Unwrapping and Applying Depth-of-Knowledge (DOK)

Western Heights PD Day
February 20, 2023

OKLAHOMA
Education

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Executive Director of Data Literacy

- Supporting Oklahoma school counselors, educators, and administrators in connecting data to leverage what is working and support continuous improvement.
- Provide technical assistance and coaching in areas of assessment and data literacy, school improvement, early warning systems, and whole school models.

Experience

- Classroom Practitioner (16 years)
- Strategic Planner/ Grant Writer- Non-Profit (2 Years)
- District Level: Director- Career and Technical Education; Curriculum, Instruction, and Assessment; Indian Education Grant, Workeyes, and Secondary Science (8 years)
- State Department: School Support Specialist, Assessment and Data Literacy (6 Years)

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When you hear DOK, how do you feel?

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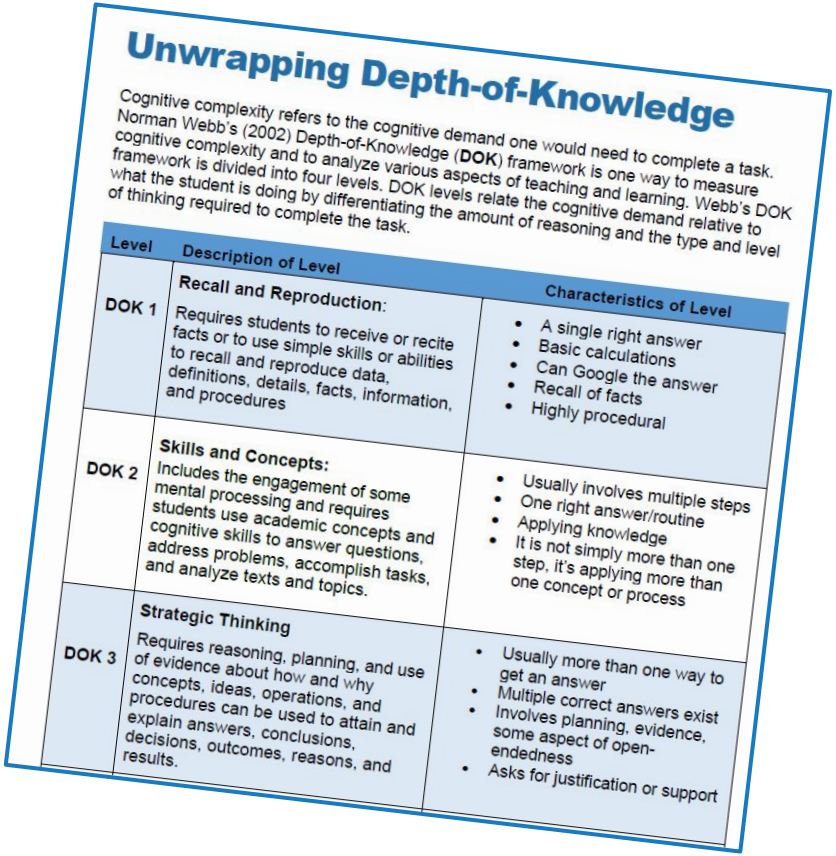
Unwrapping DOK

Unwrapping DOK

Read through the One-pager: Unwrapping DOK

As you read-

- Highlight information that reaffirms what you already know about DOK
- ★ Star information that is new to you.



Unwrapping Depth-of-Knowledge

Cognitive complexity refers to the cognitive demand one would need to complete a task. Norman Webb's (2002) Depth-of-Knowledge (**DOK**) framework is one way to measure cognitive complexity and to analyze various aspects of teaching and learning. Webb's DOK framework is divided into four levels. DOK levels relate the cognitive demand relative to what the student is doing by differentiating the amount of reasoning and the type and level of thinking required to complete the task.

