


|  | Translates the scenario into a mathematical problem (mathematizes) | Recognizes the mathematical competencies and content needed to solve the problem content: refer to Math curriculum | Recognizes the mathematical competencies and content needed to solve the problem content: refer to Math curriculum | Identifies the mathematical competencies and content needed to solve the problem content: refer to Math curriculum | Identifies the mathematical competencies and content needed to solve the problem content: refer to Math curriculum | Applies the mathematical understanding needed familiar scenario into a mathematical problem mathematical understanding: refer to $\qquad$ | Applies the mathematical understanding needed to partially translate a familiar scenario into mathematical problem mathematical understanding: refer to Math curriculum | Applies the mathematical understanding needed to translate a familiar scenario into a mathematical problem <br> mathematical understanding: refer to Math curriculum $\qquad$ or modelled | Applies the mathematical understanding needed to translate a familiar scenario into a mathematical problem mathematical understanding: refer to Math curriculum familiar: previously seen or modelled | Applies the mathematical understanding needed to translate an unfamiliar scenario into a mathematical problem $\qquad$ understanding: refer to Math curriculum unfamiliar: previously nseen or unmodelled | Applies the mathematical understanding needed to translate an unfamiliar scenario into a mathematical problem <br> mathematical understanding: refer to curriculum unfamiliar: previously nseen or unmodelled | Applies the mathematical understanding needed to translate an unfamiliar scenario into a mathematical problem <br> mathematical understanding: refer to Math curriculum unfamiliar: previously unseen or unmodelled | Applies the mathematical understanding needed o translate a complex, unfamiliar scenario into a mathematical problem $\qquad$ understanding: refer to curriculum unfamiliar: previously seen or unmodelled | Applies the mathematical understanding needed translate a complex, unfamiliar scenario problem <br> mathematical understanding: refer to俍 unfamiliar: previously nseen or unmodelled |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| Applies | Represents the <br> mathematical problem <br> (visualizes) | Represents the mathematical problem, using concrete material and/or pictures | Represents the mathematical problem, using concrete materials and diagrams | Represents the mathematical problem, using concrete materials and diagrams | Represents the mathematical problem, using concrete materials, some familiar equations $\qquad$ or modelled | Represents the mathematical problem, using concrete materials, some familiar equations <br> familiar: previously seen or modelled | Represents the mathematical problem, using concrete materials, equations | Accurately represents the mathematical problem, using a variety of models <br> models: e.g., concrete materials, diagrams equations | Accurately represents the mathematical problem, using a variety of models <br> models: e.g., concrete materials, diagrams, equations | Clearly represents the mathematical problem by choosing an appropriate model(s) <br> clearly: immediately demonstrating understanding appropriate: refer to Math curriculum models: e.g., concrete materials, diagrams, equations | Clearly represents the mathematical problem by choosing an appropriate model(s) <br> clearly: immediately demonstrating understanding $\qquad$ Math curriculum models: e.g., concrete materials, diagrams, equations | Clearly and accurately represents the problem by strategically choosing an effective model(s) <br> clearly: immediately demonstrating understanding <br> effective: fits the student's understanding and ability models: e.g., concrete materials, diagrams, equations | Clearly and accurately represents the problem in context by strategically choosing an effective model(s) <br> clearly: immediately demonstrating in context: the representation is problem or scenario effective: fits the student's understanding and ability models: e.g., concrete materials, equations | Clearly and accurately represents the problem in context by strategically choosing an effective model(s) <br> clearly: immediately demonstrating understanding in context: the representation is appropriate to the problem or scenario effective: fits the student's understanding and ability models: e.g., concrete equations |
|  | Develops a plan of approach | Experiments with problem solving using prior knowledge | Develops a <br> straightforward plan of approach, using prior knowledge and mathematical tools and strategies | Develops a basic plan of approach, using familiar mathematical tools and/or strategies <br> basic: could be one step <br> familiar: previously seen or modelled | Develops a basic plan of approach, using familiar mathematical tools and/or strategies <br> basic: could be one step <br> familiar: previously seen or modelled | Develops a sequence of steps that applies familiar mathematical tools and/or strategies <br> familiar: previously seen or modelled | Develops a logical sequence of steps that applies familiar mathematical tools and/or strategies <br> familiar: previously seen or modelled | Develops an organized and intentional sequence of steps that applies appropriate and/or strategies <br> appropriate: refer to Math curriculum | Develops a logical and organized plan that applies appropriate and/or strategies <br> plan: an intentional end goal <br> appropriate: refer to Math curriculum strategies: e.g., using a ool (calculator), picture, graph, equation | Uses mathematical reasoning to develop a logical and organized appropriate mathematical tools and/or strategies <br> lan: an intentional <br> sequence of steps with an