



# FUNCTIONS OF THE MACHINE

**R**esearchers and subject matter experts have identified the conceptual understanding of functions and how they relate to real-world phenomena as topics of particular difficulty for students. Students often tend to think of functions in terms of a single algebraic formula that must be solved through computation, rather than a dynamic system of changing quantities that must be looked at more as a process. Additionally, students have difficulty identifying the measurable attributes of real-world situations and representing them with the graph of a function.

*You've been charged with a peculiar task: decipher the function of a strange machine designed by an eccentric inventor. In the wake of her auspicious disappearance, an innovator in the field of manufacturing, Nicole Edisla, has left a warehouse full of her machines. The purpose of these machines is a mystery, but Edisla has left extensive notes. It is up to you to use her notes and an understanding of functions to get the machine up and running once more.*

Functions of the Machine builds an understanding of the purpose and nature of mathematical functions through scaffolded problems. The Edisla machines represent functions, which have a covariational relationship between their inputs and outputs. By solving problems with these machines, the student builds a conceptual understanding of functions. Each problem is more complex than the last, allowing students to slowly build their understanding as they progress through the game.

Functions of the Machine is intended for use in any algebra class that includes a unit on functions.

## THIS GAME HELPS STUDENTS TO FOSTER AN UNDERSTANDING OF PROPORTIONAL REASONING, COVARIATIONAL REASONING, AND A PROCESS VIEW OF FUNCTIONS.

- **Covariational Reasoning** – The student can coordinate two varying quantities that change in tandem in order to solve a problem.
- **Process View of Functions** – The student can explain that a function is not a set rule that defines a procedure; instead, it is a generalized input-output process.
- **Graphical Reasoning** – The student can identify attributes of a graph that give meaning to the associated function's behavior.
- **Quantitative Reasoning** – The student can identify and relate measurable attributes of an object or situation in a problem context.

This Virtual Learning Experience is offered as a supplement to traditional classroom instruction. We recommend having students play Functions of the Machine immediately before or after an initial lecture on the topic of functions. Functions of the Machine makes a good alternative homework assignment, extra credit assignment, or classroom group activity.

To access all K20 educational games at no cost to your school, go to [k20.ou.edu/getgames](http://k20.ou.edu/getgames)

