


# What Does Rigor Look Like?

## A New Lens for Examining Cognitive Rigor in Assessments, Curriculum, & the Common Core

Connect the Dots: Implementing & Assessing the Common Core Standards  
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# Presentation Overview

- ▶ Developing a shared understanding of the concept of cognitive rigor
  - ▶ Rigor, the CCSS, & SBAC “Targets”
  - ▶ Examining instructional tasks & classroom assessments
  - ▶ Next steps: How can we apply these ideas back in our schools?
  - ▶ Classroom discourse; peer coaching
  - ▶ Lesson planning & unit design
  - ▶ Assessment development & use
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## Before we begin...

- ▶ Take a minute to write your personal definition of “cognitive rigor” as it relates to instruction, learning, and/or assessment.

# Now let's apply your rigor definition

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

- ▶ What is a basic comprehension question you might ask?
- ▶ What is a more rigorous question you might ask?



# Developing the Cognitive Rigor Matrix

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

- ▶ **Bloom** –What type of thinking (verbs) is needed to complete a task?
- ▶ **Webb** –How deeply do you have to understand the content to successfully interact with it? How complex is the content?

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

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

# The Cognitive Rigor Matrix

**Source (article–handout 2):** 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)



# Webb's Depth-of-Knowledge Levels

- ▶ **DOK-1 – Recall & Reproduction** – Recall of a fact, term, principle, concept, or perform a routine procedure
- ▶ **DOK-2 – Basic Application of Skills/Concepts** – Use of information, conceptual knowledge, select appropriate procedures for a task, two or more steps with decision points along the way, routine problems, organize/display data, interpret/use simple graphs
- ▶ **DOK-3 – Strategic Thinking** – Requires reasoning, developing a plan or sequence of steps to approach problem; requires some decision making and justification; abstract, complex, or non-routine; often more than one possible answer
- ▶ **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, across disciplines/content areas/multiple sources

# DOK is about 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 physical features of a plant.
  - ***Describe*** how the two political parties are alike and different.
  - ***Describe*** the most significant effect of WWII on the nations of Europe.

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

Depth + thinking	Level 1 Recall & Reproduction	Level 2 Skills & Concepts	Level 3 Strategic Thinking/ Reasoning	Level 4 Extended Thinking
<b>Remember</b>	-Recall, locate basic facts, details, events	Not appropriate at this level		
<b>Understand</b>	-Select appropriate words to use when intended meaning is clearly evident	-Specify or explain relationships -summarize -identify central idea	-Explain, generalize, or connect ideas using supporting evidence (quote, example...)	-Explain how concepts or ideas specifically relate to other content domains or concepts
<b>Apply</b>	-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
<b>Analyze</b>	-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 -Analyze complex/abstract themes
<b>Evaluate</b>			-Cite evidence and develop a logical argument for conjectures	-Evaluate relevancy, accuracy, & completeness of information
<b>Create</b>	-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

# Practice using the CRM

- ▶ Handout #3: *Little Red Riding Hood*
- ▶ Handout #4: CRM template for ELA
- ▶ Your sample questions – basic and more rigorous



# 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
<b>Remember</b>	-Recall facts			
<b>Understand</b>	-Identify characters, setting, etc.	-Retell or summarize...		
<b>Apply</b>				
<b>Analyze</b>		-Compare-contrast		-Analyze multiple texts/sources & using text evidence for support
<b>Evaluate</b>			-Justify judgments using details/evidence from text	
<b>Create</b>		-Develop a creative summary		

# Some general rules of thumb...



- ▶ If there is only one correct answer, it is probably level DOK 1 or DOK 2
  - DOK 1: you either know it (can recall it, locate it, do it) or you don't
  - DOK 2 (conceptual): apply one concept, then make a decision before going on *applying a second concept*
- ▶ If more than one solution/approach, requiring evidence, it is DOK 3 or 4
  - DOK 3: Must provide supporting evidence and reasoning (not just HOW solved, but WHY – explain reasoning)
  - DOK 4: all of “3” + use of multiple sources or texts

