

A Guide for Using
Webb's Depth of Knowledge
with
Common Core State Standards

by Karin Hess, Ed.D.





This guide was developed by Karin K. Hess for the Common Core Institute. It consolidates numerous tools educators use to implement Webb's Depth of Knowledge for curriculum and assessment. The examples herein are drawn from several classroom-tested DOK tools: Hess' Cognitive Rigor Matrices for ELA-Social Studies, Writing, and Math-Science developed by Karin Hess, at the Center for Assessment; Norman Webb's Alignment Tool from Wisconsin Center of Educational Research; and the Florida Department of Education's guide for Depth of Knowledge Questions.

ISBN: 978-0-9857219-4-7

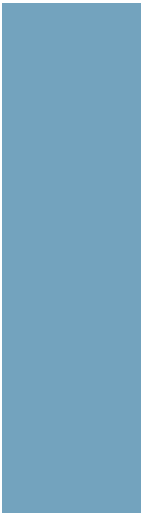


Table of Contents

Overview Page 4

Level 1..... Page 6

Level 2 Page 10

Level 3..... Page 14

Level 4..... Page 18

Content/Curriculum Analysis Form Page 22

An Educator's Guide for Applying Webb's Depth-of-Knowledge Levels to the Common Core State Standards

Overview

At the heart of College and Career Readiness is the need to increase the level of rigor in our classrooms for all students. The Common Core State Standards are a step in the right direction. However, the standards alone will not bring rigor to our classrooms. The implementation of these standards requires practical tools to develop local curricula and assessments and to promote classroom discourse aligned to higher levels of cognitive demand.

Norman Webb's Depth-of-Knowledge (DOK) schema has become one of the key tools educators can employ to analyze the cognitive demand (complexity) intended by the standards, curricular activities, and assessment tasks. Webb (1997) developed a process and criteria for systematically analyzing the alignment between standards and test items in standardized assessments. Since then the process and criteria have demonstrated application to reviewing curricular alignment as well. The model categorizes assessment tasks by different levels of cognitive expectation, or depth of knowledge, required to successfully complete the task. Hess (2004-2012) further articulated the model with content-specific descriptions for use by classroom teachers and organizations conducting alignment studies. The table below outlines the Webb DOK levels:

DOK Level	Description of Level
1	Recall & Reproduction
2	Skills & Concepts
3	Strategic Thinking & Reasoning
4	Extended Thinking



The intended DOK level can be assigned to anything from an instructional question, to broader course objectives and assessment items/tasks using the following general guidelines:

- The DOK level assigned should reflect the level of work students are most commonly required to perform in order for the response to be deemed proficient, such as in rubric descriptions describing proficient performance.
- The DOK level should reflect the complexity of cognitive processes demanded by the learning or assessment objective and task, rather than its difficulty. Ultimately, the DOK level describes the depth of understanding required by a task, not whether or not the task is considered “difficult.”
- If there is a question regarding which of two levels a standard addresses, such as Level 1 - Level 2, or Level 2 - Level 3, it is appropriate to assign the highest level as the “DOK ceiling” for the task, but also provide opportunities at the lower DOK levels as an instructional progression (e.g., summarizing a text/DOK 2 before analyzing a text/DOK 3; making observations/DOK 2 before conducting investigation/DOK 3) (Hess, 2004-2006).
- The DOK level should be assigned based upon the cognitive demand (mental processing) required by the central performance described in the objective or task.
- The task’s or objective’s central verb(s) alone is/are not sufficient to assign a DOK level. Developers must consider “what comes after verb” - the complexity of the task and content/concepts -- in addition to the mental processing required by the requirements set forth in the objective (Webb’s Depth of Knowledge Guide).

Level 1: Recall & Reproduction

Curricular elements that fall into this category involve basic tasks that require students to recall or reproduce knowledge and/or skills. The subject matter content at this level usually involves working with facts, terms, details, calculations, principles, and/or properties. It may also involve use of simple procedures or formulas. There is little or no transformation of the target knowledge or skill required by the tasks that fall into this category. A student answering a Level I item either knows the answer or does not; that is, the answer does not need to be figured out or "solved."

