

RIGOR

Rigor

How to Use
Verbs to
Determine a Skill's
Level of Rigor

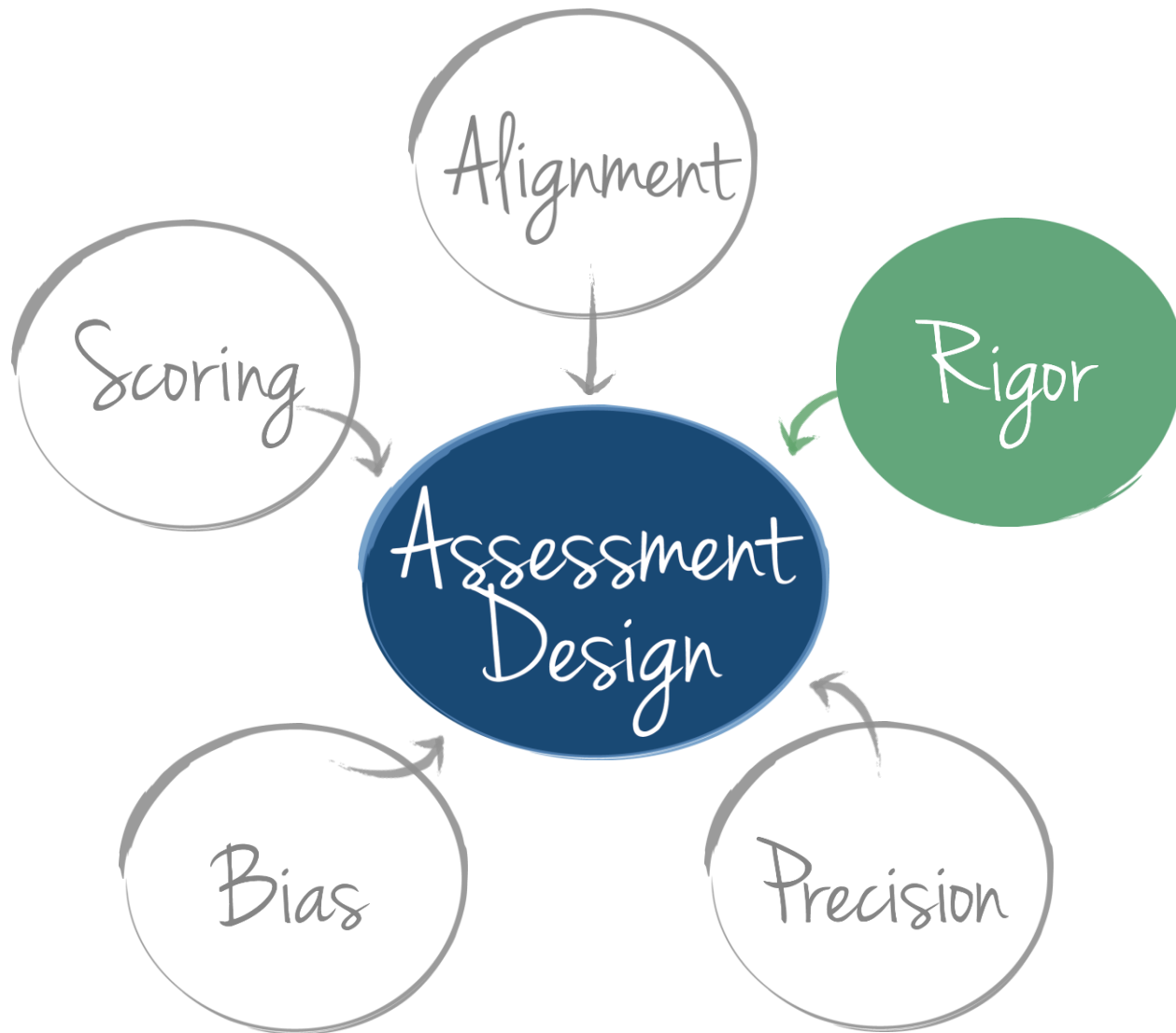
How to Measure
a Range of Student
Thinking and
Understanding

How to Match the
Rigor of Assessment
Items to the
Rigor of Skills

Tools to Help
You Think
About Rigor

How to Use
the Assessment
Blueprint

KEY CONCEPTS



INTRODUCTION & PURPOSE



Define what **RIGOR** means for the purpose of these modules



Use the **VERBS** in standards, and other tools, to identify the **COGNITIVE COMPLEXITY** in standards



Explain why assessments with an appropriate level of rigor also measure a **RANGE OF STUDENT THINKING AND UNDERSTANDING**



