will hold students' attention. To make it even more meaningful, the students could create a recipe book complete with grocery lists and costs. These books could be desktop-published and given to each child or sold, with the proceeds used to purchase a holiday meal's ingredients for a needy family.

> During a study of United States history, students work in cooperative groups to choose an important historical event from a list of events provided by the teacher. They use a variety of sources to research the significance of the chosen event in the political, social, and economic areas. They draft, revise, and edit a script for a short play that teaches about the significance of the historical event and the impact the event has had on life today. They self-assess using a rubric, submit the script to the teacher for feedback, and revise it based on feedback. They prepare costumes and props, perform and videotape the play, and respond to and evaluate each other's performances.

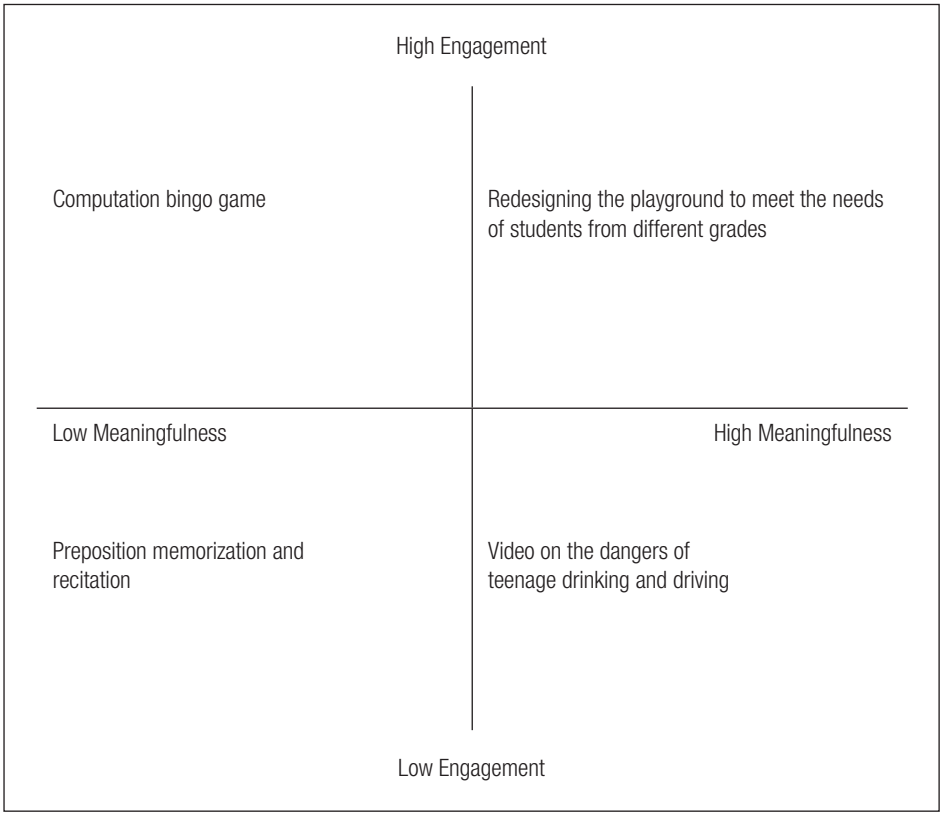
Highly engaging and meaningful, including depth of understanding and the creativity of script writing and performing, this activity falls short of authentic because it has no real-world purpose or audience outside school. What could a teacher do to make this activity more authentic? How would doing so also increase its meaningfulness for students?

Relevance concerns the extent to which students can personally relate to the information or learning strategy included in the unit. We find most relevant what is within our immediate experience and interests; that is, relevance lies in the world within our reach. Asking students to gather information about the person they admire most, then write about and present what they have learned is, in principle, more relevant than asking them to engage in the same work related to a historical character the teacher selected for them, although it's possible that at least one student might consider such a character personally relevant. Kristen found relevance and meaning in the unit by identifying and exploring problems that affected her community; engaging in a reasoned process that allowed her to research and understand these problems, prioritize them, and address them; and discovering her strengths, needs, and preferences as a learner. Tinkering with relevance involves connecting the known to the unknown and drawing on examples, texts, objects, events, and places that lie within the familiar.

Meaningful learning experiences can create the illusion of relevance because they enable students to imagine themselves inside a world in which they could be doing things they aren't currently doing. To better understand the relationship between meaningfulness and engagement, review Figure 1.1.

Sometimes, we encounter relevance by surprise. When I was 28 years old, nothing was further from my mind than the idea of teaching teachers. I was a researcher exploring individual and organizational changes that resulted from different types of innovations. During one of my research studies, while evaluating the impact of comprehensive in-service programs on teachers and students, my colleagues and I designed a series of measures of critical thinking and problem-solving skills. One such measure was an exercise consisting of planning a camping trip in northern California for a hypothetical family. Students were given a road map of California, along with a list of state and national campsites. They were also faced with some constraints, such as the need to find a campground that included facilities for people with disabilities and to alter their return route due to a bridge workers' strike. Another measure was a performance assessment of students' application of geographic knowledge and skills in which they acted as members of a disaster response team and planned an evacuation plan for a community where an oil tanker had exploded.

Figure 1.1 **Relationship Between Meaningfulness and Engagement**



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When we presented these and other measures to the teachers in our study and asked them for permission to administer them, we discovered that they liked the measures as assessments, but they also wanted to use them as learning experiences inside their curriculum. These teachers appreciated measures of outcomes they found worthy, such as the application of problem-solving and thinking skills to geographic and social issues, and recognized them as significantly different from the tests and quizzes they used. They also appreciated how much students learned while using these measures.

Teachers' reactions to these measures were a surprise to me and marked the beginning of my journey into professional development. Until that moment, I had never thought that there was that great a gap among what teachers valued, what they taught, and the learning they assessed.

Figure 1.2 includes some examples of meaningful learning experiences as well as others that would be considered rote. One can easily imagine that these examples would be more relevant to some students than others. For example, students who are interested in weather or science in general might find the second example very relevant. However, regardless of their perceived relevance, all three examples in the left column promote meaningfulness because they relate to the study of people, concepts, events, or issues that are found in the real world, within and outside schools.

As part of an action research study undertaken by a third-year teacher, a class of 7th grade students was tracked for two days, and notes were taken about the learning experiences that they had participated in during that time. What follows is a list of those learning opportunities.

Day 1

English—corrected vocabulary homework assignment; read two chapters in *Tom Sawyer;* answered questions about what was read

Science—took notes and began an electricity lab

Social studies—watched a video on life in colonial America

Math—took a quiz on determining the volume of geometric solids, graded in class; corrected homework; began geometric solid project: making a geometric ornament

Day 2

English—took a quiz on *Tom Sawyer* chapters from last night's homework; took notes on author's methods of characterization; read two more chapters

Science—finished the lab and began writing it up

Social studies—outlined Chapter 4 in textbook

Math—decided on geometric solid for ornament and created pattern using dimensions provided

Assuming that Figure 1.2 really depicts a continuum from rote to meaningful, where would you situate each of the two observed days? What questions does this raise for you? If you could change reality for these students, where would you want the two days to be situated? What kinds of learning experiences would it take to achieve those placements?

Figure 1.2 **Meaningful vis-à-vis Rote Learning**

Meaningful	Rote
Students conduct interviews to learn about the roles of different members of the community. They share their information with other students. The class is invited to ask questions of two or three guest speakers from the community. After listening to the presentations, each student creates a plan of action for acting as a good citizen in the community.	Students review and memorize words associated with citizenship. They write one sentence for every word. *Or* Students read a chapter from their social studies text and answer questions about the different roles of community members.
Students record their observations about the daily weather upon arriving in school. They compare their observations with the weather predictions for the preceding day and chart discrepancies between the two pieces of information. They write a letter to the newspaper editor or to the television news channel on their findings.	Students color worksheets on different weather scenarios (e.g., snow, rain, clear and sunny).
Students are asked to gather examples from the newspaper and other popular media that require the use of mathematics. They then answer the following questions: • What math was involved? • Which math was used the most? • Which math areas are you confident working with? • What impact will your confidence in these areas have on your life if you do not study them further?	Students complete a series of worksheets with different and unrelated math problems.

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Thinking about the table once again as a continuum from rote to meaningful, where would you place your current practice? On what are you basing this thinking? Where would you place your ideal practice? Focusing on what you will teach during your next two weeks in the classroom, what changes can you make to the learning opportunities that you have planned so that they begin to move your practice from where you placed it currently to where you want it to be?

Meaningfulness is enhanced when students have some flexibility in terms of how they can approach, process, or present their learning. Choice, even when it is limited, is a great motivator. Think of the difference between asking students to write a report and giving them the option of writing an editorial, an article, a script, or a report using the

information they have gathered about a subject. Or consider the value of letting students determine whom they can interview rather than telling whom they must interview.

Sometimes, choice can come at the end, not in terms of what students can learn or how they can learn or demonstrate it, but in how much their work counts. Imagine if students could determine the relative weight of some of their assignments even though they have to complete all of them. This scenario is illustrated by the following list, which gives students the ability to decide how many points from within a set range each of their assignments will have, as long as the points add up to 100.

Research notes and bibliography: 25–45
Interview transcripts: 25–45
Write-up: 25–45
Total: 100

Choice can be a wonderful ally when we consider the inherent limitations of anticipating and addressing the learning needs of a diverse group of students.

How Can Rationales Enhance the Quality of a Curriculum?

One of the ways that teachers can establish the meaningfulness, relevance, and engagement of the learning experiences they teach is through the articulation of curriculum rationales. A rationale justifies the existence and value of the unit as a classroom teaching tool by addressing the following questions:

- Why would teachers and students consider this a worthwhile unit?
- How do the knowledge, skills, and dispositions addressed in the unit help to prepare students for life outside school?
- How is the unit supported by current research on best teaching and assessment practices?

The rationale of the unit that led to Kristen's letter is included in Figure 1.3.

Figure 1.3 **Sample Rationale for a Unit**

This comprehensive unit is about *the future*. It is designed to give students opportunities to develop their own ideas, to think critically, to develop an informed opinion, to arrive at their own answers, to be creative, and to gain practical experience by working in their community. Every generation is responsible for envisioning and *inventing the future*. The world students inherited is different from the world that their parents or grandparents inherited, and presents them with different challenges and opportunities.

The goal of this unit is to prepare students to think broadly, deeply, realistically, and creatively to invent a sustainable future for them and future generations by giving them opportunities to

- *develop* a sense of place and value for the local knowledge in an effort to begin the process of restoring and improving the beauty, integrity, and health of the places in which we live and work;
- *explore* the unique values and cultural characteristics that will shape their future;
- *discover* "the commons," that which is shared by all, in our communities and our society, on which we are all dependent and for which we are all responsible;
- *investigate* new ways of thinking about the relationships between and among society, the economy, and the environment;
- *document* and examine the assets (what do we have going for us?) and the liabilities (what are the challenges we are facing?) that exist in our communities;
- *design* and participate in projects that contribute to positive change (examples could include creating community gardens, school-community partnerships, street tree planting, etc.).

What Steps Can Teachers Take to Refine Their Curriculum?

I know very few teachers who have structured their entire curriculum around significant concepts or questions that are supported by meaningful, authentic, relevant, and engaging learning experiences. The pressures to prepare students for externally imposed tests and our emphasis on a myriad of state standards and priority indicators, compounded by rare opportunities for teachers to prioritize them and align them to texts and other resources, among other factors, make it difficult for teachers to find the space and time to continuously construct, adapt, or use powerful and effective learning experiences.

Seeing the pressure and angst experienced by teachers whenever the conversation rolls around to "the test" makes me appreciate how sometimes not knowing what you don't know is a major advantage. When I first made the change from 14 years of teaching high school and junior high English to teaching 6th grade, I was blissfully unaware of the fact that, in New York State at that time, 6th grade was a "testing grade." I was also ignorant of the fact that I had to take something called "lunch count" and would likely have starved my students on my first day

but for the intervention of one little boy who quietly came to me and explained the daily ritual. Luckily, my ignorance about the state tests had no greater negative effect on my students than the slightly delayed lunch count on that first day.

By the time the testing was upon us and my colleagues thought to ask how many practice tests I had given, it was too late to do much of anything except quickly share a sample with my class so they recognized what was coming and trust that the work we had done all year would somehow be enough. Somehow, it was—and I entered the next year less oblivious but far more cocky, and this time I purposefully ignored the shadow of the tests.

Those tests (state social studies, math, reading, science, and others chosen by the district) remained in 6th grade for the rest of my classroom career, and as my commitment to authentic assessment grew, my confidence in my students' abilities exploded. Even some of my most tenuous learners were able to handle what the state dished out. The questions we dealt with every day, the problems we tackled, the discussions and debates we had, the work we produced—all were far more rigorous and challenging than anything that could ever turn up on a standardized test. Dealing with authentic assessment is dealing with real life, and real life is a tough teacher. To this day, I would put my students up against any test the state or district had to offer and feel confident that they would be up to the challenge.

I do wonder, though, had I known about the tests that first year, would I have been caught up in the pressure and angst? Would I have had the courage to go my own way had I known how far from the accepted path that way truly was? I would like to believe that I would … but when I see the faces of the teachers with whom my colleagues and I now work, I appreciate the strength and determination that approach would take. Although I stand by my experiences and faith in authentic assessment, I reconsider the statement that "ignorance is bliss," and I support and celebrate incremental or focused change as wholeheartedly as I do that which is more intense and accelerated. This is not an all-or-nothing proposition.

Pondering the following questions might be a good entry point for exploring quality curriculum and its relationship to teachers' practices.

- What are your curriculum units or learning experiences mostly about? What lies at their center or core?

- Why should students engage with any or all of these units or learning experiences?
- What justifies the time and energy that one or more of these units or learning experiences require?
- Is there a universal question, bigger than the specific work itself, that drives student learning in one or more of these units?
- How actively involved are students during one or more of these units or learning experiences?
- To what extent do students feel personally connected to or invested in the information learned from these units or learning experiences?
- How significant is this learning to my students?
- What content areas are necessary in addressing one or more of these units?
- Is there a real audience and purpose for these units or learning experiences?

Teachers can take other incremental but important steps to increase the effectiveness of their learning experiences:

1. Revise the assignments related to a unit, learning experience, or chapter to increase engagement and meaningfulness to students. Consider asking a question that would draw students to the material, placing the learning experience inside a real-world problem or need, or having students assume a significant role shaping the ways in which they will pursue their learning.
2. Design or revise an assignment in ways that enable students to draw from their own experience or curiosity.
3. Design or revise a unit or learning experience so that students organize, interpret, evaluate, and use information to produce a piece of original work.
4. Design or revise an assignment in ways that enable students to select either what to do or the specific approach or method to demonstrate their learning.

Needless to say, some of the preceding options may be more difficult than others, depending on the context in which teachers work and the school-, district-, or state-related constraints imposed on their curriculum. Even in contexts in which teachers are subjected to scripted curricula and pacing guides, however, there may be spaces to ask students questions such as “What do you already know about X?” or “How is X

connected to Y?" or opportunities for teachers to consider if at least one of the letters, reports, models, or problems students are asked to complete could have an audience besides the teacher or a reason for their completion besides getting a grade.

Incorporating quality curriculum components into our teaching practices can help transform education from what is required to what is inspired. Quality curriculum is good for students; after all, they are the beginning and the end reason for education. The difficulties and obstacles related to change will always be present, but the results of that change—the effects of that change on students—provide the reason to persevere. When I think about my teaching career, it is the faces and actions of students that populate my memories, not the umpteen revisions or the political and social negotiations around my own work.

I will never forget the 8th grade girl who ran down the hall to my classroom, yelling, "Look! I'm an author!!" and my turning around, expecting to see her with a piece published in a magazine or some other publication, only to find her holding a copy of the children's book she had written in my class two years before and that she had just taken out of the library, or the boy who transferred into my class in the late fall and spent his first two weeks climbing on desks and throwing books and chairs around, secretly squeezing through my classroom emergency window every day after school during a week in April so that he could finish his marketing portfolio by its due date in spite of the fact that he was out of school that week because of a death in the family, or the timid girl who had routinely scored below grade level on standardized reading tests looking up at me as the test was placed on her desk, smiling and turning confidently to the back of the test booklet to do the most difficult passages first (she tested out of remedial reading that year and is now an English teacher), or the mother of a severely dyslexic girl who approached me in tears at the end of a student-led portfolio conference to tell me that, for the first time in her child's academic life, she had seen her daughter as a proud and capable learner who recognized her strengths, was able to identify her needs, and could articulate clearly some of the things that she had done and could do in the future to help herself meet those needs.

The great thing about teaching is that every group of students and every year provide us with the opportunity to reinvent our practices, to choreograph new and better learning opportunities, to take new risks and create new possibilities, and to learn with and from our students

about teaching and learning. Figure 1.4 describes application activities for this chapter.

Figure 1.4 **Application Activities for Chapter 1**

A. Check whether the following tasks demand a meaningful or a rote approach to learning.

Tasks	Meaningful	Rote
1. Students practice repeating greetings in French.		
2. Students read a chapter from their science text and answer questions about the different parts of the cell.		
3. Students review and memorize the capitals of different states. They write one sentence for every capital.		
4. Students engage in a debate around the question "Is war inevitable?"		
5. Students create a collage of their neighborhood.		
6. Students conduct a scientific experiment comparing the buoyancy of different materials.		

B. Develop or revise an activity, assignment, or lesson so that students are actively involved in learning no less than 50 percent of the time. The teacher's role during that time would be one of observer, troubleshooter, or monitor.

Consider the following:

1. Posing problems that will require students to discover a process as they work toward a solution.
2. Asking questions that will spark student interest and learning as students develop responses.
3. Creating a situation that establishes the need for information or skills that are not yet present and thereby setting up the need for learning.

2

Coherence Through Integration and the Making of Connections

Good teachers possess a capacity for connectedness. They are able to weave a complex web of connections among themselves, their subjects, and their students so that students can learn to weave a world for themselves.

—Parker Palmer (1998)

We hunger for connections. We learn by associating the new with the old, and by comparing what we think and already know with new knowledge and experience. How we structure students' learning can either facilitate or hinder the connections we want them to make and the mental schemas we want them to develop.

Not all connections are equally significant. For example, a unit in which every lesson features a different letter of the alphabet does not assist students in making relevant connections. Spending an entire day on words that begin with *A* followed by another one on words that begin with *B* does not increase the likelihood that students will internalize those words. Much of what students experience as they move from one class to another, and from one subject to another, feels to them (or is, actually) unconnected to a larger and meaningful whole.

Students learn more when they engage with lessons that are connected and anchored in key concepts or big ideas, thematic curriculum units, and explicit opportunities to access what they already know and can do before engaging in new experiences that build on them. Without such anchors and connections, they easily forget. Connections that

matter help students develop new understandings or concepts, big ideas, or problems. Coherence is achieved through meaningful connections.

Several years ago, I had the opportunity to participate in a large-scale evaluation study of the impact of interdisciplinary curriculum design on students' learning and to visit many classes taught by teachers who worked in teams either designing or implementing interdisciplinary curriculum units in social studies and English. As part of this study, I got the chance to observe and meet high school students and teachers and to review student work that resulted from the implementation of those units. As is often the case in a learning experience, I learned things I never expected to learn.

What most impressed me from that study was that many students had trouble making meaningful connections within and among subjects, even when those connections were begging to be made. In some of the classrooms I visited, teachers implemented interdisciplinary units driven by themes or concepts such as inequality, justice, and conflict. They taught back-to-back social studies and English classes, often as teams. However, even in these fairly ideal circumstances for integration, more often than not, students missed connections between these two subjects unless their teachers explicitly demanded such links with a question such as "How is what you studied in English today connected to our social studies discussion?"

On one occasion, I saw students engage in an English class discussion of *Things Fall Apart* by Chinua Achebe having to do with the reasons for destruction of the changes in the Ibo tribe. Twenty minutes later, they engaged in a different discussion, this time with their social studies teacher, on the problems that African countries face as they struggle to adapt to a changing world while staying true to the meaning of their traditions. None of these students volunteered excerpts from their English class, even though that discussion had offered very tangible examples of that struggle. A couple of days later, when the English teacher asked the same group of students to connect the concepts of tradition and change to any of the characters in the book they had been reading, students were able to discuss Okonkwo's struggles with those themes, demonstrating that they *could* make those connections.

What this experience illustrated for me is that while we yearn to make connections, we are also driven to compartmentalize and neatly put away what we know in the many virtual drawers contained in our mind. The rhythms and interruptions of school—40- to 50-minute periods,

bells, announcements, and moves from one room to another—reinforce compartmentalization rather than the search for patterns and connections. Explicitly helping students integrate what they had learned from reading about Okonkwo's struggles with what they learned about the concepts of tradition and change in Africa deepened their understanding and appreciation of literature, history, and culture. In the absence of such assistance, students' understanding is likely to be far more cursory and fleeting.

How Does Coherence Help Teachers?

Coherence is not just good for students. In most classrooms, there is too much to do. Many teachers feel that they have too little time to teach everything students need to know. Textbooks and supplementary resources become thicker and denser in response to an exponentially growing knowledge base. There are also an increasing number of district, state, and national demands on teachers' use of classroom time, one of which entails preparing students for what seems to be an endless battery of high-stakes tests. At the same time, students' learning needs haven't diminished, and students today are expected to learn content and skills once considered the purview of the world outside school and in the workplace (i.e., 21st-century skills, which we'll discuss in Chapter 9).

In addition to helping students make sense of what they are learning, a coherent curriculum is a lifesaver for teachers. Teachers simply don't have enough time to teach required content and skills unless they find a way to compact that material into a coherent whole. Having too much to teach, with increasingly longer and more demanding textbooks, makes it difficult for teachers to carefully consider the relationship among seemingly unconnected materials from within and across subjects. It is therefore imperative that we find ways to consolidate content in such a way that students and teachers can make sense of the myriad of expectations that impinge on them.

What Shapes a Coherent Curriculum?

Let's begin with the opposite of coherence. A series of disconnected and disjointed activities presented to students with no context or purpose other than the expectation that they complete them is the antithesis of

coherence. We are constantly searching for meaning, asking, "Why? Why am I doing this? What is this about? What is it for?" When the answers elude us, we lose interest or attend to something else. Is it surprising, then, that students who face hours of drills and worksheets disengage or act out?

Purpose and Context

Coherence can be developed within a specific subject or discipline or across the curriculum. Either way, two of the ingredients that contribute to coherence are purpose and context. What happens to us, how we feel, how we see others, how we engage with people we know or don't know, how we interpret others' actions and words, and how we make sense of our daily lives are always informed by context and purpose. We are better able to make sense of what we learn when we can place it in a context of time and place and when we know its purpose. It's hard for us to find such coherence if we don't understand the reason for learning something, if what we are learning seems to be arbitrary, or if it seems to be disconnected from what precedes or follows it.

Figure 2.1 illustrates a coherent two-week curriculum that spans different subjects. As the first unit of the school year, this 7th grade interdisciplinary curriculum unit centers on the question "Who Am I?"

What makes this curriculum coherent? First, its purpose is to help students explore their individual and cultural identities from a variety of perspectives. The lessons from every one of the subjects involved actually play an important role in helping students understand themselves. Second, the lessons are contextualized is such a way that they build connections between the past and the present or between their content and students' own experiences or needs. Within each of the subjects, the activities build on each other; that is, students use what they learned in the first lesson to engage with the second lesson, and so on. Finally, the lessons within the subjects are sufficiently demanding and congruent with the grade-level curriculum they are used for.

Let's compare this curriculum with the set of foreign language lessons shown in Figure 2.2. The three learning experiences in Figure 2.2 have little to do with each other. Moving the experience on Monday to Friday wouldn't change anything in terms of student learning. Although one could argue that starting the week or the year asking students about the vocabulary they already have in another language is a good idea,

Figure 2.1 **A Two-Week Interdisciplinary Curriculum Unit Spanning Different Subjects**

	Monday	Tuesday	Wednesday	Thursday	Friday
English	Students take a learning-style inventory. They use it to write to their teacher describing their personal and academic strengths.	True colors activity.		Students interview other students to learn about personal lives of people they don't know.	
Social studies	Students read and react to Nacirema (a cross-cultural simulation).		Students bring and use artifacts to describe themselves to other class-mates.	Students explore early civilizations by examining artifacts. They discuss the differences between those artifacts and artifacts in their own culture.	
Math	Students identify the kind of problem-solving process they favor.	Students collect data on the dis-tribution of the class in terms of problem-solving preferences. They reflect on the question "Can the way I problem solve benefit others?"	Students review one of four dif-ferent methods for problem solving.	Students review two other methods for problem solving in mathematics.	Students review the fourth method for problem solving.
Science	Students identify the parts of the brain and nervous system and their different functions related to learning.		Students engage in right and left brain lab to determine their preferences.	Students explore traits that are learned and those that are inherited.	Students use Punnett squares to predict inheri-tance.

Source: Developed by C. Wieczbicki. Used with permission.

there is no explicit link between that experience and the lessons that follow. Moving the lesson on greetings to Tuesday could facilitate links to the Monday lesson by having students relate those greetings with the vocabulary they know or having them discuss why many students know some greetings but not others.

Figure 2.2 **Sample Foreign Language Lessons**

Monday	Tuesday	Wednesday	Thursday	Friday
Students engage in a carousel of all the words they already know in Spanish.	Students listen to a lecture on Hispanic influences on the United States and complete an inventory of Hispanic preconceptions and biases.	Students have an overview of greetings in Spanish and describe the differences between Spanish and English greetings.		

Integration Through Organizing Centers

Coherence is partly about integration and partly about the substance of that integration. Within a classroom, such coherence can be attained by recasting or redesigning lessons and units around a few powerful organizing centers, and by integrating content and skills in ways that make sense. An *organizing center* is the overarching idea that guides the writer in designing, revising, or implementing a unit or program. It is the hub of the unit in that all of its learning opportunities and assessments should relate to and support it. It captures and communicates the unit's intended learning focus.

The foundation of a coherent curriculum is laid by the substance of the organizing center. Let's look at the following example from 4th grade, written by Iris Gandler, a teacher in Manhasset, NY:

> The teacher begins the unit by telling the students that they need to pack their books and other school supplies and move to a small classroom across the hall because their own classroom is needed for an art project. Minutes after the students settle down in their new space, the class is interrupted by another teacher who tells the class that they need to move to another smaller space in the building since she needs the room. Some students grumble but follow their teacher's instructions. This scene is repeated throughout the morning until the students end up sitting on the steps of the stairs leading to the second floor.
>
> Obviously frustrated by repeated interruptions and cramped space, the students complain to their teacher. The teacher asks students to

put their complaints on paper and to reflect on their experience. After several students share their written reflections, the teacher connects the students' emotions to the experiences that Native Americans had during the westward movement in the United States.

Over a three-week period, the students investigate and discuss human rights. They select from poetry, narrative, or letter writing to demonstrate their understanding and express their thoughts and feelings about these rights. They also identify and research a specific human right that they believe needs to be protected. Upon completing their research, they draft, edit, revise, and ultimately send a persuasive letter to an agency charged with protecting that right.

The concept of human rights in this 4th grade unit and the question "What kind of future can we invent?" from Kristen's letter in this book's introduction are examples of organizing centers.

There are different types of organizing centers, including themes, topics or genres, concepts, issues, problems, processes or skills, or essential questions. Figure 2.3 includes examples of each of the different types of organizing centers.

Some organizing centers are more suitable for different subjects and grades than others. For example, if a teacher's primary purpose is to help students understand and use persuasion, a unit centered on the skill of persuasion might be most appropriate. If, however, the teacher's primary purpose is to help students write editorials, the theme or genre of editorials would be most appropriate as the organizing center.

To do justice to its organizing center, a unit needs to be supported by different learning experiences and assessments that relate to it and deepen students' ability to learn it. The unit whose organizing center is persuasion might require that students explore different forms of persuasion in visual, oral, and written discourse and that they examine the attributes of political persuasion, advertising, and editorials. The learning experiences that support the unit with editorials as the organizing center might include reviewing and critiquing editorials from different newspapers, identifying the quality attributes of editorials, and writing an editorial.

