Blueprints

A test blueprint is the plan that you create and use when "building" a test. Blueprinting is very helpful for the development of a sound assessment that aligns to the identified standards and instruction. **Blueprints also help improve alignment between alternate forms of pre- and post-assessments, yielding comparable data.**

A test blueprint guides assessment item selection and development. A blueprint requires the teacher to identify the intended learning to be measured in a given assessment and the level of cognitive complexity.

The first step is to identify the purpose of the assessment.

> **Example:**
> **Grade 3 Math:** *Use place value understanding and properties of operations to perform multi-digit arithmetic.*
> > *1. Use place value understanding to round whole numbers to the nearest 10 or 100.*
> >
> > *2. Fluently add and subtract within 1000 using strategies and algorithms based on place value, properties of operations, and/or the relationship between addition and subtraction.*
> >
> > *3. Multiply one-digit whole numbers by multiples of 10 in the range 10–90 (e.g., 9 × 80, 5 × 60) using strategies based on place value and properties of operations.*
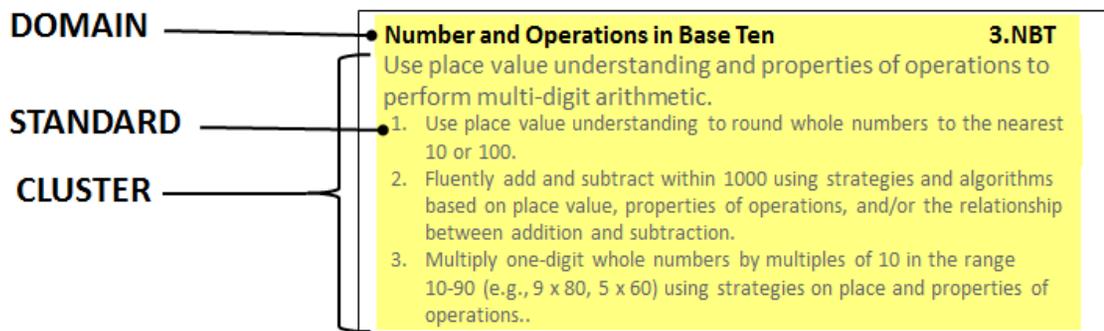
Next, you clarify the learning targets. *Clarifying the learning targets enables teachers to begin the work of creating test items directly aligned to each of the relevant learning targets.*
Example:
Use place value understanding to round whole numbers to the nearest 10 or 100.
- o   If the place value is followed 5, 6, 7, 8,or 9, increase it every time
- o   If the place value is followed by 0, 1, 2, 3, or 4,add no more.

DOK 1 Recall or Reproduce

DOMAIN	**Number and Operations in Base Ten 3.NBT**
	Use place value understanding and properties of operations to perform multi-digit arithmetic.
STANDARD	1. Use place value understanding to round whole numbers to the nearest 10 or 100.
CLUSTER	2. Fluently add and subtract within 1000 using strategies and algorithms based on place value, properties of operations, and/or the relationship between addition and subtraction.
	3. Multiply one-digit whole numbers by multiples of 10 in the range 10-90 (e.g., 9 x 80, 5 x 60) using strategies on place and properties of operations..

The level of complexity of the cognitive demand.

<u>Level 1</u>: Recall and Reproduction
Requires eliciting information such as a fact, definition, term, or a simple procedure, as well as performing a simple algorithm or applying a formula.

<u>Level 2</u>: Basic Skills and Concepts
Requires the engagement of some mental processing beyond a recall of information.

<u>Level 3</u>: Strategic Thinking and Reasoning
Requires reasoning, planning, using evidence, and explanations of thinking.

<u>Level 4</u>: Extended Thinking Requires complex reasoning, planning, developing, and thinking most likely over an extended period of time.

MASTERY Patterns of Reasoning:

Conceptual:
Students will understand the basic principles of rounding whole numbers (if the digit is five or greater the digit to the left moves up one number, if the digit is four or less the digit to the left stays the same).