Use the **ASSESSMENT BLUEPRINT** to document the level of rigor of each skill

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rigor

the cognitive complexity of a skill
within a standard or of an
assessment item

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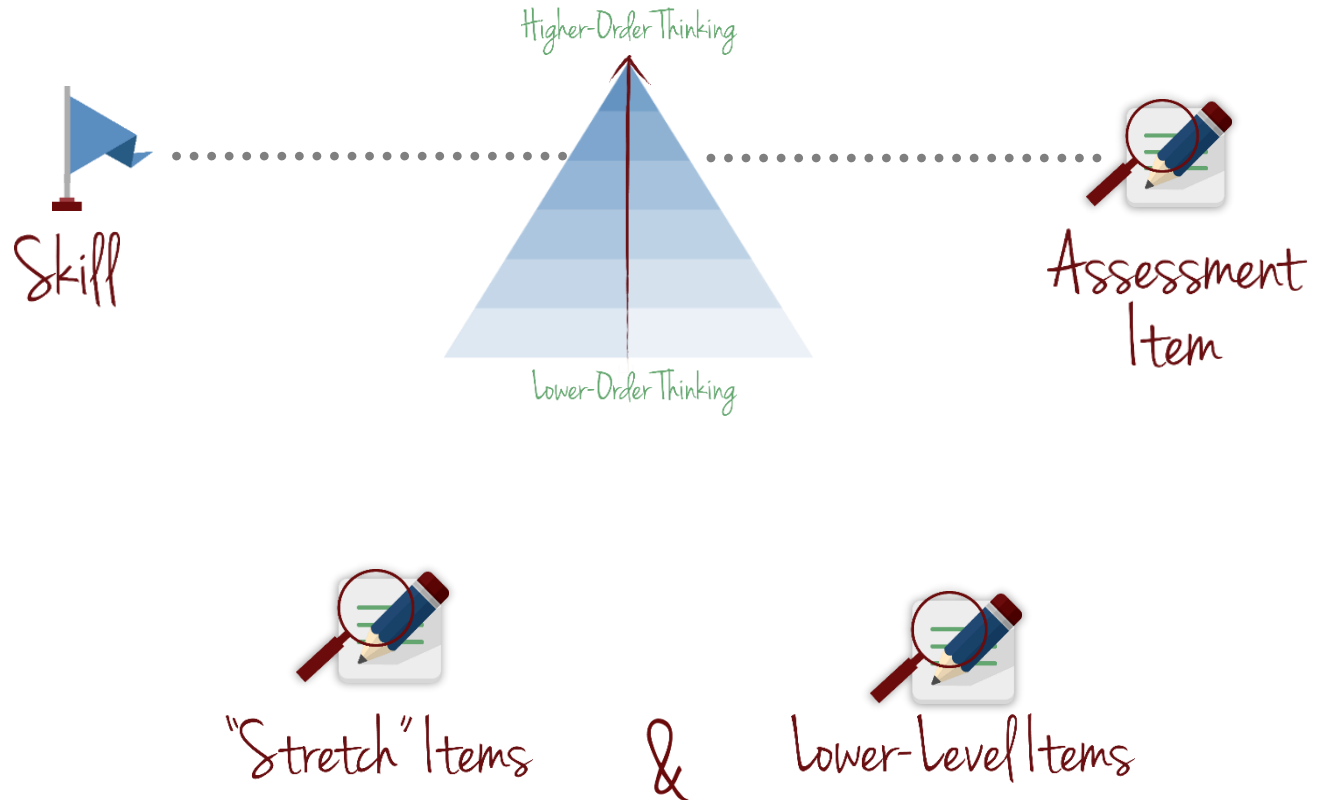
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Sources: Kansas State Department of Education, "Assessment Literacy Project"; Ohio Department of Education, "Assessment Literacy: Identifying and Developing Valid and Reliable Assessments" (2013); Relay Graduate School of Education, *Designing and Evaluating Assessments* (2014); and Rhode Island Department of Education, "Deepening Assessment Literacy."

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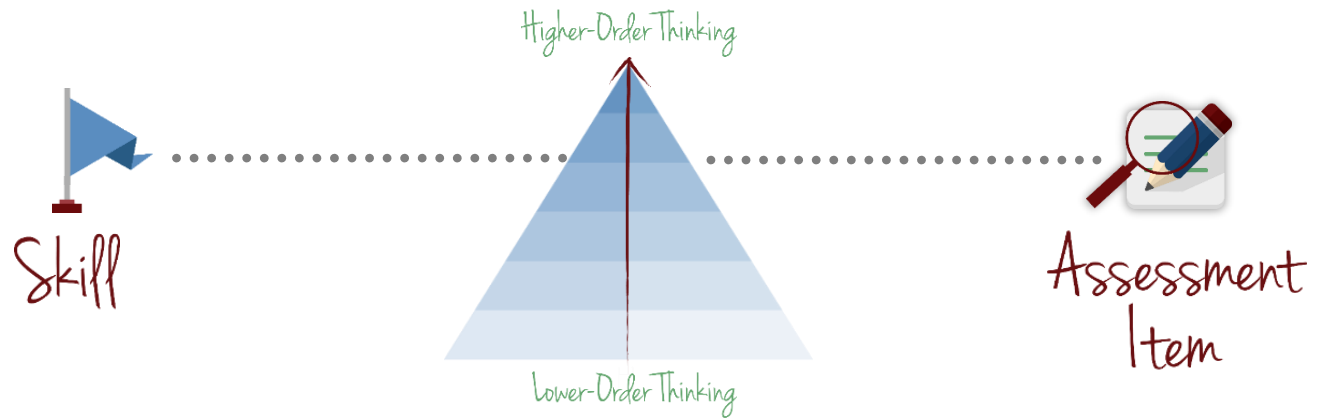
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Standard

Interpret whole-number quotients of whole numbers, e.g., interpret $56 \div 8$ as the number of objects in each share when 56 objects are partitioned equally into 8 shares, or as a number of shares when 56 objects are partitioned into equal shares of 8 objects each. For example, describe a context in which a number of shares or a number of groups can be expressed as $56 \div 8$.

Source: Tennessee Department of Education, "Tennessee's State Mathematics Standards: Grade 3" (2010).

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Skill(s)

→ Interpret whole-number quotients of whole numbers.

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Skill(s)

→ Interpret whole-number quotients of whole numbers.



Assessment Item

What is $12 \div 3$?

