



LESSON TITLE: *Diatom Adventures*[®]

BACKGROUND INFORMATION: Diatoms are microscopic organisms found in fresh and saltwater environments. They have existed since the Cretaceous Period. Diatoms are classified as *Bacillariophyceae* in the *Chromista* group of photosynthetic microbes and divided into two classes: *Pennate* (elongated) and *Centrate* (round). Diatoms are thought to photosynthesize about 25% of Earth's carbon production. These powerhouse plankton also provide a major source of food for other aquatic organisms, from krill to whales. In addition to the vital role diatoms play in the ocean's ecology and in Earth's changing climate, diatoms are also used in commercial products, including toothpaste. Their abrasive qualities come from the "glass houses" they construct by absorbing silicates from seawater. This lesson can be used to introduce students to these beautiful organisms while also reinforcing student understanding of aquatic food webs and trophic levels. The activity can be used with introductory or review material for microbiology, ecosystems, or nutrition standards. Students complete the board game in teams of four as they discover the nutritional requirements needed by microbes (e.g. diatoms) for survival and reproduction. Trophic levels are also explored, in addition to predator/prey relationships occurring within the aquatic food web. (This lesson was designed for middle school students and field-tested in grades 6, 7, and 8. This lesson is adaptable for younger and older grade levels.)

Additional Diatom Background Resources:

- <http://www.ucmp.berkeley.edu/chromista/bacillariophyta.html> (Historical and Biological information)
- <https://diatoms.org/what-are-diatoms> (Images and Ecology)
- <https://www.ucl.ac.uk/GeolSci/micropal/diatom.html> (Images, Historical, and Biological information)
- <https://www.ias.ac.in/article/fulltext/reso/020/10/0919-0930> (Biological information)

OCEAN LITERACY PRINCIPLES:

- Principle #2: The ocean and life in the ocean shape the features of Earth.
- Principle #3: The ocean is a major influence on weather and climate.
- Principle #4: The ocean made Earth habitable.
- Principle #5: The ocean supports a great diversity of life and ecosystems.
- Principle #6: The ocean and humans are inextricably interconnected.

NC ESSENTIAL STANDARDS FOR SCIENCE:

- 6.L.2: Understand the flow of energy through ecosystems and the responses of populations to the biotic and abiotic factors in their environment.
- 7.L.1: Understand the processes, structures and functions of living organisms that enable them to survive, reproduce and carry out the basic functions of life.
- 8.E.1.2: Summarize evidence that Earth's oceans are a reservoir of nutrients, minerals, dissolved gases, and life forms.
- 8.L.3: Understand how organisms interact with and respond to the biotic and abiotic components of their environment.
- 8.L.5.1: Summarize how food provides the energy and the molecules required for building materials, growth and survival of all organisms (to include plants).

MATERIALS:

Diatom Adventures[®] Board Game and 4 sets of diatom game pieces (1 game/4 students)

PROCEDURES:

Distribute 1 Diatom Adventures[®] Board and 1 set of Diatom game pieces to each group of 4 students. Review the game directions (printed on the game board) with students and allow students about 40 minutes to complete the game. Facilitate student progress and understanding as the game is completed.

ASSESSMENT:

Instruct students to create a diagram illustrating the food web explored in Diatom Adventures[®] and use the illustrations to lead class discussions and correlations to other food webs, including aquatic and terrestrial food webs.

Miriam Sutton, M.A., NBCT – Science Education & Communication - Beaufort, North Carolina

Science by the Sea[®] is a 501c3 organization providing educational support to Academic and General Audiences while assisting Research Institutions with broader impacts through Education, Communication, and Outreach. *Science by the Sea*[®] is a registered trademark. All rights reserved. EIN: 82-4893552; Serial No.: 86882933