The Standards of Mathematical Practice

The What & Why?

SMP #1:
Make sense of problems and persevere in solving them.

WHY?

- The practice of solving problems is critical to math success.
- Our new definition of proficiency includes knowing when, why, and how to apply calculations to situation.

SMP #1:
Make sense of problems and persevere in solving them.

Mathematically proficient students:

- Have an understanding of the problem solving process and how to navigate through the process from start to finish.

- Have a repertoire of strategies for solving problems and the ability to select a strategy that makes sense for a given problem.

- Have a disposition to deal with confusion and persevere until a problem is solved.

SMP #2:
Reason abstractly and quantitatively.

WHY?

- Quantitative reasoning is the ability to apply math skills and concepts to solve real world problems.

- It would be impossible to memorize how to solve every math problem. In order to solve problems, we employ abstract reasoning skills.

SMP #2:
Reason abstractly and quantitatively.

Mathematically proficient students:

- Represent quantities in a variety of ways.

- Remove the problem context to solve the problem in an abstract way. (Equation)

- Refer back to the problem context, when needed, to understand and evaluate the answer.

SMP #3:
Construct viable arguments and critique the reasoning of others.

WHY?

- As , we work to construct arguments, we use our math skills and knowledge to observe and interpret data, make conjectures about the data and the situation and draw reasonable conclusions.

- As we listen to others' arguments, we consider, analyze, and continually use our math understanding to evaluate their arguments.

SMP #3:
Construct viable arguments and critique the reasoning of others.

Mathematically proficient students:

- Construct viable arguments, both orally and in writing.

- Listen to and critique the reasoning of others.

SMP #4:
Model with mathematics.

WHY?

- ▶ Models are representations of abstract math ideas.
- ▶ Models help clarify problems.
- ▶ We visualize, simplify and make sense of mathematics through models.

SMP #4:
Model with mathematics.

▶ Mathematically proficient students:

- Model math ideas and problems in varied ways.

- Analyze models to draw conclusions and solve problems.

SMP #5:
Use appropriate tools strategically.

WHY?

▶ Mathematicians are familiar with a variety of tools, are able to determine which tool makes sense for a given task, and can effectively use the tool to perform that task.

▶ Tools are what support students to perform a task and some are discussed as models, but they can be classified as tools when they help us to perform tasks, find solutions, or solve problems.

SMP #5:
Use appropriate tools strategically.

Mathematically proficient students:

- Decide when to use tools and select appropriate tools.

- Use tool appropriately and accurately.

SMP #6:
Attend to precision.

WHY?

- ▶ Math relies on precision, both in computation and in communication.

SMP #6:
Attend to precision.

► Mathematically proficient students:

- Calculate accurately and perform math tasks with precision.

- Communicate precisely.

SMP #7:
Look for and make use of structure.

WHY?

▶ There is structure in math. When our students understand the properties of math, see the patterns in math, and understand the flexibility of numbers, they are able to see math as predictable.

▶ We apply what we know about the structure of math – its patterns and properties – as we use math each day.

SMP #7:
Look for and make use of structure.

Mathematically proficient students:

- See the flexibility in numbers.

- Understand properties.

- Recognize patterns and functions.

SMP #8:
Look for and express regularity in repeated reasoning.

WHY?

- Mathematicians are observers. We notice repetition and try to make sense of it.

- We find ways to minimize our efforts in mathematics through shortcuts that are the result of our observations and our ability to notice and make sense of repetition.

SMP #8:
Look for and express regularity in repeated reasoning.

Mathematically proficient students:

- Notice repetition
- Discover shortcuts and generalizations

Reference

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