**Types of Mathematical Modeling Tasks**

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| **DESCRIPTIVE MODELING** | **PREDICTIVE MODELING** |
| Students are provided with information about a particular scenario, and use math modeling to describe possible outcomes. Possible outcomes depend on assumptions and/or constraints.  | Students use math modeling to analyze relationships or trends in a data set (e.g., rates of increase or decrease over time) to predict additional values or outcomes.  |
| **Contexts or Questions:*** How many school buses are needed?
* How long can this snack last?
* How much can we earn by selling \_\_?
* How much water can we save?
* How many \_\_\_ do we need for \_\_\_\_?
 | **Contexts or Questions:*** Predict future number of attendees
* Predict future prices or sales
* Predictfutureweather
* Predict future success of athletes
* Predict future yield (crops, garden)
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| ***Descriptive Modeling with CLAIM probe:***Students are provided with a claim about expected outcomes and asked to evaluate whether and under what conditions the claim could be true. | ***Predictive Modeling with CLAIM probe:***Students are provided with a claim about trends, patterns, or future values, and asked to evaluate whether and under what conditions the claim could be true.  |
| **OPTIMIZING MODELING** | **RATING & RANKING MODELING** |
| Students use math modeling to find the “best” option or plan to achieve a given goal. What is “best” depends on the goal (e.g., shortest, fastest, cheapest, fairest, longest, smallest).  | Students use math modeling to rate and rank different options based on criteria and data. Students decide how to weight criteria and use their ranking to make a decision or selection.  |
| Contexts or Questions: * The “best” route through a theme park
* The “best” arrangement for a garden
* The “best” way to share costs
* The “best” price for a menu item
* The “best” way to package an item
 | Contexts or Questions: * Select players for a team
* Select a field trip or vacation spot
* Select a fundraising option
* Select a carnival game
* Select a phone or internet plan
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| ***Optimizing Model with CLAIM probe:*** Students are presented with a claim about the “best” option, and asked to evaluate whether the proposed option is the “best” given the goal. | ***Rating & Ranking Model with CLAIM probe:***Students are presented with a claim about the top ranked option, and asked to evaluate whether the ranking criteria are reasonable.  |
| **IN ALL MATH MODELING TASKS** |
| Students generate a plan/conclusion/recommendation, and justify it using math. All plans should:* Show how the plan/recommendation works in the specific scenario.
* Describe assumptions, and how those assumptions impact plan or conclusion.
* Use numbers, words, equations and/or diagrams to explain and justify conclusion.
* Describe how one could use the plan in other similar situations.
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NOTE: Adapted from Immersion (<http://immersion.mspnet.org>; <http://nsfimmersion.onmason.com>