EarthLabs: A National Model for Earth Science Lab Courses

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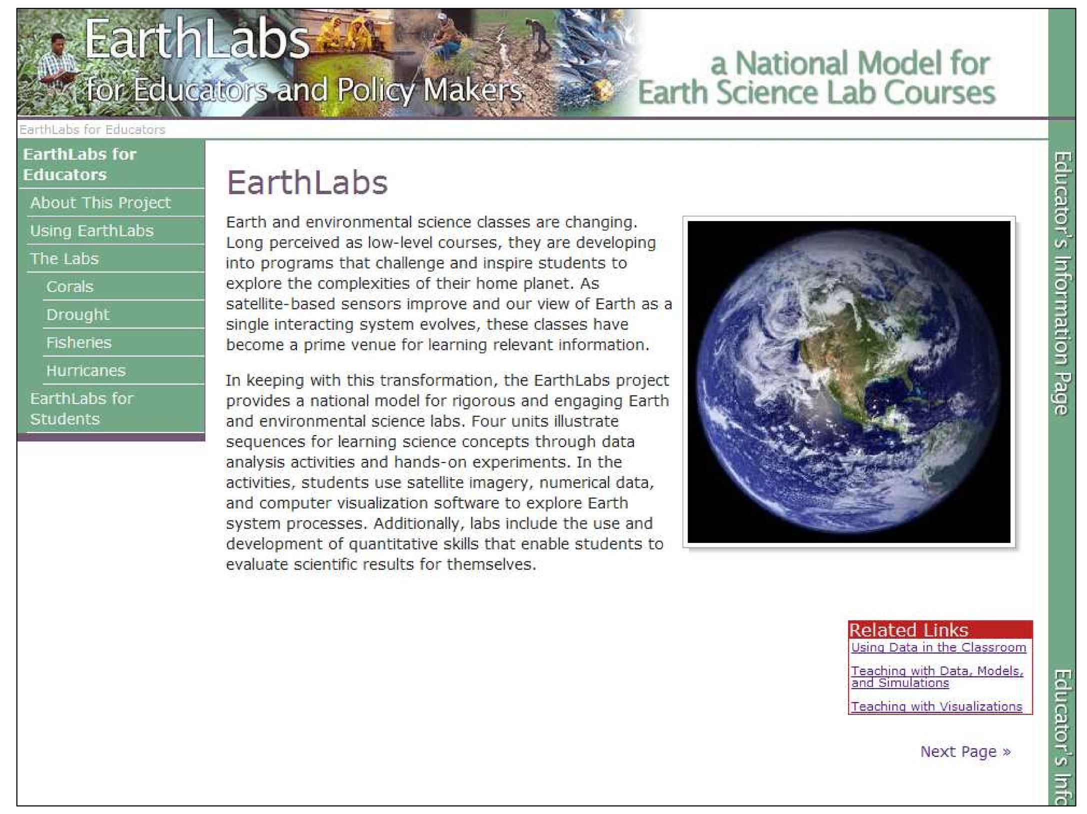
http://serc.carleton.edu/earthlabs/index.html

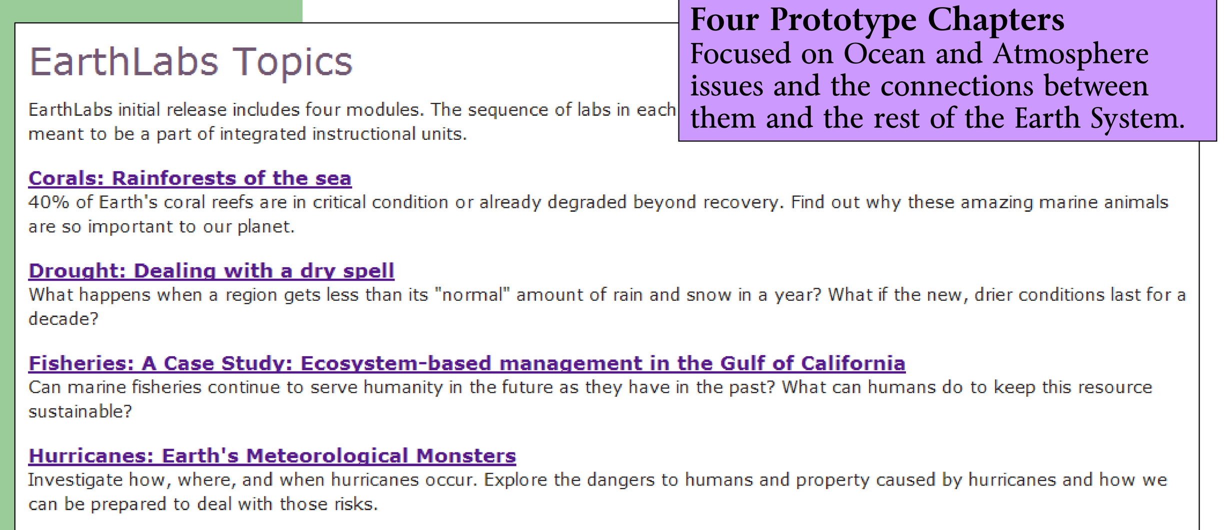
EarthLabs is a model Earth science lab course for high school students. The lab experiences feature a combination of classroom experiments and computer access to data and visualizations, and demonstrate the rigor and depth of a true lab course. This effort aims to create a set of exemplary lab modules that span several days or more, engage students in deep and long-lasting investigations, enable them to explore the rich interconnections in the Earth system, and involve a variety of inquiry-based experiences.

