



The application of Legacy Cycles in the development of Earth Science curriculum

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The Institute for Geophysics in the Jackson School of Geosciences at The University of Texas at Austin actively contributes to K-12 education, including the development of rigorous Earth and Space Science curriculum designed for secondary school learning environments. Here we report on our efforts to apply an innovative new pedagogical approach, the Legacy Cycle, to scientific ocean drilling paleoclimate data from fossil corals collected offshore Barbados in 2006 and to the creation of a high school water resources education program for Texas high school students supported by a grant from the Texas Water Development Board.

The Legacy Cycle makes use of the Internet and computer technology to engage students in extended inquiry learning. A series of inquiry activities are organized around a set of three driving questions, or challenges. Students mimic the work of scientists by generating ideas to address a given challenge, listening to multiple perspectives from experts on the topic, researching a set of sub-questions and revising their original ideas, testing their mettle with labs and quizzes, and finally composing a project or paper that answers the original challenge. The technology makes it easy for students to move through the challenges and the organizational framework since there are hyperlinks to each of the sections (and to reach the other challenges) at the bottom of each webpage. Students' final work is posted to the Internet for others to see, and in this way they leave behind their legacy. Our Legacy Cycle activities use authentic hydrologic, water quality, geochemical, geophysical data, as well as remotely sensed data such as is collected by satellites. They are aligned with the U.S. National Science Education Standards, the new Ocean, Climate and Earth Science Literacy Principles (in development), and the Texas Essential Knowledge and Skills for Earth and Space Science.

The work represents a collaboration involving teachers from The University of Texas' UTeach program, the NSF-sponsored Texas Earth and Space Science (TXESS) Revolution program of teacher professional development, and the Texas Regional Collaboratives for Excellence in Science and Mathematics Teaching, and scientists from the Institute for Geophysics, the Lamont-Doherty Earth Observatory and the Texas Water Development Board.