Verbs	Teacher Role	Student Role
Locate, calculate, define, identify, list, label, match, measure, copy, memorize, repeat, report, recall, recite, recognize, state, tell, tabulate, use rules, answer who, what, when, where, why, how	Questions to direct or focus attention, shows, tells, demonstrates, provides examples, examines, leads, breaks down, defines	Recognizes, responds, remembers, memorizes, restates, absorbs, describes, demonstrates, follows directions, applies routine processes, definitions, and procedures

Possible Products

- Fill-in-the-blank tasks
- Recite-math facts, poems, etc.
- Plot/locate points on a graph
- Edit sentences
- Identify/write sentence types
- Highlight key words
- Bookmark websites
- Use key word search
- Use dictionary, thesaurus
- Follow steps/directions (e.g., recipe, long division, make model)
- Explain, demonstrate
- Show & Tell
- Locate or recall quotes
- Document /cite sources
- Brainstorm related ideas
- Represent math relationships in words, pictures, or symbols
- Write complete sentences
- Identify parts of speech
- Label or locate parts in diagram
- List related parts or kinds (e.g., triangles)
- Vocabulary definitions-look up, recall, use in sentences
- Calculate, compute
- Measure, record data
- Reproduce map or diagram
- Use map key to locate information
- Oral reading fluency
- Decoding words
- Use formulas
- Evaluate expressions

Potential Activities

- Use step-by-step directions to make a model, plant seeds, bake a cake, etc.
- Describe an event, character, setting, etc. in a story
- Write a list of key words you know about...
- Recite/recall a fact or date related to ...
- Write/retell in your own words ...
- Cut out, draw, or match a picture that illustrates an event, process, or story
- Report or present findings to the class
- Memorize lines for a play
- Skim for facts/details/dates about an event
- Retell in your own words/paraphrase
- Locate information found in a map, chart, tables, graph, diagram, caption
- Use a dictionary, glossary, or thesaurus to find word meanings
- Make conversions between metric and customary units
- Recall, restate, remember, or recognize facts, terms, properties heard, viewed, or read
- Complete basic /routine calculation tasks (e.g., addition, subtraction, division, etc.)
- Locate or retrieve information in verbatim form to answer a question
- Recognize or identify features, objects, or steps that don't vary greatly in form (e.g., recognizing features of basic tools or shapes, properties of materials or objects)
- Edit applying a standard set of conventions and/or criteria that should eventually be automated (e.g., applying rules for punctuation, grammar, spelling)
- Complete measurement tasks (e.g., use a ruler to measure length; thermometer or temperature probe to measure temperature)
- Memorize and recognize formulas and algorithms
- Use a formula where at least one of the unknowns are provided (e. g., area formula, $y=mx + b$)

ELA, History & Social Studies Alignment to Bloom's Taxonomy (source: Hess ELA-SS CRM)

Revised Bloom's Taxonomy	Webb's DOK Level 1 Recall & Reproduction
<p>REMEMBER Retrieve knowledge from long-term memory, recognize, recall, locate, identify</p>	<ul style="list-style-type: none"> ▪ Recall, recognize, or locate basic facts, details, events, or ideas explicit in texts ▪ Read words orally in connected text with fluency & accuracy
<p>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</p>	<ul style="list-style-type: none"> ▪ Identify or describe literary elements (e.g., characters, setting, problem-solution, conflict, etc.) ▪ Select appropriate words when intended meaning/definition is clearly evident ▪ Describe/explain who, what where, when, or how ▪ Define/describe facts, details, terms, principles ▪ Write simple sentences
<p>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</p>	<ul style="list-style-type: none"> ▪ Use language structure (pre/suffix) or word relationships (synonym/antonym) to determine meaning of words ▪ Apply rules or resources to edit spelling, grammar, punctuation, conventions, word use ▪ Apply basic formats for documenting sources
<p>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)</p>	<ul style="list-style-type: none"> ▪ Identify whether specific information is contained in graphic representations (e.g. map, chart, table, graph, T-chart, diagram) or text features (e.g., headings, subheadings, captions) ▪ Decide which text structure is appropriate to audience and purpose
<p>EVALUATE Make judgments based on criteria, check, detect, inconsistencies, or fallacies, judge, critique</p>	<p>Not Applicable</p>
<p>CREATE Reorganize elements into new patterns/structures, generate, hypothesize, design, plan, produce</p>	<ul style="list-style-type: none"> ▪ Brainstorm ideas, concepts, problems, or perspectives related to a topic or concept

