New Jersey Mathematics

High School - Modeling

Modeling as a Process 1

1. Estimating how much water and food is needed for emergency relief in a devastated city of 3 million people, and how it might be distributed. 1.1
2. Planning a table tennis tournament for 7 players at a club with 4 tables, where each player plays against each other player. 1.2
3. Designing the layout of the stalls in a school fair so as to raise as much money as possible. 1.3
4. Analyzing stopping distance for a car. 1.4
5. Modeling savings account balance, bacterial colony growth, or investment growth. 1.5
6. Engaging in critical path analysis, e.g., applied to turnaround of an aircraft at an airport. 1.6
7. Analyzing risk in situations such as extreme sports, pandemics, and terrorism. 1.7
8. Relating population statistics to individual predictions. 1.8

The basic modeling cycle 2

1. identifying variables in the situation and selecting those that represent essential features, 2.1
2. formulating a model by creating and selecting geometric, graphical, tabular, algebraic, or statistical representations that describe relationships between the variables, 2.2
3. analyzing and performing operations on these relationships to draw conclusions, 2.3
4. interpreting the results of the mathematics in terms of the original situation, 2.4
5. validating the conclusions by comparing them with the situation, and then either improving the model or, if it is acceptable, 2.5
6. reporting on the conclusions and the reasoning behind them. Choices, assumptions, and approximations are present throughout this cycle. 2.6