Procedural:
Students can identify the place to which they are rounding.
Students can identify the digit that affects how the number is rounded.
Students can identify the rounding choices (digit stays the same or rounds higher).
Students can round whole numbers to the nearest 10 or 100.

Representational:
Students can represent rounding using number line, place value drawings, base ten blocks, or hundreds charts.

It is important to consider which item types will provide test takers with the best, most relevant opportunities for demonstrating whether and to what extent they have achieved the relevant learning targets. Once it is clear what types of items are best for the particular assessment, the test's item pool is then developed by selecting and/or creating high quality, aligned items and identifying the assessment methods matched to the learning targets.

Skill-Based Task: DOK 1
Round 17 to the nearest ten.
Round 22 to the nearest ten.
Round 234 to the nearest hundred.
Round 650 to the nearest hundred.
Round 459 to the nearest hundred.
Round 987 to the nearest hundred.

Problem Task: DOK 2
If you round 250 to the nearest ten, would you still say that Kent has about 300 books on his shelf? Explain why or why not?

Use a number line to explain why 450 is the least number that rounds to 500.

Your parents are looking for a new apartment. You want to be sure your furniture will fit beneath the windows, so you have measured the width of your table, bed, and sofa. The table is 64 inches, the bed is 79 inches, and the sofa is 93 inches. The landlord told you the space between the windows in the kitchen (for the table) is 70 inches, the space for the bed is 80 inches, and the space for the sofa is 90 inches. She told you she rounded the numbers to the nearest ten.

1. If you round your furniture's measurements, what do you get?

Table _____ Bed _____ Sofa _____

2. Between which benchmark numbers do the measurements in the apartment lie since they have been rounded?

Kitchen window space _____

Bedroom window space _____

Living room window space _____

3. In which spaces will your furniture fit for sure? Where are you not sure your furniture will fit?

4. What area or areas should you ask the landlord to remeasure? (Hint: The rounded amount may seem too small, but it may not be.)

Finally, there is purposeful planning of rigor and weighting in a well-constructed test blueprint.

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Assessment Blueprint Sample

Learning Expectations			Assessment					
Learning Expectations	Target DOK Level	Method	DOK 1 Recall or Reproduce	DOK 2 Basic Application of Skills/ Concepts	DOK 3 Strategic Thinking	DOK 4 Extended Thinking	Total Points	%
Describe how characters in a story respond to major events or challenges.	2	SR & CR	2 points	3 points			5 points	20%
Ask and answer questions to demonstrate understanding of key details in a text.	1	SR	3 points				3 points	12%
Determine the lesson or moral of a story.	2	CR	1 point	2 points			3 points	12%
Identify difference in point of view of different characters.	3	P		2 points	4 points		6 points	24%
Compare and contrast two or more versions of the same story.	3	P			8 points		8 points	32%
Total Points			6 points	7 points	12 points	0 points		
%			24%	28%	48%	0%		

Assessment Blueprints

- Record the prioritized learning expectations that will be on the assessment.
- Identify the assessment methods to be used.
- Identify the level of complexity of the learning expectations and the assessment items.
- Determine how much "weight" each learning priority will receive.
- Balance the rigor of the assessment.

Multiple Assessment Methods

Students Demonstrate Learning through the Written Word		Students Demonstrate Learning through Performance	
Selected Response	Constructed Response	Product Performance	Physical/Verbal/Visual Performance

Learning is measured through correct or incorrect responses.

Learning is measured through rubrics or scoring guides. These methods may involve a variety of responses and/or processes.