Level	Description of Level	Characteristics of Level
DOK 1	**Recall and Reproduction:** Requires students to receive or recite facts or to use simple skills or abilities to recall and reproduce data, definitions, details, facts, information, and procedures	• A single right answer • Basic calculations • Can Google the answer • Recall of facts • Highly procedural
DOK 2	**Skills and Concepts:** Includes the engagement of some mental processing and requires students use academic concepts and cognitive skills to answer questions, address problems, accomplish tasks, and analyze texts and topics.	• Usually involves multiple steps • One right answer/routine • Applying knowledge • It is not simply more than one step, it's applying more than one concept or process
DOK 3	**Strategic Thinking** Requires reasoning, planning, and use of evidence about how and why concepts, ideas, operations, and procedures can be used to attain and explain answers, conclusions, decisions, outcomes, reasons, and results.	• Usually more than one way to get an answer • Multiple correct answers exist • Involves planning, evidence, some aspect of open-endedness • Asks for justification or support

Share Out

What DOK level would you give this activity? WHY?

Classifying DOK

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DOK 1

What is the knowledge?

JEOPARDY!

Recall and Rote Response

DOK 2

How can the knowledge be applied?

TOP CHEF

Applied Concepts and Skills

DOK 3

How can the knowledge solve problems?

Strategic Thinking

DOK 4

How can the knowledge be extended?

SHARK TANK

Extended Thinking

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Classifying DOK

Use your knowledge and information from the reading to classify the student actions to the DOK level it represents.

- For Example: Conduct basic mathematical calculations.

When you have classified all of the student actions, add a description of what students are doing at each level based on the patterns you notice.

Share out

What stood out to you in this activity?

DOK and Assessment

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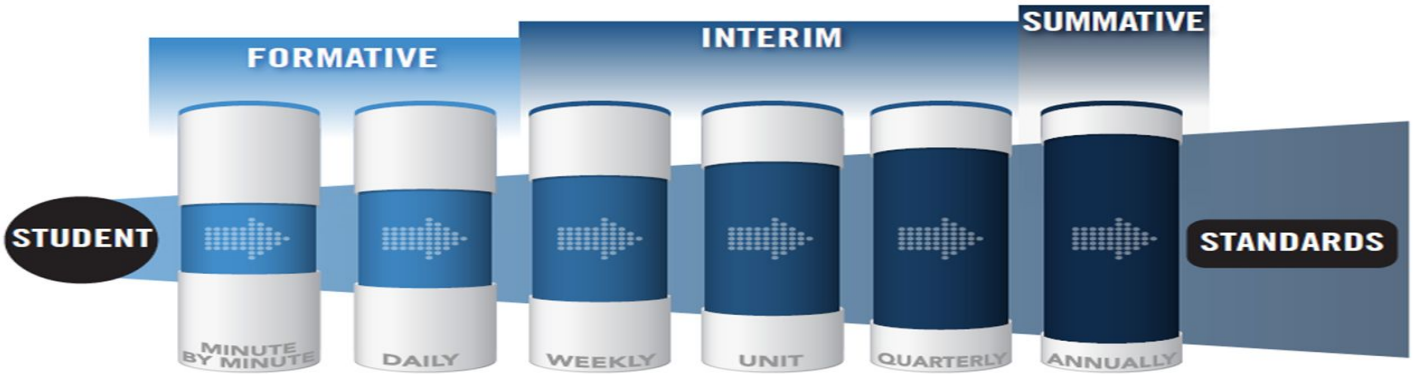
Assessment systems provide evidence of learning

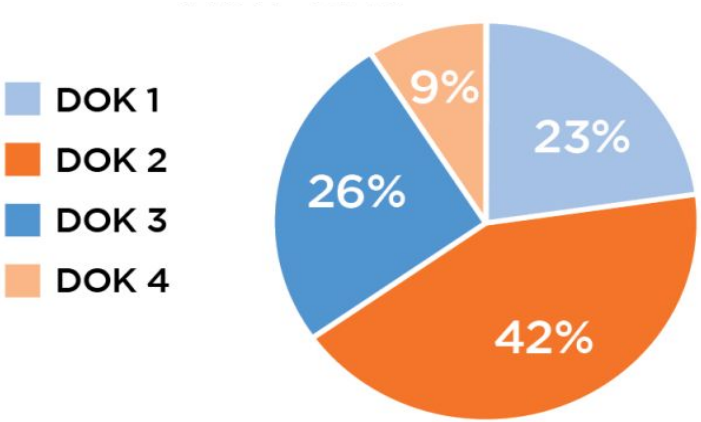
- The Oklahoma Academic Standards (OAS) outline **grade-level expectations** for what students should know and be able to graduate with the knowledge, skills, and abilities they need to be career and/or college ready.
- When tied to the OAS, a **robust assessment system** allows us to monitor student learning and make adjustments so that summative results corroborate what we already know.



