Curriculum Units by Fellows of the Yale-New Haven Teachers Institute
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Using Mathematics to Understand the Brain and Describing the Brain to Understand Mathematics

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Mathematics is a powerful tool for solving problems in the world around us. Using very abstract models we are able to describe and predict the sometimes very complex behaviors of people, markets, diseases and physical objects. It is often difficult for students of mathematics to grasp some of these abstract concepts without concrete examples. In particular, it can be a challenge to motivate students without showing some relevance to their own lives. I would like to capitalize on the students' natural curiosity about their own brains to motivate them to learn mathematics.

In particular, this unit will be used to teach students of the family of functions by using examples and data about the brain. These examples include comparing the reaction time of a giraffe and a mouse. What is the relation between the number of neurons and brain diameter? How much louder is a jet taking off than a vacuum cleaner? Why do some musical notes sound pleasant while others do not? Relevant mathematical models, and their representations, will be used in answering these questions.

(Developed for Algebra II, grades 9-11, and Pre-Calculus, grades 10-12; recommended for Algebra II, grades 9-11, and Pre-Calculus, grades 10-12)