Understanding Rigor in the Middle Grades and Its Role in 21st Century Success

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During this session we will discuss:

- Why there is a need for change in education
- How academic rigor is achieved in the middle grades
- The paradigm shift in instruction practice
- How to get started with the change process
SCANS Competencies
(Secretary’s Commission on Achieving Necessary Skills – 1992)

WORKPLACE KNOW-HOW

COMPETENCIES - effective workers can productively use:

• **Resources** - allocating time, money, materials, space, and staff;

• **Interpersonal Skills** - working on teams, teaching others, serving customers, leading, negotiating, and working well with people from culturally diverse backgrounds;

• **Information** - acquiring and evaluating data, organizing and maintaining files, interpreting and communicating, and using computers to process information;

• **Systems** - understanding social, organizational, and technological systems, monitoring and correcting performance, and designing or improving systems;

• **Technology** - selecting equipment and tools, applying technology to specific tasks, and maintaining and troubleshooting technologies.
THE FOUNDATION - competence requires:

- **Basic Skills** - reading, writing, arithmetic and mathematics, speaking, and listening;

- **Thinking Skills** - thinking creatively, making decisions, solving problems, seeing things in the mind's eye, knowing how to learn, and reasoning;

- **Personal Qualities** - individual responsibility, self-esteem, sociability, self-management, and integrity.
Types of Math Problems Presented

![Bar Graph](chart.png)

- **Using procedures**
- **Making connections**

- Australia: 61 (15) 15
- Czech Republic: 77 (16) 16
- Hong Kong: 84 (13) 13
- Japan: 41 (54) 54
- Netherlands: 57 (24) 24
- United States: 69 (17) 17
How Teachers Implemented Making Connections Math Problems

![Bar chart showing the comparison between using procedures and making connections in different countries.](chart.jpg)
Hong Kong had the highest scores in the most recent TIMSS.

Hong Kong students were taught 45% of objectives tested.

Hong Kong students outperformed US students on US content that they were not taught.

US students ranked near the bottom.

US students ‘covered’ 80% of TIMSS content.

US students were outperformed by students not taught the same objectives.
When asked about the purpose of the Declaration of Independence, only 28% of 8th graders tested, could explain the historical purpose of the Declaration of Independence.
Of the 39 states and jurisdictions that participated in both 2002 and 2007, average writing scores for eighth-graders decreased in only one state.
Rigor In The Middle Grades
1. Extra homework and assignments for all students

2. Enrichment activities for a select population of students

3. Challenging and complex curricular concepts for students and staff

4. Complicated and difficult tasks for students and staff
“...based on expectations established for students and staff that ensure students demonstrate a thorough, in-depth mastery of challenging and complex curricular concepts.”

--NC State Board of Education
Common Core State Standards and Essential Standards
Why Essential Standards?

• To prepare productive and informed citizens who can be successful now and in the future

• Focused on what students **NEED TO KNOW**, not what’s nice for them to know

• Delineates what students should know and be able to do

• FEWER, CLEARER, HIGHER
How the Essential Standards are Structured...

- Both Essential Standards and Clarifying Objectives are written in the same format:
  
  **S-V-O**
  
  **Subject – Verb - Object**

- The subject is understood to be the student hence the phrase “The student will...” is omitted
- Single verb = single targeted cognitive process
- The object = the subject matter content
# The Taxonomy Table

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<tbody>
<tr>
<td>Factual Knowledge</td>
<td>Recognizing</td>
<td>Interpreting</td>
<td>Executing</td>
<td>Differentiating</td>
<td>Checking</td>
<td>Generating</td>
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<td></td>
<td>Recalling</td>
<td>Exemplifying</td>
<td>Implementing</td>
<td>Organizing</td>
<td>Critiquing</td>
<td>Planning</td>
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<td>Conceptual Knowledge</td>
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<td>Classifying</td>
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<td>Attributing</td>
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<td>Producing</td>
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<td>Procedural Knowledge</td>
<td></td>
<td>Summarizing</td>
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<tr>
<td>Metacognitive Knowledge</td>
<td></td>
<td>Inferring</td>
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What does rigor look like in the middle school?
Middle School Philosophy

The focus of the Middle School is to address the distinctive intellectual, social, emotional, moral and physical developmental needs of adolescents (10-15 years old) using positive practices.

