Texas Webinar Series: 
Using Formative Assessment in the 
Middle School Math Classroom

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AGENDA

• How is formative assessment defined?
• What might be some benefits of using formative assessment?
• How could it be implemented in the classroom?
# ASSESSMENT OF AND FOR LEARNING

## Formative Assessment
Formal and informal processes teachers and students use to gather evidence for the purpose of improving learning

## Summative Assessment
Assessments that provide evidence of student achievement for the purpose of making a judgment about student competence or program effectiveness
## ASSESSMENT **OF AND FOR** LEARNING

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<th>Assessment OF Learning</th>
<th>Assessment FOR Learning</th>
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<tr>
<td><strong>Reason</strong></td>
<td>Check status</td>
<td>Improve learning</td>
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<td><strong>To Inform</strong></td>
<td>Others (summative)</td>
<td>Students (involvement)</td>
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<td><strong>Focus</strong></td>
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<td><strong>Example</strong></td>
<td>Internal/external</td>
<td>Diagnostic assessments,</td>
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<td>accountability tests</td>
<td>ungraded quizzes, teacher</td>
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<td>observations, learning logs,</td>
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<td>oral questioning, etc.</td>
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<td><strong>Teacher’s Role</strong></td>
<td>Administer, interpret/use results, develop classroom tests, assign grades</td>
<td>Change standards into classroom targets, provide descriptive feedback, inform and involve students</td>
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<td><strong>Student’s Role</strong></td>
<td>Meet standard, score high/avoid failure</td>
<td>See target, use results to improve learning; set goals</td>
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How is formative assessment defined?
WHAT IS FORMATIVE ASSESSMENT?

The wide-ranging research review by Black and William (1998, summarized in 2001) described formative assessment as:

…all those activities undertaken by teachers, and by their students in assessing themselves, which provide information to be used as feedback to modify the teaching and learning activities in which they are engaged. Such assessment becomes ‘formative assessment’ when the evidence is actually used to adapt the teaching work to meet the needs.
WHAT IS FORMATIVE ASSESSMENT?

When incorporated into classroom practice, the formative assessment process provides information needed to adjust teaching and learning while they are still happening. The process serves as practice for the student and a check for understanding during the learning process. The formative assessment process guides teachers in making decisions about future instruction.
WHAT IS FORMATIVE ASSESSMENT?

Here are a few examples that may be used in the classroom during the formative assessment process to collect evidence of student learning. *How many do you use?*

- Observations
- Admit/Exit Slips
- Questioning
- Response Logs
- Electronic Response Systems
- Math Journals
- Graphic Organizers
- Peer/Self Assessments

- Signals
- Practice Presentations w/feedback
- Kinesthetic Assessments
- Individual Whiteboards
- Four Corners
- Constructive Quizzes
- Think-Pair-Share/Partner Share
- As I See It/Sentence Stems
What might be some benefits of using formative assessment?

Research shows that formative assessment teaching results in more long-term learning for students.
Their research review (1998a) examined studies that collectively encompassed kindergarteners to college students; represented a range of subject areas and were conducted in numerous countries throughout the world, including the United States. The gains reported in the studies they describe are among the largest found for any educational intervention.

Typical effect sizes were between 0.4 and 0.7. In other words, the achievement gains realized by students whose teachers rely on formative assessment can range from 15 to 25 percentile points, or two to four grade equivalents, on commonly used standardized achievement test score scales. In broader terms, this kind of score gain, if applied to performance on recent international assessments, would move the United States’s rank from the middle of the pack of 42 nations tested to the top five (Black & Wiliam, 1998b).
Mathematical process standards. The student uses mathematical processes to acquire and demonstrate mathematical understanding. The student is expected to:

(A) apply mathematics to problems arising in everyday life, society, and the workplace;

(B) use a problem-solving model that incorporates analyzing given information, formulating a plan or strategy, determining a solution, justifying the solution, and evaluating the problem-solving process and the reasonableness of the solution;

(C) select tools, including real objects, manipulatives, paper and pencil, and technology as appropriate, and techniques, including mental math, estimation, and number sense as appropriate, to solve problems;

(D) communicate mathematical ideas, reasoning, and their implications using multiple representations, including symbols, diagrams, graphs, and language as appropriate;

(E) create and use representations to organize, record, and communicate mathematical ideas;

(F) analyze mathematical relationships to connect and communicate mathematical ideas; and

(G) display, explain, and justify mathematical ideas and arguments using precise mathematical language in written or oral communication.
How could it be implemented in the classroom?
STUDENTS AS PRIMARY USERS

Paul Black and Dylan Wiliam (1998) reported formative assessment produced significant gains where students were the primary users of formative assessment information. These successful schools reported these practices:

• Formative assessment began with offering students a clear picture of learning targets.

• Student received feedback on their work that helped them understand where they were with respect to the desired learning target.

• Students engaged in self-assessment.

• Formative assessment provided an understanding of specific steps that students could take to improve.
D. Royce Sadler (1989) reported similar findings. Three conditions required for students to improve:

- The student comes to hold a concept of quality roughly similar to that held by the teacher.
- The student is able to monitor continuously the quality of what is being produced during the act of production itself.
- The student has a repertoire of alternative moves or strategies from which to draw at any given point.
3 BASIC QUESTIONS???
(Adapted from Atkin, Black & Coffey 2001)

Where am I going?

