

SMP 1	MAKE SENSE OF PROBLEMS AND PERSEVERE IN SOLVING THEM	
TEACHER	STUDENT	
a. Structures activities in ways that allow students to make meaning of, explore, analyze, plan a solution pathway, monitor, explain, extend, and evaluate their progress.	a. Explains the meaning of a problem and looks for entry points to its solution.	
b. Poses complex, challenging problems that do not have an obvious solution or solution process.	b. Analyzes givens, constraints, relationships, and goals.	
c. Provides appropriate feedback allowing students to think and persevere through the problem-solving process.	c. Conjectures about the form and meaning of the solution and plans a solution pathway rather than simply jumping into a solution attempt.	
d. Allows students to consider and understand various approaches, including considering analogous problems, transforming algebraic expressions, and using concrete objects or pictures, to solve complex problems.	d. Considers analogous problems, and tries special cases and simpler forms of the original problem in order to gain insight into its solution.	
e. Provides opportunities to identify correspondences between different approaches. Provides students opportunities to make connections to prior knowledge.	e. Monitors and evaluates their progress and changes course if necessary.	
f. Provides appropriate resources that allow students to conceptualize their ideas.	f. Transforms algebraic expressions or changes the viewing window on their graphing calculator to get needed information (depending on the context of the problem).	
	g. Explains correspondences between equations, verbal descriptions, tables, and graphs or draw diagrams of important features and relationships, graph data, and search for regularity or trends.	
	h. Uses concrete objects or pictures to help conceptualize and solve problems.	
	i. Checks answers to problems using different methods.	
	j. Asks, continually, “Does this make sense?”	
	k. Understands the approaches of others to solve complex problems and identify correspondences between different approaches.	

SMP 3	CONSTRUCT VIABLE ARGUMENTS AND CRITIQUE THE REASONING OF OTHERS	
TEACHER	STUDENT	
a. Encourages students to propose, defend, and assess sound and logical arguments based on mathematical reasoning.	a. Understands and uses stated assumptions, definitions, and previously established results to construct arguments.	
b. Provides opportunities for students to interact in ways that support and challenge their strategic thinking.	b. Conjectures and builds a logical progression of statements to explore the truth of their conjectures.	
	c. Analyzes situations by breaking them into cases.	
	d. Recognizes and uses counter examples.	
	e. Justifies conclusions, communicates them to others, and responds to the arguments of others.	
	f. Reasons inductively about data, making plausible arguments that take into account the context from which the data arose.	
	g. Compares the effectiveness of two plausible arguments, distinguishes correct logic or reasoning from that which is flawed, and—if there’s a flaw in an argument—explains what it is.	
	h. Constructs arguments using concrete referents such as objects, drawings, diagrams, and actions. Such arguments can make sense and be correct, even though they are not generalized or made formal until later grades. <i>Note: applicable to elementary students</i>	
	i. Learns to determine domains to which an argument applies. <i>Note: applicable to older students</i>	
	j. Listens or reads the arguments of others, decides whether they make sense, and asks useful questions to clarify or improve arguments.	

SMP 2	REASON ABSTRACTLY AND QUANTITATIVELY	
TEACHER	STUDENT	
a. Provides opportunities for students to reason in both concrete and abstract terms: <ul style="list-style-type: none"><li>Example: creates problems that require students to make sense of quantities and relationships and attend to the meaning of those quantities.</li></ul>	a. Makes sense of quantities and their relationships in problem situations.	
	b. Brings two complementary abilities to bear on problems involving quantitative relationships: <ul style="list-style-type: none"><li>the ability to <i>decontextualize</i>—to abstract a given situation and represent it symbolically and manipulate the representing symbols as if they have a life of their own, without necessarily attending to their referents.</li><li>the ability to <i>contextualize</i>—to pause as needed during the manipulation process in order to probe into the referents for the symbols involved.</li></ul>	
	c. Creates coherent representations of the problem, considering the units involved and attending to the meaning of quantities, not just how to compute them.	
	d. Knows and flexibly uses different properties of operations and objects.	

SMP 4	MODEL WITH MATHEMATICS	
TEACHER	STUDENT	
a. Draws on real-world situations in which students need to come up with mathematical approaches to solve problems (as opposed to typical word problems in which the mathematical approach is obvious).	a. Applies the mathematics they know to solve problems arising in everyday life, society, and the workplace.	
b. Helps students understand how mathematics might be used to solve problems and explore possible mathematical approaches (e.g. making predictions, analyzing assumptions, making connections to prior knowledge, making estimations, analyzing relationships).	b. Feels comfortable making assumptions and approximations to simplify a complicated situation, realizing that these may need revision later.	
	c. Identifies important quantities in a practical situation and maps their relationships using tools such as diagrams, two-way tables, graphs, flowcharts and formulas.	
	d. Analyzes relationships mathematically to draw conclusions.	
	e. Interprets mathematical results in the context of the situation and reflects on whether they make sense, possibly improving the model if it has not served its purpose.	

SMP 5	USE APPROPRIATE TOOLS STRATEGICALLY	
TEACHER	STUDENT	
a. Makes tools accessible to students and provides opportunities for students to choose and justify the use of the appropriate tool.	a. Considers tools when solving mathematical problems. These tools might include pencil and paper, concrete models, rulers, protractors, calculators, spreadsheets, computer algebra systems, statistical packages, or dynamic geometry software.	
b. Provides opportunities for students to practice with various tools in various contexts in order for students to make sound decisions about when these tools should be used.	b. Knows about tools appropriate for their grade or course and makes sound decisions about when each tool might be useful, recognizing both the insight to be gained and their limitations.	
	c. Identifies relevant external mathematical resources, such as digital content located on websites, and uses them to pose or solve problems.	
	d. Uses technological tools to explore and deepen understanding of concepts.	

SMP 6	ATTENDS TO PRECISION	
TEACHER	STUDENT	
a. Models and encourages precise mathematical language in oral communication and in writing.	a. Tries to communicate precisely with others.	
b. Emphasizes accuracy and precision in calculations and measurements.	b. Tries to use clear definitions in discussions with others and in their own reasoning.	
	c. States the meaning of the symbols they choose, including using the equal sign consistently and appropriately.	
	d. Are careful about specifying units of measure, and labeling axes to clarify the correspondence with quantities in a problem.	
	e. Calculates accurately and efficiently, expresses numerical answers with a degree of precision appropriate for the problem context.	
	f. Gives carefully formulated explanations to other students. <i>Note: applicable in elementary grades</i>	
	g. Examines claims and makes explicit use of definitions. <i>Note: applicable by high school</i>	

SMP 7	LOOK FOR AND MAKE USE OF STRUCTURE	
TEACHER	STUDENT	
a. Provides opportunities for students to look for patterns within structures that will help them solve problems or understand mathematical concepts.	a. Looks closely to discern a pattern or structure.	
b. Provides opportunities for students to make connections and see relationships between related structures.		
	▪ Example 1. Relationships between tables, graphs, diagrams, equations, and contextual situations.	
	▪ Example 2. Relationships between fraction form, decimal form, percent form.	
	▪ Example 3. Relationships between shortcut notations and expanded notations.	
	▪ Example 4. Relationships between other types of structures in mathematics.	

SMP 8	LOOK FOR AND EXPRESS REGULARITY IN REPEATED REASONING	
TEACHER	STUDENT	
a. Provides opportunities for students to make generalizations based on reoccurring observations and patterns, create shortcuts, and flexibly go back and forth between the two.	a. Notices if calculations are repeated.	
	b. Looks for general methods and for shortcuts.	