

Applying Webb's Depth-of-Knowledge (DOK) Levels in Reading

Karin K. Hess

According to Norman L. Webb ("Depth-of-Knowledge Levels for Four Content Areas," March 28, 2002), interpreting and assigning depth-of-knowledge levels to both objectives within standards and assessment items is an essential requirement of alignment analysis. Four levels of Depth of Knowledge are used for this analysis.

A general definition for each of the four (Webb) Depth-of-Knowledge levels is followed by Table 1, which provides further specification and examples for each of the DOK levels. Webb recommends that large-scale, on-demand assessments in reading should only assess Depth-of-Knowledge Levels 1, 2, and 3. Depth of Knowledge at Level 4 in reading should be reserved for local assessment only.

Table 2 provides examples of DOK "ceilings" (the highest level of cognitive demand for large-scale assessment) using one state's reading grade-level expectations.

Descriptors of DOK Levels for Reading (based on Webb and Wixson [from Webb's March 2002 article]; and Webb, *Technical Issues in Large-Scale Assessment*, report published by CCSSO, December 2002)

Level 1 requires students to use simple skills or abilities to recall or locate facts from the text. The focus is on basic initial comprehension, not on analysis or interpretation. Items require only a shallow/literal understanding of text presented and often consist of verbatim recall from text, or simple understanding of a single word or phrase.

Level 2 requires both initial comprehension and subsequent processing of text or portions of text. Important concepts are covered, but not in a complex way. GLEs/items at this level may include words such as paraphrase, summarize, interpret, infer, classify, organize, collect, display, and compare, and a phrase such as determine whether fact or opinion. Literal main ideas are stressed. Items may require students to apply skills and concepts that are covered in Level 1.

Level 3 requires deep knowledge. Students are encouraged to go beyond the text and are asked to explain, generalize, or connect ideas. Students must be able to support their thinking, citing references from the text or other sources. Items may involve abstract theme identification, inferences between or across passages, students' application of prior knowledge, or text support for an analytical judgment made about a text.

Level 4 requires complex reasoning, planning, developing, and thinking most likely over an extended period of time, such as comparing multiple works by the same author or from the same time period. The extended time period is not a distinguishing factor if the required work is only repetitive and does not require applying significant conceptual understanding and higher-order thinking. Level 4 assessments should be done only at the local level.

Source: http://www.nciea.org/publications/DOKreading_KH08.pdf

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Table 1: Sample Depth-of-Knowledge Level Descriptors for Reading

[Adapted by Karin Hess, Center for Assessment/NCIEA, 2004, Based on Webb and Wixson (Webb, 2002)]

Level 1 Recall of Information	Level 2 Basic Reasoning	Level 3 Complex Reasoning	Level 4 Extended Reasoning
<ul style="list-style-type: none"> a. Read words orally in isolation b. Read words orally in connected text c. Read multi-syllabic words d. Locate or recall facts or details explicitly presented in text e. Identify or describe characters, setting, sequence of events f. Use language structure (pre/suffix) or word relationships (synonym/antonym) to determine meaning of words g. Select appropriate words to use in context (e.g., content-specific words, shades of meaning) when intended meaning is clearly evident 	<ul style="list-style-type: none"> a. Use context cues or resources to identify the meaning of unfamiliar words b. Predict a logical outcome based on information in a reading selection c. Make basic inferences or draw basic conclusions about information presented in text (e.g., According to this report, what caused _____?) d. Recognize appropriate generalizations about text (e.g., possible titles, main ideas) e. Identify and summarize the major events, problem, solution, conflicts in a literary text f. Determine whether a text is fact or fiction g. Distinguish between fact and opinion h. Describe the characteristics or features of various types of text i. Obtain information using text features of informational text (e.g., Table of Contents, sidebar, chart, etc.) j. Organize information presented in informational text using mapping, charting, or summarizing k. Locate information to answer questions related to explicit or implicit central ideas in informational texts l. Identify use of literary devices (e.g., imagery, idioms, exaggeration, alliteration, etc.) 	<ul style="list-style-type: none"> a. Explain, generalize, or connect ideas, using supporting evidence from the text or from other sources b. Draw inferences about author's purpose, author's message or theme (explicit or implied) c. Make and support inferences about implied causes and effects d. Describe how word choice, point of view, or bias affects the interpretation of a reading selection e. Summarize or compare information within and across text passages f. Analyze interrelationships among elements of the text (plot, subplots, characters, setting) g. Analyze or interpret use of author's craft (literary devices) to analyze or critique a literary text 	<ul style="list-style-type: none"> a. Compare or analyze multiple works by the same author, including author's craft b. Compare or analyze multiple works from the same time period or from the same genre c. Gather, analyze, organize, and interpret information from multiple (print and non-print) sources for the purpose of drafting a reasoned report d. Evaluate the relevancy and accuracy of information from multiple (print and non-print) sources (e.g., verifying factual information or assertions with other sources; researching the source of information)

