ASSESSMENT OPTIONS

Assessment is often characterized as a "systematic collection and analysis of information to improve student learning" (Stassen, 2001). The framework of Universal Design for Learning (UDL) explicitly calls for multi-dimensional assessment practices (Meyer, 2014). According to Lambert (2020), mathematical assessments should be flexible, allowing for multiple means of expression (e.g. talking, writing, drawing, typing responses) as well as actionable feedback to students.
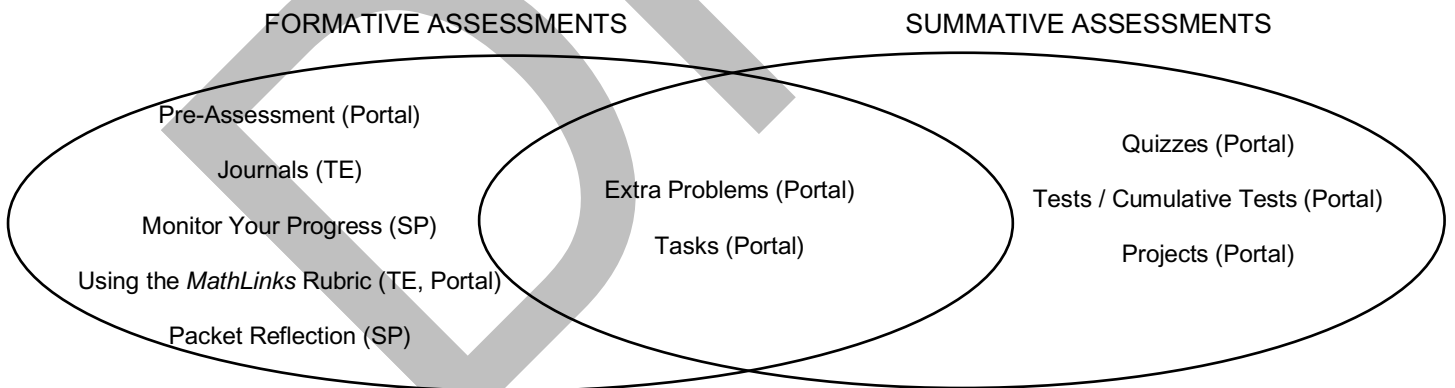
PRE-ASSESSMENT AND FOLLOWUP

MathLinks includes multiple tools for pre-assessment and pre-teaching important skills and concepts.

- MathLinks **Pre-Assessments** are located in General Resources. They provide snapshots for key information that students should know prior to instruction.

- **Getting Started** pages in the Student Packets pre-assess, refresh, and preview important concepts in the lesson.

- Reteach and practice **Essential Skills**, which are located in Packet Resources. These puzzles, games and problems focus on skills and concepts needed for success in a particular packet.

- For more extensive work, consider including **Skill Boosters** as a daily routine. They are located on the landing page of the Teacher Portal. If only a portion of the class needs this routine, consider using Nonroutine Problems in Packet Resources as an alternative routine for enrichment.

OVERVIEW OF FORMATIVE AND SUMMATIVE ASSESSMENTS

In *MathLinks* we provide both formative (assessment for learning) and summative (assessment of learning) assessments, which are located in the Student Packets (SP), cited in the Teacher Edition (TE), or available on the Teacher Portal (Portal).

FORMATIVE ASSESSMENTS   SUMMATIVE ASSESSMENTS

Pre-Assessment (Portal)

Journals (TE)

Monitor Your Progress (SP)

Using the *MathLinks* Rubric (TE, Portal)

Packet Reflection (SP)

Extra Problems (Portal)

Tasks (Portal)

Quizzes (Portal)

Tests / Cumulative Tests (Portal)

Projects (Portal)

FORMATIVE ASSESSMENTS

Formative assessment refers to a wide variety of methods that teachers use to collect data, improve instruction, and evaluate student learning while it is happening. What makes an assessment "formative" is not necessarily its design, but the way the information is used. *MathLinks* includes five features appropriate for formative assessment.

- **Pre-Assessment:** The Pre-assessment gives a quick view of proficiency for major work in prior grades. Students who need extensive work with number, expressions, or equations may benefit from including Skill Boosters as part of the classroom routine. Essential Skills provide "just in time" review for Packets with puzzles, games, and other engaging activities. The Pre-assessment and Skill Boosters are located in General Resources in the Teacher Portal. Essential Skills are in Packet Resources in the Teacher Portal.

