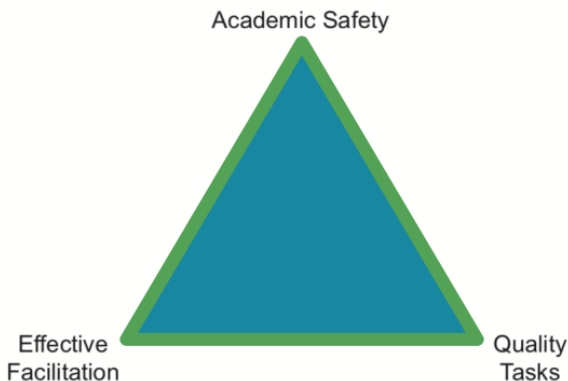


ASSESSMENT



A card set based on Chapter 10: Assessment from *Necessary Conditions: Teaching Secondary Math With Academic Safety, Quality Tasks, and Effective Facilitation* by Geoff Krall

What is this card set?

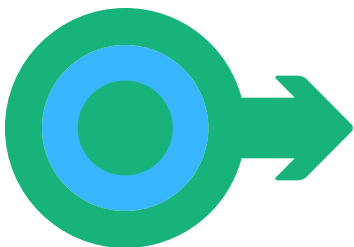
This card set provides resources, ideas, and "do nows" based on the Assessment chapter (Chapter 10) in *Necessary Conditions* by Geoff Krall.

If we aspire to a learning environment that fosters Academic Safety, employs Quality Tasks, and utilizes Effective Facilitation our Assessment practices and systems must change. Good assessment can improve adult learning as well as student learning. The following are essential ingredients to a robust, supportive system of assessment:

- Articulation of meaningful student outcomes**
- Collection of meaningful data**
- Meaningful data analysis**
- A system that supports assessment and learning**



Identify Meaningful Outcomes



Consider what skills and knowledge you'd like students to be equipped with when they leave your classroom. Much of that may be content-oriented, some of them may go beyond math content. Consider skills such as presentation, writing, and collaboration skills. Even if you don't formally assess these skills, it's important to articulate them to yourself and your students so you may embed opportunities for students to practice and learn them.

WHY: Teachers want students to be successful long after they've left their classroom. While much of that is reliant on students' math knowhow, there are other skills students will need to continue to thrive.

Consider the following prompts - feel free to journal or discuss with peers:

- Why is math important for students to know and do?
- What skills outside of those embedded in the standards of your course should students be equipped with?
- Draw a picture of the ideal graduate of your school. What are they doing? What are they saying?
- How is your course important even for students who do not proceed with careers in mathematics?

Some examples of meaningful outcomes

Schoolwide Learning Outcomes. Samueli Academy has identified five learning outcomes that the entire school assesses on, including the math department: Agency, Written Communication, Oral Communication, Collaboration. Each outcome has a rubric associated with it that teachers use to teach and assess such skills.

Mathematical Smartness. What does it mean to be mathematically smart? It goes beyond mere computation. Much of what makes being a mathematician are “smartnesses” such as persistence, trying several approaches, being creative, and clear communication of ideas.

Common Core Standards of Mathematical Practice. Common Core has provided eight practice standards that are relevant for all grade levels. The tasks you provide and the instruction you give ought to focus on mathematical practice standards such as these.

Rubrics

	Emerging	E/D	Developing	D/P	Proficient	P/A	Advanced
Content/ Problem Specific	<p>Solution does not contain an equation that models the cost of energy use over time</p> <p>Did not support your prediction by using one other mathematical model (substitution or elimination)</p>		<p>Solution contains an incomplete equation that incorrectly models the cost energy use over time</p> <p>Supported your prediction by using one mathematical model (substitution) in addition to graphing</p>		<p>Solution contains an equation that models the cost of energy use over time, given the assumptions about element price.</p> <p>Supported your prediction by using two mathematical models (substitution and elimination) in addition to graphing</p>		<p>Solution contains an explained equation that models energy use over time, given the assumptions about element price.</p> <p>Supported your prediction by explaining how you used two mathematical models (substitution and elimination) in addition to graphing</p>
Reasoning & Proof (General)	Provides incorrect or incomplete solutions without justifications		Provides partially correct solutions without logic or justification		Constructs logical, correct, complete solution		Constructs logical, correct, complete solution with justifications

Rubrics are assessment tools that assign scores based on a spectrum of student outputs. They are often arranged in rows and columns. The rows represent the skills of the student while the columns represent the level of proficiency the student displays.

