

Standards for Mathematical Practice in Action

Practice	Sample Student Evidence	Sample Teacher Actions	Questions (Self Talk)
1. Make sense of problems and persevere in solving them	<ul style="list-style-type: none"> <input type="checkbox"/> Display sense-making behaviors <input type="checkbox"/> Show patience and listen to others <input type="checkbox"/> Turn and talk for first steps and/or generate solution plan <input type="checkbox"/> Analyze information in problems <input type="checkbox"/> Use and recall multiple strategies <input type="checkbox"/> Self-evaluate and redirect <input type="checkbox"/> Assess reasonableness of process and answer 	<ul style="list-style-type: none"> <input type="checkbox"/> Provide open-ended problems <input type="checkbox"/> Ask probing questions <input type="checkbox"/> Probe student responses <input type="checkbox"/> Promote and value discourse <input type="checkbox"/> Promote collaboration <input type="checkbox"/> Model and accept multiple approaches 	<ul style="list-style-type: none"> <input type="checkbox"/> What is the problem about? <input type="checkbox"/> How can I get started? <input type="checkbox"/> Have I ever worked a problem like this? <input type="checkbox"/> What do I already know that is related? <input type="checkbox"/> What do I do when I get stuck? <input type="checkbox"/> Can I use friendlier number to help me make sense of this problem? <input type="checkbox"/> Am I doing what makes sense? <input type="checkbox"/> Does my answer make sense?
2. Reason abstractly and quantitatively	<ul style="list-style-type: none"> <input type="checkbox"/> Represent abstract and contextual situations symbolically <input type="checkbox"/> Interpret problems logically in context <input type="checkbox"/> Estimate for reasonableness <input type="checkbox"/> Make connections including real life situations <input type="checkbox"/> Create and use multiple representations <input type="checkbox"/> Visualize problems <input type="checkbox"/> Put symbolic problems into context 	<ul style="list-style-type: none"> <input type="checkbox"/> Model context to symbol and symbol to context <input type="checkbox"/> Create problems such as “what word problem will this equation solve?” <input type="checkbox"/> Give real world situations <input type="checkbox"/> Offer authentic performance tasks <input type="checkbox"/> Place less emphasis on the answer <input type="checkbox"/> Value invented strategies <input type="checkbox"/> Think Aloud 	<ul style="list-style-type: none"> <input type="checkbox"/> Does my strategy make sense in the situation? <input type="checkbox"/> Can I work with the math differently outside the situation? <input type="checkbox"/> Does my answer make sense in the situation? <input type="checkbox"/> What do the symbols in this problem mean? <input type="checkbox"/> What does it look like in the real world? <input type="checkbox"/> What math can be seen in this situation?
3. Construct viable arguments and critique the reasoning of others	<ul style="list-style-type: none"> <input type="checkbox"/> Questions others <input type="checkbox"/> Use examples and non-examples <input type="checkbox"/> Support beliefs and challenges with mathematical evidence <input type="checkbox"/> Forms logical arguments with conjectures and counterexamples <input type="checkbox"/> Use multiple representations for evidence <input type="checkbox"/> Listen and respond to others well <input type="checkbox"/> Uses precise mathematical vocabulary 	<ul style="list-style-type: none"> <input type="checkbox"/> Create a safe and collaborative environment <input type="checkbox"/> Model respectful discourse behaviors <input type="checkbox"/> “Find the error” problems <input type="checkbox"/> Promote student to student discourse (do not mediate discussion) <input type="checkbox"/> Plan effective questions or Socratic formats <input type="checkbox"/> Provide time and value discourse 	<ul style="list-style-type: none"> <input type="checkbox"/> Can I provide evidence to support my thinking? <input type="checkbox"/> Do I understand another’s explanation? <input type="checkbox"/> Can I ask a good question to understand another’s thinking better? <input type="checkbox"/> Will this strategy always work? <input type="checkbox"/> What did I learn form not getting the same answer as my classmates? <input type="checkbox"/> Is another’s explanation reasonable and mathematically true?

