Professional Development Module
Facilitator's Guide

Title: Step Up to Real World (RW) Problems

Targeted Audience: 6-12 mathematics teachers grouped into teams

Description: Participants will engage in three RW context-based activities, critiquing their levels using a hierarchy of RW contexts.

Outcomes and Success Indicators

Outcome #1 - Understand what RW contexts and modeling are and are not
Success Indicator: Pre- and post- self-reflective journal on understanding of RW contexts/tasks

Outcome #2 - Identify levels, critique, and revise RW contexts/tasks
Success Indicator: Identify the level of three RW tasks; use the hierarchy guide to critique existing and self-developed tasks

Recommended Extension Beyond this Module:

Outcome - Plan for effective implementation of high level RW tasks to positively impact student achievement and learning
Success Indicator: Participants will develop a plan for implementing RW tasks into their curriculum

Time Frame: 3 hours

Agenda:

Minutes	Activity and Procedure for the Activity	Materials (List everything that would be necessary to facilitate this PD module.)
10 min	**<u>Welcome, Introductions, Review Outcomes and Agenda</u>**	NOTE: *Making Animal Bandanas* RW task serves a dual purpose: icebreaker and Experience #1 of Activity #2
10 min	**<u>Activity #1</u>**	

	Preconceived notions journal prompt - **Describe the qualities and characteristics of a good RW context/task. Give an example that you have used with students in a middle or high school classroom.** Sharing out in teams at tables. What is common? What is unique/novel? Create master list at your tables.	Journal
60 min	**Activity #2** Experience both a pseudocontext (Experience #1) and a model level RW context/task (Experience #2). Make comparisons of the two experiences. **Discussion Questions:** (1) What do you notice about a shift in student thinking? (2) What was your engagement like for each of the problems? (3) What is the core mathematical concept that is being investigated? (4) How did they arrive at that mathematics? (5) How does the context lead to the formal mathematics? (6) How does the framing of the problem engage students and deepen their mathematical understanding? (7) How were you engaged in modeling?	Activity #2 - Experience #1 & #2 Guide
80 min	**Activity #3** 25 min Hand out the Hierarchy Guide to RW Contextual Tasks Give participants time to read and discuss the guide at their tables. Have participants share their thoughts about Experience #1 and Experience #2 in relation to where they would put them on the hierarchy and why.	Resources Hierarchy Guide to RW Contextual Tasks

	55 min (Experience #3) Begin the Bike Shock Problem. **Note:** You will probably not get through the entire problem, but participants should read what they don't complete prior to the discussion. Return to the hierarchy, discuss the differences between Experience #3 (i.e., Bike Shock Problem) and Experiences #1 and #2, and use the hierarchy to rate Experience #3 and formulate discussion. Participants should note that students are urged to make sense of the procedures of finding the inverse function and its variables using their data and the situation. This supports Freudenthal (1991) who stated, "mathematics has arisen and still arises in common sense reality...where it was once invented, mathematics should now be reinvented" (p. 73). Not exchanging the variables and just solving for the dependent variable might better address this notion and stems from common sense, and "common sense is insight" (p. 73). To Freudenthal, the teacher should, "link together nice pieces of ... reinvention, to get chains of long-term learning processes" (p. 66). **In general this level of RW experience should broaden and deepen students understanding of mathematics to enable them to connect and pursue more advanced related mathematics.** Discussion about what to look for and how to modify (repackage and remove scaffolding) an existing task.	Activity #3 - Experience #3
20 min	**Wrap-up & Evaluation** Post-reflection on the Activity #1 prompt - **Describe the qualities and characteristics of a good RW context/task.** Discuss Dan Meyer's [Makeover] Internet Plans Describe modifications that you might make to your initial example given in Activity #1 (or a different example) that you will use with your students.	Journal