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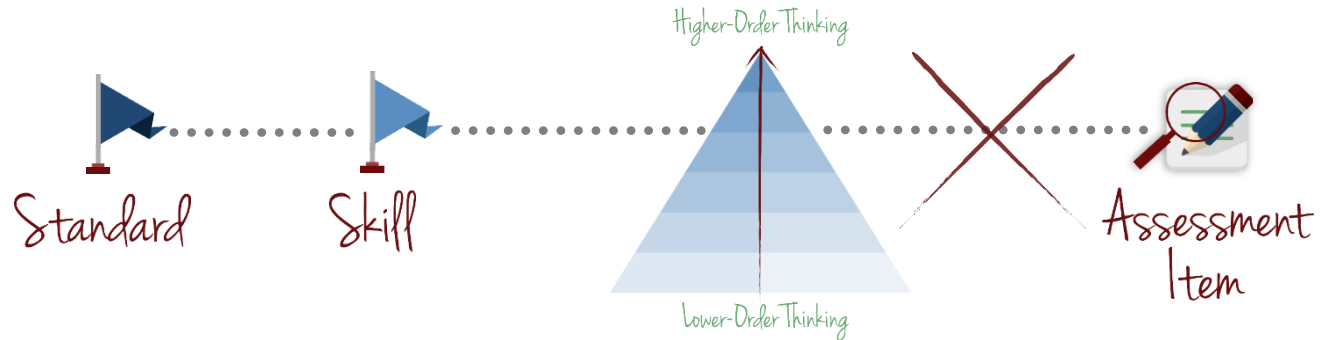
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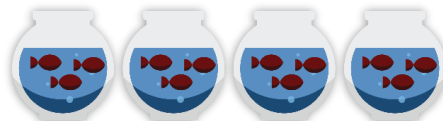


Assessment Item

Suppose there are 4 tanks and 3 fish in each tank. The total number of fish in this situation can be expressed as

$$4 \times 3 = 12.$$

- Describe what is meant in this situation by $12 \div 3 = 4$
- Describe what is meant in this situation by $12 \div 4 = 3$



Source: "Fish Tanks," Illustrative Mathematics.

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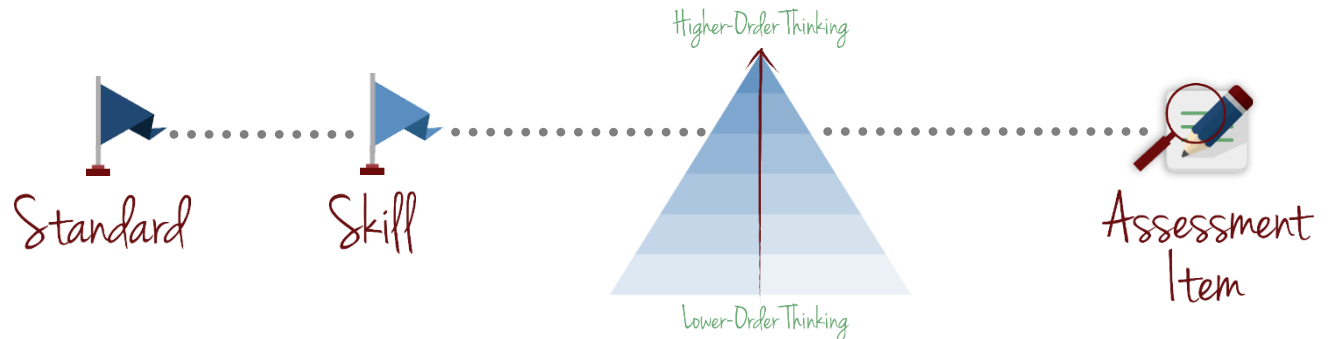
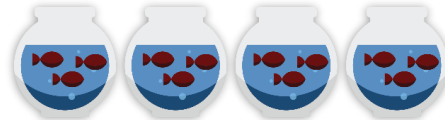


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~~"Division
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Standard

Use the relationship between particular words (e.g., synonyms, antonyms, homographs) to better understand each of the words.

Source: New York State Department of Education, "New York State P-12 Common Core Learning Standards for English Language Arts & Literacy" (2010).

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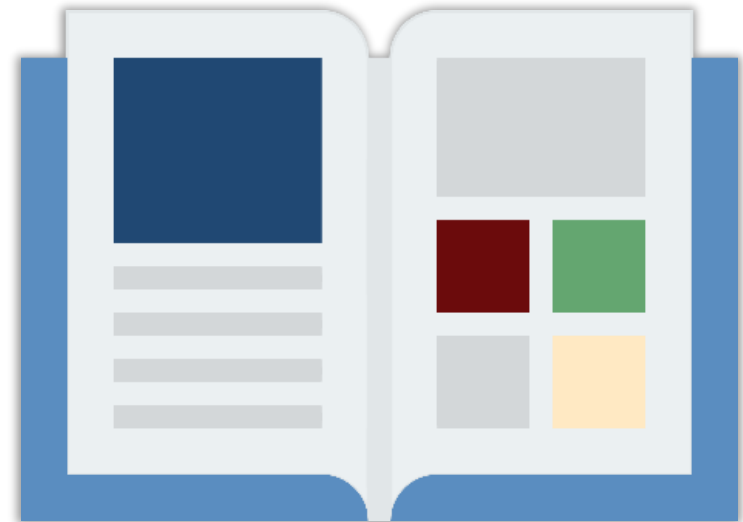
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Assessment Item

Which of the following words is an antonym of “tense”?

- a. troubled
- b. calm
- c. concerned
- d. smooth



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Assessment Item

Read the passage below. Then answer the question.

Last year my family went to a national park for our vacation. We saw wild animals that we had seen only in books, and we were amazed by the landscape of trees and rivers. The highlight of the trip was an **arduous** hike we took to the top of a small mountain. Though the hike was not easy, due to all the loose rocks and exposed roots on the path, the spectacular view from the top was worth it!

What does the word “arduous” mean in this passage?

Source: “Part 6 Language, 6.3 Vocabulary Acquisition and Use: Antonyms,” The McGraw-Hill Companies.