(ESEA Plan, p. 48)

The Oklahoma Academic Standards (OAS) have different levels of complexity to support students in graduating career ready

Sample DOK Distribution for ELA Standards



- **Level 1** requires students to use simple skills or abilities
- **Level 2** includes the engagement of some mental processing beyond recall
- **Level 3** requires some higher-level mental processing like reasoning, planning, and using evidence
- **Level 4** requires complex reasoning, planning, developing, and thinking over an extended period of time.

Rigor and Complexity

Cognitive rigor is created by the interaction of three key factors: content complexity + cognitive engagement + the intended scope and depth of the learning activity.

- Content Complexity: Complex concepts and strategies (e.g., concrete versus abstract ideas; literal versus figurative interpretations; practical applications versus theories) always require supports to increase access and engagement.
- Cognitive Engagement: Engagement with the content (sometimes defined using Depth-of-Knowledge/DOK levels) describes how deeply we want students to apply their understanding to complete a task – from surface-level recall to conceptual understanding, problem solving, or in-depth extended thinking.
- Scope and Depth: The scope of the planned learning or assessment activity influences the overall cognitive rigor, especially when multiple sources must be analyzed and interpreted or a complex product of learning is to be developed (e.g., research project, podcast, multimedia presentation).

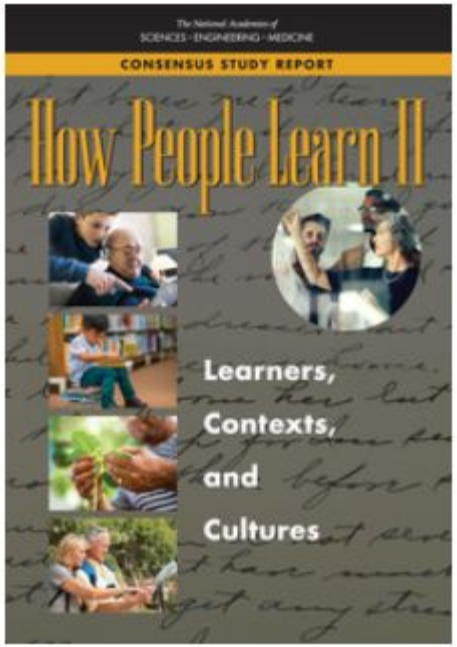
Source: https://www.middleweb.com/47245/6-places-to-find-true-rigor-in-your-classroom/

Complexity is tied to motivation

Motivation is a condition that activates and sustains behavior toward a goal.

- “Learners tend to persist in learning when they face a manageable challenge (neither too easy nor too frustrating) and when they see the value and utility of what they are learning” (p.110-111).
- “Motivation to learn is fostered for learners of all ages when they perceive the school or learning environment is a place where they “belong” and when the environment promotes their sense of agency and purpose” (p.133).

Source: How People Learn II



What DOK level is represented in the objective? Which prompt aligns with the content and cognitive complexity?

