



SCIENTIST IN RESIDENCE PROGRAM™

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Science Unit: *Meet Me at the Beach!*
Lesson # 3 *Plant and Algae Study*

Summary: Students observe collected specimens of plants and seaweed (algae) and make observations of the structural differences between them. They choose one plant specimen to draw, labeling the roots, stem and leaves, and one algae specimen, labeling the holdfast, stipe and blade.

School Year: 2014/2015

Developed for: Elsie Roy Elementary School, Vancouver School District

Developed by: Jonathan Kellogg (scientist); Saira Devji and Carolyn Fanning (teachers)

Grade level: Presented to grade K; appropriate for grades K – 5 with age appropriate modifications

Duration of lesson: 1 hour

Notes: Requires a variety of green, brown, and red algae in addition to a few small land plants (weeds, flowers, vegetables).

Objectives

1. Introduce students to the names of both land plant and marine algae structures
2. Communicate the major differences between land plants and marine algae (vascular system, photosynthetic structures)
3. Make observations of the different structures that make up both land and marine plants
4. Explore some of the ways that both plants and algae are used in the human environment.

Background Information

Algae, or seaweeds, are an important component to the intertidal ecosystem since they not only provide habitat and food for other near shore organisms, but they also contribute to the global oxygen budget and are used in many human foods, medicines, and other industrial uses.

While many students know and understand the parts of a land plant (roots, stem, leaf, flower), most do not know the names or purpose of the main structures in various algae species (holdfast, stipe, blade, gas bladder). This lesson presents students with examples of the smallest and largest of both land plants and algae, the major groupings of each, and then asked students to make observations of the structural differences with some examples that are brought to class.

Vocabulary

Microalgae	Algae that are not visible to the eye. Phytoplankton.
Macroalgae	Algae that are large enough to be seen by the eye. Seaweeds.
Algae	Technical definitions vary, but for the purposes of this lesson, algae is defined as an aquatic plant that lacks a vascular system for transporting water and nutrients
Holdfast	Anchors algae to a hard surface, photosynthetic
Stipe	Strong stem-like structure, photosynthetic
Gas bladder	Helps algae float, photosynthetic
Blade	Leaf-like structure, photosynthetic



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Materials

- Selection of red, green, brown algae collected at low tide, kept in seawater to stay fresh. Ensure samples include the complete holdfast
- Seawater filled large container for displaying in a 3D environment
- Selection of land plants (weeds, grasses, flowers, vegetable starts)
- Scrap paper to place under wet seaweed

In the Classroom

Introductory Discussion

1. Short description of 'hook' to capture student's attention.
 - Ask students if they remember being at the beach and walking on the slimy stuff. Have they ever seen seaweed? What do students think is the difference between land plants and ocean plants?
2. Short description of other items to discuss or review.
 - Review the sizes of land plants (1 mm Duckweed - 115 m Redwood) and algae (microscopic phytoplankton - 50 m Giant Kelp). Touch on the basic classifications of land plants (mosses, ferns, conifers, flowering plants, etc.) and algae (red, green, brown).
 - Fun fact about Giant Kelp: it is the fastest growing organism on the planet and can grow up to 0.67 m per day.
3. Briefly describe science experiment/activity.
 - After the introduction, students are to make observations, in the form of drawings, of both the algae and plants.
 - Observation sheets included names of different parts of the plant so students could draw arrows between the word and corresponding part of the plant on their sheet.
4. Briefly describe the processes of science that the students will focus on:
 - This lesson focuses on scientific observations and asks students to notice details about the plants and algae.
5. Briefly describe safety guidelines.
 - Students should wash their hands before eating.

Science Activity

Allow the students approximately 15 minutes to draw the algae and a similar amount of time for the plants. Students that finish early should explore the other algae examples that were brought in and/or add color to their drawing.

Draw students' attention to the veins on the leaves of the land plants and absence of them on the algae. Since algae are surrounded by water, there is no need for a specialized water transport system throughout the organism.

Instructors should circulate around students who may have difficulty finding the holdfast, stipe, and gas bladder on many types of red and green algae where those structures are small or nonexistent.



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Closure Discussion

1. Review the different structures of the plant and algae with a few examples of both the algae and plants to make sure that students saw some of the variation. Highlight the presence/absence of the vascular system in the plants/algae, respectively.
2. Discuss the ways that plants are used by humans (food, clothing, recreation, construction, medicine, art) and the ways that algae are used by humans (green: sushi, wastewater treatment, red: ice cream, yogurt, food thickeners, brown: medicine, fertilizers, toothpaste)

References (examples of the format to use for different types of references are below)

- Sherry, A.M. and B. Fitzgerald "All about algae: Primary school science resources about nature's hidden energy store," Planet-Science.com, n.d. Web. 20 May 2015.
<http://www.planet-science.com/categories/parentsteachers/science-resources/2013/01/all-about-algae.aspx>.

Extension of Lesson Plan

This activity can be expanded by having students classify the algae into their different genus/species, making observations of the microscopic structure of both plants and algae, creating algae presses (similar to a flower press) from the samples that are brought in.