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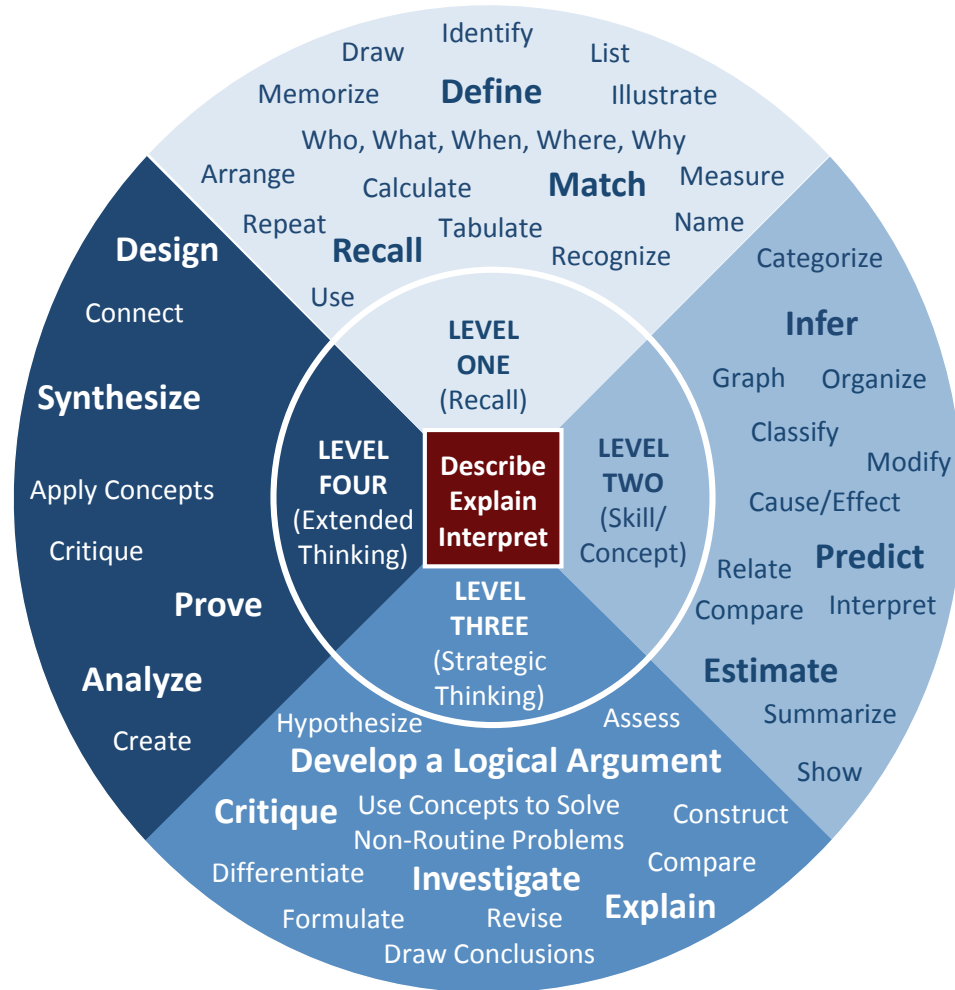
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Source: Mississippi Department of Education, *Webb's Depth of Knowledge Guide: Career and Technical Education Definitions* (2009).

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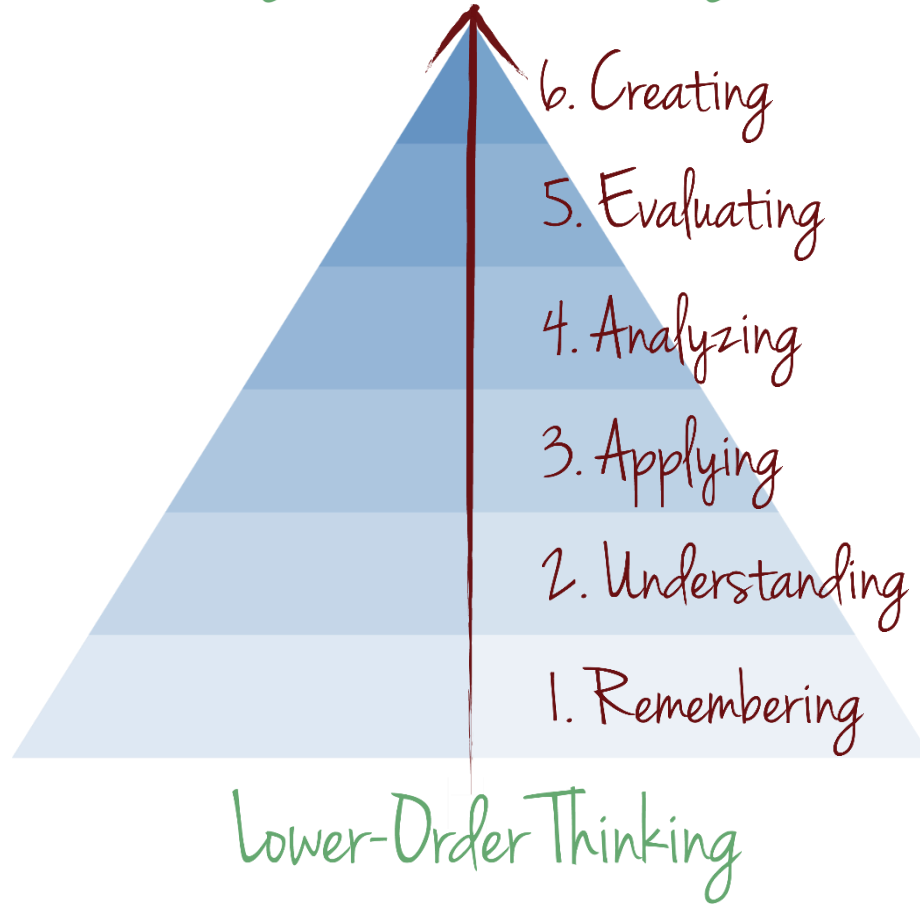
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Higher-Order Thinking



Source: Moody, Michael, and Jason Stricker, *Strategic Design for Student Achievement* (2008).

