A certain severity surrounds the concept of rigor. We imagine detailed discussions on the fine points of grammar; endless repetition of chemical formulas; long hours of drill and practice. But this is not at all what rigor should look like. Here are some different images:

- At Agnes Irwin School in Rosemont, Pennsylvania, teacher Barbara Barnett shows her French students a videotaped interview she had conducted with Marcel Jabelot (Barnett, 1995). In the interview, conducted entirely in French, the 70-year-old Jabelot discusses his experiences in the Holocaust and his lifelong quest to find meaning in his suffering and the suffering of others. The students lean forward, their eyes focused and intent. They often stop the video to take notes, look up terms, and discuss what Jabelot is trying to tell them. As they study the video, the students’ own vocabularies begin to shift. They no longer sound like the textbook. As Barnett tells it, “Their voices are full of Jabelot.”

- During the 1970s, poet Kenneth Koch (1990) journeyed into the New York City public schools, reading the works of Blake, Wordsworth, Dickinson, and other poets with students from 3rd to 9th grades. Koch taught his students how to read the great poetry of Eastern and Western literature. He showed them how to extract the central struggle, the poetic kernel, from what they read and how to use those ideas to enhance their own understanding and writing. According to Koch, nearly every literature textbook written for elementary students underrates the abilities of young readers to understand and appreciate poetry.

- Students in a 5th grade classroom in Briarcliff, New York, are reading books by logician Raymond Smullyan. They study the puzzles in his book, What Is the Name of This Book? The Riddle of Dracula and Other Logical Puzzles (1978) and discover an “error” he has made in the definition of a formal category. The students write Smullyan a letter explaining the discovery. He writes back acknowledging the confusion and thanking them for their insights. Later in the year, these same students will study number theory, explaining their answers to questions like, “What is the largest product that can be obtained from a series of addends whose sum is given?” Over the course of the next three years, the students’ scores on the New York State tests soar from seventeenth to third in the county.

- In the Humanitas Program in Los Angeles, California, the children from the poorest...
neighborhoods are studying the works of Hobbes, Locke, and Jefferson. They read The Myth of Sisyphus by Camus and Sartre's No Exit. They are trying to understand the relationship between liberty and power, and how different concepts of these ideas played themselves out in colonial and modern times. During our visit there, an elaborately tattooed young man stopped us in the hallway to initiate a discussion about whether people's beliefs regarding liberty are solely a function of their economic interests.

Before defining rigor, we ask you use Figure 1.1 to examine your own experiences with rigor.

As you approach the work of teaching in a rigorous manner, it is helpful to remember what rigor is not:

- Rigor is not a special program or curriculum for select students. The students in the opening vignettes are not part of programs for the gifted. Nor are they students in special magnet schools. They are ordinary students attending traditional public schools where standardized tests and state-run curricula are the rule of the day.
- Rigor is not about severity or hardship. The classrooms we have looked into are both warm and challenging.
- Rigor is not about back-to-basics. It is not an attempt to roll back education to some prior ideal state, or to find a curriculum that is somehow more fundamental or natural.
- Rigor is not about higher-order thinking. The examples are concerned with the content students were learning, not on how they were asked to think about it.
- Rigor is neither a conservative nor a liberal agenda that privileges the ideas of one civilization over another. No culture has any prior or superior claim on rigor, the students in our vignettes examined content from a rich variety of cultures.

As a Student:
- What subjects or courses did you find most difficult?
- Did you ever have a teacher who taught in a rigorous manner? In what ways? How did you respond?
- Did you ever have a teacher whose expectations of you were too high?
- When you studied something demanding, what made that subject difficult? How did you go about gaining control over the content?
- Did you ever have a teacher who taught in a non-rigorous, undemanding manner? How did that affect you?
- What does all this mean to you as a teacher?

As a Teacher:
- What have been your experiences with teaching—or attempting to teach—rigorously?
- What do these experiences suggest about how you might teach in the future?
- What are some ideas or texts you have taught, or would like to teach, that you consider rigorous? Which of these do you consider too difficult for your students? What makes them so difficult? What skills would your students need to master the material?
- When you are teaching a particularly difficult idea or text, how do you go about it? How do your students respond?
- What are the chief roadblocks facing you in your attempts to increase the rigor of the content you teach?

Finally—and most important—rigor is not a measure of the quantity of content to be covered. Rather, rigor is a measure of that content's quality.

So, What Is Rigor?

Now that we've settled the background—what you think about rigor and what rigor is not—here's our definition:
Rigor

Rigor is the goal of helping students develop the capacity to understand content that is complex, ambiguous, provocative, and personally or emotionally challenging.

