Rubric

INVESTIGATE THE WORLD

How well does the student use mathematics to model and investigate a given issue, situation, or event?

	Emerging	Developing	Proficient	Advanced
MATH9-10.INV1.MODEL	Creates a simple mathematical model to describe a situation or problem, but may omit some given data or information.	Designs a mathematical model to illustrate a situation or to diagram a problem, or applies a model that has been successful previously in similar situations.	Develops a comprehensive mathematical model using all relevant information to describe a situation or to diagram a problem, reflects on the process and considers possible revisions, or adapts a previous model to be applicable to a new situation or problem.	Develops a comprehensive mathematical model using all relevant information to describe a situation or to solve a problem, reflects on the process and makes effective revisions, or integrates one or more familiar models to represent a new situation or problem.
MATH9-10.INV2.RLTNS	Illustrates mathematical relationships by a simple model that reflects a complex situation, or attempts to generalize a familiar model to fit a similar situation.	Describes how the mathematical relationships in a model reflect a situation or the elements of a problem, or predicts when and/or how a model could be generalized to similar situations.	Distinguishes how the mathematical relationships in a model reflect a situation or the elements of a problem and analyzes the parameters of the problem or situation for possible limitations of the model.	Demonstrates how mathematical relationships in the model reflect the given situation or problem, using all the relevant information provided and noting reasonable restrictions from the context.
MATH9-10.INV3.RPRSN	Employs appropriate mathematical tools, procedures, and/or representations to explore the issue, situation, or event.	Distinguishes between appropriate mathematical tools, procedures, and representations to explore the issue, situation, or event and can articulate why a particular tool or procedure was selected.	Effectively employs appropriate mathematical tools, procedures, or representations to explore the given issue, situation, or event.	Creatively employs familiar mathematical tools, procedures, or representations in a unique way to explore and analyze the given issue, situation, or event.

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MATH9-10.INV4.SELEC	Generates a range of initial solution strategies and outlines why a particular strategy was chosen.	Generates a range of appropriate strategies and differentiates between applicability of the strategies to the given situation.	Formulates multiple appropriate solution strategies and evaluates how one or more will represent a correct approach and solve the problem.	Incorporates multiple solution strategies to arrive at a correct approach and solution to the problem, and revises strategy when appropriate.
MATH9-10.INV5.STRTG	Identifies a reasonable initial strategy to verify the solution and outlines why this strategy was chosen.	Selects and applies a reasonable strategy to verify the solution and differentiates appropriateness of possible strategies.	Generates multiple appropriate strategies to verify the solution with respect to the mathematics and the given context, and justifies the selection of a particular strategy using precise mathematical terminology.	Selects multiple appropriate strategies to verify the solution with respect to both the mathematics and the given context revises strategy when appropriate and justifies the selection and revision using precise mathematical terminology.

RECOGNIZE PERSPECTIVES

How well does the student recognize the impact of his/her mathematical analyses on themselves and others?

	Emerging	Developing	Proficient	Advanced
MATH9-10.PERS1.ARGUE	Draws a reasonable initial conclusion and provides simple explanations that are supported by data.	Draws a conclusion or generates an incomplete argument to justify a conclusion only partially supported by the mathematical data or information.	Presents a viable conjecture or conclusion and generates a convincing argument that is supported by the mathematical data and some analysis.	Presents a viable conjecture or conclusion based on the mathematical context and justifies the position by detailed analysis and evaluation of the mathematical data and revises conjectures based on analysis and evaluation.
MATH9-10.PERS2.VRIFY	Understands diversity in a general way and uses knowledge of the target culture(s) in a limited way to communicate in the target language.	Understands diversity in and uses knowledge of the target culture(s) to effectively communicate in the target language.	Collaborates and seeks external verification or validation of the appropriateness of their model, tools, procedures, solutions, analyses, conclusions, arguments, or decisions, and considers possible revisions based external critique.	Collaborates and seeks external verification or validation of the appropriateness of their model, tools, procedures, solutions, analyses, conclusions, arguments, or decisions, and makes revisions based on external critique to strengthen outcomes.
MATH9-10.PERS3.IMPLC	Expresses some general implications of a conclusion or conjecture arising from a mathematical model or process.	Expresses and evaluates some implications of a conclusion, conjecture, or argument arising from a mathematical model or process and uses data or information from the model as support.	Evaluates some implications of the conjecture, conclusion, decision, or arguments in the context of a wider range of reference, including national and global scales.	Evaluates the implications of the conjecture, conclusion, decision, or argument within the global context and uses the evaluation to revise or amend the conjecture, conclusion, decision, or argument within a global context.

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MATH9-10.PERS4.PERSP	Recognizes and articulates some different perspectives using precise mathematical language when appropriate.	Recognizes, articulates, and addresses different perspectives using precise mathematical language when appropriate.	Recognizes, articulates, and addresses different perspectives by revising original ideas, using precise mathematical language when appropriate.	Recognizes, articulates, and addresses different perspectives and revises original conclusions, decisions, or opinions when appropriate, incorporating specific elements of these perspectives and using precise mathematical language.
MATH9-10.PERS5.POSTN	Articulates a conjecture that reflects the mathematical process procedure model that results in a mathematically valid conclusion.	Articulates a valid conjecture that reflects the mathematical process procedure model that results in a mathematically valid conclusion and engages in mathematical discourse to justify conjecture.	Engages in mathematical discourse justifying conjectures, conclusions, and procedures, critiquing the reasoning of others, and uses external critique to analyze, review, and begin to revise conjecture, conclusion, or procedure.	Strengthens the conjectures, conclusions, or procedures through additional mathematical analyses or research and engages in mathematical discourse to interpret or evaluate and amend the conclusions, arguments, and decisions.