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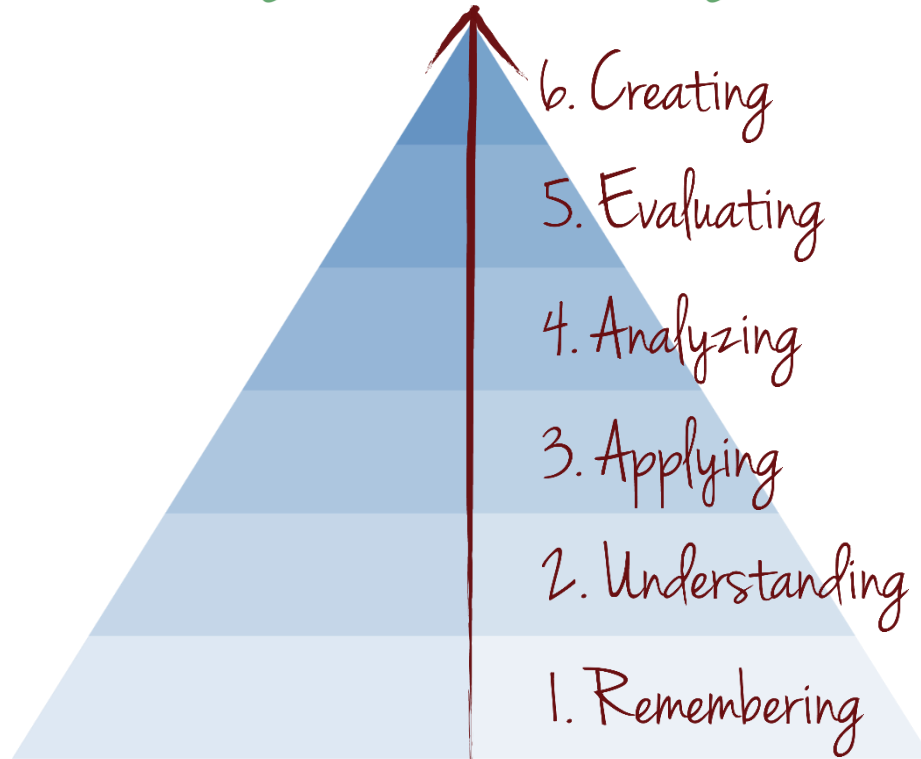
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Higher-Order Thinking



Lower-Order Thinking

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Verbs According to Bloom's Taxonomy

Higher-Order Thinking



Lower-Order Thinking

1. Remember	2. Understand	3. Apply	4. Analyze	5. Evaluate	6. Create
Remember Information	Explain Ideas or Concepts	Use Information in a New Way	Distinguish Between Parts	Justify a Position or Decision	Create a New Product or Point of View
Choose Define Find Identify Label List Match Name Recognize Recall Select Tabulate	Classify Compare Describe Estimate Explain Illustrate Infer Interpret Measure Outline Report Summarize	Apply Build Calculate Construct Demonstrate Develop Graph Model Organize Practice Solve Use	Analyze Attribute Break down Categorize Determine the relationship Differentiate Examine Group Organize Separate Simplify	Argue Assess Conclude Create Criticize Decide Deduct Defend Judge Predict Prioritize Support	Adapt Build Combine Design Develop Generate Integrate Modify Plan Produce Theorize Validate

Source: Moody, Michael, and Jason Stricker, *Strategic Design for Student Achievement* (2008).

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Remember Information	Explain Ideas or Concepts	Use Information in a New Way	Distinguish Between Parts	Justify a Position or Decision	Create a New Product or Point of View

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Standard

Integrate information presented in different media or formats (e.g., visually, quantitatively) as well as in words to develop a coherent understanding of a topic or issue.

1. Remember	2. Understand	3. Apply	4. Analyze	5. Evaluate	6. Create
Remember Information	Explain Ideas or Concepts	Use Information in a New Way	Distinguish Between Parts	Justify a Position or Decision	Create a New Product or Point of View
Choose Define Find Identify Label List Match Name Recognize Repeat Select Tabulate	Classify Compare Describe Estimate Explain Illustrate Infer Interpret Measure Outline Report Summarize	Apply Build Calculate Construct Demonstrate Develop Graph Model Organize Practice Solve Use	Analyze Break down Categorize Determine the relationship Differentiate Examine Group Organize Separate Simplify Sort	Argue Assess Conclude Create Criticize Decide Deduct Defend Judge Predict Prioritize Support	Adapt Build Combine Design Develop Integrate Invent Modify Plan Produce Theorize Validate

Source: Rhode Island Department of Education, "Common Core State Standards for English Language Arts & Literacy in History/Social Studies, Science, and Technical Subjects" (2010).

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Assessment
Items



"Stretch" Items

&



Lower-Level Items

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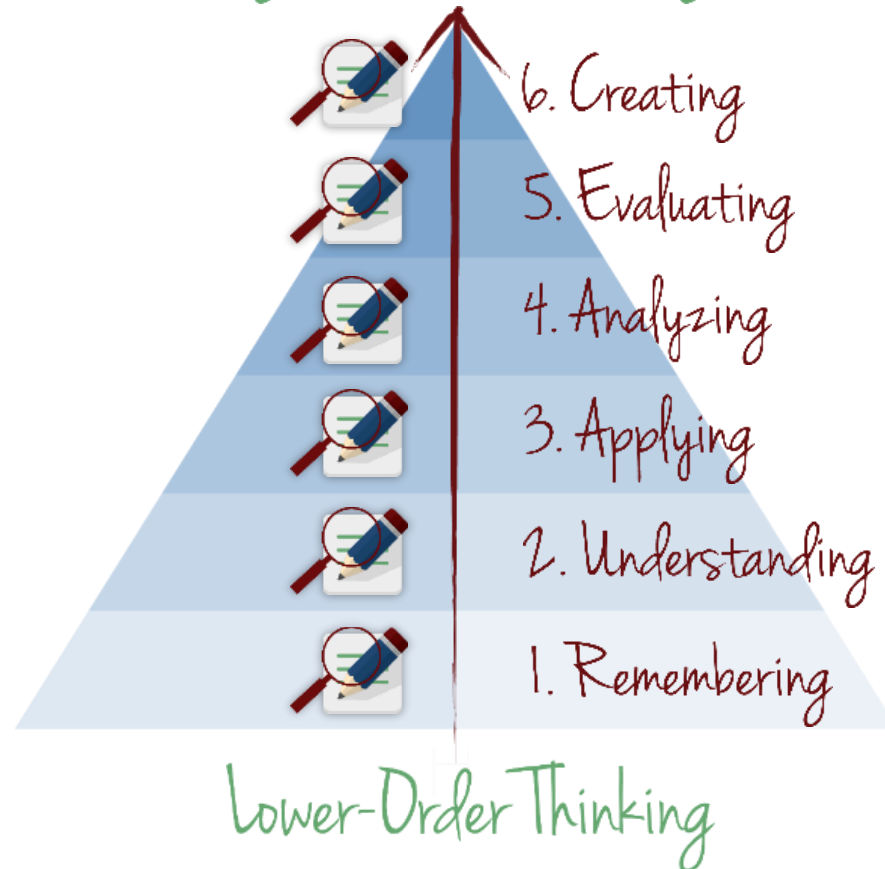
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Higher-Order Thinking



