

# 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 style="list-style-type: none"> <li><input type="checkbox"/> Display sense-making behaviors.</li> <li><input type="checkbox"/> Show patience and listen to others.</li> <li><input type="checkbox"/> Turn and talk for first steps or generate a solution plan.</li> <li><input type="checkbox"/> Analyze information in problems.</li> <li><input type="checkbox"/> Use and recall multiple strategies.</li> <li><input type="checkbox"/> Self-evaluate and redirect.</li> <li><input type="checkbox"/> Assess the reasonableness of process and answer.</li> </ul>  | <ul style="list-style-type: none"> <li><input type="checkbox"/> Provide open-ended problems.</li> <li><input type="checkbox"/> Ask probing questions.</li> <li><input type="checkbox"/> Probe student responses.</li> <li><input type="checkbox"/> Promote and value discourse.</li> <li><input type="checkbox"/> Promote collaboration.</li> <li><input type="checkbox"/> Model and accept multiple approaches.</li> </ul>  |
| 2. Reason abstractly and quantitatively.                            | <ul style="list-style-type: none"> <li><input type="checkbox"/> Represent abstract and contextual situations symbolically.</li> <li><input type="checkbox"/> Interpret problems logically in context.</li> <li><input type="checkbox"/> Estimate for reasonableness.</li> <li><input type="checkbox"/> Make connections, including real-life situations.</li> <li><input type="checkbox"/> Create and use multiple representations.</li> <li><input type="checkbox"/> Visualize problems.</li> <li><input type="checkbox"/> Put symbolic problems into context.</li> </ul>   | <ul style="list-style-type: none"> <li><input type="checkbox"/> Model context to symbol and symbol to context.</li> <li><input type="checkbox"/> Create problems such as, "What word problem will this equation solve?"</li> <li><input type="checkbox"/> Give real-world situations.</li> <li><input type="checkbox"/> Offer authentic performance tasks.</li> <li><input type="checkbox"/> Place less emphasis on the answer.</li> <li><input type="checkbox"/> Value invented strategies.</li> <li><input type="checkbox"/> Think aloud.</li> </ul> |
| 3. Construct viable arguments and critique the reasoning of others. | <ul style="list-style-type: none"> <li><input type="checkbox"/> Question others.</li> <li><input type="checkbox"/> Use examples and nonexamples.</li> <li><input type="checkbox"/> Support beliefs and challenges with mathematical evidence.</li> <li><input type="checkbox"/> Form logical arguments with conjectures and counterexamples.</li> <li><input type="checkbox"/> Use multiple representations for evidence.</li> <li><input type="checkbox"/> Listen and respond to others well.</li> <li><input type="checkbox"/> Use precise mathematical vocabulary.</li> </ul>   | <ul style="list-style-type: none"> <li><input type="checkbox"/> Create a safe and collaborative environment.</li> <li><input type="checkbox"/> Model respectful discourse behaviors.</li> <li><input type="checkbox"/> Provide find-the-error problems.</li> <li><input type="checkbox"/> Promote student-to-student discourse (do not mediate discussion).</li> <li><input type="checkbox"/> Plan effective questions or Socratic formats.</li> <li><input type="checkbox"/> Provide time and value discourse.</li> </ul>                             |
| 4. Model with mathematics.  | <ul style="list-style-type: none"> <li><input type="checkbox"/> Connect math (numbers and symbols) to real-life situations.</li> <li><input type="checkbox"/> Symbolize real-world problems with math.</li> <li><input type="checkbox"/> Make sense of mathematics.</li> <li><input type="checkbox"/> Apply prior knowledge to solve problems.</li> <li><input type="checkbox"/> Choose and apply representations, manipulatives, and other models to solve problems.</li> <li><input type="checkbox"/> Use strategies to make problems simpler.</li> <li><input type="checkbox"/> Use estimation and logic to check the reasonableness of an answer.</li> </ul> | <ul style="list-style-type: none"> <li><input type="checkbox"/> Model reasoning skills.</li> <li><input type="checkbox"/> Provide meaningful, real-world, authentic, performance-based tasks.</li> <li><input type="checkbox"/> Make appropriate tools available.</li> <li><input type="checkbox"/> Model various modeling techniques.</li> <li><input type="checkbox"/> Accept and value multiple approaches and representations.</li> </ul>  |
| 5. Use appropriate tools strategically.                             | <ul style="list-style-type: none"> <li><input type="checkbox"/> Choose appropriate tool(s) for a given problem.</li> <li><input type="checkbox"/> Use technology to deepen understanding.</li> <li><input type="checkbox"/> Identify and locate resources.</li> <li><input type="checkbox"/> Defend mathematically the choice of a tool.</li> </ul>  | <ul style="list-style-type: none"> <li><input type="checkbox"/> Provide a toolbox at all times with all available tools; students then choose as needed.</li> <li><input type="checkbox"/> Model tool use, especially technology for understanding.</li> </ul>   |

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| 6. Attend to precision.                                   | <ul style="list-style-type: none"> <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 style="list-style-type: none"> <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 style="list-style-type: none"> <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 style="list-style-type: none"> <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 style="list-style-type: none"> <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 style="list-style-type: none"> <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.

