As you arrive…

Review the yellow handout with the descriptions of the eight Standards for Mathematical Practice (SMP).

Think about how you would complete these sentences:

- Something I understand about the SMP is…
- An SMP I want to understand better is… because…

EDC Learning transforms lives.

Learn about the Standards for Mathematical Practice Using Student Dialogues

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Who?

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Goals for Today (& *for our resources)*

- Increase awareness of the Standards for Mathematical Practice (SMP)
- Support understanding of the SMP connected to content standards
- Cultivate capacity to identify these SMP in student thinking

(In our resources, this leads to supporting instructional planning focused on the SMP based on this understanding and capacity.)

Plan for Session

- ***Background:*** Learn about resources we are developing to support teacher learning about the Standards for Mathematical Practice (SMP)

- ***Math Task:*** Engage as learners in a mathematics task and discuss the mathematical thinking used and evidence of the SMP.

- ***Student Dialogue:*** Read and analyze a student dialogue to understand how the students' thinking represents the SMP.

Illustrations of the SMP

- 30+ Illustrations developed and reviewed to date *(mathpractices.edc.org; see bookmark with QR code)*
- Illustrations include math tasks, student dialogues, teacher reflection questions, math overviews, and student questions
  - Range of mathematical tasks, some more open-ended
  - Grade levels from 5-10
  - Number, algebra, geometry, data and statistics
  - Multiple SMP in each Illustration & several Illustrations per SMP
- Development included input and review from:
  - Middle and high school mathematics teachers
  - Mathematicians and mathematics educators

Need help understanding the mathematical practices?

Explore this site to learn more about the Common Core Standards for Mathematical Practice (SMP) and how they can be connected to the content standards. Use our Illustrations, centered on student dialogues, to see the Standards for Mathematical Practice in action.

See All Illustrations

About Illustrations

Each Illustration of the Standards for Mathematical Practice (SMP) consists of a mathematics task; a student dialogue based on that task; information about grade level, standards, and the context for the dialogue; teacher reflection questions; a mathematical overview; and optional student materials. While the primary use of Illustrations is for teacher learning about the SMP, some components are designed for classroom use with students. Go to "Browse Illustrations" to find Illustrations for particular SMP.

About the Project

Implementing the Mathematical Practice Standards is an EDC project funded by the National Science Foundation to develop Illustrations of the

Spotlight on...

Mathematical Practice 1: Make sense of problems and persevere in solving them.

Choosing Samples

In this Illustration students are investigating what samples of 5 rectangles will give them the best estimate of the average area of a set of 100 rectangles. They generate and test two ideas for how to take samples—having their peers choose 5 random numbers and using those numbers to select samples and having their peers choose 5 rectangles by looking at the rectangles—and then they begin to discuss the difference in the two estimates their two methods generate.

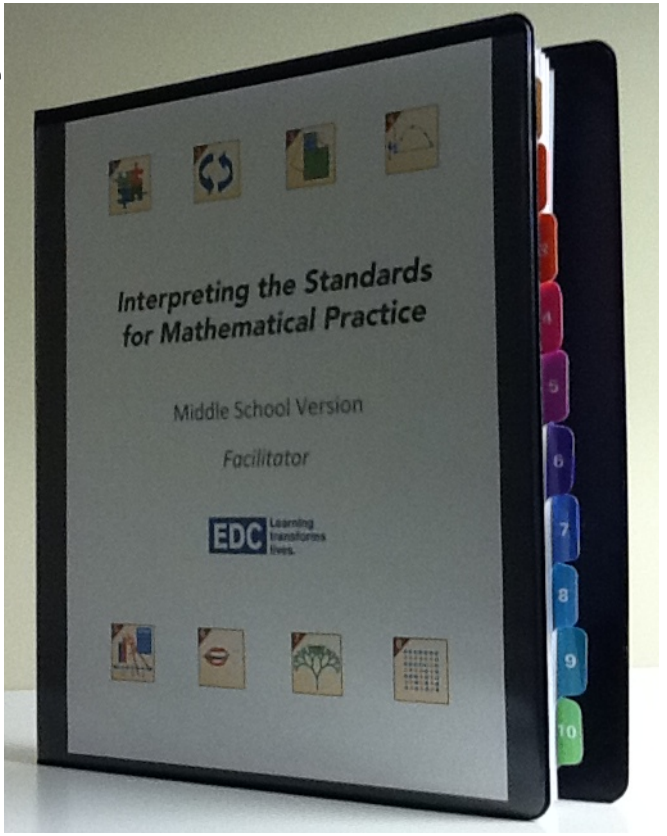
Professional Development

Materials for 20 Hour Professional Developme
Course (MS & HS Versions)

