



Embedding Rigor in Instruction

**New Mexico 2010 Start-Up Symposium.
Albuquerque, New Mexico
July 22-23, 2010**

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Embedding Rigor in Instruction
New Mexico Professional Development Summer Institute
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Objectives: Participants will:

- Determine the relationship between rigor and student achievement.
- Identify ways to measure, monitor and encourage rigor at the school and classroom levels.
- Align the level of rigor among standards and objectives, assessment and instruction.
- Determine purposeful instructional planning including determining level of proficiency, teaching to standard, writing behavioral objectives, and analyzing tasks.

Link to *HSTW* Key Practices:

- **High expectations** – setting higher expectations and getting more students to meet them.
- **Academic studies** – increasing access to academic studies that teach the essential concepts from the college-preparatory curriculum by encouraging students to use academic content and skills to address real-world projects and problems.
- **Teachers working together** – having an organization, structure, and schedule giving academic and career-technical teachers the time to plan and deliver integrated instruction aimed at teaching high-level academic and technical content.
- **Students actively engaged** – getting every student involved in rigorous and challenging learning.
- **Culture of continuous improvement** – using student assessment to continuously improve...curriculum and instruction to advance student learning.

Jigsaw: What is Rigor, and How Can We Measure It?

Overview. The purpose of this exercise is to help you explore a series of readings so that you can develop a better understanding of the definition of rigor.

With other members of your small “expert” group, discuss the questions below as they apply to your article.

1. How does the article define rigor – at the student, classroom, school and/or district levels?

2. How is rigor measured?

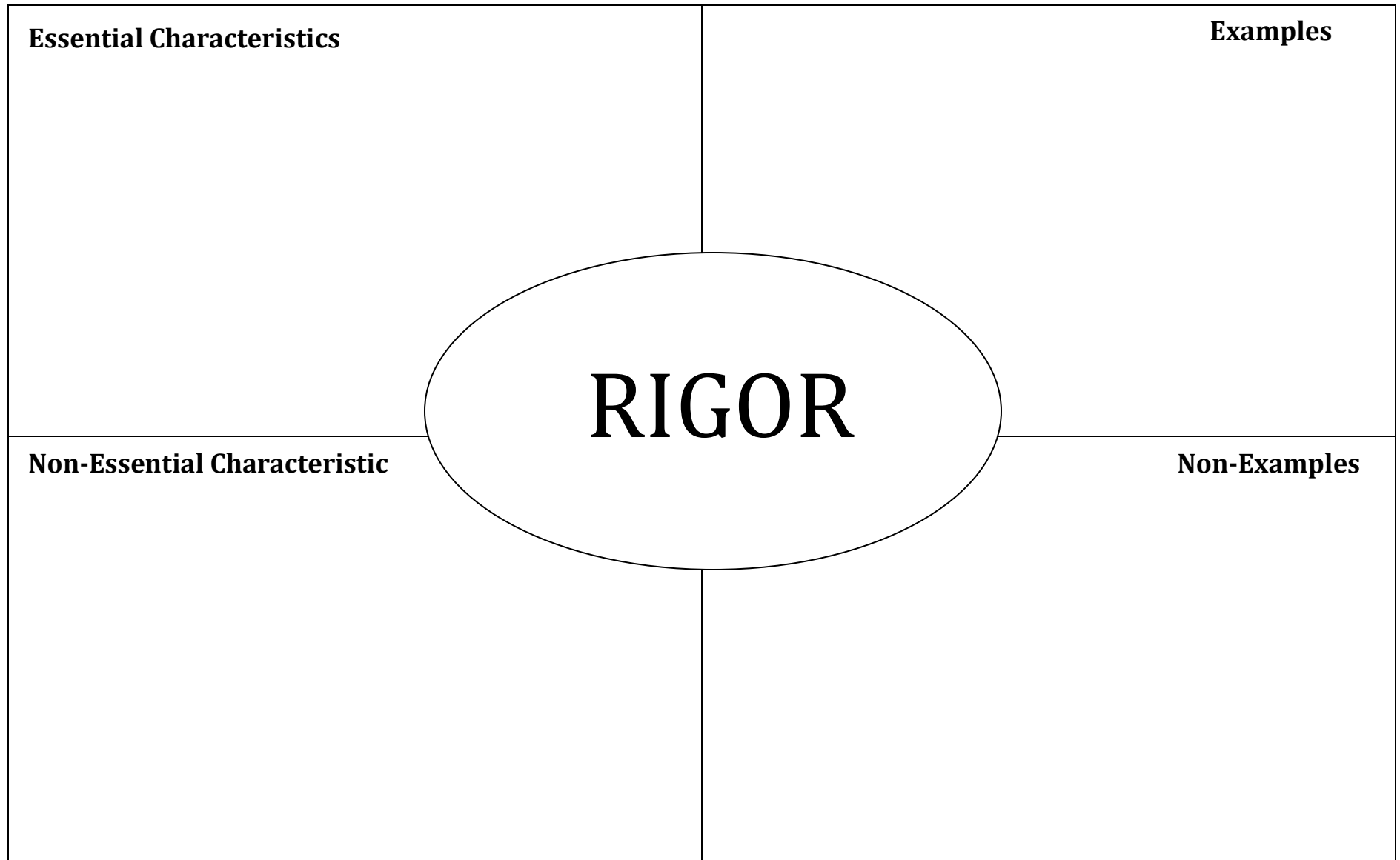
3. What are key facts about rigor that all teachers should know?

4. What statements or explanations in your article help to clear up your thinking on Rigor?

5. What is the message or key action described in the article that you should take back to your school?

PRESENTATION:

Prepare a 3-5 minute presentation to ‘teach’ the rest of the participants what your group learned from your article. The questions above should provide the focus for your presentation. Each group member must have a role in the presentation.



Practices that Increase Rigor at the Classroom Level

Unit Planning

1. Defined set of standards for course and units.
2. Unit objectives are aligned to the standards.
3. Assessment tasks are aligned to the unit objectives.
4. Instructional activities are aligned to the assessment tasks, objectives and standards.
5. Assignments are broad enough in scope to provide adequate evidence that students have reached proficiency in related standards.
6. Assignments are at an appropriate level of cognitive demand.
7. Assignments include meaningful homework.
8. All elements are aligned to an appropriate level of cognitive demand.

Explaining Expectations and Making Assignments

9. Each student clearly understands exactly what it takes to earn an A or a B.
10. Samples of quality work in relation to standards are reviewed by teachers and posted in the classroom for students.
11. Teachers' questions align to the complexity of learning expected by the standards.
12. Assignments are sequenced so that students turn in drafts of work as part of the total assignment grade. All students are expected to re-do work before the final draft is completed.

Providing Feedback

13. Students are provided with extensive and specific feedback.
14. Teachers and peers review and provide feedback on work.
15. Parents are involved in checking and responding to student work.

Working Toward Mastery for All Students

16. Instruction is differentiated to challenge students working at all levels of cognitive demand.
17. Adequate time and additional instruction is provided (without penalty) for students to re-do work/re-take assessments until standards are met.
18. Students may re-do assignments and assessments to work toward mastery.
19. Students who re-do work receive a grade that reflects their best/final work (although there may still be a penalty for not doing complete and accurate work the first time).
20. A system of interventions is in place that is triggered when a student falls below a C.
21. Extra help is structured to meet specific student needs.
22. Students receive information on when, where and how extra help can be obtained and what the student must do to get it.

Practices that Increase Rigor at the Classroom Level

Directions: For each section of practices listed on the previous pages, discuss the following questions in your table groups.

Unit Planning

- In what ways do these practices reflect a desire to increase rigor?
- Which of these are likely to have a great deal of impact?
- What additional items would you add to this list?
- What additional information would you need to add to provide clarity to these items and make them meaningful and measurable in your school?

Explaining Expectations and Making Assignments

- In what ways do these practices reflect a desire to increase rigor?
- Which of these are likely to have a great deal of impact?
- What additional items would you add to this list?
- What additional information would you need to add to provide clarity to these items?

Providing Feedback

- In what ways do these practices reflect a desire to increase rigor?
- Which of these are likely to have a great deal of impact?
- What additional items would you add to this list?
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Working Toward Mastery for All Students

- In what ways do these practices reflect a desire to increase rigor?
- Which of these are likely to have a great deal of impact?
- What additional items would you add to this list?
- What additional information would you need to add to provide clarity to these items?

THE TEST

1.

2.

3.

4.

5.

6.

7.

8.

9.

10.

Assign ALL Students Rigorous Assignments and Assessments

Proficiency Level	A question or assignment may be deemed at this level if:
Basic	<ul style="list-style-type: none"> • Question cues, such as the following, are used: recall facts; make simple inferences or interpretations; and demonstrate a rudimentary understanding of terminology, principles, and concepts that underlie the field. • It requires students to identify some parts of physical and biological systems. • It requires students to recognize relationships presented in verbal, algebraic, tabular and graphic forms. • It requires students to answer who, what, where and when types of questions. <p style="text-align: center;">Simply stated, questions and assignments that require students to remember information and make simple explanations are at the Basic Level.</p>

			USEFUL VERBS	SAMPLE QUESTION STEMS FOR ASSESSMENTS	POTENTIAL ASSIGNMENTS AND PRODUCTS
B A S I C	K N O W L E D G E	R E M E M B E R I N G C O M P R E H E N S I O N E X P L A I N I N G	VERBS Tell list describe relate locate write find state name	Question Stems What happened after...? How many...? Who was it that...? Name the...? Describe what happened at... Who spoke to...? Tell me why...? Find the meaning of...? What is it...? Which is true or false...? Write in your own words...? Write a brief outline... What do you think could have happened next...? Who do you think...? What was the main idea? Who was the main character? Distinguish between...? What differences exist between...? Provide an example of what you mean by...? Provide a definition for...?	Potential Assignments/Products <ul style="list-style-type: none"> • Make timeline of events. • List the story's main events • Make a facts chart. • List any pieces of information you can remember. • Recite a poem. • List all the animals in the story. • Make a chart showing... • Remember an idea or fact • Question and answer sessions • Workbooks and worksheets • Remember things read, heard, saw • Information searches • Reading Assignments • Drill and practice • Finding definitions • Memory games Quizzes • Forming relationships (analogies, similes) • Predicting effects of changes • Dramatization • Peer teaching Show and tell • Estimating • Story problems • Cut out or draw pictures to show a particular event • Illustrate the main idea. • Make a cartoon strip showing the sequence of events. • Write and perform a play based on the story. • Retell the story in your own words. • Paint a picture of some aspect of the story you like. • Write a summary of the event. • Prepare a flow chart to illustrate the sequence of events.

