

## CELEST CURRICULUM INNOVATION & OUTREACH

Based on recent advances in models of mind, brain, and behavior, CELEST is creating new curricula that can excite and motivate students to learn about and be conscious of themselves and others. Furthermore, CELEST curriculum innovation begins to redress the imbalance between teaching physical sciences versus teaching the science of learning in schools. An understanding of how our brains work has been left out of current national science standards (such as the AAAS Benchmarks for Science Literacy) and state standards (such as the Massachusetts Curriculum Frameworks) have followed.

Curricula are designed with two goals in mind. First, the materials must directly satisfy present curriculum requirements. Second, the materials can excite students to study many areas in the present curriculum that may seem dry or unmotivated without them. We call the latter materials "stealth modules." Such modules may take only 15 - 30 minutes to be presented as part of a more traditional lesson plan. Or they may be presented in larger curriculum units, encompassing one or more classes, depending upon the curriculum material that is being augmented and teacher implementation. Both sorts of module use can inspire students to learn more mathematics and science, and to enter previously unconsidered careers, including careers in science and teaching.

Currently, five CELEST graduate courses are being used as curriculum incubators wherein students participate in class projects to create modules with possible future connections to CELEST public curriculum offerings. Educational modules are developed in a layered manner, with the first layers requiring no previous background, while later layers introduce increasingly advanced materials in a self-contained way. CELEST hopes that its educational materials will be useful to many different people including the general public as well as middle school, high school, undergraduate, graduate and professional levels. In all cases, the curriculum modules are aligned with CELEST research thrusts. Modules under development with CELEST graduate students include: 1) *Vision: The Pathway to the Mind / Brightness Contrast Module*, (2) *Watch Where You're Going! / Obstacle Avoidance Module*, (3) *Make Your Memory Stronger! / Sequence Learning Module*, (4) *How do we know what we know? / Recognition Module* (5) *Learning in the blink of an eye / Associative Learning Module*. Standard print documentation supports the interactive software experience and includes Teacher Instructions, Background and Theory, Curriculum and Software User's Guide, and a Class Presentation.

Classroom materials have been *pilot tested* with undergraduates and high school students (approximately 49 students) and *classroom tested* in Boston-area grade 6-16 schools (18 classes, approximately 306 students). A curriculum workshop for 28 middle and high school teachers from July 9-20, 2007 at Boston University will extend outreach to schools nationwide.



CELEST curriculum: development with teachers for students.