COMMUNICATE IDEAS

How clearly and accurately does the student communicate and defend his/her mathematical thinking, approaches, representations, solution, and decisions?

	Emerging	Developing	Proficient	Advanced
MATH9-10.COMM1.COMM	Explains and justifies mathematical reasoning, concepts, procedures, or relationships using precise mathematical language.	Explains and justifies complex mathematical reasoning, concepts, procedures, and relationships using precise mathematical language in a way that is mostly organized and sequenced.	Explains and justifies complex mathematical reasoning, concepts, procedures, and relationships using precise mathematical language in an organized and sequenced way, referencing visual representations.	Explains and justifies complex mathematical reasoning, concepts, procedures, and relationships using precise mathematical language in an organized and sequenced way, referencing a variety of mathematical models for clarity when appropriate.
MATH9-10.COMM2.DEFNS	Defends a conclusion, conjecture, decision, or argument, but does not include all relevant mathematical concepts, procedures, or data from the model.	Defends a conclusion, conjecture, decision, or argument with some mathematical concepts, procedures, or data from the model using precise mathematical language.	Defends a complex conclusion, conjecture, decision, or argument with relevant and accurate concepts, procedures, or data from the model using precise mathematical language.	Defends multiple conjectures, conclusions, decisions, or arguments with relevant and accurate concepts, procedures, or data from one or more related models using precise mathematical language.
MATH9-10.COMM3.SYMBL	Decontextualizes a mathematical idea by using mathematical terms, symbols, and conventions.	Decontextualizes a mathematical idea using mathematical terms, symbols, and conventions, and begins to contextualize by some evaluation of the process using mathematical language.	Decontextualizes a mathematical idea correctly using precise mathematical terms, symbols, and conventions, and contextualizes by evaluation of the process using precise mathematical terminology and symbols.	Decontextualizes a mathematical idea in multiple ways by correctly using precise mathematical terms, symbols, and conventions, and contextualizes by evaluation of the process using precise mathematical terminology and symbols.

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MATH9-10.COMM4.GRAMM	Engages in mathematical discourse using simple, familiar mathematical terminology correctly with few errors in grammar, usage, and punctuation.	Engages in clear oral and written mathematical discourse using mathematical terminology, symbols, and conventions correctly and generally free of distracting errors in grammar, usage, and punctuation.	Engages in clear oral and written mathematical discourse that is free of mathematical misconception and errors in grammar, usage, and mechanics.	Engages in clear oral and written mathematical discourse using precise mathematical terminology and language, as well as correct grammar, usage, and mechanics, so that the communication of mathematical meaning is elevated and enhanced.
MATH9-10.COMM5.MEDIA	Selects an appropriate medium to communicate mathematical ideas in a basic way.	Selects an appropriate medium and uses it in an effective way to communicate mathematical ideas.	Selects appropriate media and uses them efficiently to communicate and evaluate mathematical ideas.	Selects appropriate media and uses them effectively to communicate mathematical ideas, evaluates and refines media choices and mathematical ideas.

TAKE ACTION

How well does the student advocate for, engage in, and reflect on plausible and responsible actions that are supported by his/her mathematics?

	Emerging	Developing	Proficient	Advanced
MATH9-10.ACT1.ADVCT	Advocates for a course of action that is somewhat plausible, somewhat responsible, and partially supported by mathematics.	Advocates for a course of action that is plausible, responsible, and supported by mathematics.	Advocates for multiple possible course of action that are plausible, responsible, and supported by mathematics.	Extends elements of a course of action beyond the scope of the task's audience to a new audience, or beyond the scope of the task.
MATH9-10.ACT2.ACTN	Identifies a plan of action supported by the mathematics that is somewhat viable, manageable, and/or responsible that is somewhat consistent with the argument, conclusion, or decision	Identifies a plan of action supported by the mathematics that is mostly viable, manageable, and/or responsible that is related to the conclusion, argument, or decision.	Develops and implements a plan of action supported by the mathematics that is viable, manageable, and/or responsible that is primarily consistent with the argument, conclusion, or decision.	Develops and implements a viable, manageable, and responsible plan of action supported by the mathematics that is consistent with the argument, conclusion, or decision.
MATH9-10.ACT3.IMPRT	Describes in general ways the importance of the plan, using some support from mathematical conclusions or conjectures.	Describes the importance of the plan of action, with some connection to the global community, supported by the data or conclusions.	Articulates the importance of the plan(s) of action within the context of the global community and identifies the limitations and potential improvements, supported by the data or conclusions.	Articulates the importance of the plan(s) of action within the context of the global community and analyzes and evaluates the limitations and potential improvements, supported by the data or conclusions.