Math & Science Alignment to Bloom's Taxonomy (source: Hess Math-Science CRM)

Revised Bloom's Taxonomy	Webb's DOK Level 1 Recall & Reproduction
<p>REMEMBER Retrieve knowledge from long-term memory, recognize, recall, locate, identify</p>	<ul style="list-style-type: none"> ▪ Recall, observe & recognize facts, principles, properties ▪ Recall/identify conversions among representations or numbers (e.g., customary and metric measures)
<p>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</p>	<ul style="list-style-type: none"> ▪ Evaluate an expression ▪ Locate points on a grid or number on a number line ▪ Solve a one-step problem ▪ Represent math relationships in words, pictures, or symbols ▪ Read, write, compare decimals in scientific notation
<p>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</p>	<ul style="list-style-type: none"> ▪ Follow simple procedures (e.g., recipe-type directions) ▪ Calculate, measure, apply a rule (e.g., rounding) ▪ Apply algorithm or formula (e.g., area, perimeter) ▪ Solve linear equations ▪ Make conversions among representations or numbers, or within and between customary and metric measures
<p>ANALYZE Break into constituent parts, determine how parts relate, differentiate between relevant-irrelevant, distinguish, focus, select, organize, outline, find coherence, deconstruct</p>	<ul style="list-style-type: none"> ▪ Retrieve information from a table or graph to answer a question ▪ Identify whether specific information is contained in graphic representations (e.g. table graph, T-chart, diagram) ▪ Identify a pattern/trend
<p>EVALUATE Make judgments based on criteria, check, detect inconsistencies or fallacies, judge, critique</p>	<p>Not Applicable</p>
<p>CREATE Reorganize elements into new patterns/structures, generate, hypothesize, design, plan, construct, produce</p>	<ul style="list-style-type: none"> ▪ Brainstorm ideas, concepts, or terms related to a topic

Level 2: Skill/Concept

Level 2 includes the engagement of mental processing beyond recalling, reproducing, or locating an answer. This level generally requires students to compare or differentiate among people, places, events, objects, text types, etc.; apply multiple concepts when responding; classify or sort items into meaningful categories; describe or explain relationships, such as cause and effect, character relationships; and provide and explain examples and non-examples. A Level 2 “describe or explain” task requires students to go beyond a basic description or definition to predict a possible result or explain “why” something might happen. The learner makes use of information provided in context to determine intended word meanings, which tools or approach is appropriate to find a solution (e.g., in a math word problem), or what characteristics to pay attention to when making observations.

At this level, students are asked to transform/process target knowledge before responding. Example mental processes that often denote this particular level include: summarize, estimate, organize, classify, extend, and make basic inferences.

Key Words	Teacher Role	Student Role
Infer, categorize, organize and display, compare-contrast, modify, predict, interpret, distinguish, estimate, extend patterns, interpret, use context clues, make observations, summarize, translate from table to graph, classify, show cause/effect, relate, edit for clarity	Questions to differentiate, infer, or check conceptual understanding, models, organizes/reorganizes, explores possible options or connections, provides examples and non-examples	Solves routine problems/tasks involving multiple decision points and concepts, constructs models to show relationships, demonstrates use of conceptual knowledge, compiles and organizes, illustrates/explains with examples or models, examines

Possible Products

- Captioned Photos Summary
- Timeline
- Demonstration
- Presentation Interview
- Diary entry
- Graphic organizer
- Reverse-Engineering
- Cracking Codes Outline
- Relationship Mind Maps
- Blog Commenting
- Survey development
- Spreadsheet
- Science logs

