

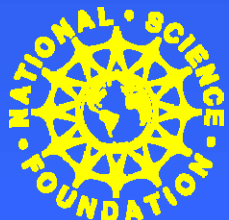


Virtual Courseware Project ScienceCourseware.org

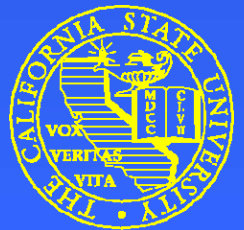
Learn by Doing: Web Simulations for Inquiry-based Science Education

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Virtual Courseware Project Philosophy

Students Learn by Doing!

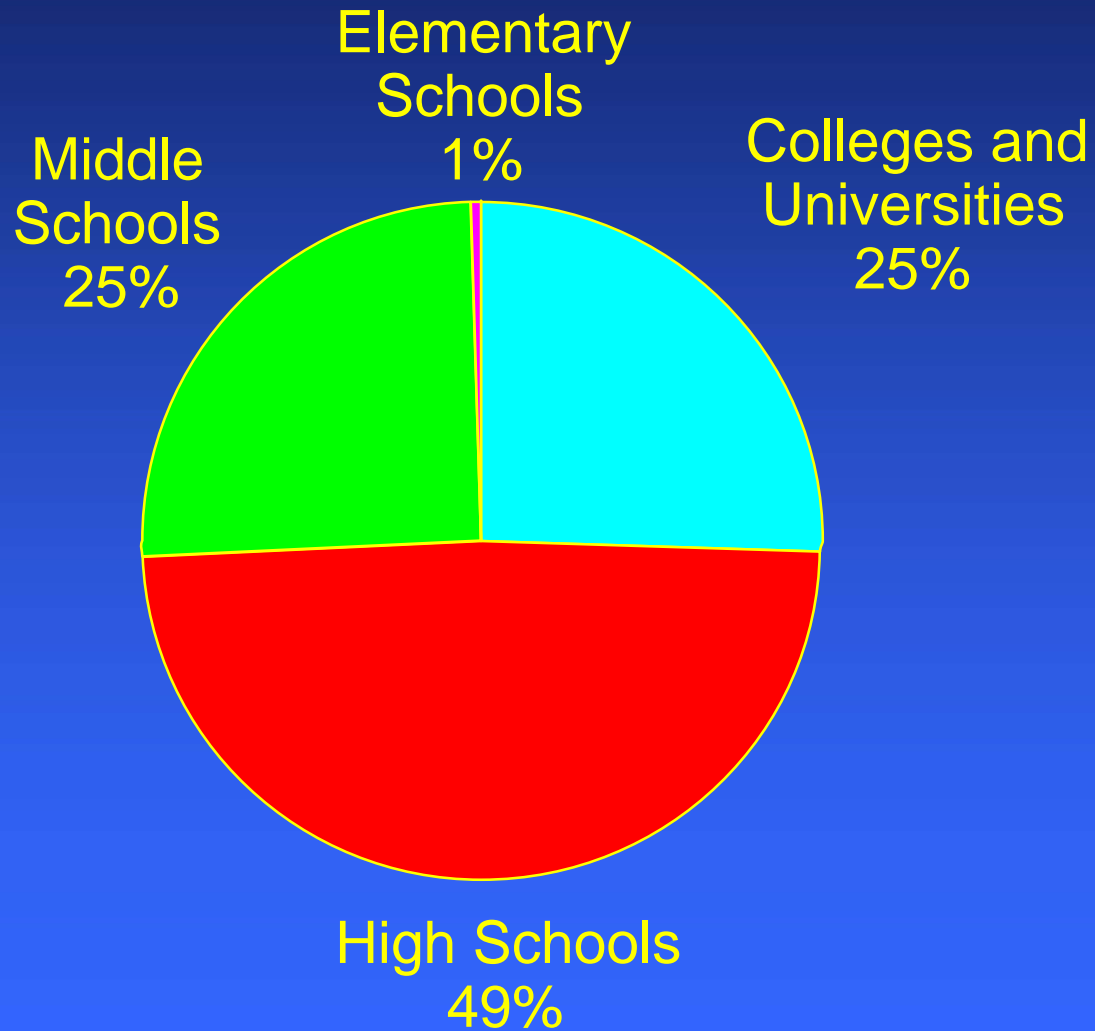
“Virtual Courseware” activities are interactive simulations that emphasize the scientific method: making observations, proposing hypotheses, designing experiments, collecting and analyzing data, synthesizing results.