NOAA initiated work on the EarthLabs course by funding four prototype units, focusing on the domains of oceans and the atmosphere and their connections with other components of the Earth system. These topics were selected because they represent rich domains of current research of interest to NOAA and the other partners.

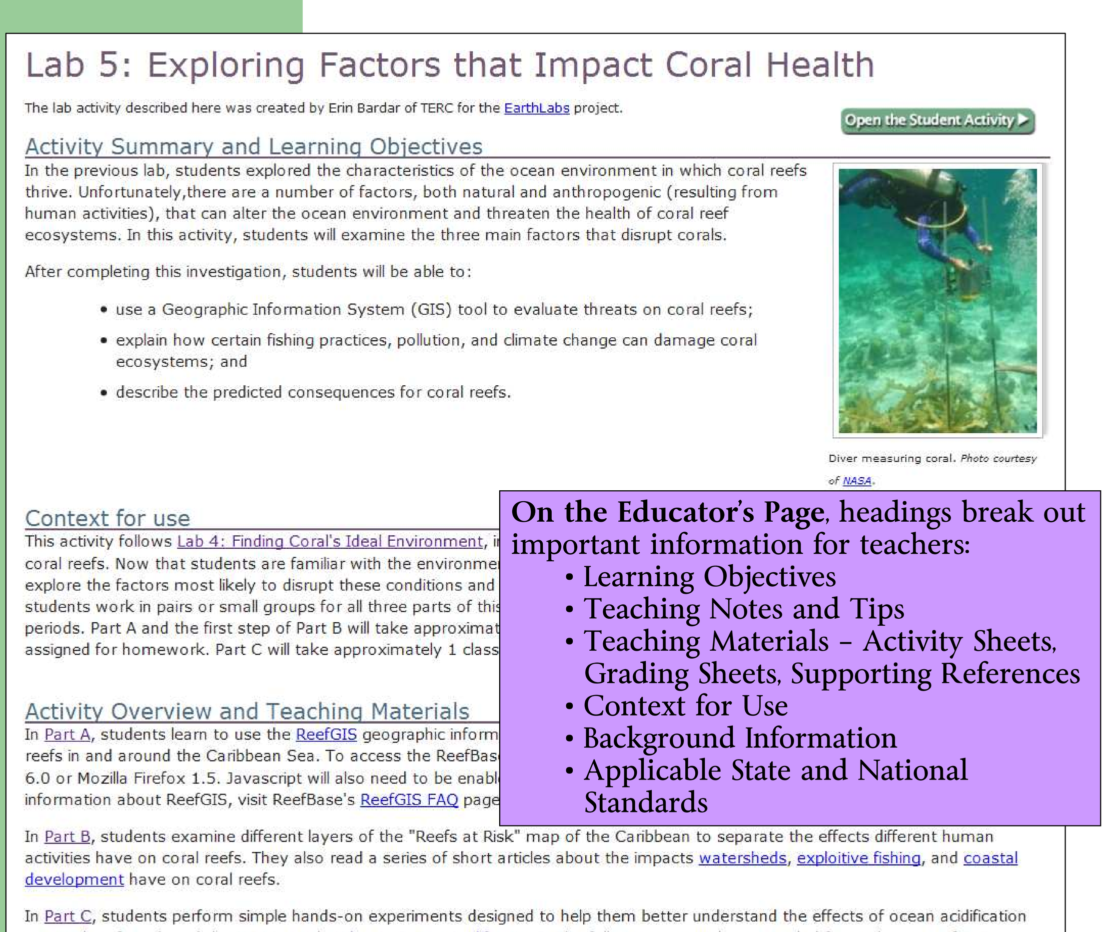
On the web, EarthLabs is composed of two sites, one for educators or policy makers and the other for students. This strategy provides teachers with the support they need without overwhelming the students with all this additional information. The students get pages that lead them through the activities which they need to complete. To avoid potential confusion for instructors, we've given the different pages distinct characteristics and labeling. There are also links from the Educator's Page to the Student's Page but not in the other direction.