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Applying Webb's Depth-of-Knowledge (DOK) Levels in Writing

Karin K. Hess

According to Norman L. Webb ("Depth-of-Knowledge Levels for Four Content Areas," March 28, 2002), interpreting and assigning depth-of-knowledge levels to both objectives within standards and assessment items is an essential requirement of alignment analysis. Four levels of depth of knowledge (DOK) are used for this analysis.

In this paper, a general definition for each of the four (Webb) Depth-of-Knowledge levels is followed by Table 1, which provides further specification and examples for each of the DOK levels. Webb recommends that large-scale, on-demand assessments in writing should only assess Depth-of-Knowledge Levels 1, 2, and 3. Because of the nature of Level 4 writing activities, Depth of Knowledge at Level 4 in writing is best reserved for local assessment, and is included in this discussion for illustrative purposes. Table 2 provides examples of DOK "ceilings" (the highest level of cognitive demand for large-scale assessment items) using one state's writing grade-level expectations as examples.

Descriptors of Levels for Writing (based on Webb, March 2002; and Webb, *Technical Issues in Large-Scale Assessment*, report published by CCSSO, December 2002)

Level 1 requires the student to write or recite simple facts. This writing or recitation does not include complex synthesis or analysis, but basic ideas.

Level 2 requires some mental processing, such as beginning to connect ideas using a simple organizational structure. At this level, students are engaged in first draft writing for a limited number of purposes and audiences. Students are beginning to connect ideas using a simple organizational structure for such things as composing a short, accurate summary.

Level 3 requires some higher-level mental processing. Students are developing multi-paragraph compositions that may include complex sentence structures or demonstrate some synthesis and analysis. Revisions are made to the writing to improve precision of language used and to produce a logical progression of ideas.

Level 4 Higher-level thinking is central to this level. Multi-paragraph compositions demonstrate synthesis, analysis, and evaluation of complex ideas or themes and evidence of a deep awareness of purpose and audience. Synthesis and analysis of information from multiple sources often includes identifying the complexities, discrepancies, and/or the differences in perspectives found in each medium.

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Table 1: Detailed Descriptions of Depth of Knowledge Levels for Writing

(Adapted by Karin Hess, Center for Assessment/NCIEA, 2005, Based on Webb)

