A New Lens for Examining Cognitive Rigor in Standards, Curriculum, & Assessments

What are some implications for the transition to Common Core State Standards?

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Before we begin…

- Take a couple of minutes to write your personal definition of "cognitive rigor" as it relates to instruction/learning/assessment.

Now, let's apply your rigor definition

Your class has just read a version of *Little Red Riding Hood.*

○ What is a basic comprehension question you might ask?

○ What is a more rigorous question you might ask?

Introducing the Hess Cognitive Rigor Matrix

Handout: CRM for English Language Arts

Source (article): What exactly do "fewer, clearer, and higher standards" really look like in the classroom? Using a cognitive rigor matrix to analyze curriculum, plan lessons, and implement assessments (Hess, Carlock, Jones, & Walkup, 2009)

Developing the Cognitive Rigor Matrix

Different states/schools/teachers use different models to describe cognitive rigor. Each may address something different.

- **Bloom** – What <u>type of thinking</u> (verbs) is needed to complete a task?

- **Webb** – <u>How deeply</u> do you have to understand the content to successfully interact with it? How complex or abstract is the content?

Bloom's Taxonomy [1956] &
Bloom's Cognitive Process Dimensions [2005]

Knowledge -- Define, duplicate, label, list, name, order, recognize, relate, recall	**Remember** Retrieve knowledge from long-term memory, recognize, recall, <u>locate</u>, <u>identify</u>
Comprehension -- <u>Classify</u>, describe, discuss, <u>explain</u>, express, <u>identify</u>, indicate, <u>locate</u>, recognize, report, review, select, translate	**Understand** -- Construct meaning, clarify, paraphrase, represent, translate, <u>illustrate</u>, give examples, <u>classify</u>, <u>categorize</u>, summarize, generalize, <u>predict</u>...
Application -- Apply, choose, demonstrate, dramatize, employ, <u>illustrate</u>, interpret, practice, <u>write</u>	**Apply** -- Carry out or use a procedure in a given situation; carry out or use /apply to an unfamiliar task
Analysis -- Analyze, <u>appraise</u>, <u>explain</u> calculate, <u>categorize</u>, compare, criticize, discriminate, examine	**Analyze** -- Break into constituent parts, determine how parts relate
Synthesis -- Rearrange, assemble, collect, compose, create, design, develop, formulate, manage, <u>write</u>	**Evaluate** -- Make judgments based on criteria, check, detect inconsistencies/fallacies, critique
Evaluation -- <u>Appraise,</u> argue, assess, choose, compare, defend, estimate, <u>explain</u>, judge, <u>predict</u>, rate, core, select, support, value	**Create** -- Put elements together to form a coherent whole, reorganize elements into new patterns/ structures

Webb's Depth-of-Knowledge Levels

- **DOK-1 – Recall & Reproduction** - Recall of a fact, term, principle, concept; perform a routine procedure; locate details

- **DOK-2 - Basic Application of Skills/Concepts** - Use of information; conceptual knowledge; select appropriate procedures for a given task; two or more steps with decision points along the way; routine problems; organize/display data; interpret/use simple graphs; summarize; identify main idea; explain relationships; make predictions

- **DOK-3 - Strategic Thinking** - Requires reasoning, or developing a plan or sequence of steps to approach problem; requires decision making or justification; abstract, complex, or non-routine; often more than one possible answer; support solutions or judgments with text evidence

- **DOK-4 - Extended Thinking** - An investigation or application to real world; requires time to research, problem solve, and process multiple conditions of the problem or task; non-routine manipulations; synthesize information across disciplines/content areas/multiple sources

DOK is about depth & complexity—not difficulty!

- The intended student learning outcome determines the DOK level. What mental processing must occur?

- While verbs may appear to point to a DOK level, it is what comes after the verb that is the best indicator of the rigor/DOK level.

  - *Describe* the process of photosynthesis.
  - *Describe* how the two political parties are alike and different.
  - *Describe* the most significant effect of WWII on the nations of Europe.