This definition has three characteristics that may strike some readers as peculiar:

First, the definition describes rigor as a curriculum goal. Most definitions define rigor simply as difficulty. By making it a goal, we are asserting that the ability to manage difficult content is a fundamental skill all students need, in school and out.

Second, the definition requires that students regularly work with difficult texts and ideas. In focusing on the role of content, we are supporting David Perkins’ assertion in Smart Schools: Better Thinking & Learning for Every Child (1992) that the most important decision we make is not how to teach, but what to teach. In fact, the decision to withhold rigor from some students is one of the most important reasons why schools fail. All students need schools to provide both rigorous content and direct instruction in the skills needed to manage that content (e.g., note making, summarizing, glossing a text).

Third, the definition points out the different ways in which content can become rigorous.

- Some contents, like molecular biology or economics, are complex, composed of interacting and overlapping ideas (think cellular respiration, the structure of an ecosystem, or the causes of depressions or recessions).
- Others are provocative, conceptually challenging, dealing with dilemmas, engaging students in identifying problems, conducting inquiry, taking positions (think of human cloning or the themes of Richard Wright’s Native Son or Katherine Paterson’s Bridge to Terabithia).
- Still others, like modern poetry, primary documents, and statistics, are ambiguous, packed with multiple meanings that must be examined and sorted into patterns of significance (e.g., Dickinson’s “The Soul Selects Her Own Society,” or A. A. Milne’s The House at Pooh Corner; or a database describing U.S. immigration patterns from 1875 to 1920).
- Finally, some content is personally or emotionally challenging (the novels of Toni Morrison or Lois Lowry; the facts of Shay’s Rebellion, or the Trail of Tears). How might they personally challenge students and their sense of how the world works?

The diversity of ways that content can become difficult implies that using one or two strategies for instruction or assessment will not be sufficient to help students learn to manage rigor. Teachers will need a repertoire of strategies keyed to the different ways content can be difficult.

Experiencing Rigor:
Get the Sensation!

Chocolate, popular food made from the beans of the cacao plant. The outer husks of the beans are stripped away through a process of fermentation and roasting that breaks the kernels into small fragments. These fragments (called nibs) are pressed to produce cocoa butter, which is then combined with sugar and sometimes milk. Chocolate is high in carbohydrates and contains caffeine. It is often sold in bars, as a powder to be used in baking, or used to create beverages.

Although that is a typical definition, you could mull over the definition for hours without knowing what chocolate really is. Quite simply, if you want to know what chocolate is, you’ve got to taste it. It’s the same thing with rigor. To know rigor is to experience it, to “get the sensation.” Figure 1.2 gives you examples of
### Figure 1.2

**Examples of Difficult Ideas**

In *The House at Pooh Corner*, A. A. Milne describes the difference between young streams and old rivers:

**By the Time** it came to the edge of the Forest, the stream had grown up, so that it was almost a river, and, being grown-up, it did not run and jump and sparkle along as it used to do when it was younger, but moved more slowly. For it knew now where it was going, and it said to itself, “There is no hurry. We shall get there some day.” But all the little streams higher up in the Forest went this way and that, quickly, eagerly, having so much to find out before it was too late.


Henry David Thoreau discusses the proper role of government in *Civil Disobedience*:

I HEARTILY accept the motto, “That government is best which governs least;” and I should like to see it acted up to more rapidly and systematically. Carried out, it finally amounts to this, which also I believe—“That government is best which governs not at all”; and when men are prepared for it, that will be the kind of government which they will have. Government is at best but an expedient; but most governments are usually, and all governments are sometimes, inexpedient. The objections which have been brought against a standing army, and they are many and weighty, and deserve to prevail, may also at last be brought against a standing government. The standing army is only an arm of the standing government. The government itself, which is only the mode which the people have chosen to execute their will, is equally liable to be abused and perverted before the people can act through it. Witness the present Mexican war, the work of comparatively a few individuals using the standing government as their tool; for, in the outset, the people would not have consented to this measure.


W. E. B. Du Bois reveals his experience of being black in a world of whites in *The Souls of Black Folk*:

BETWEEN me and the other world there is ever an unasked question: unasked by some through feelings of delicacy; by others through the difficulty of rightly framing it. All, nevertheless, flutter round it. They approach me in a half-hesitant sort of way, eye me curiously or compassionately, and then, instead of saying directly, How does it feel to be a problem? they say, I know an excellent colored man in my town; or, I fought at Mechanicsville; or, Do not these Southern outrages make your blood boil? At these I smile, or am interested, or reduce the boiling to a simmer, as the occasion may require. To the real question, How does it feel to be a problem? I answer seldom a word.


