

## Plankton Races

Students will be given a brief introduction to phytoplankton and the need for morphologic adaptations. They will use the concepts of surface area, density, mass and volume in order to determine the shape that allows a phytoplankton to sink as slowly as possible. After creating, testing, and modifying a model plankton, the students will race their models to see which sinks the slowest. If participating in the 3 hour activity, they will then make modifications to adjust for salt water and race their plankton in the lagoon.

**Grade Level:** 5<sup>th</sup>- 12<sup>th</sup> grade

**Timing:** This lab is either a **1 hour** OR **3 hour** long activity. The 1 hour keeps students on dry land while the 3 hour program involves snorkeling in the lagoon.

### Concepts Covered:

- the relationship of volume, mass and density
- the effects of density and surface area on sinking rates
- how phytoplankton use the physical concepts of volume, density and mass in their morphological adaptations
- model creation
- modification – learning and improving by doing and observing

**Vocabulary:** Plankton, Phytoplankton, Zooplankton, Photic Zone

**Resources:** <http://marinediscovery.arizona.edu/lessonsF00/bryozoans/2.html>



## **Standards Supported:**

### ***Next Generation Sunshine State Standards***

**SC.5.N.1.1:** Define a problem, use appropriate reference materials to support scientific understanding, plan and carry out scientific investigations of various types such as: systematic observations, experiments requiring the identification of variables, collecting and organizing data, interpreting data in charts, tables, and graphics, analyze information, make predictions, and defend conclusions.

**SC.5.N.1.3:** Recognize and explain the need for repeated experimental trials.

**SC.5.L.15.1:** Describe how, when the environment changes, differences between individuals allow some plants and animals to survive and reproduce while others die or move to new locations.

**SC.5.L.17.1:** Compare and contrast adaptations displayed by animals and plants that enable them to survive in different environments such as life cycles variations, animal behaviors and physical characteristics.

**SC.5.N.2.1:** Recognize and explain that science is grounded in empirical observations that are testable; explanation must always be linked with evidence

**SC.5.P.8.1:** Compare and contrast the basic properties of solids, liquids, and gases, such as mass, volume, color, texture, and temperature

**SC.6.P.12.1:** Measure and graph distance versus time for an object moving at a constant speed. Interpret this relationship.

**SC.6.N.1.4:** Discuss, compare, and negotiate methods used, results obtained, and explanations among groups of students conducting the same investigation

**SC.7.N.1.1:** Define a problem from the seventh grade curriculum, use appropriate reference materials to support scientific understanding, plan and carry out scientific investigation of various types, such as systematic observations or experiments, identify variables, collect and organize data, interpret data in charts, tables, and graphics, analyze information, make predictions, and defend conclusions.

**SC.8.N.1.1:** Define a problem from the eighth grade curriculum using appropriate reference materials to support scientific understanding, plan and carry out scientific investigations of various types, such as systematic observations or experiments, identify variables, collect and organize data, interpret data in charts, tables, and graphics, analyze information, make predictions, and defend conclusions.



# MarineLab

Marine Resources Development Foundation

*Marine Science education in the Florida Keys*

**SC.8.N.1.6:** Understand that scientific investigations involve the collection of relevant empirical evidence, the use of logical reasoning, and the application of imagination in devising hypotheses, predictions, explanations and models to make sense of the collected evidence.

**SC.912.L.17.2:** Explain the general distribution of life in aquatic systems as a function of chemistry, geography, light, depth, salinity, and temperature

**SC.912.N.1.1:** Define a problem based on a specific body of knowledge, for example: biology, chemistry, physics, and earth/space science,

## ***Ocean Literacy Principles***

**Principle 5.** The ocean supports a great diversity of life and ecosystems.

**d.** Ocean biology provides many unique examples of life cycles, adaptations and important relationships among organisms (symbiosis, predator-prey dynamics, and energy transfer) that do not occur on land

**f.** Ocean ecosystems are defined by environmental factors and the community of organisms living there. Ocean life is not evenly distributed through time or space due to differences in abiotic factors such as oxygen, salinity, temperature, pH, light, nutrients, pressure, substrate and circulation. A few regions of the ocean support the most abundant life on Earth, while most of the ocean does not support much life.

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