Grades K-5
Next Generation Science Standards:
K-2.ETS1-2, 4.LS1.1

www.MaineAgintheClassroom.org

Kelp Anatomy

Developed by the Island Institute, Rockland, Maine
Revised and formatted by Maine Agriculture in the Classroom

Activity Description:
Through a variety of activities, students will learn the structure and function of kelp anatomy. Comparisons to plankton are made and buoyancy, density and surface area are explored.

Learning Objectives:
Students will:
- List the basic anatomical parts of kelp
- Explain the function of each part

Materials:
- Costume for specific kelp species
- Kelp to label (real or paper/foam version)
- Mural paper
- Marker
- Floating protozoa supplies

Teacher Preparation:
Be familiar with your chosen species" anatomy.

Procedure:

Part I: Plankton Races
Organisms' body parts serve various functions. This activity demonstrates how anatomy affects a creature's movement and habitat. In the activity students build a floating plankton using classroom materials. This activity was designed by Herring Gut Learning Center (see Plankton Races).

Part II: Dress up as Kelp
Bring in a costume for an aquaculture species on which you are focusing. Choose one student to dress up as Kelsey Kelp (see **Kelp Anatomy** worksheet at the end of this lesson) or Oliver Oyster and have others brainstorm body parts the species has. As students name those parts, add elements to the demonstrating student's costume. See detailed instructions for similar activities *Dress up a Sheep* and *Dress up a Bean Plant* from Shelburne Farms *Cultivating Joy and Wonder* activity guide:
http://www.shelburnefarms.org/sites/default/files/cultivatingjoywonder_all_smaller.pdf

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Part III: Label a Specimen
Lay your piece of kelp on a large sheet of mural paper and label its parts. Discuss the function of each.

Part IV: Song
If you want to get the kids moving, you can teach them this short song and invite them to do the "kelp dance" while they sing.
To do the kelp dance, they imagine they are a piece of kelp and move as they think a piece of kelp would move in the water.
(To the tune of Head, Shoulders, Knees, and Toes)
Blade, stipe, and strong holdfast, strong holdfast
Blade, stipe, and strong holdfast, strong holdfast
Swing in the water eating nutrients
Blade, stipe, and strong holdfast, strong holdfast!

Shelburne Farms *Cultivating Joy and Wonder* activity guide:
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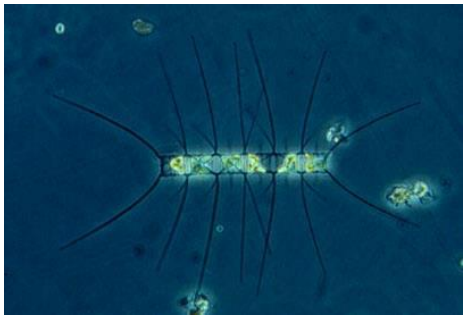
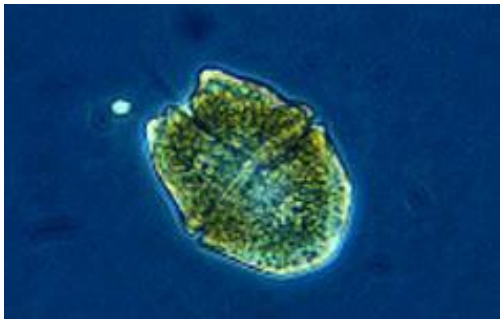
Plankton Races

Background Information

Phytoplankton (phyto = plant, plankton = drifters) are microscopic, single-celled plants that drift with the ocean currents. There are thousands of types of phytoplankton. Phytoplankton live near the surface of the sea. This is important because they need access to light in order to conduct photosynthesis and make their own food. Light, heat, carbondioxide, and nutrients (which are mixed upwards from storms and waves) are other essential elements that are needed for phytoplankton to survive.

Because phytoplankton need to stay near the surface to survive, they have developed adaptations to be buoyant. Some have tails (flagella) that keep them near the surface. Others store oil which allows them to float near the surface of the water. Others have waterwings, which also help them to stay near the surface. Some even form chains of cells to prevent from sinking.





(Images from http://www.serc.si.edu/labs/phytoplankton/primer/phyto.aspx)

Phytoplankton are essential to the health of our ecosystems. They form the base of the food chain. They use carbon dioxide in the atmosphere during photosynthesis and produce half of the world's oxygen. In addition, they have the potential to be a source of biofuel, nutritional supplements, and other materials.

Purpose: Students will learn about buoyancy, density and surface area. Students also learn about biodiversity and the relationship between the structure and function of organisms by examining phytoplankton.