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Standard

The student solves problems involving direct proportional relationships. The student is expected to estimate and find solutions to application problems involving percent; and estimate and find solutions to application problems involving proportional relationships such as similarity, scaling, unit costs, and related measurement units.

Source: Texas Education Agency Student Assessment Division, "Grade 7 Mathematics Assessment" (2010).

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"Stretch" Items

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Lower-level Items

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Assessment Item

1. What is 67 percent of 81?
2. Shawn got 7 correct answers out of 10 possible answers on his science test. What percentage of questions did he answer correctly?
3. Adam was on pace to set a high-school basketball record for free throw percentage. Going into his senior year, he had made 97 of 104 free throw attempts. What percentage of free throws had he made?
4. Adam and Jamie were competing for the best free throw percentage. Adam made 94 percent of his first 103 shots, whereas Jamie made 47 of 51 shots.
 - a. Which one had a better shooting percentage?
 - b. In the next game, Adam made only 2 of 10 shots, and Jamie made 7 of 10 shots. What are their new overall shooting percentages? Who is the better shooter?
 - c. Christine argued that if Adam and Jamie each made their next 10 shots, their shooting percentages would go up the same amount. Is this true? Why or why not? Describe in detail how you arrived at your answers.

Source: Paul Bambrick-Santoyo, "Data in the Driver's Seat" (2007–2008).

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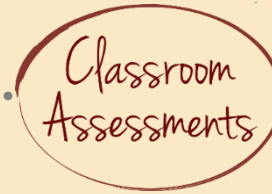
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5th Grade

Reading and Writing
about Informational Texts



Sources: Ohio Department of Education, "Ohio's New Learning Standards: English Language Standards" (2010); Student Achievement Partners, "Mini-Assessment for *Who Was Marco Polo?* by Joan Holub and *The Adventures of Marco Polo* by Russell Freedman" (2014).

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5th Grade

Reading and Writing
about Informational Texts

4 weeks

Standards

Classroom
Assessments

Instruction

Summative
Assessment

KEY CONCEPTS

Primary Purpose

Rigor

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1. Primary Purpose of the Assessment			Summative		
2. Standard(s) (one per row)		3. Skill(s) (one per row)	4. Level(s) of Rigor	5. Possible Type(s) of Items	
Reading Informational Text 1: Quote accurately from a text when explaining what the text says explicitly and making inferences.		Cite accurately from the text explicitly and making inferences.			
Reading Informational Text 2: Determine how a text is organized and how it presents related ideas and information; summarize the main point and supporting details.		Determine how a text is organized and how it presents related ideas and information; summarize the main point and supporting details.			
Reading Informational Text 4: Determine the meaning of general academic and domain-specific words and phrases in a text relevant to a grade 5 topic or subject area.		Determine the meaning of new vocabulary words.			
Reading Informational Text 8: Explain how an author uses reasons and evidence to support particular points in a text, identifying which reasons and evidence support which point(s).		Explain how the author uses evidence to support his or her claims.			
Writing 1: Write opinion pieces on topics or texts, supporting a point of view with reasons and information.		Write an opinion piece on texts.			
		Support your point of view with evidence.			
6. Write and/or Select Assessment Items					
Item #	Standard(s) and/or Skill(s)	Type of Item	Level(s) of Rigor	# of Points	% of Assessment
TOTAL					

KEY CONCEPTS

Rigor

How to Match the
Rigor of Assessment Items
to the Rigor of Skills

How to Use
Verbs to Determine a
Skill's Level of Rigor

Tools to Help You
Think About Rigor

How to Measure a Range
of Student Thinking
and Understanding

How to Use the
Assessment Blueprint

1. Primary Purpose of the Assessment			Summative		
2. Standard(s) (one per row)	3. Skill(s) (one per row)	4. Level(s) of Rigor	5. Possible Type(s) of Items		
Reading Informational Text 1: Quote accurately from a text when explaining what the text says explicitly and when drawing inferences from the text.	Quote accurately from the text (explicitly and in inferences).	<div>Level(s) of Rigor</div>			
Reading Informational Text 2: Determine two or more main ideas of a text and explain how they are supported by key details; summarize the text.	Identify main idea how key details su them.				
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3. Skill(s) (one per row)

4. Level(s) of Rigor

Quote accurately from the text
(explicitly and making inferences).

Identify main ideas and how key
details support them.

Determine the meaning of new
vocabulary words.

Explain how the author uses
evidence to support his or her
claims.

Write an opinion piece on texts.

Support your point of view with
evidence.

