

Evaluating School Mathematics and Science Textbooks and Classroom Practices Using an Assessment for Learning Framework

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Evaluation Café, September 29, 2009



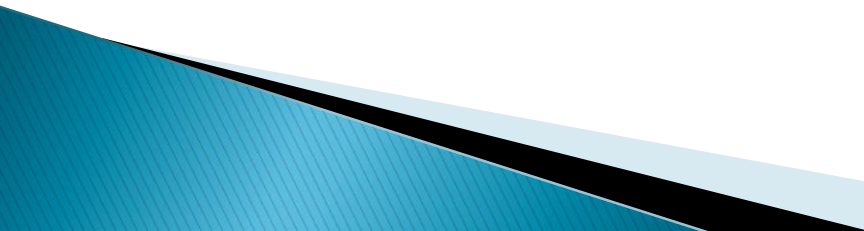
Assessment for Learning

- ▶ What is Assessment for Learning (AfL)?
 - AfL answers three questions:
 - 1) Where is the learner right now?
 - 2) Where is the learner going?
 - 3) How do we get the student there?

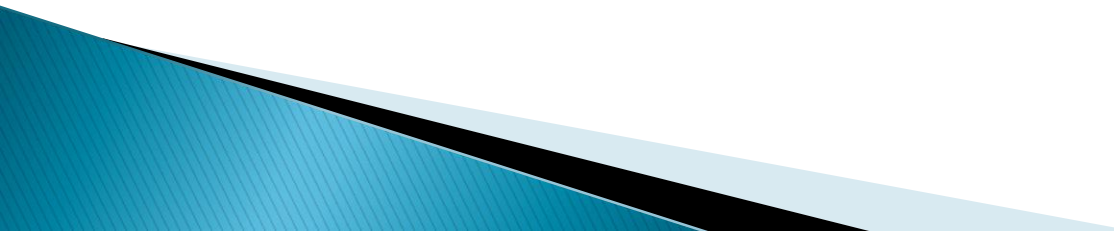
Research Question

- ▶ What does Assessment for Learning look like in mathematics and science classrooms?

Project Timeline

- ▶ Fall 2008 – Collected and analyzed current classroom observation protocols
 - ▶ Spring 2009 – Used six protocols in middle and high school mathematics and science classrooms (24 observations)
 - ▶ Summer 2009 – Began drafting AfL Classroom Observation Protocol and AfL curriculum evaluation framework
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Two Examples of Protocols

- ▶ Inside the Classroom Observation and Analytic Protocol
 - ▶ Chicago Math and Science Initiative Classroom Observation Guide
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I. Design

A. Ratings of Key Indicators

	Not at <u>all</u>					To a great <u>extent</u>		<u>Don't know</u>	<u>N/A</u>
1. The design of the lesson incorporated tasks, roles, and interactions consistent with investigative mathematics/science.	1	2	3	4	5		6	7	
2. The design of the lesson reflected careful planning and organization.	1	2	3	4	5		6*	7*	
3. The instructional strategies and activities used in this lesson reflected attention to students' experience, preparedness, prior knowledge, and/or learning styles.	1	2	3	4	5		6	7	
4. The resources available in this lesson contributed to accomplishing the purposes of the instruction.	1	2	3	4	5		6	7	
5. The instructional strategies and activities reflected attention to issues of access, equity, and diversity for students (e.g., cooperative learning, language-appropriate strategies/materials).	1	2	3	4	5		6*	7*	
6. The design of the lesson encouraged a collaborative approach to learning among the students.	1	2	3	4	5		6	7	
7. Adequate time and structure were provided for "sense-making."	1	2	3	4	5		6*	7*	
8. Adequate time and structure were provided for wrap-up.	1	2	3	4	5		6	7	
9. _____	1	2	3	4	5				

* We anticipate that these indicators should be rated 1-5 for nearly all lessons. If you rated any of these indicators 6 or 7, please provide an explanation in your supporting evidence below.

B. Synthesis Rating

1	2	3	4	5
Design of the lesson not at all reflective of best practice in mathematics/science education				Design of the lesson extremely reflective of best practice in mathematics/science education

C. Supporting Evidence for Synthesis Rating

Provide a brief description of the nature and quality of this component of the lesson, the rationale for your synthesis rating, and the evidence to support that rating.

