Task Model 5 **DOK Levels 3, 4** **Analyze the adequacy of and make improvements to an existing model or develop a mathematical model of a real phenomenon.** **Target E**	**Task Expectations:** Focus on developing a mathematical model of a real phenomenon. Any of the following scenarios can be used to assess this target. • Given a situation, the student will identify or create a symbolic or graphical model to represent the situation (includes equations, diagrams, and graphs). • Given data (table of values, scatterplot, etc.) the student will identify the type of function that might best model the situation. • The student will assess the fit of a particular model being used, including models used in two and three-dimensional geometry. • May use a simulation that mirrors the functioning of a formula-based online calculator. **Example Item 1 (Grade 8):** Primary Target 4E (Content Domain F), Secondary Target 1F (CCSS 8.F.B) (Source: Adapted from Illustrative Mathematics 8-F Modeling with a Linear Function) Select **all** situations that can be modeled by the linear equation $y = 2x+5$. A. There are initially 5 rabbits on the farm. Each month thereafter the number of rabbits is 2 times the number in the month before. How many rabbits are there after x months? B. Joe earns \$2 for each magazine sale. He also earns \$5 for each hour he spends trying to sell magazines. How much money will he earn after selling magazines for x hours? C. Sandy charges \$2 an hour for babysitting. Parents are charged \$5 if they arrive home later than scheduled. Assuming the parents arrived late, how much money does she earn for x hours? D. Sneak Preview is a members-only video rental store. There is a \$2 initiation fee and a \$5 per video rental fee. How much would Laney owe on her first visit if she becomes a member and rents x videos? E. Andre is saving money for a new CD player. He began saving with a \$5 gift and will continue to save \$2 each week. How much money will he have saved at the end of x weeks? **Rubric:** (1 point) The student identifies all situations modeled by the equation (e.g., C and E). **Response Type:** Multiple Choice, multiple correct response

Task Model 5	**Example Item 2 (Grade 8):**
DOK Levels 3, 4	Primary Target 4E (Content Domain F), Secondary Target 1F (CCSS 8.F.5)
	The table shows the relationship between the average number of hours students study for a mathematics test and their average grade.
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Target E	Which type of function is most likely to model these data?

The table shows the relationship between the average number of hours students study for a mathematics test and their average grade.

Hours Studying	Average Grade
0	62
1	78
2	85
5	74

Which type of function is most likely to model these data?

    A. linear function with positive slope
    B. linear function with negative slope
    C. non-linear function that decreases then increases
    D. non-linear function that increases then decreases

Rubric: (1 point) The student recognized the function most likely to model the data (e.g., D).

Response Type: Multiple Choice, single correct response