Assign ALL Students Rigorous Assignments and Assessments

Proficiency Level			A question or assignment may be deemed at this level if:		
Proficient			<ul style="list-style-type: none"> Question cues, such as the following, are used: use analytical skills, draw reasonable conclusions, or make appropriate conjectures or inferences by applying logical reasoning on the basis of partial or incomplete information. It requires student to defend ideas and to give supporting examples. It requires the understanding of algebraic, statistical and geometric and spatial reasoning that is relevant to the field. It requires algebraic operations involving polynomials; justifying geometric relationships. It requires the application of scientific and technical principles to everyday situations. It requires judging and defending the reasonableness of answers or solutions to problems that routinely occur in the real world or chosen technical field. <p style="text-align: center;">Simply stated, Proficient Level questions and assignments require students to apply and analyze information learned.</p>		
			USEFUL VERBS	SAMPLE QUESTION STEMS FOR ASSESSMENTS	POTENTIAL ASSIGNMENTS AND PRODUCTS
P R O F I C I E N T	A P P L I C A T I O N	A P P L Y I N G	Solve show use illustrate calculate construct complete examine classify	Do you know another instance where...? Could this have happened in...? Group by characteristics such as...? What factors would change if? Apply the method used to some experience of your own...? What questions would you ask? From the information given, develop a set of instructions about...? Would this information be useful if you had a...?	<ul style="list-style-type: none"> Construct a model to demonstrate how it will work. Make a diorama to illustrate an important event. Compose a book about... Make a scrapbook about the areas of study. Make a paper-maché map showing information Make a puzzle game using ideas from the study area. Make a clay model of... Paint a mural. Design a market strategy for your product. Design an ethnic costume. Use knowledge from various areas to find solutions Role playing/role reversal Producing a newspaper, stories, etc. Interviews Experiments Solving problems by use of known information Practical applications of learned knowledge Design a questionnaire to gather information. Make a flow chart to show critical stages. Write a commercial for a new / familiar product. Review a work of art in terms of form, color, and texture. Construct a graph to illustrate selected information. Uncover unique characteristics Distinguish between facts and inferences Evaluate the relevancy of data Recognize logical fallacies in reasoning Recognize unstated assumptions Analyze the structure of a work of art, music or writing Compare and contrast Construct a jigsaw puzzle. Analyze a family tree showing relationships.
	A N A L Y S I S	A N A L Y Z I N G	analyze distinguish examine compare contrast investigate categorize identify explain separate advertise	Which event could not have happened if...? If...happened, what might the ending have been? How was this similar to...? What was the underlying theme of...? What do you see as other possible outcomes? Why did changes occur? What must have happened when? How is...similar to...? What are some of the problems of...? What was the problem with...?	

Assign ALL Students Rigorous Assignments and Assessments

Proficiency Level	A question or assignment may be deemed at this level if:
Advanced	<ul style="list-style-type: none"> It requires the formulation of generalizations, the synthesis of ideas and the creation of models through probing examples and counterexamples. It requires students to communicate their ideas and reasoning through the use of concepts, symbolism and logical thinking. It requires the design and application of procedures to test or solve complex, real-world problems. It requires written responses that are thorough, thoughtful and extensive. <p style="text-align: center;">Simply stated, Advanced Level questions and assignments require students to evaluate and create work.</p>

			USEFUL VERBS	SAMPLE QUESTION STEMS FOR ASSESSMENTS	POTENTIAL ASSIGNMENTS AND PRODUCTS
A D V A N C E D	S Y N T H E S I S	C R E A T I N G	Create invent compose predict plan construct design imagine improve propose devise formulate	Design a...to...? What is a possible solution to...? What would happen if...? If you had access to all resources, how would you deal with...? How would you design your own way to...? How many ways can you...? Create new and unusual uses for? Develop a proposal which would...? How would you compose a song about...? Write a new recipe for a tasty dish? Is there a better solution to...? Judge the value of... Defend your position about... Do you think...is a good or bad thing? Explain How would you have handled...? What changes to...would you recommend? Are you a...person? Why? How would you feel if...? How effective are...?	<ul style="list-style-type: none"> Invent a machine to do a specific task. Design a building. Create a new product. Give it a name and plan a marketing campaign. Write your feelings in relation to... Write a TV show, play, puppet show, role-play, song, or pantomime about... Design a record, book, or magazine cover for... Create a language code. Sell an idea to a billionaire. Compose a rhythm or put new words to a known melody. Hypothesize Write a creative story, poem or song Propose a plan for an experiment Integrate the learning from different areas into a plan for solving a problem Formulate the new scheme for classifying objects Show how an idea or product might be changed Prepare a list of criteria to judge a...show. Conduct a debate about an area of special interest. Make a booklet about 5 rules you value. Make judgments about data or ideas based on either internal or external conditions or criteria Judge the logical consistency of written material Judge the adequacy with which conclusions are supported with data Judge the value of a work or art, music, writing, by using internal criteria or external standards of excellence Generate criteria for evaluation Evaluating one's own products and ideas Form a panel to discuss a topic. State criteria. Write a letter to...advising changes needed.
	E V A L U A T I O N	E V A L U A T I O N	judge select choose decide justify debate verify argue discuss determine prioritize		

Revised Taxonomy of Educational Objectives

Cognitive Process Dimension							
Knowledge Dimension	<p><i>This revised Bloom's Taxonomy will assist you as you work to improve instruction to ensure that</i></p> <ul style="list-style-type: none"> standards, lessons, and assessments are aligned. lessons are cognitively rich. instructional opportunities are not missed. 	1. Remember: retrieving relevant knowledge from long term memory <ul style="list-style-type: none"> Recognizing Recalling 	2. Understand: figuring out meaning <ul style="list-style-type: none"> Interpreting Exemplifying Classifying Summarizing Inferring Comparing Explaining 	3. Apply: carrying out or using a procedure in a given situation <ul style="list-style-type: none"> Executing Implementing 	4. Analyze: breaking material into parts and detecting how the parts relate to one another and to an overall structure or purpose <ul style="list-style-type: none"> Differentiating Organizing Attributing 	5. Evaluate: making judgments based on criteria and standards <ul style="list-style-type: none"> Checking Critiquing 	6. Create: putting elements together to form a novel, coherent whole or make an original product. <ul style="list-style-type: none"> Generating Planning Producing
	1. 1 Factual Knowledge: basic elements that students must know to be acquainted with a discipline or solve a problem in it. <ul style="list-style-type: none"> Knowledge of terminology Knowledge of specific details and elements 						
	1. 2 Conceptual knowledge: the relationships among the basic elements within a larger structure that enable them to function together <ul style="list-style-type: none"> Knowledge of classification Knowledge of principles and generalizations Knowledge of theories, models and structures 						
	1. 3 Procedural knowledge: how to do something: methods of inquiry, and criteria for using skills, algorithms, techniques and methods <ul style="list-style-type: none"> Knowledge of subject specific skills and algorithms Knowledge of techniques and methods Knowledge of criteria for determining when to use appropriate procedures 						
	1. 4 Metacognitive knowledge: knowledge of cognition in general as well as awareness of one's own cognition <ul style="list-style-type: none"> Strategic knowledge Cognitive tasks, including appropriate contextual and conditional knowledge Self-knowledge 						