- **Journals:** The Journal icon at the bottom of a page in the Teacher Edition indicates that a question may be used as a journal prompt or "Exit Ticket". These questions generally require students to explain their thinking related to an important concept in the lesson. Using them as journal prompts adds weight to their importance. By reviewing a sample of journals, the teacher will get a snapshot of class progress. Teachers may want students to keep a separate math notebook for journal prompts, notes, and other non-packet work.

> Journal Idea

Research (Stenger, 2014) shows that students who are encouraged to take ownership for their own learning are better able to identify and work toward learning goals, are more likely to believe that it is within their control to succeed in school, and demonstrate life skills such as initiative, self-direction and productivity. Three formative assessment routines in the *MathLinks* aim to engage students in self-assessment of their own learning.

- **Monitor Your Progress**: A Journal icon at the end of every lesson in the TE prompts teachers to ask students to assess their learning on the front of the packet. There, a 3-2-1-0 Likert scale gives students and teachers a quick measure of student confidence for each lesson goal. At the beginning of the year, teachers may want the classroom as a community to define the scale using growth mindset descriptors.

- **Using the *MathLinks* Rubric**: In *MathLinks*, problems with multiple parts that are built around a theme or context typically include some of the following: (1) doing procedures, (2) creating or using representations (e.g. pictures, numbers, symbols, graphs), (3) interpreting data, (4) constructing responses, (5) explaining reasoning. These kinds of problems typically appear in Student Packets or as Tasks, and there will be a notation on the Answer Key when it is appropriate to score them using a rubric. Consider the Activity Routine (see General Resources in the Techer Portal), Using the *MathLinks* Rubric, to promote class discussions and shift some responsibility for feedback to students for some these problems. The *MathLinks* Task Rubric is shown here.

> ### *MATHLINKS* Task Rubric
>
> Task requirements will vary. Choose bullets appropriately.
>
> - Math (SMP 6)
>   - Computations and procedures are correct
>   - Representations (numbers, symbols, diagrams) are created correctly
>   - Vocabulary is used properly
>
> - Context (SMP 1, 4)
>   - Solutions satisfy problem requirements, including quantities and units
>   - Suitable representations are used
>   - Data is interpreted appropriately within the problem context
>
> - Reasoning (SMP 3)
>   - Solutions and strategies are justified
>   - Explanations are clear and flow logically

- **Packet Reflection**: Near the end of each packet is a page where students make connections related to the concepts learned and reflect on their own learning. Students are also directed back to Monitor Your Progress to assess their own growth.

SUMMATIVE ASSESSMENTS

Summative assessments are used to evaluate student learning, skill acquisition, and academic achievement at the conclusion of a defined instructional period. *MathLinks* includes three features that are appropriate for summative assessments.

- **Quizzes:** These on-demand assessments are intended to be used at the end of each packet. There are two forms of quizzes. They assess work done in the packet with procedural questions and constructed responses. All questions are correlated to the grade level CCSS-M Content Standards. Quizzes for each packet are located under Assessment Options in the Teacher Portal.

- **Tests / Cumulative Tests**: Multiple choice, selected response, and short answer questions that assess grade level content standards are organized into ten "Test" files, labeled to correspond with their *MathLinks* Packets. They may stand alone or be combined to make cumulative assessments. When possible, we encourage the administration as cumulative tests several weeks after completion of packets because students continue to practice skills and concepts in Spiral Review. Tests are available .DOC and .PDF formats to make customization convenient. All questions are correlated to the grade level CCSS-M Content Standards. Test files are located under General Resources in the Teacher Portal.

- **Projects**: Projects are authentic, multi-day experiences involving skills, concepts, and problem solving across one or more domains. They may incorporate research, require collection and display of data, or creation of a product. The instructions for the project typically also serve as the scoring guide.   All projects are correlated to the grade level CCSS-M Content Domains (Big Ideas) and the Standards for Mathematical Practice. Projects are located in under Assessment Options in the Teacher Portal.

COMPONENTS FOR SUMMATIVE OR FORMATIVE ASSESSMENT

The difference between a formative and summative assessment typically lies in its intended use. Two components in *MathLinks* especially appropriate for either purpose.

- **Extra Problems**: These problems, which are organized by lesson, are appropriate for extra practice, or selected problems may be used to create additional assessments. They are located in Packet Resources and Assessment Options in the Teacher Portal.