Level 1	Level 2	Level 3	Level 4
<p>Some examples that represent, but do not constitute all, Level 1 writing performances:</p> <ul style="list-style-type: none"> a. Listing/generating ideas or words prior to developing written composition (e.g., brainstorming, webbing) b. Selecting or recalling appropriate vocabulary (words, phrases, idioms) to achieve intended meaning in writing c. Writing simple sentences d. Using punctuation marks and capitalization correctly in writing and editing e. Using Standard English conventions in writing and editing to correct errors f. Identifying misspelled words in a written passage g. Applying conventional spelling patterns/rules to new situations in writing h. Using resources (dictionary, thesaurus) to correct spelling in written passages i. Using resources to identify Standard English grammatical structures for correction j. Using resources to apply basic formats for documentation 	<p>Some examples that represent, but do not constitute all, Level 2 writing performances:</p> <ul style="list-style-type: none"> a. Note-taking or outlining as a means of organizing ideas for writing b. Developing text which <u>may be</u> limited to one paragraph c. Using simple organizational strategies to structure written work (e.g., basic paragraph form: indenting, main idea, supporting details; simple transitions) d. Constructing a variety of sentence types (e.g., simple and compound, sentences with embedded phrases) e. Writing summaries that contain the main idea of a reading selection and pertinent details or quotations f. Demonstrating basic understanding and appropriate use of such reference materials as a dictionary, thesaurus, or Web site g. Editing final drafts of compositions for mechanics and conventions, including grammar, punctuation, and capitalization 	<p>Some examples that represent, but do not constitute all, Level 3 writing performances:</p> <ul style="list-style-type: none"> a. Developing compositions that include multiple paragraphs b. Using complex or varied sentence structures in written compositions c. Demonstrating some synthesis and analysis in writing (making inferences; determining relationships; generalizing, or connecting ideas) d. Showing awareness of audience and purpose through focus, organization, voice/tone e. Using appropriate organizational text structures (e.g., description; chronology; proposition/support; compare/contrast; cause/effect) f. Editing and revising to improve the quality and meaning of the composition g. Supporting ideas with details, examples, quotations, text references, and/or citations h. Revising final drafts to improve organization and precision of language to produce a logical progression of ideas i. Summarizing information from multiple sources to address a specific topic 	<p>Some examples that represent, but do not constitute all, Level 4 writing performances:</p> <ul style="list-style-type: none"> a. Developing multi-paragraph compositions that demonstrate synthesis and analysis of complex ideas or themes b. Analyzing author's craft (e.g., style, bias, literary techniques, point of view) c. Demonstrating evidence of a deep awareness of purpose and intended audience. (e.g., in informational reports including hypotheses and supporting evidence) d. Creating compositions that demonstrate a distinct voice and that stimulate the reader or listener to consider new perspectives on the addressed ideas or themes e. Writing an analysis of two selections, identifying the common theme and generating a purpose that is appropriate for both f. Gathering, analyzing, and evaluating written information for the purpose of drafting a reasoned report that supports and appropriately illustrates inferences and conclusions drawn

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Applying Webb's Depth-of-Knowledge and NAEP Levels of Complexity in Mathematics

Marge Petit and Karin Hess

In order to define the descriptors for cognitive demand to guide test item or assessment development, classification of items, and alignment to the states' Grade Level Expectations (GLEs), the Center for Assessment recommends drawing upon such work as Webb (2002), National Assessment of Educational Progress (2004) levels of complexities, and the implied cognitive demand in states' GLEs for mathematics. These levels and descriptors can be used to guide item and overall test development, and establish the potential cognitive demand for assessment.

Descriptors of Levels for Mathematics (based on Webb, "Depth-of-Knowledge Levels for Four Content Areas," March 2002; and Webb, *Technical Issues in Large-Scale Assessment*, report published by CCSSO, December 2002)

Below is a general definition for each Depth-of-Knowledge (DOK) Level. Table 1 (on the following page) contains mathematics descriptors for each level. Table 2 provides an example of a DOK ceiling level and other potential levels for assessment of a sample mathematics GLE.

Level 1—Recall

This level involves the recall of information (fact, definition, term, or property), the use of a procedure, or the application of an algorithm or formula. Also included are one-step word problems and other specifications unique to content standards.

Level 2—Skills and Concepts

The Skills and Concepts level involves demonstrating conceptual understanding through models and explanations, comparing and classifying information, estimating, and interpreting data from a simple graph. A Level 2 response requires students to make a decision, such as how to approach the problem or activity.

Level 3—Strategic Thinking

Strategic Thinking involves reasoning, planning, and using evidence to solve a problem or algorithm. At Level 3, students may be asked to make and test conjectures, interpret information from a complex graph, solve complex problems, explain concepts, use concepts to solve non-routine problems, or provide mathematical justifications *when more than one response or approach is possible*.

Level 4—Extended Thinking

Extended Thinking requires complex reasoning, planning, and thinking generally over extended periods of time (but not time spent only on repetitive tasks). At Level 4, students may be asked to relate concepts to other content areas or to real-world applications in new situations. In mathematics, Level 4 Depth of Knowledge is not recommended by Webb to be assessed on the state grade-level assessments, but should be assessed locally.

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DOK Articles (continued)

Table 1: Math Descriptors—Applying Depth of Knowledge Levels for Mathematics

(Webb, 2002) & NAEP 2002 Mathematics Levels of Complexity

(M. Petit, Center for Assessment 2003, K. Hess, Center for Assessment, updated 2006)