Some organizing centers are more generative than others, supporting more connections to other concepts, instances, or events. A primary unit centered on the theme of whales requires lessons that relate to whales or that compare whales to other animals. It might be best addressed by

Figure 2.3 **Organizing Centers with Examples**

Theme/Topic/Genre: contained within specific subjects, areas, or disciplines *Examples:* colonial living, myths and legends, the Middle Ages, the Civil War, cartoons, Impressionism, dinosaurs, apples, safety, Canada
Concept: provides learners with mental structures they can use to describe the world they see *Examples:* culture, change, family, energy, slavery, rights, freedom, uncertainty, technology, population, voice, learning, self-regulation, identity, power, determinism
Skill or Process: skill-building units that focus on the way we solve problems and investigate reality *Examples:* observation, classification, analysis, persuasion, persuasive writing, research
Issues and Concerns: centered on specific issues or concerns of learners *Examples:* presidential election, teenage identity, peer pressure, bullying, dress codes, character, voters' apathy
Phenomena: experiences, incidents, events, and trends that learners can see, feel, taste, smell, or touch and that can be interesting and unusual to them; odd, significant, or unaccountable facts or marvels *Examples:* the Beatles and other idols, tornadoes, blogs, eclipses, celebrities, *American Idol,* floods
Persistent Global Problems: enable learners to understand significant world issues or problems and to apply what they know to possible solutions *Examples:* rain forest depletion, global hunger, child labor, exploitation of women, racism, illiteracy, ethnic cleansing, terrorism, war
Essential Question: a question that can be used as the basis for inquiry or discovery *Examples:* When is war justified? Why does matter matter? Who determines what art is? What makes writing worth reading?

lessons that explore whales' habitat, life span, habits and needs, development over time, and predators. A primary unit centered on the persistent global problem of endangered species allows for lessons that explore the meaning of endangerment; different animals that are endangered; their habitat, needs, and predators; the reasons for their endangerment; the consequences of their disappearance; the types of efforts that are under way to protect them; and even the actions that students can take to protect them. In such a unit, teachers may use a specific endangered animal as the focus of their lessons or give students the opportunity to select and study an endangered animal of their choice. Because the unit on endangered species enables students to study whales in the context of the concept of endangerment or the issue of endangered species, it is more generative than the unit centered on the theme of whales.

Let's compare and contrast other units within the same discipline. A unit that treats reading strategies and forums as a theme would rely on lessons that introduce students to selected strategies followed by opportunities to use them and reflect on their value. This unit might include an exploration and participation in literature circles, author study, and guided reading experiences. A unit on developing students as readers would be best supported by learning experiences that require students to read various texts orally and silently, and that help them understand the attributes of quality reading, assess and monitor themselves as readers, and use different strategies for improving their reading skills. While these two units are taught in the same subject, the second one is more generative, enabling broader and deeper connections for students. Figure 2.4 includes a rubric for organizing centers.

A strong connection exists between generative organizing centers and opportunities for curriculum integration. It is far easier to find entry points for different subjects in the units on persuasion, endangered species, and developing readers than in the ones focused on whales, editorials, and reading strategies and forums.

How Do We Know That Coherence Enhances Curriculum?

The human rights unit discussed in this chapter is distinctly coherent and illustrates several quality attributes of curriculum. First, this unit has a clear purpose—namely, to help students understand human rights by grappling with issues associated with compromising them. Second, it is driven by a clearly identifiable organizing center—in this case, the concept of human rights, which supports and relates to all of the activities within it. The lessons and assignments help students understand this concept in a variety of modalities, including simulations, writing assignments, and research work. Students are able to draw on their preferences and interests by choosing a writing modality to express their understanding of human rights, by selecting and investigating a human right in depth, and by writing to a constituency they believe could do something to protect it. Finally, having an audience that can learn from and perhaps benefit from the students' learning is another quality attribute in this unit.

Curriculum depth stems from the substance and significance of the learning and assessment experiences that relate to and support the

Figure 2.4 **Rubric for Organizing Centers**

1	2	3	4
• Too narrow to build a unit or lesson around	• Too narrow for students to derive any generalization	• Generative, enabling students to draw generalizations about what they learned	• Highly generative, enabling students to draw significant generalizations about what they have learned
• Related to narrow content within a subject or process	• Subject-specific	• Topic, issue, skill, concept, or problem that can be addressed from more than one discipline	• Central to at least two subjects
• Lends itself to basic recall and comprehension-level questions	• Can be approached by questions and activities that may require higher-level thinking	• Lends itself to activities and lessons that promote critical thinking	• Can best be addressed by critical thinking and inquiry questions
• Specific fact or skill that is irrelevant to students' lives today or in the future	• Specific current issue, skill, or topic that may be relevant to some students but not others	• An issue, skill, concept, or problem that would be meaningful for students today but may not be that way in the future	• Compelling issue, concept, problem, process, or question that is perfectly suited to students today and many years from now

organizing center. The manner in which these experiences are linked and presented to students defines its coherence. The overall coherence of curriculum is enhanced when the organizing centers that support it are

- significant to the subjects or disciplines taught;
- generative, enabling students to create robust schemas of concepts, skills, or dispositions; and
- supported by learning experiences that are meaningful, relevant, and engaging.

The creation of interdisciplinary units can help teachers who teach different subjects increase the meaningfulness and coherence of their units. For example, the following unit described here, which was created by a high school social studies teacher and an English teacher, enabled both of them to deepen students' understanding of each of their content areas.

In social studies, the teacher introduced the term *revolution,* first by asking students to discuss the different meanings and uses of the word, and then by defining it. She then played the Beatles song "Revolution," asking students to identify how the word was used in the song. The teacher then gave a short lecture with notes on the French Revolution and the Old Regime. In subsequent lessons that week, students read articles on the storming of the Bastille; reviewed a chart with the political, social, and economic causes of the French Revolution; and studied notes about the Reign of Terror with key vocabulary. As a homework assignment, students read primary sources on people's reactions and fears during the Reign of Terror, which they also discussed in class.

During the same week, students began the week's classes in English by writing a journal entry on the questions "What is a third-world country?" and "What are inequalities?" The teacher asked students to find examples of inequalities and stories related to third-world countries in several newspapers, and the class discussed a third-world country after students read their entries aloud. Later that week, the teacher reviewed the format of a research paper topic and of MLA formatting and asked students to write a research paper on inequality using both primary and secondary sources. She then defined and shared examples of primary and secondary materials.

In these two classes, the English lessons around writing a research paper ultimately supported students' ability to write an interdisciplinary paper on inequality that drew on the social studies content but also on the literature, both historical and contemporary, that students had read and discussed around the concepts of revolution and inequality.

Teachers can ask themselves questions like these about the coherence of their units:

- Does the unit enable students to make important generalizations about what they have learned?
- Does the unit foster the exploration of a theme, issue, or problem from different disciplinary venues?
- Will this unit be as timely and relevant 5 or 10 years from now as it is today?
- Will this unit be recognized as important by students of different genders, classes, and cultures?
- Is the unit appropriate for students in the grade level at which the unit will be taught?

- Is the unit supported by lessons and activities that promote critical thinking?

Let's practice using these questions to assess a unit on pollution. The unit includes the following activities:

- Students brainstorm what they know about air pollution.
- Students engage in a scavenger hunt about pollution.
- Students discuss the causes of air pollution due to cars.
- Students observe the kinds of vehicles that drive by their school.

The answer to the question, "Does the unit enable students to make important generalizations about what they have learned?" is both "yes" and "no." Yes, because students may recognize that the types of transportation we use play a role in air pollution. No, in that students don't learn as much about the causes, remedies, and consequences of air pollution. If we addressed the unit more conceptually, it would allow students to make important generalizations. This would require that students learn about the causes and consequences of air pollution and not just about the role of transportation.

The answer to the second question, "Does the unit foster the exploration of a theme, issue, or problem from different disciplinary venues?" is "yes." Students explore the topic of air pollution and transportation in the context of social studies and math.

In terms of the timeliness of the unit, it is very likely that pollution and transportation will remain important topics 5 or 10 years from now.

Concerning the question, "Will this unit be recognized as important by students of different genders, classes, and cultures?" the answer is "probably," in that we are all affected by air pollution and make choices in transportation that relate to air pollution in one way or another.

Finally, it is difficult to determine if the unit is supported by lessons and activities that promote critical thinking because we don't have access to the questions the teacher asked students to address. In general, the unit's focus seems to be more on comprehension and representation of information, rather than analysis, synthesis, or evaluation of information.

How Important Is Coherence?

Imagine everything that students learn within a year as dots on a page. Imagine years going by, with more and more dots being added to that page. Pretty quickly, it would become difficult to discern the dots from one another—the social-emotional dots from the academic ones, the science dots from the reading dots, the strategy dots from the skills dots, 1st grade dots from high school dots. Imagine being the students for whom all of those disconnected dots represent the reality of their learning. How long would it take for a student to realize that a dot from 2nd grade language arts actually supported a developing dot in 4th grade social studies? How difficult would it be to locate and retrieve a 7th grade math dot to relate to a 7th grade science dot? What would it take to sort through the dots to find the ones that enable writing across content areas?

Without coherence, teaching and learning are relegated to isolated instances of varying brilliance. Without coherence, accessing and adding to prior knowledge is often frustrating and discouraging—much as we would feel if every one of the computer files we've created sat on our desktop without any folder system to contain and organize them. Coherence is the adhesive that helps learning build, grow, deepen, and stick. Coherence insures against the temptation to rely on repetition and redundancies. Coherence helps all of us draw the lines that connect our varied learning experiences so they can be organized, related, and cross-referenced by context, content, purpose, or priority. This process, in turn, creates the conditions that support growth and meaningful mental schemas that will house the knowledge we value and the memories that matter. Figure 2.5 describes application activities for this chapter.

Figure 2.5 **Application Activities for Chapter 2**

A. Assess the organizing center of one of your units, projects, extended lessons, or assignments by answering the following questions and rating it with the rubric in Figure 2.4.

Questions	**Yes/No/ Not Sure**
1. Does the center enable students to make important generalizations about what they have learned?	
2. Does the center foster the exploration of a theme, issue, or problem from different disciplinary venues?	
3. Will this center be as timely and relevant 5 or 10 years from now as it is today?	
4. Will this center be recognized as important by students of different genders, classes, and cultures?	
5. Is the center appropriate for students in the grade level at which the unit or lesson set will be taught?	
6. Is the center supported by lessons and activities that promote critical thinking?	

B. Use the examples of organizing centers in Figure 2.3 to help you transform a unit or series of connected lessons.

1. Determine what type of organizing center currently provides the structure of the unit or lesson set.
2. Select two additional types of organizing centers and rethink the unit or lesson set from those perspectives.
3. Consider how a change might affect the unit or lesson set:
   a. What, if anything, would be gained from making the shift from the current organizing center to one of the two alternates?
   b. What, if anything, would be lost?
   c. How would revising the organizing center affect students' thinking, learning, and work?

3

Reconciling Depth with Standards

The day could be any day, the season any season. In this case, it is early afternoon on a cool day in November, the time of year when the "honeymoon" of careful and proper behavior is past and the realities and challenges of the year ahead loom large. This particular conversation takes place in a middle school faculty room where a group of six teachers commiserate about their work, but similar interactions can be overheard in elementary and high schools as well.

Ellen, a 7th grade math teacher, drops her grade book and a stack of student papers onto the worktable and grumbles, "What's with students today? Again, half of my class didn't do their homework. And it wasn't even hard—just a simple math worksheet of basic computations and a couple of word problems. Imagine if I gave them something really challenging? Some of them have more homework zeros than checks this marking period. It just gets worse every year."

She drops into a chair and stares at the pile of papers in front of her, sighing. Her colleagues look up from various places in the room and smile sympathetically.

Allyson, a 6th grade teacher in her tenure year, adds, "No wonder some of them aren't doing well in school! How many times do we have to teach the same exact thing before they actually learn it? They can master a video game and stay focused on that for hours, but they can't keep historical dates or figures straight."

"Kids today have trouble just learning and remembering the most basic facts," adds Frank, an 8th grade English teacher. "I have to go over and over the same stuff year after year. I don't understand why they just

don't learn it the first time and be done with it so they can do something interesting."

"I remember when kids did their homework, no matter what. Today, no one cares—not the kids or the parents or the administrators. They're all just so focused on the standards and the tests so that nothing else matters, as long as there's a standard attached," continues Ellen. "And the kids know it."

"And if they can't achieve or work at grade-level standards, and if they don't show a year's growth, whose fault is that?" asks Jose, one of the school's special education teachers.

"Ours!" the room choruses.

"I'm not sure it's about the standards," Allyson says. "I've taken standards workshops and been on the committee that selected the last standards-based science program the district bought. I spent a whole week last summer showing how our curriculum aligns to the standards. Now, all of my worksheets and assignments have the standards written at the top. They're posted in my classroom and on my bulletin boards. I tell students how important the standards are—and it doesn't matter. They still aren't interested in doing more than the bare minimum, if that."

"And with all of the focus on tests, how do we get to the rest of what we're supposed to be teaching?" Frank adds. "For the past three years, I've had to rush through my last four units."

"Someone who taught a course I took years ago suggested that we start teaching at the end of the book instead of the beginning, since the first three chapters in most math textbooks is review anyway. Maybe I should try that—although I don't know what difference it would make. How can students even begin to understand a unit on probability when they don't seem to know simple math facts?"

From behind the copy machine, Fran comments, "Don't worry—in the end it really won't matter because by the time they get to high school, they won't remember it, anyway."

"Wouldn't it be great to be able to ask kids to learn something because you think it's important to learn or because it's fun, and not just because it's in the standards or on some test?" Allyson asks, not expecting an answer. "Not to be in a rush, so you can give kids time to be challenged and to really dig into something?"

"What can we do about all of this?" challenges Ellen. "How can we give kids the time to think and learn deeply and still make sure they get the basics and finish the curriculum? There has to be something we can

do, something that will make a difference. I don't want to go through an entire year of kids not doing homework and not caring about learning anything. If there isn't a way to do this, then how will they be prepared for high school and college?"

"How will they be prepared for life?" asks Jose.

These teachers are uncovering critical issues for educators today: issues around changing attitudes and competing demands, the tensions of addressing externally produced standards and evaluation measures, the need to provide students with more than just a race through the year's curriculum. Their questions cross geographic, economic, and social boundaries, and their concerns echo those of other educators, ringing true independent of grade level. What does depth mean? What does it look like? How do we engage students in deep learning? How can we negotiate what feels like a tension between depth and breadth? How do we use standards as a foundation and resource for negotiating what we should teach or abandon, and do so without compromising depth?

Without a doubt, the depth or rigor of the curriculum and assessment teachers use has a significant impact on student learning. Different types of learning opportunities and assessment tasks place different expectations and demands on students' thinking and performance. The demands associated with recording notes from the blackboard or with memorizing facts and formulas are very different from experiences requiring problem solving, decision making, reasoning, or conjecturing.

What Does Curriculum Depth Mean?

A curriculum with depth promotes understanding, deliberate thinking, and performance through sustained inquiry or academic research that results in the development of a core of knowledge and skills related to a theme, problem, or issue. It requires thinking beyond the literal level of comprehension and taps a range of thinking skills (analysis, inferring, interpretation, synthesis, evaluation, etc.) by demanding that students use their knowledge to form opinions, make decisions, or create authentic products or performances. A curriculum that has depth is satisfying. It feels substantive and important, like a book that made us think way past our reading of the last page.

In a social studies unit, the question "How is history constructed?" promotes depth by transcending specific content or a specific time period, culture, or grade level. This unit could as easily be about the

Civil War as it could be about Vietnam or World War II when, in fact, this is the central question of a unit about the Spanish conquest of Mexico. A set of subquestions that further break down this big question provides opportunities for students to engage on a variety of levels and through several entry points. "From whose perspective is this account written?" "Who is writing the history?" "What is left out?" "How are the people and places described?" These questions support the principal goal of the unit: to examine an event in history through a variety of lenses. The depth that the unit probes through the use of these and other questions supports a natural flow of discussion and debate of issues and concepts related to perspective, interpretation balance, bias, and audience, among others.

A deep curriculum requires students to ponder and ask different kinds of questions as their primary means of inquiry and engagement. It gives students access to primary and secondary sources and expects that students reconcile different aspects of a topic or different viewpoints. It often has an authentic writing or production component that requires students to write an extended piece or produce a tangible product or performance for a purpose and audience beyond the teacher. Frequently engaging students with real problems and audiences, a deep curriculum often incorporates at least two disciplines: one conveying the process of students' work, and the other, the content.

Depth is not something that one must "work up to" or "develop into." A curriculum that fosters depth can be taught at any grade level and in every subject. Depth can be seen in a 2nd grade, integrated unit on expertise that uses paleontology as the area of study; demands that students ponder the role of expertise in our lives by asking, "Can you create a museum exhibit and not know?"; and culminates in an experience that finds these 7- and 8-year-olds working as teaching volunteers, leading groups in the Dinosaur Halls of the American Museum of Natural History. Depth can be equally visible in a high school biology unit on genetics and evolution through which students learn about how traits are inherited, investigate the genetic makeup associated with specific disorders, and review multiple perspectives on cloning and stem cell research, and then engage in debates around these issues and ultimately write a letter to the U.S. Senate subcommittee that is charged with developing national policy on these issues.

Common attributes of deep curriculum are

- the presence of inquiry,
- the need for higher-order thinking skills,
- integration of content areas,
- reading to access information from multiple sources and perspectives, and
- a culminating authentic product.

Figure 3.1 includes a rubric for assessing deep curriculum that can be used to support design work.

What Does a Curriculum Revised for Depth Look Like?

Figure 3.2 presents "before" and "after" curricula. A careful examination of the revised curriculum reveals the sources of increased depth. These include providing students with explicit lessons on the meaning of key critical thinking vocabulary (e.g., *fact, relevant, irrelevant, related*) so that they can critically engage with source material on hurricanes, helping students negotiate the information they gathered about hurricanes with each other, asking students to articulate their individual understanding of how hurricanes are formed, engaging students in identifying the criteria for a good emergency plan before writing one, and having students justify how their proposed plan meets the criteria for this plan.

What Skills and Processes Contribute to Depth?

We promote depth in our curriculum and assessment when we engage students in activities that help them use a variety of thinking skills and processes, such as forming hypotheses, seeking explanations, conducting experiments, collecting and interpreting data, developing inferences from data or observations, and searching for patterns. Figure 3.3 lists selected thinking and reasoning processes that contribute to the depth of the curriculum if a teacher explicitly teaches students to recognize and use each one.

We also promote depth when we teach students the vocabulary associated with good thinking; when we teach them the meaning of words such as *bias, argument, assumption, data, fallacy, judgment, proof,* and *premise;* when we design and use lessons and assessments that demand their use; and when we help students revisit and refine their use of those

Figure 3.1 **Rubric for Deep Curriculum**

Inquiry and Levels of Thinking			
1	**2**	**3**	**4**
• Students collect information about a topic.	• Students answer teacher-generated questions that are open-ended but have single, correct answers.	• Students seek answers to teacher-generated, open-ended questions that have more than one correct answer.	• Students seek answers to essential questions or to self-generated inquiry questions that require the consideration of multiple perspectives.
• Focus exclusively on recall and literal comprehension of text(s) read or sources encountered.	• Focus primarily on recall and literal comprehension of text(s) read or sources encountered; curriculum may ask for some connection making or comparison/contrast.	• Require higher-level thinking skills including analysis, synthesis, and/or evaluation.	• Integrate the use of basic and higher levels of thinking by requiring students to evaluate based on both analysis and synthesis.
• Students complete questions and exercises from worksheets or textbook chapters.	• Students access one or more teacher-identified resources as part of their learning.	• Students collect data or reading, using primary and secondary sources as part of their learning.	• Students engage in field or academic research that requires use and integration of primary and secondary sources to arrive at an informed opinion, deliberate and precise performance, and/or synthesis of what they have learned in a product of their own.
Integration			
• Framed within a single subject or discipline.	• Framed within a single subject or discipline with a tenuous connection to another content area.	• Integrates two content areas.	• Naturally integrates two or more disciplines in a way that enhances learning from each one.
Reading			
• Requires students to read a single text or source.	• Requires students to read two texts that are connected.	• Requires students to read two or more texts that represent different aspects of a topic or different viewpoints.	• Requires students to read multiple texts that are thematically related and represent a variety of perspectives.
Writing/Production			
• Requires limited student writing in the form of responses to specific questions.	• Requires students to write or create an extended piece whose purpose is to complete the assignment and demonstrate learning to the teacher.	• Has an authentic production component that requires students to write or create an extended piece for a purpose and audience beyond the teacher.	• Has an authentic production component in which students write an extended piece or create a product that is purposeful and will be published or given to an audience that can benefit from that work.

Figure 3.2 **Original and Revised Curricula**

Original Curriculum	Revised Curriculum
The teacher …	The teacher …
• asks students what they know about hurricanes (the K of KWL).	• asks students what they know about hurricanes (the K of KWL).
• reads aloud a nonfiction book on hurricanes, posing the following two questions during the read-aloud and allowing children to turn and talk to each other: Which do you think is more dangerous, a tropical storm or a hurricane? Why? (Shows students where Florida is on the map.) Why do you think there are so many hurricanes in Florida this season?	• reads aloud a nonfiction book on hurricanes, posing the following two questions during the read-aloud and allowing children to turn and talk to each other. Which do you think is more dangerous, a tropical storm or a hurricane? Why? (Shows students where Florida is on the map.) Why do you think there are so many hurricanes in Florida this season?
• facilitates a shared reading of the science textbook segment on hurricanes.	• introduces the word *fact* and lists the facts about hurricanes from the reading.
• asks students to turn and talk about what they learned about how hurricanes are formed.	• introduces the words *relevant* and *irrelevant* using the root word *related.*
• asks students to write independently in their science journals about how hurricanes are formed.	• has children identify the facts on the list that are relevant to the statement "Hurricanes are dangerous."
• assigns the following independent writing task: "Write a letter to your family with a plan so that your family will be prepared in case a hurricane comes to our area. Be sure to explain why you have included each part of your plan."	• facilitates a shared reading of the science textbook segment on hurricanes.
	• asks students to turn and talk about what they learned about how hurricanes are formed.
	• asks students to write independently in their science journals about how hurricanes are formed.
	• asks students to work in pairs to identify new facts from the textbook relevant to the statement "Hurricanes are dangerous" and to add new facts to the original list.
	• asks students to complete the following writing task: "Write a letter to your family with a plan so that your family will be prepared in case a hurricane comes to our area. Use relevant facts about hurricanes to explain why you have included each part of your plan."
	• before students work on their plans, has a conversation about what will make a good plan, eliciting criteria such as "It will keep everyone in the family safe," "It won't cost a lot of money," and "It is possible to do it in a short time." Students list the criteria on a chart and use it to draft their plan.

Figure 3.3 **Selected Thinking and Reasoning Skills and Processes**

Thinking and Reasoning Process	Definition	Prompts or Questions
1. Classifying	Arranging objects or events in classes or groups according to some criteria, method, or system	Asking students to take objects such as buttons from a mixed collection and place them in groups by color, size, shape, number of holes, or texture
2. Comparing and contrasting	Looking for differences and similarities among objects, items, people, events, etc.	"Do you want to determine how things are similar or different?"
3. Analyzing errors	Discriminating accurate and effective information/material from inaccurate and ineffective information/material	"What are the errors in this passage?"
4. Forming opinions and developing arguments	Identifying beliefs, usually open to dispute	"What is the position of this character on this issue?"
5. Forming hypotheses	Constructing tentative and testable statements about something that may be true based on reasoning	Making a statement that can be used as the basis for an experiment: "Double-layered paper towels absorb more water than single-layered towels."
6. Measuring	Making quantitative observations by using conventional or nonconventional measurement standards	"Let's calculate the space we need to redesign for our reading area."
7. Observing	Becoming aware of an object, person, or event by using the senses and/or supporting equipment to identify properties	"Take notes on all the verbal interactions you hear on the playground among students."
8. Generalizing	Drawing general conclusions from data or generalizations	"Given these data, what can we conclude about the effects of this substance on weathering?"
9. Making inferences	Making conclusions based on reasoning to explain an observation	"What conclusions can you make based on what you've read or observed?"
10. Recording data	Collecting bits of information about objects, people, or events that illustrate a particular situation	"Track the number of questions each of you asked during our Socratic seminar."

words in meaningful contexts. After all, how can we expect students to think critically when they lack a working understanding of the very words that clarify such thinking? Figure 3.4 depicts the words associated with thinking, along with definitions and examples.

In addition to introducing the preceding terms and incorporating them in lessons and assignments, teachers can use them as the basis for helping students probe deeply into information and arguments. Here are some examples of the kinds of questions and prompts that accomplish this:

Look Again: Do You See the Holes in Your Argument?

1. What is the specific position you take in this editorial?
2. What is the first supportive claim you make?
3. What evidence do you have to support your claim?
4. How would the opposition counter this claim?
5. Identify your second claim.
6. What evidence do you have to support your claim?
7. How would the opposition counter this claim?
8. What solutions did you suggest to resolve your problem?
9. Would the opposition see these as viable solutions? Why or why not?

The Holes

1. What, if any, are the flaws in your position or claims?
2. What evidence do you need to strengthen your claims?
3. Have you overlooked a solution? If so, what is it?

What Does Depth Mean in Terms of Assessment?

The depth or rigor of an assessment experience can be found in the cognitive demand of the assessment task itself, in the implementation of the task, in the students' responses or discussions stemming from completing the task, and in the teacher's expectations as evidenced by the scoring tool used to assess the task. Tasks that lack depth or that place low cognitive demands on students involve either memorization or the application of procedures with no connection to meaning or understanding.

Figure 3.4 **Selected Critical Thinking Words and Examples**

Word	Definition and Example
Assumption	Something we take for granted or presuppose. Human thought is based on assumptions. Can be justified or unjustified. *If a boy is African American, his parents must be African American.*
Bias	A mental leaning or inclination. Can be neutral (based on our point of view) or negative (blindness or irrational resistance to weaknesses within one's point of view). *Poetry is dumb.*
Criteria	Standards, rules, or tests by which something can be judged or measured. *Goodness, fairness*
Data	Facts, figures, or information from which conclusions can be inferred or on which interpretations or theories can be based. *There were 3,000 robberies in the city last year.* *This apple contains no fat.*
Ethnocentricity	A tendency to view one's own race or culture as central based on the deep-seated belief that one's own group is superior to all others. *The United States determines the state of the global economy.*
Generalization	The act or process of extending from particulars to generals. *All wars are inevitable.* *All children can learn.*
Idea	Anything existing in the mind as an object of knowledge or thought. *This city has a traffic problem.*
Inference	A step of the mind; an intellectual act by which one concludes that something is so in light of something else being so or seeming to be so. Can be strong or weak, justified or unjustified. *The soldiers are tired.*
Justification	The act of showing a belief, opinion, action, or policy to be in accord with reason and evidence, or to be acceptable. *That punishment was fair given the nature of the crime.*
Primary source	A firsthand document or primary reference work. *Witness statement, diaries, firsthand investigations*
Secondary source	A secondhand document or reference. *A review of research, historian's compendiums, police report taken at the station*

The following items from a social studies quiz illustrate lack of depth:

1. Write Y (yes) if the answer is true or N (no) if it is false.
   The southeastern states are
   West Virginia. _____
   New York. _____
   Georgia. _____
   Seattle. _____
   Arkansas. _____

2. Fill in with the correct answer:
   a. Florida is typically _____.
   b. The capital of Kansas is _____.
   c. Louisiana was once a _____ and _____ colony.

One of the ways that teachers can increase the depth of the preceding items is to shift them from focusing exclusively on recall and recognition to asking students to do something with what they know. For example, a teacher might ask students to describe some of the ways in which geography impacts the economic activity of California and North Dakota. A related approach is identifying a concept or theme that subsumes specific facts and asking students to explain the connections between specific facts and the theme. In the preceding items, a logical theme could be "place," and a connection item could be "Select two of the following states on this list, and describe their similarities and differences related to the geographic theme of 'place.'"

Assessments that require high cognitive demands on students, multiple solution strategies, different representations, and opportunities for students to elaborate on what they know are associated with higher levels of academic achievement (Avery & Palmer, 2001; Black & Wiliam, 1998, 1999; Herman et al., 2006; Ladwig, Smith, Gore, Amosa, & Griffiths, 2007; Stein & Lane, 1996). Assessments that promote depth of understanding have multiple entry points, perspectives, or solution strategies, allowing students to approach them in different ways based on their prior knowledge and interests. They often feature or demand multiple representations, as well as opportunities for students to form connections between key ideas and their representation or communities. Following are three examples of assessment tasks that promote depth of understanding:

> Students research the topic of bullying by generating a hypothesis concerning the amount of bullying they assume is occurring in their school, based on their personal experiences and observations. They design a survey and administer it to students in grades 3 through 6. They work in teams to tabulate data, transfer the data to a computer spreadsheet, and analyze the data to test their hypotheses. They watch videos, read articles, role-play, learn the characteristics of bullies and victims, and practice strategies to help them effectively handle a bullying situation. They keep a journal that contains questions, activities, and reflection pages. They make real-life observations and record incidents from the bus, playground, cafeteria, and the classroom; use these notes as the basis of skits that they create and present to the class; and receive feedback on their ability to deliver a message. The final authentic assessment is a product or performance for an audience of each student's choice that shows a willingness to take a stand to promote positive change in the school. (This task stems from a unit created by Nancy Krakowka and published by the Center for the Study of Expertise in Teaching and Learning.)

Notice how in this multifaceted assessment, students have multiple ways of learning and demonstrating their understanding about bullying. They also have to reconcile various perspectives about bullying, including their own, their peers', and those obtained through their research. Let's look at another example.

> Students research the different kinds of notification systems and number chains that are used during disasters. They design a phone chain using appropriate technology that will contact their classmates in case of an emergency (assume a class of 30). They determine how long it would take to call everyone on the chain if they used a three-, four-, or five-person chain, explaining the method used to make that determination. They consider the advantages and disadvantages of using certain number chains and explain their reasoning. They present their solution to the class using a persuasive argument. The class selects the best proposal and sends it to the school's office.