ELA 7.3.R.3 Students will analyze literary elements to support an interpretation of a text: ● setting ● plot ● characters (i.e., protagonist, antagonist) ● characterization ● conflict (i.e., internal, external) ● point of view (i.e., third person limited and omniscient and second person)

Option A	Option B
Prompt: *Authors use various literary elements throughout a story to convey a theme in their writing. Write an essay analyzing the literary elements used by the author throughout the text to convey a theme. Use evidence from the text to support your response.*	**Prompt:** *Identify a theme from the text and summarize the story.*

Because the state summative assessment is designed to test our OAS, DOK distribution mirrors what we see in the standards

DOK Level in Math	Grade 3	Grade 4	Grade 5	Grade 6	Grade 7	Grade 8
Level 1: Recall and Reproduction	**40-50%**	**25-35%**	**20-30%**	**15-25%**	**15-25%**	**10-20%**
Level 2: Skills/Concepts	**45-55%**	**60-70%**	**65-75%**	**65-75%**	**65-75%**	**65-75%**
Level 3: Strategic Thinking	**5-10%**	**5-15%**	**5-15%**	**10-20%**	**10-20%**	**15-25%**

DOK Level in ELA	Grade 3	Grade 4	Grade 5	Grade 6	Grade 7	Grade 8
Level 1: Recall and Reproduction	**15-30%**	**10-20%**	**5-15%**	**5-15%**	**5-15%**	**5-10%**
Level 2: Skills/Concepts	**65-80%**	**65-75%**	**70-85%**	**70-85%**	**70-85%**	**60-75%**
Level 3: Strategic Thinking	**5-10%**	**5-15%**	**5-20%**	**10-20%**	**10-20%**	**20-30%**
Level 4: Extended Thinking			**10% of score**			**12% of score**

Source:Grade level test and item specifications: https://sde.ok.gov/assessment-material

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State summative assessment's role within an assessment system

- State assessments sample from across the breadth and depth of content standards to produce a student achievement level and reporting category subscores.
- State assessments are a single **snapshot** and do not tell the whole story
- Scores from state assessments should be used in **conjunction with** district and classroom assessments to monitor progress and overall achievement

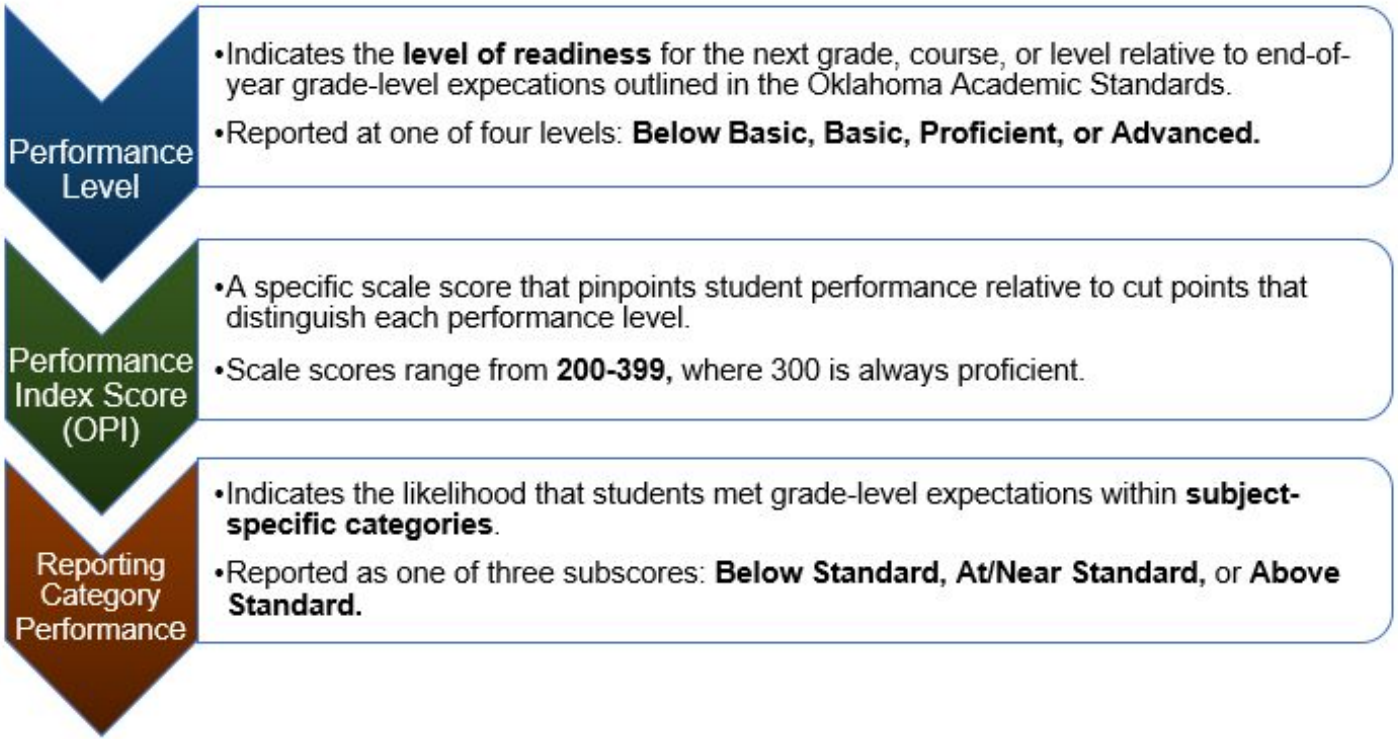
Where are students relative to end-of-year expectations?

