Engaging in the Mathematical Practices (Look-fors)

Mathematical Practices		Students:	Teachers:
Overarching Habits of Mind	**1. Make sense of problems and persevere in solving them**	☐ Explain the meaning of the problem and look for entry points to its solution. ☐ Analyze and organize information (givens, constraints, relationships, goals). ☐ Make conjectures and plan a solution pathway. ☐ Consider analogous problems and try special cases. ☐ Use different representations of the problem to understand and solve it. ☐ Monitor and evaluate progress on the problem and change course as needed. ☐ Check answers to problems and ask, "Does this make sense?" ☐ Understand the approaches of others and identify connections between different approaches.	☐ Involve students in rich problem-based tasks that encourage them to persevere in order to reach a solution. ☐ Provide opportunities for productive struggle and help students persevere by providing just-in-time scaffolds and checking in with them to help them clarify their thinking and process. ☐ Provide opportunities for students to solve problems that have multiple approaches and solutions. ☐ Encourage students to represent their thinking while problem solving. ☐ Use tasks that lend themselves to multiple representations.
	6. Attend to precision	☐ Communicate precisely to others using clear definitions and math vocabulary. ☐ State the meaning of symbols they use and use them appropriately. ☐ Specify units of measure when working with quantities. ☐ Calculate accurately and efficiently, expressing numerical answers with a degree of precision appropriate for the problem context. ☐ Provide carefully formulated explanations. ☐ Accurately label diagrams and axes to clarify the correspondence with quantities in the problem.	☐ Help students learn math definitions by bridging the gap between informal math language and formal terminology as students engage in mathematical explorations and experiences. ☐ Consistently model precise communication with notation and vocabulary. ☐ Encourage students to focus on the clarity of the definitions, notation, and vocabulary used to convey their reasoning. ☐ Help students consider the accuracy and efficiency of computation and problem-based solutions.
Reasoning and Explaining	**2. Reason abstractly and quantitatively**	☐ Make sense of quantities and their relationships in problem situations. ☐ Decontextualize: abstract a given situation and represent it symbolically. ☐ Contextualize: relate the symbolic representation of a problem back to the situation it represents. ☐ Create a coherent representation of the problem at hand. ☐ Consider the units involved in a problem. ☐ Know and flexibly use different properties of operations and objects.	☐ Help students understand the relationship between a problem scenario and its mathematical representation. ☐ Encourage students to use properties of operations and objects when solving problems. ☐ Ask how, why, and when questions to prompt students to reflect on their reasoning.
	3. Construct viable arguments and critique the reasoning of others	☐ Understand and use stated assumptions, definitions, and previously established results in constructing arguments. ☐ Construct arguments and justify conclusions using objects, drawings, diagrams, and/or actions. ☐ Make conjectures and build a logical progression of statements to explore the truth of their conjecture. ☐ Listen to or read the arguments of others, decide whether they make sense, and ask useful questions to clarify or improve the argument. ☐ Compare arguments and distinguish correct logic or reasoning from that which is flawed, and—if there is a flaw in an argument—explain what it is. ☐ Analyze situations by breaking them into cases and use counterexamples to show a statement if false.	☐ Provide opportunities for students to explain their thinking aloud and encourage them to use objects, drawings, diagrams, and/or actions to support their explanations. ☐ Provide opportunities for students to listen to and compare the solution strategies of others. ☐ Provide opportunities for students to engage in explorations and/or investigations and make conjectures. ☐ Provide opportunities for error analysis.

Mathematical Practices		Students:	Teachers:
Modeling and Using Tools	**4. Model with mathematics**	☐ Apply the math they know to solve problems arising in everyday life, society, and the workplace. ☐ Use assumptions and approximations to simplify a complicated situation. ☐ Decide which tools and methods to use to solve the problem. ☐ Identify important quantities in a situation and model their relationships using diagrams, two-way tables, graphs, flowcharts, and/or formulas. ☐ Check to see if an answer makes sense within the context of the situation and improve the model if necessary.	☐ Use real-world scenarios that interest students and pose, or ask students to pose, questions that require the use of mathematics to solve. ☐ Use tasks that require students to make decisions about how to approach a problem mathematically. ☐ Help students understand the context of the problem. ☐ Remind students that a mathematical model used to represent a problem's solution is 'a work in progress,' and may be revised as needed.
	5. Use appropriate tools strategically	☐ Consider available tools (e.g., pencil and paper, ruler, compass, protractor, calculator, concrete models, digital technologies,) when solving a problem and know when and how to use the tool. ☐ Use technological tools to explore and deepen understanding of concepts.	☐ Provide students access to a variety of physical and digital tools to represent, explore, and deepen student understanding of math concepts. ☐ Help students make sound decisions concerning the use of specific tools by discussing the insight that could be gained using the tool as well as the limitations of the tool.
Seeing Structure and Generalizing	**7. Look for and make use of structure**	☐ Look for a pattern or structure in a mathematical object and use it to develop an efficient strategy to solve a problem. ☐ Shift perspectives to see things (e.g., numbers, expressions, shapes, graphs, etc.) as a single object or compositions of several objects.	☐ Ask students to Notice & Wonder when introducing a task. ☐ Provide opportunities for students to demonstrate flexibility in representing mathematics in different ways.
	8. Look for and express regularity in repeated reasoning	☐ Look at the reasoning involved in a process or sequence of steps and notice when calculations are repeated, then create shortcuts or general methods based on the repeated calculations. ☐ See the overall process of solving a problem using repeated reasoning while still attending to the details. ☐ Continually evaluate the reasonableness of intermediate results.	☐ Encourage students to organize and record calculations so they can more easily see when they are repeated. ☐ Ask students to describe the processes they used and to look for repetition in those processes.

* All indicators are not necessary for providing full evidence of a practice. Each practice may not be evident during every lesson.