Potential Activities

- Sequence a key chain of events and supporting details using a timeline, cartoon strip, outline or flow chart
- Write a summary /informational report or develop an outline of central ideas and supporting details
- Develop a concept map or diagram showing a process or describing relationships about a topic of study
- Explain a series of steps used to find a solution
- Construct a model to demonstrate how it looks or works
- Make a diorama to illustrate/explain an event
- Write a diary/blog entry for a character or historical figure
- Make a captioned scrapbook or photo essay about the area of study
- Make a topographic map using data provided/data collected
- Make a puzzle or game about the topic
- Explain the meaning of a concept using words, objects, and/or visuals
- Demonstrate how to perform a particular task
- Complete complex recognition tasks that involve recognizing concepts and processes that may vary in how they “appear”
- Complex calculation tasks involving decision points (e.g., standard deviation)
- Identify appropriate strategies or sources for conducting research projects that involve locating, collecting, organizing and displaying, and summarizing information
- Create a questionnaire or survey to answer a question
- Conduct measurement or observational tasks that involve organizing the data collected into basic presentation forms such as a table, graph, Venn diagram, etc.
- Participate in a simulation in order to understand and describe differing perspectives

Potential Questions

How or why would you use ...?

What examples/non-examples can you find to ...?

How would you organize_ to show ...?

How could you show your understanding of ... ?

What approach/tools would you use to ...?

How would you apply what you learned to develop ... ?

What other way could you solve/find out...?

What is your prediction ... and why?

How would you organize these facts/observations?

If you changed these elements ... what would/might happen ?

What facts are relevant to show ...?

What questions would you ask in an interview /survey about ...?

What question is being asked in this problem?

ELA, History & Social Studies Alignment to Bloom's Taxonomy (source: Hess ELA-SS CRM)

Revised Bloom's Taxonomy	Webb's DOK Level 2 Skills & Concepts
<p>REMEMBER Retrieve knowledge from long-term memory, recognize, recall, locate, identify</p>	<p>Not Applicable</p>
<p>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</p>	<ul style="list-style-type: none"> ▪ Specify, explain, show relationships, explain why, cause-effect ▪ Give non-examples/examples ▪ Summarize results, concepts, ideas in one text or one data set ▪ Make basic inferences or logical predictions from data or texts ▪ Identify main ideas or accurate generalizations of texts or issues ▪ Locate information to support explicit-implicit central ideas
<p>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</p>	<ul style="list-style-type: none"> ▪ Use context to identify the meaning of words/phrases ▪ Obtain and interpret information using text features ▪ Develop a text that may be limited to one paragraph ▪ Apply simple organizational structures (paragraph, sentence types) in writing
<p>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)</p>	<ul style="list-style-type: none"> ▪ Categorize/compare library elements, terms, facts/details, events ▪ Identify use of literary devices ▪ Analyze format, organization & internal text structure (e.g., signal words, transitions, semantic cues) of different texts ▪ Distinguish relevant-irrelevant information, fact/opinion ▪ Identify characteristic text features; distinguish between texts, genres
<p>EVALUATE Make judgments based on criteria, check, detect inconsistencies, or fallacies, judge, critique</p>	<p>Not Applicable</p>
<p>CREATE Reorganize elements into new patterns/structures, generate, hypothesize, design, plan, produce</p>	<ul style="list-style-type: none"> ▪ Generate conjectures or hypotheses based on observations or prior knowledge and experience

Math & Science Alignment to Bloom's Taxonomy (source: Hess Math-Science CRM)