As was the case in the preceding example, this assessment requires that students engage in classroom inquiry, reconcile different perspectives and methods, and demonstrate their understanding in different ways.

Now let's consider yet another example, this time from the field of health and wellness.

> Students conduct a personal health and fitness appraisal to determine areas of health risk. They use the appraisal results to develop a personal vision and plan for achieving a health-enhancing goal that is realistic, attainable, and beneficial to health. They design and implement an action plan using goal-setting guidelines from previous lessons on personal and social skills. They conduct research on (1) guidelines and recommendations associated with goal attainment; (2) needed behavioral changes; and (3) medical findings about different approaches. They periodically assess and evaluate their progress toward reaching their goals by writing journal entries (including artwork and poetry) and working with their peers. The appraisal ends with students' assessing their progress and identifying future goals.

Notice that in this health and wellness assessment, inquiry also plays a role, this time in the middle of the assessment. Once again, students reconcile multiple perspectives and are able to demonstrate their understanding through different means.

How Do Standards Relate to Depth?

State, national, and international standards are no longer new in education. In most states, standards have been coupled with high-stakes state tests, making them difficult to ignore. However, many teachers continue to struggle with ways of relating standards and their accompanying performance indicators to their lessons and teaching resources. Sometimes they assume that someone within their school or district has already aligned standards to their curriculum, so they don't need to look at them. In other cases, they're overwhelmed by the number of standards, or they don't have opportunities to engage in a careful review and alignment process to help determine how well they attend to these standards in their teaching. In yet other cases, as with Allyson at the beginning of this chapter, teachers may continue to rely on their texts and lessons and then justify them by linking them to standards in only the most general terms.

Despite the fact that many schools fail to provide teachers with adequate opportunities to learn and use standards, standards can be of

great assistance to teachers. They can help them validate, prioritize, and substantiate their curriculum. They can support conversations among teachers within and across grades that relate to aligning expectations for students' learning. A careful standards review and alignment process can also prompt teachers to deemphasize or even eliminate some lessons and units, creating space and time to deepen students' learning. It is also possible that the review process provides teachers with the impetus for designing learning and assessment experiences that transcend the standards, as was the case with the paleontology unit described earlier.

How Can Standards Become a Tool for Deep Curriculum and Assessment Design?

Teaching and assessing with standards is not about developing individual lessons and assignments for every single standard and performance indicator. To do so would more than likely result in breadth without depth.

A curriculum that addresses the standards doesn't need to compromise depth. In fact, using the criteria for depth and academic rigor, teachers can revise or develop assignments that incorporate far more performance indicators from state, national, or international standards than their original assignments. To do justice to a curriculum while attending to standards, teachers need to use a standards-based design process that begins with identifying desired exit standards or outcomes for their students. These standards should relate to their primary content area and to a process area that supports it. For example, the content area of science might best be combined with the process standards of language arts.

The second step in the design process is identifying specific performance indicators that relate to desired exit standards. A third step involves determining or designing specific assessment experiences that would enable students to demonstrate their attainment of desired standards. Finally, teachers can develop or identify the learning experiences that would prepare students for the culminating assessments they will complete.

What follows is an example of an original assignment and its transformation using the New York State learning standards. I have noted the relevant standards and performance indicators in the original and revised assignment.

Original Assignment

Write a well-developed essay about a national policy of your choice. Your essay should (1) explain the policy that you researched; (2) express your opinion about the policy in a way that will persuade your reader to adopt your point of view; (3) use appropriate conventions, including citations; and (4) include a bibliography.

If teachers were to develop a rubric for this opinion paper, their rubric might look like the one in Figure 3.5.

The New York State English Language Arts Standards performance indicator that would be addressed by this assignment is "11.w.3.c. *Use strategies designed to influence or persuade* in writing speeches, editorials, and advertisements." A social studies teacher who engages in a careful review of the English language arts and social studies standards while considering this assignment might identify the following desired exit standards and indicators:

Social Studies Standards

SS 1.2.b. *Develop and test hypotheses about important events, eras, or issues in New York State and United States history,* setting clear and valid criteria for judging the importance and significance of these events, eras, or issues.

SS 1.2.c. *Compare and contrast the experiences of different groups in the United States.*

SS 5.4.a. *Consider the need to respect the rights of others, to respect others' points of view* (adapted from *The National Standards for Civics and Government,* 1996).

SS 5.4.e. *Participate in school/classroom/community activities that focus on an issue or problem.*

SS 5.4.f. *Prepare a plan of action that defines an issue or problem, suggests alternative solutions or courses of action,* evaluates the consequences for each alternative solution or course of action, prioritizes the solutions based on established criteria, and proposes an action plan to address the issue or to resolve the problem.

English Language Arts Standards

ELA 11.R.1.d. *Check the consistency of hypothesis with given information and assumption.*

Figure 3.5 **Opinion Paper Rubric**

Dimension	1	2	3	4
Opening statement	• Opinion is not stated. • Opening paragraph needs to be revised to make it more compelling for the reader to continue.	• Weak statement on writer's position. • Adequate opening paragraph that would benefit with additional description and emotionally charged words.	• Opinion is stated with conviction. • Opening paragraph grabs the reader's attention. • Effective use of description and emotionally charged words.	• Opinion is stated clearly and forcefully. • Opening paragraph is so powerful that the reader is compelled to continue.
Supporting sentences	• Reasons don't support opinion. • Reasons are simply listed. • Student needs valid ideas to support opinion. • Connection to documents isn't made.	• Supporting sentences don't adequately explain position. • Student uses limited examples from documents to validate opinion. • Documents need to be cited correctly.	• Rational argument is made for supporting author's opinion. • Student uses several examples from documents, citing them correctly.	• Significant reasons and logic are used to support opinion. • Clear and evident relationship exists between documents cited and author's opinion.
Closing	• Paper ends abruptly with no closing.	• Weak closing needs a synopsis that restates main idea.	• Summative closing captures main points of argument.	• Inspirational closing supports main points of argument and is powerful enough to sway a reader's opinion.
Mechanics	• Many spelling and grammatical errors. • Difficult to read.	• Noticeable spelling and grammatical errors. • Legible handwriting.	• Minor spelling or grammatical mistakes. • Typed or excellent handwriting.	• No spelling errors and no grammatical errors. • Typed, no errors.

ELA 11.R.1.e. *Analyze and synthesize* information from *different sources, making connections and showing relationships to other texts, ideas,* and subjects and to the world at large.

ELA 11.W.3.b. *Analyze a wide range of texts using resources* such as recognized experts, *knowledge from* school subjects and *reading,* and personal experience.

ELA 11.W.3. c. *Use strategies designed to influence or persuade* in writing speeches, editorials, and advertisements.

The following revised assignment might result from brainstorming the best possible assignment to address all of the preceding indicators.

Revised Assignment

Now that you have completed your research and the analysis of the key documents and excerpts that you selected related to policies you were interested in, you will create a policy brief for each of the policies you have examined. Your policy brief should (1) include evidence of the research and analysis that you have completed (references to the documents and perspectives that you have examined—accurate, detailed, and clear information); (2) clearly convey the multiple perspectives of the stakeholders involved in the issue; (3) compellingly develop and support your hypothesis and the position that it informs; (4) express well-thought-out opinions and proposals for alternate solutions to the policy issue; (5) persuade your audience of the validity of your analysis and hypothesis and the feasibility of your proposal; and (6) adhere to conventions of writing.

Figure 3.6 portrays the rubric for the policy brief. This rubric was created by drawing on the language of the performance indicators that relate to the assignment.

How is the revised assignment different from or better than the original one? The original assignment was isolated from any meaningful context and required students to demonstrate an understanding and opinion related to a specific policy. The revised assignment relates more closely to civic engagement and democratic participation. It is situated within prior research and inquiry around policies that students may care about and that require enough of an understanding to either endorse

Figure 3.6 **Policy Issue Brief Rubric**

Dimension	1	2	3	4
Research: reflecting an accurate understanding of diverse opinions/ views	• Mentions the policy issue • Is unfocused or presents only own opinion • Includes information that's unrelated to the policy issue	• Provides a description or explanation of the policy issue • Focuses on a single opinion or point of view about policy issue • Includes information that contains inaccuracies	• Provides an analysis of the policy issue • Includes multiple opinions on the policy issue • Includes information that's accurate and clear	• Provides a detailed analysis of the policy issue • Takes into account diverse perspectives on the policy issue • Includes information that's detailed, accurate, and clear
Content: taking and defending a position related to the policy	• Takes a position that is confusing or irrational • Lacks analysis of policy issues or makes no point • Provides no evidence to support the hypothesis • Uses irrelevant examples or no examples	• Takes a position that's vague • Analyzes policy issues in a confusing way • Provides insufficient evidence to support the hypothesis • Uses relevant and irrelevant examples	• Takes a well-defined position • Analyzes policy issues to make a clear point • Provides adequate evidence to support the hypothesis • Uses relevant examples	• Takes a strong, convincing position • Analyzes policy issues to make a clear, powerful point • Provides accurate and compelling evidence to support the hypothesis • Uses extensive and relevant examples
Relevance: making connections between the policy issue and its stakeholders	• Makes few or no explicit connections • Misrepresents, misunderstands, or ignores the policy issue's effect on any stakeholder • Expresses no opinion or opinions unrelated to the effects of the policy on the community • Makes no recommendations for change	• Relates policies to policy issues or to stakeholders • Relates the effects of the policy issues on a single stakeholder or perspective • Relates personal opinions about the policy • Makes recommendations for the stakeholder to change or influence that policy	• Relates policies and policy issues to stakeholders • Describes the effects of the policy issues on the experiences of different stakeholders • Connects personal or researched opinions about policy to the effects of the policy on the stakeholders • Makes recommendations for the stakeholder to change or influence that policy	• Relates policies, policy issues, and research to stakeholders • Analyzes the effects of the policy issues on the experiences of different stakeholders • Connects personal and researched opinions about policy to the effects of the policy on the stakeholders • Makes clear and possible recommendations for the stakeholder to change or influence that policy

Source:

or challenge them. It demands that students grapple with policies much like we do as citizens—namely, by identifying, reconciling, and negotiating multiple perspectives. Furthermore, it asks that students link their understanding of policies to a hypothesis they have generated as they craft a proposal demanding some kind of action or change.

Conclusion

As educators, we say that we want students to think deeply and critically. It is not enough simply to want that, however. Depth takes commitment and time—a commitment to probe into important questions; to look beneath the surface; to use different disciplinary lenses; to search for patterns and connections; and to examine competing perspectives. This commitment translates into fewer and longer interconnected learning experiences, supported by assessments that promote application and transfer, along with additional learning. It requires that we rethink how we approach lessons and assessments, teaching "the basics" inside complex contexts, revisiting our own priorities and approaches, and not accepting the status quo simply because it exists. We must meet Ellen's challenge from the beginning of this chapter so that we can truly prepare students for their future—in school and in life. The application activities in Figure 3.7 will get you started.

Figure 3.7 **Application Activities for Chapter 3**

Application Activity 1: Thinking and Reasoning Skills and Processes

Fill in the right column with prompts and questions you use in your own classroom that help teach your students these thinking and reasoning processes.

Thinking and Reasoning Process	Definition	Sample Prompts or Questions	Prompts or Questions from Your Curriculum
1. Classifying	Arranging objects or events in classes or groups according to some criteria, method, or system	Asking students to take objects such as buttons from a mixed collection and place them in groups by color, size, shape, number of holes, or texture	
2. Comparing and contrasting	Looking for differences and similarities among objects, items, people, events, etc.	"Do you want to determine how things are similar or different?"	
3. Analyzing errors	Discriminating accurate and effective information/material from inaccurate and ineffective information/material	"What are the errors in this passage?"	
4. Forming opinions and developing arguments	Identifying beliefs, usually open to dispute	"What is the position of this character on this issue?"	
5. Forming hypotheses	Constructing tentative and testable statements about something that may be true based on reasoning	Making a statement that can be used as the basis for an experiment: "Double-layered paper towels absorb more water than single-layered towels."	
6. Measuring	Making quantitative observations by using conventional or nonconventional measurement standards	"Let's calculate the space we need to redesign for our reading area."	
7. Observing	Becoming aware of an object, person, or event by using the senses and/or supporting equipment to identify properties	"Take notes on all the verbal interactions you hear on the playground among students."	
8. Making inferences	Making conclusions based on reasoning to explain an observation	"What conclusions can you make based on what you've read or observed?"	
9. Recording data	Collecting bits of information about objects, people, or events that illustrate a particular situation	"Track the number of questions each of you asked during our Socratic seminar."	

Source: Adapted from Learner-Centered Initiatives, 2002.

Figure 3.7 **Application Activities for Chapter 3 (*continued*)**

Application Activity 2: Words Associated with Thinking and Examples

Complete the right-hand column with examples of how you teach your students these "thinking" words.

Word	Definition and Example	Example from Your Curriculum
Assumption	Something we take for granted or presuppose. Human thought is based on assumptions. Can be justified or unjustified. *If a boy is African American, his parents must be African American.*	
Bias	A mental leaning or inclination. Can be neutral (based on our point of view) or negative (blindness or irrational resistance to weaknesses within one's point of view). *Poetry is dumb.*	
Criteria	Standards, rules, or tests by which something can be judged or measured. *Goodness, fairness*	
Data	Facts, figures, or information from which conclusions can be inferred or on which interpretations or theories can be based. *There were 3,000 robberies in the city last year. This apple contains no fat.*	
Ethnocentricity	A tendency to view one's own race or culture as central based on the deep-seated belief that one's own group is superior to all others. *The United States determines the state of the global economy.*	
Generalization	The act or process of extending from particulars to generals. *All wars are inevitable. All children can learn.*	
Idea	Anything existing in the mind as an object of knowledge or thought. *This city has a traffic problem.*	
Inference	A step of the mind; an intellectual act by which one concludes that something is so in light of something else being so or seeming to be so. Can be strong or weak, justified or unjustified. *The soldiers are tired.*	
Justification	The act of showing a belief, opinion, action, or policy to be in accord with reason and evidence, or to be acceptable. *That punishment was fair given the nature of the crime.*	
Primary source	A firsthand document or primary reference work. *Witness statement, diaries, firsthand investigations*	
Secondary source	A secondhand document or reference. *A review of research, historian's compendiums, police report taken at the station*	

PART TWO

Assessment

How can we diagnose, monitor, and evaluate student learning?

4

Assessment That Produces and Measures Learning

Not all words are equal. Some, like *beautiful, interesting, test,* and *above average,* evoke emotional responses from both users and receivers. *Assessment* is such a word. It carries significant baggage and evokes strong responses, especially when uttered in the context of education.

When my daughter was in 7th grade, she did something as a student that I would never have had the courage to do. Shortly after being handed a social studies test, she carefully drew a diagonal line across its front page and wrote, "When you have something interesting to ask me, let me know." She then proceeded to give the test back to her teacher.

As a parent, I had to confront this act of defiance and urge my daughter to comply with the school's testing requirements. As a designer and consultant in the field of assessment, I admit that her actions raised fundamental questions for me about the use and value of tests.

After perusing the test, which included 30 multiple-choice questions on factual information related to U.S. history with no explicit conceptual framework to support them, I wondered about the value of these test questions, in this form, as evidence of student learning and about the distance between those facts and what students read, talked about, or did on a regular basis. I asked myself about the role of questions whose responses required an effort on the part of the learner to make connections between seemingly distant historical facts and the mundane yet relevant facts and issues of current everyday life.

I have now spent almost 20 years helping teachers design assessments that measure a wide array of student knowledge, skills, and dispositions and that are congruent with what teachers value. Even though

the U.S. educational system has shifted several times in terms of emphasizing equality of opportunities and excellence in outcomes, schools' and teachers' responses to externally imposed assessment demands have been very consistent over time. Teachers' assessments mirror measures they believe serve as gatekeepers for students' success. Success, in general, means access to upper grades, better schools, and, ultimately, universities. The SAT, state assessments, and most standardized tests define the scope, form, and content of the majority of assessments teachers use, even though they measure a relatively narrow band of what students know, can do, and value, and even though evidence suggests that these measures aren't the best predictors of students' success in higher education and beyond.

Assessment as a concept and a practice is both simple and complex. At one level, assessment is as natural and common as breathing. We do it all the time. We constantly assess whether students are paying attention and whether they are on task. We assess their understanding and misconceptions when they answer and ask questions. On another level, assessment is complicated and precise, requiring thoughtful planning and execution. In education, assessment is at its best when it is ongoing and most difficult to distinguish from the teaching that is occurring.

What Should Teachers Assess?

The complexity of assessment lies in the fact that almost everything worth understanding requires multiple and different kinds of data sources. If we truly want to understand students' critical thinking and problem-solving abilities, we need to use a variety of assessments, some that measure generic skills as well as others that assess thinking and problem solving in specific domains or contexts. It is probably a truism that what is easy to measure is not all that important, and what is worth measuring is difficult to measure easily. Therein lies one of the major problems in our educational system: schools rely on and are bound by a huge assessment enterprise that is mostly measuring relatively unimportant things.

Truly assessing students' learning means measuring how they can use and share what they know, what and how they think about learning and about themselves as learners, how they process and use information, and what they can create by combining what they have learned with available resources. It means finding opportunities to discern how

students transfer what they have learned in one context to a different one, how they express what they have read or know to different audiences, how they react under pressure, and how well they can answer and ask questions. Measuring the facts that students remember in social studies or science, the formulas they can recognize in algebra, or the order of the lab procedures they need to follow in science is but a small part of both the students and their potential.

No single assessment, whether commercially produced or teacher designed, can realistically measure all that it is possible or even desirable to measure. Determining what should be assessed at any given moment is a critical step in creating an assessment system that is both proactive and responsive. Decisions about what should be assessed come directly from established grade-level or course learning outcomes and/or standards and expectations, from the content of lessons taught in the classroom, and from identified and targeted areas of student need. Prioritization can help narrow the scope of an individual assessment task and make assessment manageable, but this very act of narrowing underscores the need for multiple measures in order to attain an accurate snapshot of student learning. This point is illustrated in the following scenario, in which a principal and teacher begin with an analysis of test data and then use classroom data to refine their understanding of student needs and to support next steps.

It is November 1. A principal's meeting has been called for the purpose of distributing the results of the most recent standardized test. As she looks through the charts and graphs in the file she has been handed, principal Carmen Sanchez ponders how to communicate the results of this extensive data analysis of students in her school. She knows that the knowledge and skills areas that need attention are extensive and that many of her teachers, half of whom are in their first year, will be overwhelmed. She decides to begin by sharing the information with Judy Robinson, a third-year teacher who, though young, is already a leader at her grade level.

Some of Carmen's colleagues advocated the use of more test simulations to monitor growth in the problem areas, whereas others felt strongly that teachers should develop specific lessons and activities for each of the problem areas. One of her colleagues indicated that teachers should ignore any lessons in the existing curriculum that do not explicitly relate to the problem areas, until the new state test is given. None of these choices seemed quite right to Carmen at the time. At least for

now, she would trust her instincts and follow through on the conversation with Judy.

When she returns to her building, Carmen calls Judy to her office. She begins the meeting by stating that she has just received a list of "learning gaps" or "problem areas" based on an item analysis of the test. Judy examines the list carefully (see Figure 4.1).

Figure 4.1 **Learning Gaps Resulting from Analysis of Test Data**

- Editing/revising
- Finding supporting evidence
- Locating information in text
- Using appropriate spelling, capitalization, punctuation
- Developing ideas
- Finding details/main idea
- Making inferences
- Answering all parts of a question
- Planning a story
- Writing a sentence
- Writing a paragraph
- Drawing conclusions
- Interpreting facts
- Interpreting figurative language
- Responding to writing prompt
- Identifying theme
- Identifying author's purpose
- Using graphic organizers
- Using a strong lead
- Writing with a "voice"
- Using transitions
- Making inferences about characters
- Sequencing ideas
- Using vivid language
- Drawing conclusions about characters
- Understanding vocabulary
- Communicating a main idea
- Interpreting questions
- Writing a conclusion
- Using appropriate details
- Writing a topic sentence
- Understanding others' point of view
- Performing task within the time limits
- Maintaining a focus
- Writing complete ideas

After giving Judy time to examine the data, Carmen asks her if there are any items on the list that she knows are not problems for her own students. When Judy nods, Carmen recommends that she refine the list by crossing out any needs that aren't currently evident in her class and adding any others that she thinks are evident in her students but that aren't on the list. Judy deletes the following items:

- Locating information in text
- Answering all parts of question
- Responding to writing prompt
- Drawing conclusions about characters

Carmen and Judy both think about the revised list. Judy wonders whether the way in which she edited the list makes sense, since she can think of at least one student who has most of the needs, but she can also think of

many others who share some items on the list but not others. She asks herself, "Is there a magic number I should be using to determine what comes off the list?" Carmen wonders what evidence Judy drew from to edit the list as she did. She also thinks about whether some of the learning needs are more widespread than others. Both Judy and Carmen find the list overwhelmingly long and, after discussing this, decide that Judy should cluster all similar items and create headings for each cluster (see Figure 4.2).

Figure 4.2 **Clustered List of Problem Areas or Learning Needs Relating to Writing**

Writing Process
- Planning a story
- Using graphic organizers
- Revising

Conventions
- Using appropriate conventions
- Editing

Test Taking
- Performing a task within time limits
- Responding to writing prompt

Development of Ideas
- Developing ideas
- Writing appropriate details

Focus and Organization
- Maintaining a focus
- Communicating a main idea
- Writing a topic sentence
- Writing a conclusion
- Writing a sentence
- Writing a paragraph
- Using transitions effectively
- Writing complete ideas

Style
- Writing with a "voice"
- Using a strong lead
- Using vivid language

As they look at the latest version of the list, Carmen and Judy have three big new questions:

- What classroom assignments have been used since the beginning of the year to measure students' skills and knowledge related to these needs?
- What work have students produced that could reveal any evidence of their current skills and knowledge or of their development toward attaining them?
- What other documentation exists of students' learning needs?

Judy thinks about these questions and begins to associate what she has asked students to do, or what she has collected, with the clusters

of needs that she has just created. The more she thinks about this, the less comfortable she is, realizing that, although she has always felt she has enough information to support her assessment of student writing, she has relied primarily on two basic sources: (1) student responses to specific prompts that she has provided and (2) activities around the development of isolated skills, like recognition of parts of speech or editing drills. She realizes that, though she has lots of data, the information isn't varied enough in type or focus to help her prioritize the needs on the list.

Judy decides that she needs to create assessments that will help her measure students' abilities, needs, and progress in the clustered areas on her list. These clusters will provide the focus of her assessments for the next several weeks.

Once the focus of the assessments has been established, Carmen and Judy recognize that planning for their implementation is the next step. Identifying the optimum moments inside any set of learning experiences to assess what is important helps maximize the connections between teaching and assessing. It allows the assessment of student learning to be spread over a period of time. In Judy's case, not only will she need to design assessment activities that will help her tap the specific areas that she and her principal have decided require more student data, but she will have to do so inside the curriculum that she is currently teaching.

When Should We Assess?

In assessment, although timing isn't everything, it is certainly an important piece of the picture. The timing of an assessment of student learning is a determining factor in how that assessment information can and should be used. For example, assessment at the beginning of a learning experience—what we refer to as *diagnostic assessment*—is a powerful informant for an educator, allowing a glimpse of where students are relative to what is about to be taught and providing the opportunity to make early adjustments or rethink upcoming learning opportunities by keeping in mind the students who are about to engage in them.

This same diagnostic assessment, while powerful as an indicator of where students are as they begin to engage with a learning experience, provides little information about ongoing student learning or students' ultimate attainment relative to the outcomes of the upcoming learning

experiences. For that, ongoing *formative* assessments, followed by a culminating or *summative* assessment or series of assessments, would be necessary. A chart correlating assessment focus areas, types, and possible appropriate activities appears in Figure 4.3.

What Forms Can Diagnostic Assessment Take?

I've often heard teachers say, "If only I had known this about my students at the beginning of the year, I could have accomplished so much more!" One of the most interesting innovations resulting from this realization has been an array of beginning-of-the-year diagnostic assessments, implemented during the first two weeks of school to help teachers assess what they consider to be students' skills, understandings, and dispositions that would be most helpful for them to know early on. In some cases, teachers have designed diagnostic centers so that students cycle through different experiences daily. In other cases, these diagnostics take the form of individual or group activities, worksheets, reflective questions, inventories, or surveys. In all cases, the intent is to use the information gathered from these assessments to inform the design of learning experiences so that they best suit their students where they are. Figure 4.4 presents an organizer designed to help teachers plan these diagnostic assessments.

The use of a pre-test is another way of uncovering what students know, do not know, or need to clarify relative to what is about to be taught. In designing the pre-test, a teacher highlights important skills and knowledge. Often a pre-test is used as a diagnostic, but it does not automatically qualify as such. For a test to be considered a diagnostic assessment, the teacher must use information from the pre-test to make adjustments in the subsequent learning experiences, such as rethinking necessary strategies, appropriate levels and types of resources, and other possible adaptations or modifications.

Baseline assessments, semantic webs, mind maps, surveys, inventories, and reflection prompts or activities, among others, can provide diagnostic assessment data. Diagnostic assessment itself has less to do with the actual activities used than with the timing and purpose of those activities: before learning begins and with the intent to gather information about the learners that will influence the content or teaching methodology of the upcoming learning experiences.

Figure 4.3 **Assessment Focus Areas, Types, and Possible Activities**

What We Measure	Best Measured Through	Possible Assessments
KNOWLEDGE **Content** (e.g., specific geographic features, structure of a cell, *Macbeth*, musical notation)	Recall-based measures (e.g., tests and quizzes)	**Diagnostic:** pre-test, KWL **Formative:** class work, fact-based *Jeopardy*! or bingo, end-of-lesson reflection (could communicate learning, questions, misunderstandings), review for test **Summative:** quiz/test
Concepts (e.g., justice, genre, energy, family, beauty, cycle)	Combination of recall and performance-based measures (e.g., role-plays, designs, experiments)	**Diagnostic:** concept map, proposal, sketch **Formative:** concept map with revisions, revised proposal, sketch, plan with process notes and revisions, rehearsal, review, annotated experiment log/journal **Summative:** final revised concept map, project log and summary of accomplishments, role-play, essay
Procedures (e.g., how to add, balance a checkbook, take notes, dribble a basketball)	Performance tasks (e.g., adding, balancing a checkbook, taking notes, dribbling a basketball)	**Diagnostic:** problem solving, proposal, outline **Formative:** simulation/practice, identification/explanation of steps in the process, talk through or "think aloud" while solving problems **Summative:** problem solving, performance task
SKILLS **Literacy** (reading, writing, speaking, listening)	Performance and authentic tasks	**Diagnostic:** baseline sample, KWL, reflection questions **Formative:** assignment checklist or rubric used while students are working, reflection questions posed as students work, conference on the draft of a paper **Summative:** final draft or performance and checklist or rubric used
Processes (drawing inferences, making analogies, comparing, synthesizing, analyzing, questioning)	Performance and authentic tasks	**Diagnostic:** pre-test/analysis, baseline sample **Formative:** peer paired sharing, conferences, criteria chart or checklist with guiding questions for self-assessment **Summative:** project, performance, or other culminating task with rubric, checklist, or criteria chart
Subject-specific (playing a musical instrument, keyboarding, computer programming, problem solving)	Authentic performances	**Diagnostic:** pre-test, baseline sample **Formative:** positive or negative suggestions on work in progress, checklist or rubric used while students are working **Summative:** performance or other culminating task with rubric, checklist, or criteria chart
ATTITUDES/DISPOSITIONS **Toward self** (self-awareness, self-regulation/monitoring; self-efficacy, tolerance of own limitations, humility)	Combination of reflective prompts and observations	**Diagnostic:** reflection prompts or activities, inventory, survey **Formative:** reflection questions posed as students work, readiness questions: "Are you ready to …?" **Summative:** inventory or survey; reflection on self as a learner, on learning, on processes; goal setting and strategic planning
Toward others (perspective taking, empathy, tolerance, collegiality)	Experiences and prompts that activate these attitudes/dispositions (e.g., role-plays, peer reviews), portfolios	**Diagnostic:** baseline measure, role-play, reflection prompts or activities, inventory **Formative:** Reflection questions or activities, role-play, criteria in checklists or rubrics used to set and monitor goals, peer review **Summative:** role-plays, portfolios
Toward school Shared responsibility, civic-mindedness, commitment to making a difference	Experiences and prompts that activate these attitudes/dispositions (e.g., role-plays, peer reviews), portfolios	**Diagnostic:** baseline measure, reflection prompts or activities, survey **Formative:** establishing and using exemplars and models, peer sharing or review, role play with reflection **Summative:** role-plays, portfolios

Figure 4.4 **Planning Diagnostic Assessment**

What do you need to know about your students' *current* skills, conceptual or content understandings, experience, and dispositions/attitudes that would help you be better prepared to meet their needs and create learning experiences that challenge them appropriately?

