The Changing Structure of American Education

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Introduction: Why do we Care?

- Oceans are not being taught in many classrooms. This is why.
- We now know so much about science that we cannot possibly teach it all. So what do we teach, and what do we not teach?
- Various scientific groups have met and decided what ought to be taught at each grade level. These are called the national standards for teaching math, science, geography, history, and other subjects.

The groups include:
- The American Association for the Advancement of Science, publisher of Science for All Americans.
- The National Academy of Sciences/National Research Council’s National Science Education Standards.
- Texas Education Agency, Texas Essential Knowledge and Skills.
- Other states have similar standards, all derived from the national standards.

- Each state has adopted their own standards, and this is what is taught in the classroom.
- Texas and a few other states have taken the standards to their natural conclusion, other states will probably follow, with federal pressure.
- Texas textbooks must align with the Texas Essential Knowledge and Skills.
- Texas test student performance at the end of each grade.
- The test is tied to the Texas standards.
- Schools are evaluated based on how well their students perform on the test.

As a result of this rigorous accountability, Texas is leading the nation in improving student performance.

- If it isn’t in the standards, it isn’t taught. The standards barely mention the ocean. Therefore oceanography is not being taught.

Improved Education

The National Science Foundation’s idea of an ideal merging of science and education looks something like this.

- NSF Requirements for Education
- Criteria 2 for proposal evaluation
- Applies to all proposals

Your Proposed Work

Meets National Standards?

Age appropriate?

Yes

Is it innovative?

Yes

Is it easy for teachers to use?

Yes

Does it work? Do students learn?

Yes

Can students and teachers find the materials?

Yes

Vertical Alignment of K-16 Teaching

National and state standards for teaching math and science

College

High School

Middle School

Elementary School

What Are the Implications?

- Because the experiences of many future high school teachers are still being shaped by traditional curricula, this initiative extends the improvement of high school instruction.

- The implications are clear: We will be expected to change the way we teach science courses taken by science majors who expect to become teachers.
- Use more hands-on activities. High school classes have lots of these activities. It is a very effective way to teach.
- Make sure the material includes the topics (includable in the national standards).
- Although the standards don’t include oceanography, we can teach physics, mathematics, chemistry, and biology using oceanographic examples.

What Can We Do?

- Become more involved in science education, especially effectively.
- Let’s help teachers.
- We can help these teachers learn little things teaching in the earth sciences.
- Therefore we are not as effective as they could be teaching earth science or oceanography.
- They tend to use classroom material that has major errors.
- For the more they know the better they can teach.
- Invite teachers to work in your lab over the summer.
- Show them why your work is interesting, and how science is done. Most educators don’t have to see science.
- Work closely with them in developing teaching material.
- Get your graduate students more involved in oceanographic research.
- Hire undergraduate to work in your lab, especially students who have an interest in the earth sciences and teaching.
- Remember, students are interested in careers as well as science.
- Join the community of teachers.
- Share your materials with others who teach.
- Bill Proctor at UC Santa Barbara is creating a community of oceanography teachers.
- Join your local NSF Math Science Partnership.

Oceanworld’s Growth

Monthly Report

- Increased interest in the field over the past 5 years

An Example

A Problem-Based Oceanography Course for Teachers

Introduction to Oceanography (OCNG-401)

This is a problem-based course that will be offered each year and will be heavily based on OCEANWORLD. The course will be offered at Texas A&M University. You may need to be an undergraduate to enroll in the course. To find out more, contact Dr. Robert D. Schmid.

- Texas A&M University
- College Station, TX

March 1997: Ocean: An Introduction

Why do we need ocean science? How important is oceanography in our economy of today? The oceans make up 71% of our total planet. Ocean science provides answers that range from elementary to complex. As we learn more about oceanography, the importance of the oceans increases. The oceans provide us with the life we know today. Understanding marine life is key to our future.

The basic question is: How can we improve knowledge about the oceans? The oceans are vast, complex, and full of secrets. The oceans provide us with food, shelter, and livelihood. The oceans provide us with resources, both renewable and non-renewable. Understanding the oceans is vital to our future.

The issue today is: How can we improve the knowledge and teaching about the oceans? The oceans are vast, complex, and full of secrets. The oceans provide us with food, shelter, and livelihood. The oceans provide us with resources, both renewable and non-renewable. Understanding the oceans is vital to our future.


Results of Our Discourse