12.8 Sample Professional Development Activity: Mathematical Practices Mini-Vignettes

Professional development focus or topic: Deepening understanding of the Mathematical Practices

Intended audience: Small group or large group of teachers (any grade)

Outcomes: Teachers will be able to …

- Connect student actions with the Mathematical Practices
- Describe the essence of each of the Mathematical Practices
- Describe distinctions and connections among the Mathematical Practices

Preparation:

- Copy the mini-vignettes on bright paper, laminate (optional), and cut into cards.
  - Elementary Mini-Vignettes (on next page, for example, and available for download)
  - Middle School Mini-Vignettes (available for download)
  - High School Mini-Vignettes (available for download)
- Copy the placemat (one for every group of teachers) and laminate (optional).
- Download the Mathematical Practices & Student Look Fors Bookmark for each teacher (optional).

Description of activity:

- Distribute the placemats and bookmarks to teachers. If needed, provide time for teachers to read each of the Mathematical Practices.
- Place teachers in small groups (3–4).
- Instruct groups to have each teacher draw one of the mini-vignettes, read it silently, and decide which Mathematical Practice he or she thinks it *best* fits.
- After everyone is ready, instruct teachers to go one by one, sharing their vignette and placing it on the placemat where that teacher thinks it should go. Allow time for other teachers to question if it could go in another spot on the placemat. Repeat until each mini-vignette has been placed on the placemat. (You can refer to the vignettes by the student's name in the vignette to reinforce that the Mathematical Practices are *student* practices.)
- If there are several groups of teachers, have them compare their results, sharing where they placed each mini-vignette.
- Summarize by highlighting what has emerged from the conversation—likely that student actions (even small ones) can indicate more than one practice; that there are distinct meanings to each of the Mathematical Practices; and that the first step in being able to nurture the development of these practices is thinking about what they actually look like in the context of a math lesson.

Note: The vignettes were designed for one particular Mathematical Practice, so teachers should be able to place one card in each of the eight practices on the placemat. But they may do this in more than one way because the vignette intended for one practice has hints of other practices as well. Here are our intended matches:

SMP#1 – D SMP#2 – H SMP#3 – A SMP#4 – E

SMP#5 – B SMP#6 – F SMP#7 – C SMP#8 – G

Mini-Vignettes (Elementary) For Tool 12.8

D. Anna is trying to find the area of an unusually shaped garden. She thinks about a simpler problem of a rectangular garden. She partitions the garden into familiar shapes to solve the task. As she works, she monitors and evaluates her progress and adapts her strategy when it doesn't seem to be working.

H. Christopher is working on addition strategies. He looks at 8 + 7 and decides to use the context of his toy cars to think about the problem. He recognizes that 8 cars equals 5 cars and 3 more and 7 cars equals 5 cars and 2 more. He pictures the cars lined up in fives and solves the problem by adding 5 + 5 + 5.

A. Noah is studying the attributes of various triangles. He says, "A scalene triangle cannot have a right angle." Nick says, "Yes, it can, as long as the sides are different lengths." Amy says, "It is an equilateral triangle that cannot have a right angle." Maria says, "An obtuse triangle can't have a right angle either."

E. Rachel listened to a story about a family of four who wanted to grow their family to 10. She decides to represent the story using this equation: 4 + c = 10 and draws a number line to show the situation:

B. To solve $\frac{3}{4}+\frac{3}{8}$, Mindy decides to use a number line. She starts at $\frac{3}{4}$, which is also $\frac{6}{8}$, jumps up $\frac{2}{8}$ to get to 1, and then one more eighth to get to $1\ \frac{1}{8}$.

F. Lin and Ben are working on describing what makes a square a square. Lin says, "All the sides are the same." Ben says, "But that is true for a rhombus, too." Lin pauses and changes his description, saying, "It is a quadrilateral with four equal sides and four right angles."

C. In working on expressions such as 6 x 3 x 5, Zöe realizes that she gets the same answer if she multiplies 6 x 5 x 3, which is easier to do in her head. She realizes that this will always work because each of these factors could be the measures of the sides of a box, which can be in any position.

G. José is using a hundreds chart to count by 10, starting with various numbers. When starting at 28, he recognizes that all the numbers end in 8 (38, 48, 58, etc.). When the teacher asks him to add 9 to 28, he notices that the numbers are one less than counting by tens (37, 47, 57, etc.), and they all end in 7.

Mathematical Practices Placemat For Tool 12.8

1. Make sense of problems and persevere in solving them. *Mathematically proficient students start by explaining to themselves the meaning of a problem and looking for entry points to its solution.*	**2. Reason abstractly and quantitatively.** *Mathematically proficient students make sense of quantities and their relationships in problem situations.*
3. Construct viable arguments and critique the reasoning of others. *Mathematically proficient students understand and use stated assumptions, definitions, and previously established results in constructing arguments.*	**4. Model with mathematics.** *Mathematically proficient students can apply the mathematics they know to solve problems arising in everyday life, society, and the workplace.*
5. Use appropriate tools strategically. *Mathematically proficient students consider the available tools when solving a mathematical problem.*	**6. Attend to precision.** *Mathematically proficient students try to communicate precisely to others.*
7. Look for and make use of structure. *Mathematically proficient students look closely to discern a pattern or structure.*	**8. Look for and express regularity in repeated reasoning.** *Mathematically proficient students notice if calculations are repeated and look both for general methods and for shortcuts.*