

Full text of **O L O W Unifying Concepts And Processes** conference

[Reception](#) | [Meeting Room](#) | [Resources](#) | [Oceanside](#)

| [Unifying Concepts and Processes](#) | [Science As Inquiry](#) ^{NEW} | [Physical Science](#) ^{NEW} | [Life Science](#) ^{NEW} |
| [Earth & Space](#) | [Science & Technology](#) | [Personal & Social Perspectives](#) ^{NEW} | [History & Nature of Science](#) ^{NEW} | [Other topics](#) |

Unifying Concepts and Processes

Please add ocean content under the appropriate standard

<http://books.nap.edu/html/nses/>

#	Title (click on column header to sort item list)	New	Last
1	General Comments		2
2	9-12 Systems, order and organization		0
3	5-8 Systems, order, and organization		5
4	K-4 Systems, order, and organization		4
5	9-12 Evidence, models and explanation		0
6	5-9 Evidence, models, and explanation		2
7	K-4 Evidence, models, and explanation		4
8	9-12 Change, constancy, and measurement		1
9	5-8 Change, constancy, and measurement		2
10	K-4 Change, constancy, and measurement		2
11	9-12 Evolution and Equilibrium		1
12	5-8 Evolution and Equilibrium		3
13	K-4 Evolution and Equilibrium		2
14	9-12 Form and Function		0
15	5-8 Form and Function		2
16	K-4 Form and Function		3
17	K-12 Other topics		0

General Comments

Item 1 [Peter Tuddenham](#) Oct 22, 2004 16:47

General Comments.

Here are a couple of paragraphs from the beginning text Pages 115-116 from NSES on this standard.

Response 1:1 [Peter Tuddenham](#) Oct 22, 2004 17:25

"This standard presents broad unifying concepts and processes that complement the analytic, more discipline-based perspectives presented in the other content standards. The conceptual and procedural schemes in this standard provide students with productive and insightful ways of thinking about and integrating a range of basic ideas that explain the natural and designed world.

The unifying concepts and processes in this standard area subset of the many unifying ideas in science and technology. Some of the criteria used in the selection and organization of this standard are:

- The concepts and processes provide connections between and among traditional scientific disciplines
- The concepts and processes are fundamental and comprehensive
- The concepts and processes are understandable and usable by people who will implement science programs
- The concepts and processes can be expressed and experienced in a developmentally appropriate manner during K-12 science education."

copied from pages 115-116 NSES Content Standard: k-12 Unifying Concepts and Processes.

Response 1:2 [Peter Tuddenham](#) *Oct 22, 2004 17:36*

So the challenge now is to add ocean and ocean related topics that can be taught to meet these standards.. please fill in your suggestions in the appropriate item.

Anything that does not fit put in the last item, other topics.

9-12 Systems, order and organization

Item 2 [Peter Tuddenham](#) *Oct 22, 2004 16:49*

9-12 Systems, order and organization

5-8 Systems, order, and organization

Item 3 [Peter Tuddenham](#) *Oct 22, 2004 16:50*

5-8 Systems, order, and organization

Response 3:1 [Susan Snyder](#) *Oct 26, 2004 10:51*

Content topics: 1) In the ocean, organisms are generally classified as plankton or nekton, benthic or pelagic, and sessile or motile. 2) Shorelines are classified as rocky coasts, mudflats, or sandy beaches.

Response 3:2 [Bob Stewart](#) *Oct 28, 2004 20:06*

Susan, I would also add microbial. Yes they are plankton, but they are not included in discussions of plankton. Yet, the entire ocean ecosystem is mostly microbe based, in contrast to the land, which is not.

In systems I would put: 1) the carbon cycle, 2) the hydrological cycle, and 3) climate system.

Response 3:3 [Lynn Whitley](#) *Oct 29, 2004 00:54*

ocean organisms as examples of classification according to domain, kingdom, phylum, etc.

Response 3:4 [Bob Stewart](#) *Oct 30, 2004 14:48*

What are the earth systems?

How are they related?

How do they interact?

Introduce carbon cycle, interactions of ocean and atmosphere and how they produce the hydrological cycle.

The oceans warm the atmosphere, the sun does not.

