

Integrating Math Practices

Why are the Standards for Mathematical Practice (SMPs) important?

Teachers sometimes ask, “Why is it important to integrate the SMPs into instruction?” For one thing, they are actually standards, though they are different from the content standards that focus on the mathematics students should learn. The SMPs are the same for all grades and are the habits we know will help them be successful with mathematics.

What are the SMPs and NCTM Teaching Practices?

The SMPs (sometimes called the Process Standards) are habits that are the same for all grades that will help students better understand and retain what they learn and have more successful experiences with mathematics as a result.

Teachers can support students in developing the SMPs by integrating the National Council of Teachers of Mathematics (NCTM) Teaching Practices into their instruction. These 10 teaching practices provide the pedagogical strategies that support students in developing the habits outlined in the SMPs.

Standards for Mathematical Practice

Mathematically proficient students . . .

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. Choose appropriate tools strategically.
6. Attend to precision.
7. Look for and make use of structure.
8. Look for and express regularity in repeated reasoning.

(CCSS, 2010)

NCTM Teaching Practices

Effective mathematics educators . . .

1. Establish mathematical goals that focus learning.
2. Implement tasks that promote reasoning and problem solving.
3. Use and connect mathematical representations.
4. Facilitate meaningful mathematical discourse.
5. Pose purposeful questions.
6. Build procedural fluency from conceptual understanding.
7. Support productive struggle in learning mathematics.
8. Elicit and use evidence of student thinking.

(NCTM, 2014)

How are the SMPs and NCTM Teaching Practices integrated into *i-Ready Classroom Mathematics*?

The SMPs and NCTM Teaching Practices are integrated throughout *i-Ready Classroom Mathematics* instruction. **In fact, *i-Ready Classroom Mathematics* is one of the only programs identified by evaluators at [EdReports.org](https://edreports.org), as well as other organizations and districts, to fully address all of the SMPs!** Here is some of what they saw:

Within the Try–Discuss–Connect Routine

Through faithful use of the Try–Discuss–Connect routine and the support of the Teacher’s Guide, teachers will automatically integrate the NCTM Teaching Practices and most of the SMPs.

Try It	Make Sense of the Problem	Students make sense of the problem (SMP 1), explain what the problem is about, identify important information, and clarify what they are trying to find. Through this process, teachers guide students to attend to precision of language (SMP 6) and reason quantitatively (SMP 2).
	Solve and Support Your Thinking	As students solve the Try It problem, they persevere in solving problems (SMP 1), reason quantitatively and abstractly (SMP 2), model problems with mathematics (SMP 4), and decide which tools they want to use to help them with the problem (SMP 5).
Discuss It	Share Your Thinking with a Partner	Students explain their reasoning and critique the reasoning of a partner (SMP 3). Responding to an explanation with clarifying questions helps students develop arguments that are accurate and precise in both mathematics and academic language (SMP 6).
	Compare Strategies	Students are asked to reason quantitatively and abstractly (SMP 2) as they think critically to understand other students’ explanations (SMP 3), which strengthens the connections they make between student strategies and those in the Student Worktext.
Connect It	Make Connections and Explain Your Thinking	Students are asked to reason quantitatively and abstractly (SMP 2) as they think critically to explain connections between strategies (SMP 3).
	Apply Your Thinking to New Problems	Students may use any number of mathematical practices as they apply their learning to new problems. Make sure manipulatives, tools, and other resources are available to students as they model with mathematics (SMP 4) and choose tools appropriately (SMP 5).

Deepen Understanding in the Teacher’s Guide

Deepen Understanding occurs multiple times in every lesson to connect the key concepts of the lesson to an SMP. By providing activities or Ask/Listen For questions, teachers are able to engage students in discourse to develop deeper understanding of a lesson concept while reinforcing a specific mathematical practice. The provided example is from a Grade 3, Lesson 6 lesson of *i-Ready Classroom Mathematics*.

Deepen Understanding

Breaking Apart Arrays

SMP 7 Look for structure.

When discussing breaking apart the array, prompt students to think about how the dimensions of all three arrays relate to one another.

Ask Look at the number of rows of the original array and each of the two smaller arrays. What do you notice?

Listen for The three arrays all have the same number of rows.

Ask How many columns does each array have? How is the number of columns of the original array related to the number of columns of the smaller arrays?

Listen for The original array has 3 columns. The smaller arrays have 1 column and 2 columns. $3 = 1 + 2$

Generalize When you break apart an array by columns, how will the number of rows and columns of the smaller arrays compare to the original. The smaller arrays will have the same number of rows as the original. The number of columns of the smaller arrays will add up to the number of columns of the original array.