SC SDE (Pat Mohr). (2001). Adapted from Anderson, L., et al. (Eds.) *A Taxonomy For Learning, Teaching, and Assessing: A Revision of Bloom's Educational Objectives* Boston: Allyn and Bacon, © 2001 Pearson Education; reprinted by permission of the publisher

Practice: Using the Taxonomy Table

Directions, Part One: Determine where each of the following standards falls on dimensions of knowledge and cognitive processes (table below). Use the table on page 11 to guide your discussion. Plot each element on the table on page 11.

	A:Knowledge Dimension	B:Cognitive Process Dimension
Use concrete objects and pictorial models to generate equivalent fractions (TX, Math, Grade 4)		
Apply the properties and definitions of lines and angles to model and solve problems (NC, Math, Secondary)		
The student will explain how the properties of a molecule are determined by the atoms it contains and their arrangement. (MD, Science, Secondary)		
Compose a piece of music in AB form. (WV, Music, K-2)		
Explain the role of homeostasis and its mechanisms as these relate to the body as a whole and predict the consequences of the failure to maintain homeostasis. (GA, Health Sciences, Secondary)		
Classify animals as vertebrates and invertebrates according to their structure. (AR, Science, Grade 3)		
Select the topic sentence in a paragraph. (TN, Language Arts)		

***Practice: “Unpacking” New Mexico Content Standards
Using the Taxonomy Table***

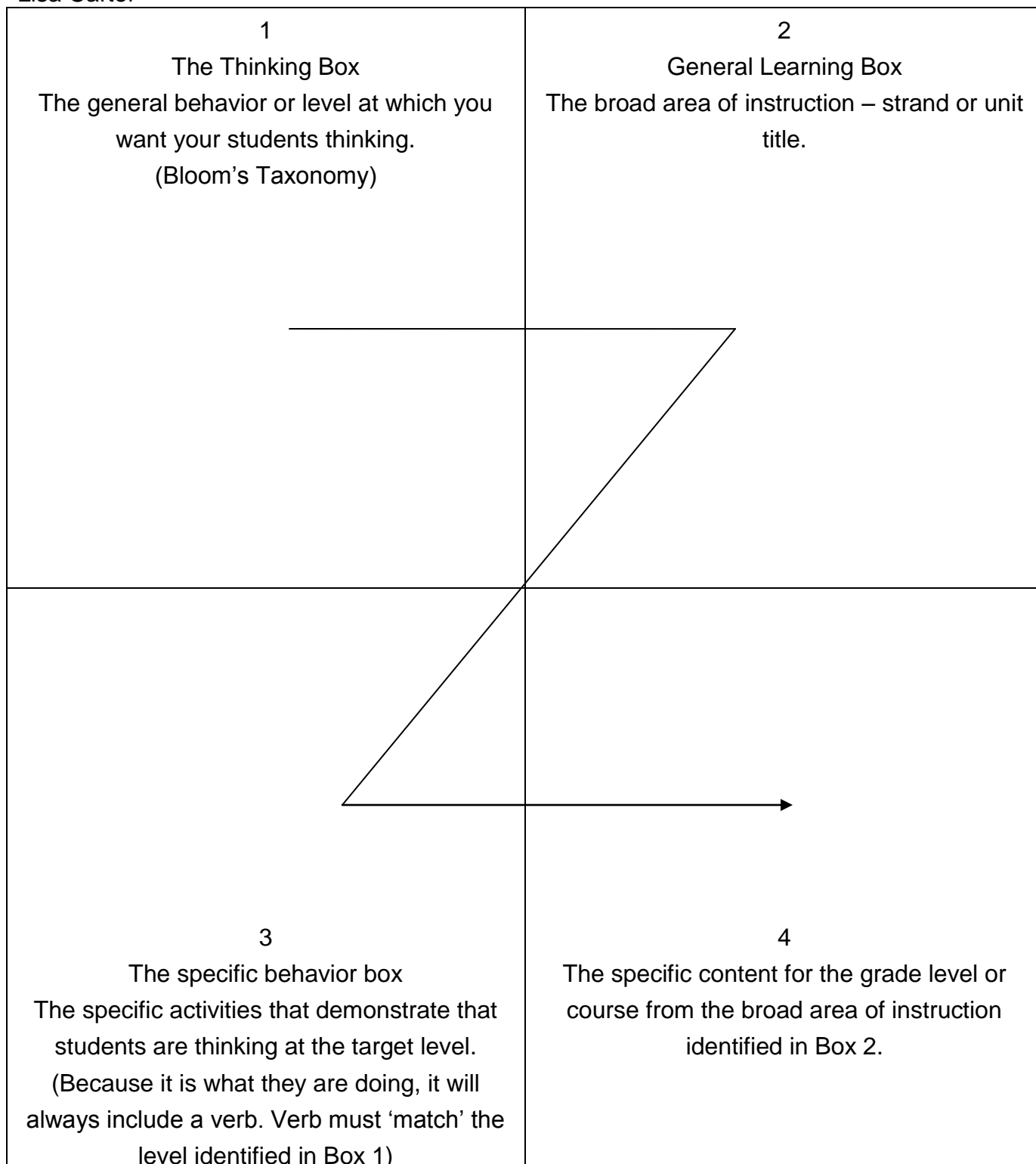
New Mexico Content Standards	A: Knowledge Dimension	B: Cognitive Process Dimension
<div style="border: 1px solid black; padding: 5px; margin-bottom: 10px;"> Benchmark I-B: Use comprehension strategies to understand the meaning of a text. </div> <p>2. Recognize and recall main ideas by selecting topic sentences, identifying thesis statements, selecting key words and phrases, and summarizing the material (English 9)</p>		
Intent of the Standard		
<p>9-12 Benchmark.A.1: Represent and analyze mathematical situations and structures using algebraic symbols.</p> <p>9-12.A.1.2 Classify and use equivalent representations of natural, whole, integer, rational, irrational numbers and complex numbers, and choose which type of number is appropriate in a given context.</p>		
Intent of the Standard		
<div style="border: 2px solid black; padding: 5px; margin-bottom: 10px;"> Standard I: Understand the processes of scientific investigations and use inquiry and scientific ways of observing, experimenting, predicting, and validating to think critically. </div> <div style="border: 2px solid black; padding: 5px; margin-bottom: 10px;"> 9-12 Benchmark I: Use accepted scientific methods to collect, analyze, and interpret data and observations and to design and conduct scientific investigations and communicate results. </div> <p>4. Convey results of investigations using scientific concepts, methodologies, and expressions, including:</p> <ul style="list-style-type: none"> • scientific language and symbols • diagrams, charts, and other data displays • mathematical expressions and processes (e.g., mean, median, slope, proportionality) • clear, logical, and concise communication • reasoned arguments. 		
Intent of the Standard		