# Applying Cognitive Rigor to the SBAC *Assessment targets and the Common Core*

<http://www.smarterbalanced.org>

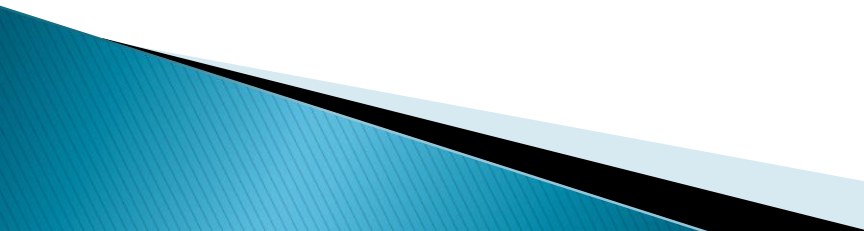


# SBAC Assessment Targets: Reading

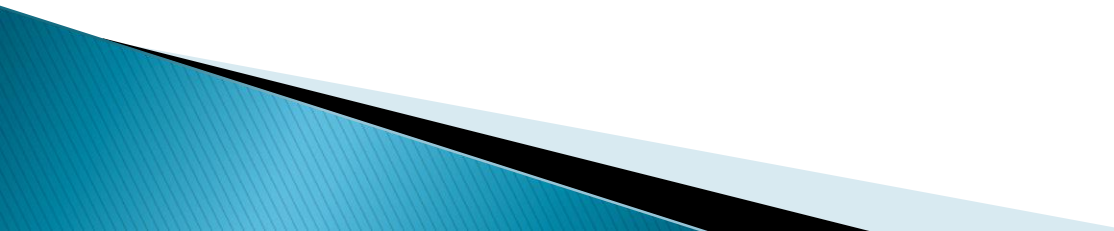
## (1–7 Read Literature; 8–14 Read Informational Text) & Writing

Depth + thinking	Level 1 Recall & Reproduction	Level 2 Skills & Concepts	Level 3 Strategic Thinking/ Reasoning	Level 4 Extended Thinking
<b>Remember</b>	-1/8 Key details			
<b>Understand</b>	-1/8 Key details -3/10 Word meanings-fill in	-1/8 Key details -2/9 Central ideas	-4/11 Reasoning & evaluation	-4/11 Reasoning & evaluation
<b>Apply</b>	-3/10 Word meanings-roots, affixes, structure -Edit/clarify use technology	3/10 Word meanings-use in context 6/13 Text structures & features	-6/13 Text structures & features	-4/11 Reasoning & evaluation
<b>Analyze</b>		-6/13 Text structures & features -7/14 Language use-identify non literal usage	-4/11 Reasoning & evaluation -5/12 Analysis <u>within</u> or <u>across texts</u>	-5/12 Analysis within or <u>across texts</u> -6/13 Text structures & features
<b>Evaluate</b>			-7/14 Language use-impact/intent -5/12 analysis <u>within</u> or <u>across texts</u>	-4/11 Reasoning & evaluation -5/12 Analysis within or <u>across texts</u>
<b>Create</b>		-Write/revise brief texts	-Compose full texts	-Compose full texts

# For each local assessment or rubric analyzed, ask...

- ▶ What is its purpose?
  - ▶ What is the implied/intended rigor? (What mental processing would you expect students to engage in? *Use the CRM to find descriptors*)
  - ▶ When (lesson/unit) could this be used?
  - ▶ Which CC standard(s) does it align with?
  - ▶ Will student responses tell a teacher what to do next? E.g., what could students do/not do (all or part of this assessment task)?
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# Some implications for applying rigor to unit design/re-design:

- ▶ What are the overall learning goals & expectations (and cognitive demand) of the unit?
  - ▶ Does the cognitive demand of the assessments match the stated learning expectations?
  - ▶ Do the learning activities in the unit have the coherence & increasing cognitive rigor to get students there?
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# Reflecting on your own learning

- ▶ Revisit your definition of rigor – has it changed/been refined? In what way?
- ▶ What is one way you might apply these ideas in your work?
  - What existing curriculum/assessment materials could you/your school examine for a range of cognitive rigor?
  - Classroom/instructional practices?

# Take-Away Message: 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
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# Related Resources



- ▶ Numerous papers and presentations available upon request or at [www.nciea.org](http://www.nciea.org)
- ▶ Hess (2004). Applying Webb's Depth-of-Knowledge (DOK) Levels in reading, writing, math, science, social studies, science [online] available:
  - ▶ [http://www.nciea.org/publications/DOKreading\\_KH08.pdf](http://www.nciea.org/publications/DOKreading_KH08.pdf)
  - ▶ [http://www.nciea.org/publications/DOKsocialstudies\\_KH08.pdf](http://www.nciea.org/publications/DOKsocialstudies_KH08.pdf)
  - ▶ [http://www.nciea.org/publications/DOKwriting\\_KH08.pdf](http://www.nciea.org/publications/DOKwriting_KH08.pdf)
  - ▶ [http://www.nciea.org/publications/DOKscience\\_KH08.pdf](http://www.nciea.org/publications/DOKscience_KH08.pdf)
  - ▶ [http://www.nciea.org/publications/DOKmath\\_KH08.pdf](http://www.nciea.org/publications/DOKmath_KH08.pdf)
- ▶ Hess & Biggam (2004). A Discussion of "Increasing Text Complexity"[online] available:  
[http://www.nciea.org/publications/TextComplexity\\_KH05.pdf](http://www.nciea.org/publications/TextComplexity_KH05.pdf)
- ▶ Hess (2006). Linking Formative Assessment Approaches to Instructional Decisions [http://www.nciea.org/publications/RILS\\_KH06.pdf](http://www.nciea.org/publications/RILS_KH06.pdf)
- ▶ Hess (2008). Teaching and Assessing Understanding of Text Structures across Grades. [online] available:  
[http://www.nciea.org/publications/TextStructures\\_KH08.pdf](http://www.nciea.org/publications/TextStructures_KH08.pdf)

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