Hess' Cognitive Rigor Matrix:
Applies Webb's DOK to Bloom's Cognitive Process Dimensions

Depth + thinking	Level 1 Recall & Reproduction	Level 2 Basic Skills & Concepts	Level 3 Strategic Thinking & Reasoning	Level 4 Extended Thinking
Remember	- Recall, locate basic facts, details, events			
Understand	- Select appropriate words to use when intended meaning is clearly evident	- Specify, explain relationships - summarize – identify main ideas	- Explain, generalize, or connect ideas using supporting evidence (quote, example...)	- Explain how concepts or ideas specifically relate to other content domains or concepts
Apply	- Use language structure (pre/suffix) or word relationships (synonym/antonym) to determine meaning	– Use context to identify meaning of word - Obtain and interpret information using text features	- Use concepts to solve non-routine problems	- Devise an approach among many alternatives to research a novel problem
Analyze	- Identify whether information is contained in a graph, table, etc.	– Compare literary elements, terms, facts, events – analyze format, organization, & text structures	- Analyze or interpret author's craft (literary devices, viewpoint, or potential bias) to critique a text	– Analyze multiple sources or texts - Analyze complex/abstract themes
Evaluate			– Cite evidence and develop a logical argument for conjectures	- Evaluate relevancy, accuracy, & completeness of information
Create	- Brainstorm ideas about a topic	- Generate conjectures based on observations or prior knowledge	- Synthesize information within one source or text	Synthesize information across multiple sources or texts

Let's practice using the CRM

Handout: *Little Red Riding Hood* CRM template

Where would you place your sample questions in the CRM- basic and more rigorous questions?

The CR Matrix: A Reading Example
Back to *Little Red Riding Hood*, …

Depth + thinking	Level 1 Recall & Reproduction	Level 2 Skills & Concepts	Level 3 Strategic Thinking/ Reasoning	Level 4 Extended Thinking
Remember				
Understand				
Apply				
Analyze				
Evaluate				
Create				

What are some implications for current-to-future…

- Curriculum & Instruction?
- School/Classroom Assessment?
- Formative Assessments & Progress Monitoring?

Figure out where you are now & where your transition plan begins

1. Revisit your definition of rigor – has it changed? In what ways?

2. Establish a shared understanding of what cognitive rigor looks like across content areas for your district/school/classrooms.

3. What existing curriculum or assessment materials could you re-examine to increase the range of cognitive rigor?

4. What gaps will need to be filled?
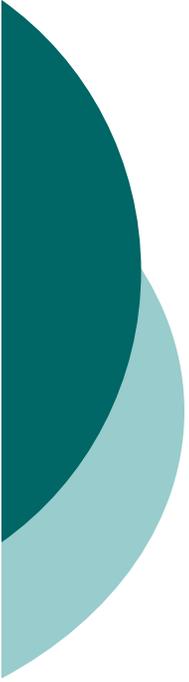
Cognitive Rigor & Some Implications for Assessment

- Assessing only at the highest DOK level will miss opportunities to know what students do & don't know – go for a range; end "high" in selected/prioritized content

- Performance assessments can offer varying levels of DOK embedded in a larger, more complex task

- Planned formative assessment strategies and tools can focus on differing DOK levels

Examples of formative assessment tools that uncover thinking & require "cognitive rigor"

Handouts:

TBEAR, Bookmark, Reading Strategy Use, Literary Essay graphic organizer

Some Related Resources

Papers available at www.nciea.org

Hess, Carlock, Jones, & Walkup (2009). What exactly do "fewer, clearer, and higher standards" really look like in the classroom? Using a cognitive rigor matrix to analyze curriculum, plan lessons, and implement assessments

Hess, K. (2004). "Applying Webb's Depth-of-Knowledge (DOK) Levels in reading, writing, math, science, social studies, science" [online]:

http://www.nciea.org/publications/DOKreading_KH08.pdf
http://www.nciea.org/publications/DOKsocialstudies_KH08.pdf
http://www.nciea.org/publications/DOKwriting_KH08.pdf
http://www.nciea.org/publications/DOKscience_KH08.pdf
http://www.nciea.org/publications/DOKmath_KH08.pdf

Also contact Karin Hess [khess@nciea.org] about formative tools, CRM templates, and use of an accompanying 20-minute video produced by NYC public schools.