Response 3:5 [Francesca Cava, Nat. Geo. Society, Santa Barbara, California](#) *Oct 31, 2004 08:33*

- Latitude, longitude/depth

- Spatial representation and technology (ie ocean atlases, GIS GPS);
 - Locations of major ports, major ocean resources
-

K-4 Systems, order, and organization

Item 4 [Peter Tuddenham](#) *Oct 22, 2004 16:51*

K-4 Systems, order, and organization

Response 4:1 [Francesca Cava, Nat. Geo. Society, Santa Barbara, California](#) *Oct 28, 2004 10:25*

Oceans as a 3-dimensional habitat (ie introduce the concept of depth, area)

Response 4:2 [Francesca Cava, Nat. Geo. Society, Santa Barbara, California](#) *Oct 28, 2004 10:26*

Distribution of water (ie more than 70% of the Earth's surface)

Response 4:3 [Pam Stryker](#) *Oct 29, 2004 18:43*

This is important for elementary students to see that the interactions between all the parts of the system. Parts to a whole is big in the Texas TEKS. There is order and organization in things and when mans intervention disrupts that order the system changes. I feel that ocean concepts should be taught at the elementary level at a systems or wholistic level. One TAKS fifth grade science test item that was consistently missed, was one about the sun as the source of energy for the many systems. I love the MARE program because it introduces habitats and their systems. We have gone on to really expand the program making it even more content rich. When I take the second graders to the coast four hours away, the blow their parents away with their depth of understanding. Discrete concepts taught in isolation do not enhance understanding. There is a story to tell and you need all the elements to appreciate the story.

Response 4:4 [Bob Stewart](#) *Oct 30, 2004 14:15*

I second Pam's comments (4:3). Give them the big picture,

9-12 Evidence, models and explanation

Item 5 [Peter Tuddenham](#) *Oct 22, 2004 16:51*

9-12 Evidence, models and explanation

5-9 Evidence, models, and explanation

Item 6 [Peter Tuddenham](#) *Oct 22, 2004 16:51*

5-9 Evidence, models, and explanation

Response 6:1 [Susan Snyder](#) *Oct 27, 2004 21:34*

Content topic: Satellites and sonar are used to collect data about topographic features on the ocean floor. Using this data, models of the ocean floor (eg. bathymetric maps) are constructed.

Response 6:2 [Francesca Cava, Nat. Geo. Society, Santa Barbara, California](#) *Oct 31, 2004 08:38*

Physical processes shape the ocean and all Earth systems to create, sustain and modify ecosystems.

- The biological ocean -- processes and interaction (ie, ocean ecosystems, interdependence of life of Earth and the ocean, food webs, carbon cycling, animal behavior)
 - Ocean physics, (eg, climate change, atmosphere/ocean linkages, waves)
-

K-4 Evidence, models, and explanation

Item 7 [Peter Tuddenham](#) *Oct 22, 2004 16:53*

K-4 Evidence, models, and explanation

Response 7:1 [Francesca Cava, Nat. Geo. Society, Santa Barbara, California](#) *Oct 28, 2004 10:29*

The effect of humans on the ocean; beach closures to explain non point runoff; beach closures to explain how you

someone can get sick swimming in the water, etc.

Response 7:2 [Lynn Whitley](#) *Oct 29, 2004 00:56*

Basic satellite data showing plankton blooms, sea surface temperature.

Response 7:3 [Pam Stryker](#) *Oct 29, 2004 19:17*

Sounding activities to amp the ocean floor.

Oil spill clean up models.

Any activities that model the way birds feed, birds feet/adaptation, plankton drifting...

Any dress -a critter activity or creat a "fish"

Response 7:4 [Bob Stewart](#) *Oct 30, 2004 14:21*

1) what do they do that contributes to ocean pollution?

2) List how the ocean influences their lives? Food, water, air, rain, climate.

3) what food comes from the sea?

4) I would avoid oil spill exercises, very, very little oil in the oceans comes from spills, almost all comes from natural seeps and runoff.

9-12 Change, constancy, and measurement

Item 8 [Peter Tuddenham](#) *Oct 22, 2004 16:55*

9-12 Change, constancy, and measurement

Response 8:1 [Francesca Cava, Nat. Geo. Society, Santa Barbara, California](#) *Oct 31, 2004 08:42*

Oceans and other bodies of water have physical and biotic characteristics which are used to define habitats and regions.

- Inrerdependence of land areas and the ocean (ie, erosion)
- Physical and human processes that shape the ocean and coasts (ie, damming rivers, construction of marinas)

5-8 Change, constancy, and measurement

Item 9 [Peter Tuddenham](#) *Oct 22, 2004 16:58*

5-8 Change, constancy, and measurement

Response 9:1 [Susan Snyder](#) *Oct 27, 2004 13:09*

Content topic: The characteristics of places and regions change over time because of coastal erosion, sea level change, and sea surface temperature change.