Webb's DOK and Assessment Method
Level I and Level II
- Usually one right answer
- Usually assessed by selected response or constructed response

Level III and Level IV
- More than one correct answer or approach is possible and may involve real-world applications in new situations
- Usually assessed by constructed response or performance

JALSDD Blueprint Template

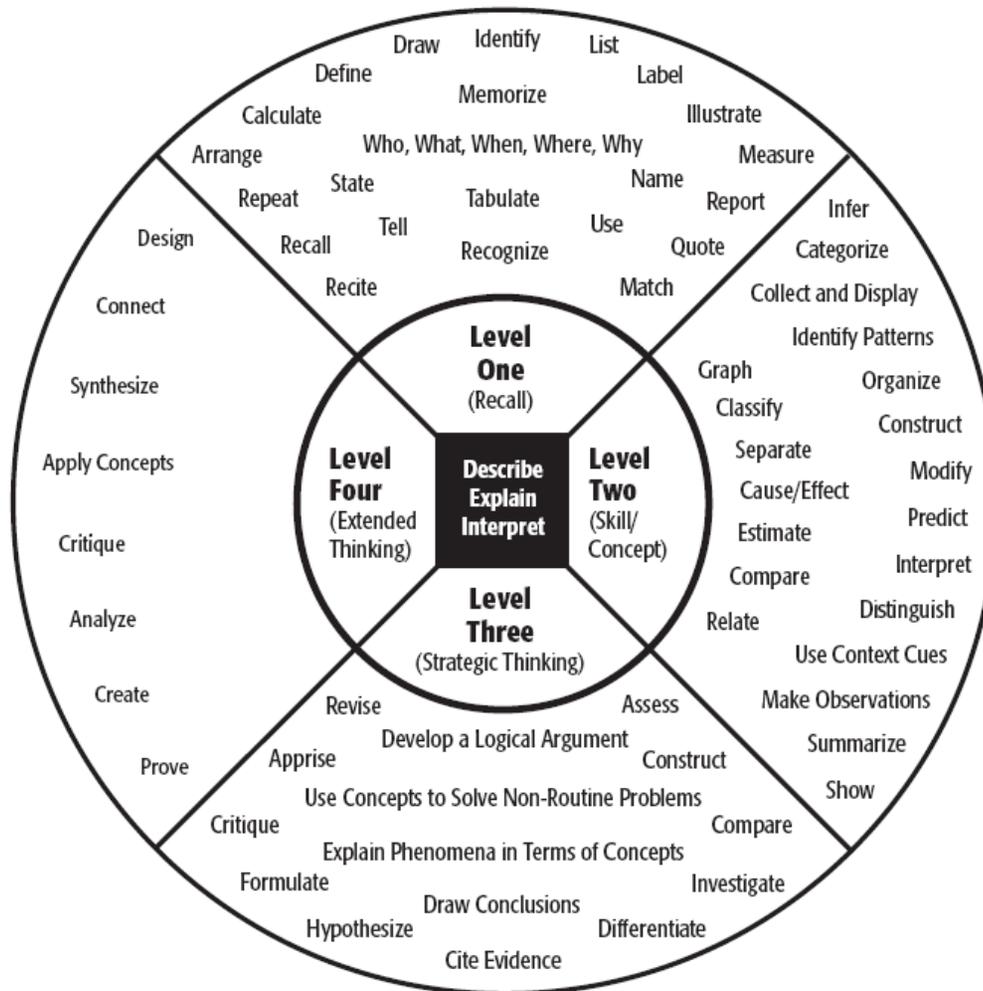| Learning Expectations		Assessment						
Learning Expectations	Target DOK Level	Method	DOK 1 Recall or Reproduce	DOK 2 Basic Application of Skills / Concepts	DOK 3 Strategic Thinking	DOK 4 Extended Thinking	Total points	% of Total points
Standard # 1	2		**Levels of Cognitive Complexity**				**# points**	**%**
Standard # 2	1						**WEIGHT**	
Standard # 3	2	SR	(5 questions) 10 Points					
Standard # 4	2	SR/ CR	(5 questions) 10 Points	(2 questions) 10 Points	(2 questions) 10 Points			
Standard # 5	3	SR / CR / P		(3 questions) 15 Points	(1 Question) 6 Points	(1 Question) 6 Points		
Total points			20	25	16	6		
% of Total points			30%	37%	24%	9%		
			RIGOR					