Where am I now?

HOW CAN I CLOSE THE GAP?
# SEVEN STRATEGIES OF ASSESSMENT FOR LEARNING

*(Stiggins, Arter, Chappuis, & Chappuis, 2004)*

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<td>Strategy 4: Teach students to self-assess and set goals.</td>
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<th>How Can I Close the Gap?</th>
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<td>Strategy 5: Design lessons to focus on one learning target or aspect of quality at a time.</td>
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<td>Strategy 6: Teach students focused revision.</td>
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<td>Strategy 7: Engage students in self-reflection, and let them keep track of and share their learning.</td>
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Strategy 1: Provide students with a clear and understandable vision of the learning target.

• Share learning targets before instruction begins.
• Talk to students about why they are learning what they are learning.
• Targets should be linked to standards but rewritten in student-friendly language. (I can statements)
• Have students help you rewrite standards in student-friendly language as you dissect/unpack standard together.
Who is assessing work products and providing feedback in your classroom?

*We tend to think that providing feedback is something done exclusively by teachers.*
When teachers model and facilitate reviewing of student work samples with students, they are “teaching the habits and skills of collaboration in peer-assessment. Peer-assessment can help develop the objectivity (and essential skills) required for effective self-assessment.”

(Black, Harrison, Lee, Marshall, & Wiliam, 2003)
Strategy 2: Use examples and models of strong and weak work.

• It seems simple…for students to strive for excellence, they must know what excellence look like. Use exemplars!!!

• When students evaluate weak examples that mirror common misconceptions, they become more proficient at identifying their own weaknesses and gain better understanding of quality. (My Favorite No, Thumbs Up/Thumbs Down, Who’s Correct?)

• Peer assessment leads to self-assessment—have students analyze and evaluate student work products and provide evidence. This works well with rubrics!!!
RESEARCH SHOWS that only providing a positive example does not eliminate some of the things students may think. Consistent peer analysis will also help students analyze their own work for errors and correctness.
Strategy 3: Offer regular descriptive feedback.

Marzano stated that feedback should be:

• Corrective in nature
• Timely
• Specific to criterion
• Students can provide some of their own feedback (self-assessment)

Black & Wiliam (et al, 2003) stated comments should be based on mathematical performance and identify:

• What has been done well
• What still needs improvement
• Give guidelines on how to make the improvement
FEEDBACK EXAMPLES

Non-examples:

- “Good job”
- “Title?”
- “Please finish”
- “Answer all questions”
- “This is neater and shows you tried harder”

Examples:

- “Susan, you have got the right idea here about trying to explain the rule. Think, does this apply to triangles?”
- “Richard, clear method, results and graph, but what does this tell you about the relationship?”
Study by Ruth Butler in 1988 had 3 different feedback groups: students who received numerical grades only, student who received a combination of grades and comments, and a comments only group.

RESULTS:
• Marks only = NO GAINS
• Comments only = Scored 30% higher (average)
• Marks and Comments combined = NO GAINS, marks canceled beneficial effects of the comments

What can you conclude from this?
Where am I now?

Strategy 4: Teach students to self-assess and set goals.

• Have students use a rubric to self-assess and attach rubric to work they turn in.
  – They can highlight in yellow, you highlight in blue, when you return anything that is green is where teacher and student agreed

• Goal setting and student portfolios
  – Use self-assessment forms like shown here and keep in portfolio with sample work
  – Revisit and update portfolio. Reflect on achievement towards goals, set new goals, etc.
Strategy 5: Design lessons to focus on one learning target or aspect of quality at a time.

“Choose your battles!”

• This does not mean lessons cannot be aligned to multiple standards. However, when you are focusing on developing aspects of quality, choose one aspect to focus on for particular lessons. Especially when you are teaching students to peer or self-assess with rubrics/criteria lists.
“Since we very often present only polished, final (products) in mathematics classrooms, students have too few opportunities to see the importance of revision as a necessary component of reasoning.”

“We need to convince our students that mathematics is a rich, interesting subject that deserves their prolonged intellectual attention, not just their first-draft thinking.”

(Silver, Kilpatrick, and Schlesinger, 1995)
CLASS TIME FOR REVISION

Students need the opportunity to read, use and reflect on feedback to work on improvement within a supportive environment, specifically, the classroom.
Strategy 7: Engage students in self-reflection, and let them keep track of and share their learning.

• Quick check-ins, such as exit slips
• Journals with questions about goals and progress towards goals
• Sharing data with students and providing self-reflective questions for them to use to analyze their data and set goals or revise goals
• Celebrate successes
• Student Portfolios—populate with student work and items such as those listed above
“The seven strategies described here are designed to help students better understand their learning goals, recognize their own skill level in relation to the goals, and take responsibility for reaching the goals. By expanding our formative assessment practices to systematically involve students as decision makers, teachers acknowledge the contributions that students make to their own success and give them the opportunity and structure they need to become active partners in improving their learning.”

(Jan Chappuis)
DON’T FORGET…

Think about the types of task you use in your classroom…
Are they good resources for formative assessment?

• Register to review our Texas Middle School Math Series
  – www.carnegielearning.com/texasreview

THANK YOU FOR JOINING US TODAY!!!
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