



Teacher(s): Diane Bassett

Grade(s): 9-12

Subject(s): Hon/IB Marine Science

Title of Lesson:
The Systematics of Biogeochemical Cycling

Learning Objectives:

- | |
|---------------------------------------------------------------------------------------------------------------------------------------------|
| Aim 10 Develop an understanding of the influence of atmospheric science and ecology on the decision-making process |
| Aim 8 Become critically aware of the human impact upon oceans and the ethical implications of this information |
| Aim 7 Use of 21st century satellite communications to track SST, extent of sea ice, currents, etc. |
| Aim 4 Develop an ability to analyze, evaluate and synthesize scientific information on the climate record and current climate change |
| Aim 9 Develop an appreciation of the possibilities and limitations of modeling technology with regard to climate change. |
| Aim 2/3 Acquire and apply a body of knowledge, methods and techniques to study coastal dynamics |

Standards Addressed:

- | |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 3.1 Interactions between atmosphere and ocean |
| Nature of science: Use of models to represent reality [1.10] |
| Looking for patterns, trends and discrepancies [3.1] |
| Nature of science: Discrepant events lead to deeper understanding. [1.4 / 1.5] |
| Nature of science: Scientists look for patterns and correlations to discover how changes in one system affect changes in another system. [3.1] |
| Problem-solving requires risk analysis, precautionary principle and international dialogue to meet the concerns for human- enhanced carbon dioxide levels in the atmosphere and the impact on ocean acidification. [4.8] |

Lesson Outline:

1. Students read literature about the "prescribed" biogeochemical cycles, for background knowledge.
2. Lecture notes to "hit the highlights"
3. Carbon System (Cycle), as given at UF/Fla Humanities workshop. Students add human influences including carbon to the system.
4. Activity "Carbon on the Move", from PineMap/Project Learning Tree Secondary Environmental Education Module
5. Next day try adapted Phosphorus, Nitrogen and Hydrological Cycles.

Systems thinking connection (learning habits and/or tools used):

Carbon, Nitrogen, Phosphorus and Hydrologic cycles as "systems" NOT necessarily linear.

Carbon system paper given to us at UF/Fla Humanities workshop

Learning Strategies:

Individual reading

Accountable conversation

Critical thinking

Science Concept(s):

The world as an interconnected set of systems, necessary for the support of life.

Humanities Concept(s):

Human influence on the natural world.

Student Assessment Strategies:

Authentic assessment by observation, discussion, etc.

Written test

Benefit to my students:

Connection to the natural world.

Human place and obligation.

Meeting set standards of the curriculum in an understandable way.

Resources and Materials (supplies needed for activities):

PineMap/Project Learning Tree Secondary Environmental Education Module book/templates

Pictures for each station, laminated

Station cards, laminated