



Curriculum Units by Fellows of the Yale-New Haven Teachers Institute
2009 Volume IV: How We Learn about the Brain

Introduction

We are all curious about the workings of our brain and we are aware that much is known about its function. Yet many of us have little idea how the nervous system is studied. This seminar examined a variety of approaches to the study of the brain. The overall aim was to expose Fellows and their students to some of the details of the science that has revealed how the brain works.

Much of what we know about our own brains is derived from the study of the brains and sensory organs of other animals. Why do birds see so much better than humans? Why does the elephant hear so well? We can also study the brain and senses by investigating how disease, injury and drugs alter their functions. Stroke, brain injury, alcoholism, Parkinson's Disease, Alzheimer's Disease, Huntington's Disease, poor nutrition and drugs -- both prescribed and illicit -- alter the way we sense, think and behave. We can study the structure and function of the normal human brain through a variety of diagnostic procedures. These include recording of brain electrical activity by EEG, or through electrical potentials evoked by flash stimulation of the eye and by tone stimulation of the ear. Modern imaging methods like the MRI and CAT scan have allowed volume measurements of specific regions of the brain. More recent advances have permitted visualization of functional activity of the brain.

This seminar was intended for teachers of biology and anatomy at all levels, as well as teachers of social or environmental studies, psychology, and art. The units cover a wide range of topics, from the embryonic human brain to the hearing of the elephant. Teaching science and technology to students in the elementary grades, Nick Perrone examines the receptor organs and brains of the sea turtle, elephant and eagle. These animals have remarkable sensory capacities that far exceed man's. Andrea Bailey's unit is intended for the primary grades; she examines the role of nutrition in the growth of the brain and in learning. Ruth Chaffee introduces high-school students, in a special education curriculum, to the structure and function of the brain. The unit emphasizes behaviors that will enhance or degrade thinking. Jennifer Esty's unit is written for her class of pregnant high-school students. The unit follows the development of the brain before and after birth, with the importance of proper maternal nutrition and postnatal sensory stimulation discussed. Larissa Giordano explores the effect of drugs on the brain. Given specific, age-appropriate explanations, her third-grade students will be better poised to make sound decisions. Darla Martinez has written a unit to introduce kindergarten students to the five senses. Sam Jones uses examples from the structure and function of the brain to teach high-school mathematics. Topics include comparing the reaction times of mouse and giraffe and analysis of the frequency of musical tones.

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