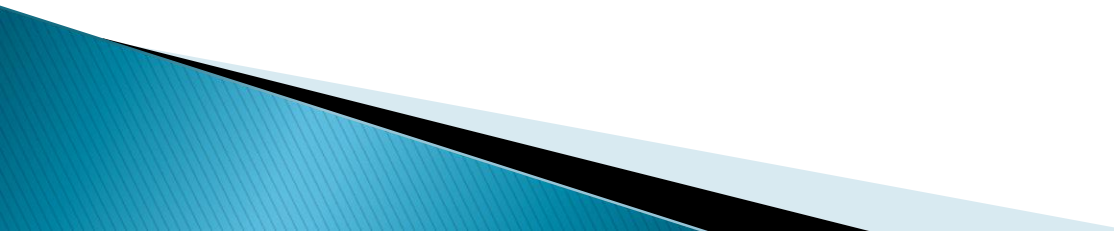
Mathematics Classroom Observation Guide

2008-2009

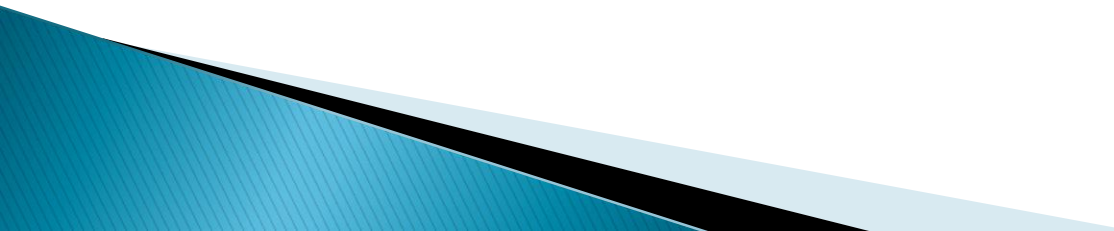
The *Mathematics Classroom Observation Guide* is designed to support observation and conversation about learning in a mathematics classroom. An observation supported by this guide focuses on the key mathematical ideas in the lesson, student experiences designed to address the ideas, and evidence of student understanding. An observer is not expected to see all of the components in any one lesson, but over time, evidence related to all questions should emerge. The *Directions for Use* document that accompanies this guide provides detailed examples of classroom practices exemplified in high-quality mathematics classrooms. Professional development is essential to provide a context for the use of the *Mathematics Classroom Observation Guide*.

Part One: Focus on Student Learning	Conjectures	Evidence from Classroom
<p>Content</p> <ol style="list-style-type: none"> 1. What are the key mathematical ideas in the lesson? 2. In what kinds of mathematical thinking are students engaged? (Examples – procedural, conceptual, problem solving, justification) 3. Is the mathematics content significant, worthwhile, and appropriate to the grade level? 4. How do connections made to other disciplines and real-world situations promote understanding of the mathematical ideas? 5. How are connections made to prior work in the mathematics classroom? 		
<p>Learning</p> <ol style="list-style-type: none"> 6. Are students actively engaged? 7. What is the evidence of understanding of the key mathematical ideas? 8. What misconceptions are arising? 9. How are students justifying their answers, offering alternative solution strategies, and demonstrating that their strategies work? 10. How do students use a variety of representations – models, graphs, drawings, manipulatives, writing – to demonstrate their understanding of the mathematics? 11. Are students reflective about their learning? 12. How do diverse learners access the mathematics content in the lesson? 		
<p>Learning Environment</p> <ol style="list-style-type: none"> 13. In what ways do students communicate their ideas, orally or in writing? 14. Is the climate one of respect for students' ideas and one that encourages students to engage in mathematical risk-taking? 15. Where does the authority of the mathematics reside in the classroom? 16. Do the interactions reflect collaborative relationships and peer support, and promote understanding of the mathematical ideas? 		

