Co-Craft Questions and Problems

(Math Language Routine 5 – MLR 5)

Background

The eight Math Language Routines, or MLRs, are part of the Illustrative Math® (IM®) K-12 Math curriculum. This curriculum has been adapted for adult learners and can be accessed on the PA Adult Education Resources website. The MLRs provide the chance for students to reason, communicate, and strengthen their understanding in a collaborative and supportive environment.

Zwiers et al. (2017) identify four design principles that guide mathematical language routines:

- Supporting sense-making
- Optimizing output
- Cultivating conversation
- Maximizing linguistic and cognitive meta-awareness

For more information, visit Math Language Routines: Discourse with a Purpose.

Purpose

This MLR allows students to consider the context of a mathematical scenario *before* they are asked to compute the answer to the problem.

Goal

- Students use mathematical language to create and refine questions or problems and develop an understanding of the language used in mathematical questions or problems.

Audience

- Intermediate to advanced English learners
- English learners transitioning to adult basic education classes
- Adult basic education learners

Supported Standards for Mathematical Practice

- **Standards for Mathematical Practice 3**: Construct viable arguments and critique the reasoning of others.
- **Standards for Mathematical Practice 4**: Model with mathematics.

Materials

- A picture, video, diagram, data display, or description of a mathematical scenario
- Student template

Procedure

1. Provide a picture, video, diagram, data display or description of a mathematical scenario.
2. Students work independently or in small groups to develop a question that matches the prompt.
3. As a large group, students refine the questions and select the question(s) that best address the information provided in the prompt.

Tips for Using this Routine

- Model the routine by demonstrating the process.
- Model how to ask for and share information, clarify questions and information, and collaborate to find a solution.
- This routine can be used to reinforce skills or introduce new topics by asking students to use their math sense and express mathematical reasoning.
- If you would like support with implementing this routine from an instructional coach, email dschauer@tiu11.org.

Reference

Zwiers, J., Dieckmann, J., Rutherford-Quach, S., Daro, V., Skarin, R., Weiss, S., & Malamut, J. (2017). *Principles for the design of mathematics curricula: Promoting language and content development*. Understanding Language/Stanford Center for Assessment, Learning, and Equity. https://ul.stanford.edu/sites/default/files/u6232/ULSCALE_ToA_Principles_MLRs__Final_v2.0_030217.pdf ul.stanford.edu