





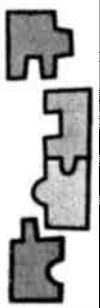





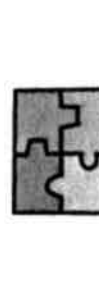






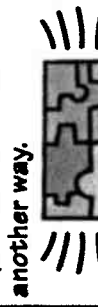


Exemplars® Jigsaw Student Rubric

| Level | Problem Solving | Reasoning and Proof | Communication | Connections | Representation |
|---|--|---|--|--|---|
| Novice Makes an effort No or little understanding | I did not understand the problem.  | My math thinking is not correct.  | I used no math language and/or math notation.  | I did not notice anything about the problem or the numbers in my work.  | I did not use a math representation to help solve the problem and explain my work.  |
| Apprentice Ok, good try Unclear if student understands | I only understand part of the problem. My strategy works for part of the problem.  | Some of my math thinking is correct.  | I used some math language and/or math notation.  | I tried to notice something, but it is not about the math in the problem.  | I tried to use math representation to help solve the problem and explain my work, but it has mistakes in it.  |
| Practitioner Excellent Clear Strong understanding Meets the standard | I understand the problem and my strategy works. My answer is correct.  | All of my math thinking is correct.  | I used math language and/or math notation throughout my work.  | I noticed something about my math work.  | I made a math representation to help solve the problem and explain my work, and it is labeled and correct.  |
| Expert Wow, awesome! Exceptional understanding! | I understand the problem. I used a rule, and/or verified that my strategy is correct.  | I showed that I knew more about a math idea that I used in my plan. Or, I explained my rule.  | I used a lot of specific math language and/or notation throughout my work.  | I noticed something in my work, and used that to extend my answer and/or I showed how this problem is like another problem.  | I used another math representation to help solve the problem and explain my work in another way.  |

Thermometer Student Rubric

| Categories | Novice | Apprentice | Practitioner | Expert |
|--|---|---|---|---|
| Understanding | I did not understand the problem. | I understood parts of the problem. I got started, but I couldn't finish. | I got it. I understood the problem and have an appropriate solution. All parts of the problem are addressed. | I got it!! I did it in new ways and showed you how it worked. I can tell you what math concepts are used. |
| Strategies, Reasoning, Procedures | I couldn't get started. I don't know how to begin. | I am stuck. I have part of the solution, but now I don't know what to do. I'm not sure my answer is right. I could use some help. | I have a correct solution. I used a plan to solve the problem. | My solution is effective and inventive. I used big math ideas to solve the problem. I addressed the important details. I showed you some other ways I can solve this problem. I checked to make sure my answer was right. |
| Communication | I did not explain how I solved the problem. I didn't use pictures, tables or graphs to show you how I solved the problem. | I explained some of what I did. I tried to use pictures, tables, graphs and numbers to explain how I did the problem. | I clearly explained how I solved the problem. I used math language and pictures, tables, graphs and numbers to explain how I did the problem. | I clearly detailed how I solved the problem. I included all the steps so you don't have to guess what I did. I used words, numbers, pictures, graphs and/or models. |

Exemplars[®] Standards-Based Math Rubric*

| | Problem Solving | Reasoning and Proof | Communication | Connections | Representation |
|-------------------|--|---|---|--|---|
| Novice | No strategy is chosen, or a strategy is chosen that will not lead to a solution. Little or no evidence of engagement in the task present. | Arguments are made with no mathematical basis. No correct reasoning nor justification for reasoning is present. | No awareness of audience or purpose is communicated. or Little or no communication of an approach is evident or Everyday, familiar language is used to communicate ideas. | No connections are made. | No attempt is made to construct mathematical representations. |
| Apprentice | A partially correct strategy is chosen, or a correct strategy for only solving part of the task is chosen. Evidence of drawing on some previous knowledge is present, showing some relevant engagement in the task. | Arguments are made with some mathematical basis. Some correct reasoning or justification for reasoning is present with trial and error, or unsystematic trying of several cases. | Some awareness of audience or purpose is communicated, and may take place in the form of paraphrasing of the task. or Some communication of an approach is evident through verbal/written accounts and explanations, use of diagrams or objects, writing, and using mathematical symbols. or Some formal math language is used, and examples are provided to communicate ideas. | Some attempt to relate the task to other subjects or to own interests and experiences is made. | An attempt is made to construct mathematical representations to record and communicate problem solving. |

*Based on revised NCTM standards.

