

Rubric for Mathematical Models

- A complete and correct Mathematical Model:
 - Simplifies reality completely and accurately enough for the intended audience and purpose.
 - Cites sources of all information used.
 - Has an appropriate title.
 - Has appropriately named (x and y are not appropriate) variables and/or abbreviations, and appropriately chosen units used consistently in all subsections of the model.
 - Is clear, legible and uncluttered and conveys the information to the intended audience completely and accurately.
 - Has variable values expressed as numbers. Year names, like 1995, are not numbers except in the rare case that the year 0 is the model's starting point.

- Contains a complete and correct Graph that:
 - Has the independent variable on the horizontal axis uniformly scaled to spread the data as much as possible.
 - Has the dependent variable on the vertical axis uniformly scaled to spread the data as much as possible.
 - Has scale starting points (usually zero) chosen so as not to mislead the intended audience.
 - Has the data represented in scatter plot form, NOT bar or line graph form.
 - Includes a line or curve of best fit (also called trend line or regression line).

- Contains a complete and correct Stock-Flow Diagram that:
 - Has appropriately chosen stocks that represent the most important accumulations in the system, including the dependent variable. Each stock must be labeled, indicate units, and initial values.
 - Has appropriately chosen flows that represent the relevant flows into each stock. Each flow must show correct direction, and must be labeled and indicate units.
 - Has appropriately chosen auxiliary variables that represent the most important constants and converters in the system. Each auxiliary variable must be labeled, indicate units, initial values and/or indication of operation.

- Contains a complete and correct Table that:
 - Has the independent variable in the left column or if horizontally arranged, in the top row.
 - Has the dependent variable in the right column or if horizontally arranged, in the bottom row.

- Contains a complete and correct Equation that:
 - Has the dependent variable expressed as a function of the independent variable and a correctly extrapolated or interpolated example added to the graph.
 - Has the inverse function expressing the independent variable as a function of the dependent variable and a correctly extrapolated or interpolated example added to the graph.

- Contains a complete and correct Verbal Description that:
 - Uses clear and correct professional language to explain the numerical relationship between the two variables.
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 - Contains a complete and correct Statement of Limitations that:
 - Is a clear statement of the strengths, weaknesses and limitations of the model. This statement is intended to warn the reader of any sources of error or misinterpretation in the model and to make clear what its uses are.

- The student should grade the model using this rubric before presenting it.
 - Grading scale:
 - A – meets or exceeds all criteria
 - B – meets all criteria but contains minor flaws that do not affect usefulness.
 - I – does not meet all criteria, and/or contains evidence of major gaps in understanding, and/or contains major flaws that affect usefulness.