

Math Practice 7: Look for and Make Use of Structure (District/Building Leader Facilitation Guide)

Presenter:

Intended Use

This facilitation guide is designed for district and school leaders to use when delivering sessions on the Standards for Mathematical Practice 1: Make Sense of Problems and Persevere in Solving Them. The document can be used by district and building leaders to facilitate broader conversations on the use of local data, focusing on the broader impact of the MPs across building and district levels. Its purpose is to help broaden discussions with staff members on Math Practice 1 (MP 1) to a building and district level.

Viewing the Math Practice series can be done in any order. While viewing the series is encouraged in groups, it can also be done individually. To get the full benefit of the professional development series, educators should engage in the tasks and participate in local discussions on Mathematical Practice. Therefore, viewing the professional learning series in small groups is encouraged over individuals watching it in isolation.

Reproducing the Facilitation Guide

If you would like to make copies of any portion of this facilitation guide or accompanying PowerPoint presentation, please credit the Ohio Department of Education and Workforce.

During Facilitation: Discussion Questions

For each discussion question(s), pause the recording and facilitate a group discussion.

DISCUSSION QUESTION

PowerPoint Slides 23:

- How can we ensure that Math Practice 7 is consistently implemented across all classrooms in our district?
- What strategies can we use to support teachers in looking for and making use of structure at the building and district levels?

DISCUSSION QUESTION

PowerPoint Slides 24: Kindergarten-Grade 5 Task

- How many ways can you find to solve the expression 48×5 ?
- Discuss:
 - Common ways you found to solve the expression 48×5 .
 - Identify different ways you found to solve the expression 48×5 .
 - Which methods are your students likely to produce?
 - Which methods are your students unlikely to produce? Why?

DISCUSSION QUESTION

PowerPoint Slides 25: Grades 6-8 Task

- If there were a row of 50 connected equilateral triangles, what would the perimeter be?
- Share how you determined the perimeter.
- Which methods are your students likely to use as they come up with their answers?
- Which methods are your students unlikely to come up with? Why?

DISCUSSION QUESTION

PowerPoint Slides 26: Grades 9-12 Task

- Consider two algebraic expressions $(n + 2)^2 - 4$ and $n^2 + 4n$.
 - Use the figures to illustrate why the expressions are equivalent.
 - Verify this result algebraically.
- Share how you illustrated the equivalence of the two expressions and how you verified the results.
- Which methods are your students likely to use as they come up with their answers?
- Which methods are your students unlikely to come up with? Why?

DISCUSSION QUESTION

PowerPoint Slides 27

- What are the specific learning needs of our students across the building and district levels?
- How can we address these needs to ensure that students regularly demonstrate their understanding of Math Practice 7 in the classroom?

DISCUSSION QUESTION

PowerPoint Slides 28: Discussion Debrief

- Where in the Breakout Room tasks did you observe opportunities for students to:
 - Look for connections between the conceptual and abstract levels
 - Create and use representations to organize, record, and communicate math ideas
 - Make ideas available for deeper reflection and allow for explicit connections
 - Demonstrate flexibility with numbers
 - Understand or recognize patterns and functions

DISCUSSION QUESTION

PowerPoint Slides 31: Discussion

- What do you think Math Practice 7: Look for and Make Use of Structure means or looks like at your grade level/course?
- How does your school or district support students' progression of the usage of structure across grade levels and/or courses?

DISCUSSION QUESTION

PowerPoint Slides 35

- What additional supports do our teachers and students need to effectively implement Math Practice 7?
- How can building and district leaders provide these supports?

DISCUSSION QUESTION

PowerPoint Slides 40

- What local data do we currently collect that can help us understand the implementation of Math Practice 7?
- How can we use this data to improve our instructional practices and student outcomes?

Engagement Activities

The following are optional activities for district and school leaders to use as part of their facilitation session(s) to further engage their audience.

Pattern Recognition Activity

- Engage participants in identifying and using patterns and structures in mathematical problems. This can be done by participating in the problem-solving tasks on PowerPoint Slides 24-26 with others who do not teach or work primarily at the task-aligned grade band.
 - Provide participants with a series of mathematical problems that involve patterns and structures. Ask them to identify the patterns and use them to solve the problems. Facilitate a group discussion on the importance of recognizing and using patterns in mathematics.

Structure Exploration Workshop

- Explore the structure of mathematical concepts and how they can be used to solve problems.
 - Set up stations with different mathematical concepts (e.g., number systems, algebraic expressions, geometric figures). Ask participants to explore the structure of each concept and discuss how it can be used to solve problems. Facilitate a group discussion to share insights and best practices.

Rapid Brainstorming

- Identify different types of patterns in mathematics.
 - Participants split into groups. Each group will have 5 minutes to brainstorm as many examples of patterns in mathematics as they can in the time allotted. After the 5 minutes are up, the groups can compare their lists to determine which group brainstormed the most examples.

Resources Links

Ohio Department of Education Documents

- [Standards for Mathematical Practice](#)
- [Kindergarten-Grade 5](#)
- [Grades 6-8](#)
- [High School](#)

Other National Resources

- [Inside Mathematics](#)
- [Illustrative Mathematics](#)
- [Robert Kaplinsky: Math CCSS Math Practices Readable](#)
- [Standards for Mathematical Practice: Commentary and Elaborations for 6-8](#)

Other Resources

- [Implementing Standards for Mathematical Practices](#) from Louisiana Believes
- [Implementing the Mathematical Practice Standards](#)
- [Math Argumentation Rubric](#) (Draft)
- [Mathematical Practice Standards](#) by Charles A. Dana Center
- [Ohio Learning Standards](#)
- [Standards for Mathematical Practice Rubric](#)
- [The Power of Making Mistakes in Learning Math”](#)
- [What Isn’t Mathematical Modeling?](#)

References

Boston, M., Dillon, F., Smith, M., & Miller, S. (2017). *Taking Action Implementing Effective Mathematics Teaching Practices, Grades 9-12*. Reston, VA: The National Council of Teachers of Mathematics

Graham, K., Cuoco, A., & Zimmermann, G., (2010). *Focus on High School Mathematics: Reasoning and Sense Making*. Reston, VA: The National Council of Teachers of Mathematics

Illustrative Mathematics. (2014, May 6). *Standards for Mathematical Practice: Commentary and Elaborations for 6–8*. Tucson, AZ.

Koestler, C., Felton-Koestler, M. D., Bieda, K., & Otten, S. (2013). *Connecting the NCTM process standards and the CCSSM practices*. Reston, VA: The National Council of Teachers of Mathematics.

O'Connell, S., & SanGiovanni, J. (2013). *Putting the practices into action: Implementing the common core standards for mathematical practice, K-8*. Portsmouth, NH: Heinemann.

Conversation Notes: