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| **MP.1: Make sense of problems and persevere in solving them.****(problem solving)** |
| The Math Task: | The Student: | The Teacher: |
| * Is an interesting problem
* Has more than one solution path which may be unpredictable
* Creates discussion
* Requires cognitive effort
* Connects to real world
* Relates to grade level CCSS
* Builds student understanding of grade level standard
* Leads students to look back and reflect on answer
* Explicitly asks for justification or explanation

(from: Implementing Standards-Based Mathematics Instruction; Stein, Smith Henningsen & Silver,1998) | * Analyzes information given
* Looks for different ways to solve the problem (i.e. situation vs. solution)
* Knows and uses different representations (i.e. equation vs. table or graph) and/or manipulative
* Evaluates progress and changes plan if needed
* Explains using both pictures and words
* Makes connection to the way they solved the problem and how others solved the problem
* Uses basic fact fluency or fact strategies
 | * Promotes visible thinking using pictures and equations
* Gives time for students to discuss with others or class
* Encourages students to keep trying and builds supportive math community
* Uses explicit and precise language when using representations and definitions and expects students to do the same in their discussions
* Helps students make connections between representations, equations, and student thinking
* Engages students in metacognition
* Models problem situation, not problem solution.
 |
| **MP.2: Reason abstractly and quantitatively.****(number sense)** |
| The Math Task: | The Student: | The Teacher: |
| * Is an interesting problem
* Has more than one solution path which may be unpredictable
* Creates discussion
* Requires cognitive effort
* Connects to real world
* Relates to grade level CCSS
* Builds student understanding of grade level standard
* Leads students to look back and reflect on answer Task explicitly asks for justification or explanation

(from: Implementing Standards-Based Mathematics Instruction; Stein, Smith Henningsen & Silver,1998) | * Makes sense of quantities and their relationship in problem situations
* Recognizes that quantities can be represented in different ways
* Uses numbers and words to make sense of a problem
* Gives attention to the meaning of the numbers and knows which operation to choose
* Performs operations flexibly, accurately, and efficiently
* Uses multiple representations
* Connects numbers, symbols or units to quantities
* Justifies solutions
* Makes connections to how they solved a problem and how others solved the problem
* Reasons with attributes of geometric figures
 | * Promotes visible thinking using pictures and equations
* Uses physical representations (manipulatives, drawings)

to model what happens to a variable when it changes and how that effects the other variable* Gives time for students to discuss with others or class
* Encourages students to keep trying
* Uses explicit and precise language when using representations and definitions and expects students to be the same in their discussion
* Builds a supportive math community
* Helps make connections between representations, equations, student thinking, and content standard
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| **MP.3: Construct viable arguments and critique the reasoning of others.****(math talk)** |
| The Math Task: | The Student: | The Teacher: |
| * Is an interesting problem
* Has more than one solution path which may be unpredictable
* Creates discussion
* Requires cognitive effort
* Connects to real world
* Relates to grade level CCSS
* Builds student understanding of grade level standard
* Leads students to look back and reflect on answer
* Explicitly asks for justification or explanation

(from: Implementing Standards-Based Mathematics Instruction; Stein, Smith Henningsen & Silver,1998) | * Communicates by using mathematical reasoning with objects, drawings, diagrams, equations …
* Justifies solutions
* Makes connections between their own thinking and that of others
* Demonstrates actively listening by asking questions of others
* Makes statements to prove or disprove concepts or presented ideas
* Students understand different forms of reasoning (ie. deductive reasoning) and when to apply them
* Uses accurate vocabulary
 | * Promotes math talk and the critiquing of presented solutions
* Asks higher-order questions to facilitate discussion and presses for justification
* Gives time for students to construct their own ideas before small or large group discussions
* Expects students to be explicit and precise when using representations, definitions, and symbols
* Builds a supportive math community
* Helps make connections between the reasoning of students and content standard
 |
| **MP.4: Model with mathematics.****(representations and graphs)** |
| The Math Task: | The Student: | The Teacher: |
| * Is an interesting problem
* Has more than one solution path which may be unpredictable
* Creates discussion
* Requires cognitive effort
* Connects to real world
* Relates to grade level CCSS
* Builds student understanding of grade level standard
* Leads students to look back and reflect on answer
* Explicitly asks for justification or explanation