Revised Bloom's Taxonomy	Webb's DOK Level 2 Skills & Concepts
<p>REMEMBER Retrieve knowledge from long-term memory, recognize, recall, locate, identify</p>	<p>Not Applicable</p>
<p>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</p>	<ul style="list-style-type: none"> ▪ Specify and explain relationships (e.g., non-examples/examples, cause-effect) ▪ Make and record observations ▪ Explain steps followed ▪ Summarize results or concepts ▪ Make basic inferences or logical predictions from data/observations ▪ Use models (e.g., diagrams to represent or explain mathematical concepts) ▪ Make and explain estimates
<p>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</p>	<ul style="list-style-type: none"> ▪ Select a procedure according to criteria and perform it ▪ Solve routine problem applying multiple concepts or decision points ▪ Retrieve information from a table, graph, or figure and use it to solve a problem requiring multiple steps ▪ Translate between tables, graphs, words, and symbolic notations (e.g., graph data from a table) ▪ Construct models given criteria
<p>ANALYZE Break into constituent parts, determine how parts relate, differentiate between relevant-irrelevant, distinguish, focus, select, organize, outline, find coherence, deconstruct</p>	<ul style="list-style-type: none"> ▪ Categorize, classify materials, data, figures based on characteristics ▪ Organize or order data ▪ Compare/contrast figures or data ▪ Select appropriate graph and organize & display data ▪ Interpret data from a simple graph ▪ Extend a pattern
<p>EVALUATE Make judgments based on criteria, check, detect inconsistencies or fallacies, judge, critique</p>	<p>Not Applicable</p>
<p>CREATE Reorganize elements into new patterns/structures, generate, hypothesize, design, plan, construct, produce</p>	<ul style="list-style-type: none"> ▪ Generate conjectures or hypotheses based on observations or prior knowledge and experience

Level 3: Strategic Thinking & Reasoning

Tasks and classroom discourse falling into this category demand the use of planning, reasoning, and higher order thinking processes, such as analysis and evaluation, to solve real-world problems or explore questions with multiple possible outcomes. Stating one's reasoning and providing relevant supporting evidence are key markers of DOK 3 tasks. The expectation established for tasks at this level require an in-depth integration of conceptual knowledge and multiple skills to reach a solution or produce a final product. DOK 3 tasks and classroom discourse focus on in-depth understanding of one text, one data set, one investigation, or one key source, whereas DOK 4 tasks expand the breadth of the task using multiple texts or sources, or multiple concepts/disciplines to reach a solution or create a final product.

Verbs	Teacher Role	Student Role
Critique, appraise, revise for meaning, assess, investigate, cite evidence, test hypothesis, develop a logical argument, use concepts to solve non-routine problems, explain phenomena in terms of concepts, draw conclusions based on data	Questions to probe reasoning and underlying thinking, asks open-ended questions, acts as a resource and coach, provides criteria and examples for making judgments and supporting claims, encourages multiple approaches and solutions; determines when/where (text, concept) depth and exploration is most appropriate	Uncovers and selects relevant and credible supporting evidence for analyses, critiques, debates, claims and judgments; plans, initiates questions, disputes, argues, tests ideas/solutions, sustains inquiry into topics or deeper problems, applies to the real world

Possible Products

- Complex Graph
- Set up a database
- Conduct or critique a designed investigation
- Video cast or podcast
- Analyze survey results
- Debate from a given perspective
- Develop storyboard for film or cartoon animation
- Multi-paragraph essay or short story
- Literary critique
- Play, book, music, or movie review
- Informational report with several subtopics
- Fact-based argument (Is this criticism supported by the historical facts?)
- Create a Wiki or website

Potential Activities

- Analyze results of a questionnaire or survey (e.g., survey classmates/ industry members to find out what they think about a current issue)
- Prepare an informational report about an area of study
- Write a letter to the editor after evaluating a product
- Prepare for and participate in a debate
- Use evidence to generate criteria for making judgments
- Make a booklet or brochure about a topic, organization, or issue
- Participate on a panel to discuss differing viewpoints on...
- Prepare a speech to support your perspective about ...
- Explain and apply abstract terms and concepts to real-world situations
- Solve complex, non-routine problems that draw upon multiple skills, concepts, and processes
- Write an essay, short story, poem, or play
- Create complex graphs or databases where reasoning and approach to data organization is not obvious
- Design, conduct, or critique an investigation to answer a research question
- Propose an alternate solution to a problem studied

Potential Questions

What are the possible design flaws in ...?
What is the theme/the lesson learned ... ?
How would the theme change if ...?
What underlying bias is there ... ?
What inferences will these facts support ... ?
How does the author create tension/suspense...?
What is the author's chain of reasoning or point of view for ...?