***Practice: “Unpacking” New Mexico Content Standards
Using the Taxonomy Table***

New Mexico Content Standards	A: Knowledge Dimension	B:Cognitive Process Dimension
Intent of the Standards		
Intent of the Standards		
Intent of the Standards		
Intent of the Standards		

Aligning Instruction

Lisa Carter



In order to turn into a behavioral objective, read from square 1 to 2 to 3 to 4 and fill in the words as you go.

Writing Behavioral Objectives

1	2
3	4

Behavioral Objective:

1	2
3	4

Behavioral Objective:

1	2
3	4

Behavioral Objective:

1	2
3	4

Behavioral Objective:

1	2
3	4

Behavioral Objective:

1	2
3	4

Behavioral Objective:

TASK ANALYSIS

1. Determine the learning goal/standard to be addressed.
2. Determine exact meaning of the learning goal/standard.
3. Identify the steps necessary to accomplish the goal and establish a logical order for instruction.

10 Steps for Writing a Standards-Based Unit

- 1) Choose a Topic carefully.
- 2) Standards – chunk standards and indicators that drive the instruction
- 3) Essential Questions – based on the standards that you want the students to know and be able to do at the end of the unit
- 4) Assessments – post assessment test and a task (product, performance or problem) and establish grading criteria that show mastery of standards.
- 5) Brainstorm possible resources
- 6) Choose literacy strategies
- 7) Select Habits of Success
- 8) Plan the daily sequence for each day of the unit using lesson planning cycle
- 9) Teach the unit
- 10) Review / Determine how to increase the level of proficiency

GROUP 1

Published: January 11, 2006

COMMENTARY

Rigor on Trial

By Tony Wagner

Rigor, it seems, is the new reform de jour. As a nation, we appear to have come to a consensus that all children deserve a “challenging and rigorous” education. The problem is, we have no common agreement about what constitutes “rigor.” Is it rigorous to require all students to take a college-prep curriculum, including advanced math? Are high school Advanced Placement courses the new standard for rigor, as many are now suggesting?

I had an opportunity last year to explore these and related questions in depth with a remarkable group of educators. As a follow-up to my Commentary “Secondary School Change,” in which I introduced the idea of the new “three R’s” of rigor, relevance, and respectful relationships (“**Secondary School Change**,” Nov. 27, 2002.), a group of principals in Kona, Hawaii, challenged me to help them think about what those three R’s actually look like in the classroom. They wanted to create a rubric for assessing rigor at all grade levels.

We began our discussions with a half-day retreat, at which we explored basic questions about rigor. What are teachers doing in a rigorous classroom? What are students doing? What does rigorous student work look like at different grade levels? The more we discussed these questions, the more we realized how difficult our task was. Rigor in the classroom, we began to see, was invariably tied to the larger questions of what society will demand of students when they graduate, what it means to be an educated adult, and how the skills needed for work, citizenship, and continuous learning have changed fundamentally in the last quarter-century.

By the end of the first afternoon, we’d constructed a basic rubric we thought was ready for testing. For the next few days, we conducted “learning walks” in each of the six principals’ schools, K-12. At the end of each of these two-hour visits, we dissected every class we’d observed in terms of whether we thought the class was high-, medium-, or low-rigor and why. Discussions were frustrating, at first, because there was no agreement among group members about the levels of rigor they’d seen. This led us to revise our classroom-observation tool following each school visit.