Teacher's Website

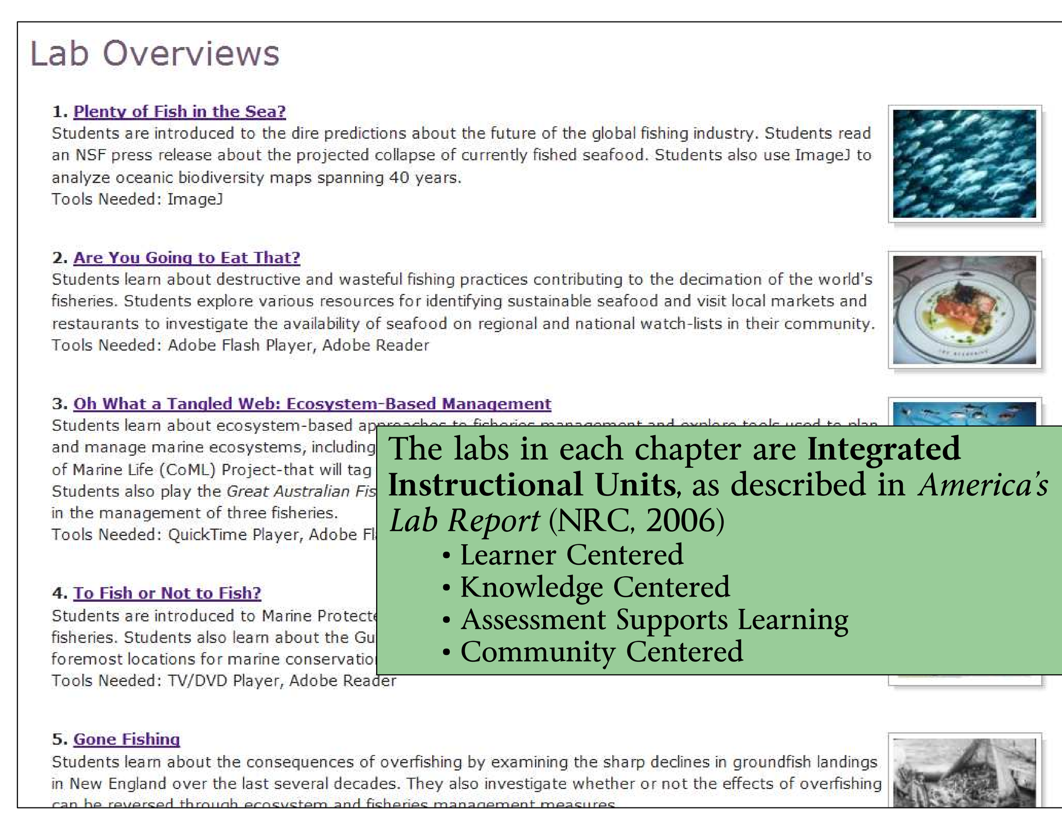




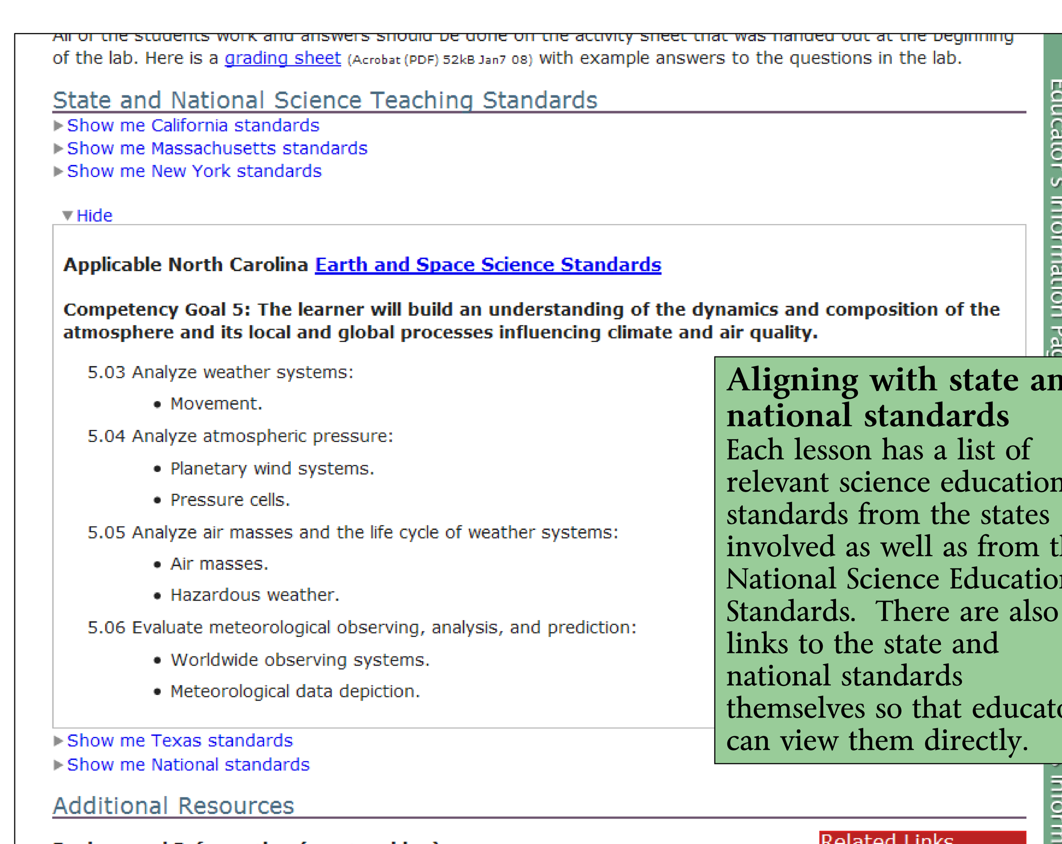
Four Prototype Chapters
Focused on Ocean and Atmosphere issues and the connections between them and the rest of the Earth System.



On the Educator's Page, headings break out important information for teachers:
- Learning Objectives
- Teaching Notes and Tips
- Teaching Materials - Activity Sheets, Grading Sheets, Supporting References
- Context for Use
- Background Information
- Applicable State and National Standards



The labs in each chapter are **Integrated Instructional Units**, as described in *America's Lab Report* (NRC, 2006)
- Learner Centered
- Knowledge Centered
- Assessment Supports Learning
- Community Centered



Aligning with state and national standards
Each lesson has a list of relevant science education standards from the states involved as well as from the National Science Education Standards. There are also links to the state and national standards themselves so that educators can view them directly.