What is the impact on the reader /viewer for use of this (rhetorical device, analogy, figurative language use, visual image, etc.)?
What conclusions can you draw ... ?
How can you prove that your solution or estimate is reasonable?
What evidence can you find to support ... ?
What ideas justify this position ... ?

ELA, History & Social Studies Alignment to Bloom's Taxonomy (sources: Hess ELA-SS and Writing CRMs)

Revised Bloom's Taxonomy	Webb's DOK Level 1 Strategic Thinking & Reasoning
<p>REMEMBER Retrieve knowledge from long-term memory, recognize, recall, locate, identify</p>	<p>Not Applicable</p>
<p>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</p>	<ul style="list-style-type: none"> ▪ Explain, generalize, or connect ideas using supporting evidence (e.g., quote, example, text reference) ▪ Identify/make inferences about explicit or implicit themes ▪ Describe how word choice, point of view, or bias may affect the readers' interpretation of a text ▪ Write multi-paragraph composition for specific purpose, focus, voice, tone & audience
<p>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</p>	<ul style="list-style-type: none"> ▪ Apply a concept in a new context ▪ Revise final draft for meaning or progression of ideas ▪ Apply internal consistency of text organization and structure to composing a full composition ▪ Apply word choice, point of view, style to impact readers'/viewers' interpretation of a text
<p>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)</p>	<ul style="list-style-type: none"> ▪ Analyze information within a text or source ▪ Analyze interrelationships among concepts, issues, problems ▪ Analyze or interpret author's craft (literary devices, viewpoint, or potential bias) to create or critique a text or to support text interpretations ▪ Use reasoning and evidence to generate criteria for making and supporting an argument of judgment (e.g., Was FDR a great president? Who was the greatest ball player?)
<p>EVALUATE Make judgments based on criteria, check, detect inconsistencies, or fallacies, judge, critique</p>	<ul style="list-style-type: none"> ▪ Cite evidence and develop a logical argument for conjectures ▪ Describe, compare, and contrast solution methods ▪ Verify reasonableness of results ▪ Justify or critique conclusions drawn
<p>CREATE Reorganize elements into new patterns/structures, generate, hypothesize, design, plan, produce</p>	<ul style="list-style-type: none"> ▪ Synthesize information within one source or text ▪ Develop a complex model for a given situation ▪ Develop an alternative solution

Math & Science Alignment to Bloom's Taxonomy (source: Hess Math-Science CRM)

Revised Bloom's Taxonomy	Webb's DOK Level 3 Strategic Thinking & Reasoning
<p>REMEMBER Retrieve knowledge from long-term memory, recognize, recall, locate, identify</p>	<p>Not Applicable</p>
<p>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</p>	<ul style="list-style-type: none"> ▪ Use concepts to solve non-routine problems ▪ Explain, generalize, or connect ideas using supporting evidence ▪ Make and justify conjectures ▪ Explain thinking when more than one response/solution is possible ▪ Explain phenomena in terms of concepts
<p>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</p>	<ul style="list-style-type: none"> ▪ Design investigation for a specific purpose or research question ▪ Conduct a designed investigation ▪ Use concepts to solve non-routine problems ▪ Use and show reasoning, planning, and evidence ▪ Translate between problem & symbol notation when not a direct translation
<p>ANALYZE Break into constituent parts, determine how parts relate, differentiate between relevant-irrelevant, distinguish, focus, select, organize, outline, find coherence, deconstruct</p>	<ul style="list-style-type: none"> ▪ Compare information within data sets or texts or across related data sets ▪ Analyze and draw conclusions from data, citing evidence ▪ Generalize a pattern ▪ Interpret data from complex graph ▪ Analyze similarities/differences between research procedures or solutions
<p>EVALUATE Make judgments based on criteria, check, detect inconsistencies or fallacies, judge, critique</p>	<ul style="list-style-type: none"> ▪ Cite evidence and develop a logical argument for concepts or solutions ▪ Describe, compare, and contrast solution methods ▪ Verify reasonableness of results
<p>CREATE Reorganize elements into new patterns/structures, generate, hypothesize, design, plan, construct, produce</p>	<ul style="list-style-type: none"> ▪ Synthesize information within one data set, source or text ▪ Formulate an original problem given a situation ▪ Develop a scientific/mathematical model for a complex situation