end goal <br> appropriate: refer to Math curriculum <br> strategies: e.g., using a graph, equation | Uses mathematical reasoning to develop a logical and organized plan that applies appropriate mathematical tools and/or strategies <br> plan: an intentional <br> sequence of steps with an end goal <br> appropriate: refer to <br> Math curriculum <br> strategies: e.g., using a graph, equation | Uses mathematical reasoning to develop a logical, organized, and effective plan that applies appropriate and/or strategies <br> plan: an intentional sequence of steps with an end goal $\qquad$ Math curriculum strategies: e.g., using a tool (calculator), algorithm, picture, graph; Social Studies/Science. evidence from text | Uses mathematical reasoning to develop a logical, organized, an effective multi-step plan that applies mathematical tools and/or strategies <br> plan: an intentional end goal da goal <br> ppropriate: refer to Math curriculum strategies: e.g., using a tool (calculator) algorithm, picture, graph, Social Studies/Science: evidence from text | Uses mathematical reasoning to develop a logical, organized, an effective multi-step appropriate mathematical tools and/or strategies <br> plan: an intentional sequence of steps with an end goal <br> appropriate: refer to Math curriculum strategies: e.g., using a tool (calculator), algorithm, picture, graph; Social Studies/Science: evidence from text |


| Aspect | Sub-aspect | K | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |



| Aspect | Sub-aspect | K | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  | Reflects on the reasonableness of the solution in context | Identifies a reasonable solution in relation to the original problem/scenario | Identifies a reasonable solution in relation to the original problem/scenario | Reflects on the reasonableness of a solution in relation to the origina problem/scenario | Reflects on the reasonableness of a solution in relation to the original problem/scenario | Reflects on the reasonableness of their solution in relation to the original problem/scenario | Reflects on the reasonableness of their solution in relation to the origina problem/scenario problem/scenario | Reflects on the reasonableness of their solution within the context of the problem <br> reasonableness: <br> rationality, practicality <br> context of the problem: e.g., Social $\qquad$ from text; Arts: soliciting feedback | Reflects on the reasonableness of their solution within the context of the problem <br> reasonableness: <br> rationality, practicality <br> context of the problem: e.g., Social Studies/Science: evidence feedback | Reflects on the validity of their solution within the context of the problem <br> validity: accuracy in context <br> context of the problem e.g., Social Studies/Science: evidence from text. Arts: feedback | Reflects on the validity of their solution within the context of the problem <br> validity: accuracy in context <br> context of the problem e.g., Social Studies/Science: evidence from text. Arts: feedback | Reflects on the validity of their solution, identifying contextual factors that may affect their answer <br> validity: accuracy in context <br> solution: e.g., lab results, map, product, model contextual factors: e.g., Social Studies/Science: evidence from text; Arts: soliciting feedback | Reflects on the validity and reliability of their processes and solutions and describes how contextual factors may affect their answer <br> validity: accuracy in <br> context <br> reliability: reproducibility of results <br> contextual factors: e.g., Social Studies/Science: evidence from text; Arts: soliciting feedback | Reflects on the validity and reliability of their processes and solutions and describes how contextual factors may affect their answer <br> validity: accuracy in <br> context <br> reliability: reproducibility fresults <br> contextual factors: e.g. Social Studies/Science: soliciting feedback |
| Analyzes | Evaluates alternative approaches | Identifies an alternative approach approach: own approach peer-or teacher-driven approach | Identifies an <br> alternative approach <br> approach: own approach peer-or teacher-driven approach | Explores an alternative approach <br> approach: own approach, peer- or teacher-driven approach | Explores alternative approaches <br> approach: own approach, peer- or teacher-driven approach | Compares and contrasts alternative approaches <br> approaches: own approach, peer- or teacher-driven approach | Compares and contrasts alternative approaches <br> approaches: own approach, peer-or teacher-driven approach | Describes the benefits and limitations of alternative approaches <br> approaches: own approach, peer- or teacher-driven approach | Describes the benefits and limitations of alternative approaches <br> approaches: own approach, peer- or teacher-driven approach | Evaluates the benefits and limitations of alternative approaches <br> approaches: own approach, peer- or teacher-driven approach teacher-driven | Evaluates the benefits and limitations of alternative approaches <br> approaches: own approach, peer-or teacher-driven approach, based approaches | Evaluates the efficiency and effectiveness of alternative approaches <br> approaches: own approach, peer- or teacher-driven approach, based approaches | Evaluates the efficiency and effectiveness of alternative approaches and possible improvements approaches: own approach, peer- or comparison with research based approaches | Evaluates the efficiency and effectiveness of alternative approaches and possible improvements approaches: own approach, peer- or teacher-driven approach, based approaches |
