

Mathematical Practices: A Walk-Through Protocol

**Note: This document should also be used by the teacher for planning and self-evaluation.*

Mathematical Practices	Observations
MP.1. Make sense of problems and persevere in solving them.	<p>Students are expected to _____:</p> <ul style="list-style-type: none"> <input type="checkbox"/> Engage in solving problems. <input type="checkbox"/> Explain the meaning of a problem and restate in it their own words. <input type="checkbox"/> Analyze given information to develop possible strategies for solving the problem. <input type="checkbox"/> Identify and execute appropriate strategies to solve the problem. <input type="checkbox"/> Check their answers using a different method, and continually ask “Does this make sense?”
	<p>Teachers are expected to _____:</p> <ul style="list-style-type: none"> <input type="checkbox"/> Provide time for students to discuss problem solving.
MP.2. Reason abstractly and quantitatively.	<p>Students are expected to _____:</p> <ul style="list-style-type: none"> <input type="checkbox"/> Connect quantity to numbers and symbols (decontextualize the problem) and create a logical representation of the problem at hand. <input type="checkbox"/> Recognize that a number represents a specific quantity (contextualize the problem). <input type="checkbox"/> Contextualize and decontextualize within the process of solving a problem.
	<p>Teachers are expected to _____:</p> <ul style="list-style-type: none"> <input type="checkbox"/> Provide appropriate representations of problems.

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<p>MP.3. Construct viable arguments and critique the reasoning of others.</p>	<p>Students are expected to _____:</p> <ul style="list-style-type: none"> <input type="checkbox"/> Explain their thinking to others and respond to others' thinking. <input type="checkbox"/> Participate in mathematical discussions involving questions like "How did you get that?" and "Why is that true?" <input type="checkbox"/> Construct arguments that utilize prior learning. <input type="checkbox"/> Question and problem pose. <input type="checkbox"/> Practice questioning strategies used to generate information. <input type="checkbox"/> Analyze alternative approaches suggested by others and select better approaches. <input type="checkbox"/> Justify conclusions, communicate them to others, and respond to the arguments of others. <input type="checkbox"/> Compare the effectiveness of two plausible arguments, distinguish correct logic or reasoning from that which is flawed, and if there is a flaw in an argument, explain what it is. <hr/> <p>Teachers are expected to _____:</p> <ul style="list-style-type: none"> <input type="checkbox"/> Provide opportunities for students to listen to or read the conclusions and arguments of others.

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MP.4. Model with mathematics.	<p>Students are expected to _____:</p> <ul style="list-style-type: none"> <input type="checkbox"/> Apply the mathematics they know to solve problems arising in everyday life, society, and the workplace. <input type="checkbox"/> Make assumptions and approximations to simplify a complicated situation, realizing that these may need revision later. <input type="checkbox"/> Experiment with representing problem situations in multiple ways, including numbers, words (mathematical language), drawing pictures, using objects, acting out, making a chart or list, creating equations, etc. <input type="checkbox"/> Identify important quantities in a practical situation and map their relationships using such tools as diagrams, two-way tables, graphs, flowcharts, and formulas. <input type="checkbox"/> Evaluate their results in the context of the situation and reflect on whether their results make sense. <input type="checkbox"/> Analyze mathematical relationships to draw conclusions. <hr/> <p>Teachers are expected to _____:</p> <ul style="list-style-type: none"> <input type="checkbox"/> Provide contexts for students to apply the mathematics learned.
MP.5. Use appropriate tools strategically.	<p>Students are expected to _____:</p> <ul style="list-style-type: none"> <input type="checkbox"/> Use tools when solving a mathematical problem and to deepen their understanding of concepts (e.g., pencil and paper, physical models, geometric construction and measurement devices, graph paper, calculators, computer-based algebra or geometry systems.) <input type="checkbox"/> Consider available tools when solving a mathematical problem and decide when certain tools might be helpful, recognizing both the insight to be gained and their limitations. <input type="checkbox"/> Detect possible errors by strategically using estimation and other mathematical knowledge.

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	<p>Teachers are expected to _____:</p> <p><input type="checkbox"/> Model the use of appropriate tools (e.g. manipulatives) instructionally.</p>
MP.6. Attend to precision.	<p>Students are expected to _____:</p> <p><input type="checkbox"/> Use clear and precise language in their discussions with others and in their own reasoning.</p> <p><input type="checkbox"/> Use clear definitions and state the meaning of the symbols they choose, including using the equal sign consistently and appropriately.</p> <p><input type="checkbox"/> Specify units of measure and label parts of graphs and charts.</p> <p><input type="checkbox"/> Calculate with accuracy and efficiency based on a problem's expectation.</p> <p>Teachers are expected to _____:</p> <p><input type="checkbox"/> Emphasize the importance of precise communication.</p>
MP.7. Look for and make use of structure.	<p>Students are expected to _____:</p> <p><input type="checkbox"/> Describe a pattern or structure.</p> <p><input type="checkbox"/> Look for, develop, generalize, and describe a pattern orally, symbolically, graphically and in written form.</p> <p><input type="checkbox"/> Relate numerical patterns to a rule or graphical representation</p> <p><input type="checkbox"/> Apply and discuss properties.</p>

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	<p>Teachers are expected to _____:</p> <p><input type="checkbox"/> Provide time for applying and discussing properties.</p>
<p>MP.8. Look for and express regularity in repeated reasoning.</p>	<p>Students are expected to _____:</p> <p><input type="checkbox"/> Describe repetitive actions in computation</p> <p><input type="checkbox"/> Look for mathematically sound shortcuts.</p> <p><input type="checkbox"/> Use repeated applications to generalize properties.</p> <p><input type="checkbox"/> Use models to explain calculations and describe how algorithms work.</p> <p><input type="checkbox"/> Use models to examine patterns and generate their own algorithms.</p> <p><input type="checkbox"/> Check the reasonableness of their results.</p> <hr/> <p>Teachers are expected to _____:</p> <p><input type="checkbox"/> Encourage students to look for and discuss regularity in reasoning.</p>