## MATH Standards for Mathematical Practice in Action

Practice	Sample Student Evidence	Sample Teacher Actions
1. Make sense of problems and persevere in solving them.	<ul> <li>Display sense-making behaviors.</li> <li>Show patience and listen to others.</li> <li>Turn and talk for first steps or generate a solution plan.</li> <li>Analyze information in problems.</li> <li>Use and recall multiple strategies.</li> <li>Self-evaluate and redirect.</li> <li>Assess the reasonableness of process and answer.</li> </ul>	<ul> <li>Provide open-ended problems.</li> <li>Ask probing questions.</li> <li>Probe student responses.</li> <li>Promote and value discourse.</li> <li>Promote collaboration.</li> <li>Model and accept multiple approaches.</li> </ul>
2. Reason abstractly and quantitatively.	<ul> <li>Represent abstract and contextual situations symbolically.</li> <li>Interpret problems logically in context.</li> <li>Estimate for reasonableness.</li> <li>Make connections, including real-life situations.</li> <li>Create and use multiple representations.</li> <li>Visualize problems.</li> <li>Put symbolic problems into context.</li> </ul>	<ul> <li>Model context to symbol and symbol to context.</li> <li>Create problems such as, "What word problem will this equation solve?"</li> <li>Give real-world situations.</li> <li>Offer authentic performance tasks.</li> <li>Place less emphasis on the answer.</li> <li>Value invented strategies.</li> <li>Think aloud.</li> </ul>
<ol> <li>Construct viable arguments and critique the reasoning of others.</li> </ol>	<ul> <li>Question others.</li> <li>Use examples and nonexamples.</li> <li>Support beliefs and challenges with mathematical evidence.</li> <li>Form logical arguments with conjectures and counterexamples.</li> <li>Use multiple representations for evidence.</li> <li>Listen and respond to others well.</li> <li>Use precise mathematical vocabulary.</li> </ul>	<ul> <li>Create a safe and collaborative environment.</li> <li>Model respectful discourse behaviors.</li> <li>Provide find-the-error problems.</li> <li>Promote student-to-student discourse (do not mediate discussion).</li> <li>Plan effective questions or Socratic formats.</li> <li>Provide time and value discourse.</li> </ul>
4. Model with mathematics.	<ul> <li>Connect math (numbers and symbols) to real-life situations.</li> <li>Symbolize real-world problems with math.</li> <li>Make sense of mathematics.</li> <li>Apply prior knowledge to solve problems.</li> <li>Choose and apply representations, manipulatives, and other models to solve problems.</li> <li>Use strategies to make problems simpler.</li> <li>Use estimation and logic to check the reasonableness of an answer.</li> </ul>	<ul> <li>Model reasoning skills.</li> <li>Provide meaningful, real-world, authentic, performance-based tasks.</li> <li>Make appropriate tools available.</li> <li>Model various modeling techniques.</li> <li>Accept and value multiple approaches and representations.</li> </ul>
5. Use appropriate tools strategically.	<ul> <li>Choose appropriate tool(s) for a given problem.</li> <li>Use technology to deepen understanding.</li> <li>Identify and locate resources.</li> <li>Defend mathematically the choice of a tool.</li> </ul>	<ul> <li>Provide a toolbox at all times with all available tools; students then choose as needed.</li> <li>Model tool use, especially technology for understanding.</li> </ul>



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6. Attend to precision.	<ul> <li>Communicate (orally and in writing) with precise vocabulary.</li> <li>Carefully formulate questions and explanations (not retelling steps).</li> <li>Decode and interpret the meaning of symbols.</li> <li>Pay attention to units, labeling, scale, and so forth.</li> <li>Calculate accurately and effectively.</li> <li>Express answers within context when appropriate.</li> </ul>	<ul> <li>Model problem-solving strategies.</li> <li>Give explicit and precise instruction.</li> <li>Ask probing questions.</li> <li>Use English language arts strategies of decoding, comprehending, and text-to-self connections for interpreting symbolic and contextual math problems.</li> <li>Guided inquiry.</li> </ul>
7. Look for and make use of structure.	<ul> <li>Look for, identify, and interpret patterns and structures.</li> <li>Make connections to skills and strategies previously learned to solve new problems and tasks.</li> <li>Breakdown complex problems into simpler and more manageable chunks.</li> <li>Use multiple representations for quantities.</li> <li>View complicated quantities as both a single object and a composition of objects.</li> </ul>	<ul> <li>Let students explore and explain patterns.</li> <li>Use open-ended questioning.</li> <li>Prompt students to make connections and choose problems that foster connections.</li> <li>Ask for multiple interpretations of quantities.</li> </ul>
8. Look for and express regularity in repeated reasoning.	<ul> <li>Design and state shortcuts.</li> <li>Generate rules from repeated reasoning or practice (e.g., integer operations).</li> <li>Evaluate the reasonableness of intermediate steps.</li> <li>Make generalizations.</li> </ul>	<ul> <li>Provide tasks that allow students to generalize.</li> <li>Don't teach steps or rules, but allow students to explore and generalize to discover and formalize.</li> <li>Ask deliberate questions.</li> <li>Create strategic and purposeful check-in points.</li> </ul>

Source: Adapted from "Common Core Look Fors (CCL4s)" (iPad App). Adapted from NCSM Summer Leadership Academy, June, 2011, Atlanta, Ga.



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