Level 1 Recall	Level 2 Skills/Concepts	Level 3 Strategic Thinking	Level 4 Extended Thinking
<ul style="list-style-type: none"> a. Recall, observe, or recognize a fact, definition, term, or property b. Apply/compute a well-known algorithm (e.g., sum, quotient) c. Apply a formula d. Determine the area or perimeter of rectangles or triangles given a drawing and labels e. Identify a plane or three-dimensional figure f. Measure g. Perform a specified or routine procedure (e.g., apply rules for rounding) h. Evaluate an expression i. Solve a one-step word problem j. Retrieve information from a table or graph k. Recall, identify, or make conversions between and among representations or numbers (fractions, decimals, and percents), or within and between customary and metric measures l. Locate numbers on a number line, or points on a coordinate grid m. Solve linear equations n. Represent mathematical relationships in words, pictures, or symbols o. Read, write, and compare decimals in scientific notation 	<ul style="list-style-type: none"> a. Classify plane and three-dimensional figures b. Interpret information from a simple graph c. Use models to represent mathematical concepts d. Solve a routine problem requiring multiple steps/decision points, or the application of multiple concepts e. Compare and/or contrast figures or statements f. Construct 2-dimensional patterns for 3-dimensional models, such as cylinders and cones g. Provide justifications for steps in a solution process h. Extend a pattern i. Retrieve information from a table, graph, or figure and use it to solve a problem requiring multiple steps j. Translate between and among tables, graphs, words, and symbolic notation k. Make direct translations between problem situations and symbolic notation l. Select a procedure according to criteria and perform it m. Specify and explain relationships between and among facts, terms, properties, or operations n. Compare, classify, organize, estimate, or order data 	<ul style="list-style-type: none"> a. Interpret information from a complex graph b. Explain thinking when more than one response is possible c. Make and/or justify conjectures d. Use evidence to develop logical arguments for a concept e. Use concepts to solve non-routine problems f. Perform a procedure with multiple steps and multiple decision points g. Generalize a pattern h. Describe, compare, and contrast solution methods i. Formulate a mathematical model for a complex situation j. Provide mathematical justifications k. Solve a multiple-step problem and provide support with a mathematical explanation that justifies the answer l. Solve 2-step linear equations/inequalities in one variable over the rational numbers, interpret solution(s) in the original context, and verify reasonableness of results m. Translate between a problem situation and symbolic notation that is not a direct translation n. Formulate an original problem, given a situation o. Analyze the similarities and differences between procedures p. Draw conclusion from observations or data, citing evidence 	<ul style="list-style-type: none"> a. Relate mathematical concepts to other content areas b. Relate mathematical concepts to real-world applications in new situations c. Apply a mathematical model to illuminate a problem, situation d. Conduct a project that specifies a problem, identifies solution paths, solves the problem, and reports results e. Design a mathematical model to inform and solve a practical or abstract situation f. Develop generalizations of the results obtained and the strategies used and apply them to new problem situations g. Apply one approach among many to solve problems h. Apply understanding in a novel way, providing an argument/justification for the application <p><i>NOTE: Level 4 involves such things as complex restructuring of data or establishing and evaluating criteria to solve problems.</i></p>

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Applying Webb's Depth-of-Knowledge (DOK) Levels in Science

Karin Hess

According to Norman L. Webb, Wisconsin Center for Educational Research ("Depth-of-Knowledge Levels for Four Content Areas," March 28, 2002), "interpreting and assigning Depth-of-Knowledge Levels to both objectives within standards and assessment items is an essential requirement of alignment analysis. Four levels of Depth-of-Knowledge are used for this analysis." Norman Webb's "Depth-of-Knowledge Levels for Four Content Areas" include: Language Arts (Reading, Writing), Mathematics, Science, and Social Studies.

A general definition for each of the four (Webb) Depth-of-Knowledge levels is followed by Table 1, which provides further specification and examples for each of the DOK levels. Webb recommends that large-scale, on-demand assessments in science should only assess Depth-of-Knowledge Levels 1, 2, and 3. Depth-of-Knowledge at Level 4 in science should be reserved for local assessment only.

Descriptors of DOK Levels for Science (based on Webb and Wixson, [Webb, March 2002])

Level 1 Recall and Reproduction requires recall of information, such as a fact, definition, term, or a simple procedure, as well as performing a **simple** science process or procedure. Level 1 only requires students to demonstrate a rote response, use a well-known formula, follow a set procedure (like a recipe), or perform a clearly defined series of steps. A "simple" procedure is well-defined and typically involves only **one step**. Verbs such as "identify," "recall," "recognize," "use," "calculate," and "measure" generally represent cognitive work at the recall and reproduction level. Simple word problems that can be directly translated into and solved by a formula are considered Level 1. Verbs such as "describe" and "explain" could be classified at different DOK levels, depending on the complexity of what is to be described and explained.