	Skills	Conceptual/ Content Understandings	Experience	Dispositions/ Attitudes
Math (Highlighted or underlined are essential to know immediately.)				
Planning Diagnostic Assessment: Math				
Diagnostic activity	What the teacher does: What the students do:			
Focus	**Skills**	**Conceptual/ Content Understandings**	**Experience**	**Dispositions/ Attitudes**
Assessed				
Grade-level expectations (standards)				
Additional teacher expectations/criteria				
"Bonus" info (What else could I learn from this assessment?)				

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How Can Formative Assessment Be Used to Support Student Learning?

Formative assessments provide insights into learning in progress. Timed well, they can reveal issues of misunderstanding or confusion before they become obstacles to student learning. Formative assessments are planned and documented (e.g., conferences, observations, review of work or proposed goals, and strategic plans); they aim to provide information about student progress, in progress. They don't generate formal grades but are rich in the feedback that they provide—for teachers about the relative effectiveness of lessons and activities, and for learners about

the degree to which their learning and work are meeting expectations and standards. They are powerful in the revisions they inspire. Formative assessments help educators and learners alike answer the question "What do I do next?"

What follows are three examples of best practices in formative assessment. In each it is clear that the assessment (1) is occurring during the course of student learning, (2) has as its primary purpose to monitor student learning, and (3) provides data the teacher can use to adjust instruction to better meet the learning needs revealed.

Formative Assessment Example 1

Learning issue: *The errors that show up in students' class work or homework leave one wondering whether they were actually in the classroom when the lessons were taught.*

Formative assessment: *Students compare their homework solutions in groups, determine one or two areas of confusion that still exist, and share these with the teacher. Later, they individually write, "What is still confusing is . . . ."*

Timing: *A few days into the unit.*

What teachers learn: *What needs to be retaught, and at what level.*

What students learn: *Different ways that students in the class deal with the same material.*

Formative Assessment Example 2

Learning issue: *This is the third lab, and students are still forgetting to include all the requirements of a lab report.*

Formative assessment: *Hand out copies of an excellent lab report and a poor lab report. Students identify indicators of quality with the reports (either locating these on the rubric or creating the rubric). Students then rewrite their first lab report, indicating particular places where they attempted to include the indicators.*

Timing: *Before the fourth lab is written.*

What teachers learn: *Whether they and their students are "on the same page" as to what constitutes a good lab report, and which rubric or checklist criteria may need more models (at several levels of competence).*

What students learn: *How the teacher's expectations and theirs are similar or different in terms of quality.*

Formative Assessment Example 3

Learning issue: *Even the best students repeatedly write dry and uninteresting narratives.*

Formative assessment: *Working in pairs, students use criteria from the idea development dimension of a rubric to give and receive feedback on a personal narrative. The focus for the review is the use of description and details. Referring to the rubric, they write comments or questions designed to help each other better use details and description to develop their writing, identifying specific examples from their partner's piece to illustrate their comments and questions. Time is provided for all students to set goals for the next day's writing time, based on what they would do to their piece in response to the feedback.*

Timing: *While or after students revise their narrative.*

What teachers learn: *How well students are applying what they learned about descriptive writing; how well students themselves can use the rubric criteria; how well students can support their use of criteria with examples; what rubric criteria or language may require revision, either to better match the assignment or to better enable student use; how well students use feedback to rethink and revise work.*

What students learn: *How the rubric criteria actually apply to their work; how to use the rubric to give feedback to a peer; how to find evidence of rubric criteria in their own and others' work; how to use the rubric to help them improve their work.*

Here are two more formative assessment examples:

- Students have been presented with the culminating task and rubric at the beginning of the unit. At any stage of their work, they may ask the teacher to look at it for feedback against the rubric.
- Students create a "ticket out the door": they write on an index card one insight or one area of confusion, or a solution to a new problem using the concept taught in class.

Because of their ongoing nature, formative assessments are sometimes regarded as "informal assessments," but this view actually weakens the concept and its implementation. It also limits the reliability and

usefulness of the resultant learning. Although informal assessments are very often formative in nature, they are rarely consistently documented, which greatly reduces the degree to which they can be used once the informal moment has passed. The most useful formative assessments are those that are planned and captured in some way. Creating a manageable documentation system for formative assessments so that we can return to the data that they provide is important if we want to track student progress and the effect of interventions. Figure 4.5 is a chart that shows seven different formats for capturing formative assessment data, as well as strategies for documentation, optimum timing, and who may actually be assessing. It is typically a relief for teachers to note that they are not necessarily the lone assessors or documenters.

What Is the Role of Summative Assessment?

Occurring at the end of a learning experience, *summative* assessments aim to measure the learning that results from the content and strategies of lessons or a unit. They are responsible for generating grades or data indicative of the degree to which the established learning outcomes or standards have been achieved and the expectations met. Summative assessments can take many forms but are most easily recognized as end-of-unit tests or projects. What follows is an alternative to this image.

A teacher who wanted to assess a broader array of learning outcomes than what would be measured by the typical end-of-unit test asked students an open-ended guiding question (see Chapter 8) about the topic, both before and after teaching the topic. This allowed her to measure the impact of her teaching on the students' learning, independent of how much the students might have known about that topic in the first place. Figure 4.6 shows an example of a student's response to a pre-/post-assessment from her 8th grade English class.

This teacher also encouraged her students to reveal and explore their learning insights and processes as well as to analyze their own growth and attainment by attaching reflective questions to the post-assessment experience. Following Figure 4.6 is the same 8th grader's own analysis of the differences between the pre- and post-tests.

Figure 4.5 **Assessment Formats, Strategies, Timing, and Assessors**

Format	Strategy	Timing	Assessor
Rubric	• Highlighting or marking descriptors • Writing comments in a "notes" column • Conferencing to set goals and plan around next steps	• During any stage of a process, as long as there is time to revise work as a result of what is learned or planned	• Student • Teacher • Peer • Others who have a clear understanding of the criteria
Checklist	• Checklist marked in a "draft," "self," or "peer" column • Comments, question, or suggestion area for draft • Reflection space for planning tomorrow's work based on today's feedback	• During any stage of a process, as long as there is time to revise work as a result of what is learned or planned	• Student • Teacher • Peer • Others who have a clear understanding of the criteria
Feedback sticky note	• +/–/? with related comments placed on a sticky note attached to the paper. This note can be dated and transferred to a student's file as documentation.	• During any stage of a process, as long as there is time to revise work as a result of response	• Student • Teacher • Peer • Others who have a clear understanding of the criteria
Annotations	• Notes written directly on work. The work itself becomes the documentation.	• During any stage of a process prior to the final draft	• Student • Teacher • Peer
Reflection	• Space on rubric, on checklist, on the work itself, or in a journal for identifying strengths/needs, setting goals, and/or articulating next steps	• During any stage of the process, as long as a link is made to possible implementation of next steps	• Student • Teacher
Conference logs	• Notes made immediately after a conference, documenting focus, learning, goal setting, next steps, etc.	• During any stage of the process	• Student • Teacher • Peer • Others who have a clear understanding of the criteria
Anecdotal records	• Notes made as a result of reviewing work—to document recommendations, needs, strengths, learning, etc.	• During any stage of the process	• Student • Teacher • Peer • Others who have a clear understanding of the criteria

Source:

Figure 4.6 **Student Response to Pre- and Post-test Assessment**

Pre-test	Post-test
What is the connection between memory, fiction & truth? • Fiction is fake. • Truth is what you believe or what you want to believe. Memory is something that has happened and is stored in your brain.	What is the connection between memory, fiction, and truth? • The connection is that a fictional story can have truth & real memories. • A truthful story of a memory can have little "white lies" to make it sound better.
What makes the Vietnam War different from any other American War? • Vietnam War was fought between the people of Vietnam & America joined to stop the spread of Communism. • Many people protested. Soldiers came back messed up.	What makes the Vietnam War different from any other American War? • The men that fought in the Vietnam War were for the most part boys. They were mostly 18 or 19 years of age. And these boys were mostly from the Middle or Lower Class because the rich boys dodged the draft by going to college. • Agent Orange (also known as Wack Jack), jungle fungus, the fighters of Vietnam did not come home with a home sick heart. Young boys were stricken with horrible nightmares. Most of the men were unable to function in a normal society when they got back, some say they turned mental.

Analysis of Pre- & Post-tests

1. My post test has 123 words and my pre-test has 50 words. My pre-test has 6 concepts and the post test has 8 concepts. My post test has 8 sentences and my pre test has 6 sentences
2. My post test is organized in sentences. And my pre test is organized in a list form. The pre test was written like sporadic gunfire, each thought came out one at a time a few minutes apart. While the thoughts for my post test flowed out in clumps.
3. The depth of my post test is much deeper than the depth of my pretest. My pre test is very shallow, all it is is simple facts that only scratch the surface. And my post test has facts with a little more substance that can cut through the surface & take away a layer.
4. The information in pre test is very broad and general, while the information in my post test is a little narrower and more specific than the pre test. The information in my pre test is simply cold facts, the most

general you can get. The information in my post test is specific facts and more emotional and deep rooted than my pre attempt.

5. I coldly wrote down the information in my pre test. But in my post test, I felt what I was writing because I was more aware of the background specifics. The tone of my pre test is one of levity and the tone of my post test is one of sincerity.
6. The writing of my post test covers an area of at least 3 times that of my pre test.

From my analysis of the 2 tests, it is evident that I learned about the Vietnam War. It is also evident that my awareness of the side effects of war was heightened.

There is no question in my mind that even if teachers had the time to complete such an analysis on all of their students' pre- and post-measures, they still couldn't acquire the kinds of insights that this student has revealed. Additionally, this type of self-assessment and analysis provide a tremendous opportunity for students in that it allows them the structured time to recognize their own learning, growth, and accomplishments, comparing themselves to themselves—an act that is a rare chance for some students to appreciate themselves as learners.

How Should We Assess?

As important as purpose and timing are to assessment, yet another attribute must be considered in the overall picture: the type of assessment that will be implemented. Assessment falls primarily into one of four categories: information recall, product, performance, or process.

Information recall assessments tap what students can remember or recognize as a result of what they have learned. Students' information recall can be measured through the use of multiple-choice, true-false, matching, fill-in, or short-answer tasks. *Product* assessments require students to use what they have learned to create something tangible. Posters, research reports, essays, sculptures, lab reports, and models are all examples of the kinds of products that students might make. In *performance* assessments, learning is evidenced when students perform something. Participating in experiences like role-plays, oral presentations, debates, skits, simulations, or basketball games would allow students to evidence their learning through performance. Finally, *process*

assessments provide data on how students think, learn, work, write, or problem solve. Student-generated journal responses, verbal reflections, logs, or think-alouds generate process-related evidence of student learning.

Attention to the types of assessment we use adds new layers to thinking about assessment. Different types of assessment are better suited to different purposes, and each category lends itself to different learning styles or preferred intelligences. Balancing the types of assessments used over time can help ensure that evidence of student achievement is rich and varied.

The outline of the unit shown in Figure 4.7 illustrates the interplay among assessment types (recall, product, performance, process), purposes (diagnostic, formative, and summative), and the unit's learning experiences. The types of assessment appear in the column on the left, assessment opportunities are identified in the second column, and the unit's learning experiences are described in the column on the right.

Conclusion

Assessment as an event is a narrow and myopic enterprise, pinning all impressions and evaluation on a single, isolated experience. Assessment as a system provides a rich montage of student learning, created from a collection of multiple pieces of evidence gleaned through a variety of types of assessment, each administered with a clear purpose and timed so as to support data collection as well as promote continued learning. Figure 4.8 shares some application activities for this chapter.

Figure 4.7 **Excerpts from a Middle School English/Social Studies Unit Based on the Concept of Childhood**

Assessment Type (Recall, Performance, Product, Process)	**Assessment Opportunities** (Diagnostic, Formative, Summative)	**Description of Learning Experiences Within Unit**
Recall/process	Diagnostic	Students write individual responses to the essential question "What does childhood mean? The class discusses these answers. Group explores "What do you think might be the same about being a child, no matter where in the world you might grow up? What might be different depending on where you live?"
		Groups of students identify a targeted country and create a research plan including list of potential resources, schedule of research, and choice of graphic organizers. Research is focused on family and home conditions, education, economics, and leisure activities. Individually, students complete different research tasks within their groups.
		Teacher does a minilesson on conducting library research and introduces students to relevant research terms.
		Students create a list of resources with annotations regarding information found in each.
Product	Formative	Students complete and hand in their bibliography page and completed research log.
Recall	Summative	Teacher administers a quiz on research terms.
		Students share their research logs within small groups to prepare for writing diary entries.
		Teacher guides a discussion around attributes of a diary.
Product	Formative	Students draft diary entries and share for feedback.
Product	Summative	Students submit 5–10 diary entries, covering a period of no less than one month and written in the voice of a child from the researched country.
Product	Formative	Students meet in small groups to identify a powerful issue related to childhood in their targeted country or region. They write a thesis statement presenting the issue identified by the group and turn it in.
Process	Formative (informal)	Students work to create a presentation on their issue (an explanation and discussion of it) and proposed actions or solutions. Teacher conferences with groups on presentation design.

Figure 4.7 **Excerpts from a Middle School English/Social Studies Unit Based on the Concept of Childhood (*continued*)**

Assessment Type (Recall, Performance, Product, Process)	**Assessment Opportunities** (Diagnostic, Formative, Summative)	**Description of Learning Experiences Within Unit**
Product	Formative	Students engage in a peer review of their presentation plans.
Performance	Summative	Small groups present a panel presentation at a "Children's Conference," where they present their issue and solution to classmates. Students then vote on the most compelling issue and feasible solution.
		Students work on a proposal for an individual showcase piece communicating conditions of childhood—including outline, sketch, or description of display; list of materials needed and how they will be obtained; and implementation of plan.
Product	Formative	Students engage in a peer review of the early stage of showcase pieces.
Product	Formative	Students have a peer review of near-complete pieces.
		Teams preview showcase pieces: "A Mosaic of Childhood."
Product	Summative	Students do a public presentation of "A Mosaic of Childhood."
Product (question), process (growth)	Summative	Students respond to the essential question again and compare their answers to their initial responses to the question to assess their growth.

Figure 4.8 **Application Activities for Chapter 4**

What follows are activities designed to help you think more deeply about assessment and your own practice. As you proceed through this section, treat each activity as an opportunity to reflect and raise questions or wonderings rather than generate clear answers. If possible, share this section with a colleague who has also read the chapter so that your thinking can add to and grow from the thinking of others.

Application Activity 1: Reflection Questions

1. What are my biggest questions?

2. What do I want to look at more deeply in my own assessment system?

3. What am I interested in learning more about?

4. What do I want to rethink or revise?

Application Activity 2: How Do I Use Formative Assessments?

Directions

1. Underline examples of formative assessment (in the right-hand column) that you currently use. Add examples to the list, if necessary.
2. Circle those that you would be interested in using but that aren't part of your current repertoire.
3. Share your findings with colleagues.

What We Measure	Best Measured Through	Possible Assessments
KNOWLEDGE **Content** (e.g., specific geographic features, structure of a cell, *Macbeth*, musical notation)	Recall-based measures (e.g., tests and quizzes)	**Diagnostic:** pre-test, KWL **Formative:** class work, fact-based *Jeopardy!* or bingo, end-of-lesson reflection (could communicate learning, questions, misunderstandings), review for test **Summative:** quiz/test
Concepts (e.g., justice, genre, energy, family, beauty, cycle)	Combination of recall and performance-based measures (e.g., role-plays, designs, experiments)	**Diagnostic:** concept map, proposal, sketch **Formative:** concept map with revisions, revised proposal, sketch, plan with process notes and revisions, rehearsal, review, annotated experiment log/journal **Summative:** final revised concept map, project log and summary of accomplishments, role-play, essay
Procedures (e.g., how to add, balance a checkbook, take notes, dribble a basketball)	Performance tasks (e.g., adding, balancing a checkbook, taking notes, dribbling a basketball)	**Diagnostic:** problem solving, proposal, outline **Formative:** simulation/practice, identification/explanation of steps in the process, talk through or "think aloud" while solving problems **Summative:** problem solving, performance task

Figure 4.8 **Application Activities for Chapter 4 (*continued*)**

What We Measure	Best Measured Through	Possible Assessments
SKILLS **Literacy** (reading, writing, speaking, listening)	Performance and authentic tasks	**Diagnostic:** baseline sample, KWL, reflection questions **Formative:** assignment checklist or rubric used while students are working, reflection questions posed as students work, conference on the draft of a paper **Summative:** final draft or performance and checklist or rubric used
Processes (drawing inferences, making analogies, comparing, synthesizing, analyzing, questioning)	Performance and authentic tasks	**Diagnostic:** pre-test/analysis, baseline sample **Formative:** peer paired sharing, conferences, criteria chart or checklist with guiding questions for self-assessment **Summative:** project, performance, or other culminating task with rubric, checklist, or criteria chart
Subject-specific (playing a musical instrument, keyboarding, computer programming, problem solving)	Authentic performances	**Diagnostic:** pre-test, baseline sample **Formative:** positive or negative suggestions on work in progress, checklist or rubric used while students are working **Summative:** performance or other culminating task with rubric, checklist, or criteria chart
ATTITUDES/DISPOSITIONS **Toward self** (self-awareness, self-regulation/monitoring; self-efficacy, tolerance of own limitations, humility)	Combination of reflective prompts and observations	**Diagnostic:** reflection prompts or activities, inventory, survey **Formative:** reflection questions posed as students work, readiness questions: "Are you ready to …?" **Summative:** inventory or survey; reflection on self as a learner, on learning, on processes; goal setting and strategic planning
Toward others (perspective taking, empathy, tolerance, collegiality)	Experiences and prompts that activate these attitudes/dispositions (e.g., role-plays, peer reviews), portfolios	**Diagnostic:** baseline measure, role-play, reflection prompts or activities, inventory **Formative:** Reflection questions or activities, role-play, criteria in checklists or rubrics used to set and monitor goals, peer review **Summative:** role-plays, portfolios
Toward school Shared responsibility, civic-mindedness, commitment to making a difference	Experiences and prompts that activate these attitudes/dispositions (e.g., role-plays, peer reviews), portfolios	**Diagnostic:** baseline measure, reflection prompts or activities, survey **Formative:** establishing and using exemplars and models, peer sharing or review, role-play with reflection **Summative:** role-plays, portfolios

5

Helping Students Understand What We Mean by Quality

I worked on this chapter at the courthouse where I had been called for jury duty. As part of the original pool of 18 potential jurors, I observed the prosecutor and the defense teams taking notes on the different responses given by the potential jurors in the pool. Watching their behavior convinced me that they had predefined criteria about what they wanted in a juror, and I have no doubt that their notes supported their assessments about every one of us, probably based on some shared as well as different indicators, facts, and inferences. The fact that I couldn't discern the logic behind the ultimate selection of the four jurors from that pool, despite my copious notes on each juror's responses, told me much about the complexity and implicitness of their criteria informing this assessment.

Dismissed, I found myself strangely bothered, wondering what I had said or done to keep myself from having been selected as a juror. The experience made me consider how similar my feelings might be to those of a student trying to discern what a teacher is looking for when those expectations haven't been made public. Are they as perplexed as I was when I didn't make it as a juror, despite having given what I believed were honest, thoughtful, and forthright responses to each of the lawyers' queries? Do they wonder, as I did, what might have been said or done differently to change the ultimate result?

Having clear expectations about students' learning is a necessary condition—though certainly not the only one—for students to produce exemplary work. Articulating such expectations in ways that students can easily understand and readily use is a key step in promoting quality.

But what do we mean by "quality"? And how do we convey our expectations for producing that "quality"—both for work whose quality criteria we have experienced and of which we have evidence, and for work whose quality criteria we can only imagine, due to any number of circumstances?

I remember grading my first large batch of over 100 student papers, all responding to the same social studies assignment. Using what I have since discovered to be a fairly typical list of expectations, including criteria like "Used at least five sources; addressed the question; well written; clearly organized," I proceeded to assign letter grades to 67 of the essays. Essay 68 was a far better essay than every one of the essays I had already graded with *A* and *A+*. The student who wrote that essay went beyond my list of expectations, not only using a variety of primary and secondary sources, but weaving them skillfully into her own arguments. She developed arguments and counterarguments and was able to make a compelling case for her position, far surpassing my idea of "well written and clearly organized." Revealing criteria that clearly represented what I believed a true *A* was but that I hadn't included in the list of expectations I shared with students, her work raised many questions for me—not the least of which was whether I should regrade all of the prior 67 essays!

What Informs Our Understanding of Quality and Gets in the Way of Communicating It?

We define and articulate quality based on our own experience, biases, and resources. In thinking about quality as it relates to others, specifically to our students, this definition becomes intertwined with expectations that are informed by what we, and others, believe those students can or should be able to produce. The pitfall here is in allowing our experience, biases, resources, and beliefs to inform definitions and expectations of quality that are unrealistic, too low, or too high.

Clearly understanding and articulating our expectations about quality is not an easy feat. Sometimes our own understanding of quality is clouded by the fact that the work we want students to produce isn't work we ourselves know well. We may lack experience teaching or even familiarity with a particular curriculum, we may be pushing our students and ourselves to think differently, or we may just be trying a new idea. Sometimes we aren't completely clear about what we want students to

demonstrate. Other times, we may assume that quality is so transparent that students know what we expect. Regardless of the specific reason that leads to our lack of clarity, what results is student work that can be uneven, if not downright disappointing.

What Can Teachers Do to Clarify Their Expectations?

The most common strategy teachers rely on to communicate their expectations is to tell students what to do. Using this as a primary strategy raises several issues, not the least of which is denying access to our expectations to anyone who isn't an auditory processor. This strategy also can suffer from whatever else is competing for attention at the time. Even with prompts to listen carefully, only part of what teachers say may actually be heard; "Eyes on me" guarantees only the directionality of a stare, not the focus necessary to begin to hear, register, and process what is said. While spoken statements such as "Write a sentence for each of the words I listed on the board" or "Complete each of the problems in your worksheet" work relatively well for simple tasks, they become more cumbersome as the depth, breadth, and complexity of expectations increase. Imagine listening to this version of sentence-writing instructions: "Write a sentence for each of the words I listed on the board. Be sure to use the words correctly in the sentence and in such a way that I can tell that you understand the meaning of the word. Make your sentences interesting by using adjectives and adverbs. Check and correct your sentence structure, grammar, and spelling."

When the tasks are complex or teachers can't reinforce their spoken instructions with other support, students may ignore or miss them, in part or completely. At that point, there is little to be done except return to the relative memories of words spoken. Students who weren't present at all for the original telling are also at a disadvantage and must rely on a retelling, which may or may not be identical to the original or helpful to them.

Lists

To make their expectations clearer and more memorable, teachers can use written lists to supplement their verbal instructions. One teacher who asked students to write a fable provided them with the following list of criteria that the students could use as they composed their work:

Your story must have the characteristics of a fable.

- The main characters are animals.
- The animals act like people.
- The story has a central event that might be based on a trick, a trap, or one character outwitting another.
- The fable teaches a lesson.
- The moral statement fits the story.
- The story is short.

Your fable must contain dialogue punctuated correctly using quotation marks and periods, question marks, or exclamation points.

In this case, both students and the teacher were able to return to the list to ask questions, give or receive feedback, or further develop ideas at any point in the process of writing the fable. This list could be used as a checklist to guide student composition, from brainstorming and drafting through revisions and publication.

One of the advantages of criteria charts, lists, or checklists is that they break the assignment down into individual qualities or procedures that further clarify the task and related expectations, helping students remember what to attend to. This is especially true if teachers generate such lists with students. The following is an example of a list generated by a 6th grade teacher and her students to help recognize and focus on the qualities of good readers:

Qualities of Good Readers

- Backtrack to help understand words
- Use time effectively
- Think about what you read
- Read fast
- Read complicated books
- Like to read
- Read all kinds of books—large amounts of material
- Comprehend what you read
- Take ideas from what you read

- Do not get distracted while reading
- Use prior knowledge
- Form questions to understand parts of book you don't understand
- Set goal to make sure you finish book
- Form opinion about the book
- Listen to suggestions
- Stop and write down things learned from the book
- Read for facts, clues, and information
- Read without help
- Read to get ideas
- Translate information from the book in your own words
- Correct your mistakes on the first draft
- Read both fiction and nonfiction
- Sound out words when you read

Long lists, whether generated with or without student input, can be unwieldy and confusing or difficult to use. To remedy this, especially where the list is functioning as a tool for students and teachers to use during a learning experience or activity, taking time to cluster, categorize, and order the list can be a worthwhile investment. Look at the 6th grade list again and imagine how much more helpful it would be if the attributes were grouped into related or like attributes, and if those groups had titles or names. Then imagine an order that might help students be even more successful at recognizing—or becoming—good readers.

Checklists

Most useful for monitoring whether attributes of quality are present, checklists can be greatly enhanced when their items are organized and ordered. To increase their diagnostic value and usefulness as a feedback tool, sometimes it is helpful to include a rating scale. This was the case for students preparing for a series of debates. The students discovered that an important piece of information was missing from the checklist if they were to use it to improve their performances. They found that it

wasn't enough for them to simply check off an attribute as present or not, because often the attributes were present in varying degrees. To improve the use of their criteria checklist as a feedback tool, they added a range of numbers, from 1 to 4, with 4 indicating that the attribute was "definitively" present and 1 indicating that it was "not at all" evident. Students and their teacher used this checklist as they prepared and practiced their presentations (see Figure 5.1).

The use of a checklist as an interactive device, allowing students to highlight, write a check mark, or note yes or no, can help them more accurately self-assess and self-monitor, as well as provide feedback to their peers. The checklist in Figure 5.2 is a good example of an interactive checklist whose criteria are clearly stated, organized, and prioritized.

Figure 5.1 **Presentation Checklist**

	Not at all 1	2	3	Definitively 4
Speaks clearly.				
Faces audience when speaking.				
Speech is deliberate and evenly paced.				
Voice is loud enough for all in room to hear.				
Information is accurate.				
Presenter is respectful of other's right to disagree.				
Beginning argument makes a clear point.				
Closing argument sums up main points of presentation.				
Satisfactorily answers opponents' attack on position.				
Polite and does not interrupt speaker.				
Behavior is purposeful and focused.				

Note that the criteria—in this case, consistently posed as questions—are clear and directly worded. Related criteria have been grouped and titled, and the groups themselves have been listed in an order that supports a successful presentation. Finally, rather than a simple checkbox, students are put in a position of responding yes or no to each criteria question. This format might be further enhanced if there were multiple columns of yes and no on the right side, allowing for self, peer, and teacher feedback to be documented on the same page so that students could monitor their progress even more efficiently.

Point Systems

The use of single or cumulative point systems to indicate the value of different work or task components is another way for teachers to define and clarify their expectations. Figure 5.3 illustrates the use of a

Figure 5.2 **Interactive Presentation Checklist**

	Yes	No
Time management		
1. Did I use my time at an even pace, completing all sections of the presentation?		
2. Did I set up and begin promptly?		
Organization		
3. Was the flow of my presentation and material logical and smooth?		
4. Were all the presented materials well organized and easily accessible?		
Resource use		
5. Did I use different media to present my information?		
6. Did I use the most important media for the kind of information I presented?		
Audience awareness		
7. Did I make frequent eye contact with my audience?		
8. Did I vary my voice to suit my presentation?		
9. Did I present my material in a way that suited my audience?		
Aesthetics		
10. Did I present myself in a professional way in my dress and grooming?		
11. Did I hand out and use materials that were aesthetically pleasing?		

cumulative point system to clarify expectations and the importance of attributes of a research project. Note once again that the quality criteria statements are clustered into components and that the components have been named. In this case, students know that they are focusing on four major areas when completing their assignment: content, use of sources, organization, and presentation. Both the order of the components and the number of points they are allocated help students attend to issues of priority and importance.

Oral instructions and reminders, criteria charts, attribute lists, checklists, and point scales all belong to the array of ways of communicating quality criteria and expectations. Rubrics represent yet another way for teachers to clarify expectations.

Figure 5.3 **Cumulative Point System**

Component	Definition	Points
Content	Originality and quality of the ideas in the thesis, analysis, or conclusion of research; understanding of the topic; use of questions for future inquiry; research limitations	30
Use of sources	Use of information from varied sources; use of references and paraphrasing of citations; use of quotes, footnotes, and bibliographies	30
Organization	Clear and relevant focus of paper; logical organizational structure	20
Presentation	Articulation of writer's opinion; clarity of presentation; use of language for intended audience; use of graphs/tables/pictures to clarify presentation	20

Rubrics

Rubrics can be *holistic,* capturing the whole of a product in a single score for descriptors at a particular level. When each of the dimensions in a rubric gets a unique score, a rubric is considered an *analytic* rubric. Analytic rubrics tend to be better diagnostic devices than holistic rubrics

in that students can easily determine the strengths and weaknesses of their work.