Exemplars® Standards-Based Math Rubric (Cont.)*

| | Problem Solving | Reasoning and Proof | Communication | Connections | Representation |
|---------------------|---|---|---|--|--|
| Practitioner | <p>A correct strategy is chosen based on mathematical situation in the task.</p> <p>Planning or monitoring of strategy is evident.</p> <p>Evidence of solidifying prior knowledge and applying it to the problem solving situation is present.</p> <p>Note: The practitioner must achieve a correct answer.</p> | <p>Arguments are constructed with adequate mathematical basis.</p> <p>A systematic approach and/or justification of correct reasoning is present. This may lead to...</p> <ul style="list-style-type: none"> • clarification of the task. • exploration of mathematical phenomenon. • noting patterns, structures and regularities. | <p>A sense of audience or purpose is communicated.</p> <p>and/or</p> <p>Communication of an approach is evident through a methodical, organized, coherent sequenced and labeled response.</p> <p>Formal math language is used throughout the solution to share and clarify ideas.</p> | <p>Mathematical connections or observations are recognized.</p> | <p>Appropriate and accurate mathematical representations are constructed and refined to solve problems or portray solutions.</p> |
| Expert | <p>An efficient strategy is chosen and progress towards a solution is evaluated.</p> <p>Adjustments in strategy, if necessary, are made along the way, and / or alternative strategies are considered.</p> <p>Evidence of analyzing the situation in mathematical terms, and extending prior knowledge is present.</p> <p>Note: The expert must achieve a correct answer.</p> | <p>Deductive arguments are used to justify decisions and may result in formal proofs.</p> <p>Evidence is used to justify and support decisions made and conclusions reached. This may lead to...</p> <ul style="list-style-type: none"> • testing and accepting or rejecting of a hypothesis or conjecture. • explanation of phenomenon. • generalizing and extending the solution to other cases. | <p>A sense of audience and purpose is communicated.</p> <p>and/or</p> <p>Communication at the Practitioner level is achieved, and communication of argument is supported by mathematical properties.</p> <p>Precise math language and symbolic notation are used to consolidate math thinking and to communicate ideas.</p> | <p>Mathematical connections or observations are used to extend the solution.</p> | <p>Abstract or symbolic mathematical representations are constructed to analyze relationships, extend thinking, and clarify or interpret phenomenon.</p> |

*Based on revised NCTM standards.

Classic Exemplars Rubric

| Level | Understanding | Strategies, Reasoning, Procedures | Communication |
|---------------------|--|--|--|
| Novice | <ul style="list-style-type: none"> There is no solution, or the solution has no relationship to the task. Inappropriate concepts are applied and/or procedures are used. The solution addresses none of the mathematical components presented in the task. | <ul style="list-style-type: none"> No evidence of a strategy or procedure, or uses a strategy that does not help solve the problem. No evidence of mathematical reasoning. There were so many errors in mathematical procedures that the problem could not be solved. | <ul style="list-style-type: none"> There is no explanation of the solution, the explanation cannot be understood or it is unrelated to the problem. There is no use or inappropriate use of mathematical representations (e.g. figures diagrams, graphs, tables, etc.). There is no use, or mostly inappropriate use, of mathematical terminology and notation. |
| Apprentice | <ul style="list-style-type: none"> The solution is not complete indicating that parts of the problem are not understood. The solution addresses some, but not all of the mathematical components presented in the task. | <ul style="list-style-type: none"> Uses a strategy that is partially useful, leading some way toward a solution, but not to a full solution of the problem. Some evidence of mathematical reasoning. Could not completely carry out mathematical procedures. Some parts may be correct, but a correct answer is not achieved. | <ul style="list-style-type: none"> There is an incomplete explanation; it may not be clearly presented. There is some use of appropriate mathematical representation. There is some use of mathematical terminology and notation appropriate of the problem. |
| Practitioner | <ul style="list-style-type: none"> The solution shows that the Student has a broad understanding of the problem and the major concepts necessary for its solution. The solution addresses <u>all</u> of the mathematical components presented in the task. | <ul style="list-style-type: none"> Uses a strategy that leads to a solution of the problem. Uses effective mathematical reasoning. Mathematical procedures used. All parts are correct and a correct answer is achieved. | <ul style="list-style-type: none"> There is a clear explanation. There is appropriate use of accurate mathematical representation. There is effective use of mathematical terminology and notation. |
| Expert | <ul style="list-style-type: none"> The solution shows a deep understanding of the problem including the ability to identify the appropriate mathematical concepts and the information necessary for its solution. The solution completely addresses all mathematical components presented in the task. The solution puts to use the underlying mathematical concepts upon which the task is designed. | <ul style="list-style-type: none"> Uses a very efficient and sophisticated strategy leading directly to a solution. Employs refined and complex reasoning. Applies procedures accurately to correctly solve the problem and verify the results. Verifies solution and/or evaluates the reasonableness of the solution. Makes mathematically relevant observations and/or connections. | <ul style="list-style-type: none"> There is a clear, effective explanation detailing how the problem is solved. All of the steps are included so that the reader does not need to infer how and why decisions were made. Mathematical representation is actively used as a means of communicating ideas related to the solution of the problem. There is precise and appropriate use of mathematical terminology and notation |