

Figure 2.4. Mathematics Teaching Practices School Leadership Team Reflection

NCTM Mathematics Teaching Practices (MTP)	Possible School Actions	Strengths Identify team actions that currently support the MTP	Challenges Identify needed team actions to support the MTP
<p><b>Establish mathematics goals to focus learning.</b> Effective teaching of mathematics establishes clear goals for the mathematics that students are learning, situates goals within learning progressions, and uses the goals to guide instructional decisions.</p>	<ul style="list-style-type: none"> <li>Establish clear learning goals for students and teachers to monitor student learning and stay focused on the mathematics.</li> <li>Develop a shared understanding of the progression of learning goals to support development of meaningful and relevant mathematics.</li> <li>Use the learning goals to guide lesson design and use of assessments.</li> </ul>		
<p><b>Implement tasks that promote reasoning and problem solving.</b> Effective teaching of mathematics engages students in solving and discussing tasks that promote mathematical reasoning and problem solving and allow multiple entry points and varied solutions strategies.</p>	<ul style="list-style-type: none"> <li>Design or select tasks that promote reasoning and problem solving that lead to the improved student learning and, as implemented, maintain the intended level of cognitive demand.</li> <li>Choose mathematical tasks that are balanced in cognitive demand.</li> <li>Support student perseverance by using tasks with multiple entry points to guarantee equity and access.</li> <li>Encourage students to use different tools and representations to engage in problem-solving tasks.</li> </ul>		

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## REPRODUCIBLE

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<p><b>Use and connect mathematical representations.</b>                      Effective teaching of mathematics engages students in making connections among mathematical representations to deepen understanding of mathematics concepts and procedures and as tools for problem solving.</p>	<ul style="list-style-type: none"> <li>• Select tasks that promote multiple forms of representations for students to make choices and connections as they are solving problems.</li> <li>• Focus students' attention on mathematical structures and reasoning.</li> <li>• Support students' learning by using various representations when solving problems.</li> </ul>		
<p><b>Facilitate meaningful mathematical discourse.</b>                      Effective teaching of mathematics facilitates discourse among students to build shared understanding of mathematical ideas by analyzing and comparing student approaches and arguments.</p>	<ul style="list-style-type: none"> <li>• Engage students in purposeful sharing of mathematical ideas, reasoning, and approaches using varied representations.</li> <li>• Provide students with opportunities to learn from their peers while engaged in discourse.</li> <li>• Teach teachers and students to listen carefully to each other and critique the reasoning and use examples to support or refute the thinking.</li> <li>• Plan intentionally for meaningful discourse.</li> </ul>		

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<p><b>Pose purposeful questions.</b>                      Effective teaching of mathematics uses purposeful questions to assess and advance students' reasoning and sense making about important mathematical ideas and relationships.</p>	<ul style="list-style-type: none"> <li>• Include questions that go beyond gathering information to probing thinking and requiring explanation and justification during instruction.</li> <li>• Ask intentional questions that make the mathematics more visible and accessible for student examination and discussion.</li> <li>• Teach students to explain, clarify, and elaborate on their thinking and focus on more than just an answer.</li> <li>• Structure questioning so that it builds on rather than “funnels” their thinking.</li> </ul>		
<p><b>Build procedural fluency from conceptual understanding.</b>                      Effective teaching of mathematics builds fluency with procedures on a foundation of conceptual understanding so that students, over time, become skillful in using procedures flexibly as they solve contextual and mathematical problems.</p>	<ul style="list-style-type: none"> <li>• Introduce lessons with a focus on conceptual understanding so that students construct mathematical meaning from the procedures that they learn.</li> <li>• Provide students with opportunities to share their own reasoning and problem-solving pathways.</li> <li>• Ask students to discuss and explain why the procedures that they are using work to solve particular problems.</li> <li>• Make purposeful connections with student-generated strategies and methods throughout the lesson.</li> <li>• Teach students to think flexibly.</li> </ul>		

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<p><b>Support productive struggle in learning mathematics.</b></p> <p>Effective teaching of mathematics consistently provides students, individually and collectively, with opportunities and supports to engage in productive struggle as they grapple with mathematical ideas and relationships.</p>	<ul style="list-style-type: none"> <li>• Select and implement high-level tasks that promote reasoning and problem solving, as these tasks are essential to developing conceptual understanding.</li> <li>• Teachers anticipate student thinking, including where students might struggle during a lesson, and need to be prepared to support them, so students persevere while remaining engaged in tasks.</li> <li>• Students ask questions to understand the concepts and are able to persevere.</li> <li>• Teachers embrace mistakes and treat them as a learning opportunity.</li> <li>• Students realize that confusion and errors are a natural part of learning.</li> </ul>		
<p><b>Elicit and use evidence of student thinking.</b></p> <p>Effective teaching of mathematics uses evidence of student thinking to assess progress toward mathematical understanding and to adjust instruction continually in ways that support and extend learning.</p>	<ul style="list-style-type: none"> <li>• Teachers choose mathematical tasks that promote reasoning and problem solving to elicit student thinking.</li> <li>• Teachers and students reflect on mistakes or misconceptions.</li> <li>• Teachers and teams consistently gather evidence of student learning during and after instruction to inform instruction.</li> </ul>		

Source: Adapted from NCTM (2014, 2017).

 Visit <https://www.mathedleadership.org/resources/summary.html> to download a free reproducible version of this figure.

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