Level 4: Extended Thinking

Curricular elements assigned to this level demand extended and integrated use of higher order thinking processes such as critical and creative-productive thinking, reflection, and adjustment of plans over time. Students are engaged in conducting multi-faceted investigations to solve real-world problems with unpredictable solutions. Employing and sustaining strategic thinking processes over a longer period of time to solve the problem or produce an authentic product is a key feature of curricular objectives assigned to DOK 4. Key aspects that denote this particular level typically include authentic problems and audiences, and collaboration within a project-based setting.

Verbs	Teacher Role	Student Role
Initiate, design and conduct, collaborate, research, synthesize, self-monitor, critique, produce/present	Questions to extend thinking and broaden perspectives; facilitates teaming, collaboration, self-evaluation	Designs, takes risks, researches synthesizing multiple resources, collaborates, plans, organizes, and modifies, creates concrete tangible products

Possible Products

- Short film
- Agency presentation
- Research report
- Play
- Video Game
- Documentary
- Newspaper or series of articles
- Multi-Media product
- Anthology of original writing, art, music, etc.

- Applying information from more than one discipline to solve ill-defined problems in novel or real-world situations
- Research tasks that involve generating questions, and formulating and testing hypotheses
- Tasks that require making multiple strategic and procedural decisions as new information is processed
- Tasks that require multiple roles and collaboration and coordination with others (e.g., script writing, camera work, editing, and acting/ talent)
- Tasks that involve drawing evidence from multiple sources to support solutions/conclusions
- Conducting an internship in industry where students are faced with real-world, unpredictable problems
- Organizing/conducting a community service project or school-based event

Potential Questions

What changes would you make to solve or address this major problem/ or issue...?
How would you improve upon this invention or innovation?
Can you propose an alternative solution to...?
What could be done to minimize (maximize) ...?
In what way would you design or redesign ... and why ?
What evidence would you cite to defend the actions of ...?
How would you evaluate ... ?
How would you prioritize criteria for making this (local zoning) decision ... and why?
How would you evaluate the works by this author over time?
Can you formulate and test a conjecture for...?
Can you predict the potential benefits and drawbacks if this law does/does not pass ?
Can you construct a model that would change ...?
Can you think of an original way to apply ... ?

Do you agree with the actions ...? with the outcomes ... ? with the decision to ...?
How would you prove ...? disprove ...?
Can you assess the value or importance of ...?
What information would you use to support a differing perspective ... ?
What can be learned about this time in history from reading and analyzing various cultural, political, and social perspectives?

ELA, History & Social Studies Alignment to Bloom's Taxonomy (sources: Hess ELA-SS and Writing CRMs)

Revised Bloom's Taxonomy	Webb's DOK Level 4 Extended Thinking
<p>REMEMBER Retrieve knowledge from long-term memory, recognize, recall, locate, identify</p>	<p>Not Applicable</p>
<p>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</p>	<ul style="list-style-type: none"> ▪ Use multiple sources to elaborate on how concepts or ideas specifically draw from other content domains or differing concepts (e.g., research paper, arguments of policy: – should this law be passed? What will be the impact of this change?) ▪ Develop generalizations about the results obtained or strategies used and apply them to a new problem or contextual scenario
<p>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</p>	<ul style="list-style-type: none"> ▪ Select or devise an approach among many alternatives to research and present a novel problem or issue ▪ Illustrate how multiple themes (e.g., historical, geographic, social) may be interrelated within a text or topic
<p>ANALYZE Break into constituent parts, determine how parts relate, differentiate between relevant-irrelevant, distinguish, focus, select, organize, outline, find coherence, deconstruct</p>	<ul style="list-style-type: none"> ▪ Analyze multiple sources of evidence, or multiple works by the same author, or across genres, or time periods ▪ Analyze complex/abstract themes, perspectives, concepts ▪ Gather, analyze, and organize multiple information sources ▪ Compare and contrast conflicting judgments or policies (e.g., Supreme Court decisions)
<p>EVALUATE Make judgments based on criteria, check, detect inconsistencies or fallacies, judge, critique</p>	<ul style="list-style-type: none"> ▪ Evaluate relevancy, accuracy, and completeness of information across multiple sources ▪ Apply understanding in a novel way, provide argument or justification for the application ▪ Critique the historical impact (e.g., policy, writings, discoveries, etc.)
<p>CREATE Reorganize elements into new patterns/structures, generate, hypothesize, design, plan, construct, produce</p>	<ul style="list-style-type: none"> ▪ Synthesize information across multiple sources or texts in order to articulate a new voice, alternate theme, new knowledge or nuanced perspective

