Formative Assessment in the Mathematics Classroom

Slides at https://goo.gl/2tMMIH
Figure 1.1. The Cycle of Instruction with Formative Assessment

Objectives, Goals, Standards

Responding to Data

Formative Assessment

Targeted Instruction

Informed Teaching

Data Analysis
Principles to Actions

Ensuring Mathematical Success for All

NCTM's landmark publication Principles to Actions connects research with practice. Specific, research-based teaching practices that are essential for a high-quality mathematics education for each and every student are combined with core principles to build a successful mathematics program at all levels.
Assessment serves 4 distinct functions in Maths

- Monitoring students’ progress to promote student learning
- Making instructional decisions to modify instruction to facilitate student learning
- Evaluating students’ achievements to summarize and report students’ demonstrated understanding at a particular moment in time
- Evaluating programs to make decisions about instructional programs
Obstacles

Although assessment should support student learning, too often it functions in schools as an obstacle to promoting mathematics success for all students.
At the school carnival, Carmen sold 3 times as many hot dogs as Shawn. The two of them sold 152 hot dogs altogether. How many hot dogs did Carmen sell?

A. 21
B. 38
C. 51
D. 114
E. 148

Input your answer at on this form: http://bit.ly/carnivalmath
Beliefs about mathematics assessment

What are your beliefs? What are the beliefs of teachers at your school(s)?
<table>
<thead>
<tr>
<th><strong>Unproductive Beliefs</strong></th>
<th><strong>Productive Beliefs</strong></th>
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<tbody>
<tr>
<td>The primary purpose of assessment is accountability for students through report card marks or grades.</td>
<td>The primary purpose or assessment is to inform and improve the teaching and learning of mathematics.</td>
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<tr>
<td>Assessment in the classroom is an interruption of the instructional process.</td>
<td>Assessment is an ongoing process that is embedded in instruction to support student learning and make adjustments to instruction.</td>
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<tr>
<td>Only multiple choice and other “objective” paper-and-pencil tests can measure mathematical knowledge reliably and accurately.</td>
<td>Mathematical understanding and processes can be measured through the use of a variety of assessment strategies and tasks.</td>
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<td>A single assessment can be used to make important decisions about students and teachers.</td>
<td>Multiple data sources are needed to provide an accurate picture of teacher and student performance.</td>
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<td>Assessment is something that is done to students.</td>
<td>Assessment is a process that should help students become better judges of their own work, assist them in recognizing high-quality work when they produce it, and support them in using evidence to advance their own learning.</td>
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<td>Stopping teaching to review and take practice tests improves students’ performance on high-stakes tests.</td>
<td>Ongoing review and distributed practice within effective instruction are productive test prep strategies.</td>
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Assessing conceptual understanding, reasoning and procedural fluency

1. Create a situation that could be modeled with $6 \div \frac{3}{4}$

2. Write three equations, one with no solution, one with exactly one solution, and one with infinitely many solutions.

3. Is $12 \div 3$ the same as $3 \div 12$? Explain.
Assessing conceptual understanding, reasoning and procedural fluency

A key question for teachers to consider in creating or selecting assessment tasks and items is:

“What evidence will this provide about students’ mathematical knowledge?”
Example of Mathematics Formative Assessment

“My favorite No”
Next Steps

What can you do to increase and/or improve mathematics formative assessment mindsets and strategies at your school?