State summative assessments can also help inform the "big picture" by helping us answer questions such as:

- In what **reporting categories** might students need extra support?
- Where might we want to **invest in curriculum** or **standards-based professional development** next year for teachers?
- Did our recent intervention or curriculum **deliver the results that were promised**?

Source: https://www.nciea.org/blog/monitoring-covid-recovery-efforts/

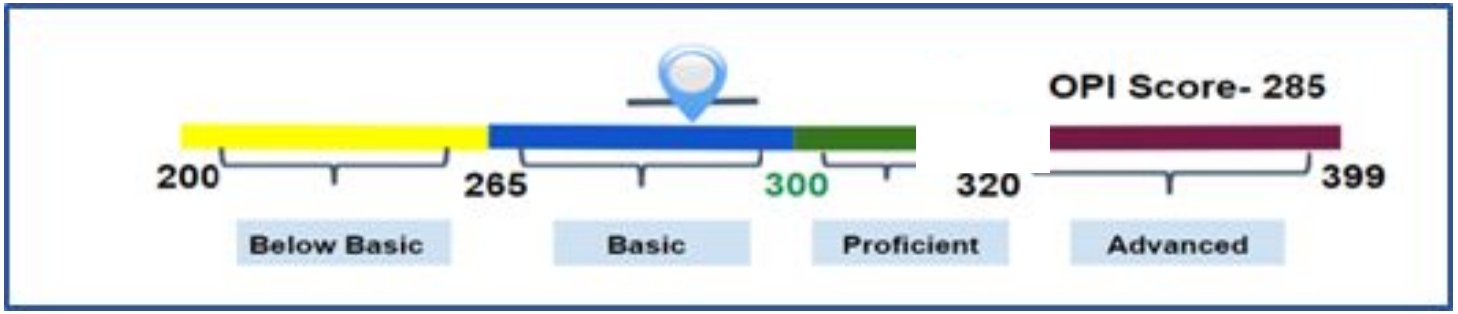
OSTP performance data



Performance Levels are defined by Performance Index Scores (OPI)

- A student's **OPI score** is used to place them in one of four performance levels.

Grade 5 Math OPI Score Ranges and Performance Levels

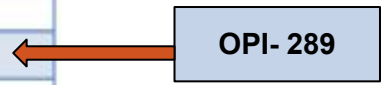


- OPIs are obtained by **translating raw scores** onto a common scale to account for **differences in item complexity across test forms** so that comparisons between test takers can made made.

Performance index (OPI) scores

- Performance Index (OPI) Scores supplement performance-level data by **pinpointing where a score** is relative to the performance level cut-points.

Grade/Content Tested	Form	Scaled Score Range	Performance Level
Grade 5 ELA	Spring	200 – 270	Below Basic
		271 – 299	Basic
		300 – 322	Proficient
		323 – 399	Advanced



- OPI scores range from 200-399 where 300 is always proficient.
- Average or **mean OPI** scores allow for **comparison of student groups**.

OPIs: where are students today?

