

Sample Professional Development Activity: Questioning and the Mathematical Practices

Professional development focus or topic: Deepening understanding of asking questions to provide opportunities for students to demonstrate the Mathematical Practices

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

Outcomes: Teachers will be able to ...

• Connect questions for students with the Mathematical Practices

Preparation:

- Copy the sample questions on colored paper and laminate (optional). Cut apart and put each set into an envelope. You will need one set of questions for each group.
- Download the Mathematical Practices & Student Look Fors Bookmark for each teacher (optional).

• Copy and laminate (optional) one Mathematical Practices placemat for each group.

Description of activity:

- Distribute one Mathematical Practices placemat and a bookmark to each teacher. If needed, provide time for teachers to read the look fors for each of the Mathematical Practices on the bookmark.
- Distribute one set of sample questions to each group.
- Instruct each participant to read a question to the group and discuss which Mathematical Practice students might have an opportunity to demonstrate if asked the question. Instruct participants to place the question in the appropriate place on the placemat. Continue until all questions have been placed on the placement.
- Optional: You can have participants create their own questions to add to the placemat.
- Summarize by highlighting what has emerged from the conversation. Share the answer key, which is merely one possible set of answers.

NOTES

Sample Questions For Tool 12.10

How is this task similar to a previous task you have completed?	How might a number line help you think about the problem?
What strategies might help you to solve this problem?	What manipulative or picture might you use to solve the problem?
What helped you be successful in solving the problem?	What other resources might help you with this problem?
What expression or equation represents this data/ situation?	When will this strategy work?
Are these expressions equivalent? How do you know?	Which is the better unit of measure for this task?
What do the variables/numbers/answer mean related to the context?	What labels might be useful for this problem?
Why did you use [a graph] to solve it?	When can you regroup numbers and maintain equivalence?
How did you get [that equation]?	How might you use break-apart to solve this problem?
What do the rest of you think about Anna's strategy?	What is true about all of these triangles?
How does your model/equation connect to the situation?	What patterns do you notice across these problems?
Where can you find [the rate] in this situation? The table? The equation?	How are these problems the same? Different?
Are these two equations equivalent? Which (if any) is more efficient?	How might this problem help you solve another problem?

	Mathematical Practices Placemat		
1.	Make sense of problems and persevere in solving them.		
2.	Reason abstractly and quantitatively.		
3.	Construct viable arguments and critique the reasoning of others.		
4.	Model with mathematics.		
5.	Use appropriate tools strategically.		
6.	Attend to precision.		
7.	Look for and make use of structure.		
8.	Look for and express regularity in repeated reasoning.		

Answer Key For Tool 12.10 (Note: This is one possible set of answers.)

1.	Make sense of problems and persevere in solving them.	How is this task similar to a previous task you have completed? What strategies might help you to solve this problem? What helped you be successful in solving the problem?
2.	Reason abstractly and quantitatively.	What expression or equation represents this data/situation? Are these expressions equivalent? How do you know? What do the variables/numbers/answer mean related to the context?
3.	Construct viable arguments and critique the reasoning of others.	Why did you use [a graph] to solve it? How did you get [that equation]? What do the rest of you think about Anna's strategy?
4.	Model with mathematics.	How does your model (equation) connect to the situation? Where can you find [the rate] in this situation? The table? The equation? Are these two equations equivalent? Which (if any) is more efficient?
5.	Use appropriate tools strategically.	How might a number line help you think about the problem? What manipulative or picture might you use to solve the problem? What other resources might help you with this problem?
6.	Attend to precision.	When will this strategy work? Which is the better unit of measure for this task? What labels might be useful for this problem?
7.	Look for and make use of structure.	When can you regroup numbers and maintain equivalence? How might you use break-apart to solve this problem? What is true about all of these triangles?
8.	Look for and express regularity in repeated reasoning.	What patterns do you notice across these problems? How are these problems the same? Different? How might this problem help you solve another problem?