WHY: Quality rubrics offer accurate insight into specific knowledge and skills while offering a pathway to improvement for students. Rubrics yield much more information than a simple numerical grade and, provided you provided the same or similar rows, you can measure growth over time.

Parts of a rubric

Proficiency Columns: The columns indicate the levels of proficiency. From left to right, give names to various levels of proficiency (such as, “Emerging,” “Developing,” “Proficient,” and “Advanced”).

Rows and skills: The rows lay out the specific skills and knowhow students demonstrate in the task.

Indicators: Indicators are the identifiers by which student work is placed in a specific column.

Proficiency Columns				
	Emerging	Developing	Proficient	Advanced
Math Content (Displaying Graphs)	Graph is difficult to interpret and/or its formatting is indecipherable.	Graph shows gas usage over time, but is scaled in a misleading or confusing way.	Graph shows gas usage over time and is properly scaled.	Graph shows gasoline usage over time, properly scaled and annotated.
Skills				
Indicators				

Checklist vs. Rubrics. Be wary of checklists masquerading as rubrics. Rubrics indicate levels of student work while checklists typically offer a binary (right or wrong, present or not present).

Do now: create a small rubric for the next complex task you'll assign in class.

Extend: See the cards “Using Common Indicators” and “Teaching Rubrics” for more insight in making rubrics even more robust.

Using Common Indicators



Common indicators are rubric indicators that are used over a span of time or multiple tasks. Such indicators are general enough that they can be assessed even in different problem contexts, yet specific enough that the assessment is meaningful and actionable.

WHY: By using the same or similar indicators over multiple tasks, we can assess and communicate to students how they've grown over time. This, of course, requires a system by which teachers and students can access the data provided by these common indicators.

Common indicators provide an opportunity to reinforce student skills and attributes. For a task, consider what are the skills apart from the math content that we might want to revisit later. Refer to your list of Meaningful Outcomes (p.189) for potential common indicators

How to build a rubric row with common indicators:

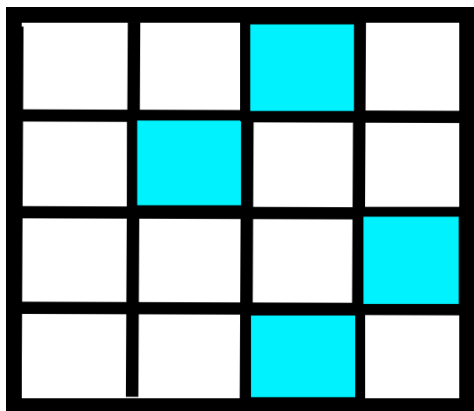
- 1) Start with the “proficient” column. Write an indicator that would be proficiency for the associated row or skill.
- 2) Think about what it would look like to go beyond “proficient.” What would exemplary work look like? Fill out the advanced indicator in the far right column (“advanced”).
- 3) Consider what would it look like to fall short of proficient. Fill in the indicators for the two left columns.
- 4) Assign points to the rows if appropriate.

Once you have that row, save it somewhere and reapply it to future tasks and associated assessment rubrics.

Do now: Create a row for a common indicator. Some suggestions: problem solving, checking for accuracy, clear visual aids, collaborative encouragement, presentation skills, etc.

Extend: Share the common indicator row with the rest of your department to get feedback and invite them to use the indicators as well.

Teaching Rubrics



Just like with any tool, students need to be taught how they are being assessed with rubrics and what the indicators of the rubrics mean.

WHY: Rubrics can be intimidating assessment tools on first glance. As with any daunting task, teachers need to be mindful of how much information they're presenting to students and how they're presenting it.

How to teach a rubric

Provide examples for each rubric column. Let students see what, say, “Proficient” work looks like vs. “Advanced” work. Make sure students understand the difference and how those differences show up in the indicators.

Start with small rubrics. Early on, consider providing rubrics with only one or two rows with indicators. Use small rubrics often early in the year by providing a single row on warm ups or exit tickets.

