

## Best Practices for Mathematics Instruction

Quality mathematics teaching is a critical key for student success. In *Principles to Actions (2014)*, the National Council of teachers of Mathematics outlines eight valuable teaching practices every teacher should incorporate to guarantee student achievement. These eight research-informed practices briefly explained below provide a foundation for effective mathematics teaching and student learning.

Research-Based Practice	Description
Establish mathematics goals to focus learning.	<ul style="list-style-type: none"> <li>Establishing learning goals sets the stage and helps to guide instructional decisions.</li> <li>Teachers must keep in mind what is to be learned, why the goal is important, where students need to go (the trajectory), as well as how learning can be extended. Students must clearly understand the purpose of each lesson beyond simply repeating the Standard.</li> </ul>
Implement tasks that promote reasoning and problem solving.	<ul style="list-style-type: none"> <li>Implementing tasks that promote reasoning and problem solving opportunities for students to engage in exploration and encourages students to use procedures in ways that are connected to conceptual understanding.</li> <li>The tasks teachers choose should be built on current student understandings and have various entry points with multiple ways for the problems to be solved.</li> </ul>
Use and connect mathematical representations.	<ul style="list-style-type: none"> <li>Using and connecting representations leads to students to deeper understanding.</li> <li>Different representations, including concrete models, pictures, words, and numbers, should be introduced, discussed, and connected to support students in explaining their thinking and reasoning.</li> </ul>
Facilitate meaningful mathematical discourse.	<ul style="list-style-type: none"> <li>Facilitating meaningful student mathematical conversations provides students with opportunities to share ideas, clarify their understanding, and develop convincing arguments.</li> <li>Talking and sharing aloud can advance the mathematical thinking of the whole class.</li> </ul>
Pose purposeful questions.	<ul style="list-style-type: none"> <li>Posing purposeful questions reveals students' current understanding of a concept and encourages students to explain, elaborate, and clarify thinking.</li> <li>Asking good questions makes the learning of mathematics more visible and accessible for student examination.</li> </ul>
Build procedural fluency from conceptual understanding.	<ul style="list-style-type: none"> <li>Building procedural fluency from conceptual understanding based on experiences with concrete representations allows students to flexibly choose from a variety of methods to solve problems.</li> </ul>
Support productive struggle in learning mathematics.	<ul style="list-style-type: none"> <li>Supporting productive struggle in learning mathematics is significant and essential to learning mathematics with understanding.</li> <li>Productive struggle allows students to grapple with ideas and relationships.</li> <li>Giving young students ample time to work with and make sense out of new ideas is critical to their learning with understanding.</li> </ul>
Elicit and use evidence of student thinking.	<ul style="list-style-type: none"> <li>Eliciting and using evidence of student thinking helps teachers access learning progress and can be used to make instructional decisions during the lessons as well as help to prepare what will occur in the next lesson.</li> <li>Formative assessment through student written and oral ideas are excellent artifacts to access student thinking and understanding.</li> </ul>