<p>4. Model with mathematics</p>	<ul style="list-style-type: none"> <input type="checkbox"/> Connect math (numbers and symbols) to real-life situations <input type="checkbox"/> Symbolize real-world problems with math <input type="checkbox"/> Make sense of mathematics <input type="checkbox"/> Apply prior knowledge to solve problems <input type="checkbox"/> Choose and apply representations, manipulatives and other models to solve problems <input type="checkbox"/> Use strategies to make problems simpler <input type="checkbox"/> Use estimation and logic to check reasonableness of an answer 	<ul style="list-style-type: none"> <input type="checkbox"/> Model reasoning skills <input type="checkbox"/> Provide meaningful, real world, authentic performance-based tasks <input type="checkbox"/> Make appropriate tools available <input type="checkbox"/> Model various modeling techniques <input type="checkbox"/> Accept and value multiple approaches and representations 	<ul style="list-style-type: none"> <input type="checkbox"/> Can I figure out what math would help me solve this real-world problem? <input type="checkbox"/> Did my model work? Did my answer make sense? <input type="checkbox"/> Is there another mathematical model that might work? <input type="checkbox"/> Is there more than one way to represent this problem?
<p>5. Use appropriate tools strategically</p>	<ul style="list-style-type: none"> <input type="checkbox"/> Choose appropriate tool(s) for a given problem <input type="checkbox"/> Use technology to deepen understanding <input type="checkbox"/> Identify and locate resources <input type="checkbox"/> Defend mathematically choice of tool 	<ul style="list-style-type: none"> <input type="checkbox"/> Provide a “toolbox” at all times with all available tools – students then choose as needed <input type="checkbox"/> Model tool use, especially technology for understanding 	<ul style="list-style-type: none"> <input type="checkbox"/> What objects or materials would help me think about the problem? <input type="checkbox"/> What representations would help me think about the problem? <input type="checkbox"/> Should I use a calculator? <input type="checkbox"/> What strategies do I know that would help me? <input type="checkbox"/> What tools have I used with a similar problem? <input type="checkbox"/> What tools are available? <input type="checkbox"/> Will estimation or mental math help?
<p>6. Attend to precision</p>	<ul style="list-style-type: none"> <input type="checkbox"/> Communicate (oral and written) with precise vocabulary <input type="checkbox"/> Carefully formulate questions and explanations (not retelling steps) <input type="checkbox"/> Decode and interpret meaning of symbols <input type="checkbox"/> Pay attention to units, labeling, scale, etc. <input type="checkbox"/> Calculate accurately and effectively <input type="checkbox"/> Express answers within context when appropriate 	<ul style="list-style-type: none"> <input type="checkbox"/> Model problem solving strategies <input type="checkbox"/> Give explicit and precise instruction <input type="checkbox"/> Ask probing questions <input type="checkbox"/> Use ELA strategies of decoding, comprehending, and text-to-self connections for interpretation of symbolic and contextual math problems <input type="checkbox"/> Guided inquiry 	<ul style="list-style-type: none"> <input type="checkbox"/> Have I used the right words to communicate my meaning? <input type="checkbox"/> Is my answer accurate? <input type="checkbox"/> Do I understand the meaning of the symbols I used? <input type="checkbox"/> Is my work accurate and easy to follow? <input type="checkbox"/> Have I used all the labels needed for someone to understand my work?

<p>7. Look for and make use of structure</p>	<ul style="list-style-type: none"> <input type="checkbox"/> Look for, identify, and interpret patterns and structures <input type="checkbox"/> Make connections to skills and strategies previously learned to solve new problems and tasks <input type="checkbox"/> Breakdown complex problems into simpler and more manageable chunks <input type="checkbox"/> Use multiple representations for quantities <input type="checkbox"/> View complicated quantities as both a single object or a composition of objects 	<ul style="list-style-type: none"> <input type="checkbox"/> Let students explore and explain patterns <input type="checkbox"/> Use open-ended questioning <input type="checkbox"/> Prompt students to make connections and choose problems that foster connections <input type="checkbox"/> Ask for multiple interpretations of quantities 	<ul style="list-style-type: none"> <input type="checkbox"/> Can I figure out and use properties about how the operations work? <input type="checkbox"/> Can I figure out and use properties about how these numbers work? <input type="checkbox"/> Can I figure out and use properties about how the symbols work? <input type="checkbox"/> Can I compose or decompose to help me see the structure? <input type="checkbox"/> Can I add a representation to help me see the structure?
<p>8. Look for and express regularity in repeated reasoning</p>	<ul style="list-style-type: none"> <input type="checkbox"/> Design and state “shortcuts” <input type="checkbox"/> Generate “rules” from repeated reasoning or practice (e.g. integer operations) <input type="checkbox"/> Evaluate the reasonableness of intermediate steps <input type="checkbox"/> Make generalizations 	<ul style="list-style-type: none"> <input type="checkbox"/> Provide tasks that allow students to generalize <input type="checkbox"/> Don’t teach steps or rules, but allow students to explore and generalize in order to discover and formalize <input type="checkbox"/> Ask deliberate questions <input type="checkbox"/> Create strategic and purposeful check-in points 	<ul style="list-style-type: none"> <input type="checkbox"/> If I am doing something repeatedly, can I come up with a general method or a shortcut? <input type="checkbox"/> What is staying the same and what is changing? <input type="checkbox"/> What comes next? Next? Is there a pattern? <input type="checkbox"/> Is there a shorter or more efficient way to get to a result?

N. Smith, 2012

Adapted from:
 NCSM Summer Leadership Academy, Atlanta, GA, June 22, 2011
 iPad App “Common Core Look Fors (CCL4s)”