- **Tasks**: Tasks engage students in solving multi-part problems around a theme or context. The *MathLinks* Task Rubric is an appropriate tool for evaluating student work on many of the Tasks. All tasks are correlated to the grade level CCSS-M Content Domains (Big Ideas) and the Standards for Mathematical Practice. They are located in Packet Resources and Assessment Options.

THE IMPORTANCE OF RUBRIC-WORTHY PROBLEMS AND TASKS

Depth of Knowledge (DoK) categorizes student work according to the complexity of thinking required to successfully complete it. This wheel summarizes key words often used to describe DoK. (Guido, 2020).

MathLinks quizzes and tests align to specific Standards for Mathematical Content (CCSS-M). These tend to focus on specific concepts and procedures (typically Depth of Knowledge levels 1-3). Rubric-worthy problems, tasks, and projects align to content domains (MathLinks Big Ideas) and the Standards for Mathematical Practice (typically Depth of Knowledge levels 2-4). They typically require application of concepts and procedures in nonroutine ways as students communicate reasoning. This is one reason why it is so important for students to experience rubric-worthy problems on a regular basis.

Regular practice with rubric-worthy problems and tasks will also help prepare students for high stakes assessments such as those created by the Smarter Balanced Assessment Consortium (SBAC) and Partnership for Assessment of Readiness for College and Careers (PARCC). Both organizations publish similar "Claims" for their assessments.

A DEPTH OF KNOWLEDGE WHEEL
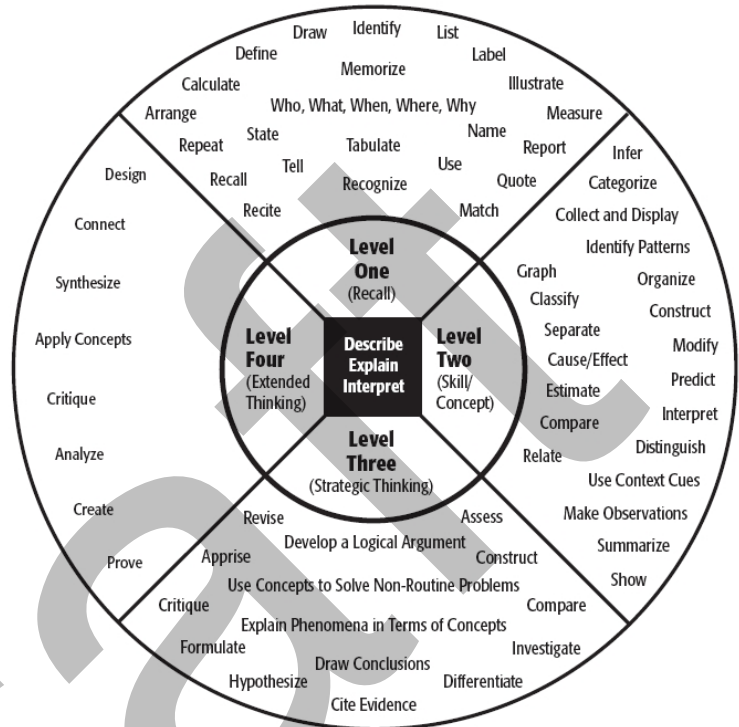
SBAC	PARCC Master Claim: On track for college and career readiness.
Claim #1: Concepts and Procedures	Sub-Claim A: Problem solving involving Major content for the grade*
Claim #2: Problem Solving	Sub-Claim B: Problem solving involving Additional and Supporting Content of the grade*
Claim #3: Communicating Reasoning	Sub-Claim C: Express Mathematical Reasoning (highlights MP 3, 6)
Claim #4: Modeling and Data Analysis	Sub-Claim D: Modeling/Applications (highlights MP4)

*As defined by Achieve the Core.

Descriptive feedback helps students improve the quality of their responses (Stenger, 2014), but it is a time-consuming expectation for teachers. The *MathLinks* Task Rubric synthesizes key elements of the SBAC and PARCC Claims into a concise and simple feedback and scoring tool that can be used throughout the year by both students and teachers.

By Using the *MathLinks* Rubric as an Activity Routine a few times each month in class, students will learn to create more complete responses through class discussions, peer review, and feedback. This work also aims to help students see the beauty and utility of mathematics, and set them up for greater success on summative high-stakes assessment tasks.