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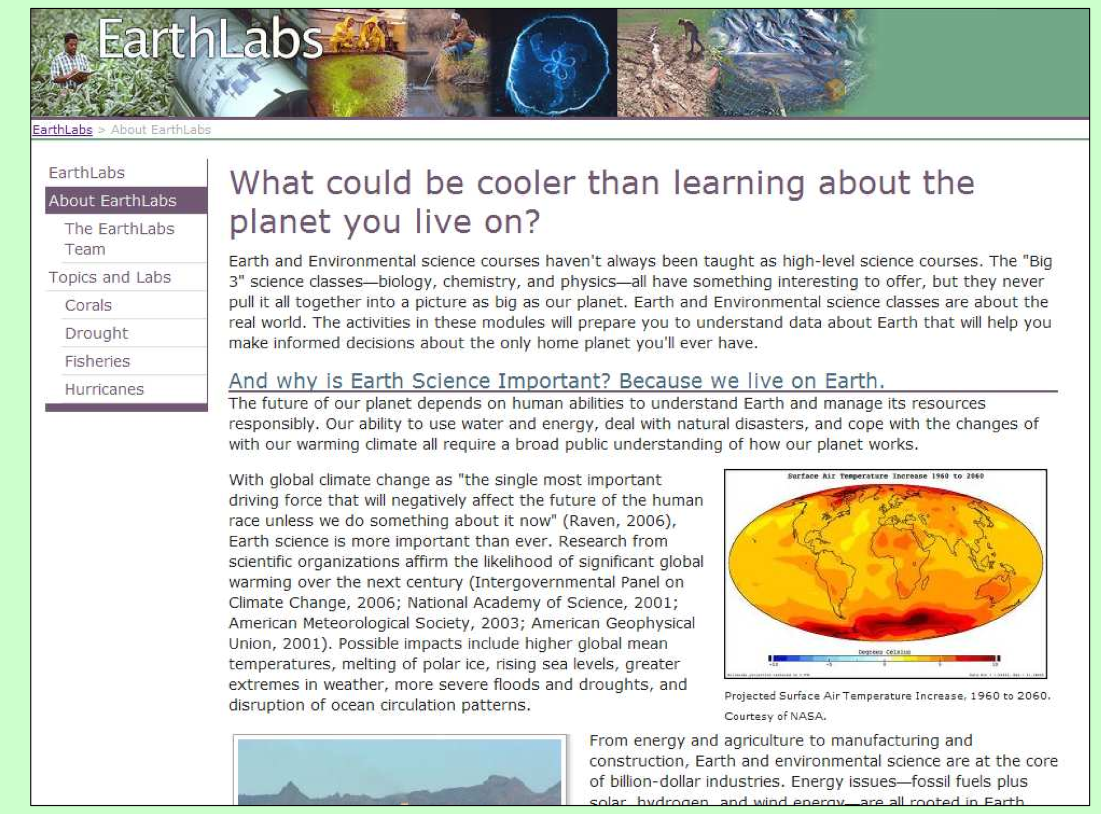
Student's Website



RELATED RESOURCES

Hurricane Visualizations
serc.carleton.edu/NAGTWorkshops/visualization/collections/hurricane.html

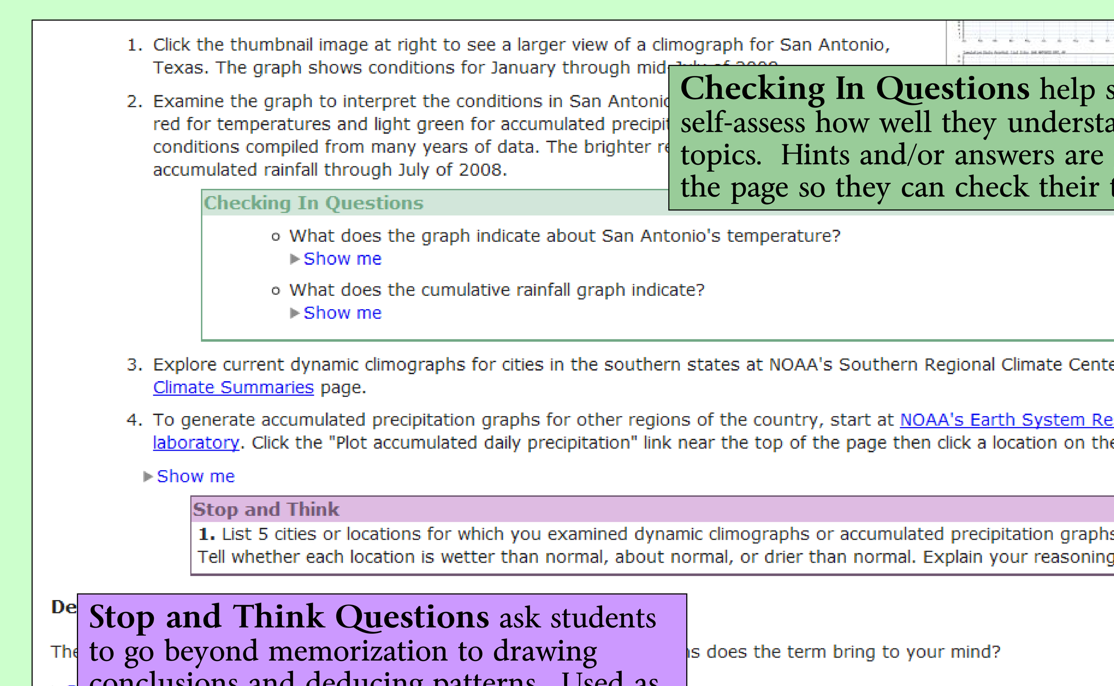
Teaching Biocomplexity in the Geosciences
serc.carleton.edu/NAGTWorkshops/biocomplexity/index.html

