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ReVision
LEARNING PARTNERSHIP

ASSESSING HIGHER ORDER THINKING

Helping educators to find
new *Vision* in their work

Tools for Analyzing Student Performance Tasks

Session Objectives

- Explore ways to define and assess higher-order thinking
- Revisit rubrics—definition and use
- Understand how SBAC defines higher-order thinking
- Explore tools and processes for analyzing and refining higher-order learning tasks (aka, performance tasks)

Higher Order Thinking...

- “Is students being able to relate their learning to other elements beyond those they were taught to associate with it.”
- “Is problem solving—the nonautomatic strategizing required for reaching a goal.”

Higher Order Thinking...

- Requires construction of knowledge through the use of disciplined inquiry, to produce discourse, products, or performances that have value *beyond school*.
- Increases students' sense of control over ideas.
- Is much more fun than memorizing!

Principles for Assessing Learning

Aligning Learning Tasks to Assessment Criteria
Refining Rubrics

Basic Principles for all Assessment

- Specify clearly and exactly what it is you want to assess
- Design tasks that require students to demonstrate this knowledge or skill
- Decide what you will take as evidence of the degree to which students have demonstrated this knowledge or skill

Non-Example

- Learning target: SWBAT interpret poems
- Assessment parts:
 - ▣ One section matching poems to authors
 - ▣ One section requiring identification of rhyme & meter schemes in selected poems
 - ▣ One section asking students to write an original poem
- Question: Does this assessment measure the learning target?

Revisiting Rubrics

- Rubric—from the Latin for *red*
 - ▣ *A coherent set of criteria for students' work that includes descriptions of levels of performance quality on the criteria*
- Analytic Rubrics
 - ▣ Describe the work on each criteria separately
- Holistic Rubrics
 - ▣ Describe the work by applying all criteria at the same time

**4-Point
Informative-Explanatory
Performance Task Writing Rubric (Grades 3-5)**

Score	4	3	2	1	NS
Purpose/Organization	<p>The response has a clear and effective organizational structure, creating a sense of unity and completeness. The response is fully sustained, and consistently and purposefully focused:</p> <ul style="list-style-type: none"> • consistent use of a variety of transitional strategies to clarify the relationships between and among ideas • logical progression of ideas from beginning to end • effective introduction and conclusion • controlling or main idea of a topic is clear, focused, and strongly maintained • controlling or main idea of a topic is introduced and communicated clearly within the purpose, audience, and task 	<p>The response has an evident organizational structure and a sense of completeness, though there may be minor flaws and some ideas may be loosely connected. The response is adequately sustained and generally focused:</p> <ul style="list-style-type: none"> • adequate use of transitional strategies with some variety to clarify the relationships between and among ideas • adequate progression of ideas from beginning to end • adequate introduction and conclusion • controlling or main idea of a topic is clear and mostly maintained, though some loosely related material may be present • main idea of the topic is adequate within the purpose, audience, and task 	<p>The response has an inconsistent organizational structure, and flaws are evident. The response is somewhat sustained and may have a minor drift in focus:</p> <ul style="list-style-type: none"> • inconsistent use of transitional strategies and/or little variety • uneven progression of ideas from beginning to end; and/or formulaic • introduction or conclusion, if present, may be weak • controlling or main idea may be clearly focused but is insufficiently sustained • controlling or main idea may be unclear and/or somewhat unfocused 	<p>The response has little or no discernible organizational structure. The response may be related to the topic but may provide little or no focus:</p> <ul style="list-style-type: none"> • few or no transitional strategies are evident • frequent extraneous ideas are evident; may be formulaic • introduction and/or conclusion may be missing • may be very brief or have a major drift • focus may be confusing or ambiguous 	<ul style="list-style-type: none"> • Unintelligible • In a language other than English • Off-topic • Copied text • Off-purpose