Although rubrics exist inside the same realm as checklists and scales, what they communicate about quality is slightly different. Whereas checklists focus the user on the presence or absence of attributes, and scales attend to the degree of presence or the weight of an attribute, rubrics are instructional and assessment tools that define, describe, and differentiate levels of performance. They include dimensions or categories, similar to the titled categories of an organized checklist, and levels that range from unacceptable or minimum quality to exemplary quality, similar to the levels in the checklist in Figure 5.1 that the students used to help them with their debate presentations. Rubrics also include descriptors, which articulate the quality criteria for each dimension at each of the different levels, minimum to exemplary. It is through descriptors that rubrics differentiate themselves from other tools like checklists and point scales, focusing on explaining degrees and gradations of quality as apparent in student work. Figure 5.4 illustrates the different rubric components.

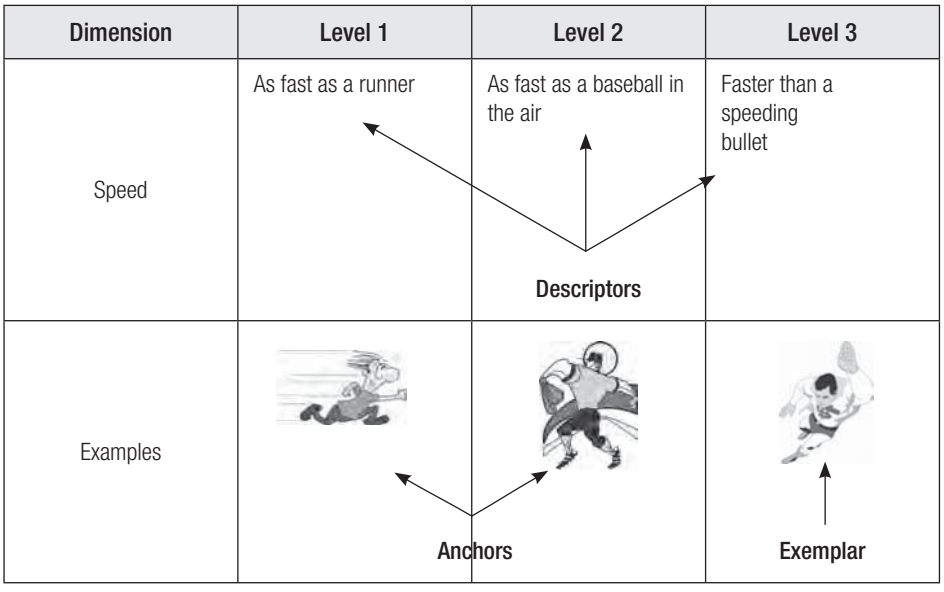
In some cases, rubrics are supported by samples of responses or performances related to the assigned task that can be used as examples of quality at levels of the rubric that are below the highest level. These samples are called *anchors*. Anchors often come from student work created for the task, but they can also be teacher-made samples produced for the task to specifically illustrate the achievement of criteria at rubric levels below the highest level. Anchors are most useful in drafting, sharing, and revising rubrics. They can help students and teachers unpack and describe quality-related issues and differences between one level and another.

The samples of quality responses or performances for the assigned task that illustrate the highest end of the rubric are called *exemplars*. Exemplars can come from several places:

- student work created for the task, exemplifying the achievement of criteria at the highest level of the rubric;
- professionally produced, real-world samples of work that matches the task, modeling the qualities measured by the criteria and meeting the standards set by the highest level of the rubric; or
- teacher-created samples produced for the task, exemplifying the achievement of criteria at the very highest level of the rubric.

Exemplars are most useful in the initial drafting and sharing of rubrics. In general, I recommend using three exemplars to provide a range of possibilities for students. With only one or two, the tendency is to think that what's shown represents the only way to succeed, and more than three becomes overwhelming. A group of three exemplars, shared in conjunction with the criteria that they exemplify, provides a range of possibilities and minimizes the likelihood that students will copy any one of them.

Figure 5.4 **Minilesson on Rubric Language**



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The Link Between Clear Expectations and Quality Work

As teachers become clearer about their expectations for quality work, they get better at describing them and illustrating and supporting them. Though it may be difficult to imagine, it is not such a big leap to students getting better at producing quality work. When that happens, new exemplars will be produced, as students beat expectations and raise their own bar.

When I taught 6th grade, I had the opportunity to spend an extended period of time with my students in an intense study of various forms

of literature, including children's literature. Our year culminated in the students' authoring, illustrating, and publishing their own books. The project was quite complex, requiring them to tap everything that they had learned about quality reading and writing all year long and to use it to write a quality children's book. These books were shared at public readings and ultimately catalogued and entered onto the school library shelves, available in the children's section with the likes of Bill Peet and Tomie dePaola titles.

When it was time to discuss the quality attributes of these books, we designed our rubric together. To give students the opportunity to see how the rubric related to this particular project's end product, I shared the previous class's rubrics along with three exemplary samples of books they produced. Though the projects were never the same, the students could at least make connections between the criteria in the rubric and the qualities of the exemplar, and then we could discuss the processes and expectations that supported the work as well as some of the strategies that they might want to consider.

In my third revision of this experience, when I proudly shared the exemplars from my previous two years, the conversation suddenly took a very different turn. Far from being awed by the quality of the work I had selected to share, students that year critiqued both the exemplars and the rubrics that guided them, letting me know in no uncertain terms that they were far more capable and could be held to far higher standards than the students who had produced the work I was so quick to extol. This class was determined that its rubric would be informed by world-class standards, elicited by examining a variety of high-quality published books. That was the criteria that they wanted to guide them.

In this case, the rubrics and exemplars inspired students' own expectations and moved them to reach for heights that they might never have imagined had they not been able to visualize the possibilities through the criteria and work of others. Needless to say, I was also inspired and awed—and moved to find new exemplars.

Is Creating a Rubric or Checklist Really Worth the Time?

Teachers often wonder whether being explicit and public about criteria and expectations means investing a lot of time to create something that they will use only when grading or documenting student achievement.

This concern surfaces most directly in discussions about the design and use of rubrics, but it's expressed in other conversations, too. When I begin sessions about explicit criteria by inviting participants to voice their questions, some version of "Where will we find the time to develop rubrics and checklists for everything?" is always in the top five responses. Once we get into the program, it becomes quickly apparent that there is no one-size-fits-all answer to sharing criteria. The way criteria and expectations are shared, whether orally or in a checklist, rubric, or some other way, is in large part determined by what is being measured and why.

A year after being in my class, one of my students was questioned rather sharply by an upper-grade-level teacher who challenged him on the design and use of rubrics. The teacher said, "Sure, you had rubrics last year, so you always knew what to expect and what you had to do to pass. But what good does it do you now? No one is telling you what you have to do to do well. None of your teachers uses rubrics. Now that you don't have someone telling you what to do and what's necessary to pass, how do you know what to do? Don't you feel lost?" The young man replied, "No, I don't feel lost. Do I wish that Mr. S. would write rubrics? Sure I do, and I'd even help him. But it doesn't really matter. After last year, I know what good writing is. I carry the rubric around in my head." When a rubric helps establish a student's understanding of quality, and when that student internalizes it to develop optimal quality, creating rubrics is truly a worthwhile venture.

How Do We Know When to Use Rubrics Versus Checklists or Point Systems?

Use of Rubrics

In general, I recommend that teachers use rubrics for complete processes, performances, and products that are common outside school. These include scientific experiments, design briefs, stories, debates, oral presentations, and posters. The reason for this recommendation is twofold. First, because a rubric needs to define and describe qualities at different levels, it is better to develop it based on real exemplars and samples of work that convey the nuances of quality. Such samples are common when the assessment task is based on a product, performance, or process that exists in the real work. Given that rubrics convey very clearly what the teacher's values are, when these values are based on

real-world work, it is much easier to defend the resulting grading criteria. When rubrics are created for work that is idiosyncratic, they become more difficult to defend.

As a classroom teacher, my rule of thumb was if whatever it was that students had to produce was going to require copious notes or detailed explanations to support its quality production, feedback, or responses, I considered using a rubric. For me, rubrics were far more useful as instructional tools than as evaluation devices. My decision to design a rubric had far less to do with how it would help me grade a piece than with how it would help students produce a piece that was worthy of evaluation. In fact, when it did come time to grade, I never used a "clean" rubric. By the time the rubric made it to me, it was dog-eared, marked, and remarked, having already been used at least twice, possibly three or more times, as students self-assessed, received peer feedback, and used the criteria to set and monitor goals and to reflect on their own decisions and uses of strategies. Because the rubric was at the heart of all of this, it informed the language of students' discourse—with themselves, one another, and me—and was evident in their own reflections, goal setting, and the feedback they provided one another. Rubrics were a huge part of the ongoing process of student learning and creation of products.

Use of Checklists

Checklists are most appropriate for components of complex products, skills, and knowledge items that are used primarily in classrooms, such as paragraphs, sentences, answers to short essay questions, and book reports. They are also indicated when the teacher is most interested in determining if the students did something, as opposed to determining how well that something was done. The following items would be appropriate on a checklist:

- Selects book
- Identifies favorite character
- Gives reasons for character selection
- Identifies feelings associated with favorite character
- Compares favorite character to another character

Checklists can be used in conjunction with rubrics by helping students "check" the different rubric requirements as they complete them. Many teachers we work with use the third level of a four-point rubric to create a checklist, which the students use when giving feedback or setting

work goals for the following day. Checklists are also useful in helping students understand the basic components of complex tasks, enabling them to see, in short and precise quality statements, what will later be far more explicitly described in the rubric. Some teachers we've worked with create a checklist that is a precursor to a rubric, believing that until students can determine whether all of the important components are actually present, it is pointless to discuss quality. Students use the checklist until they're certain that all of the necessary components are present; after a brief conference with the teacher or a peer to confirm that this is indeed the case, they shift their focus to developing the quality of what is now present and to using a rubric.

Use of Point Systems

In general, it is best to use single- or multiple-point systems for items that can only be right or wrong, such as computation problems.

How Can We Use Explicit Criteria to Help Students Understand and Achieve Quality?

By now, you probably realize that this isn't a chapter simply about how to design rubrics and checklists. A detailed explanation of the process of checklist and rubric design is outlined in *Becoming a Better Teacher: Eight Innovations That Work* (Martin-Kniep, 2000).

Although the tools of criteria are indisputably important, how they are developed and used determines the degree to which they actually influence student learning. Designing a rubric, checklist, or other descriptive device simply for use as a scoring tool diminishes it significantly, limiting its worth to that of a reflective opportunity for teachers to examine and document their beliefs and expectations related to quality, maintaining that understanding as owned by educators. Sharing the design process, weaving the access to and use of quality criteria throughout learning, and keeping expectations and criteria present and public propel the concept of "explicit criteria" into the practice of powerful teaching and learning. That is worth attending to. So how do we accomplish this?

Undoubtedly, it is important for teachers to explore and probe their own ideas about quality and their expectations for student learning and work. Once teachers have a clear sense of the criteria that define their

expectations, it is best to involve students in developing the tools that will be used. Such involvement may include having the teacher use a variety of exemplary and contrasting work to help students elicit criteria for the top level of the rubric and to discover the range of performance or quality found in a rubric. They can also create a "what to do" list and a "what not to do" list.

Teachers could also involve students in some of the following design-related activities:

- Clustering different quality indicators and identifying headings for them
- Defining the headings (dimensions) of a rubric
- Assessing work with the rubric draft as a large- or small-group activity
- Using a range of work to help students develop the language and criteria for a checklist or scoring sheet
- Using a checklist to create a two-, three-, or four-level rubric
- Guiding students in reconciling the language for the rubric with specific applicable standards and performance indicators
- Adapting and/or incorporating language from a generic rubric (from state or national standards, International Baccalaureate, developmental rubrics, etc.) with students to create a task-specific one
- Supporting relative or quantitative language with quality and specific descriptors of work
- Guiding students in connecting the language they have generated for the rubric with the work they do in class

With my own students, I started small, at first asking them to help me refine the language of a rubric that I had designed myself. Sometimes we used student work to help us; sometimes we used real-world examples; often we used a combination of the two. I found it interesting that one of the earliest challenges with my students was to accept that the top level of the rubric described work that was above expectation. I now see this notion mirrored in almost every criteria-focused professional development program that I facilitate. Though initially uncomfortable, in the end, this shift is one of the keys in viewing a rubric as more than a scoring device. There is no point to creating a scoring tool with a level generally perceived as a stretch for most students, since inspiration and motivation have little to do with ultimate evaluation and grades, but

there is every reason to include that very level in a tool whose function is to support and promote quality learning.

Conclusion

One could argue that clarifying our quality expectations to ourselves and to our students is not only pedagogically sound and critical to good assessment, it is actually a moral imperative. After all, how can we expect students to accomplish what we hope they can accomplish and to be the best they can be if we do not help them understand, in no uncertain terms, what we mean by "not good enough to pass," "good," and "great"? Figure 5.5 offers application activities in the form of checklists for teacher self-assessment of explicit criteria and quality rubrics. These activities set you on the course for helping nurture quality work from your students.

Figure 5.5 **Application Activities for Chapter 5**

Application Activity 1: Teacher Self-Assessment of Explicit Criteria

Use this checklist to assess your content practices related to rubric/checklist development and use and to identify ways to refine your practice.

Practices Related to Rubric/Checklist *Development*	Check what you currently do	Check the ones you plan to use
1. I identify important criteria prior to developing a rubric or a checklist.		
2. I use a variety of exemplary work to help students elicit criteria for the top level of the rubric.		
3. I use contrasting work (anchors) to help students discover the range of performance or quality found in a rubric.		
4. I involve students in clustering different indicators and identifying headings for them.		
5. I involve students in defining the dimensions (categories) of a rubric or a checklist.		
6. I show and assess models with the rubric as a large- or small-group activity.		
7. I use exemplars and contrasts to help students create a "what to do" list and a "what not to do" list.		
8. I use a range of work to help students develop the language and criteria for a checklist or rubric.		

Figure 5.5 **Application Activities for Chapter 5 (*continued*)**

Practices Related to Rubric/Checklist *Development*	Check what you currently do	Check the ones you plan to use
9. I use a checklist to create a two-, three-, or four-level rubric.		
10. I guide students in reconciling the language for the rubric with specific, applicable standards and performance indicators.		
11. I adapt and/or incorporate language from generic rubric criteria (from state or national standards, International Baccalaureate, developmental rubrics, etc.) with students.		
12. I help students support relative or quantitative language with qualitative and specific descriptors of work.		
13. I guide students in connecting the language they have generated for the rubric with the work they do in class.		
Practices Related to Rubric/Checklist *Use*	**Check what you currently do**	**Check the ones you plan to use**
1. I introduce a rubric in stages, one dimension at a time.		
2. My rubrics are accompanied by a variety of models/exemplars and anchors.		
3. I model the use of the rubric/checklist for self-assessment.		
4. I model the use of the rubric/checklist for peer assessment.		
5. I expect students to use the rubric/checklist as they begin to plan their work.		
6. I expect students to use the rubric/checklist to self-assess while working.		
7. I create time for students to give each other feedback using the rubric/checklist (when developmentally appropriate).		
8. My students use the rubric/checklist to set and evaluate learning goals.		
9. I provide students with multiple, formal opportunities to use the rubric/checklist to revise work.		
10. I use the rubric/checklist to give targeted feedback during and after the students' work.		
11. My students and I regularly refer to rubrics during work sessions.		
12. I tie rubrics to performances and processes and support different dimensions or sections with minilessons and/or individualized support for students.		
13. Rubrics are shared with parents.		
14. Rubric levels are anchored with samples of student work that illustrate the different levels of performance.		

Figure 5.5 **Application Activities for Chapter 5 (*continued*)**

Practices Related to Rubric/Checklist *Use*	Check what you currently do	Check the ones you plan to use
15. My students and I revise the rubric over the course of the year as students' work improves.		
16. I support the use of the rubric with specific reflection prompts that help students monitor and evaluate their learning.		
17. I use the rubric and accompanying anchors to share my expectations for student learning with colleagues within and across grades (vertical and horizontal articulation).		

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Application Activity 2: Checklist for Quality Rubrics

☐ 1. The rubric is titled.
☐ 2. The rubric dimensions are defined so students can understand their meaning and importance.
☐ 3. The rubric uses language that students will understand.
☐ 4. The rubric describes the quality content as much as format of the task, performance, or process.
☐ 5. The rubric is descriptive and specific.
☐ 6. When quantitative terms are used, they are supported with quality attributes.
☐ 7. When adjectives are used, they are defined with specific descriptors.
☐ 8. The dimensions of the rubric are prioritized or placed in a purposeful order.
☐ 9. The low levels describe what is present as well as what isn't, enabling students to identify what they have done.
☐ 10. The top level of the rubric is above the expected standard.
☐ 11. There is consistency across levels of the rubric.
☐ 12. There is consistency in the language used across levels, without an over-reliance on the same words.
☐ 13. The layout of the rubric is clear and user-friendly.
☐ 14.
☐ 15.
☐ 16.
☐ 17.

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6

Portfolios That Capture Growth, Effort, Attainment, and Process

While helping students learn what we want them to know, understand, and do is a monumental task, documenting the richness and breadth of that learning in a manageable way is no small feat, either. It requires a great deal of clarity about the learning we want to uncover, about the specific kinds of work that best reveal such learning, and about the organizational framework that makes it possible for us to communicate clear, accurate, and even compelling stories of students' learning.

When we take the time to consider the outcomes that we want students to demonstrate and what would show evidence of their attainment, we become better able to assess the impact of our teaching. We can help students examine and reflect on their own learning by using what they discover through this reflection to guide their future learning and work. We can also communicate student learning to parents and others in ways that are accessible and based on multiple sources of information. Unfortunately, sometimes we collect what is practical or easy to collect rather than what constitutes the most compelling evidence of what we want to show about student learning.

When my daughter went to middle and high school, I remember feeling a tinge of apprehension on parent-teacher conference days. Despite the fact that I was an educator myself and that I monitored and supported my daughter's schoolwork as much as I could, I often felt as though in the course of conversations with her teachers, something was going to be revealed to me about her that I should have known.

I felt that way because the picture I had of her as a learner in school was fuzzy and incomplete. I didn't know how she engaged with her peers and with her teachers during social studies, how she responded to science questions, or how she approached a group assignment with students who weren't her friends. I didn't know much about her frustration threshold when she came to a problem or a question she didn't fully understand, how she explained her thinking to others, or how she saw herself as a learner of particular subjects.

In my daily interactions with her, I knew she was a keen observer of how people used art and language to express, clarify, and accentuate emotions, but I didn't know how that predisposition affected her work in English or art. She was fascinated with all kinds of animals and would go out of her way to examine their behavior whether or not she tried to affect it. I wondered how such an interest influenced her approach to science.

As it turns out, in several of those parent-teacher conferences, my apprehension was well grounded. During the review of the progress report or report cards, or as her teacher explained a particular notation, I would learn something that helped me understand something new about my daughter as a learner or something that clarified a question I had already framed about her or her learning. Oftentimes, however, such explanations and assertions were devoid of supporting documents or artifacts that could have helped me fully appreciate their meaning. I know that as a parent, I would have had a much clearer understanding of her as a student had I seen such documentation. This is one of the promises of portfolios—a promise that I didn't get to see fulfilled in the course of my daughter's education, but one that I have witnessed in the work of many teachers since then.

What Are Portfolios?

The word *portfolios* is used differently outside education. Financial portfolios, for example, represent an array of investments. Artist portfolios document the range of best work produced by an artist. As different as their meaning may be depending on the context in which they exist, all portfolios serve a specific purpose.

Student portfolios are strategic and carefully assembled collections of student work that can include rich, layered portraits of student learning. They are informed by clear, specific learning outcomes and are

directed at a particular audience. Portfolios are strategic because the work they include is carefully selected and organized to substantiate student progress and attainment of desired outcomes, and because students are guided through the process of using such work to assess past learning and inform future goals and strategies. The work inside a portfolio is annotated, described, or reflected on in ways that allow students, teachers, parents, and others to understand and appreciate its meaning.

Rather than being a random collection of students' writing or work samples that travels from one grade to another, with more work present each year, these collections represent a carefully crafted, personal investment on the part of the student—an investment evident in the student's selection of the contents, in the use of teacher-established criteria for judging the work included, and in the insights that students glean from assessing such work to inform future learning and work.

The words of my students are never far from mind when discussing the meaning and merits of portfolios. At the time of the following conversation, I was no longer a classroom teacher, but several of my students were asked to serve as a panel and to present to groups of teachers in the district about the work that we had done. Taken to task by a high school teacher, a 7th grader differed strongly with this teacher's characterization of student attitudes and portfolios. I didn't witness this exchange, but several of the students and adults who were in the room relayed consistent versions of what transpired, so I'm comfortable accepting it as reality.

The teacher's remarks were strong and pointed. "I don't buy for a minute that kids care about what they do or learn in school. I see you all stream out on the last day and toss your notebooks at the trash cans. You don't even look back to see if they made it in. Now you all want me to believe that you still have your portfolios from over a year ago tucked safely away in the attic somewhere? Sorry, I don't buy it."

My former student responded, "Maybe you don't really understand the difference between a notebook and a portfolio. Sure, we throw out notebooks without looking back. Why shouldn't we? Those notebooks belong more to you than they do to us. Nothing in those notebooks is really ours. They're filled with what you have told us is important to know, not with our questions or what we think or know is important or with our goals and plans. And next year there will be new ones that we'll fill with what other teachers tell us we should know. You may not believe it, but I do have my portfolio from last year, only it isn't tucked

away somewhere safe. It's in my room where I can get to it. I go back to my portfolio when I want to think about stuff like what's important to learn or what good writing looks like. My portfolio is who I am, as a person and as a student. I would never throw myself away."

What Can Portfolios Reveal About Student Learning?

The learning that portfolios reveal can be limited to students' achievement of learning outcomes in a specific subject, or it can include evidence of attained outcomes in several subjects or areas. It can also present evidence of progress and effort that contextualizes such achievement.

There are generally two types of student portfolios. When portfolios include primarily work that illustrates achievement, they are considered *showcase portfolios*. When they include evidence of progress, effort, or learning processes, they are often called *developmental* or *growth portfolios*. Such portfolios show evidence of effort by having students include all drafts leading to a completed product or work and tests that include corrections of errors. They measure student progress by having students include first drafts along with final or published work. They share evidence of process through reflections on the merits, shortcomings, meaning, and value of work and through explanations of the steps they took in completing work, or in assessing their work and its implications for future learning goals and activities.

Teachers who want to uncover all aspects of student learning combine these two types to create portfolios that include evidence of process, attainment, effort, and progress. These portfolios can be so rich that they sometimes reveal extraordinary insights about student learning. Take, for example, the portfolio of a 7th grade student who, after being in special education all his life, was considered as a candidate for the Talented and Gifted program on the basis of his 7th grade portfolio. His letter to the reader provides some hints as to how this student sees himself.

> Dear reader of my portfolio,
>
> Before I came to this class my writing was not so good. I couldn't write about myself and every thing I wrote was so crazy no one could believe it. I had problems with spelling mostly, but my story lines weren't good.

> This year I learned to write better, more believable lies. My spelling is still bad, but thanks to modern science the spell check has taken care of that. I think that my writing has improved much over the year. I have to say the worst think about the writing program is Skills 7 Haze, period 11.
>
> I always try to write something about ten pages long, and it is always really stupid. Next year I hope to write something that is more than 10 pages long that is NOT dumb. I don't think that I should come here next year but the state test will say go.

Prompted to include journal entries and explain why he chose the ones that he did, the reflection that follows reveals how he is becoming more comfortable with the fact that his writing is unconventional, associating himself and his style with that of other great writers. In this reflection, his most critical remarks are now aimed at his thinking rather than his writing.

> As you can see, the journals I chose are very hard to understand. The reason I chose these journals is because the greatest writers of the past wrote in ways impossible to understand, so I followed. These journals are very descriptive and they don't tell a story. The way I write reflects the way I think, you can't understand it.

Here is an example of one of his selected journal entries:

> Heavy darkness surrounds me. All I can see are buried shapes against a dark wall. I strain my muscles to keep the heavy lids open, but I can't. The fall shut. I am enveloped in darkness. I can't see my hands in front of my face. But I do see spots, spots against the blackness. The spots turn into lines and the lines turn into pictures. The pictures I see are of amazing things, things no one has ever seen before. I call to them and they call back. I start talking to them and they take me to a place so butiful I can't describe them. All of a sudden light pours into the darkness. A heavy cloth pushes on my chest. I get up and leave.

Besides being purposeful, strategic, and carefully assembled, portfolios can take many different forms and include very different content. Following are several descriptions of the form and content of several classroom portfolio designs:

Science Portfolio

Students demonstrate their growth and attainment of outcomes related to understanding and using science by completing a variety of science-related assignments, labs, papers, tests, and projects during the year.

At the end of the year, they select the specific work samples that provide evidence of the following outcomes:

- Conducting labs and annotating findings (achievement and process)
- Growing in their ability to conduct scientific observations (growth and achievement)
- Understanding and using graphs, tables, and scientific notation (achievement and process)
- Interpreting scientific data (achievement)
- Conducting scientific experiments (achievement)
- Researching scientific ideas (achievement)

Communication/Thinking Portfolio

Every marking period, students assess their progress and achievement as communicators and thinkers as they review their work for samples that demonstrate the following outcomes:

- Writing for a variety of purposes and audiences, showing both early drafts and published work (progress and achievement)
- Communicating information through a variety of visual and oral presentations (achievement)
- Reflecting on their ability and growth as readers, writers, listeners, and speakers (process)

Student-as-Learner Portfolio

To help students assess themselves as learners, a teacher asks her students to brainstorm all the different ways in which they can show who they are as learners at the beginning of the year. Students' ideas include revising and improving their work, asking good questions, doing research, writing work that shows what they know, and learning with others. The teacher turns these ideas into a list of outcomes and once a month asks students to take 45 minutes to create or select and reflect on work samples that illustrate each of them.

Writing Portfolio

A kindergarten teacher who decides to create portfolios of her students' growth and development as writers engages students in a series of assessments that reveal their knowledge and use of letters, words, sentences, and stories. Every month, she meets with each of her students, engages them in an assessment activity using a writing sample, and asks them to reflect on their learning. She records her comments, which the students listen to at the end of the year to reflect on their growth.

What Do Portfolios Include?

The kinds of work included in portfolios depend greatly on their purpose and audience. However, to the extent that there is an audience for portfolios beyond the students who create them, portfolios always include a Dear Reader letter or introductory reflection that describes the portfolio and contextualizes the pieces, providing the reader with a road map for its review and appraisal of its contents. Following are excerpts of three Dear Reader letters.

Sample 1

Dear Reader,

Welcome to Portfolio "Peace on the Earth." To read it start on the left where all my goals are then move on to my right where my work is. Look and see if I was working on my goals.

A Portfolio is someplace where you reflect on your work you picked. In my Portfolio you should see work I improved on or horrible work. Also work I put effort into.

In my goals section you should look at and see all my plans and goals. When you finish reading you can see my new goal. I have worked hard on this Portfolio. I hope you like it.

Sincerely,

P.S. Please write a comment.

The purpose of this letter is to help the reader navigate the portfolio, though it also educates the reader as to what a portfolio is. The request

for comments at the end underscores the dynamic and communicative nature of a portfolio. Its purpose may be documentation, but its meaning is derived from being shared and responded to.

Sample 2

I am a seventh grade student who has been earning grades 90 or above. Social Studies may not be my best subject, but I like to learn about the different cultures, as well as learning about all the reasons why & how we acquired the United States.

In Social Studies this year we have been keeping a portfolio. The purpose of these portfolios is to show you what we have learned in seventh grade Social Studies. Many things that I have learn this year will help me in the future. Writing and researching are only two of the techniques that will be especially helpful in the future.

We had to choose three assessments from our works in progress folder and assemble them in our portfolio. I choose my exploration essay, the American Revolution Interview, and my Exploration timeline. My exploration essay was on Costa Rica. This project required extensive research, but not as much as the American Revolution Interview. For this assessment I interviewed Marquis de Lafayette and researched the winter at Valley Forge. I had the most fun working on the Exploration Timeline because I was able to use my talents in art. I chose these three assessments because I had the most fun working on them and I was able to use what I learned in writing and researching.

I am a very hard worker. You can see this because I have always included my rough drafts, revisions and final copies. Writing has always been one of my strengths. For example, my exploration essay shows how well I can write as well as research. A weakness that I hope to improve on is writing summaries. Summaries are supposed to be short and brief, but my writings are very detailed which makes it tough for me.

An advantage of keeping a portfolio is that you can see how much you have improved throughout the year. For example, my writing assignments at the beginning of the year may not have been as good as toward the end of the year because I was still learning how to research. The only disadvantage that comes to mind is that it is extra work.

This introduction is both procedural and reflective, unpacking the actual process of creating the portfolio, as well as analyzing insights about the student's self-perceptions as a learner and offering an opinion about the pros and cons of maintaining a portfolio.

Sample 3

It is funny how growth kind of sneaks up on you. I honestly didn't realize how much I've changed as a reader, writer, and thinker until I was able to do this project. When I look back upon my work from the earlier sections of the year, I can hardly believe that the "me then" and the "me now" are the same person. Still as I flip through the pages of my older work and compare it with that of my new work, the changes that I have undergone are thoroughly evident.