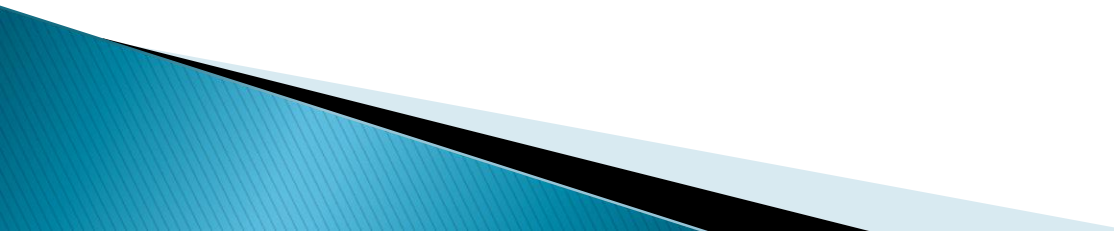
Audience

- ▶ Our classroom observation protocol is intended to be used in 6th – 12th grade science and mathematics classrooms.
 - ▶ Our target audience includes teachers, mentors, professional development providers and possibly administrators.
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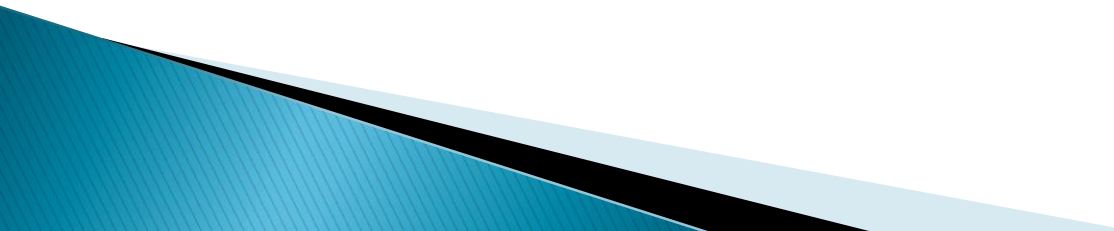
Our Working Framework

- ▶ Planning
 - ▶ Launch
 - ▶ Exploration
 - ▶ Post-lesson
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Framework

- Planning
 - Learning goals, identifying criteria with examples, anticipating hurdles, differentiated instruction based on student level, modeling, target setting, connections to past lessons and work, opportunities to improve work, time for student review
 - Launch
 - Exploration
 - Post-lesson
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Framework

- Planning
 - Launch
 - Provide student learning objectives and performance tasks, examples of student work, grading criteria
 - Questioning strategies to determine level of student understanding
 - Exploration
 - Post-lesson
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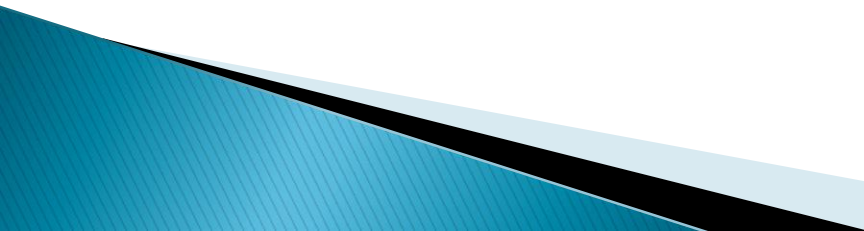
Framework

- Planning
- Launch
- Exploration
 - Questioning strategies, teacher/student feedback mechanisms, peer- and self-assessment opportunities, teacher support of self assessment, opportunities to improve work, post assessments
- Post-lesson

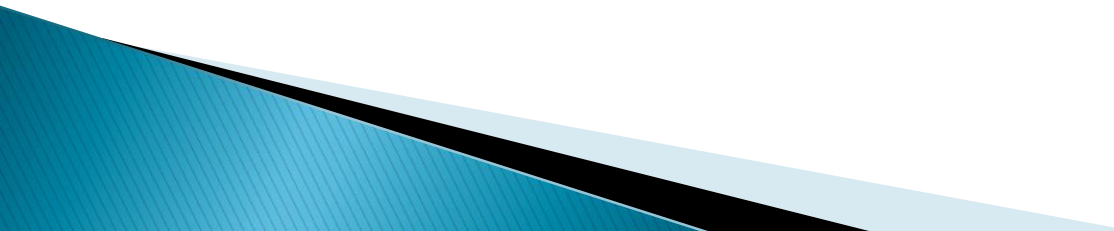
Framework

- Planning
- Launch
- Exploration
- Post-lesson
 - Questioning strategies, self-assessment activities, opportunities to improve work

Where Are We Going?

- ▶ Evaluate curriculum materials for formative assessment practices.
 - Are formative assessment strategies present in the planning, launch, exploration, and post-lesson sections of a lesson?
 - ▶ Create an observation protocol to help determine how well and to what extent the teacher uses formative assessment strategies in the lesson.
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Video Task One:

- ▶ Look for evidence of formative assessment.
 - Is it present? How so?
 - ▶ Look for opportunities where using formative assessment could improve this lesson.
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Video Task Two:

- ▶ Examine the protocol.
- ▶ Use the rubric to critically analyze this launch for any use of formative assessment practices.

Video Two

Comments or suggestions?