**4-Point
Informative-Explanatory
Performance Task Writing Rubric (Grades 3–5)**

Score	4	3	2	1	NS
Evidence/Elaboration	<p>The response provides thorough and convincing support/evidence for the controlling idea or main idea that includes the effective use of sources, facts, and details. The response clearly and effectively elaborates ideas, using precise language:</p> <ul style="list-style-type: none"> comprehensive evidence from sources is integrated references are relevant effective use of elaborative techniques use of domain-specific vocabulary is clearly appropriate for the audience and purpose 	<p>The response provides adequate support/evidence for the controlling idea or main idea that includes the use of sources, facts, and details. The response adequately elaborates ideas, employing a mix of precise with more general language:</p> <ul style="list-style-type: none"> some evidence from sources is integrated references may be general adequate use of elaborative techniques use of domain-specific vocabulary is generally appropriate for the audience and purpose 	<p>The response provides uneven, cursory support/evidence for the controlling idea or main idea that includes uneven or limited use of sources, facts, and details. The response elaborates ideas unevenly, using simplistic language:</p> <ul style="list-style-type: none"> evidence from sources is weakly integrated, vague, or imprecise references may be vague, imprecise, or absent weak or uneven use of elaborative techniques use of domain-specific vocabulary is uneven or somewhat ineffective for the audience and purpose 	<p>The response provides minimal support/evidence for the controlling idea or main idea that includes little or no use of sources, facts, and details. The response's elaborates of ideas is vague, lacks clarity, or is confusing:</p> <ul style="list-style-type: none"> evidence from the source material is minimal, absent, incorrect, or irrelevant references may be absent or incorrect minimal, if any, use of elaborative techniques use of domain-specific vocabulary is limited or ineffective for the audience and purpose 	<ul style="list-style-type: none"> Unintelligible In a language other than English Off-topic Copied text Off-purpose

**Narrative Short Write Conclusion Rubric
Grade 7
Organization**

	Organization
2	<p>The response:</p> <ul style="list-style-type: none"> • has a logical organizational pattern and conveys a sense of wholeness and completeness; advances the narrative and has a conclusion • maintains consistent focus on the topic, purpose, or main idea • provides transitions to connect ideas
1	<p>The response:</p> <ul style="list-style-type: none"> • has an uneven organizational pattern; advances the narrative but may lack a conclusion • demonstrates some focus on the topic, purpose, or main idea; lapses may occur • provides weak or inconsistent transitions
0	<p>The response:</p> <ul style="list-style-type: none"> • has little or no organizational pattern • demonstrates little or no focus • provides poorly utilized or no transitions

Common Misconceptions About Rubrics

- Rubrics are not about *the requirements* for the assignment, nor are they about *counting* things—they are not checklists
- Checklists assess *compliance* not learning:
 - My state poster:
 - ___ has six facts.
 - ___ has a picture related to each fact.
 - ___ is neat.
 - ___ uses correct grammar.

“Poor” Rubric Example

My State Poster

	4	3	2	1
Facts	The poster includes 6 facts about the state and is interesting to read.	The poster includes 4-5 facts about the state and is interesting to read.	The poster includes 2-3 facts about the state.	Several facts are missing.
Graphics	All graphics relate to the topic and make it easier to understand.	One graphic is not related to the topic.	Two graphics are not related to the topic.	Graphics do not relate to the topic.
Neatness	The poster is exceptionally attractive in terms of design, layout, and neatness.	The poster is attractive in terms of design, layout, and neatness.	The poster is acceptably attractive, although it may be a bit messy.	The poster is messy or very poorly designed.
Grammar	There are no mistakes in grammar, punctuation, or spelling.	There are 1-2 mistakes in grammar, punctuation, or spelling.	There are 3-4 mistakes in grammar, punctuation, or spelling.	There are more than 4 mistakes in grammar, punctuation, or spelling

Assessing Higher-Order Thinking

Defining Higher-Order Thinking

Analyzing & Refining Learning Tasks

Misconception:

Recall = Easy; H-O Thinking = Difficult

	Easy	Difficult
Recalling	Who is the main character in <i>The Cat in the Hat</i> ?	Name all the characters in <i>Hamlet</i> .
Higher-Order Thinking (analyzing/evaluating)	Why do you think the Cat cleaned up the house on his way out, before the Mother got home?	Hamlet wrestles with a major question in his soliloquy, “O, that this too, too solid flesh would melt...” in Act 1, Scene 2, Lines 131-161. What is the question in his mind, and how do you think he resolves it in the end of the soliloquy? State your interpretation of his major question and his resolution, and use evidence from the speech to support it.

Bloom vs. Webb

Bloom:

- What *type of thinking* is needed to complete a task?

SBAC Uses Webb's
DOK as its
theoretical basis

Webb

- How *deeply* do you have to *understand* the content to successfully interact with it?
- How *complex* or abstract is the content?