Give the rubric early in (or before) a task. Let students see what they are being assessed on before they complete the task. This will allow them to better understand what’s being asked of them while allowing them to revise their work.

Allow students to reflect on their work with the rubric. Let students assess themselves with the rubric. If appropriate, offer a time for a sentence or two on why they gave themselves the score they did.

Extend: Have students create examples of work that would reside in each column of a rubric. Ask them to describe why the example is in that particular column.

Student Portfolios



Create (or have students create) repositories of mathematical artifacts which you may then use to identify growth throughout the year.

WHY: Collecting and reflecting on student work produced by high quality tasks over the course of the year will help you and the student see their growth. Students will see how much the quality of their work has improved in a way that is rarely reflected in ephemeral assessments such as unit tests.

Establishing portfolio system requires intentionality. There are several elements that a teacher or department must establish to make sure the system is structured and effective.

Essential elements of a portfolio system

Element of a Portfolio System	Suggested Resources and Tools
Complex Tasks	<i>Three-Act Math</i> tasks (Chapter 3) <i>Would You Rather . . .</i> tasks (Chapter 3) Problem-Based Learning tasks (Chapter 3) Problem-Solving tasks (Chapter 8)
A place to store the student work	Physical folders or files Google Docs/Google Drive (For paper-based work, take a photo and upload.)
Student reflection materials	Rubrics Reflection prompts
Periodic times to revisit the work during the school year	End of the semester End of each grading period Student-teacher/student-parent-teacher conferences End of the school year

Discuss: How might student portfolios communicate to students that they are capable mathematicians better than traditional forms of assessment?

Extend: Provide your class’s portfolios for teachers of the next grade level. This will give their teachers better insight into what students have done in your class than any test score.

Analyzing Student Work



Use protocols with peers to analyze student work to clarify student knowhow and provide insight to your own instruction.

WHY: Analyzing student work allows teachers to gain insight into how students understand a particular task and their overall understanding of the mathematical content. The use of protocols allows for this to be done in a safe learning environment with colleagues.

With your colleagues, set aside departmental time to analyze student artifacts. Student work analysis both requires and fosters a collaborative, professional culture. The insight teachers gain into their students and their own lessons is invaluable.

Sample Student Work Analysis Protocol

Student Work Analysis Protocol

Prework:

Presenting teacher collects two artifacts of student work based on rich task. The teacher brings one “high” and one “medium” artifact to the session. The designation isn’t particularly significant. We just need enough work to be able to learn something about what the student knows and can do.

Protocol:

- Presenting teacher describes the task the student work came from. (2 minutes)
- Participants analyze and annotate the work silently. (5–10 minutes)
- Facilitator asks, “What did you see in the student work?” Participants describe evidentiary items they saw in the work. (5–10 minutes)
- Facilitator asks, “What do you think the student thought he or she was working on, based on the evidence we see?” Participants talk about the work from the student’s perspective. (5–10 minutes)
- Facilitator asks, “What questions are you left with after this discussion?” Participants share questions they have for the student and/or presenting teacher. (5–10 minutes)
- Presenting teacher reflects aloud on the conversation. (5 minutes)

Do now: On a shared calendar, mark who will be presenting student work during professional development time, such as in-service or early release days.

Designing Better Tests



Redesign your current assessment structures to better reflect your day-to-day instructional practice.

WHY: Traditional assessments can still be an efficient means of collecting information of what students know and can do. Provided we are thoughtful about such assessments, we can make them align well with our pedagogy of academic safety, quality tasks, and effective facilitation.

Here are some suggested “do nows” that can make tests and quizzes better in the near term.

Make tests and quizzes shorter. Don't use an entire class period for students sitting silently taking a test. Make the assessment shorter and use the bank of time to discuss strategies or reflect on their work.

Incorporate high-quality tasks into your tests. Give a few assessment items that map with the Quality Task Checklist. Assess it with a rubric (provided for the students ahead of time).

Assess the standards for the current week and key standards from previous week. Make sure that the lessons from previous weeks stick. It's helpful to provide reminders for students of how previous material connects to current material.

Allow collaboration and discussion on at least a portion of the test. Don't shy away from groupwork even during assessment time. Try to make your assessments look as much like regular class days as possible.

Allow (and demand) retakes for full credit. Let all students improve their score. Encourage (and demand) students retake assessments early on in the school year or grading period.