Emily Dickinson reflects on the process of decision making in “The Soul Selects Her Own Society”:

| The Soul selects her own Society—— |
| Then—shuts the Door—— |
| To her divine Majority—— |
| Present no more—— |
| Unmoved—she notes the Chariots—pausing—— |
| At her low Gate—— |
| Unmoved—an Emperor be kneeling —— |
| Upon her Mat—— |
| I’ve known her—from an ample nation—— |
| Choose One—— |
| Then—close the Valves of her attention—— |
| Like Stone—— |


In a math textbook, the authors describe how Carl Friedrich Gauss, at the age of 10, added up all the counting numbers from 1 to 100 in a matter of seconds:

To find the requested sum \((1 + 2 + 3 + 4 + 5 + \ldots + 97 + 98 + 99 + 100)\), Gauss noticed that when the first and last terms were added, the sum was 101. Likewise, when the second and next-to-last terms were added, the sum was 101, as it was when the third and the third-from-last terms were added, and so on. Since Gauss knew the order in which the numbers were added did not matter, he recognized that the problem could be solved by adding up pairs, each of which added to 101. That is,

\[
(1 + 2 + 3 + 4 + 5 + \ldots + 97 + 98 + 99 + 100) = \\
(1 + 100) + (2 + 99) + (3 + 98) + \ldots + (50 + 51)
\]

And how many pairs were there? Fifty. So the sum must be 50 x 101, or 5050.

rigorous content to sample. We couldn’t insert Moby Dick, so we selected some descriptions of difficult ideas from a variety of content areas. Browse through them. Then select one or two to concentrate on and make a sincere effort to understand what their authors are trying to say. Enjoy! Get the sensation!

**What Does Rigor Mean and Why Does It Matter?**

We hope you found our rigorous samples more like a wine-tasting than an algebra test. The key is that all kinds of rigors are not the same. Some, like the explanation of how Gauss solved problems, are difficult because they are complex—made up of intricate and interrelated ideas. Others, like the excerpt from Thoreau’s “Civil Disobedience,” are provocative—they challenge our natural ways of thinking and believing. Still others, like Dickinson’s poem, are ambiguous—rich in symbols, images, and multiple meanings. Here the sample from Milne’s The House at Pooh Corner is notable because, unlike most children’s literature, its content is metaphorical as well as descriptive. Finally, some content is emotionally or personally challenging—it arouses strong or unfamiliar feelings, as does W. E. B. Du Bois’s picture of black people at the turn of the century.

Interacting with and working their way through difficult texts in all four types is essential if students are to grow as learners. In making this claim, we affirm the idea that content is important. Yet by narrowing attention too closely on individual bits of information, or by emphasizing only generalized themes, the educational community has in many ways lost sight of deep, rich, and substantive content.

Regular use of rigorous texts and content at all grade levels is important for five reasons:

1. **Rigorous reading and content demand attention.** Simplistic textbooks and content that has been “dumbed down,” require little thought or attention, they do little to help students enhance their capacities in either attention or critical thinking. On the other hand, Thoreau’s “Civil Disobedience” or the explanation of how Gauss solved a difficult math problem (see Figure 1.2) compel our attention. We know from the outset that understanding these will not be easy. A wind blows across our face and we awaken.

2. **Rigorous reading and content help us to handle uncertainty.** Simplistic texts and ideas seduce us with seeming clarity. They hide complexities and obscure interrelationships. But when we read Emily Dickinson’s “The Soul Selects Her Own Society,” our minds come alive with questions: Why does she use the word society? What does she mean by chariots and the emperor? What is the ample nation? When we succeed in making sense of passages like these, we have new resources for handling uncertainty, not only in texts but in our lives.

3. **Rigorous content increases flexibility in thinking.** Making sense of difficult material teaches us to follow a train of thought, to come to terms with nuance and subtlety. With practice, we build complex intellectual schema that are broad, flexible, and adaptable to a rich variety of situations. Very simple schema (“survival of the fittest,” stereotypes, “I don’t know much about art, but I know what I like”) can easily become the unexamined core of thought and action. Students raised on bland and featureless texts and ideas are thus left without the resources they need to handle academic learning, or the surprises of a constantly changing world.

Take another look at Du Bois’s introduction to The Souls of Black Folk (Figure 1.2). Notice how the author’s delay in asking the crucial question forces the reader to contemplate the context in which the question fails to appear,
and to experience the awkwardness of the white speakers and its effect on the black listener. This is exactly the kind of emotional and contextual complexity that supports the creation of flexible schema in the minds of readers and learners.