A student answering a Level 1 item either knows the answer or does not: that is, the answer does not need to be "figured out" or "solved." In other words, if the knowledge necessary to answer an item automatically provides the answer to the item, then the item is at Level 1. If the knowledge necessary to answer the item does not automatically provide the answer, the item is at least at Level 2.

Level 2 Skills and Concepts includes the engagement of some mental processing beyond recalling or reproducing a response. The content knowledge or process involved is **more complex** than in Level 1. Items require students to make some decisions as to how to approach the question or problem. Keywords that generally distinguish a Level 2 item include "classify," "organize," "estimate," "make observations," "collect and display data," and "compare data." These actions imply **more than one step**. For example, to compare data requires first identifying characteristics of the objects or phenomenon and then grouping or ordering the objects. Level 2 activities include making observations and collecting data; classifying, organizing, and comparing data; and organizing and displaying data in tables, graphs, and charts.

Some action verbs, such as "explain," "describe," or "interpret," could be classified at different DOK levels, depending on the complexity of the action. For example, interpreting information from a simple graph, requiring reading information from the graph, is at Level 2. An item that requires interpretation

DOK Articles (continued)

from a complex graph, such as making decisions regarding features of the graph that need to be considered and how information from the graph can be aggregated, is at Level 3.

Level 3 Strategic Thinking requires deep knowledge using reasoning, planning, using evidence, and a higher level of thinking than the previous two levels. The cognitive demands at Level 3 are **complex and abstract**. The complexity does not result only from the fact that there could be multiple answers, a possibility for both Levels 1 and 2, but because the multi-step task requires **more demanding reasoning**. In most instances, requiring students to explain their thinking is at Level 3; requiring a very simple explanation or a word or two should be at Level 2. An activity that has more than one possible answer and requires students to justify the response they give would most likely be at Level 3. Experimental designs in Level 3 typically involve more than one dependent variable. Other Level 3 activities include drawing conclusions from observations; citing evidence and developing a logical argument for concepts; explaining phenomena in terms of concepts; and using concepts to solve non-routine problems.

Level 4 Extended Thinking requires **high cognitive demand** and is **very complex**. Students are required to make several connections—relate ideas *within* the content area or *among* content areas—and have to select or devise one approach among many alternatives on how the situation can be solved. Many on-demand assessment instruments will not include any assessment activities that could be classified as Level 4. However, standards, goals, and objectives can be stated in such a way as to expect students to perform extended thinking. “Develop generalizations of the results obtained and the strategies used and apply them to new problem situations,” is an example of a Grade 8 objective that is at Level 4. Many, but not all, performance assessments and open-ended assessment activities requiring significant thought will be at Level 4.

Level 4 requires complex reasoning, experimental design and planning, and **probably will require an extended period of time** either for the science investigation required by an objective, or for carrying out the multiple steps of an assessment item. However, the extended time period is not a distinguishing factor if the required work is only repetitive and does not require applying significant conceptual understanding and higher-order thinking. For example, if a student has to take the water temperature from a river each day for a month and then construct a graph, this would be classified as a Level 2 activity. However, if the student conducts a river study that requires taking into consideration a number of variables, this would be at Level 4.

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Table 1: Detailed Descriptors of Depth-of-Knowledge Levels for Science

(K. Hess, Center for Assessment, based on Webb, update 2005)