After a remarkable two days of work together, the group had calibrated its classroom assessments to the point where there was frequent agreement about the level of rigor in the classes we observed, as well as about what each principal might say to the teacher to create a more challenging class. Along the way, we had substantially modified our rigor rubric, as well. We began to realize that rigor has less to do with how demanding the material the teacher *covers* is than with what *competencies* students have mastered as a result of a lesson. We

were able to agree on this because, in our journey, we had gone from creating a series of *teacher-centered* observations to reaching consensus on a set of questions we would ask *students*. Students chosen at random were questioned to determine not only the level of rigor in the class, but also the extent to which there was evidence of the other two R's of relevance and respectful relationships, essential elements in motivating students to want to achieve rigor. The seven questions that emerged from this work are the following:

1. What is the purpose of this lesson?
2. Why is this important to learn?
3. In what ways am I challenged to think in this lesson?
4. How will I apply, assess, or communicate what I've learned?
5. How will I know how good my work is and how I can improve it?
6. Do I feel respected by other students in this class?
7. Do I feel respected by the teacher in this class?

Discussing these questions with students led us to see all of the courses we'd observed in a new light, especially the Advanced Placement classes. In virtually all the AP classes we visited, teachers were covering more academic content at a faster pace. But the primary competency students were being asked to master was the ability to memorize copious amounts of information for the test. Teachers' questions to students tended to be almost entirely related to factual recall. In our opinion, not a single one of the AP classes we saw was sufficiently rigorous to prepare students for work, citizenship, and continuous learning in today's world. In fact, in several of the non-AP classes we observed, there was a stronger purpose to the lesson, more thinking being done by students, and assessments that required more analysis.

We concluded our three days with a discussion of what our new understanding of rigor meant for superintendents, principals, and their work together. For rigorous teaching to become more than a random act of excellence, these leaders began to realize, their work had to change, both at the building level and as a group concerned with students' experiences, from kindergarten through grade 12. Meetings at every level had to consist of more than just housekeeping matters. For a principal or superintendent, meetings are the classroom. They must be models of rigor. So the members of our group committed themselves to replicating these discussions of what constitutes rigor with their own faculty members—and devising new ways of working together. Instead of meeting only occasionally for a quick catch-up over breakfast, for example, one superintendent and his principals now meet for a half-day a month in one of their colleagues' schools. There they conduct learning walks and present and discuss case studies related to strengthening rigorous instruction in their schools. They are becoming what we at Harvard's Change Leadership Group call a "leadership practice community," a

community of practice whose goal is to help its members become better leaders of change.

While inspired by my time with these leaders, the experience also leaves me with thought-provoking questions about rigor. The principals later reflected, for example, that the power of the experience came from having to think through, for themselves, what rigor is, rather than having someone give them the answer. That insight leads me to wonder what might happen if our seven questions were applied not only to every class, but also to every adult meeting or professional-development program. Could the questions be used as a set of standards for planning and assessing both adult and student learning across a district? Would this lead to more-rigorous meetings? And if educators were routinely asked in their work to *really* think—to analyze data, assess research, and solve problems together—would students then be more likely to learn these same competencies?

If such a connection exists—and I think it does—then how do we create an education reform strategy that relies less on mindless, mandated compliance and computer-scored, test-based accountability and more on the development of educators' collaborative problem-solving and reasoning skills?

The low levels of rigor we observed in Advanced Placement classes raise additional questions. The main trouble with these courses was not poor teaching, but the tests for which students were being prepped. Developing more-skillful teaching and instructional leadership by focusing on the seven questions is important work, but it will not solve the problem of bad tests that require more memorization than thinking. What happens to our students and to our society if AP tests and the traditional college-prep curriculum are enthroned as the new standard for rigor?

There is no question that all students must now graduate from high school college-ready, as the skills for work, college, and active and informed citizenship have converged. But I am deeply troubled by how we currently define and assess college-readiness—not only what is tested, but also what courses students must take to be college-eligible. I am also alarmed by the lack of alignment between what is required to get into college vs. what's needed to *stay* in college and succeed as an adult. Consider one example: We know that advanced-math requirements are one of the most significant contributors to increasing numbers of high school students' dropping out; why, then, should all students have to take these courses for admission to a four-year college, instead of classes that teach more widely used math skills, like statistics and probability? Math teachers say that research shows that students who take advanced math are more likely to succeed in college, but the research suggests only an association, not cause and effect. We could require all students to take any difficult subject—say, four years of Greek—and probably get the same research result.

We must also ask what competencies essential for adult success are *not* being taught because there is currently no college-entrance requirement or national test for them. Imagine, for a

moment, that you were accused of a serious crime you did not commit and were on trial for your life. How confident would you be of getting a fair trial if the members of your jury had merely met the intellectual standards of our college-prep courses as they exist today? Certainly they would know how to memorize information and perform on multiple-choice and short-answer tests. But would your jurors know how to analyze an argument, weigh evidence, recognize bias (their own and others'), distinguish fact from opinion, and be able to balance the sometimes competing principles of justice and mercy? Could they listen with both a critical mind and a compassionate heart and communicate clearly what they understand? Would they know how to work with others to seek the truth?

What would it mean to graduate all of our high school students both college-ready and "jury-ready"? Might these turn out to be one and the same goal? Increasingly in our schools, what gets taught is only what gets tested. Shouldn't we, then, start designing rigorous tests for citizenship as well as for college? Many politicians will ask again, as they did in the 1990s, whether we can afford to develop these more expensive, qualitative assessments. But perhaps the real question is, can we afford not to? n

Tony Wagner is the co-director of the Change Leadership Group at Harvard University's graduate school of education, in Cambridge, Mass. His most recent book, *Change Leadership: A Practical Guide to Transforming Our Schools*, written with Robert Kegan and their Change Leadership Group colleagues, has just been published by Jossey-Bass. He can be reached at ***tony_wagner@harvard.edu***.