Webb's Depth-of-Knowledge Levels

- **DOK-1 – Recall & Reproduction** - Recall of a fact, term, principle, concept; perform a routine procedure; locate details
- **DOK-2 - Basic Application of Skills/Concepts** - Use of information; conceptual knowledge; select appropriate procedures for a given task; two or more steps with decision points along the way; routine problems; organize/display data; interpret/use simple graphs; summarize; identify main idea; explain relationships; make predictions
- **DOK-3 - Strategic Thinking** - Requires reasoning, or developing a plan or sequence of steps to approach problem; requires decision making or justification; abstract, complex, or non-routine; often more than one possible answer; support solutions or judgments with text evidence
- **DOK-4 - Extended Thinking** - An investigation or application to real world; requires time to research, problem solve, and process multiple conditions of the problem or task; non-routine manipulations; synthesize information across disciplines/content areas/multiple sources

DOK is about depth and complexity— not difficulty

- The intended student learning outcome determines the DOK level—What *mental processing* must occur?
- It is *what comes after the verb* that is the best indicator of the rigor/DOK level

DOK is about depth and complexity— not difficulty: Example

- **Describe** three characteristics of metamorphic rocks (requires simple recall)
- **Describe** the difference between metamorphic and igneous rocks (Requires cognitive processing to determine the differences in the two rock types)
- **Describe** a model that you might use to represent the relationships that exist within the rock cycle (Requires deep understanding of the rock cycle and determination of how best to represent it)

Principles for Assessing Higher-Order Thinking

- Present something new for students to think about
 - ▣ Introductory text, visuals, scenarios, resource material, problems
 - ▣ Use novel material— new to the student, not covered in class
- Distinguish between level of difficulty (easy vs. hard) and level of thinking (lower vs. higher-order) and control for each separately

Something *New* to Think About

- “A seemingly higher-order-thinking essay question about how Melville used the white whale as a symbol is merely recall if there was class discussion on the question, “What does the white whale symbolize in *Moby Dick*?””
- “From the student’s perspective, that essay question becomes, “*Summarize what we said in class last Thursday.*””

Assessing *Creativity*

- Creative \neq *artistic* or *aesthetically pleasing*
- Creativity \neq *interesting* to the teacher or reader
- Creativity & creative thinking require:
 - ▣ A deep knowledge base in the subject
 - ▣ Production of something **NEW**, or combining known things in ***new ways*** = **INNOVATION**
 - ▣ Critical reflection on & evaluation of the new idea or innovation

Assessing *Creativity*

- Learning occurs when **you** have an “aha!” moment. Creativity occurs when you put things together so that **others** will have an “aha!” moment.
- Refrain from using creativity on a rubric as a “fudge factor” for the teacher’s overall impression of the student’s efforts.
- Refocus assessment of creativity that really means something else to its true target (e.g., neatness, artistry, interest, persuasiveness).

Task & Rubric Revision Example 1 (before)

Create a PowerPoint presentation about your country. Include information about the location, form of government, climate, flora & fauna, major industries & resources, major religions, capital, and so on.

Rubric Component	Points
Information/Content:	30
Creativity	20
Directions Followed	10

Task & Rubric Revision Example 1 (after)

Create a PowerPoint presentation in which you argue your position in response to the following question: How do the major industries in your country reflect opportunities afforded by the geopolitical location of the country?

Rubric Component	Points
Thesis is clear & supported by persuasive evidence	20
Content is accurate	20
Organization shows sound reasoning	10
Images and text on each slide show a clear understanding of PowerPoint as a visual medium for presenting ideas	10

Task & Rubric Revision Example 2 (before)

Write a review of one of the plays the class has read.

Rubric Component: Creativity	Score
Review demonstrates a high level of creativity . It is exciting & interesting. The review makes you want to go see the play.	4
Review demonstrates a moderate level of creativity . It is interesting. The review makes you want to see the play.	3
Review demonstrates some level of creativity . It could be more interesting. The review does not make you want to see the play.	2
Review demonstrates no level of creativity . It is not interesting. The review does not make you want to see the play.	1

What does this teacher actually want to assess on this component of the rubric?

Task & Rubric Revision Example 2 (after)

Assignment: Write a review that piques readers' interest and persuades them to go see one of the plays the class has read.

Rubric Component: Persuasion	Score
Review demonstrates a high level of persuasion . It is exciting & interesting. The review makes the reader want to go see the play.	4
Review demonstrates a moderate level of persuasion . It is somewhat interesting. The review makes the reader want to see the play.	3
Review demonstrates some level of persuasion . It could be more interesting. The review does not make the reader want to see the play.	2
Review demonstrates no level of persuasion . It is not interesting. The review does not make the reader want to see the play.	1

5 Step Process for Analyzing an Assessment

1. Analyze your assessment item by item.
2. Organize the learning targets into an assessment plan.
3. Question your assessment plan.
4. Adjust your assessment plan.
5. Draw conclusions about your assessment.

