Professional Development Module
Facilitator's Guide

Title: **Using Student Work to Assess Understanding**

Targeted Audience: **6-12 Grade Teachers of Mathematics**

Description: **This module addresses how to assess, analyze, and correct student misconceptions and common mistakes using in-class formative assessment and student discussion.**

Outcomes and Success Indicators:

Outcome #1: ***Participants reflect on and analyze student work to drive instructional changes.***
Success Indicator: ***Participants demonstrate strategies for modifying student thinking and teacher questions based on student work.***

Outcome #2: ***Participants will address common misconceptions and plan for next steps to improve student learning.***
Success Indicator: ***Participants have one sample formative assessment with anticipated common student misconceptions and a plan for next steps ready to implement in their classroom.***

Outcome #3: ***Participants discuss daily feedback strategies to promote student learning.***
Success Indicator: ***Participants are aware of various assessment strategies such as exit slips, individual white boards, document cameras, … and the instantaneous teacher responses - more questions.***

Time Frame: 3 hours

Overview and Context

The participant will

1. solve a mathematical problem in order to discuss common errors and what should be done next so students learn from the errors
2. look at sample student work and discuss what questions can be asked to students to help them correct the misconceptions
3. discuss different feedback strategies

Agenda:

Minutes	Activity and Procedure for the Activity	Materials (List everything that would be necessary to facilitate this PD module.)
(.25 hr)	**Welcome, Introductions, Icebreaker Review Outcomes and Agenda**	

.5 minute /person 3 minutes	• Each participant shares name, school, subjects taught, and one little known anecdote of interest. • Purpose and outcomes of 3 hour Module presented (orally and .ppt)	Name tags or tents *MS Power point*

• 5 min
• 5 min
• 5 min
• 10-15min
• 5-10min
• 5 min
	Activity #1: Solving Sample Problems
	Procedure:
	Flour Problem?
	• Participants work in small groups of 3 or 4 solving 6th grade - high school mathematics "Enough Flour?" problem identified by grade-level and standard.
	Have participant's first work on the problem individually.
	• Small group discussion on "Enough Flour?" problem. Discussion should include different ways the problem was solved and indicating any errors that occurred and why.
	  ○ Participants discuss how they themselves may have misinterpreted the problem or how their students may have misinterpreted the problem.
	• Hand out sample student work of "Enough Flour?" problem. Small group discussion.
	  ○ Participants review sample student work of same problems, discussing what students have done, how students may have misinterpreted the problem, how they themselves may have misinterpreted the problem, how the errors represented in the work are common errors students make that we want students to reflect on and understand where they are making errors, explaining any errors they see in shared work just as participants of this workshop are doing.
	• Large group discussion on "Enough Flour?" problem. Discussion topics should include different ways the problem was solved and the common errors.
	  ○ Display teacher worked out problem using document camera/overhead modeling a classroom discussion as if they were looking at student work.
	• Large group discussion on what the teacher should do next to allow the students to recognize the common errors. (Display both examples for class discussion, etc)
	Presenter may reference the post "Using Math Mistakes in Whole-Group Discussions" on the website Math Mistakes by Michael Pershan to help guide group discussion or show one of the short videos: Learning from Mistakes or My Favorite No
	
	Area and Distributive Problem
	• Participants work in small groups of 3 or 4 solving 6th grade - high school mathematics Area and Distributive Problem identified by grade-level and standard.
		• Worksheet of **Solving Sample Problems**
		• Sample student work of same problems
		• MARS Site Formative Assessment PD
		• Math Mistakes by Michael Pershan
		• Video - Learning from Mistakes ; My Favorite No

● 5 min ● 5 min ● 15-20min ● 10-15min	● Small group discussion on Area and Distributive Problem. Discussion should include different ways the problem was solved and indicating any errors that occurred and why. ○ Participants discuss how they themselves may have misinterpreted the problem or how their students may have misinterpreted the problem. ● Hand out sample student work of Area and Distributive Problem. Small group discussion. ○ Participants review sample student work of same problems, discussing what students have done, how students may have misinterpreted the problem, how they themselves may have misinterpreted the problem, how the errors represented in the work are common errors students make that we want students to reflect on and understand where they are making errors, explaining any errors they see in shared work just as participants of this workshop are doing. ● Large group discussion on Area and Distributive Problem. Discussion topics should include different ways the problem was solved and the common errors. ○ Display teacher worked out problem using document camera/overhead modeling a classroom discussion as if they were looking at student work. ○ Pass out copies of Student Common Issue Template. ○ Ask small groups to brainstorm possible student misconceptions/errors. ○ Facilitator asks for examples from large group and models filling in the common misconceptions on the template. ○ Small groups brainstorm “next steps” and questions to help correct misconceptions. ○ Facilitator asks for examples from large group and models filling in the next steps on the template. **Saving Money Problem** ● Hand out Saving Money Problem and a blank copy of Student Common Issue Template. (Move from teachers completing the problem to anticipating student errors and discussing ways for students to find the errors themselves and student led classroom discussion). ○ Teachers will anticipate common student errors and brainstorm next steps while completing the Student Common Issue Template. ○ Teachers will discuss methods of displaying student work to drive student led discussion.	

● 30-35min	● Teachers will discuss feedback strategies (one student making an error, ¼ class making the error, ½ class making the error) to drive student learning. Teachers share what they do in the classroom. ○ Problematic situations are essential for learning, so when one writes or sees an inconsistency, that is a learning situation. For teachers to circle or point these out is not as effective as having students find their own, and this is a process they can develop if encouraged to look at their own work in small groups. Facilitator models this through encouraging participants to share during the workshop discussion. Presenter may reference or show the video Highlighting Mistakes: A Grading Strategy to help lead discussion on feedback strategies.	
● .5 hr	**Activity #2: Teacher Created Tasks (One Each) Aligned to Standards** Procedure: ● Participants create a task aligned to grade-level standards to use with their own students in near future. ● An alternative for participants that do not want to create their own task would be to use the alternate version of Flour problem. ● Participants reflect on potential errors students will make and on the strategies discussed in Activity #1 that they will duplicate with their own students.	● CCSS-M Standards ● Student Common Issues Template ● Alternate Versions of Flour problem

	● Discussion of various implementation strategies of created task including exit slips, individual white boards, document cameras, student board work, etc. and which is most appropriate for these teacher created tasks. (Facilitators will collect teacher created tasks and save in folder for future workshops)	
● 10 min.	**Wrap-up & Evaluation** ● Questions ● Exit slips in which participants list one top thing learned and one thing desired to learn more about (these will be summarized and shared with future presenters in order to modify the **Using Student Work to Assess Understanding Module** implementation).	