|  | Revises approach as needed | Experiments with a recommended alternative approach to solve the problem | Experiments with a recommended alternative approach to solve the problem | Selects an alternative approach to solve the problem | Selects an alternative approach to solve the problem | Identifies and experiments with an alternative approach to solve the problem | Identifies and experiments with an alternative approach to solve the problem | Refines approach, using the benefits and limitations of alternative approaches to solving the problem refines: improves through small changes | Refines approach, using the benefits and limitations of alternative approaches to solving the problem refines: improves through small changes | Revises approach, using the benefits and limitations of alternative approaches to solving the problem revises: reflects and adjusts | Revises approach based on their evaluation of alternative approaches to solving the problem revises: reflects and adjusts | Revises approach using the benefits and limitations of alternative approaches to compare alternative solution(s) to the problem revises: reflects and | Redesigns approach to improve efficiency of process or accuracy of solution to the problem redesigns: iteratively reflects and adjusts | Redesigns approach to improve efficiency of process or accuracy of solution to the problem <br> redesigns: iteratively reflects and adjusts |


| Aspect | Sub-aspect | K | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  | Represents processes | Represents the <br> problem-solving <br> numbers, pictures, <br> and/or manipulative |  | problem-solving tools <br> familiar tools: e.g., <br> graphic organizers, chart | Represents processes and solution by selecting and using reasonable tools reasonable tools: e.g., table, manipulative, graphic organizer, array, model | Represents processes and solution by selecting and using reasonable tools reasonable tools: e.g., model, chart, map, table, graph, chart, array | Represents processes and solution by selecting and using reasonable tools reasonable tools: e.g., model, chart, map, table, graph, chart, array | complete process an and using appropriat tools <br> appropriate tools: e.g., graph, chart, array | Represents the olution by selecting and using appropriate tools appropriate tools: e.g., graph, chart, array, equation | Effectively represents <br> he complete process <br> and solution, using <br> presentation <br> effectively: student selects an appropriate number of <br> steps <br> appropriate <br> presentations: e.g. <br> equation, graph, mod <br> map, table, array | Effectively represents <br> he complete process <br> and solution, using appropriate <br> presentations <br> effectively: student selects an appropriate number of <br> steps <br> appropriate <br> presentations: e.g., <br> equation, graph, model <br> map, table, diagram |  |  |  |
| Communicates | $\underbrace{}_{\substack{\text { Explins ste epproach } \\ \text { taken }}}$ | Identifies one step of their problem-solving approach | $\begin{aligned} & \text { outinestheir } \\ & \text { peporemplovin } \\ & \text { pappach } \end{aligned}$ | Outlines their problem-solving approach, using familiar mathematical language familiar: previously seen or modelled mathematical language: refer to Math curriculum | Describes their <br> problem-solving approach, using <br> familiar mathematica <br> language <br> familiar: previously seen or modelled <br> mathematical language: <br> refer to Math curriculum | Describes their <br> problem-solving approach, using <br> familiar mathematica <br> language <br> familiar: previously seen or modelled <br> mathematical language: <br> refer to Math curriculum | Describes their <br> problem-solving approach, using <br> language <br> familiar: previously seen <br> mathematical language: <br> refer to Math curriculum | Accurately explains their problem-solving approach approach: e.g., process: making a model; tool: manipulatives; strategy: using an equation | Accurately explains their problem-solving approach approach: e.g., process: making a model; tool: calculator; strategy: using an equation | Accurately explains their problem-solving approach, identifying its limitations and assumptions approach: e.g., process: making a diagram; tool: calculator; strategy: using an equation | Accurately explains their problem-solving approach, identifying its limitations and assumptions approach: e.g., process: making a diagram; tool: calculator; strategy: using an equation |  | Explains their problem-solving and in detail, evaluating the effect limitations $\qquad$ making a flowchart; tool: an algorith from text $\qquad$ evaluating: implications |  |
|  | Defends decisions and assumptions | $\begin{aligned} & \text { Identifies one } \\ & \text { problem-solving } \\ & \text { decision } \end{aligned}$ | Outlines one problem- <br> solving decision | Describes one porbiomsoling decison and supporoting reason | $\begin{aligned} & \text { Describes their } \\ & \text { problem-solving } \\ & \text { decisions and } \\ & \text { supporting reasons } \end{aligned}$ | Explains their problem-solving decisions and supporting reasons | Explains their problem-solving decisions and supporting reasons | Presents a rationale for their problemassumptions | Presents a rationale for their problemfor their problem- solving decisions and assumptions | Presents a logical argument and justifies their decisions and assumptions | Presents a logical argument and justifie assumptions | Presents a valid, logical argument to justify their decisions about the selected approach and assumptions, and describes the effects of these choices | Presents a valid, logical argument to justify their decisions about the selected approach, evaluating assumptions and the effects of their choices evaluating: assessing the implications | Presents a valid, logical argument to justify their decisions about the selected approach, evaluating assumptions and the effects of their choices evaluating: assessing the implications |

