Moving Forward Together

Coaching for Rigor

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Table 2: Hess' Cognitive Rigor Matrix with Curricular Examples: Applying Webb's Depth-of-Knowledge Levels to Bloom's Cognitive Process Dimensions

Bloom's Revised Taxonomy of Cognitive Process Dimensions	Webb's Depth-of-Knowledge (DOK) Levels			
	Level 1 Recall & Reproduction	Level 2 Skills & Conceots	Level 3 Strategic Thinking/ Reasoning	Level 4 Extended Thinkina
Remember Retrieve knowledge from long-term memory, recognize, recall, locate, identify	Recall, recognize, or locate basic facts, ideas, principles Recall or identify conversions: between representations, numbers, or units of measure Identify facts/details in texts			
Understand Construct meaning, clarify, paraphrase, represent, translate, illustrate, give examples, classify, categorize, summarize, generalize, infer a logical conclusion (such as from examples given), predict, compare/contrast, match like ideas, explain, construct models	Compose & decompose numbers Evaluate an expression Locate points (grid/, number line) Represent math relationships in words pictures, or symbols Write simple sentences Select appropriate word for intended meaning Describe/explain how or why	Specify and explain relationships Give non xamples/examples Make and record observations Take notes; organize ideas/data Summarize results, concepts, ideas Make basic inferences or logical predictions from data or texts Identify main ideas or accurate generalizations	Explain, generalize, or connect ideas using supporting evidence Explain thinking when more than one response is possible Explain phenomena in terms of concepts Write full composition to meet specific purpose Identify themes	Explain how concepts or ideas specifically relate to other content domains or concepts Develop generalizations of the results obtained or strategies used and apply them to new problem situations
Apply Carry out or use a procedure in a given situation; carry out (apply to a familiar task), or use (apply) to an unfamiliar task	Follow simple/routine procedure (recipe-type directions) Solve a one-step problem Calculate, measure, apply a rule Apply an algorithm or formula (area, perimeter, etc.) Represent in words or diagrams a concept or relationship Apply rules or use resources to edit spelling, grammar, punctuation, conventions	Select a procedure according to task needed and perform it Solve routine problem applying multiple concepts or decision points Retrieve information from a table, graph, or figure and use it solve a problem requiring multiple steps Use models to represent concepts Write paragraph using appropriate organization, text structure, and signal words	Use concepts to solve non-routine problems Design investigation for a specific purpose or research question Conduct a designed investigation Apply concepts to solve non-routine problems Use reasoning, planning, and evidence Revise final draft for meaning or orooression of ideas	Select or devise an approach among many alternatives to solve a novelproblem Conduct a project that specifies a problem, identifies solution paths, solves the problem, and reports results Illustrate how multiple themes (historical, geographic, sociaQ may be interrelated
Analyze Break into constituent parts, determine how parts relate, differentiate between relevant-irrelevant, distinguish, focus, select, organize, outline, find coherence, deconstruct (e.g., for bias or point of view)	Retrieve information from a table or graph to answer a question Identify or locate specific information contained in maps, charts, tables, graphs, or diagrams	Categorize, classify materials Compare/ contrast figures or data Select appropriate display data Organize or interpret (simple) data Extend a pattern Identify use of literary devices Identify text structure of paragraph Distinguish: relevant-irrelevant information· fact/ooinion	Compare information within or across data sets or texts Analyze and draw conclusions from more complex data Generalize a pattern Organize/interpret data: complex graph Analyze author's craft, viewpoint, or ootential bias	Analyze multiple sources of evidence or multiple works by the same author, or across genres, or time periods Analyze complex/abstract themes Gather, analyze, and organize information Analyze discourse styles
Evaluate Make judgments based on criteria, check, detect inconsistencies or fallacies, judge, critique			Cite evidence and develop a logical argument for concepts Describe, compare, and contrast solution methods Verify reasonableness of results Justifv conclusions made	Gather, analyze, & evaluate relevancy & accuracy Draw & justify conclusions Apply understanding in a novel way, provide argument or justification for the application
Create Reorganize elements into new patterns/structures, generate, hypothesize, design, plan, construct, produce	Brainstorm ideas, concepts, or perspectives related to a topic or concept	Generate conjectures or hypotheses based on observations or prior knowledge	Synthesize information within one source or text Formulate an originalproblem, given a situation Develop a complex model for a given situation	Synthesize information across multiple sources or texts Design a model to inform and solve a real-world, complex, or abstract situation

http://www.stancoe.org/SCOE/iss/common_core/overview/overview_depth_of_knowledge.htm

