NTN Knowledge and Thinking Rubric for Math Problem Solving, Grade 8

The ability to reason, problem-solve, develop sound arguments, and create new ideas by applying and adapting the knowledge, skills, and strategies of a discipline.

NewTech Network

	EMERGING	E/D	DEVELOPING	D/P	PROFICIENT High School Ready	P/A	ADVANCED High School Level
PROBLEM SOLVING *What is the evidence that the student understands the problem and the mathematical strategies that can be used to arrive at a solution?*	• Identifies and uses very few important quantities and variables in a practical situation • Ignores or attends to few of the givens, goals, and definitions of the problem • Uses few, if any, problem solving strategies and tools		• Identifies and uses important quantities and variables in a practical situation in a limited way • Attends to some of the givens, goals, and definitions of the problem • Uses inappropriate or inefficient problem solving strategies and tools		• Identifies and uses important quantities and variables in a practical situation • Identifies givens, goals, and definitions in the problem • Uses appropriate problem solving strategies and tools		• Creates a model to simplify a complicated situation • Analyzes all given constraints, goals and definitions • Uses appropriate problem solving strategies and tools
REASONING AND PROOF *What is the evidence that the student can apply mathematical reasoning/procedures in an accurate and complete manner?*	• Provides partially correct or incorrect solutions without justifications • Results are not interpreted in terms of context		• Provides partially correct solutions with justification or correct solutions without logic or justification • Results are interpreted partially or incorrectly in terms of context		• Explains logical, correct, complete solution with justifications • Results are interpreted correctly in terms of the practical situation, and explains why final answer makes sense (through prior estimation, process knowledge, etc.)		• Explains logical, correct, complete solution with justifications and identifies any sources of error. • Results are interpreted correctly in terms of context, including addressing reasonableness of final answer
COMMUNICATION AND REPRESENTATION *What is the evidence that the student can communicate mathematical ideas to others?*	• Does not use representations (diagrams, tables, graphs, formulas, physical models, etc.) or uses few representations in ways that do not demonstrate ideas and reasoning • Uses incorrect definitions or mathematical notation (units of measure, labeled diagrams and axes, equation formats, etc.)		• Uses multiple representations (diagrams, tables, graphs, formulas, physical models, etc.) that demonstrate ideas and reasoning in a limited way; extraneous representations may be included • Uses imprecise definitions or incomplete mathematical notation (units of measure, labeled diagrams and axes, equation formats, etc.)		• Uses multiple representations (diagrams, tables, graphs, formulas, physical models, etc.) to demonstrate ideas and reasoning; only relevant representations are included • With few exceptions, uses accurate definitions and accurate mathematical notation (units of measure, labeled diagrams and axes, etc.)		• Uses multiple representations (diagrams, tables, graphs, formulas, etc.) to help the audience follow the chain of reasoning; only relevant representations are included • With few exceptions, uses precise definitions and accurate mathematical notation (units of measure, labeled axes, equation formats, etc.)