1. Analyze your assessment item by item.

- Identify and write down what learning each item assesses.
- Describe the learning in whatever terms you want.
- If two or more items address the same learning, use the same terms to describe that learning.

2. Organize learning targets into an assessment plan.

Learning Target	Item #s	Points
Write expressions in equivalent forms to solve problems	1, 5, 9, 11, 16	15
Interpret the structure of expressions	2	3
Solve equations and inequalities in one variable	4, 12	6
Create equations that describe numbers or relationships	3	3
Perform arithmetic operations on polynomials	7, 10, 14, 15	12
Rewrite rational functions	13	3
Represent and solve equations and inequalities graphically	6, 8	6

3. Question your assessment plan.

- Does the number of points for each target represent its relative importance?
- Does the the number of points represent the amount of instructional time spent per target?
- Are some important targets missing from the assessment?
- Do all of the items align with the standards actually taught in class?

4 . Adjust your assessment plan.

- Consider the amount of time spent teaching each learning target & each target's relative importance to the content as a whole; then adjust the point totals
- Add or delete learning targets to reflect what was taught and what was most important to learn and assess

5. Draw conclusions about your assessment.

- What does your analysis tell you about the matches among what's written in your curriculum, what you taught, and what you assessed?

A Tool for Analyzing Learning Tasks

The Hess Matrix

Hess' Cognitive Rigor Matrix: Applies Webb's DOK to Bloom's Cognitive Process Dimensions

Source: Karin Hess, 2009

Depth + thinking	Level 1 Recall & Reproduction	Level 2 Basic Skills & Concepts	Level 3 Strategic Thinking & Reasoning	Level 4 Extended Thinking
Remember	- Recall, locate basic facts, details, events			
Understand	- Select appropriate words to use when intended meaning is clearly evident	- Specify, explain relationships - summarize - identify main ideas	- Explain, generalize, or connect ideas using supporting evidence (quote, example...)	- Explain how concepts or ideas specifically relate to other content domains or concepts
Apply	- Use language structure (pre/suffix) or word relationships (synonym/antonym) to determine meaning	- Use context to identify meaning of word - Obtain and interpret information using text features	- Use concepts to solve non-routine problems	- Devise an approach among many alternatives to research a novel problem
Analyze	- Identify whether information is contained in a graph, table, etc.	- Compare literary elements, terms, facts, events - analyze format, organization, & text structures	- Analyze or interpret author's craft (literary devices, viewpoint, or potential bias) to critique a text	- Analyze multiple sources or texts - Analyze complex/abstract themes
Evaluate			- Cite evidence and develop a logical argument for conjectures	- Evaluate relevancy, accuracy, & completeness of information
Create	- Brainstorm ideas about a topic	- Generate conjectures based on observations or prior knowledge	- Synthesize information within one source or text	- Synthesize information across multiple sources or texts

SBAC Example: Grade 4 ELA Task

- Read an article and watch a video about what some animals do to defend themselves from danger; answer three questions about what you have learned; write an article that explains how some animals defend themselves.

SBAC Example: Grade 4 ELA Questions

1. What does the article tell you about why some animals curl up? Use details from the article to support your answer.
2. Think about the animals described in the article. In what way are their defenses similar or different? Explain your answer using details from the article.
3. In the video, the puffer fish and the crab were both successful in protecting themselves from the same enemy. Do the puffer fish and the crab have the same type of defense? Explain your answer and include details from the video in your response.

SBAC Example: Grade 11 Math

- Task: Organize and analyze data to model the relationship between temperature and the chirping rates of snowy tree crickets. Develop an equation to describe the relationship, and compare your mathematical model to another formula.
- Task Purpose: To assess students' ability to use new data to challenge the assumptions of an existing mathematical formula.

A Few More Examples—Turn & Talk

1. Design an investigation to explain the effect of varying temperatures of the river in different locations. DOK level? 4
2. Measure the temperature of water at different times/places. DOK level? 2
3. Measure the temperature of water. DOK level 1
4. Construct a model to organize, display, and compare the data. DOK level? 3

THANK YOU!

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Remaining Questions?



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