I feel that my greatest and most substantial growth occurred in my essay writing. Here is where I learned to write more concretely, to focus and to eliminate much of the unnecessary verbiage that would often infect my writing. The changes that occurred in this area are seen in my Baseline and exit pieces as well as the revision pieces that I did for this portfolio. Still, I think that my mind and the way that I think about literature has transformed as well. I have become much more of a conscientious reader than ever before. I am noticing new things when I read. I am making connections with English and life, and I feel as though I can successfully analyze material in ways that I never could prior to this year. Furthermore, my use of the English language seems to have improved tremendously as well. The ways in which I now express myself seem far more glib and advanced than they were earlier on.

Yet, despite all these things, I know that I still have quite a lot to work on. After all, the fact remains that one never really stops growing or learning. If I had the time, I probably could have kept revising and revising all of my pieces … for I am rather hard to satisfy. However, if I think realistically, there are a few particular things about myself and my habits that I must improve. Perhaps the most important of these is that I must calm down. I do have a tendency to "go all over the place" and sometimes I fear that this habit of getting a little overwhelmed affect my work. Furthermore, I need to work on the way that I write things,

> in class. When ever something is timed, I tend to either go berserk and muddle the entire thing or I simply lose it and write a rather mediocre paper. Also, I have to work on pacing myself for many times I will spend literally hours on things that could have been done in a period. Last but not least, I desperately need to improve my handwriting. The fact is that it really isn't that bad when I'm at home and am more focused. However, it gets progressively worse when I'm nervous or rushing to complete something. The other problem with my handwriting is that I have this obsession with the way my work "sounds." Because of this, I will often change and re-change word after word to make sure that it sounds "all right." Without an erasable pen, this becomes a catastrophe leaving my paper filled with alien markings and cross-outs.

The voice and metacognitive nature of this introduction reveal much about this student as a learner. The student's analysis of progress, strengths, needs, and obstacles to learning provides an image of where the student is now and where he or she can go in the future. There is a clear sense of ownership and control over learning throughout this piece.

Other consistent portfolio components include a table of contents, annotations and reflections on the work included, and, to the extent that the portfolio is used as an assessment device, criteria for the assessment of the portfolio and its entries. Consider these samples:

> **Sample 1**
> What music is being rehearsed? *Regal March*
> What instrument/vocal part are you on? *Clarinet*
> Describe your strengths and needs:
>
> Strengths
> • *Dynamics*
> • *Keeping the Tempo*
> • *Notes*
>
> Needs
> • *Breath taking*
> • *When F try not to squeak certain parts should get faster*
>
> Describe the ensemble's strengths and needs:
>
> Needs
> • *Dynamics*

Strengths

- *Tempo and Rhythm*

What goals do you have for the next rehearsal?

- *To stager my breathe*
- *To not go so loud on F so I don't squeak*

What goals should the ensemble have for the next rehearsal?

We should work on Dynamics

The preceding format provides a structured opportunity for self-assessment and reflection as well as goal setting. Students are guided by the prompts to identify their own strengths, needs, and goals. It reinforces both the vocabulary of the learning and work and a sense of individual and collective responsibility.

Sample 2

I'll say this! I am a very good writer. Maybe it's because my dads a writer. That's right! My dad is a writer for A. B. C. news. I sometimes like writing about sports. I also like what I'm doing now: writeing about me as a writer. Yesterday I wrote about me as a reader but today I wrote about me as a writer. I aprecate that writeing was invented because you couldeent read with out writeing. I really like writing especially about Russia and whales. I once wrote a poem about flowers and it went in the News paper.

In our group it is usallay hard to consentrate whail we wright. I like to write on the computer because you don't use a pencil. Intead you type keys. I really think writeing is a good idea because your chonces to write privet things. Usally I write alot but sometimes I only write a little. I like how wer write about whats happaning to our Painted Lady Butterflys. Right now most of them are in thare chrisalys. I like studying maps and then write them down.

This reflection reveals the student's thinking about the work done all year, especially the work that's in the portfolio. What can you learn about this student that goes beyond the words? To what extent is the self-assessment in the opening sentence evidenced in the piece itself? What value might it add to the overall picture of this student as a writer?

Depending on the nature and scope of the portfolios, as well as the outcomes that inform them, portfolios may include periodic goal statements and strategies for meeting goals; drafts and final versions of at least one of the pieces; self- and peer evaluations accompanied by teacher- and student-completed checklists; and process statements or descriptions of the process that a student followed to produce work.

Sample 1

Put in time and effort.

I think this has meet the outcome of good learners put in time and effort because I'm not very good on the computer so it took me like 2 days to type my thing, but it took me like a week to get all my info together. That took time and I put in effort by typing it in the computer. All of the thing aspesliy typing made my thing look professional.

Sample 2

I, therefore, focused on what had to be changed when I rewrote this essay. I included topic sentences which supported my arguments for my position about protecting the environment. I also added transition sentences which aided in the flow from one paragraph to another adding to a better understanding of what I was stating. I consider this to be a clear indication of my growth in writing.

My introduction paragraph successfully restates the question being asked, gave my own opinion and also showed my reasons for this view. I feel I have definitely improved in my ability to write and introduction which lead clearly into the body of my essay.

In my conclusion paragraph, I gave specific ways in which people can change the way they function in relation to the environment. I also feel I went from specific to general, a technique used for writing conclusions.

Portfolios can be electronic or paper. They may be housed in binders, folders, pizza boxes, milk crates, Web sites, or any of a number of other containers that make sense and are available. Sometimes, the theme of a portfolio can be reflected in its physicality, and sometimes students can be allowed to choose the way the portfolio is housed and presented. Audience, purpose, resources, and practicality are all important considerations.

How Can We Best Organize Portfolios to Document and Promote Student Learning?

A key consideration when designing a portfolio is whether it will be structured to provide evidence of students' attainment of specific learning outcomes or standards or whether it will be driven by curriculum content. In an outcomes-driven portfolio, teachers would ask students to select entries for outcomes such as the following.

- *Students will demonstrate perseverance in pursuing goals or completing work to a high standard of quality:* projects that took several days to be completed, with an explanation of the steps taken; work with multiple drafts and revisions, additions, or other changes, along with a justification for those changes
- *Students will demonstrate their ability to represent and communicate in mathematics:* work that uses graphs, tables, charts, or diagrams to inform others; a write-up of a complex problem with an explanation of all the steps used to solve it
- *Students will show effort, progress, and achievement in reading and writing:* a piece of writing for which the ending or beginning was changed to improve it, along with a description of the changes that were made; work that shows improvement as a reader of literature; a log that shows the range of books read; and a selection of book notes from different kinds of books
- *Students will demonstrate that they can communicate in a second language:* a piece of work that shows the ability to initiate and sustain face-to-face conversations; a translation of a dialogue you heard in another language; a letter written to a pen pal
- *Students will demonstrate their collaboration skills:* a sample of work done with at least one other person in class, accompanied by a description of how group members worked together and evidence of the group members' individual contributions to this work
- *Students will show historical understanding and teamwork:* a project developed with someone else in class to demonstrate the impact of the past on the present, along with a description of own and partners' contributions to this work
- *Students will illustrate their analysis skills:* writing that analyzes a situation or a document

As this list shows, in a standards- or outcomes-based portfolio, the teacher provides the students with a list of standards or outcomes, or generates such a list with them. The student chooses among his or her work to select the pieces that provide the best evidence of progress toward or attainment of these outcomes. Figure 6.1 shares another example of the components of an outcomes-based portfolio, this time in math.

In a curriculum- or content-driven portfolio, the teacher uses the curriculum or text to decide on the work that should be included as

Figure 6.1 **Components of an Outcomes-Based Portfolio in Math**

Outcomes	Indicators	Assessments	Selection Prompts	Reflections
Students will demonstrate improvement as problem solvers.	• Understand that some ways of representing a problem are more efficient than others. • Interpret information correctly, identify the problem, and generate possible strategies and solutions. • Connect and apply mathematical information to solve problems.	• Quick quiz • Homework • Tests • Word problems • Math lab reports	Select a piece of work for your portfolio that shows you have improved as a problem solver.	• I chose this piece, _____, because it shows I have improved as a problem solver. • Before this work, I used to …. • An example that shows this is …. • In this piece, however, you can see how much better I am at solving problems. I …. • This shows improvement because …. • One goal that I have for next time I solve problems is to ….
Students will use a variety of strategies to solve problems.	• Act out or model with manipulatives. • Represent problems verbally, numerically, algebraically, and/or graphically. • Collaborate with others to solve problems. • Translate from a picture/diagram to a number or symbolic expression. • Use trial and error and the process of elimination to solve problems. • Analyze problems by observing patterns. • Make organized lists or charts to solve numerical problems.	• Quiz • Homework • Tests • Word problems • Math lab reports	Select a piece of work for your portfolio that shows you explained the steps taken or the strategies you used when you solved a math problem.	• This problem involving _____ shows that I have explained the steps taken to solve it. • You can see this when you look at …. • In this piece, you can really see that I understand the math concepts I used because I mention …. • If I were to go back to this piece at the end of the year, it would be useful to me because …. • In the future, I wish to also write and explain the steps to solving these types of math problems, because ….

evidence of students' learning. For example, a science teacher may ask students to compile the following artifacts: one lab write-up per marking period, two end-of-unit tests, three consecutive days of notes, and their first and last research reports. As a result, curriculum-driven portfolios tend to be much more standardized than outcome-driven portfolios, as this example suggests:

Table of Contents, 3rd Grade Writing Portfolio

Personal Narrative
How-to Essay
Nonfiction Informational Essay
Folktale
Reflection on Strengths and Needs as a Writer
Writing Goals for the Year

A related issue teachers should consider when designing portfolios is the extent to which the portfolio content will be driven by the teacher or by the students. That is, who will decide what goes into the portfolio, and who will be responsible for the portfolio's maintenance—the teacher, the students, or both? An outcomes-based portfolio tends to be more student driven than a curriculum-based one, in that the student has more freedom to choose appropriate evidence in the former than the latter. However, even an outcomes-based portfolio can be teacher driven when the range of pieces from which students can select is very limited. This would be the case if a teacher asks students to select a piece that shows that they are artistic when only one or two opportunities throughout the year called for students to create an artistic representation.

Conclusion

Many years ago, I listened to Jane Hansen talk about her work helping teachers design literacy portfolios. She described a school that had made great strides in institutionalizing portfolios at all grades. In their initial incarnation, these portfolios were centered on reading and writing, but later they evolved into collections of work that showcased the journey and attainment of students as learners. Because the portfolios were student driven, students took their portfolios home with them but brought them back at the beginning of their next year, and they used them to present themselves to their new teachers. Jane told a story of

a 10th grader who, for two years in a row, turned in an empty binder with "Illiterate" on the cover. Jane had the opportunity to interview this student about her work. When she asked her why her portfolio was empty, the girl stated that she hated to write or read in school, so she had no interest in including that work. Jane asked the student what her interests and activities were outside school. The girl said that she was the founder, writer, and editor of a monthly music magazine, which had over 500 readers. The magazine included feature articles, editorials, news stories, and a calendar. The student's self-declaration of herself as illiterate in school underscored the chasm that she perceived between what she cared about and valued as a writer and what she felt the school wanted from her.

Again and again I find that portfolios, especially when they invite students to invest in the documentation and reflection of their learning, reveal—sometimes intentionally and sometimes by accident, as was the case of this 10th grader—that students are so much more and so much better than what we see.

See Figure 6.2 for application activities for this chapter.

Figure 6.2 **Application Activities for Chapter 6**

A. Designing Portfolio Outcomes and Indicators

Outcomes are broad, global statements that describe what students should know and be able to do. They are interdisciplinary in nature, so it is often difficult to determine what subject area they describe.

Examples:
- Students will show growth in work habits and social development.
- Students will become problem solvers.
- Students will read for meaning.

Indicators describe the steps students need to take in order to reach the outcome. They are the components of outcomes.

Example:
- Students will become problem solvers by:
  - Engaging in a variety of problem-solving activities.
  - Applying problem-solving strategies appropriately.
  - Analyzing a problem for important information in order to understand what must be done.
  - Organizing information.
  - Explaining steps taken or strategies used.
  - Finding multiple ways of solving a problem.
  - Using math language correctly.

1. Using the above definitions and examples, begin to sketch possible outcomes and indicators for your classroom.

2. Consider how these outcomes and indicators might provide the framework for a portfolio in which students put work that they believe indicates their growth toward or achievement of the outcomes.

Figure 6.2 **Application Activities (*continued*)**

B. Use the checklist below to help you in designing or refining a classroom portfolio.

Quality Checklist for Student Portfolio Design

Purpose and Audience
___ The primary purpose of the portfolio that students will keep is clearly stated.
___ It is clear what the portfolio is intended to document: effort, growth, achievement.
___ The primary and secondary audiences for the portfolio are identified.

Focus
___ The curricular focus of the portfolio is clear.
___ The portfolio is linked to important standards and is connected to the curriculum.
___ The standards and indicators that will be documented are clearly identified.

Entries
___ There is a list of possible entries that students may include in the portfolio.
___ Possible entries are directly related to the standards identified.
___ It is clear how, when, and how often students will make selections and reflect on their work.
___ Specific guidelines for student selection are described. The guidelines are specific and age-appropriate.
___ Specific guidelines/prompts/questions for student reflection are identified.

Management
___ There is a realistic portfolio timeline that includes time for:
- Introduction of portfolio to students.
- Time for selection and reflection.
- Time for submission, response, and sharing with teacher, peers, and others.

___ A management system for helping students to save work and organize materials is described.
___ The portfolio is designed so that students have ownership and some control of it.

PART THREE

Instruction

How can we facilitate and support learning for all students?

7

Creating Paths to Understanding Through Scaffolding

My first full day as a university student in the United States was in the fall of 1978. I wasn't particularly worried about the differences between the college campus, academic program, social environment, or the life I had left in Mexico just a few months before and the college that I had just joined.

Some of these differences were significant. In Mexico City, I was one of 3,500 students across all departments; in Los Angeles, I was one of 26,000. In Mexico, I could walk the campus within 10 minutes. In Los Angeles, I had to drive to get from one class to another. I wasn't thinking about the fact that my program in Mexico was predefined with required courses and no room for electives, and that I knew all the members of my class, four of whom were my closest friends. On my first day in class, these differences seemed relatively unimportant. Having left Mexico to continue studying film and media, I was excited about being in a new country and, more than anything, about being close to Hollywood, where so many of the films I liked had been produced. This was to be my seventh semester, and little did I know what awaited me.

I had three classes on my first day: Geology, the American Political System, and Geography. Even though I had managed to transfer many of my course credits, I needed to take 18 credits of general education courses to graduate from this U.S. college. My ultimate course assignment resulted partly from my own interests and partly from what was being offered that semester. It wasn't until I experienced the first 10

minutes of each of the three classes that I realized the precarious nature of my situation.

All three of my classes were held in large rooms, located in three different buildings, and were each attended by approximately 100 to 150 students. They were taught by professors whose English was undecodable to me; one was Chinese, one was from Texas, and one was from Hawaii. Even though I thought I spoke English fluently, no matter how much I tried to pay attention to them, I didn't understand more than a word here and there. I was used to small classes held seminar-style, with discussions and small-group work being as prevalent as lectures. I now faced heavily accented lectures accompanied by what I considered cryptic outlines written on a board. The self-confidence I had amassed over 15 years of success as a student dissipated, and I felt insecure and lost.

I left those Monday classes, and the rest of the classes I took that week, thinking I would surely fail. That was certainly reinforced by my first quizzes of the semester, on which, for the first time in my experience as a student—and to my great dismay—I got *C*s and *D*s. These quizzes presented me with yet another challenge: the multiple-choice item. In all of my years as a student in Mexico, I seldom took tests that presented me with forced choices. Instead, most of my exams, whether written or oral, required elaborate answers on my part. Within days of starting the semester, I found myself dreading going to the university, second-guessing my every move while attending classes, having trouble determining whether I actually knew how to take notes, and feeling sick to my stomach every time I knew I had a test.

Weeks later, I more or less figured out how to negotiate my way as a student in these courses by using the syllabus as an outline under which I wrote copious notes based on the required chapters of the book and several supplements, a self-imposed scaffolding structure that allowed me to deal with my handicap. I read and reread my own study guides and tried to develop internal rules and hints that would help me on the tests. By the end of the semester, I was able to pull my grades to low *B*s, but I was never able to fully master the genre of multiple-choice tests. I continue to feel a great deal of empathy for other students who struggle with them as I did.

Many years have gone by since those undergraduate days, but on more than one occasion since, I have needed some support as a learner. I don't believe I'm alone. Each of us needs some kind of scaffolding at

one point or another to receive information, to process and use it, or to demonstrate that we understand it.

What Is Scaffolding?

Scaffolds are temporary structures that physically support workers while they complete jobs that otherwise would be impossible. They provide workers with both a place to work and the means to reach work areas they could not access on their own (Herber & Herber, 1993).

In education, *scaffolding* is a term associated with Vygotsky's zone of proximal development (Vygotsky, 1978). The zone of proximal development is the difference between what a learner can accomplish alone and what she or he can do with adapted assistance from a more capable peer. Not all scaffolding involves working with a peer. Teachers play a key role in providing the kind of assistance that helps students attain what, to some learners, seemed impossible.

Instructional scaffolding strategies help students acquire new knowledge and skills by engaging students individually or collaboratively in experiences and tasks that would be too difficult for them to complete on their own. Teachers initially provide extensive instructional support, or scaffolding, to assist students in building their understanding of new content and processes, gradually shifting the responsibility for the learning to the students as they internalize this instruction.

Instructional scaffolding entails two steps. The first is the development of instructional plans or lessons that lead the students from what they know and can do to a deeper understanding of the new material or a more facile use of a new skill. The second is the execution of the plans or lessons, where the instructor provides needed support to students at every step of the learning process (Turnbull, Turnbull, Shank, & Leal, 1999).

The techniques that teachers can use to scaffold their instruction revolve around modeling desirable behaviors, using explanations, actively engaging students in the scaffolded lesson, and providing feedback.

Modeling

Teachers can model desired behaviors in various ways, one of which is through think-alouds that verbalize their thought process as they

complete a task or solve a particular problem (e.g., finding a main idea). They can also complete a task while verbalizing the process to do so (e.g., solving a math problem), or they can engage in performance modeling by completing a task without verbalizing the process (e.g., demonstrating finger tracking while engaged in silent reading). The kind of modeling that a teacher uses depends on students' familiarity with what they are learning, a student's learning preferences, and the complexity of what is being taught.

Here is the lesson outline of a 4th grade teacher who used modeling to scaffold her students' understanding and use of a strategy to help them respond to a writing prompt and revise their responses:

Lesson 1: Using the Strategy for Planning and Writing to a Prompt

Teacher modeling/guided practice: I used the modeling strategy in the *Handbook of Writing Strategies* (Atkinson & DeRue, 2003). I handed out the teacher-created prompt and read aloud *Three Little Pigs*. We then discussed the prompt as a class and completed the Growing Ideas organizer for the prompt (using student input). We reviewed the components of a QUALITY paragraph reminder sheet and where to get the topic sentence from on the organizer.

Independent practice: Students were asked to create a complete answer to the prompt using the Growing Ideas web as a guide for the details to include within their answer.

Writing application: I collected the paragraphs students wrote to determine if they understood how to use the strategy and assessed their paragraphs on the incorporation of details and the parts of a paragraph to answer a prompt completely.

Lesson 2: Using the Strategy to Revise for Content Within a Written Piece

Guided practice: Students were given back their responses to four to five writing prompts completed since the beginning of the school year. I scored them for content, and students were asked to pick the writing piece that received the LOWEST content score. It was explained to them that they were being given the opportunity to improve this score.

Independent practice: I gave the students a blank Growing Ideas planning page that I created and explained that they could use it to plan a

section of their writing they wanted to improve or look at the whole prompt and use the strategy to plan it.

Writing application: I collected the original writing piece from the students and their revised quality copy, along with their Growing Ideas planning page, and assessed the revised writing.

Using Explanations

A different scaffolding technique involves the use of explanations that the teacher adjusts to fit the learners' emerging understandings. Typically, when teachers introduce something new, their explanations are limited to the most important information students need to understand stripped of any details that could confuse students or that don't relate to what is immediately required of them. As students' familiarity increases, teachers increase the complexity and elaboration of their explanations to help them learn more or more deeply, at which times teachers may also rely on short phrases and words to reinforce past learning.

Actively Involving Students

Another scaffolding technique is to invite students to participate in the identification of the next steps of a procedure or strategy about what is being learned so they can internalize rules, procedures, or strategies. When, in the midst of showing students how to do long division, we ask students, "What comes next?" we're using this kind of scaffolding technique. In the previous example, the students identified their next steps in terms of using the strategy on only a part of the response or on the entire piece.

Giving Feedback

Feedback, in the form of clarification questions and statements that mirror students' assumptions and understandings, is yet another scaffolding technique. Feedback is critical because when students are learning something they don't yet know or are struggling with, their insecurity can influence their investment in the learning process. Helping them determine what they know and understand—where they are on the learning curve—can diminish their degree of discomfort and increase their motivation to learn. While it is not included in the preceding example, the teacher

would have missed a scaffolding opportunity had she not provided feedback to students on their use of the strategy and their understanding of writing a quality paragraph before beginning Lesson 2.

What Scaffolding Materials Can I Use?

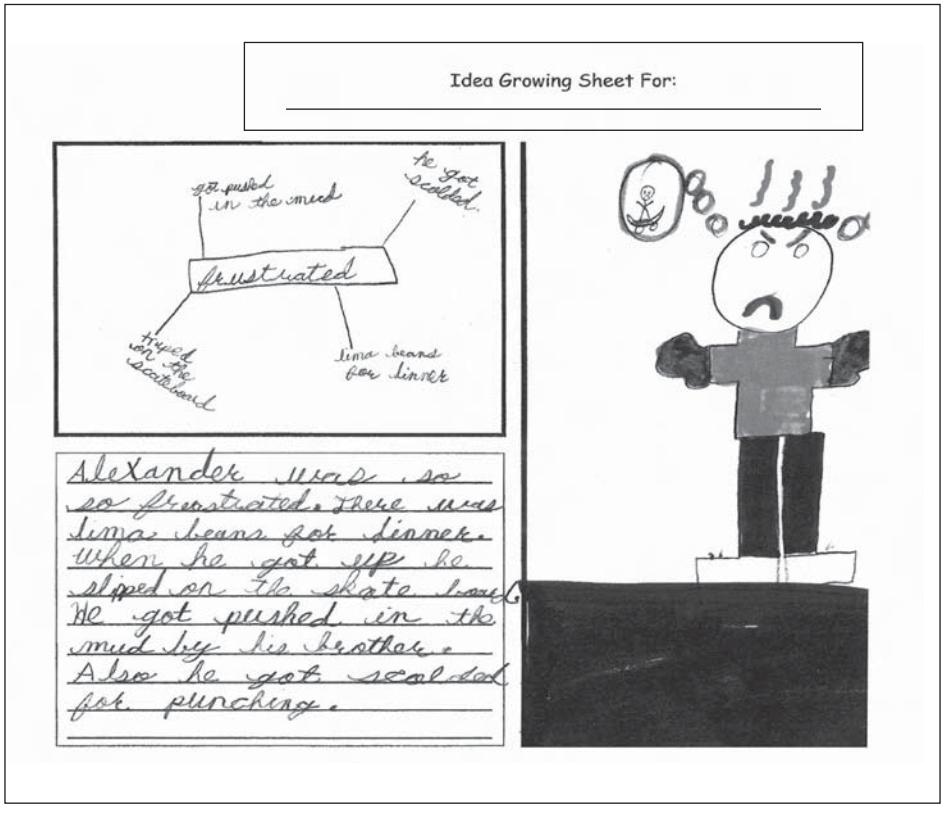
Along with instructional strategies, teachers can use a number of instructional scaffolding materials to enable learners to represent and document their learning. These materials fit into one of three categories. *Reception* scaffolds help learners gather information from available sources by keeping their attention focused on important information and prompting them to organize and record what they see (e.g., story maps, graphic organizers on causes and events). The Growing Ideas planning page described earlier by the 4th grade teacher is a reception scaffold. Figure 7.1 is an example of that planning page completed by a student.

Transformation scaffolds help students impose structure on information. For example, students may be asked to take information from a graph and translate it into a different kind of graph. Here's a sample of the student writing that resulted from the use of the transformation scaffold regarding quality paragraph reminders:

> The wolf is rude and angry. The wolf's voice was a loud deep voice. His voice was as loud as the thru way on at a construction site. The wolf was also mad because the 3rd pig arived erlier than the wolf ecspectid. That made the wolf reely mad. He also got mad because he kep huffing and puffing but the house dident blow down so that made him angr. The 3rd pig also didn't let him in because he wasn't using his pleases and tankuoys. Thats why the wolf is rude.

Figure 7.2 shows a lesson that includes various types of scaffolds. In this lesson, the postcard serves as a *production* scaffold—the third type. Production scaffolds are tools that prompt the students to convey what they have learned in an effective way (e.g., report outlines). The lesson itself is on the left-hand side, and the right side includes some notes on the scaffolding provided by the activities.

Figure 7.1 **Completed Reception Scaffold Using the Growing Ideas Planning Page**



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What Are Criteria for Effective Scaffolding?

The primary criteria for determining if our scaffolding has been effective are found in the degree to which students succeeded as learners and can continue to use the learning they acquired.

One of the dangers of scaffolding lies in the fact that too much scaffolding begets dependence and may mask students' real attainment. Teachers should not offer too much assistance for too long; they need to continuously assess the extent to which their help is still necessary. It is critical that the level of instruction always be within the zone of proximal development and challenging to students. A scaffolded curriculum is not a dumbed-down curriculum. Teachers should provide students with scientific explanations to prevent them from falling back on naive ideas of concepts and issues (Byrnes, 2001, p. 37).

Figure 7.2 **Lesson on Assimilation and Acculturation with an Explicit Scaffold**

<table>
<tr><th>Lesson Activities</th><th>Scaffolding Strategies and Processes</th></tr>
<tr><td>As a whole class, the teacher asks students to raise their hand if any of the following questions apply to them and to tally their responses:
• Do you listen to rap music?
• Do you eat TV dinners or frozen dinners?
• Do you want to wear clothing with labels like Nike, Gap, and so forth?
• Do you eat more pizza than you eat the food you used to eat before immigrating?</td><td>These questions activate students' prior knowledge.</td></tr>
<tr><td>He explains that students who answered yes to most of these questions have assimilated. He introduces the definition of assimilation, connecting that definition to each of the questions he asked.</td><td>Students are encouraged to think aloud.</td></tr>
<tr><td>The teacher asks students to graph their responses to each of the preceding questions.</td><td>This is a transformation scaffold (going from a show of hands to a graph) that helps students represent their responses using a different modality.</td></tr>
<tr><td>He then asks students to raise their hand if any of the following questions apply to them:
• Do you use both English and Spanish when you talk?
• Do you read both Spanish and English texts?
• Do you swear or curse in both languages?
• Do you listen to music from your own country and from this one?</td><td></td></tr>
<tr><td>He asks students to graph their responses and tells them that students who answered yes to most of these questions have become acculturated into U.S. culture. He then introduces the definition of acculturation and links it to the questions he asked before.</td><td>Students again think aloud.</td></tr>
<tr><td>Students examine their graphed responses and discuss the results.</td><td>Students learn from each other as they discuss the graphs.</td></tr>
<tr><td>The teacher asks students to define acculturation and assimilation. They use the chart below to individually create their definition of the two terms.</td><td>Students internalize the definitions by using their own words.</td></tr>
<tr><td><table><tr><th>Concepts</th><th>Definition</th></tr><tr><td>Acculturation</td><td></td></tr><tr><td>Assimilation</td><td></td></tr></table></td><td>This is a reception scaffold because it helps students capture the terms and their definition.</td></tr>
<tr><td>The teacher asks students to read a short nonfiction essay about how long it takes to assimilate to a new country. He asks students to search in the reading for terms and examples of assimilation and acculturation.</td><td></td></tr>
</table>

Figure 7.2 **Lesson on Assimilation and Acculturation with an Explicit Scaffold (*continued*)**

Lesson Activities	Scaffolding Strategies and Processes
The teacher asks students to write their answers to the following questions using an organizer where they can answer these questions based on the reading in one column and based on their own experience and knowledge in the other. • What are three differences between Old and New World immigrants? • How are new immigrants perceived by others? After reading and jotting down their answers to the focus questions, students share two or three responses in pairs and then as a whole class.	This is another reception scaffold since students capture information from the text but are also able to make personal connections. Working in pairs lets students use each other as a resource and test what they know before having to share it with the whole class.
In groups of four, students are asked to create a sequence-of-events chain that lists three or more steps that most immigrants take toward assimilation.	This is a reception scaffold that allows students to understand that the events are linked.
Formative Assessment: Reflection Based on what students have just discussed and earlier activities with definitions, the teacher asks students to describe one example of how they have assimilated and another of how they have acculturated.	This is a transformation scaffold that helps students apply the definitions and connect them to their own experience.
The teacher asks students to write a postcard to a person who would read it (friend or family member) taking the perspective of an Old or New World immigrant, commenting on their immigration experience. Students are asked to use the information they have read in the article or their own personal experiences to help them complete their postcard. Prior to their beginning this assignment, the teacher reviews his criteria for postcards. • The postcard has a clear point of view from either an Old World or New World immigrant. • It includes facts of where the person came from and events that happened upon arrival. • It describes how others perceived that person or his or her experiences (in either a negative or positive light). • The postcard has an appropriate picture, address, heading, and signature. After completing their postcard, students are asked to respond to the following questions in their journals: • How do you think the reader will react to your postcard and why? • What are the strengths and weaknesses of your postcard?	This serves as a production scaffold. Having access to the quality criteria guides students through the development of the postcard. Asking students to self-assess helps them revisit and better internalize the quality criteria for the postcard.