JALSD Blueprint Template

Learning Expectations								
			STRETCH					
Learning Expectations	Target DOK Level	Method	DOK 1 Recall or Reproduce	DOK 2 Basic Application of Skills / Concepts	DOK 3 Strategic Thinking	DOK 4 Extended Thinking	Total points	% of Total points
Total points								
% of Total points								

JALSD Blueprint Template

Learning Expectations		Assessment						
Learning Expectations	Target DOK Level	Method	DOK 1 Recall or Reproduce	DOK 2 Basic Application of Skills / Concepts	DOK 3 Strategic Thinking	DOK 4 Extended Thinking	Total points	% of Total points
List the standards you are testing here.	Analyze each standard to determine it level on the DOK Chart	How will you test: Selected Response, Constructed Response, Performance / Product or performance visual /physical	Place here how many questions and points for each standard being tested @ DOK 1	Place here how many questions and points for each standard being tested @ DOK 2	Place here how many questions and points for each standard being tested @ DOK 3	Place here how many questions and points for each standard being tested @ DOK 4	Here list how many points for each standard	Here place percent of total for each standard
Total points		Here total # of points for each DOK Level						
% of Total points		Here total % of points for each DOK level						

Depth of Knowledge (DOK) Levels

Level One (Recall)

Draw, Identify, List, Define, Label, Memorize, Calculate, Illustrate, Arrange, Who, What, When, Where, Why, Measure, State, Name, Repeat, Tabulate, Report, Tell, Use, Recall, Quote, Recognize, Recite, Match

Level Two (Skill/Concept)

Infer, Categorize, Collect and Display, Identify Patterns, Graph, Organize, Classify, Construct, Separate, Modify, Cause/Effect, Predict, Estimate, Interpret, Compare, Distinguish, Relate, Use Context Cues, Make Observations, Summarize, Show, Compare, Investigate, Differentiate

Level Three (Strategic Thinking)

Revise, Assess, Develop a Logical Argument, Construct, Apprise, Use Concepts to Solve Non-Routine Problems, Critique, Explain Phenomena in Terms of Concepts, Formulate, Draw Conclusions, Hypothesize, Cite Evidence

Level Four (Extended Thinking)

Design, Connect, Synthesize, Apply Concepts, Critique, Analyze, Create, Prove

Describe, Explain, Interpret

Why do I need to learn about Webb's Depth of Knowledge (DOK)?

Depth of Knowledge (DOK) was created by Norman Webb for the purpose of aligning assessments and assessment items to the cognitive complexity level of the standards they were designed to assess. The DOK level is determined by **the degree of mental processing required of the student to meet the objectives of a particular standard**, **assessment item or instructional activity.** The DOK level focuses on how deeply a student needs to understand the content. Understanding the DOK level of the standard will help teachers create assessment items that accurately assess the standard at the expected level of rigor.

How do I include stretch in my assessment?

To have sufficient stretch, an assessment must contain questions that vary in complexity. The assessment should contain both basic and advanced knowledge and skill questions so that both low-performing and high-performing students can demonstrate growth. One way to do this on an assessment is to consider questions for a particular standard at different depths of knowledge (See FAQ #4). Karin Hess's Cognitive Rigor Matrix can be especially helpful for creating assessment items with stretch. Here is an example:

CCSS.Math.Content.6.EE.C.9 Use variables to represent two quantities in a real-world problem that change in relationship to one another; write an equation to express one quantity, thought of as the dependent variable, in terms of the other quantity, thought of as the independent variable. Analyze the relationship between the dependent and independent variables using graphs and tables, and relate these to the equation. For example, in a problem involving motion at constant speed, list and graph ordered pairs of distances and times, and write the equation d = 65t to represent the relationship between distance and time.

