



Cabrillo Marine Aquarium Lesson Plan

Grade Level: Fifth Grade

Title: Diatom Art

Objective: Students will: (1) be introduced to the size, shape and color of diatoms; (2) be able to describe the importance of microscopic organisms such as diatoms; and (3) create a pattern inspired by Victorian age art that involved arranging diatoms on a microscope slide.

California Science Standards: 5th: 2f, 2g

Time to Complete: 90 minutes + time to allow art project to dry

Materials Provided by CMA Ocean Discovery Kits: *Worksheet: Diatom Art Template, Worksheet: Phytoplankton Coloring Sheet, Graphic: Example of Diatom Art 1-3, Photo: Diatom Art 1-6*, Prepared Slide with Assorted Diatoms

Materials Provided by Teacher: Images and videos of diatoms from the Internet (optional), art supplies (paper, pencils, crayons, paint or sponge brushes, watercolors, construction paper, cups for water), newspaper, scissors, glue

Vocabulary: Diatom, phytoplankton, zooplankton, frustule, producer, photosynthesis, centric, radial, pennate, bilateral symmetry, radial symmetry

Teacher Preparation: If desired, search the Internet for pictures and/or videos of diatoms, and other examples of diatom art. Make enough copies of the *Worksheet: Diatom Art Template* for each student and some extras to have handy.

Background Information:

Diatoms: Diatoms are a group of phytoplankton that have cell walls made up of glass-like, silica shells. This glass-like shell is called a frustule and has two halves (or “valves”) similar to a petri-dish or Tupperware container where one side fits into the other.

Diatoms are primary producers that use the energy from the sun to do photosynthesis, making them an important part of the marine food chain. In the marine environment, diatoms are often eaten/consumed by zooplankton. Diatoms also produce oxygen as a by-product of photosynthesis so humans and other organisms on our planet that respire benefit from diatoms as well. Diatoms are found in two basic shapes, centric (round or radial) and pennate (thin ellipse). Diatoms can be solitary or form chains.

Diatom Art: During the Victorian age (mid to late 1800s), microscopes were improving and becoming more commonplace. People were fascinated with what everyday objects looked like under a microscope because things looked so different than what people could only see with the naked eye. Some households even had a cabinet of curiosities with prepared slides of items such as bones, insects, feathers, cloth, fossils, and even diatoms. To create diatom art, microscopists would move diatoms around under the microscope with a single human hair mounted on a wooden shaft to create elaborate designs and patterns.

Lesson Outline:

Students will be introduced to artwork from the Victorian age which involved arranging diatoms on a microscope slide to create microscopic intricate patterns. To further illustrate the diversity of colors, shapes and sizes of diatoms, teachers can show videos and/or more pictures. Students will use diatom inspired shapes and colors to create their own diatom art patterns on paper.

Lesson Procedures:

1. Project or pass around photos of Victorian diatom art without revealing from what the patterns have been created.
2. Have students guess how the artists created the art, what materials the artists might have used, and during what time period the art might have been created.
3. After allowing enough time for students to make their guesses, share with them how these images were created and what they were created with.
4. Using videos and/or pictures found on the CD in the Plankton and Algae Kit or the Internet, or the prepared slide of diatoms, introduce students to the amazing diversity of diatoms that exist in a microscopic world in our ocean water. Discuss the structure, function, and importance of diatoms.
5. Have students create their own geometric, bilaterally or radially symmetrical patterns using shapes and colors inspired by diatoms.
6. Using the *Worksheet: Diatom Art Template* provided, have students first draw/sketch a single concentric diatom shape in the center.
7. Next, select only one slice of the template and working from the center towards the outer part of the triangle, draw different diatoms to fill up most of the space.
8. Now have students draw the same diatoms from the first slice into all of the remaining parts of the circle.
9. After the design is sketched, students can darken the outlines with pencil.
10. Color the diatoms using crayons. You can encourage your students to use reds, greens, yellows, golds, and browns to imitate the colors naturally found in actual diatoms.
11. Now have students put their sketched designs on a stack of newspapers to paint the background of their designs with watercolors. Be sure to tell your students not to move the paper around when it is wet because the paper may tear easily. Gently blot (not rub!) with paper towels if necessary. Students can paint in a

- radial fashion, starting with the middle of the circle and using different colors as they move to the outer, larger concentric circles.
12. After the artwork is dry, you may want to cut the circles out and mount onto construction paper.

Lesson Extensions:

1. For younger students, teachers can have different diatom-inspired shapes pre-cut from construction paper or pre-drawn patterns, which students can choose from to arrange in their own radial pattern on a second sheet of construction paper.
2. For older students familiar with using photo editing software, like PowerPoint or Photoshop, artwork can be done on a computer.
3. Examine samples of concentrated ocean water under a microscope to look for diatoms.
4. Look at diatomaceous earth under a microscope.
5. Include the *Worksheet: Phytoplankton Coloring Sheet*

References:

- Diatoms are Delightful
<http://glaquarium.org/wp-content/uploads/2012/08/Delightful-Diatoms.pdf>
- Tree-of-Life Web Project
<http://tolweb.org/Diatoms/21810>
- Monterey Bay Aquarium Research Institute Diatoms Quick Facts
http://www.mbari.org/staff/conn/botany/phytoplankton/phytoplankton_diatoms.htm
- Plankton Chronicles, Diatoms – Life in Glass Houses (video)
<http://www.planktonchronicles.org/en/episode/new-diatoms-life-in-glass-houses>
- A Cabinet of Curiosities – A Selection of Antique Microscope Slides from the Victorian Era
<http://www.victorianmicroscopeslides.com/slides.htm>