Grade/Content Tested	Form	Scaled Score Range	Performance Level
Grade 5 ELA	Spring	200 – 270	Below Basic
		271 – 299	Basic
		300 – 322	Proficient
		323 – 399	Advanced
Grade 5 Math	Spring	200 – 265	Below Basic
		266 – 299	Basic
		300 – 320	Proficient
		321 – 399	Advanced
Grade 5 Science	Spring	200 – 271	Below Basic
		272 – 299	Basic
		300 – 329	Proficient
		330 – 399	Advanced

Mean OPI scores pinpoint overall performance within a performance level.

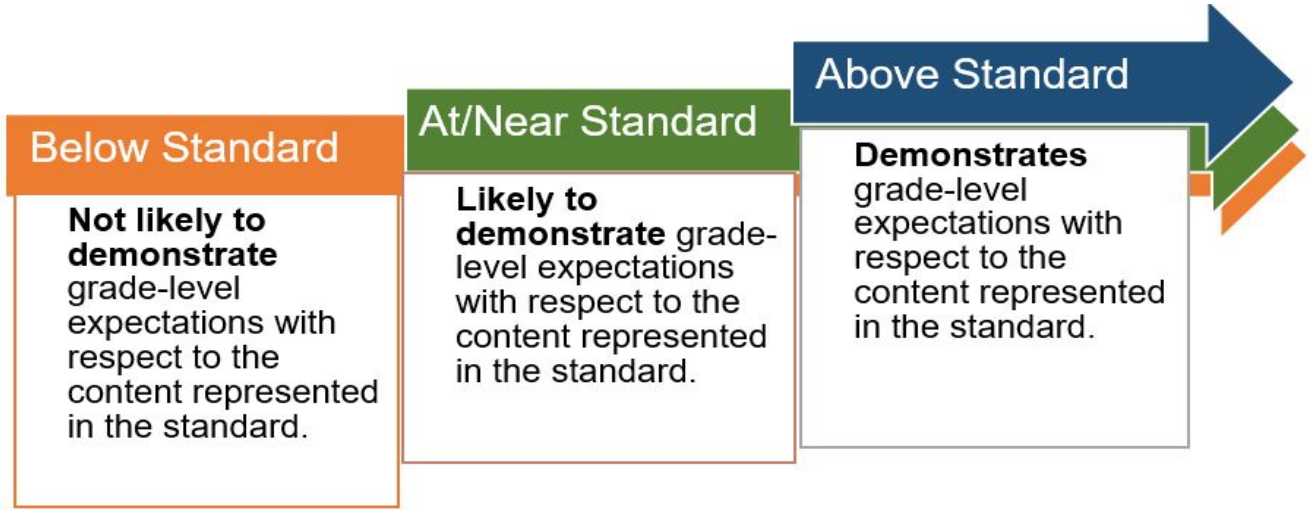
Grade 11 OPI scale scores for ELA and Math are displayed in the Accountability Reporting application in the Assessment Performance Report.