Vol. 25, Issue 18, Pages 28-29

GROUP 2

Best Teaching Practices for Rigor in Learning

Classroom Techniques to Draw a Line Between Difficult & Challenging

Dec 7, 2008 Marcy Paulson

Best teaching practices & Student education are prone to buzzwords. A while ago, "rigor" entered the eduspeak lexicon. How should the concept fit in classroom techniques?

Best teaching practices concerning rigor can be confusing, because teachers are sure they know what "rigor" is, but very few educators agree on classroom techniques to achieve it in everyday student education. What is "rigor"? Merriam Websters online dictionary has several definitions for it:

- 1.harsh inflexibility in opinion, temper, or judgment : severity
- 2.the quality of being unyielding or inflexible : strictness
- 3.severity of life : austerity b: an act or instance of strictness, severity, or cruelty
- 4.a tremor caused by a chill
- 5.a condition that makes life difficult, challenging, or uncomfortable; especially : extremity of cold
- 6.strict precision : exactness
- 7.rigidity, stiffness b: rigidness or torpor of organs or tissue that prevents response to stimuli c: rigor mortis

Try applying these definitions to an ideal classroom setting. The definition that seems to have the most universality with teachers seems to be the one about making "life difficult, challenging, or uncomfortable." If rigor is simply making classrooms artificially difficult, why not require students to construct their own pencils each day before being allowed to complete their worksheets?

Best Teaching Practices Concerning What Rigor Is Not

It doesn't make any sense to artificially create obstacles for students. On the other hand, rigorous learning is often difficult. The difference comes from the order of thought. Is a lesson rigorous because it is difficult, or might it be difficult because it is rigorous?

To use an illustration from the classroom, when trying to teach students the difference between energy and work, one teacher asks a student to move a pencil five feet and another student to move the classroom wall five feet. Afterwards he asks, "Who used more energy? Who got more work done?" Moving the pencil five feet is akin to the level of rigor (or lack of it) many classrooms have. Moving the wall five feet is akin to the types of situations some teachers put students in to claim their teaching is rigorous.

Some states have scotch-taped the upper tier of Bloom's Taxonomy to the word "rigor" as a working definition. Politicians have demanded that rigor be put back in the classroom. But still, there is very little understanding or agreement in what rigor is.

Jeff Paulson, an instructional coach, uses a definition that he pulled together from the Rigor/Relevance Framework, which was created by the International Center for Leadership in Education.

Rigor (n) An expectation that requires students to apply new learning to other disciplines and to predictable and unpredictable real-world situations.

The Rigor/Relevance Framework loosely aligns itself with Blooms. It is like this:

1. Remember – acquire new information
 2. Understand – summarize new learning
 3. Apply – apply new learning within same discipline
 4. Analyze – apply new learning across disciplines
 5. Evaluate – apply new learning to real-world predictable situations
 6. Synthesize – apply new learning to real-world unpredictable situations
- (Note that the skills on the right are only aligned with the Blooms on the left; they are not explanations of Blooms.)

Strong, Silver, and Perini offer another definition: "Rigor is the goal of helping students develop the capacity to understand content that is complex, ambiguous, provocative, and personally or emotionally challenging." (Teaching What Matters Most: Standards and Strategies for Raising Student Achievement. ASCD, 2001)

While the application part of the definitions are obvious, there is one other subtle part worth noting. First, rigor is made of high expectations for the student, but it also requires the teacher to provide the tools necessary for students to accomplish the task. As an analogy, if the task is to reach a high place, a rigorous teacher is the ladder. A ladder in itself holds an expectation to climb and also a way to achieve it.

For a teacher that is just awakening to rigor, it can seem simple until she applies it in the classroom. Rigor is certainly an educational concept that is worth further explanation.

GROUP 3

Is it Rigor? Or is it Something Else?

There's a lot of talk in education circles today about rigor. Educators all over America are frantically waving copies of Thomas Friedman's, *The World is Flat*, as they attempt to awaken their colleagues to the impending doom our nation faces if we do not deliver a rigorous and relevant education to every American child. Politicians talk about the need to return rigor to the classroom. Parents demand rigorous programs for their children. School administrators performing classroom walk-throughs look for signs of it, and teachers are resolutely attempting to prove their lessons are full of the stuff.

But what is rigor?

Let's start with what it is not. Rigor is not fifty math problems for homework when fewer will achieve mastery. Rigor is not more worksheets for the student who finished the assignment early. Rigor is not using a seventh grade text book with your high performing sixth grade students. Rigor is not covering more material in a shorter period of time. Rigor is not cold or impersonal. And most of all, rigor is not just for a select group of students.

So, what is rigor? The most concise definition of rigor I've encountered is taken from *Teaching What Matters Most: Standards and Strategies for Raising Student Achievement* by Richard W. Strong, Harvey F. Silver and Matthew J. Perini, ASCD, 2001. According to Strong, Silver, and Perini, **"Rigor is the goal of helping students develop the capacity to understand content that is complex, ambiguous, provocative, and personally or emotionally challenging."**

Isn't it ironic that this definition of rigor presents the possibility that even an advanced placement course may not be full of rigor? While the curriculum may be complex, time may not be given to allow the content to reveal its ambiguous, provocative, or personally and emotionally challenging nature. And because of this, students are simply memorizing huge chunks of facts, regurgitating them onto an AP exam, and then forgetting them forever. How discouraging it must be for both the teacher and the student to expend so much time and energy and have so little to show for their efforts.

But do we really need all this rigor? Can we just set it aside for our gifted and high achieving students or as we say in Florida, our Level 4's and 5's? Strong, Silver, and Perini make clear that a rigorous learning environment is for every student. Their findings show **"the decision to withhold rigor from some students is one of the most important reasons why schools fail."** (Strong, Silver, Perini, 2001)

What is the mind set that would consciously design a system where some students receive a rigorous education and others do not? I don't want to think about the history of class distinction, prejudice, tradition, and countless other factors that might have lead us to such a system. But I do want to think about what it will take to ensure that every American classroom provides the kind of rigorous learning environment that will guarantee all our students' ability to successfully compete in the flat world in which they live.