Revised Bloom's Taxonomy

	Rigor and Relevance Quadrant A or B			Rigor and Relevance Quadrant C or D		
	Remembering	**Understanding**	**Applying**	**Analyzing**	**Evaluating**	**Creating**
Verbs	Choose Describe Define Find Identify Label List Locate Match Memorize Name Omit recall Recite Recognize Reproduce Sequence-simple Select State Tell	Calculate Classify Demonstrate Distinguish Explain Extend Give example Illustrate Indicate Interrelate Interpret Infer Judge Match Paraphrase Represent Restate Rewrite Show Summarize	Apply Chose Dramatize Explain Generalize Judge Organize Paint Prepare Problem-calculation Produce Select Sequence-complex Show Sketch Solve Use	Analyze Categorize Cause/Effect Classify Compare Complex-Infer Contrast Deduce Differentiate Distinguish Identify Point out Organize Select Subdivide Survey	Appraise Argue Estimate Evaluate Determine- bias Judge Criticize Critique Debate Defend Justify Prioritize Pros and Cons Rate Value Verify Weigh	Add to Combine Compose Construct Create Design Develop Devise Forecast Formulate Predict Solution Formulate Hypothesize Invent Originate
Instructional Strategies	Highlighting Rehearsal Memorizing Mnemonics Make a list of the main events Make a timeline of events Make a facts chart Write a list of any pieces of information you can remember List all the .. in the text or video	Key examples Emphasize connections Elaborate concepts Summarize - written Paraphrase – oral Students explain Students state the rule Why does this example…? Visual representations Concept maps Outlines- verbal	Students modeling Sequencing Real World application opportunities Case studies Simulations Algorithms in problem form Construct a model, diorama, scrapbook, to explain ideas or information in context Organize a collection to make a point Make up a game	Analogies Models of thinking Challenging assumptions Retrospective analysis Reflection through journaling Collaborative learning like jigsaws Design a questionnaire to gather information Construct a data chart Write a commercial to sell	Challenging assumptions Evaluative journaling Debates Collaboration to evaluate point or view, worth or other specific aspect Decision-making Solution development Problem based learning Prepare a list of criteria to judge…	Design activities Inventions Creation of a model of a solution to a complex problem Devise a new way to solve a complex problem Compose music Create original art
Model Questions	Who? Where? Which one? What? How? What is the best one? Why? How much? When? What does it mean?	State in your own words Which are facts? What does this mean? Is this the same as… Give an example Condense this paragraph or paraphrase it Explain what is happening What are they saying? What seems to be…?	Predict what would happen if… Choose the best statements that apply What would result Tell what would happen Tell how, when, where and why Tell how much change there would be Identify the results of	Is this fact or opinion and why? What are the assumptions behind…? What is the relevance? What is the motive? What are the conclusions based upon? What does the	Is it valid that? Judge the effects What fallacies, consistencies, inconsistencies appear or exist? Which is more important, moral, better, logical, valid, or appropriate? Find the errors Defend your	How would you test…? Propose an alternative. Develop a creative solution for… Invent a new process, system, procedure or product that addresses…
DOK	**Level 1: Literal, right there, summarize or remember**		**Level 2: Search and think, infer, connect and relate, or associate**		**Level 3: Logical justification, derive, or on your own**	

Sources: Bloom (1954 and 1956) revised by Anderson and Krathwohl (2001), Dalton, J. and Smith, D. (1986), Kuzmich, L. (2011), Webb, N. DOK, SABC, and Daggett, W. ICLE Rigor and Relevance Model. Original chart created by Lead4Ward, Region XIII, Texas.

DOK Question Stems

DOK 1	DOK 2
• Can you recall_____? • When did ____happen? • Who was ____? • How can you recognize____? • What is____? • How can you find the meaning of____? • Can you recall____? • Can you select____? • How would you write____? • What might you include on a list about___? • Who discovered___? • What is the formula for___? • Can you identify___? • How would you describe___?	• Can you explain how ____affected _____? • How would you apply what you learned to develop ____? • How would you compare ____? Contrast_____? • How would you classify____? • How are____alike? Different? • How would you classify the type of____? • What can you say about____? • How would you summarize____? • How would you summarize___? • What steps are needed to edit___? • When would you use an outline to ___? • How would you estimate___? • How could you organize____? • What would you use to classify___? • What do you notice about___?
DOK 3	**DOK 4**
• How is ____related to _____? • What conclusions can you draw _____? • How would you adapt____to create a different____? • How would you test____? • Can you predict the outcome if____? • What is the best answer? Why? • What conclusion can be drawn from these three texts? • What is your interpretation of this text? Support your rationale. • How would you describe the sequence of____? • What facts would you select to support____? • Can you elaborate on the reason____? • What would happen if___? • Can you formulate a theory for___? • How would you test__? • Can you elaborate on the reason___?	• Write a thesis, drawing conclusions from multiple sources. • Design and conduct an experiment. Gather information to develop alternative explanations for the results of an experiment. • Write a research paper on a topic. • Apply information from one text to another text to develop a persuasive argument. • What information can you gather to support your idea about___? • DOK 4 would most likely be the writing of a research paper or applying information from one text to another text to develop a persuasive argument. • DOK 4 requires time for extended thinking.

From Depth of Knowledge – Descriptors, Examples and Question Stems for Increasing Depth of Knowledge in the Classroom Developed by Dr. Norman Webb and Flip Chart developed by Myra Collins

Depth of Knowledge (DOK):

How deeply will we help students learn?

