Mathematical Practices and Indicators

1. Make sense of problems and persevere in solving them.	
Mathematically proficient students… • explain the meaning of the problem. • discuss the meaning of the problem with one another. • make conjectures (inferences) and plan a solution path. • monitor and evaluate their progress "Does this make sense?" • use a variety of strategies to solve problems (Go Bulldog). • are flexible in choosing appropriate strategies for solving and computing a problem.	Teachers shape mathematically proficient students by… • providing time for students to think about and analyze the problem. • facilitating discussion between students about the meaning of the problem. • modeling problem solving process and appropriate strategies to solve problems. • monitoring and evaluating student progress. • providing descriptive feedback. • helping students shift toward a more efficient strategy when solving and computing problems.
2. Reason abstractly and quantitatively.	
Mathematically proficient students… • have the ability to contextualize and decontextualize (navigate between the concrete and the abstract). manipulatives ◄► pictures ◄► symbols • understand and can explain the computation methods they use.	Teachers shape mathematically proficient students by… • modeling and providing the appropriate tools. • facilitating conversations to connect models and symbols used in mathematical concepts. manipulatives ◄► pictures ◄► symbols
3. Construct viable arguments and critique the reasoning of others.	
Mathematically proficient students… • make a mathematical statement (conjecture) and justify it. • listen, compare, and critique conjectures and statements. • ask useful questions. • analyze and justify the reasoning "Does this make sense?" • compare the effectiveness of arguments. Explain any flaws.	Teachers shape mathematically proficient students by… • providing a safe environment that encourages discussion and risk-taking. • listening to students and questioning for clarity of arguments. • modeling effective questioning and appropriate ways to discuss and critique a mathematical statement.
4. Model with mathematics.	
Mathematically proficient students… • apply mathematics to solve problems that arise in everyday life. • demonstrate understanding using a variety of appropriate tools and strategies. • are comfortable attempting challenging problems. • reflect on their attempt to solve problems and make revisions to improve their model as necessary.	Teachers shape mathematically proficient students by… • selecting problems that are challenging and reflect everyday situations. • making connections between mathematics and everyday life. • introducing students to models by providing opportunities for students to share. • focusing students on the process rather than the solution.

5. Use appropriate tools strategically.	
Mathematically proficient students… • consider the available tools when solving a problem (i.e. calculator, protractor, ruler, manipulatives, software). • make sound decisions about tool selection. • detect possible errors when using tools by strategically using estimation and other mathematical knowledge. • are able to use technological tools.	Teachers shape mathematically proficient students by… • providing a variety of tools daily during mathematics instruction. • teaching and modeling appropriate use of tools. • facilitating discussion regarding tool selection. • modeling the use of technological tools to explore and deepen student understanding.
6. Attend to precision.	
Mathematically proficient students… • use clear definitions and mathematical vocabulary to communicate reasoning. • specify labels, units, and answers within the context of the problem. • understand and explain the meaning of mathematical symbols.	Teachers shape mathematically proficient students by… • providing content and academic word walls and anchor charts. • generating anchor charts with relevant student examples. • modeling and expecting the daily use of mathematical language and vocabulary. • modeling specific labels, units, and answers within the context of the problem. • providing opportunities for students to explore the mathematical symbols and their meaning.
7. Look for and make use of structure.	
Mathematically proficient students… • look closely to determine possible patterns and structure (properties) within a problem. • analyze patterns and apply them in appropriate mathematical context. • use prior knowledge of numbers and their relationships to reason and solve mathematical problems.	Teachers shape mathematically proficient students by… • selecting problems that are challenging and incorporate the use of patterns. • building number sense daily. • facilitating the process of utilizing patterns and structure to compute and solve problems.
8. Look for and express regularity in repeated reasoning.	
Mathematically proficient students… • notice repeating calculations and look for efficient methods/representations to solve a problem. • evaluate the reasonableness of their results throughout the problem solving process.	Teachers shape mathematically proficient students by… • thinking-aloud the problem solving process by teachers and/or students. • providing students with time and opportunity to discover efficient methods for problem solving.