

# Recommendations on Teaching Mathematics

INCREASE	DECREASE
<p><b>Teaching Practices:</b></p> <ul style="list-style-type: none"> <li><input type="checkbox"/> Use of manipulative materials.</li> <li><input type="checkbox"/> Cooperative group work.</li> <li><input type="checkbox"/> Discussion of mathematics.</li> <li><input type="checkbox"/> Questioning and making conjectures.</li> <li><input type="checkbox"/> Justification of thinking.</li> <li><input type="checkbox"/> Writing about mathematics.</li> <li><input type="checkbox"/> Problem-solving approach to mathematics.</li> <li><input type="checkbox"/> Content integration.</li> <li><input type="checkbox"/> Use of calculators and computers.</li> <li><input type="checkbox"/> Being a facilitator of learning.</li> <li><input type="checkbox"/> Assessing learning as an integral part of instruction.</li> </ul>	<p><b>Teaching Practices:</b></p> <ul style="list-style-type: none"> <li><input type="checkbox"/> Rote practice.</li> <li><input type="checkbox"/> Rote memorization of rules and formulas.</li> <li><input type="checkbox"/> Single answers and single methods to find answers.</li> <li><input type="checkbox"/> Use of drill worksheets.</li> <li><input type="checkbox"/> Repetitive written practice.</li> <li><input type="checkbox"/> Teaching by telling.</li> <li><input type="checkbox"/> Teaching computation out of context.</li> <li><input type="checkbox"/> Stressing memorization.</li> <li><input type="checkbox"/> Testing for grades only.</li> <li><input type="checkbox"/> Being the dispenser of knowledge.</li> </ul>
<p><b>Mathematics as Problem Solving:</b></p> <ul style="list-style-type: none"> <li><input type="checkbox"/> Word problems with a variety of structures and solution paths.</li> <li><input type="checkbox"/> Everyday problems and applications.</li> <li><input type="checkbox"/> Problem-solving strategies.</li> <li><input type="checkbox"/> Open-ended problems and extended problem-solving projects.</li> <li><input type="checkbox"/> Investigating and formulating questions from problem situations.</li> </ul>	<p><b>Mathematics as Problem Solving:</b></p> <ul style="list-style-type: none"> <li><input type="checkbox"/> Use of cue words to determine operation to be used.</li> <li><input type="checkbox"/> Practicing routine, one-step problems.</li> <li><input type="checkbox"/> Practicing problems categorized by type.</li> </ul>
<p><b>Mathematics as Communication:</b></p> <ul style="list-style-type: none"> <li><input type="checkbox"/> Listening to mathematical ideas.</li> <li><input type="checkbox"/> Reading mathematics.</li> <li><input type="checkbox"/> Discussing mathematics.</li> <li><input type="checkbox"/> Writing mathematics.</li> </ul>	<p><b>Mathematics as Communication:</b></p> <ul style="list-style-type: none"> <li><input type="checkbox"/> Doing fill-in-the-blank worksheets.</li> <li><input type="checkbox"/> Answering questions that need only yes or no responses.</li> <li><input type="checkbox"/> Answering questions that need only numerical responses.</li> </ul>
<p><b>Mathematics as Reasoning:</b></p> <ul style="list-style-type: none"> <li><input type="checkbox"/> Drawing logical conclusions.</li> <li><input type="checkbox"/> Justifying answers and solution processes.</li> <li><input type="checkbox"/> Reasoning inductively and deductively.</li> </ul>	<p><b>Mathematics as Reasoning:</b></p> <ul style="list-style-type: none"> <li><input type="checkbox"/> Relying on authorities (teacher, answer key).</li> </ul>
<p><b>Mathematical Connections:</b></p> <ul style="list-style-type: none"> <li><input type="checkbox"/> Connecting mathematics to other subjects and to the real world.</li> <li><input type="checkbox"/> Connecting topics within mathematics</li> <li><input type="checkbox"/> Applying mathematics.</li> </ul>	<p><b>Mathematical Connections:</b></p> <ul style="list-style-type: none"> <li><input type="checkbox"/> Learning isolated topics.</li> <li><input type="checkbox"/> Developing skills out of context.</li> </ul>

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<p><b>Numbers/Operations/Computation:</b></p> <ul style="list-style-type: none"> <li><input type="checkbox"/> Developing number and operation sense.</li> <li><input type="checkbox"/> Understanding the meaning of key concepts such as place value, fractions, decimals, ratios, and percents.</li> <li><input type="checkbox"/> Various estimation strategies.</li> <li><input type="checkbox"/> Thinking strategies for basic facts.</li> <li><input type="checkbox"/> Using calculators for complex calculations.</li> </ul>	<p><b>Numbers/Operations/Computation:</b></p> <ul style="list-style-type: none"> <li><input type="checkbox"/> Early use of symbolic notation.</li> <li><input type="checkbox"/> Complex and tedious paper-and-pencil computations.</li> <li><input type="checkbox"/> Memorizing rules and procedures without understanding.</li> </ul>
<p><b>Geometry and Measurement:</b></p> <ul style="list-style-type: none"> <li><input type="checkbox"/> Developing spatial sense.</li> <li><input type="checkbox"/> Actual measuring and the concepts related to units of measure.</li> <li><input type="checkbox"/> Using geometry in problem solving.</li> </ul>	<p><b>Geometry and Measurement:</b></p> <ul style="list-style-type: none"> <li><input type="checkbox"/> Memorizing facts and relationships.</li> <li><input type="checkbox"/> Memorizing equivalencies between units of measure.</li> <li><input type="checkbox"/> Memorizing geometric formulas.</li> </ul>
<p><b>Statistics/Probability:</b></p> <ul style="list-style-type: none"> <li><input type="checkbox"/> Collection and organization of data.</li> <li><input type="checkbox"/> Using statistical methods to describe, analyze, evaluate, and make decisions.</li> </ul>	<p><b>Statistics/Probability:</b></p> <ul style="list-style-type: none"> <li><input type="checkbox"/> Memorizing formulas.</li> </ul>
<p><b>Patterns/Functions/Algebra:</b></p> <ul style="list-style-type: none"> <li><input type="checkbox"/> Pattern recognition and description.</li> <li><input type="checkbox"/> Identifying and using functional relationships.</li> <li><input type="checkbox"/> Developing and using tables, graphs, and rules to describe situations</li> <li><input type="checkbox"/> Using variables to express relationships.</li> </ul>	<p><b>Patterns/Functions/Algebra:</b></p> <ul style="list-style-type: none"> <li><input type="checkbox"/> Manipulating symbols.</li> <li><input type="checkbox"/> Memorizing procedures and drilling.</li> </ul>
<p><b>Evaluation:</b></p> <ul style="list-style-type: none"> <li><input type="checkbox"/> Having assessment be an integral part of teaching.</li> <li><input type="checkbox"/> Focusing on a broad range of mathematical tasks and taking a holistic view of mathematics.</li> <li><input type="checkbox"/> Developing problem situations that require applications of a number of mathematical ideas.</li> <li><input type="checkbox"/> Using multiple assessment techniques, including written, oral, and demonstration formats.</li> </ul>	<p><b>Evaluation:</b></p> <ul style="list-style-type: none"> <li><input type="checkbox"/> Having assessment be simply counting correct answers on tests for the sole purpose of assigning grades.</li> <li><input type="checkbox"/> Focusing on a large number of specific and isolated skills.</li> <li><input type="checkbox"/> Using exercises or word problems requiring only one or two skills.</li> <li><input type="checkbox"/> Using only written tests.</li> </ul>