Education-By-Design

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"…scientists as advocates in science education that understand the culture of science and that of our schools."
Dr. Bruce Alberts: President of the National Academy of Sciences

Research
Science Researchers, Science Technicians, Information Managers, Education Liason, Science Instructors, Educators

Partnerships
NSF Artists/Writers, LTER, SLTER, SDSC, TEA, TEP, DLESE, SERC, SIO, Birch Aquarium

Long Term Ecological Research

Learning Community

Education *for* **Scientific Literacy**
Formal Learning Centers:
Classrooms, Institutions
Informal Learning Centers:
Museums, Laboratories, Science Centers, Libraries, Aquaria

"Long-Term Ecological Research (LTER) sites offer unique opportunities for establishment of science education programs and partnerships because of their long-term design. These sites provide environments for effective learning about long-term science through participation and inquiry by students and teachers."
Diane Ebert-May

Curriculum Development

Themes: Modules: Lessons

Mutually-supported classroom modules that collectively and critically challenge students to integrate scientific concepts, improve their knowledge and understanding of long-term research and achieve scientific literacy.

I. Forming a Hypothesis
- a. Boning up on Research*
- b. Ice Adventure*

II. Long Term Research
- a. Time Series
- b. Information Management
- c. Ice Adventure*

III. Navigation/Geography
- a. Finding Your Way*
- b. The Amazing Race*
- c. Voyage to Antarctica

IV. Primary Productivity
- a. Through the water Column

V. Antarctic Food Web
- a. Penguin-Temp-Ice-SOI Dataset
- b. Penguin Story

VI Across the Ecosystem (LTER)

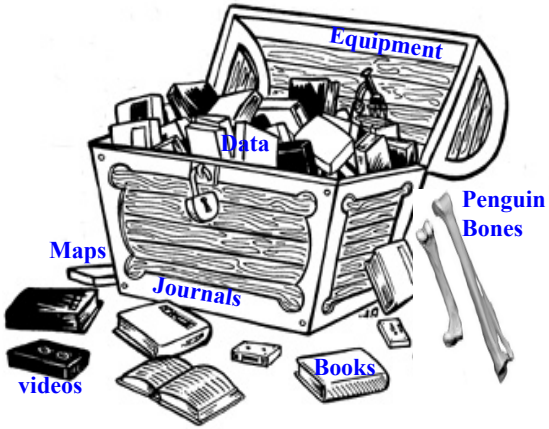
VII. Global Impacts
- a. Ice Adventure*

* Lesson in progress

Curriculum Theory

"Inquiry science which is engaging and meaningful can spawn a students' 'innate' curiosity for the natural world. Students observe, ask questions, make predictions, think about results, reflect on their progress and craft their next move." (Wheeler, 2000)

Palmer LTER Outreach Trunk



LTER All Scientists Meeting
Seattle, September 18th – 21st, 2003

Presently, our curriculum is in the discovery phase of development. A few lessons have been drafted for assessment as working prototypes. The flexibility in the design of these module themes and lessons is to encourage teachers to interchange the activities to fit their student's ability levels and to assess performance competency of state and national standards.

"BONING UP ON RESEARCH..."

The original version of this page can be found in the *Laboratory Manual* for Scott, Foresman's text *Biology* (by Irwin L. Slesnick), 1985, page 75 (ISBN 0-673-22303-6).

CONTENT STANDARDS: Investigation/Experimentation:b,c,d,f,g,k

TEACHER READS ENTHUSIASTICALLY! (anticipatory set)

So many scientists have traveled to this polar peninsula but now you're the one who gets to step foot on the bottom of the world, a place where only 100,000 people have ventured since the discovery of Antarctica in 1820! The plane takes off as you glance across the seats to scrutinize the other passengers; marine biologists, biological oceanographers, terrestrial ecologists, biooptical oceanographers, microbiologists, zooplankton marine scientists, physical oceanographers, graduate students, and support staff too, are all huddled together, anxiously awaiting the next leg of your journey to begin, the research cruise. While a six week LTER cruise seems like a long time, the lists of research tasks that you plan to accomplish seems almost unattainable.

DIRECTIONS:

In this activity, you and the members of your research field team will take on the role of research biologists coming to Antarctica's Torgersen Island to learn how the wildlife survives in an extremely cold environment. In this specific case, you are called upon to identify and study the unusual fossil remains resting beneath you of a species on this Island.

Begin by removing four bones from the rookery/envelope without looking at the one remaining.

Long Term Ecological Research

ICE ADVENTURE

Journey on the Antarctic Peninsula

LESSON #8: THE BIG CHILL

You've made it to the "Big Chill"! In this portion of your "Ice Adventure" you will be evaluating the climate change on the Antarctic Peninsula. The information provided below will assist you in completing this leg of your journey. Good luck!

Content Standards: Investigation/Experimentation: a,b,c,d,f,l,k

Develop your Hypothesis: In the past twenty-five years Antarctica has been in a deep freeze. What insight does the past two and a half decades reveal to scientists about what lies ahead? Create a hypothesis and support your idea(s)

Determine Your Data: What data will you need to test your hypothesis? Explain why.

Archival Data **Real Time Data** **Both**

Background Information: Information on Temperature/Climate in Antarctica.

Real Time Data

Research Data: Follow the data link below and answer the **Q-button** questions associated with each link: Data Link

(Palmer Air Temperature-Versus-Time data)

State Your Conclusion: After viewing the data presented in this activity, state your conclusions. Do your conclusions agree or disagree with your hypothesis?

Global Application: See if your conclusions hold true using global maps and current event articles.

Data Link

(Interannual Variability Temperature Maps) Data Link **U.S. News and World Report)**

Curriculum Theory References

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Edelson Daniel C. , (2001) Learning-for-use: A Framework for the Design of Technology-Supported Inquiry Activities. Journal of Research in Science Teaching, 38,(3),355-385.

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* Format and content still evolving