Math & Science Alignment to Bloom's Taxonomy (source: Hess Math-Science CRM)

Revised Bloom's Taxonomy	Webb's DOK Level 4 Extended Thinking
<p>REMEMBER Retrieve knowledge from long-term memory, recognize, recall, locate, identify</p>	<p>Not Applicable</p>
<p>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</p>	<ul style="list-style-type: none"> ▪ Relate mathematical or scientific concepts to other content areas, other domains, or other concepts ▪ Develop generalizations of the results obtained and the strategies used (from investigation or readings) and apply them to new problem situations
<p>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</p>	<ul style="list-style-type: none"> ▪ Select or devise an approach among many alternatives to solve a problem ▪ Conduct a project that specifies a problem, identifies solution paths, solves the problem, and reports results
<p>ANALYZE Break into constituent parts, determine how parts relate, differentiate between relevant-irrelevant, distinguish, focus, select, organize, outline, find coherence, deconstruct</p>	<ul style="list-style-type: none"> ▪ Analyze multiple sources of evidence ▪ Analyze complex/abstract themes ▪ Gather, analyze, and evaluate information
<p>EVALUATE Make judgments based on criteria, check, detect inconsistencies or fallacies, judge, critique</p>	<ul style="list-style-type: none"> ▪ Gather, analyze, & evaluate information in order to draw conclusions ▪ Apply understanding in a novel way, provide argument or justification for the application
<p>CREATE Reorganize elements into new patterns/structures, generate, hypothesize, design, plan, construct, produce</p>	<ul style="list-style-type: none"> ▪ Synthesize information across multiple sources or texts ▪ Design a mathematical model to inform and solve a practical or abstract situation

Content/Curriculum Analysis

Course or Unit Name:

List course or unit learning objectives under the correct DOK Level.

DOK Level(s)	Objective	CCSS DOK Level (s)	Common Core Standards(s)	Location/ Performance or Assessment
LEVEL 1 Recall/ Reproduction of Information & Procedures				
LEVEL 2 Working with Skills and Concepts				
LEVEL 3 Strategic Thinking & Reasoning				
LEVEL 4 Extended Strategic Thinking				

Resources:

Anderson, L., Krathwohl, D., Airasian, P., Cruikshank, K., Mayer, R., Pintrich, P., Raths, J., & Wittrock, M. (Eds) (2001). *A taxonomy for learning, teaching, and assessing: A revision of Bloom's taxonomy of educational objectives*. New York: Addison Wesley Longman, Inc.

Florida Department of Education, *Depth of Knowledge Questions*

Hess, K. K. (2004-2012). Center for Assessment, National Center for the Improvement of Educational Assessment, Inc. [papers posted and available] www.nciea.org

Webb, N. (March 28, 2002) "Depth-of-Knowledge Levels for four content areas," unpublished paper.

Webb, N. (August 1999). Research Monograph No. 18: "Alignment of science and mathematics standards and assessments in four states." Washington, D.C.: CCSSO.

Webb, N. (1997). Research Monograph Number 6: "Criteria for alignment of expectations and assessments on mathematics and science education. Washington, D.C.: CCSSO.

ISBN: 978-0-9857219-4-7