Three Main Activity Types:

- Doing and Discussing Mathematics
- Analyzing Artifacts of
  Student Thinking
- Connecting to Classroom Practice

Field tested in 7 states with over 400 teachers



Exploring an Illustration: Postage Stamps – Integer Combinations

1) Work on mathematics task (individual then pairs)
2) Sharing/debriefing mathematics of task (full group)

3) Read student dialogue – working on math task
4) Discuss dialogue (small groups)
5) Debrief MPs from the task/dialogue (whole group)

6) Review Mathematical Overview

Postage Stamps – Integer Combinations: Math Task

Part 1: Suppose the post office only sold five-cent stamps and seven-cent stamps. Some amounts of postage can be made with just those two kinds of stamps. For example, 1 five-cent and 2 seven-cent stamps make 19 cents in postage, and 2 five-cent stamps makes 10 cents in postage. Which amounts of postage is it impossible to make using only five-cent and seven-cent stamps?

Part 2: Suppose the post office only sold six-cent and nine-cent stamps. Which amounts of postage is it impossible to make?

Work individually for 5 min (quietly), then in pairs (loudly ☺).
Keep track of thinking, questions, wrong turns, etc.

Postage Stamps – Integer Combinations: Discussing the Mathematics

What strategies did you use to explore the problem?

How did you start the problem?

What conjectures or questions do you have at this point?

Postage Stamps – Integer Combinations: Reflecting on the SMP

What evidence of the SMP did you see in…

1) Your own work on the task?

2) Colleagues' work on the task?

Exploring an Illustration: Postage Stamps – Integer Combinations

1) Work on mathematics task (individual then pairs)
2) Sharing/debriefing mathematics of task (full group)

3) Read student dialogue
4) Discuss dialogue (small groups)
5) Debrief SMP in the dialogue (whole group)

6) Review Mathematical Overview

Student Dialogues

- Dialogue between three fictitious middle grades or high school characters (either Sam, Dana, and Anita, or Chris, Lee, and Matei) working on a mathematics task

- The dialogues are intended to:
  - Clarify the *meaning* of particular SMP by showing what student discourse and thinking could be
  - Illustrate *key ideas* about the Standards for Mathematical Practice (SMP) in context using specific mathematical content
  - Serve as an artifact to promote discussion among educators about the SMP, about mathematics, and about issues of teaching practice.

Student Dialogues

Given the intention to illustrate the meaning and key ideas of the SMP:

- Plausible student thinking, but the discourse may not always sound realistic.
- The student characters are “caricatures,” intended to illustrate particular types of thinking and discussion.
- A teacher voice is intentionally not included.
- Discussion of whether or how a teacher might intervene, or of how to promote similar thinking with your own students, are productive avenues for discussion.

Reading the Student Dialogue

- 3 volunteers read the student dialogue out loud

- Re-read the dialogue individually:
  - Try to understand how the students are thinking about the task.
  - Then, note places where the students seem to be engaging in any of the Standards for Mathematical Practice.

Discuss Student Dialogue in Small Groups

1. **Describe the strategies used by students in the Student Dialogue as they work on the mathematics task.**

2. **Where in the Student Dialogue do you see students constructing viable arguments and critiquing the reasoning of others (MP 3)?** *(Be specific about evidence in dialogue. Use SMP handout.)*

3. **What other evidence do you see of students engaging in any of the Standards for Mathematical Practice?**

4. **Had the students in the dialogue started to randomly list combinations, how (if at all) would you intervene? Had the students used the table approach in the dialogue but continued making combinations up to 60 without noticing a pattern or generalizing an argument, how (if at all) would you intervene?**

Mathematical Overview

Review the mathematical overview.

What surprises you or resonates with you?

Implementing the Mathematical Practice Standards

Questions?

mathpractices.edc.org
(QR code on bookmark)

Thank you!

If you are interested in learning more about the Illustrations or PD materials, talk to us after the session or e-mail us at mathpractices@edc.org