

Mathematics Practices

Math Practices	Beginning Some Evidence	Approaching Partial Development	Accomplished Deep Understandings
1. <i>Make sense of problems and persevere in solving them</i>	Uses concrete evidence and visuals to solve problems with verbal prompts	Tries simpler forms of a problem to gain insights; learns to change course when needed	Evaluates and applies multiple approaches to solve problems
2. <i>Reason abstractly and quantitatively</i>	Computes when solving problems; applies properties of operations and objects	Applies different manipulations to represent problems and units	Decontextualizes problems with symbols and quantitative reasoning
3. <i>Construct viable arguments and critique the reasoning of others</i>	Asks questions about other students' responses to see if they make sense; uses objects, drawings, and diagrams for reasoning	Justifies arguments and sees laws in their own and others' reasoning; uses data with some evidence of inductive reasoning	Compares the effectiveness of more than one argument; makes generalizations to justify arguments; sees flaws in reasoning of self and others; clarifies application of data
4. <i>Model with mathematics</i>	Learns how to use math properties to relate to practical situations and problems; thinks if answers make sense; e.g., uses addition to total items spent, division to share	Maps math relationships with diagrams, tables, and flow charts; makes logical approximations and assumptions to describe situations	Routinely analyzes mathematical problems with relationships; draws conclusions; reflects and revises with abstract thinking; applies formulas
5. <i>Use appropriate tools strategically</i>	Uses some tools to make decisions; realizes that tools are helpful	Detects errors with technological tools; identifies data on websites	Compares data; makes predictions; solves problems; explores consequences
6. <i>Attend to precision</i>	Notices differences in problem requirements; labeling answers; starts to communicate in math discussions	Examines and explains own answers; calculates with partial mastery; expresses answers somewhat appropriately	Shifts perspectives; examines claims; calculates accurately and proficiently; uses clear and concise labeling, definitions, and explanations
7. <i>Look for and make use of structure</i>	Recognizes strategies, patterns, number lines, similar shapes	Notices differences in structure; applies some knowledge to see problem parts and structure	Sees overviews in problems; shifts perspectives; uses structure to accurately solve problems

<p><i>8. Look for and express regularity in repeated reasoning</i></p>	<p>Notices repetitions and details in some problems; draws conclusions with visual and verbal prompts</p>	<p>Acknowledges repetitions in calculations; begins to evaluate reasonableness</p>	<p>Evaluates reasonableness of results; solves problems with attention and application to details and uses knowledge proficiently</p>
<p>Activate working memories; assess whether students have conceptual understandings or are relying too much on procedures without expertise of the concepts</p> <p>Decide on how students will demonstrate math understandings with formative curriculum-based assessments</p> <p>Model how to represent situations symbolically; monitor mathematical processes</p> <p>Instruct with practical math connections to students' lives; involve cooperative learning so the students explain the math to each other; involve technology tools; e.g., virtual manipulatives, interactive step-by-step videos, tutorial sites</p> <p>Reflect on illustrations of mathematical concepts; revise pacing to ensure understandings, retention, and application</p> <p>Engage students in opportunities to consistently explore subject matter to solidify calculations, concepts, and explanations; engage students in Socratic discussion and fun activities</p>			