DOK Level 1 – List and graph ordered pairs of distances and times
DOK Level 2 – Analyze the relationship between distance and time using graphs and tables
DOK Level 3 – Describe a situation involving a moving object that this graph could represent

Because this Grade 6 Math standard is written at DOK Level 2, the assessment should include items that ensure students are mastering the material at that level. However, based on pretest or trend data, stretch could be achieved by including questions at DOK Levels 1 and 3 so that low and high performing students can demonstrate their learning.

Level One Activities	Level Two Activities	Level Three Activities	Level Four Activities
Recall elements and details of story structure, such as sequence of events, character, plot and setting.	Identify and summarize the major events in a narrative.	Support ideas with details and examples.	Conduct a project that requires specifying a problem, designing and conducting an experiment, analyzing its data, and reporting results/ solutions.
Conduct basic mathematical calculations.	Use context cues to identify the meaning of unfamiliar words.	Use voice appropriate to the purpose and audience.	
Label locations on a map.	Solve routine multiple-step problems.	Identify research questions and design investigations for a scientific problem.	Apply mathematical model to illuminate a problem or situation.
Represent in words or diagrams a scientific concept or relationship.	Describe the cause/effect of a particular event.	Develop a scientific model for a complex situation.	Analyze and synthesize information from multiple sources.
Perform routine procedures like measuring length or using punctuation marks correctly.	Identify patterns in events or behavior.	Determine the author's purpose and describe how it affects the interpretation of a reading selection.	Describe and illustrate how common themes are found across texts from different cultures.
Describe the features of a place or people.	Formulate a routine problem given data and conditions.	Apply a concept in other contexts.	Design a mathematical model to inform and solve a practical or abstract situation.
	Organize, represent and interpret data.		

Webb, Norman L. and others. "Web Alignment Tool" 24 July 2005. Wisconsin Center of Educational Research. University of Wisconsin-Madison. 2 Feb. 2006. <http://www.wcer.wisc.edu/WAT/index.aspx>.

Is it appropriate to assess higher-level thinking with multiple choice items?
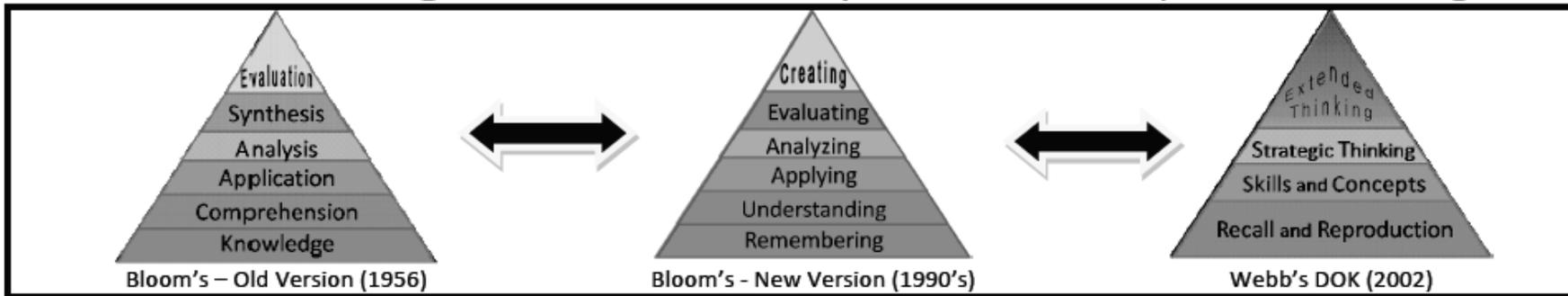
The appropriateness of an assessment method (for example, multiple choice or other selected response methods) depends on the purpose and context of the assessment. When speaking of "higher-level thinking," we are usually referring either to higher levels of Bloom's Taxonomy or higher levels of Webb's Depth of Knowledge (DOK). While it is not impossible to assess higher-level thinking (for example, DOK level 3) with multiple choice items, it may not serve the purpose well. For example, a student may be asked to evaluate a situation in which they must draw a conclusion based on evidence from a text. It is possible to structure an item such that the student must reason through the question and pull information together, justifying their reasoning in their mind in order to select the correct response(s). However, it is very difficult to write such items well, and higher-level thinking tasks often involve an extended period of time to perform. It is also important to keep the purpose of the assessment in mind. If the purpose is for the student to *demonstrate* mastery of the knowledge and skills in a DOK 3 standard (which is usually what is desired), then constructed response or performance would be more suitable assessment methods, since these methods require the student to show their reasoning more directly.