Grade 3-8 OSTP Performance Level Lookup Table

Grade 11: ACT/SAT OPI Conversion

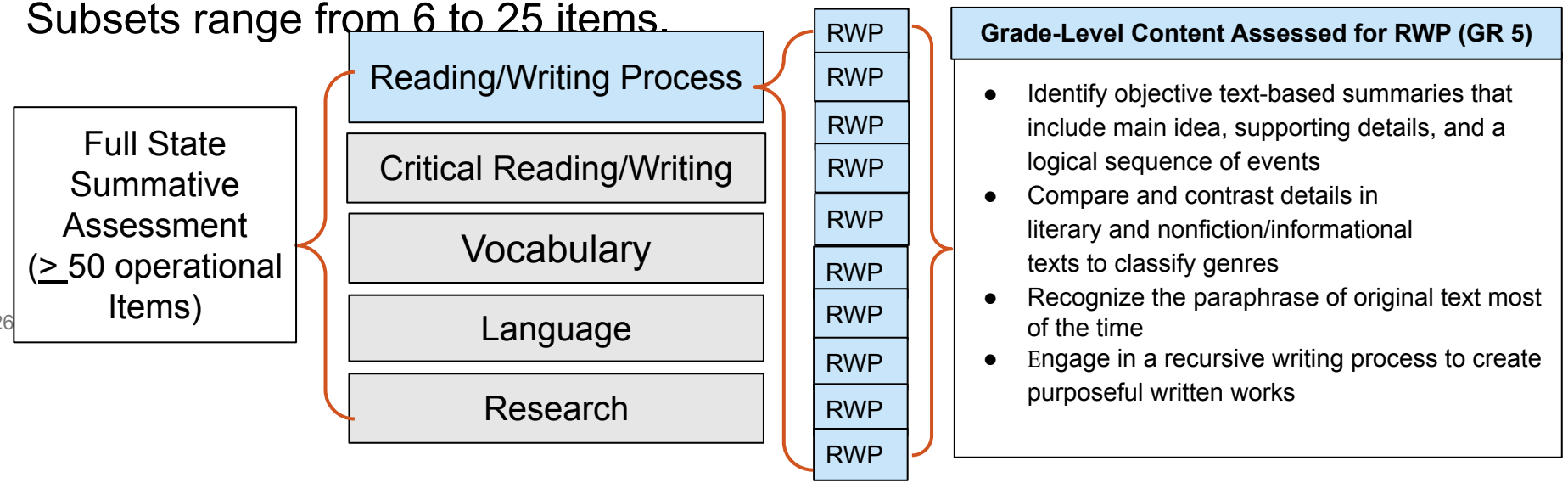
Reporting Category performance indicates grade-level readiness at the ELA standard, math strand, or science domain level

Reporting Category Performance indicates the likelihood that a student or group of students demonstrated grade-level performance expectations within content-specific categories (e.g., critical reading and writing for ELA).



Reporting Category scores are based on a subset of content-specific items.

Performance in each Reporting Category is determined by a student's performance on a subset of content-specific items for each reporting category. Subsets range from 6 to 25 items.



Reporting category scores: what's working? where might students need extra support?

- Performance by Reporting Category provides an additional piece of information that when connected with your local assessment data, helps educators understand where students are demonstrating grade-level expectations and where they may need extra support in each subject.

English Language Arts	Mathematics	Science	U.S. History
• Reading/Writing Process • Critical Reading and Writing • Language • Vocabulary • Research	• Number and Operations • Algebraic Reasoning • Geometry and Measurement • Data and Probability	• Life Science • Physical Science • Earth and Space Science	• **U.S. History** • **Civics**

Reporting category subscores signal where students may need extra support.

Grade 6: Group Summary PL

Options | Save | Download | Print | Table | Chart | Transpose

Subject	Administration	Total N	Valid N	Mean OPI	% in Each Performance Level				% in Each Reporting Category Performance Level		
					Below Basic	Basic	Proficient	Advanced	Below Standard	At/Near Standard	Above Standard
					%	%	%	%	%	%	%
ELA	2021	126	124	274	42	43	11	4			
Reading/Writing Process	2021		124						62	26	12
Critical Reading/Writing	2021		124						75	19	6
Vocabulary	2021		124						65	25	10
Language	2021		124						44	40	16
Research	2021		124						48	35	18
Mathematics	2021	126	124	268	48	36	11	4			
Number & Operations	2021		124						74	13	13
Algebraic Reasoning	2021		124						72	17	11
Geometry & Measurement	2021		124						65	21	15
Data & Probability	2021		124						64	23	13

Mean OPI: Average scale score for all students that tested. Scores range from 299-399

% in Each Reporting Category: At/near and Above standard signal that we are confident students are meeting grade-level expectations based on their performance on the state test.

Tools and Resources

Test and Item Specifications
ELA Vertical Progressions
Math Vertical Progressions- Appendix B
OSTP Key Questions for Educators

Reflection

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Reflection

I Used to Think... about DOK

Now I Think...about DOK

Source: http://www.pz.harvard.edu/resources/i-used-to-think-now-i-think

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Contact

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Workshop Resources

DOK Alignment Activity student actions

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Webb's DOK for Four Content Areas Alignment