Teaching the Ocean System
serc.carleton.edu/NAGTWorkshops/ocean/index.html

Using an Earth Systems Approach
serc.carleton.edu/introgeo/earthsystem/index.html

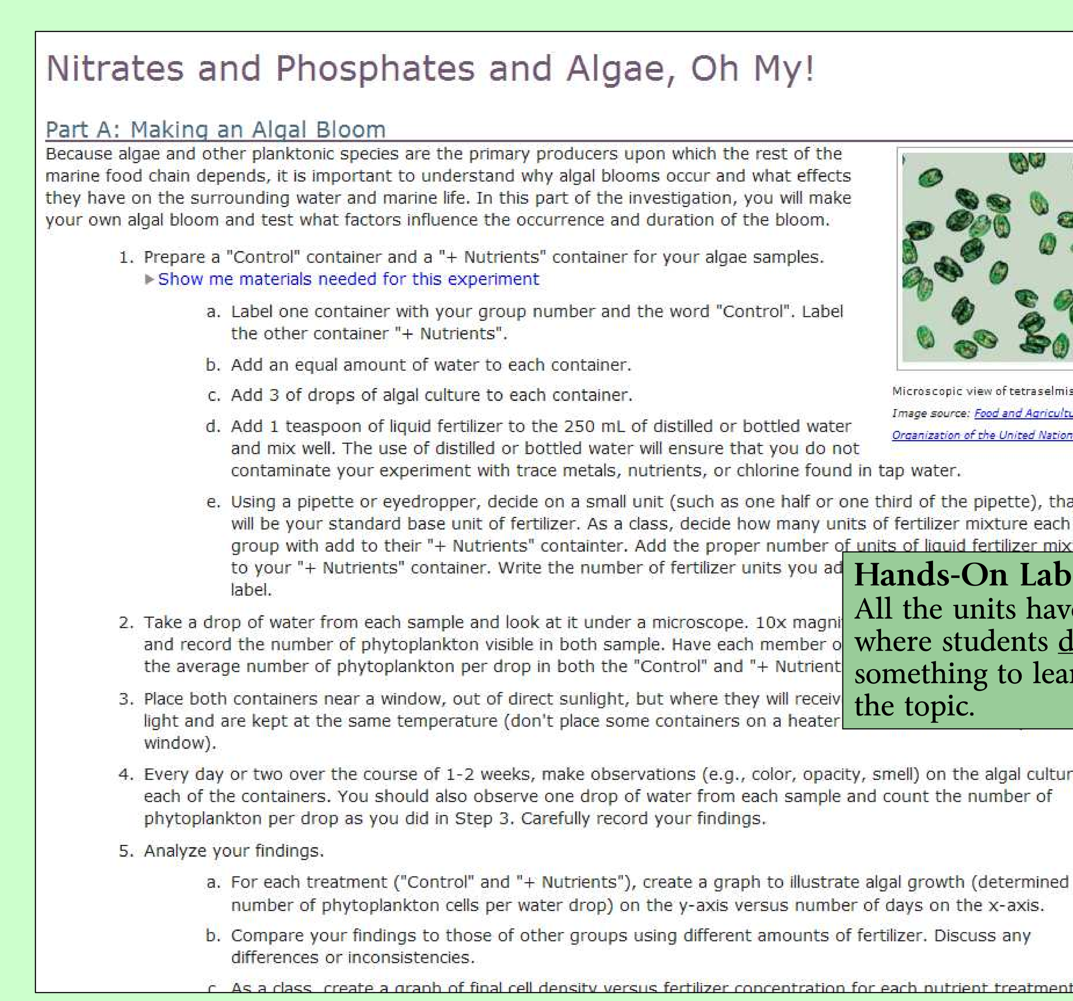
Using Data in the Classroom
serc.carleton.edu/usingdata/index.html

On the Student Pages, students are presented with the materials they are going to interact with:
- Readings
- Videos
- Visualizations
- Formative and Summative Questions



Checking In Questions help students self-assess how well they understand topics. Hints and/or answers are given on the page so they can check their thinking.

Stop and Think Questions ask students to go beyond memorization to drawing conclusions and deducing patterns. Used as summative assessment via the activity sheets.



Hands-On Labs
All the units have labs where students do something to learn about the topic.