Hess' Cognitive Rigor Matrix & Curricular Examples: Applying Webb's Depth-of-Knowledge Levels to Bloom's Cognitive Process Dimensions – *M-Sci*

Revised Bloom's Taxonomy	Webb's DOK Level 1 Recall & Reproduction	Webb's DOK Level 2 Skills & Concepts	Webb's DOK Level 3 Strategic Thinking/ Reasoning	Webb's DOK Level 4 Extended Thinking
Remember Retrieve knowledge from long-term memory, recognize, recall, locate, identify	o Recall, observe, & recognize facts, principles, properties o Recall/ identify conversions among representations or numbers (e.g., customary and metric measures)			
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	o Evaluate an expression o Locate points on a grid or number on number line o Solve a one-step problem o Represent math relationships in words, pictures, or symbols o Read, write, compare decimals in scientific notation	o Specify and explain relationships (e.g., non-examples/examples; cause-effect) o Make and record observations o Explain steps followed o Summarize results or concepts o Make basic inferences or logical predictions from data/observations o Use models /diagrams to represent or explain mathematical concepts o Make and explain estimates	o Use concepts to solve non-routine problems o Explain, generalize, or connect ideas using supporting evidence o Make and justify conjectures o Explain thinking when more than one response is possible o Explain phenomena in terms of concepts	o Relate mathematical or scientific concepts to other content areas, other domains, or other concepts o Develop generalizations of the results obtained and the strategies used (from investigation or readings) 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	o Follow simple procedures (recipe-type directions) o Calculate, measure, apply a rule (e.g., rounding) o Apply algorithm or formula (e.g., area, perimeter) o Solve linear equations o Make conversions among representations or numbers, or within and between customary and metric measures	o Select a procedure according to criteria and perform it o Solve routine problem applying multiple concepts or decision points o Retrieve information from a table, graph, or figure and use it solve a problem requiring multiple steps o Translate between tables, graphs, words, and symbolic notations (e.g., graph data from a table) o Construct models given criteria	o Design investigation for a specific purpose or research question o Conduct a designed investigation o Use concepts to solve non-routine problems o Use & show reasoning, planning, and evidence o Translate between problem & symbolic notation when not a direct translation	o Select or devise approach among many alternatives to solve a problem o Conduct a project that specifies a problem, identifies solution paths, solves the problem, and reports results
Analyze Break into constituent parts, determine how parts relate, differentiate between relevant-irrelevant, distinguish, focus, select, organize, outline, find coherence, deconstruct	o Retrieve information from a table or graph to answer a question o Identify whether specific information is contained in graphic representations (e.g., table, graph, T-chart, diagram) o Identify a pattern/trend	o Categorize, classify materials, data, figures based on characteristics o Organize or order data o Compare/ contrast figures or data o Select appropriate graph and organize & display data o Interpret data from a simple graph o Extend a pattern	o Compare information within or across data sets or texts o Analyze and draw conclusions from data, citing evidence o Generalize a pattern o Interpret data from complex graph o Analyze similarities/differences between procedures or solutions	o Analyze multiple sources of evidence o analyze complex/abstract themes o Gather, analyze, and evaluate information
Evaluate Make judgments based on criteria, check, detect inconsistencies or fallacies, judge, critique			o Cite evidence and develop a logical argument for concepts or solutions o Describe, compare, and contrast solution methods o Verify reasonableness of results	o Gather, analyze, & evaluate information to draw conclusions o 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	o Brainstorm ideas, concepts, or perspectives related to a topic	o Generate conjectures or hypotheses based on observations or prior knowledge and experience	o Synthesize information within one data set, source, or text o Formulate an original problem given a situation o Develop a scientific/mathematical model for a complex situation	o Synthesize information across multiple sources or texts o Design a mathematical model to inform and solve a practical or abstract situation

ABOVE MATH SCIENCE / See appendix for Social Studies, Reading, Writing and Arts DOK Charts.