What is it?

Classifies how deeply students need to know the content to be successful.
Helps identify how students engage with content.
It's about COMPLEXITY, not difficulty.
Each level increases the cognitive complexity
Developed by Norman Webb as a way to classify assessment items. (20+ states use DOK to evaluate rigor of their state assessments)

DOK vs. Bloom's

Bloom is about the TYPE of thinking students use; DOK is about how deeply students need to know the content.
Bloom's Taxonomy can be applied at each DOK level. (*see reverse of this page*)

Resources

Webb's Depth of Knowledge Guide*:
http://bit.ly/10167W3
Cognitive Rigor Matrix (Perkins)
Math/Science*: http://on.nyc.gov/ZVrvZs Reading/Writing*: http://on.nyc.gov/10m91nN
Overview Chart*: http://bit.ly/13fac6a
Question Stems:
http://bit.ly/10Tf7I4
PD Module "Norman Webb's Depth of Knowledge"
http://www.watervalley.net/users/twest/NW/
Karin Hess' DOK Introduction Video**:
http://vimeo.com/42788913

* and ** were used in the creation of this handout.

	What it is	Teacher	Student	Sample Activities	Sample Language
1 Recall and Reproduction	Ability to recall	Directs Questions Demonstrates Tells Compares	Memorizes Responds Remembers Translates Restates	Write an outline that explains a process List the main points	BEWARE! Verbs may appear to point to a DOK level, but it's what comes AFTER the verb that is the best indicator of rigor,** as in the following examples:
2 Skills and Concepts	Basic application & skills	Facilitates Questions Shows Organizes	Solves problems Constructs Illustrates Calculates	Construct a model to demonstrate the process Measure the high temperature for a week and present it as a graphic	DESCRIBE the life cycle of a frog
3 Strategic Thinking & Reasoning	Use reasoning to answer or strategize	Probes Questions Observes Clarifies Guides	Discusses Uncovers Assesses Debates Questions	Create a Venn diagram to show how two characters are the same and different Prepare a case for or against an issue	DESCRIBE how two presidents are alike and different
4 Extended Thinking	Synthesize information into new thinking	Facilitates Reflects Analyzes Extends	Modifies Plans Creates Designs Proposes	Work with partners to propose several solutions to a problem and "sell" one of them to the class Create a hypothesis, test it out, then present the findings	DESCRIBE the most significant effect of WWII on the participating nations.

Usually ONE right answer

Usually SEVERAL right answers or multiple strategies to get the right answer

Bloom's Taxonomy and Webb's DOK

How can Bloom's be applied at each Depth of Knowledge?

Revised Bloom's Taxonomy	Remembering	Understanding	Applying	Analyzing	Evaluating	Creating		
Remember Retrieve knowledge from long-term memory, recognize, recall, locate, identify	Recall and observe facts, properties, principles Define terms	e points on a grid or number line Identify literary elements rite simple sentences	Calculate, measure, or apply a rule (e.g. rounding) Use prefixes/ suffixes to determine word meaning	nd a pattern or trend Identify if some information is included in a graphic or caption Decide appropriate text structure for audience		Brainstorm ideas, concepts, or perspectives related to a topic	1 Recall and Reproduction	Ability to recall
Understand Construct meaning, clarify, paraphrase, represent, translate, illustrate, give examples, classify, categorize, summarize, generalize, infer a logical conclusion), predict, compare/contrast, match like ideas, explain, construct models		ake and record observations; summarize results e information to support a central idea notes and organize ideas	Retrieve information from a table or graph and use it to solve a multiple step problem Use context to understand word meaning	end a pattern Classify or organize items into groups Identify fact and opinion Identify relevant and irrelevant information		Create a hypothesis based on observations or prior knowledge	2 Skills and Concepts	Basic application & skills
Apply Carry out or use a procedure in a given situation; carry out (apply to a familiar task), or use (apply) to an unfamiliar task		Use supporting evidence to explain or connect ideas ake inferences about themes	Design and conduct an investigation ply a concept to a new concept	Compare information from several sets of data or text pport inferences with reasoning and evidence	rify whether results are reasonable ify conclusions	Develop a model for a complex situation Develop an alternative ending/solution	3 Strategic Thinking & Reasoning	Use reasoning to answer or strategize
Analyze Break into constituent parts, determine how parts relate, differentiate between relevant-irrelevant, distinguish, focus, select, organize, outline, find coherence, deconstruct (e.g., for bias or point of view)		Connect concepts to other content areas or concepts	Solve a problem by selecting from multiple approaches Show how multiple themes are inter-related	Gather and analyze evidence from multiple sources	Use understanding in an original way Evaluate relevance, accuracy, and completeness of information from multiple sources	Design a model to inform and solve a situation Articulate a new perspective	4 Extended Thinking	Synthesize information into new thinking
Evaluate Make judgments based on criteria, check, detect inconsistencies or fallacies, judge, critique								
Create Reorganize elements into new patterns/structures, generate, hypothesize, design, plan, produce								