Curriculum Should be:
- Developmentally responsive
- Challenging
- Empowering
- Equitable
Time for a paradigm shift in Instructional Practice

Teacher Driven
Lesson Comparison
United States and Japan

<table>
<thead>
<tr>
<th>The emphasis on skill acquisition is evident in the steps most common in U.S. classrooms</th>
<th>The emphasis on understanding is evident in the steps of a typical Japanese lesson</th>
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<tbody>
<tr>
<td>• Teacher instructs students in concept or skill</td>
<td>• Teacher poses a thought provoking problem</td>
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<td>• Teacher solves problems with/for the class</td>
<td>• Students and teachers explore the problem</td>
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<tr>
<td>• Students practice on their own while teacher assists individual students</td>
<td>• Various students present ideas or solutions to the class</td>
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<td>• Teacher summarizes the class solutions</td>
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<td>• Students solve similar problems</td>
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Lessons Learned

• Mile wide and inch deep does not work.

• The task ahead is not so much about how many specific topics are taught; rather, it is more about ways of thinking.

• To change students’ ways of thinking, we must change how we teach.
"So far, all we’re learning is how to take a math test, how to take a science test, and how to take a reading test."
Content Integration
Curriculum Integration

Involves students in the unit development process and affords them in opportunity to identify topics, develop questions, plan inquiry, divide tasks, research information and share the cognitive process and content. Technology resources are also embedded into daily practices of the classroom.
New, Better, Different

Earth/Environmental concepts enhanced to improve environmental literacy and promote stewardship.
- aligned to NSF Earth Science Literacy Principles
Activity

“Provocative Proteins” – A Blended Standards Approach

Read the article and briefly tell how you think it could be used to address multiple content areas.
Standards for Mathematical Practices

1. Make sense of problems and persevere in solving them
2. Reason abstractly and quantitatively
3. Construct viable arguments and critique the reasoning of others
4. Model with mathematics
5. Use appropriate tools strategically
6. Attend to precision
7. Look for and make use of structure
8. Look for and express regularity in repeated reasoning
GETTING STARTED
4 Postulates

1. We are being asked to teach in distinctly different ways from how we were taught.

2. The Traditional curriculum was designed to meet societal needs that no longer exist.

3. It is unreasonable to ask a professional to change more than 10 percent a year, but it is unprofessional to change by much less than 10 percent a year.

4. If you don’t feel inadequate, you’re probably not doing the job.

Are your students...

- Problem Solvers?
- Good Communicators?
- Good Collaborators?
- Information & Technology Literate?
- Innovative & Creative?
- Globally Competent?
- Financially Literate?
- Critical Thinkers?
Components of an Academically Rigorous Middle School

- Investigative
  - Open-ended

- Creativity

- Critical Thinkers

- Inquiry based

- Problem-solvers

- Complex & abstract concepts

- Student-centered
When it comes to developing rigor, my schools?

1. Exemplary
2. Satisfactory
3. Needs a lot of work
4. Still in the 20th Century
Let’s Continue to Build Rigorous Classroom for 21st Century Success. Together we can!

Contact Info:

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Resources

- Partnership for 21\textsuperscript{st} century skills
  www.21stcenturyskills.org

- SCANS Skills
  http://www.academicinnovations.com/report.html

- Time Article: How to Bring Our Schools Out of the 20\textsuperscript{th} Century by Claudia Wallis
  http://www.time.com/time/magazine/article/0,9171,1568480-1,00.html

- National Middle School Association: This We Believe
  http://www.nmsa.org/AboutNMSA/ThisWeBelieve/tabid/1273/Default.aspx

- Huffman, Lauren R. and Daniel J. Rahler. Mathematics Teaching in the Middle School
  "Improving the Planning and Teaching of Mathematics by Reflecting on Research",