Level 1 Recall & Reproduction	Level 2 Skills & Concepts	Level 3 Strategic Thinking	Level 4 Extended Thinking
<p>a. Recall or recognize a fact, term, definition, simple procedure (such as one step), or property</p> <p>b. Demonstrate a rote response</p> <p>c. Use a well-known formula</p> <p>d. Represent in words or diagrams a scientific concept or relationship</p> <p>e. Provide or recognize a standard scientific representation for simple phenomenon</p> <p>f. Perform a routine procedure, such as measuring length</p> <p>g. Perform a simple science process or a set procedure (like a recipe)</p> <p>h. Perform a clearly defined set of steps</p> <p>i. Identify, calculate, or measure</p> <p><i>NOTE: If the knowledge necessary to answer an item automatically provides the answer, it is at Level 1.</i></p>	<p>a. Specify and explain the relationship between facts, terms, properties, or variables</p> <p>b. Describe and explain examples and non-examples of science concepts</p> <p>c. Select a procedure according to specified criteria and perform it</p> <p>d. Formulate a routine problem given data and conditions</p> <p>e. Organize, represent, and compare data</p> <p>f. Make a decision as to how to approach the problem</p> <p>g. Classify, organize, or estimate</p> <p>h. Compare data</p> <p>i. Make observations</p> <p>j. Interpret information from a simple graph</p> <p>k. Collect and display data</p> <p><i>NOTE: If the knowledge necessary to answer an item does not automatically provide the answer, then the item is at least at Level 2. Most actions imply more than one step.</i></p> <p><i>NOTE: Level 3 is complex and abstract. If more than one response is possible, it is at least at Level 3 and calls for use of reasoning, justification, evidence, as support for the response.</i></p>	<p>a. Interpret information from a complex graph (such as determining features of the graph or aggregating data in the graph)</p> <p>b. Use reasoning, planning, and evidence</p> <p>c. Explain thinking (beyond a simple explanation or using only a word or two to respond)</p> <p>d. Justify a response</p> <p>e. Identify research questions and design investigations for a scientific problem</p> <p>f. Use concepts to solve non-routine problems/more than one possible answer</p> <p>g. Develop a scientific model for a complex situation</p> <p>h. Form conclusions from experimental or observational data</p> <p>i. Complete a multi-step problem that involves planning and reasoning</p> <p>j. Provide an explanation of a principle</p> <p>k. Justify a response when more than one answer is possible</p> <p>l. Cite evidence and develop a logical argument for concepts</p> <p>m. Conduct a designed investigation</p> <p>n. Research and explain a scientific concept</p> <p>o. Explain phenomena in terms of concepts</p>	<p>a. Select or devise approach among many alternatives to solve problem</p> <p>b. Based on provided data from a complex experiment that is novel to the student, deduct the fundamental relationship between several controlled variables</p> <p>c. Conduct an investigation, from specifying a problem to designing and carrying out an experiment, to analyzing its data and forming conclusions</p> <p>d. Relate ideas <i>within</i> the content area or <i>among</i> content areas</p> <p>e. Develop generalizations of the results obtained and the strategies used and apply them to new problem situations</p> <p><i>NOTE: Level 4 activities often require an extended period of time for carrying out multiple steps; however, time alone is not a distinguishing factor if skills and concepts are simply repetitive over time.</i></p>

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Applying Webb's Depth-of-Knowledge (DOK) Levels in Social Studies

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According to Norman L. Webb ("Depth-of-Knowledge Levels for Four Content Areas," March 28, 2002), interpreting and assigning Depth-of-Knowledge levels to both objectives within standards and assessment items is an essential requirement of alignment analysis. Four levels of Depth of Knowledge are used for this analysis.

A general definition for each of the four (Webb) Depth-of-Knowledge levels is followed by Table 1, which provides further specification and examples for each of the DOK levels for social studies. Webb recommends that large-scale, on-demand assessments only assess Depth-of-Knowledge Levels 1, 2, and 3, due primarily to testing time constraints. Depth-of-Knowledge at Level 4 in social studies is best reserved for local assessment. Table 2 provides examples of DOK "ceilings" (the highest level of cognitive demand for large-scale assessment) using one state's social studies grade-level expectations.

Descriptors of DOK Levels for Social Studies

(based on Webb, *Technical Issues in Large-Scale Assessment*, report published by CCSSO, December 2002)

Level 1 Recall of Information

Level 1 asks students to recall facts, terms, concepts, trends, generalizations, and theories or to recognize or identify specific information contained in graphics. This level generally requires students to identify, list, or define. The items at this level usually ask the student to recall who, what, when, and where. Items that require students to "describe" and "explain" could be classified at Level 1 or 2 depending on what is to be described and explained. A Level 1 "describe or explain" would recall, recite, or reproduce information. Items that require students to recognize or identify specific information contained in maps, charts, tables, graphs, or drawings are generally Level 1.

Level 2 Basic Reasoning

Level 2 includes the engagement of some mental processing beyond recalling or reproducing a response. This level generally requires students to contrast or compare people, places, events, and concepts; convert information from one form to another; give an example; classify or sort items into meaningful categories; describe, interpret, or explain issues and problems, patterns, reasons, cause and effect, significance or impact, relationships, points of view, or processes. A Level 2 "describe or explain" would require students to go beyond a description or explanation of recalled information to describe or explain a result or "how" or "why."