4. Rigor develops perseverance, intellectual modesty, and tolerance. Rigorous material rewards effort. The more we think about a rigorous text or concept, the deeper our thoughts become and the more we discover about the conditions of our own lives. The difficulties we confront remind us how hard it is to fully understand the positions of others, and how likely we are to misunderstand their ideas by imposing our own understanding on them. In this way rigor develops not just cognitive understanding but character as well, teaching us to persevere when meaning is not obvious, and to respect the complexity and rationality of others' thoughts.

5. Rigor creates self-confidence. How many of our students feel condescended to by the texts and ideas that comprise their curriculum? How much secret condescension underlies the idea that the next activity will be fun or easy? How much better is it to tell students that these ideas are difficult, that they will challenge their intellect? If they succeed, they will bring new confidence to the next task; if they temporarily fail, they will retain pride because the challenge they faced was a worthy one.

Here we have failed to learn from coaches. Coaches rarely say, “This is going to be easy,” because they know the pride and self-respect of their players depend on confronting challenges. A coach who says, “This is going to be hard,” is really saying, “This will be an adventure worthy of your attention, energy, and perseverance. I present you with this challenge because I believe in you. If I thought less of you, I would give you a smaller challenge.”

With these ideas in mind, we can begin to ask ourselves questions about the curriculum we teach in our schools.

Reflecting and Discussing

Figure 1.3 is a chart for measuring and discussing the rigor in your school or classroom as a prelude to informed discussion. Rate your curriculum on a scale of one, the least, to four, the most. What signs and what indicators in your content support this rating? What would need to happen to increase the rigor in your curriculum?

Quick Tips for Increasing Rigor in Your Classroom

Elementary

- **Make Room for Pooh!** Increase the role of chapter books at read-aloud time in the primary grades.
- **Bite Off More Than You Can Chew!** Announce today that your 5th graders will be performing *A Midsummer Night’s Dream* this spring.
- **Rigorous Mondays.** Set aside 30 minutes each week to read classical and contemporary rigorous texts to your students. Why wait for middle school or high school for *Jane Eyre* or *Emma*? Eleanor Roosevelt didn’t!
- **Use the “Measuring Rigor Scale.”** Evaluate your textbooks, classroom, and school libraries against Figure 1.3. What kinds of rigor are you lacking? Have you looked into the Touchpebbles Program, examined the Junior Great Books Textbook Series, or contemplated the Comprehensive School Mathematics Program? All of these score high on the rigor scale.
- **Read Together.** Set up reading groups for the adults in your school. Don’t read children’s literature. Read adult literature, and talk about it. Why not start with Sandra Cisneros’s *House on Mango Street*, or Edward Ball’s *Slaves in the Family*, or Shakespeare’s *The Tempest*?

Secondary

- **Increase the Use of Primary Documents.** History has a history, and so do science and math.
Not studying and reading this history is a nearly perfect demonstration of a lack of rigor.

- **Rigorous Tuesdays.** Set aside 30 to 45 minutes each week to read aloud or to read with all your students examples of challenging and rigorous texts. Why wait for college to provide students with excerpts from Darwin's *The Origin of Species*?
  - **Read Math!** Take a serious look at textbooks like the *Connected Math Series* (Lappan, Fey, Fitzgerald, Friel, & Phillips, 1998) and the *University of Chicago School Mathematics Project* that are sophisticated mathematically, with substantive readings on math concepts.
  - **Get Philosophical!** Add philosophy texts to all courses, or create new philosophy-oriented courses from middle through high school. For example, how about making *The Philosophy of Human Rights* (Winston, 1989) the frame for current events or history classes? Or, how about World Literature classes that look at Harold Bloom's *The Western Canon* as a way of thinking about how cultures decide which texts are important? Why not use John Horgan's controversial *The End of Science* to explore the concept of limits to knowledge in science classes? Or, *Thinking Mathematically* (Mason, Burton, Stacey, 1985) in math? The possibilities are both endless and provocative.
  - **Diversify Your Texts.** Secondary school textbooks are usually too broad and shallow to be rigorous. Systematically collect articles and books that discuss aspects of your content provocatively. Last year 100 new math titles
and 150 new science titles passed through our corner bookstore. Why aren’t more of these titles in our schools?

• A Department Is a Club for Readers. Ask the members of department, whether it’s science, social studies, history, English, math, foreign language, art, or physical education, to read a book together and discuss it. Better still, read different books and make presentations to each other.

One rule: No books on pedagogy allowed!