Response 9:2 [Lynn Whitley](#) *Oct 29, 2004 01:02*

changes over time in fisheries and fish populations due to human influences

K-4 Change, constancy, and measurement

Item 10 [Peter Tuddenham](#) *Oct 22, 2004 16:58*

K-4 Change, constancy, and measurement

Response 10:1 [Francesca Cava, Nat. Geo. Society, Santa Barbara, California](#) *Oct 28, 2004 10:21*

The role of the oceans in the migration of human populations, trade and human settlement -- how has the ocean produced change or kept constancy in where people live and what we do; the ocean can be used to predict populations of not only people but other life.

Response 10:2 [Pam Stryker](#) *Oct 29, 2004 18:51*

The applications of each of the concepts need to apply concretely to their world... what happens with flooding, what are the effects of hurricanes on barrier islands, where do my shrimp come from, what happens if too much fresh water flows into the bays from my river

9-12 Evolution and Equilibrium

Item 11 [Peter Tuddenham](#) Oct 22, 2004 16:59

9-12 Evolution and Equilibrium

Response 11:1 [Francesca Cava, Nat. Geo. Society, Santa Barbara, California](#) Oct 31, 2004 08:45

Knowledge of the oceans enables people to develop an understanding of the relationships between life, habitats and environments over time -- that is of Earth as it was, is and might be.

- Influence of ocean features to past events (ie, volcanic island formation, continental drift, sea level change)
-

5-8 Evolution and Equilibrium

Item 12 [Peter Tuddenham](#) Oct 22, 2004 17:00

5-8 Evolution and Equilibrium

Response 12:1 [Susan Snyder](#) Oct 26, 2004 10:57

Content topics: 1) Ocean basins evolve over time. Although basins spread where crustal plates diverge and disappear where crustal plates converge (trenches), the total amount of crust remains about the same. Earth is not getting bigger or smaller. 2) Coastal regions evolve over time. While sediments erode from some shores, they are deposited on others.

Response 12:2 [Lynn Whitley](#) Oct 29, 2004 01:05

evolution of whales from land based organisms to oceans

Response 12:3 [Gene Williamson](#) Oct 29, 2004 12:01

Beaches represent a sort of cyclical equilibrium dependent upon sediment supply, wave action in conjunction with tidal cycle, etc.

K-4 Evolution and Equilibrium

Item 13 [Peter Tuddenham](#) Oct 22, 2004 17:00

K-4 Evolution and Equilibrium

Response 13:1 [Francesca Cava, Nat. Geo. Society, Santa Barbara, California](#) Oct 28, 2004 10:23

Biodiversity in the ocean; what is there, what has changed.

Response 13:2 [Bob Stewart](#) Oct 30, 2004 14:22

what happens if we eat all the fish in the ocean?

9-12 Form and Function

Item 14 [Peter Tuddenham](#) Oct 22, 2004 17:37

9-12 Form and Function

5-8 Form and Function

Item 15 [Peter Tuddenham](#) Oct 22, 2004 21:36

5-8 Form and Function

Response 15:1 [Sarah Schoedinger](#) Oct 27, 2004 12:23

Body shapes and features of fishes and their behavior (how they move, how they catch prey, etc.)
Body forms of invertebrates and modes of feeding (deposit, filter)

Response 15:2 Allison Whitmer *Oct 27, 2004 12:36*

Perhaps making links to commonly used examples would facilitate getting ocean examples into classrooms. For example, sinusoidal locomotion is found in many animals (oceanic and terrestrial) and can be linked to form, function, evolution, etc.

K-4 Form and Function**Item 16 Peter Tuddenham** *Oct 22, 2004 21:36*

K-4 Form and Function

Response 16:1 Francesca Cava, Nat. Geo. Society, Santa Barbara, California *Oct 28, 2004 10:31*

The relationships of rivers, estuaries, and the oceans and the concept of watershes (ie, the interconnectedness of land and sea; changes in one part affect another, etc.)

Response 16:2 Stacey Halboth *Oct 28, 2004 18:13*

Form can be related to fish adaptations. You can use the MARE activity called Fish Formation through Ocean Immersion to teach this concept. Form can be related to body shape, tail shape, mouth, teeth and gill rakers, and color patterns.

Response 16:3 Pam Stryker *Oct 29, 2004 18:35*

Is important in any of the ocean habitats. How to you stay on a rock with waves hitting you? How do you move through on slushy surface like mud? How do you survive when the waves move your workd out from under you like sand? This is a great problem solving activity for elementary age students before you introduce the adaptations. How to you protect yourself - fish, invertibrate, mammal?

K-12 Other topics**Item 17 Peter Tuddenham** *Oct 22, 2004 21:36*

K-12 Other topics