Source: Developed by Nicole Tine. Used with permission.

Vygotsky (1978) identified four phases of instructional scaffolding that can help teachers support students in a way that minimizes dependency. The phases begin by the teacher's modeling with verbal commentary. Then the students imitate the skill taught, including the commentary provided by instructor. Thereafter, the teacher gradually removes the scaffolding until the students can perform the task without assistance.

Not all students need the same type or degree of scaffolding, so teachers need to structure their lessons in a way that enables students to tap into scaffolding techniques and resources when needed but to work without them where appropriate. Therefore, the ultimate criterion for effective scaffolding is that all students have succeeded.

How Can I Use Scaffolding to Develop Students' Thinking Skills?

Scaffolding for powerful thinking skills is especially important because thinking happens within us and because thinking deeply is hard work. It involves helping students unpack and internalize critical thinking vocabulary in different ways and using many strategies for tapping that vocabulary. Let's examine the lesson on change in Figure 7.3. The lesson provides students with an opportunity to articulate their assumptions about change and the implications of such assumptions.

Let's assume that you wanted students to develop a working understanding of the critical thinking terms introduced in Chapter 3—namely, *claim, assumption, evidence,* and *justification*. You could begin by asking students to create an individual semantic web or concept map of each of the terms, and then generate a class map. You could then use a short personal story that features all of the terms, to illustrate their definition, and ask students for additional examples of each term from their own experience.

In small "expert" groups, students could be charged with generating five questions for each of the four terms—for example, "What will we see in a piece of writing that applies to the term *claim*?" Students use the term's definition to create the questions and to make sure that the questions don't require simple yes or no answers. The expert groups trade questions and answer their new sets of questions.

Another possible scaffolding strategy for thinking would be to have students generate evidence of the five terms in different contexts—say, literature, newspapers, their own writing, and the school at large. For

Figure 7.3 **Lesson on Change**

To understand the concept of change as it applies to themselves and their community, students first review changes that have occurred in their personal lives, such as height and weight. To help students understand how they are to think about change, the teacher first explores their understanding of the term *change* using a classroom concept map. The map allows students to brainstorm terms they associate with the word *change*. They then discuss a number of past and present community changes and express their feelings about them. The teacher asks the class to select one of the changes that has occurred. To allow students to evaluate this change, she asks them:

- "How do you feel about this kind of change in your community?"
- "Is this a good change or a bad change? Why?"

To help them clarify their own assumptions, she takes note of their responses and discusses each one for its implications. ("One of you said a change was bad because it left less room to play. Is less room for children to play always a bad change, or just in this one case?")

When referring to their responses, she helps them articulate criteria for assessing change by pointing out the features that good changes have in common and then does the same for bad changes. "How was reason X like reason Y? What did the good changes have in common? Is this part of why they were good?" She writes these questions and answers on the board so that students can begin to see patterns in good and bad changes.

The class discusses why it is important to be clear about these reasons to help students begin to see that knowing what makes a change good or bad helps when someone has to make changes.

example, they might identify evidence of assumptions in a novel that they're reading, in newspaper articles, in their own persuasive writing, and in school rules and policies.

Students might also explore the distinction between fact and opinion, probing statements of fact for the opinions that might be influencing them or the opinions they might be influencing, and trying to uncover the facts inside popularly held opinions. This investigation can cross content areas, encouraging further thinking about the content and contexts that tend to promote the use of fact vis-à-vis those that promote the development and articulation of opinions.

What Tools Convey Explicit Criteria to Scaffold and Support Learning?

Teachers can employ a number of strategies to help students use rubrics and checklists to scaffold and support their learning. These include introducing a rubric in stages, one dimension at a time and with a variety of models, exemplars, and anchors. Other strategies involve

- having the teacher model the use of the rubric or checklist with his or her own work;

- asking students to use it as they begin to plan their work;
- helping students use the rubric or checklist for self- and peer assessment as they work and after their work is completed; and
- having students use the rubric to give feedback to each other, to set and evaluate goals, and to revise and reflect on their work, and also to give feedback on the rubric itself.

Scaffolding learning may require that the teacher use anchors for each level of performance and tie rubrics to performances and processes. The teacher may also support different dimensions or sections with minilessons or individualized assistance.

To revise rubrics or checklists by refining the language used to describe quality at different levels of achievement, especially in cases where the original draft of the rubric left questions, teachers can use examples or student work created in response to the assigned task. Such student work can come from current students—this work would be used to refine the wording of the rubric descriptors after implementation—or past students who have completed the same, or a similar, assignment—this work could be used to refine the wording of descriptors after initial drafting but before implementation.

In general, scaffolding is most effective when teachers provide continuity in the classroom by presenting tasks that are repeated throughout instructional sequences, with variations that are interconnected to each other and correspond to the curriculum. Using a variety of modalities to present the same concept is extremely useful, too, because students vary greatly in terms of their learning preferences.

Conclusion

Creating a safe and relatively risk-free learning environment in which students can test the limits of their knowledge, develop intellectual courage, and exercise some choice in terms of the questions they can ask, what they want to learn, how they can go about learning it, and how they might demonstrate what they know and can do are all practices that go a long way in terms of scaffolding learning for all students. Figure 7.4 presents application activities to check your understanding of scaffolding.

Figure 7.4 **Application Activities for Chapter 7**

A. Complete the following chart to record your understanding of scaffolding.

Term	My Definition	One Example from My Practice
Scaffolding		
Modeling		
Offering explanations		
Inviting participation		
Providing feedback		
Receptive scaffolds		
Transformation scaffolds		
Production scaffolds		

B. Revising to Include Scaffolds

1. Consider a unit, a series of related lessons, or an assessment that you currently implement.
2. Determine the places and purposes that would benefit from the scaffolding strategies discussed in this chapter. (Refer to the chart in Section A to help you think of some specific strategies.)
3. Revise the unit, lesson set, or assessment to include the scaffolds that you have identified.

8

Using Questions to Engage and Support Learning

If, however, it is in the nature of hidden questions to disappear, it is also in their nature resolutely to reappear. And given the right climate, one question leads to another and another, smaller questions combine into larger, and many small questions reveal they were right along large ones.
—Robert Gardner (1994)

Why is questioning so important? We discover the limitations of our understanding through the questions that we ask ourselves and those that others ask us. Questions enable us to define and negotiate what we know and want to know, to test and expand the boundaries of our insights, and to differentiate our own thinking from that of others. Asking questions is the key to negotiating the differences between what is mundane and what is exquisite, what is busywork and what is transformative. Knowing what questions to ask and when to ask them gives us control over the knowledge we can negotiate. Teaching students to ask and ponder all kinds of questions, especially ones that can't be answered, can certainly produce better learners and thinkers than many of our current graduates.

"Is art in the eye of the beholder?" "What is more constant than change?" "What does it mean to be free?" Teachers who use questions like these have no trouble appreciating their merits. They use questions to promote thinking, stimulate discussion, incite curiosity, and encourage multiple perspectives. They recognize that, in their ambiguity or seeming complexity, these questions tap central aspects of our existence. They appreciate that when students are asked such questions, their responses reveal opinions, beliefs, or values that might otherwise stay

hidden. Questions like these are central to promoting students' thinking, deepening their understanding, and helping them make connections.

As compelling as this scenario may sound, such questions are seldom evident in the classrooms we visit or the work we review. In a typical classroom, teachers tend to pose questions that they themselves can answer or whose answers are clearly available for the finding. The act of questioning and responding is far more comfortable and benign for all involved than questions like those in the previous paragraph. Far from stimulating debate, probing assumptions, and delving into that gray area of no right and no wrong, classroom questions are much more likely to be focused on assessing or monitoring student comprehension, attention, or use of a strategy or process. In short, most teachers are far better at teaching students how to answer questions than how to pose good questions themselves.

Many teachers develop a relatively stable pattern of questioning fairly early in their careers. As their repertoire becomes predictable and consistent, students can "size them up" and determine what they need to succeed or, at the very least, avoid becoming the focus of attention. They can decide when and how to pay attention or study.

In the past 30 years, much has been studied about effective questioning. This research suggests that many teachers ask too many low-level questions and could improve their questioning practices. Assessing, refining, and expanding one's repertoire of questioning practices is a powerful way to improve teaching skills. Consider the differences between the original and revised assignments shown in Figure 8.1, which will illustrate how a teacher revamped the questions she planned to ask her students as they examined a current weather map.

Effective questioning is indispensable if we want students to learn how to ask as well as answer questions. We live in a time when knowing *what* questions to ask is probably as important as, if not more important than, knowing *how* to answer them. A focus on purposefully developing students' own effective questioning skills improves their ability to think critically, to grapple with all kinds of problems, and to make sense of the information explosion to which they are exposed every day.

Teachers are often ill equipped to provide students with opportunities to develop their critical thinking skills. In some cases, they themselves have not learned enough about questioning strategies or critical thinking skills, or about how to teach and assess them. In others, textbooks and other resources focus primarily on the attainment

of discrete knowledge or skills, or separate the lessons on basic skills from the enrichment opportunities that might allow students to work with more complex material or to transfer a skill from one context to another. Given the significant curriculum demands in each subject area, teachers may never get to the enrichment section of their curriculum. Finally, although many state and national standards demand the use of higher-order thinking skills, teachers generally have had insufficient professional development opportunities to enable them to deconstruct, operationalize, and internalize the standards so that they can explicitly teach and assess them.

Figure 8.1 **Original and Revised Questions on Meteorology**

Original Questions	Revised Questions
What are the general weather conditions associated with a low-pressure area in terms of temperature, wind patterns, cloud development, and precipitation?	What process do meteorologists use to make weather predictions?
What are the general weather conditions associated with a high-pressure area in terms of temperature, wind patterns, cloud development, and precipitation?	Check the weather report for Atlanta daily during your forecast period to assess the accuracy of your prediction. How accurate were your predictions? What factors influence the accuracy of your forecast?
	What factors could lead different individuals interpreting the same data to arrive at different predictions?

What Questions Should We Ask Students?

We should ask students many types of questions, including questions that elicit one right answer; questions that produce a wide range of answers; questions that tap different levels of thinking; questions about content, processes, and procedures; questions about definitions and interpretations; questions about values; and even questions about questions. Most important, we should ask students questions that are congruent with and support the outcomes we want them to attain.

Questions can be classified in many different ways. The classifications emphasized here relate to thinking demands and processes, the level of depth, the degree of open-endedness, the extent to which they can be answered, and support for values clarification.

Questions That Support Different Kinds of Thinking

One such classification relates to the kinds of thinking demands and processes that different questions promote. For example, *memory* questions are used to assess students' recall of information. *Text-explicit* questions focus on information that can be extracted from a text or word problem. *Text-implicit* questions require that students read "between the lines." *Inference* questions center on implied meaning. *Interpretation* questions require that students restate or translate information into their own words. *Transfer* questions enable students to apply learning in one context or situation to another. Questions about *hypothesis* ask students to ponder or state the relationship between two variables. *Evaluative* questions require that students make judgments. *Reflective* questions focus on helping students think about their thinking and learning.

The saying "You get what you ask for" applies quite clearly to classroom questioning. Often, teachers are disappointed in the responses that questions elicit, and the temptation is to blame some deficit in students' abilities or understanding. A return to the question itself can reveal important gaps between the original intention and what the question actually asked. For example, if the intention was for students to reflect on how their choice of strategies affected their ability to solve a problem, but the question was "What strategies did you use to solve the problem?" student responses are likely to fall short. The root of the disappointment, however, may not lie in the students or their ability to respond to a question but instead in the fact that a memory question was used in an attempt to elicit a reflective response. When teachers understand the thinking that different kinds of questions support, they can design and use their questions strategically, better ensuring a connection between intent and result.

Deep Versus Surface Questions

Another classification discriminates surface-level questions from deep questions. *Surface* questions refer to basic, factual (requiring only recall of information), or procedural information, and they usually require a single unambiguous answer (e.g., yes or no). *Deep* questions focus on stating explanations and causes, making predictions, or resolving discrepancies in knowledge; they are more open, imaginative, and reflective. They include *wonderment* questions that reflect curiosity,

puzzlement, skepticism, or speculation (e.g., "What do you think would happen if …?").

Teaching students how to ask deep questions is as important as helping them answer them. One of the ways teachers can help young children distinguish questions of different depth and complexity is by using the idea of $10 and $100. Here's a 2nd grade teacher's translation of this approach:

$10—facts from the book

- What is a _____?
- What does _____ look like?

$100—big ideas, thinking

- What would it be like without _____?
- How does _____ compare to _____?
- How does knowing about _____ help someone?
- How does _____ affect _____?

Students are quick to learn how to discriminate questions that vary in terms of depth and relevance. They also can use their own questions to tap into areas they're interested in learning about. Thomas, a 4th grader who's fascinated with transportation, illustrates this ability in the following example:

- $10 question: How much time does it take to build a whole complete car?
- $100 question: How can airplanes fly such a heavy cargo?
- $1,000 question: How did the man who built the first car know how to do it, if nobody built a car before him?

Convergent and Divergent Questions

Questions can also be classified according to their open-endedness. *Convergent* questions focus on a correct response and reflect given or remembered information. They involve the processes of explaining, stating relationships, and comparing and contrasting. These questions can be factual and simple:

- "Where did the Boston Tea Party take place?"
- "When do you use a period in a sentence?"

- "What is the verb in the sentence 'The girls told the boy what to do'?"
- "Do metals sink or float?"
- "What is the definition of a triangle?"

They can also be factual and complex:

- "What community do you live in?"
- "How did character X show his anger at Y?"
- "In how many different ways can we sort these buttons?"

Divergent questions are more demanding of a student's thought processes and may call for several plausible or correct responses. They often ask for students' opinions or conjectures. They tend to demand higher-order thinking by tapping the processes of predicting, hypothesizing, inferring, or reconstructing. Sample divergent questions include these:

- "Is a neighborhood always a community?"
- "Why did the Boston Tea Party take place?"
- "How does the body work?"
- "What happens when we do not use punctuation?"
- "How do we rewrite the present and future tense of the verb in the sentence 'The girl told the boy what to do'?"
- "How can we know if something will sink or float without trying to sink or float something?"

Essential and Guiding Questions

Yet another classification involves essential and guiding questions. *Essential* questions are universal questions that have no definitive answer. By their very nature, they are addressable but yield no definite answer. Here are a few examples:

- "What is the meaning of life?"
- "Is justice possible?"
- "Who defines art?"

Questions like these provide a compelling and relevant "hook" into the students' own experience and knowledge base, stimulating inquiry and engaging their interest. Because of their universality, these questions transcend subjects, ages, and grade levels—although some are more accessible than others at different ages (e.g., "What is the meaning of

life?") and require adaptations to content to make them fully accessible to young learners. They also tend to be cross-disciplinary. In the context of units, they can be used as the title of a unit, assignment, or lesson. They can also be administered as pre- and post-instruction assessment tools and used to measure students' growth in their thinking about these questions.

Essential questions are most effective when teachers use them to stimulate student inquiry as well as to elicit and help students access and understand multiple perspectives. Because so much of the curriculum tends to be rather convergent, emphasizing the acquisition of specific content knowledge and the use of basic skills, essential questions are seldom used on a regular basis. When teachers do find ways of using them and helping students ponder them, however, the payoffs can be tremendous, for both students and teachers. Consider this excerpt of a student's response to the question "What does citizenship require?":

> Being educated doesn't necessarily mean I will take my responsibilities seriously and actually follow through with all the things I should do to be a good citizen. It is easy to say that you'll take action, or do something to help, but it is hard to actually do this, since we all live such busy lives and it's so much easier to just wrap ourselves in our New Hampshire, Durham bubbles. I feel like I am not a good citizen at this point in my life because I don't make time to watch the news or write petitions or get involved in my local and national communities to change our country. In order to be a good citizen in this country you can't just be aware of your rights, you have to exercise and appreciate them.

Guiding questions, distinctly different from essential questions, are both specific and answerable. They are sometimes called *curriculum* questions. A unit about war and the United States could include guiding questions like "What were the causes and consequences of 20th-century American wars?" or, even more specifically, "Why did the United States enter World War II?"

Guiding questions are derived from the unit or lesson objectives; they help teachers connect lessons and increase the coherence of units. They can be linked to and support teachers' pursuit of essential questions. The examples in Figure 8.2 show the relationship between essential and guiding questions.

Figure 8.2 **Essential and Guiding Questions**

Essential Questions	Guiding Questions
• What is freedom?	• What is the Fourth Amendment to the U.S. Constitution?
• Is time a cultural concept?	• How many seconds are in a minute?
• What is our place in the universe?	• What is the distance from the Earth to the Sun?
• What is more constant than change?	• What is the pattern that best represents the tides?
• What does it take for the world to feed itself?	• Which countries have high rates of poverty?
• What makes writing worth reading?	• How do authors make characters interesting?
• Is war inevitable?	• What were the causes of the Civil War?

The use of essential and guiding questions can transform a unit, lesson set, or assignment. In the following example, criteria for incorporating essential and guiding questions are used to revise a unit.

Original Unit

Organizing center: Air pollution

1. What do you know about air pollution?
2. What can we learn about air pollution?
3. What types of transportation are used where we live?
4. How do cars pollute the air?
5. How can we document or graph what we have learned?

In the original unit, air pollution is the organizing center, supported by five guiding questions and no essential question. Consider the types of questions that have been generated as guiding questions. What kinds of thinking and responses do they support? Would you consider these questions to be convergent or divergent? Are they $10, $100, or $1,000 questions? How would you describe the array or balance of the thinking that these questions promote in students? Figures 8.3 and 8.4 present the rubrics that teachers who designed this unit used in thinking about their unit and the questions that framed it. The underlined descriptors, or parts of descriptors, indicate the feedback they received and used to create the revision that appears on page 144.

Review the teachers' revisions to their unit's questions. How will these revisions likely affect the learning experiences and assessments that they will design?

Figure 8.3 **Essential Questions Rubric**

1	2	3	4
• Essential question is missing, unclear, poorly stated, or irrelevant to inquiry.	• Essential question is clear and open-ended.	• Essential question is significant and relevant.	• Essential question is compelling.
• Essential question is divorced from organizing center.	• Essential question and organizing center are unclearly or tangentially connected.	• Essential question is clearly linked to the organizing center.	• Essential question is the organizing center, providing the central focus of the unit or lesson set.
• Essential question remains unaddressed, explicitly or implicitly, throughout the unit/lesson set.	• Essential question is addressed at the beginning and/or the end of the unit or lesson set.	• Essential question is linked to one or more learning experiences but is not consistently addressed throughout the unit/lesson set.	• Essential question is addressed and drives students' inquiry throughout the learning experiences and assessments of the unit/lesson set.
• Essential question is unrelated to the standards.	• Connections between the essential question and identified standards are unclear or contrived.	• Essential question is clearly connected to the identified standards.	• Essential question clearly supports and is supported by the identified standards.

Source:

Revised Unit

Essential question: How much air pollution is too much?

Guiding questions

- What do you know about air pollution?
- What are the causes of air pollution?
- How do cars pollute the air?
- How does air pollution affect us?
- How do we currently deal with air pollution?
- What are the costs of air pollution?

Consider the types of questions that have now been generated as guiding questions. How are they different from the original guiding questions? What kinds of thinking and responses do they support? Would you consider these questions to be convergent or divergent? Are they $10, $100, or $1,000 questions? How would you describe the array or balance of the thinking that these questions promote in students? How would the rubric assessment be different for the new questions?

Figure 8.4 **Guiding Questions Rubric**

1	2	3	4
• Questions rely exclusively on one or more general guiding questions that are unrelated to the learning experiences.	• Guiding questions are too general or superficial to provide a framework for the unit/lesson set.	• One or more guiding questions are meaningful and provide a framework for the lessons or unit.	• Guiding questions support the essential question and frame every learning experience.
• Questions support a single level of thinking.	• Questions focus primarily on recall, comprehension, and factual knowledge acquisition.	• Questions support different levels of thinking.	• Questions support different levels and processes of thinking.

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Questions That Help Students Clarify Their Values

A different classification sorts questions according to the role they play in helping students clarify their values. These questions matter because students need support in thinking about who they are, what they need and want, and how to recognize and mediate situations that entail competing values.

Questions that can help students make choices and recognize the differences between their own aspirations and desires and those of others include these:

- "What do your parents want you to be?"
- "How many years will you give to this pursuit?"
- "How will you know that this is a good choice for you?"
- "What will you do if you're not good enough?"

Here are examples of questions that help students identify criteria for making decisions and choosing from different alternatives:

- "How long will you look around before you decide?"
- "What else will you consider before you pick this?"
- "What will go into the final decision?"
- "Who will help you? Do you need any further help?"
- "Will you consider another possible alternative?"
- "What's really good about this choice that makes it stand out from the other possibilities?"

Helping students ponder and ask such questions is critical at all ages and can greatly support their ability to self-regulate.

It's often difficult for adults and students alike to consider the intended and unintended consequences of their choices and decisions. Questions that help students make reflective and thoughtful choices by helping them articulate their implicit assumptions and mental models include these:

- "What will be the consequences of each available alternative?"
- "Have you thought about this very much? How did your thinking go?"
- "What assumptions are involved in your choice?"
- "If you do this, what will happen to …?"
- "Just what is good about this choice? Where will it lead?"
- "For whom are you doing this?"
- "What will you have to do? What are your first steps? Second steps?"

We also need to help students develop self-confidence and acquire a strong sense of self by asserting what they believe and value with questions like these:

- "What do you believe about _____?"
- "What do you want?"
- "How long have you believed or wanted it?"
- "Are you glad you feel that way?"
- "What good is it?"
- "What purpose does it serve?"
- "Why is it important to you?"
- "Is this something you really prize? In what way would life be different without it?"

As students develop strong convictions about what they believe, are, and want, teachers can help them affirm their values with questions like these:

- "Should a person who believes the way you do speak out?"
- "Do people know that you believe that way or do that?"
- "Are you willing to stand up and be counted for that?"
- "Would you be willing to sign a petition supporting that idea?"
- "Are you saying that you believe [repeat the idea]?"

In contexts where it is appropriate to reinforce students' convictions and help them consider actions, teachers can ask students questions that will help them reinforce their values:

- "Have you felt this way for some time?"
- "What are your plans for doing more of it?"
- "Should you get other people interested and involved?"
- "Has it been worth the time and money?"
- "Are there some other things you can do that are like it?"
- "How long do you think you will continue?"
- "Did you run into any difficulty? Will you do it again?"

Finally, in situations where it is appropriate to invite students to take action or mobilize other people's actions, teachers can ask questions like these:

- "I hear what you are for; now, is there anything you can do about it? Can I help? What are your first steps, second steps, and so on?"
- "Are you willing to put time and money behind this idea?"
- "Have you examined the consequences of your actions?"
- "Are there any organizations set up for the same purposes? Will you join?"
- "Have you done much reading on the topic?"
- "Who has influenced you?"
- "Have you made any plans to do more than you already have done?"
- "Where will this lead you?"
- "How far are you willing to go?"
- "How has it already affected your life?"
- "How will it affect you in the future?"

Although it's not always relevant or necessary to ask students questions related to their own or others' values, these kinds of questions are critical for circumstances such as helping students think through college or career choices, dealing with issues of attitude or behavior, helping students unpack their own and others' reactions to current events or social awareness assemblies, and supporting learning experiences that focus on identifying problems and proposing and taking action. Thinking back to the example in this book's introduction, you may realize now

that questions like these probably were instrumental in helping Kristen and her classmates during the course of their learning.

How Do Questions Affect Student Participation and Engagement?

Let's examine the effect of a teacher's questioning more closely. Figures 8.5 and 8.6 include transcripts from two different teachers and their students. Look closely at the students' communication in each of them.

In Transcript 1, in Figure 8.5, the teacher uses questions to engage his students in a dialogue with him and with each other about the text. His questions probe, provoke, and invite students' responses. Now consider Transcript 2, in Figure 8.6. Notice that in the second example, the teacher and the students are not interacting with each other. The teacher questions students but does not seem to be bothered by the lack of response and moves on with the class.

Conclusion

Can you imagine life without questions? I would like to think that we do our best as teachers when we engender in students a love of questions—not in the sense of needing to answer all of them, but in terms of appreciating the privilege that we, as human beings, enjoy as we delve in the territory of the unknown. Handy (1997) speaks to this phenomenon when he refers to the "two hungers":

> In Africa, they say there are two hungers, the lesser hunger and the greater hunger. The lesser hunger is for the things that sustain life, the goods, the services, and the money to pay for them, which we all need.
>
> The greater hunger is for the answer to the question "why," for some understanding of what life is for. (p. 13)

Figure 8.7 shares application activities for this chapter.

Figure 8.5 **Transcript 1: 10th Grade English Class Discussing a Chapter from John Steinbeck's Biography**

Teacher	Students
"Let's start with his voice. How would you describe the emotion? What is his tone? What words or phrases convey it?"	Several students speak: "Passion." "Anger?" "More passion than anger."
"What kind of passion? Joyous? Serious?"	"Frustrated."
"How many agree?"	Ten hands go up.
"How can you tell that he is frustrated?"	Several students speak at once offering illustrations from the text.
"What technique does Steinbeck use?"	Student offers "repetition" and an example.
Teacher writes on board: REPETITION "Circle any words that you see repeated."	CHANGE/MULTIPLIED A MILLION TIMES/RESULTS NOT CAUSES.
"What is the purpose of repetition in general?" Teacher reads, emphasizing repetition. He pauses.	"To emphasize."
"What are the owners doing here? In their nervousness what are they doing?"	"They are attacking the government."
"What else?"	"Labor unions."
"What else?" He pauses.	"Taxes."
"'What they don't realize is that these are the results, not the causes,' says Steinbeck. So what are the causes? Let's keep reading."	Students read in silence.
"What's the cause?"	"Hunger."
"For what?" He pauses.	"Food, happiness, joy, etc."
"You are thinking about something more. What do you think? Use a different word than *know*."	"*Understand*."
Teacher continues reading. "Holy cow, did you notice something the author used?"	"Imagery." Students give examples of imagery. "Steinbeck is saying you can know this the easy way or the hard way." "'If the step were not taken … the bombs would not fall.… Every bomb is proof that the spirit has not died.'"
"Other examples?"	"People are trying to protest."

Figure 8.6 **Transcript 2: 10th Grade Biology Class**

Teacher	Students
"What have you done from yesterday? You have a lot to do before next Wednesday."	Students are silent.
"What kind of paper did you use for electrophoresis?"	No one answers.
"Do you have all the criteria? Raise your hand if you do."	Ten students raise their hands but do not speak.
"Copy the assignment I wrote on the board now and get started on it."	Students begin to take notes.
"Glad to see you're working now."	Silence.
"Are you OK?"	Several students are talking to each other and passing notes.
"Are you having trouble getting started?"	Students do not respond but continue their behavior.
"Can I have your attention, please? If you have questions, you need to come see me during another class period. This is due Wednesday. Would anyone be willing to share what they have learned? Has anyone learned anything new or discovered any problems?"	Students do not respond.

Figure 8.7 **Application Activities for Chapter 8**

1. Think of a unit, set of lessons, project, or work-related endeavor that focuses or requires inquiry and for which eliciting multiple perspectives would be helpful. Consider what you want students or others to learn or discover as a result of your engaging with that unit, set of lessons, project, or work-related endeavor. Remember the criteria for including an essential question. Write your question here:

2. Identify the guiding questions that could support the essential question you have identified.

3. Describe the activity that would precede the use of the essential question.

4. Describe the activity that would follow the use of the essential question.

Use the following checklist to identify your future uses of essential and guiding questions.

Essential and Guiding Questions Checklist
☐ Identify an essential question for an upcoming unit or project that is designed to stimulate student inquiry and the drawing of multiple perspectives. Use it at least once to frame a classroom discussion.
☐ Generate an essential question for a unit or culminating assignment, and use it as a pre- and post-test. Ask students to review both sets of responses and to reflect on their growth.
☐ At the beginning of the year, semester, or unit, ask students to brainstorm essential questions, and select one of them as the focus for a discussion.
☐ Identify the guiding questions for an upcoming unit to assess the level and kind of thinking they target. Identify the state standards and performance indicators that will be addressed and assessed by those questions.
☐ Identify the essential and/or guiding questions for an exit project.
☐ Use the examples and rubric for essential and guiding questions included in this chapter to identify the questions for an upcoming unit and to web the main lessons or activities.