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Level 3 Complex Reasoning

Level 3 requires reasoning, using evidence, and a higher level of thinking than the previous two levels. Students would go beyond explaining or describing “how and why” to justifying the “how and why” through application and evidence. The cognitive demands at Level 3 are more complex and more abstract than Levels 1 or 2. Items at Level 3 include drawing conclusions; citing evidence; applying concepts to new situations; using concepts to solve problems; analyzing similarities and differences in issues and problems; proposing and evaluating solutions to problems; recognizing and explaining misconceptions or making connections across time and place to explain a concept or big idea.

Level 4 Extended Reasoning

Level 4 requires the complex reasoning of Level 3 with the addition of planning, investigating, or developing that will most likely require an extended period of time. The extended time period is not a distinguishing factor if the required work is only repetitive and does not require applying significant conceptual understanding and higher-order thinking. At this level the cognitive demands should be high and the work should be very complex. Students should be required to connect and relate ideas and concepts within the content area or among content areas in order to be at this highest level. The distinguishing factor for Level 4 would be evidence through a task or product that the cognitive demands have been met. A Level 4 performance will require students to analyze and synthesize information from multiple sources, examine and explain alternative perspectives across a variety of sources, and/or describe and illustrate how common themes and concepts are found across time and place. In some Level 4 performance students will make predictions with evidence as support, develop a logical argument, or plan and develop solutions to problems.

Many on-demand assessment instruments will not include assessment activities that could be classified as Level 4. However, standards, goals, and objectives can be stated so as to expect students to perform thinking at this level. On-demand assessments that do include tasks, products, or extended responses would be classified as Level 4 when the task or response requires evidence that the cognitive requirements have been met.

Source of Challenge Criterion for Social Studies

The Source of Challenge criterion is only used to identify items where the major cognitive demand is inadvertently placed and is other than the targeted social studies content, concept, skill, and application. Excessive reading demands, cultural bias, or specialized knowledge could be reasons for an item to have a source of challenge problem. Such item characteristics may cause some students to not answer an assessment item or answer an assessment item incorrectly even though they have the social studies content knowledge, understanding, and skills being assessed. Items with an appropriate source of challenge level will differentiate between those students who have the social studies knowledge and understanding the assessment item intends to measure and from those students who do not have this knowledge.

Table 1: Sample Depth-of-Knowledge Level Descriptors for Social Studies

(Based on Webb, Karin Hess, 2005, National Center for Assessment www.nciea.org)

Level 1 Recall & Reproduction	Level 2 Skills & Concepts	Level 3 Strategic Thinking	Level 4 Extended Thinking
<ul style="list-style-type: none"> a. Recall or recognition of: fact, term, concept, trend, generalization, event, or document b. Identify or describe features of places or people c. Identify key figures in a particular context meaning of words d. Describe or explain: who, what, where, when e. Identify specific information contained in maps, charts, tables, graphs, or drawings 	<ul style="list-style-type: none"> a. Describe cause-effect of particular events b. Describe or explain: how (relationships or results), why, points of view, processes, significance, or impact c. Identify patterns in events or behavior d. Categorize events or figures in history into meaningful groups e. Identify and summarize the major events, problem, solution, conflicts f. Distinguish between fact and opinion g. Organize information to show relationships h. Compare and contrast people, events, places, concepts i. Give examples and non-examples to illustrate an idea/concept 	<ul style="list-style-type: none"> a. Explain, generalize, or connect ideas, using supporting evidence from a text/source b. Apply a concept in other contexts c. Make and support inferences about implied causes and effects d. Draw conclusion or form alternative conclusions e. Analyze how changes have affected people or places f. Use concepts to solve problems g. Analyze similarities and differences in issues or problems h. Propose and evaluate solutions i. Recognize and explain misconceptions related to concepts 	<ul style="list-style-type: none"> a. Analyze and explain multiple perspectives or issues within or across time periods, events, or cultures b. Gather, analyze, organize, and synthesize information from multiple (print and non-print) sources c. Make predictions with evidence as support d. Plan and develop solutions to problems e. Given a situation/problem, research, define, and describe the situation/problem and provide alternative solutions f. Describe, define, and illustrate common social, historical, economic, or geographical themes and how they interrelate

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