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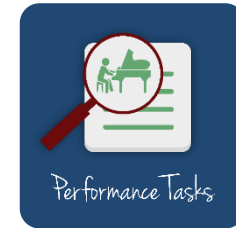
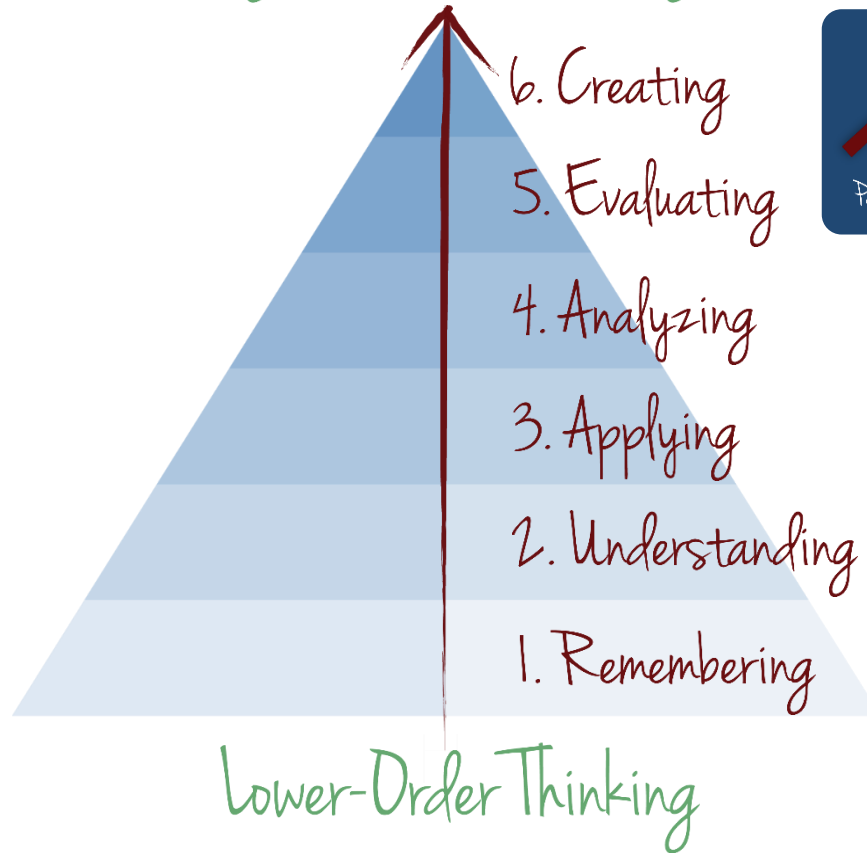
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How to Use the
Assessment Blueprint

Higher-Order Thinking



KEY CONCEPTS

Rigor

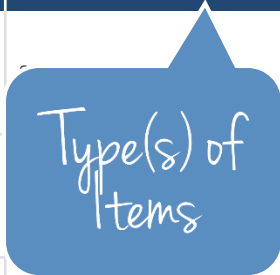
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Reading Informational Text 8: Explain how an author uses reasons and evidence to support particular points in a text, identifying which reasons and evidence support which point(s).	Explain how the author uses evidence to support his or her claims.	4	CR		
Writing 1: Write opinion pieces on topics or texts, supporting a point of view with reasons and information.	Write an opinion piece on texts.	5	CR, PT		
	Support your point of view with evidence.	5	CR, PT		
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Reading Informational Text 2: Determine two or more main ideas of a text and explain how they are supported by key details; summarize the text.	Identify main ideas and how key details support them.	2	CR		
Reading Informational Text 4: Determine the meaning of general academic and domain-specific words and phrases in a text relevant to a grade 5 topic or subject area.	Determine the meaning of new vocabulary words.	2	SR		
Reading Informational Text 8: Explain how an author uses reasons and evidence to support particular points in a text, identifying which reasons and evidence support which point(s).	Explain how the author uses evidence to support his or her claims.	4	CR		
Writing 1: Write opinion pieces on topics or texts, supporting a point of view with reasons and information.	Write an opinion piece on texts.	5	CR, PT		
	Support your point of view with evidence.	5	CR, PT		
6. Write and/or Select Assessment Items					
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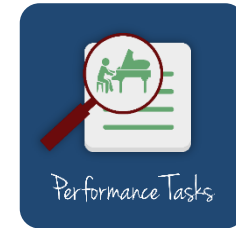
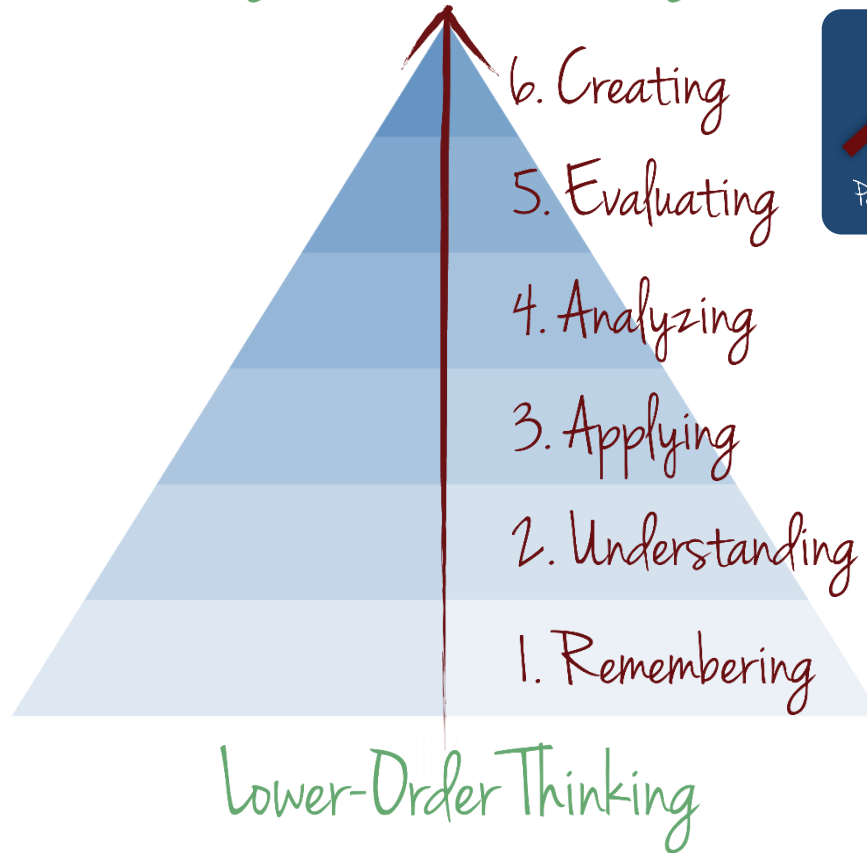
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Higher-Order Thinking