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9

Helping Students Become Strategic Learners

If I asked all the teachers in any given school to contribute one penny for every student they have in grades 2–12 who struggles with note taking, studying properly, managing time, knowing how to take turns, using information gathered, or managing their impulses, I would probably gather enough money to fund at least one staff position or a state-of-the art teachers' resource library.

I remember one such student. She had immigrated to the United States from Nicaragua and had only received two years of schooling in her village before coming to this country. Her language skills in both English and Spanish were marginal, at best. She was sweet and quiet, always smiling but hardly ever speaking in class. In that particular year, I had five different preps, two of which were new courses, so I felt I was in way over my head. This student's deficits were so extreme relative to the rest of my class, which happened to be more homogeneous than usual, that I remember catching myself thinking, "Why me? Why is she here? Why didn't someone catch this problem before?"

Just as many teachers in the secondary grades complain about having students with these maladies as in the primary grades, and their answer to the question "Where does this problem come from?" invites a similar answer: that somehow something was lacking in earlier grades, and students didn't learn how to learn. Shifting the burden to other teachers and grades, though a common reaction, has done little to remedy the problem. For my young Nicaraguan student, I couldn't really know, let alone change, what had gone on before. Ultimately, as her teacher, I had the responsibility to do what I could to address her present needs

in whatever way I could. Helping students learn to learn is everyone's responsibility.

Some students are very quick to learn the value of memorization in terms of being recognized as good students, the importance of note taking to facilitate test reviews, the usefulness of outlines for organizing information, and the benefits of answering test questions we know first and leaving the hardest questions for later. Some students are quick to grasp that studying in science requires different strategies than studying a second language and that there are different tricks or strategies for using other people's work.

These students learned to learn. They learned how to regulate themselves as learners from watching successful learners, from being assisted by their parents or others at home or by teachers who'd coached them, or from being naturally reflective and introspective. Other students, however, may have lacked such assistance at home; maybe they didn't have access to explicit instruction and coaching on learning; maybe they were overwhelmed by other pressures and distractions; or maybe they were simply not particularly introspective. Many of the students in the latter group are often referred to as being "at risk," and their risk factors may be associated with poverty, lack of acculturation or language skills, or physical, emotional, or mental deficits.

Teaching so that all students can learn demands that we ensure that every child, regardless of grade level, acquire learning-to-learn and strategic learning practices and processes that will promote success as a learner in school and beyond.

What Does Learning to Learn Entail?

Learning to learn refers to both acquiring and fostering attitudes, understandings, and skills associated with effective participation in education and the carrying out of learning-related tasks (Smith et al., 1990). Some of the competencies associated with learning to learn are listed here:

- Knowing how to self-monitor and reflect when engaged in an educational activity
- Participating actively and assuming the appropriate amount of control of a learning experience
- Accessing and using a repertoire of learning strategies

- Accommodating to the requirements of different delivery systems, methods, and subject areas
- Having self-confidence and motivation to learn
- Engaging in different types of thinking (conceptually, analytically, reflectively) as needed
- Using group inquiry and problem-solving skills
- Making sound choices among the educational programs and resources available
- Using organizational thinking (Smith et al., 1990, p. 4)

In a class of 6th graders I taught, Jen was the quiet but capable student everyone knew they could count on. She was an independent and facile thinker, able to take the twists and turns of the most challenging learning experiences with the graceful confidence of someone with a collection of strategies at her beck and call—and the awareness to appreciate what that means.

When I think of Jen in relation to the preceding list, as well as in the context of the 21st-century skills we'll explore later, it's apparent to me that some of her greatest strengths are there. She was reflective as a learner—and as a person—and was not afraid to share her questions, her perceived strengths, or what she felt she needed. Jen was proactive, able to look at a situation and assess what it was she could handle on her own, what would be best done with her peers, and what, if anything, might require additional support and where that support should come from.

During the course of one extended unit, we discovered at the last minute that a local TV news channel was going to cover our planned culminating event a day earlier than we had anticipated having it ready. Jen calmly stepped up and asked to convene a team meeting. After the problem was presented and discussed, she shared her thoughts of how to complete the learning experience and be ready for the presentation of our work in time for the television crew. Her ideas made so much sense that there was almost instant agreement. Jen proceeded to organize groups of students around specific jobs; then she turned to me, filled me in on what was under control and what I might still need to pay attention to, and joined the group she had assigned herself to. Jen had so accurately assessed and analyzed the situation and so well appointed people to tasks that in the end we were ready for our TV appearance,

having had time to rehearse, give and receive feedback, make revisions, and even laugh.

Learning-to-learn processes and skills have always been important for promoting successful lifelong learners. In their current incarnation as part of the 21st-century skills, they have recently been touted as critical if we are to meet the demands of today's world. For more information, see www.21stCenturySkills.org. Here are three major sets of 21st century skills, each one supported by additional competencies:

- Digital age literacy—today's basics
  - Basic, scientific, and technological literacies
  - Visual and informational literacy
  - Cultural literacy and global awareness
- Inventive thinking—intellectual capital
  - Adaptability/managing complexity and self-direction
  - Curiosity, creativity, and risk taking
  - Higher-order thinking and sound reasoning
- Interactive communication—social and personal skills
  - Teaming and collaboration
  - Personal and social responsibility
  - Interactive communication
- Quality, state-of-the art results
  - Prioritizing, planning, and managing for results
  - Effective use of real-world tools
  - High-quality results with real-world application

It isn't difficult to see how learning-to-learn skills support 21st-century skills. However, in general, learning to learn is often couched under the aegis of strategic learning and self-regulation. Identifying worthy and attainable goals, developing strategies and actions for attaining them, reflecting on the meaning of what we've learned, and evaluating the work or learning attained are all key to strategic learning.

Self-regulation, which emerged in the literature of health psychology, educational psychology, and organizational psychology, has been defined by Pintrich and others as the process by which individuals attempt to monitor, regulate, and control their learning (Chamot & Kupper, 1989; Pintrich, 2000). Self-regulated learners are aware of their learning, can reflect on it, and can self-monitor as they learn. Such awareness, self-monitoring, and reflection capabilities help them identify and cope

with barriers to learning, and they use their self-direction and control to approach all kinds of learning challenges and tasks. These abilities allow them to extract meaning from experiences as learners in and outside school. Self-regulated learners know themselves. They know how they prefer to receive, process, and assimilate information and how they'd rather demonstrate their understanding. They also have a sense of their preferred learning environments (e.g., stimulating, quiet, bright, social).

One of the most effective strategies I used with my students to help them learn about themselves as learners involved adapting a strategy I learned from Jim Voss, a cognitive psychologist and good friend of mine, who once shared with me how he used it to help his graduate students learn about self-regulation. Whenever I gave a test to my students, I asked them specific questions before they took it and after they completed it. When they first got the test, I asked them to write their responses to the following questions in the upper-right corner:

1. What grade do you think you will get on this test?
2. How much time did you study for this test?
3. When did you study?
4. How did you study for this test?

When they finished the test, I asked them to write their responses to the following four questions in the lower-right corner:

1. How do you feel you did on this test?
2. Now that you completed the test, what grade do you think you will get?
3. To what extent were you successful?
4. What do you need to do better on the next test?
5. What kind of support, if any, do you need from me to improve your performance?

I discovered many differences among my students in terms of their ability to accurately predict their performance, the time and resources they had used to study, their use of study strategies, and their assessment of how the extent to which they had studied prepared them for the test. I also learned that the students who performed lowest were less specific in their articulation of how they had studied, and they tended to rely on a very limited repertoire of strategies for studying (e.g., flash cards).

This finding was echoed by teachers who adapted my test-questioning strategy with their own students. Figure 9.1 presents the responses from two different students in one class and the grades they actually received.

Figure 9.1 **Sample Student Self-Assessment, Pre- and Post-tests**

Student 1	Student 2
Pre-test 1. The grade I think I will get on this test is 85 or 90. 2. The way I study for this test is I put my TV on so I can hear it a little bit. Then I take the book and read through the things we have read. I copy those notes into my notebook and read them. 3. I study for about 1 hour and a half two times. 4. I study by myself. 5. I study on Tuesday and Thursday night.	**Pre-test** 1. What grade do you think you will get on this test? *Not good* 2. How did you study for this test? *Looking over answers* 3. How much time did you study for this test? *Not a lot* 4. *I study alone.* 5. When did you study? *At night*
Post-test 1. How I feel is good because I study. 2. I was successful because I study as hard as I can. 3. I need to improve in studying the vocabulary. 4. I need from the teacher to improve is let her keep doing the things to help me.	**Post-test** 1. How I feel I did on this test: *Not very well* 2. Why was I successful? *Not successful* 3. What I need to improve next time. *I don't know* 4. What I need from my teacher to improve. *To help me.*
Grade: 94	**Grade:** 43

The ability to be aware of and reflect on one's own process while undertaking to learn develops late in children, and it does not automatically increase with age (Schmitt & Newby, 1986). Such self-regulatory mechanisms as checking results, evaluating one's learning strategies, and planning one's next move may be present from early childhood, but they're more often used by older children and adults (Brown, 1987). Interestingly enough, skills and strategies that promote self-regulation can be taught at any age. One of the things I decided to do as a result of what I learned using the pre- and post-test questions was to administer the inventory shown in Figure 9.2 to my students and to design activities to help students in their areas of need.

Figure 9.2 **Self-Assessment of Self-Regulation Skills**

Check the skills that you think you need help with.	
1. How to ask questions	
2. When to answer questions	
3. When to ask or get help	
4. When it is appropriate to struggle with something on my own	
5. How to know when an internal struggle requires outside help	
6. How to help others	
7. How to give others feedback	
8. How to diagnose my learning needs realistically	
9. How to translate my learning needs into learning objectives or goals to be able to measure my accomplishments	
10. How to identify resources—human, material, and experimental—for accomplishing different learning objectives	
11. How to design a plan of strategies for using learning resources effectively	
12. How to carry out a learning plan systematically and proactively	
13. How to collect, use, and validate evidence of my accomplishments	

Source: Adapted from Knowles (1990, pp. 123–124).

A minilesson that I designed to help my students learn how to ask questions involved having them brainstorm questions about a specific topic before and during the teaching of the topic. After we generated a rather lengthy list of questions, I asked them to categorize those questions based on Bloom's taxonomy and to place them on a sheet of chart paper. Prior to taking a test on that topic, to help them review what they had learned, I asked students to refer to their chart and ask each other one question from each cognitive level. Teachers I've assisted have used this lesson successfully with students as young as 4th graders.

To teach students how to determine when it's appropriate for them to ask for outside assistance, I had my class brainstorm a list of struggles they had faced in the past week or two; categorize the reasons for the difficulties (e.g., lack of knowledge, skill, time, energy, materials, money, confidence); and determine which struggles on their list required outside assistance and which of them they could handle on their own.

As these examples suggest, many of the lessons that can help students become better learners involve tapping into their own life experiences and then helping them translate insights and strategies to the world of school.

What Do We Know About How to Best Help Students Learn How to Learn?

Learning to learn is a developmental process. We get better at it as we get older. Teaching students to learn to learn involves helping them acquire a repertoire of attitudes, understandings, and skills that allows them to become more effective, flexible, and self-organized learners in a variety of contexts. Because learning to learn occurs prior to, and in conjunction with, learning endeavors, it can be promoted through strategies and approaches used in the context of teaching any subject in school. To help students learn how to learn, teachers must help them access the deep meaning structures of material they need to learn and, in its most advanced forms, become aware of assumptions, rules, conventions, and social expectations that influence how people perceive knowledge and how they think, feel, and act when learning.

Asking students to reflect on their learning with questions such as "What did you find easy to do?" "What was difficult for you?" and "What would you do differently?" can help students become more self-aware of their learning preferences and needs. The following example from a 4th grader, after a unit on Native Americans, reveals the need to organize his notes better:

- What did you find easy to do? *I found thinking about the topic easy because the teacher gave us the topic.*
- What was difficult for you? *Putting the notes into sentences was difficult because it is not easy to write as many things and to make them into sentences that you can understand.*
- What would you do differently? *Taking more notes and putting them in order so I don't have to work so hard on the sentences.*

A slightly different approach to helping students identify their learning preferences and needs is illustrated by the following responses from a 5th grader:

- Write about one thing that we did this week that was good for you. *Writing the limericks*
- Why did it work well for you? *I thought it was easy and there were not hard to write.*
- Write about one thing that we did this week that was difficult for you. *Writing a expository essay was hard.*
- Why was it hard for you? *It was hard because I did not like to organize all the facts and write them down.*

Teachers can also benefit from asking students to reflect. In fact, students are a valuable source of information when it comes to refining curriculum or assessment because they're uniquely equipped to comment on the strengths and weaknesses of the curriculum they experience. The following is a response from a 3rd grade student who was asked to reflect on the week's learning:

> During this week in the classroom a subject that worked well for me was science. In science we have been studying energy. When we were studying energy I especially enjoyed when the class was doing kinetic and potential energy. It was fun I learned a lot and enjoyed it. At first I did not understand the words. But by making it really fun and talking it over in a fun way I learned so much.

Increasing students' ability to self-assess enables them to develop a deep understanding of their strengths and weaknesses and empowers them to know how to improve their work, as evident in the following reflections from two 6th graders:

> I think I'm a very good reader. I like to read science-fiction books usually. When I read I usually read for about one hour a day and I finish several books in about a week. The books are usually about 350 to 400 pages. On good days I read about 50 pages in a day. I usually read series of books like the DragonLance books. If there is a book report that is the only time I stop reading the series I'm reading. When I'm doing research I usually only use encyclopedias, unless I need to use a magazine. I always read the directions to a worksheet. For a game, I sometimes read the directions. That is how I think I read.

When I look at my Ghost Story and my Jed story I can see my growth as a writer. I've given the story more detail and description. In the ghost story, I had description but in Jed, I gave even more! For example, in the ghost story:

"The grass looked like it hadn't been cut in years",

And in the Jed story:

"The rain hit hard on the roof like marbles hitting a hard wood floor."

How Do We Help Students Become Strategic?

Strategic learning and planning includes five components: goal setting, planning, implementation, self-management, and self-monitoring. Helping students develop and use goals is central to their ability to become strategic thinkers and planners.

Goal Setting

Goal setting requires that students review the choices for learning, make decisions about what is important to learn or accomplish, and set clear goals to pursue them. Many adults and students need support in terms of being able to formulate goals that are specific, relevant, and appropriate to our needs; attainable; results oriented; and measurable or at least observable. When we first ask students to articulate learning goals, their initial goal statements are fuzzy, too general (e.g., "I want to get better in math"; "I want to do well in writing"), or without any reference to expected results or benefits.

One of the best ways to help students improve their goal-setting capabilities is to embed the articulation, assessment, and rearticulation of goals into the curriculum, providing students with ongoing and explicit opportunities to link their goals to their learning in school. Through explicit instruction in the articulation of goals, either by identifying the characteristics of appropriate goals or by comparing goals with different degrees of ambiguity and specificity, students can quickly become goal-directed individuals. Here's a sequence of goals, goal assessment, revised goals, and revised assessment from a 3rd grader who had several minilessons on goal setting:

November: My goal is to read 20–30 minutes every other day.
January: I met my goal by reading some days I missed some but I still read.

January: My revised goal is to read at least 2 books a week. They will not be picture books they will be chapter books at my level of reading. I will keep track of how many books I read by counting all the books I read a week.

February: I met my goal of reading two chapter books. I had trouble understanding parts of the book and I got bored with one of them but I still finished it.

February: My new goal is to understand chapter books. I will read 2 new chapter books and will keep track of the parts where I get stuck. I will use the dictionary and re-read the sentences that are before the parts that are confusing to help me understand.

Notice that the February goal relates to improved understanding and not just to reading more books. The student in this example was able to identify specific strategies to improve her comprehension, but this is an area where some students need a lot of help. Questions and statements such as the following can help teachers determine what students know about learning strategies and how they use them:

- "How do you personally figure out new words?"
- "Some of the clues I use are …."
- "I sound out the word by …."
- "The best method for learning new vocabulary is …. Why?"
- "The method that is not working is …. Why?"

Here's an example of a student's response to these and other questions:

- How do you personally figure out new words? *I sound out the word by breaking the word up and sounding each part.*
- Some of the clues I use are *the words around the word I don't know.*
- I sound out the word by *breaking up the words.*
- The best method for learning new vocabulary is …. Why? *The best method for learning new words is to find a word in the meaning*

and give me a clue of the main word because it helps me remember the words that go together.

- The method that is not working is .... Why? *The method that is not working for me is just reading over the word and definition b/c it doesn't stay in my head.*

To help my own students translate learning needs into objectives or goals, I would ask them to list all the things they wanted to have or be able to do when they turned 21 years old. I then had them categorize those wants using labels such as "simple," "complex," "one-step," "multistep," "requires self only," "requires others," "can happen quickly," and "takes a long time." Finally, I had them identify a learning goal for each of those categories. Some of the questions that help students formulate goals include these:

- "Why should you work on that goal?"
- "How do you know that this is the right goal for you right now?"
- "Is your goal attainable?"
- "Is your goal measurable?"

Planning

The second component of strategic learning is planning. In planning, students learn to outline exactly what they have to learn and accomplish, select the methods of learning that are appropriate to the task and for their learning style, and organize a plan of action for achieving their goal. Sometimes helping students plan involves helping them access what they already know and distinguish it from what they need to learn with questions like these:

1. What do I know about my topic?
   - Who is involved in my topic? Why did it happen? What was the impact?
   - What historical influences do I know about that might be important?
   - What cultural influences do I know about that might be important?
2. How does this topic relate to other things I know?
   - What topics have I studied this year that are similar to this topic?

- How is it similar?
- What did I learn about X when studying that similar topic?
- What questions does my knowledge of the similar topic lead me to ask about the current topic?

3. What seems important to me about this topic?
   - If I were to summarize what I know about this topic as it relates to the theme, what points would I focus on?
   - What points seem less important?
   - Why do I think so?
4. What *don't* I know about my topic?
   - What do I need to know?
   - What is my plan for how to find out?

To help students develop an appropriate plan based on their assessment, the same teacher who asked the questions related to figuring out new words had students rate their use of different reading strategies. Here are her questions to students and a student's response.

> On a scale of 1 to 5 (5 being the best way I learn and 1 being the least likely way I learn), rate how each strategy helps you pronounce a new word.
>
> 1. I sound the word by identifying the beginning and ending sounds. 1
> 2. I say the word and check to see if the sounds heard match the letters in the word. 2
> 3. I "point and slide" using my finger to underline and sound each letter until I can pronounce the word. 1
> 4. I use clues in the surrounding text to help me figure out unknown words. 4
> 5. I use word analysis to help me recognize a new word. Is there a prefix or suffix I know? Is it a compound word? 2
> 6. I ask myself if the word makes sense in the passage. 2
> 7. I pull apart or "dissect" a word. 3

In general, plans should comprise very specific action items, and each action item should be limited to a single action and accompanied by specific time and duration. Planning also includes the identification of needed resources and materials to implement needed action steps.

Implementation and Self-Management

I often combine implementation and self-management. Implementation revolves around carrying out the action plan; self-management involves helping students learn how to organize and manage their time and effort. During this stage, students identify possible contingencies when things don't go as fast or as well as they can and anticipate possible courses of action. This component of strategic learning and planning is also key to helping students learn to function as self-regulated individuals.

Self-Evaluation

The final component in this recursive process of strategic learning involves self-evaluation, in which students determine what constitutes success. Self-evaluation occurs (or should occur) throughout the strategic planning process. Students should first self-evaluate immediately after goal setting, as they think about how they might determine the degree to which they attained their goals. Here are the kinds of questions that help students identify success indicators:

- "What will you have completed after each work session?"
- "What will be different in your work?"
- "What will be different in the ways in which you work?"
- "What will improve?"
- "What will take you more or less time?"

Self-evaluation also occurs as students self-monitor, especially if and when they encounter unforeseen obstacles that require the reframing of their success indicators based on new conditions.

Finally, self-evaluation occurs when students assess goal attainment. The following questions help students assess their goals:

- "What did you actually complete or do?"
- "What do you now know, or what can you now do that you didn't know or couldn't do before?"
- "What is different in the quality of your work?"
- "What is different in the ways in which you work?"
- "What has improved?"

Conclusion

It's difficult for any of us to accurately predict what our students will remember 10, 15, or 20 years from now. I remember how much I used to agonize over what to cut when feeling pressured or after having taken far more time on a particular unit than I'd anticipated. I would like to believe that even if my students remember little of the content of our classes, I still contributed in a small way to their overall ability to learn, to ask important questions and know how to pursue them, to learn what they wanted to learn, and to pursue the goals that will make them feel whole as human beings.

Figure 9.3 presents an application activity on learning to learn—and specifically how that capability pertains to 21st-century skills.

Figure 9.3 **Application Activities for Chapter 9**

Assessment of Current Attention to 21st-Century Skills

1. Review each component of the *enGauge 21st Century Skills*.
2. Highlight the component of the skill you attend to.
3. Check the extent to which you currently teach and formally assess it.

Highlight the component of the skill you attend to	Check if you teach it	Check if you formally assess it
1. Digital Age Literacy—Today's Basics **Basic, Scientific, and Technological Literacies** As society changes, the skills that citizens need to negotiate the complexities of life also change. It has only been in recent years that the public education system has expected all students to learn to read critically, write persuasively, think and reason logically, and solve complex problems in mathematics and science.		
Visual and Information Literacy The graphic user interface of the World Wide Web and the convergence of voice, video, and data into a common digital format have increased the use of visual imagery dramatically. Advances such as digital cameras, graphics packages, streaming video, and common imagery standards allow for the use of visual imagery to communicate ideas. Information literacy includes accessing information efficiently and effectively, evaluating information critically and competently, and using information accurately and creatively.		

Figure 9.3 **Application Activities for Chapter 9 (*continued*)**

Highlight the component of the skill you attend to	Check if you teach it	Check if you formally assess it
Cultural Literacy and Global Awareness The world is rapidly becoming wired and the resulting globalization of commerce and trade has increased the need for cultural literacy. In such a global economy, with the U.S. concerned about interactions, partnerships, and competition from around the world, there is a greater necessity for knowing, understanding, and appreciating other cultures, including cultural formations established as norms in a technological society, such as virtual realities.		
2. Inventive Thinking—Intellectual Capital **Adaptability/Managing Complexity and Self-Direction** The interconnectedness of today's world brings with it unprecedented complexity. Globalization and the Web are inherently complex, accelerating the pace of change in today's world. Interaction in such an environment requires individuals to be able to identify and react to changing conditions independently—self-directed learners who are able to analyze new conditions as they arise, identify the new skills that will be required to deal with these conditions, and independently chart a course that responds to these changes. They must be able to take into account contingencies, anticipating changes and understanding interdependencies within systems.		
Curiosity, Creativity, and Risk Taking Today's knowledge workers are expected to adjust and adapt to changing environments. Inherent in such lifelong learning is a curiosity about the world and how it works. Researchers now understand how the very structure of the brain can be changed through intellectual pursuits. Curiosity fuels lifelong learning as it contributes to the quality of life and to the intellectual capital of the country. Equally as important is risk taking—without which there would be few quantum leaps in discoveries, inventions, and learning.		
Higher-order Thinking and Sound Reasoning For decades reports have been calling for higher-order thinking and sound reasoning in P–12 curricula. Sound reasoning enables students to plan, design, execute, and evaluate solutions—processes that are often carried out more efficiently and effectively using technological tools.		
3. Interactive Communication—Social and Personal Skills **Teaming and Collaboration** The rapid pace of today's society and communications networks have caused—and enabled—a shift in the level of decision making down to the worker, closer to the client or product. At the same time the complexity of today's world requires a high degree of specialization by decision makers—hence the need for teaming of specialists to accomplish complex tasks in ways that are efficient, effective, and timely. Information technology plays a key role in the ease with which individuals and groups collaborate.		

Figure 9.3 **Application Activities for Chapter 9 (*continued*)**

Highlight the component of the skill you attend to	Check if you teach it	Check if you formally assess it
Personal and Social Responsibility Emerging technologies of today often present ethical and values dilemmas. As the technical complexity increases, our society needs to advance ethics and values to guide the application of science and technology in society—to manage the use of these powerful tools at the personal, community, and governmental levels.		
Interactive Communication In today's wired, networked society it is imperative that students understand how to communicate using technology. This includes asynchronous and synchronous communication such as person-to-person e-mail interactions, listservs, group interactions in virtual learning spaces, chat rooms, interactive videoconferencing, phone/audio interactions, and interactions through simulations and models. Such interactions require knowledge of etiquette often unique to that particular environment.		
4. Quality, State-of-the-Art Results High productivity, on the other hand, though currently not a high-stakes focus of schools, often determines whether a person succeeds or fails in the workforce. **Prioritizing, Planning, and Managing for Results** High levels of complexity require careful planning, managing, and anticipating contingencies. This means more than simply concentrating on reaching the main goals of the project or keeping an eye on the project outcomes. It also requires the flexibility and creativity to anticipate unexpected outcomes.		
Effective Use of Real-World Tools Choosing appropriate tools for the task and applying them to real-world situations in ways that add significant value results in increased collaboration, promotion of creativity, construction of models, preparation of publications, and other creative works.		
High-Quality Results with Real-World Application Researchers are finding learning benefits for students who build authentic products with tools—whether they be sand castles, computer programs, documents, graphs, LEGO constructions, or musical compositions.		

Adapted from enGauge 21st Century Skills: Literacy in the Digital Age by North Central Regional Educational Laboratory and the Metiri Group.

Conclusion

Effective teaching isn't effortless, although it often appears to be. It is a committed, labor-intensive, yet highly rewarding endeavor resulting from a combination of intuition, inspiration, and playfulness. It is grounded in depth: in a deep knowledge of teaching, learning, and subject matter; in a deep-seated commitment to developing and honing the craft of teaching; and in a deep conviction that every student and every group of students possess unique needs, idiosyncrasies, and talents. Effective teaching is about trusting the familiar while embracing the novel, respecting what we know while attending and listening to what our students know, paying at least as much attention to the questions our students ask as we do to their answers to our own questions, and embracing the small miracles that each of our students represents.

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About the Authors

Giselle Martin-Kniep is a teacher educator, researcher, program evaluator, and writer. She is the president of Learner-Centered Initiatives, an educational consulting organization specializing in comprehensive regional and school-based curriculum and assessment work. She is also the founder and president of Communities for Learning: Leading Lasting Change™, an organization committed to the development of lasting professional learning communities that learn and lead.

She has a strong background in organizational change and has graduate degrees in communication and development, social sciences in education, and educational evaluation from Stanford University. She has worked with hundreds of schools and districts nationally and internationally in the areas of curriculum and assessment, standards-based design, school improvement, and action research.

Dr. Martin-Kniep has written extensively. Her books include *Becoming a Better Teacher: Eight Innovations That Work* (ASCD, 2000); *Why Am I Doing This? Purposeful Teaching Through Portfolio Assessment* (Heinemann, 1998); *Capturing the Wisdom of Practice: Professional Portfolios for Educators* (ASCD, 1999); *Developing Learning Communities Through Teacher Expertise* (Corwin, 2004); and *Communities That Learn, Lead and Last: Building and Sustaining Educational Expertise* (Jossey-Bass, 2008).

Joanne Picone-Zocchia has worked in school, district, regional, and statewide programs, focusing on the design and implementation of teacher induction programs, portfolio assessment systems, and standards-based curriculum and assessment design. In addition, she is actively engaged in exploring connections between systems thinking skills and processes

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Joanne is the vice president of operations and organizational development of Communities for Learning. As such, she is involved in projects designed to help organizations and individuals explore, develop, and deepen their capacity and readiness to participate in or support professional learning communities.

She is a published curriculum designer, has coauthored the article "Using Curriculum and Gap Analysis Maps to Assess What Teachers Do," and has recently coauthored a book with Giselle Martin-Kniep titled *Supporting Mathematical Learning: Effective Instruction, Assessment, and Student Activities, K–5* (Jossey-Bass, 2008).

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Becoming a Better Teacher: Eight Innovations That Work by Giselle Martin-Kniep (#100043)

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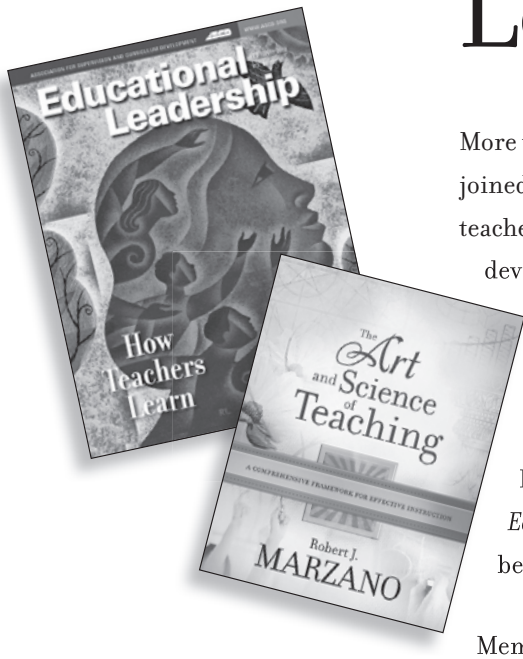

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