Virtual Courseware Development and Usage

Activity or Suite	Time Period	No. Users
<i>Virtual FlyLab</i>	7/95 – 8/00	665,000
<i>Virtual Earthquake</i>	9/96 – present	3,632,000
Biology Labs On-Line: <i>CardioLab, DemographyLab, EnzymeLab, EvolutionLab, FlyLab, HemoglobinLab, LeafLab, MitochondriaLab, PedigreeLab, PopGenLab, PopEcoLab, TranslationLab</i>	9/99 – present	827,000
Geology Labs On-Line: <i>Virtual Dating – Isochron, Virtual Dating – Radiocarbon, Virtual River – Discharge, Virtual River – Flooding</i>	9/99 – present	548,000
Earth and Environmental Science Courseware: <i>Earthquake; Global Warming – Energy Balance, Future Climate Change</i>	9/01 – present	559,000
Virtual Courseware for Inquiry-based Science Education: <i>Drosophila, Natural Selection, Relative Dating</i>	1/09 – present	262,000
	Total	6,493,000

Users of Virtual Courseware

Earthquake Activity



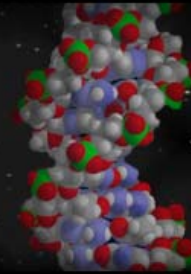
Technologies Utilized

Activity or Suite	Technologies
Virtual FlyLab	Web page forms and CGI scripts
Virtual Earthquake	Web page forms and CGI scripts
Biology Labs On-Line	Java with scripts for HTML export
Geology Labs On-Line	Java, Flash, CGI scripts
Earth and Environmental Science Courseware	Java, Flash, PHP, MySQL for accounts & assessment
Virtual Courseware for Inquiry-based Science Education	Flash, PHP, MySQL for accounts & assessment

ScienceCourseware.org



science
courseware.org



The Virtual Courseware Project produces interactive, online simulations for the life science laboratory or for earth science field studies. The activities are designed to enhance an existing curriculum and include online assessments. They can be used by students ranging from middle school, high school, or college classrooms.

Click on a project on the right to access the entry point for this fun, exciting, and engaging suite of activities.

The activities contain Macromedia Flash movies or Java applets (see System Requirements in each project). Click [here](#) to see testimonials and recognition for the Virtual Courseware Project to see awards and recognition for the Virtual Courseware Project.



The Virtual Courseware Project is supported by grants from the U.S. National Science Foundation and the California State University.



Virtual Courseware for Inquiry-based Science Education



Exploratory activities in the earth and life sciences that are aligned to state and National Science Education Standards, especially for high school classrooms.

Virtual Courseware for Earth and Environmental Sciences



Interactive simulations and tutorials on global warming and seismology.

Geology Labs Online



Interactive tutorials on isochron and radiocarbon dating, river discharge and flooding, and earthquake epicenter and magnitude determination.

Biology Labs Online



A subscription website of college and advanced high school level biology simulations. Take a tour of any of the 12 activities.

Conclusion

Virtual Courseware:

- provides opportunities for inquiry-based learning.
- can be used for activities too expensive, too dangerous, too time-consuming, or impractical for traditional hands-on instruction.
- provides convenient opportunities for out-of-class and out-of-lab learning.
- is an inexpensive method of inquiry-based learning.
- allows efficient assessment of learning.