CHECK FOR UNDERSTANDING

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CHECK FOR UNDERSTANDING



Define what **RIGOR** means for the purpose of these modules



Use the **VERBS** in standards, and other tools, to identify the **COGNITIVE COMPLEXITY** in standards



Explain why assessments with an appropriate level of rigor also measure a **RANGE OF STUDENT THINKING AND UNDERSTANDING**



Use the **ASSESSMENT BLUEPRINT** to document the level of rigor of each skill

CHECK FOR UNDERSTANDING



Assessment Items

CHECK FOR UNDERSTANDING



Assessment Item

1. Using Bloom's Taxonomy, identify the level or levels of rigor in this standard from Iowa. Remember to pay close attention to the verbs.

Understand the use of geographic tools to locate and analyze information about people, places, and environments.

1. Remember	2. Understand	3. Apply	4. Analyze	5. Evaluate	6. Create
Remember Information	Explain Ideas or Concepts	Use Information in a New Way	Distinguish Between Parts	Justify a Position or Decision	Create a New Product or Point of View

Source: Iowa Department of Education, "Iowa Core K-12 Social Studies" (2010).

CHECK FOR UNDERSTANDING

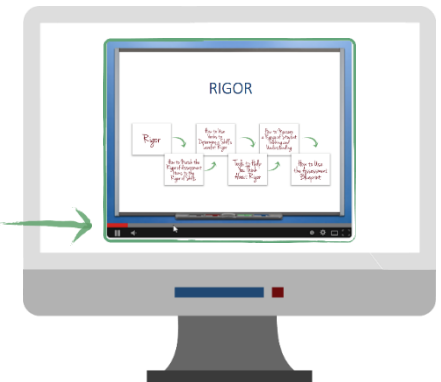


Assessment Item

1. Using Bloom's Taxonomy, identify the level or levels of rigor in this standard from Iowa. Remember to pay close attention to the verbs.

Understand the use of geographic tools to locate and analyze information about people, places, and environments.

1. Remember	2. Understand	3. Apply	4. Analyze	5. Evaluate	6. Create
Remember Information	Explain Ideas or Concepts	Use Information in a New Way	Distinguish Between Parts	Justify a Position or Decision	Create a New Product or Point of View



CHECK FOR UNDERSTANDING



Answer

1. Using Bloom's Taxonomy, identify the level or levels of rigor in this standard from Iowa. Remember to pay close attention to the verbs.

Understand the use of geographic tools to locate and analyze information about people, places, and environments.

The key verbs in the skills in this standard are “use” and “analyze,” which are associated with lower- and higher-order skills. “Understand” is a level 1 skill, and “analyze” is a level 4 skill.

CHECK FOR UNDERSTANDING



Assessment Item

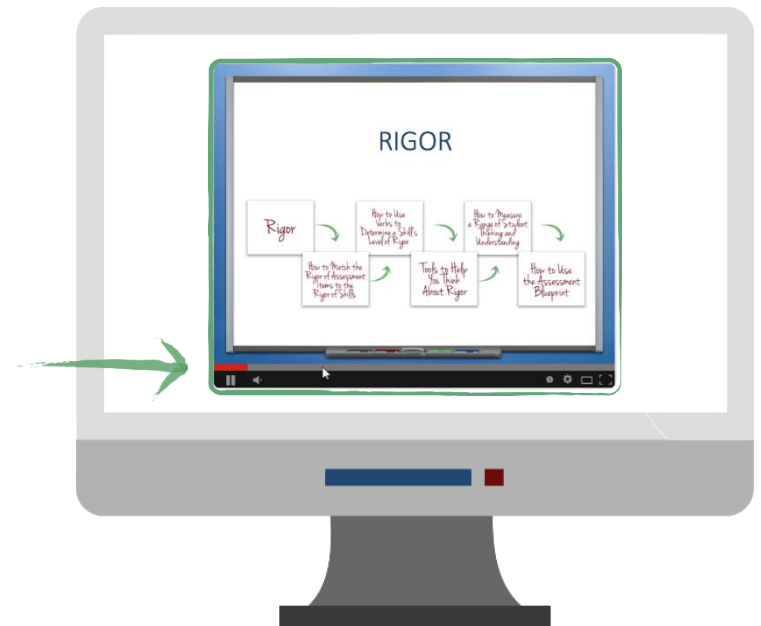
2. Explain in your own words why well-designed assessments should measure a range of student thinking and understanding.

CHECK FOR UNDERSTANDING



Assessment Item

2. Explain in your own words why well-designed assessments should measure a range of student thinking and understanding.



CHECK FOR UNDERSTANDING



Answer

2. Explain in your own words why well-designed assessments should measure a range of student thinking and understanding.

Well-designed assessments include items with various levels of rigor to ensure that they measure what all students know and can do. If assessments are too easy, some students may not have the opportunity to demonstrate the upper bounds of what they know and can do. I should include items in my assessment that challenge all of my students.

On the other hand, if assessments are too complex, some students may not be able to showcase their knowledge and skills at all. I can include items that require lower-level thinking to reveal where learning breaks down among students struggling to master a standard.

CHECK FOR UNDERSTANDING