Think about what kind of teaching methods will allow teachers to deliver their curriculum in ways which meet the requirements of rigor set out by Strong and company. Then factor in the

skills we must help our students acquire so they may successfully encounter curriculum on this level.

We're talking about instructional delivery methods like project based instruction which use an inquiry model to empower students to seek their own answers to important issues, create models that represent their findings, and explore ways their discoveries can make a positive difference in the world. We're talking about classrooms that find ways to be connected to the world, whether or not they use the latest technologies, to help create those personal and emotional synapses that motivate students to embrace challenging curriculum. We're talking about classrooms where students are taught the strategies they need to attack challenging text, detect bias, gather relevant information, and decide how to put what they've learned to work in a useful way.

But we'd better do more than talk. It's time, really past time, that we make the changes that create these wonderful classrooms. If you've got ideas on ensuring rigor for every student, I want to hear them. Our combined efforts can have a powerful positive influence on the future of American schools.

GROUP 4

Identifying Rigor in the Curriculum

How to Determine if a Lesson Contains Rigor

Apr 8, 2009 [Tammy Andrew](#)

Engage Students with Rigorous Lessons - *Carlos Gustavo Curado*

There are several important components to rigor that can be easily looked for in lessons when determining if there is rigor present in the curriculum.



Evaluating lessons for rigor can be a time consuming process. Each unit and lesson should be [examined](#) for opportunities to present students with complex and challenging concepts. Overall, checking curriculum units for rigor provides a valuable opportunity to reevaluate and update lessons. Though not every lesson or activity must have rigor, students need to be exposed to it throughout the curriculum and throughout each school year.

There are several key components to rigor that should be kept in mind while examining lessons. Rigor is student centered and requires students to explore and expand their current knowledge. It also encourages students to examine their emotional response or take a controversial stand on a topic. Though it can include difficult subjects and content rigor is not limited to advanced students and can be included at any grade level.

How to Identify Rigor

It can become confusing to keep many different examples of rigorous lessons in mind when examining existing curriculum for rigor. The following list of rigorous components is to assist in the process. They need not be done in any particular order, and all of them do not need to be present in every unit. The goal for including rigor should be to expose students to a variety of rigorous activities throughout the school year.

Check the unit for evidence of student centered learning. This could take the form of individual or group research projects or activities where students are presented with a question and must defend their answer.

Look for ways that students can make a difference in the world around them. If students research the effects of local farming they could create a [school garden](#). After learning about poetry from a specific time period students could hold a poetry reading.

Examine the units for ways that students can make connections to other subjects. For example, while learning about the ecological impact of local farming students could be exposed to the history of victory gardens, financial concerns and community involvement.

Including rigor in classroom lessons and throughout the curriculum can start with analyzing current lessons and then enhancing them with rigorous activities.

Investigate lessons for situations where students are encouraged to analyze their own feelings for a topic. This can be through taking a position on controversial issues or even opportunities to show acceptance or understanding when others do not agree with their opinions.

Rigor is created when students are engaged with difficult or challenging concepts. Through their interaction with researching and applying knowledge students learn how to learn and have a deeper understanding of how they are part of their community. By updating lessons to include more rigor teachers empower their students as learners.

How to Create a Rigorous Lesson

Using Bloom's Taxonomy to Include Rigor in the Classroom

Apr 16, 2009 [Tammy Andrew](#)

Including rigor in the classroom does not require rewriting entire curriculum units. Bloom's taxonomy provides a convenient starting place.

Though the ultimate goal may be for the entire curriculum to be [rigorous](#), it is useful to at least start with a few lessons. For some teachers, it may be easier to identify a project or activity that could be changed to be more student-centered, whereas others might be more inclined to creating a new activity. In either case, start with the familiar structure of Bloom's Taxonomy to help adapt the lesson or project for more rigorous activities.

Rigor and Bloom's Taxonomy

Consider the three domains of Bloom's taxonomy: Affective, Psychomotor and Cognitive. The affective and cognitive domains relate directly to rigor since [rigor](#) is obtained through students' active engagement with knowledge and how it emotionally affects them.

The US Department of Education provides a [table](#) to assist teachers with applying the cognitive domain of Bloom's taxonomy to create engaging lesson plans. The first two categories, knowledge and comprehension, are concerned with memory and basic understanding. However, the other four; application, analysis, synthesis and evaluation, involve students with using their knowledge and comprehension. These four categories of the cognitive domain can also provide teachers with a starting point for including rigor in a lesson.

The affective domain helps teachers include material in their lessons that are based on emotional reaction. This includes not only how students receive and respond to emotional stimulation but also how they value, organize and characterize their responses. Inclusion of the affective domain leads to rigorous lessons through provocative questions or by having students work with concepts that can be emotionally challenging.

Creating Rigorous Activities

Whether adapting an existing lesson or creating a new one, keep in mind Bloom's taxonomy. While examining the lesson, ask questions such as, "Are students asked to apply their knowledge to solve a similar situation," "Are students asked to relate this information to something else," "Are students asked how they would improve something," or "Can they explain why they made certain choices." Also consider how student centered the work will be and look for ways for students to interact with each other while learning.

Once teachers understand what rigor is, they may find that it is already present in some of their activities. The challenge then becomes identifying where, tweaking it to be more effective and finding more places in the curriculum to use it. Bloom's taxonomy, especially the cognitive and affective domains, gives a starting place for understanding rigor using a familiar set of categories.

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