Levels of Thinking in Bloom's Taxonomy and Webb's Depth of Knowledge

Bloom's – Old Version (1956) — Evaluation, Synthesis, Analysis, Application, Comprehension, Knowledge

Bloom's - New Version (1990's) — Creating, Evaluating, Analyzing, Applying, Understanding, Remembering

Webb's DOK (2002) — Extended Thinking, Strategic Thinking, Skills and Concepts, Recall and Reproduction

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Bloom's six major categories were changed from noun to verb forms in the new version which was developed in the 1990's and released in 2001. The knowledge level was renamed as remembering. Comprehension was retitled understanding, and synthesis was renamed as creating. In addition, the top two levels of Bloom's changed position in the revised version.

Bloom's Taxonomy	Revised Bloom's Taxonomy
Knowledge	**Remembering**
Recall appropriate information.	
Comprehension	**Understanding**
Grasp the meaning of material.	
Application	**Applying**
Use learned material in new and concrete situations.	
Analysis	**Analyzing**
Break down material into component parts so that its organizational structure may be understood.	
Synthesis	**Evaluating**
Put parts together to form a new whole.	Make judgments based on criteria and standards.
Evaluation	**Creating** (Previously Synthesis)
Judge value of material for a given purpose.	Put elements together to form a coherent or functional whole; reorganizing elements into a new pattern or structure through generating, planning, or producing.

Norman L. Webb of Wisconsin Center for Educational Research generated DOK levels to aid in alignment analysis of curriculum, objectives, standards, and assessments.

Webb's Depth of Knowledge & Corresponding Verbs
Some verbs could be classified at different levels depending on application.

Recall and Reproduction Correlates to Bloom's 2 Lowest Levels

Recall a fact, information, or procedure.

arrange, calculate, define, draw, identify, list, label, illustrate, match, measure, memorize, quote, recognize, repeat, recall, recite, state, tabulate, use, tell who- what- when- where- why

Skill/Concept

Engages mental process beyond habitual response using information or conceptual knowledge. Requires two or more steps.

apply, categorize, determine cause and effect, classify, collect and display, compare, distinguish, estimate, graph, identify patterns, infer, interpret, make observations, modify, organize, predict, relate, sketch, show, solve, summarize, use context clues

Strategic Thinking

Requires reasoning, developing plan or a sequence of steps, some complexity, more than one possible answer, higher level of thinking than previous 2 levels.

apprise, assess, cite evidence, critique, develop a logical argument, differentiate, draw conclusions, explain phenomena in terms of concepts, formulate, hypothesize, investigate, revise, use concepts to solve non-routine problems

Extended Thinking Correlates to Bloom's 2 Highest Levels

*Requires investigation, complex reasoning, planning, developing, and thinking-probably over an extended period of time. *Longer time period is not an applicable factor if work is simply repetitive and/or does not require higher-order thinking.*

analyze, apply concepts, compose, connect, create, critique, defend, design, evaluate, judge, propose, prove, support, synthesize

Debbie Perkins, 2008

JALSD Blueprint Template Blank

Learning Expectations		Assessment						
Learning Expectations Standards being Tested	Target DOK Level for each Standard	Method Type of assessment task	DOK 1 Recall or Reproduce	DOK 2 Basic Application of Skills / Concepts	DOK 3 Strategic Thinking	DOK 4 Extended Thinking	Total points	% of Total points
Total points	■						■	
% of Total points	■						■	