(from: Implementing Standards-Based Mathematics Instruction; Stein, Smith Henningsen & Silver,1998) | * Identifies important elements and quantities needed for a model
* Describes relationships of models and equation
* Chooses a representation
* Applies formulas/equations
* Uses models to draw conclusion
* Explains why it is a good model for the problem
* Recognizes and uses parts of a graph (i.e. title, labels, symbols, key)
 | * Expects students to justify their choice in models
* Gives students opportunity to evaluate the appropriateness of their model and that of others
* Helps make connections with the relationships between representation, equation, answer, student thinking, and content standard
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| **MP.5: Use appropriate tools strategically.****(calculators, rulers, manipulative)** |
| The Math Task: | The Student: | The Teacher: |
| * Is an interesting problem
* Has more than one solution path which may be unpredictable
* Creates discussion
* Requires cognitive effort
* Connects to real world
* Relates to grade level CCSS
* Builds student understanding of grade level standard
* Leads students to look back and reflect on answer
* Explicitly asks for justification or explanation

(from: Implementing Standards-Based Mathematics Instruction; Stein, Smith Henningsen & Silver,1998) | * Uses mental computations fluently
* Knows which tools are appropriate for the task
* Knows when to use a tool
* Understands and uses properties of operations
* Uses estimation to find errors and check answer for reasonableness
* Justifies tool selection
 | * Allows students to choose appropriate learning tools
* Uses appropriate tools to represent, explore and deepen student understanding
* Models how different representations are tools
* Uses technology tools to deepen students’

understanding of a concept* Helps make connections between tool, equation, student thinking, and content standard
 |
| **MP.6: Attend to precision.****(vocabulary, labeling, answers)** |
| The Math Task: | The Student: | The Teacher: |
| * Is an interesting problem
* Has more than one solution path which may be unpredictable
* Creates discussion
* Requires cognitive effort
* Connects to real world
* Relates to grade level CCSS
* Builds student understanding of grade level standard
* Leads students to look back and reflect on answer
* Explicitly asks for justification or explanation

(from: Implementing Standards-Based Mathematics Instruction; Stein, Smith Henningsen & Silver,1998) | * Uses appropriate math vocabulary
* Uses clear definitions in discussion
* Calculates accurately and efficiently
* Explains their reasoning with accurate mathematical language
* Uses proper unit labels with measuring
* Uses appropriate labels when graphing and solving story problems
* Determines when different levels of precision are needed and how precision affects results
 | * Communicates precisely using clear definitions
* Emphasizes the importance of precise communication
* Emphasizes the importance of precision of measurement
* Helps make connections between vocabulary, student thinking, unit labels, calculations, and content standard
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| **MP.7: Look for and make use of structure.****(how numbers and shapes are organized)** |
| The Math Task: | The Student: | The Teacher: |
| * Is an interesting problem
* Has more than one solution path which may be unpredictable
* Creates discussion
* Requires cognitive effort
* Connects to real world
* Relates to grade level CCSS
* Builds student understanding of grade level standard
* Leads students to look back and reflect on answer
* Explicitly asks for justification or explanation

(from: Implementing Standards-Based Mathematics Instruction; Stein, Smith Henningsen & Silver,1998) | * Recognizes that quantities can be represented in different ways
* Uses properties of operations to make sense of problems
* Recognizes how numbers and shapes are organized
* Looks for patterns and structures in the number system
* Justify strategy for basic facts
* Uses models to prove equations
* Recognize how symbols help represent relationships and can be applied to new situations
 | * Gives students time to discuss connections
* Brings students back to the rule or properties being used
* Helps students look for patterns and structures in the number system
* Helps make connections between the structure used, equation, student thinking, and content standard
* Helps make connections to real world
 |
| **MP #8: Look for and express regularity in repeated reasoning.****(number pattern)** |
| The Math Task: | The Student: | The Teacher: |
| * Is an interesting problem
* Has more than one solution path which may be unpredictable
* Creates discussion
* Requires cognitive effort
* Connects to real world
* Relates to grade level CCSS
* Builds student understanding of grade level standard
* Leads students to look back and reflect on answer
* Explicitly asks for justification or explanation

(from: Implementing Standards-Based Mathematics Instruction; Stein, Smith Henningsen & Silver,1998) | * Notices number patterns
* Notices if calculations are repeated
* Applies more efficient computation strategies using number patterns
* Looks both for general methods and for shortcuts
 | * Encourages students to connect task to prior concepts taught
* Helps make connections between pattern, equation, student thinking, and content standard
 |