Materials

- Various sizes of washers (representing heavy parts of the cell)
- Cloth
- Pipe cleaners
- Styrofoam shapes
- Beads
- Felt
- Straws
- Toothpicks
- Screens or meshes of various sizes
- Tape
- Large container of water
- Any other materials can be used

Procedure

1. Lay out all materials
2. Students create a phytoplankter with the materials
3. The goal of the *race* is to see who can make a phytoplankter that can sink the slowest or hover just below the surface of the water.
4. Students test their plankton in the ocean tank to see if it floats or sinks.
5. Students continually modify their plankter until they are satisfied.
6. Two students *race* their plankton to see who sinks the slowest. (If a plankter floats on the surface, it is disqualified.
7. A winner is determined, and all students keep their creation.

(Lesson adapted from MARE Ocean Immersion Program, Lawrence Hall of Science http://mare.lawrencehallofscience.org/)

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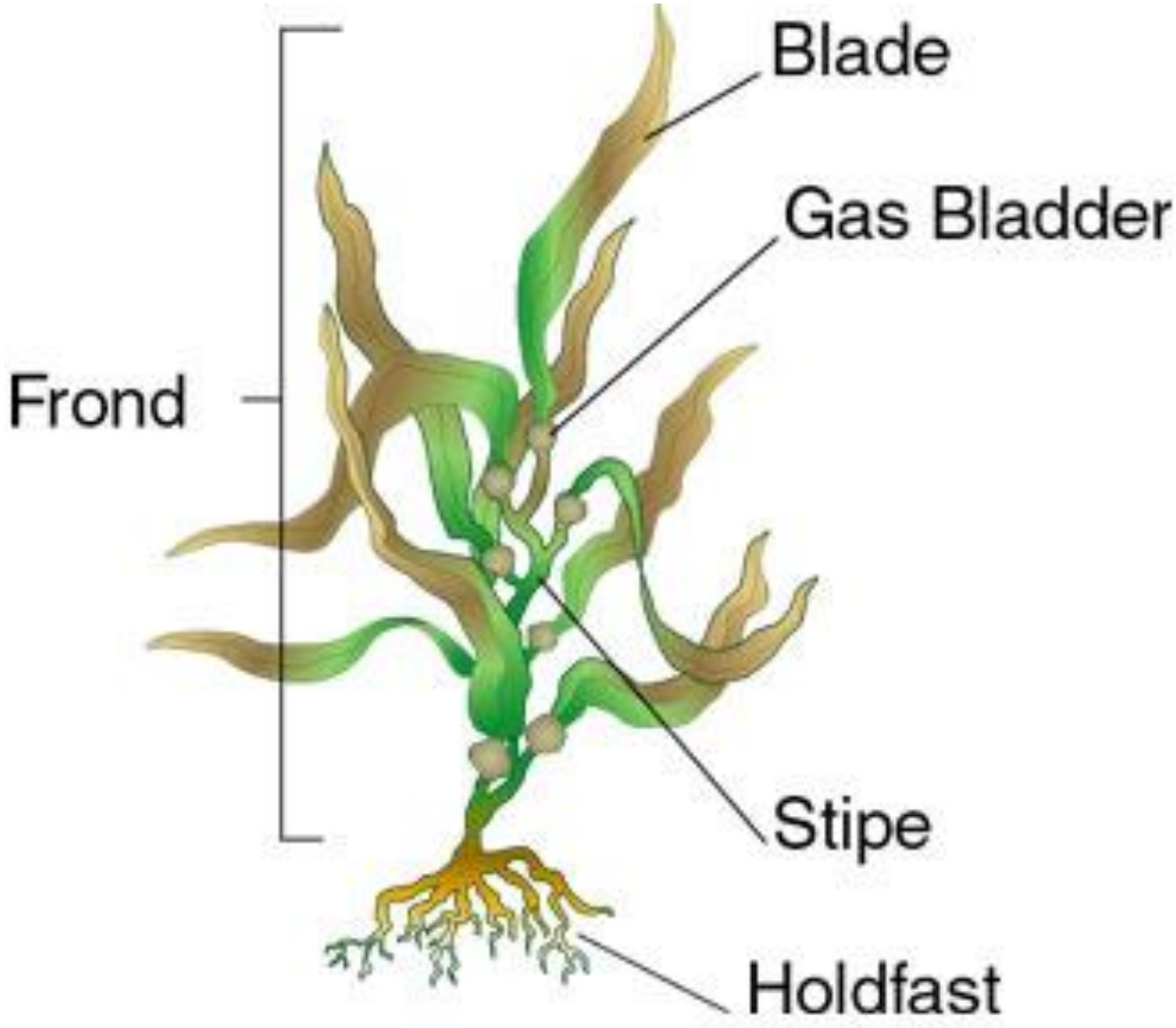

Holdfast – Anchors the plant to the ocean floor
Stipe – Structure similar to a stem
Gas bladder – A balloon-like structure filled with gases
Blade – Structure similar to a leaf
Frond – Parts of the algae above the holdfast

Information from: www.surfscience.org/articles/kelp