Plankton Races

Objective:

Students will understand how the unique structure of plankton allows them to stay near the surface of the ocean, and create their own organisms in the quest for neutral buoyancy.

Concept:

Plankton are a crucial, but often overlooked, component of marine ecosystems. Furthermore, most intertidal invertebrates spend some of their life cycle in a planktonic phase.
This activity is an excellent way for students to learn about the unique adaptations of plankton and use their problem-solving skills to create a well-adapted plankter model.

Materials:
- Pictures of Plankton Shapes
(or real live plankton from a plankton tow)
- Bits of sponge (no larger than 1 in x 1 in)
- Bits of cork or foam (no larger than 1 in x 1 in)
- Toothpicks
- Metal washers and nuts
- Large tank of water
- Stop Watch

Preparation:

Set the toothpicks, sponge, foam, cork and pieces of metal on the table for students to use. Fill the tank about 2/3 of the way full with lukewarm water and place it on the table.

Print out pages of the Phytoplantkon and Zooplankton ID Guides from the Kachemak Bay Research Reserve: http://www.adfg.alaska.gov/index.cfm?adfg=kbrr_educationResources.home

Introduction:

Begin by introducing the concept of plankton and that plankton is divided into two groups, phytoplankton and zooplankton.

Explain their importance in the ecosystem. As photosynthesizers, phytoplankton need to remain where there is light in the "photic" zone near the top of the water column.

Zooplankton consume phytoplankton or other zooplankton, so they too need to avoid sinking and stay near the water surface.

Have students brainstorm different adaptations types of plankton might have to slow their sinking. Share pictures of phytoplankton and zooplankton, or look at prepared microscope slides to introduce the variety of plankton morphology.

Procedures & Activities:

Explain that students will be creating their own plankton models. Once each group has created a plankter, the models will race in the aquarium. The one that reaches the bottom LAST will be the winner because plankton need to sink as slowly as possible so they can remain in the photic zone.

Break students into groups of 2-4. Provide toothpicks, sponges, cork and metal washers/nuts for students to build their plankton.

Give students 5 minutes to create the organisms. You can decide whether or not to let them test their models in the aquarium before the big race.

Ask student to sketch their models in their science notebooks and write the different components they included to achieve neutral buoyancy.

Plankton Races *Continued*

Have one student from each group explain the adaptations they gave their organism.

Then race the plankton. To do this you can either

1) use a stopwatch to time how long it takes each model to reach the bottom of the aquarium after being released at the surface or

2) release all models at the same time and proclaim the last model to reach the bottom as the winner.

You can repeat the race if there is time.

Wrap-up:

Have the winning team explain the adaptations that allowed their plankter to sink the slowest.

Compare the winning design with pictures of actual plankton and identify similarities. If there is time, provide groups with an additional 5 minutes to adjust their design and perform the race again.

Ask students to respond to the following questions in their science notebooks:

What worked well in the plankton design?
What could be better in the design?
Why is it important for plankton to be neutrally buoyant?

Extensions & Lesson Connections:

This activity works very well in conjunction with the "Plankton Studies" lesson.

Evaluation:

Assess student comprehension of neutral buoyancy and problem solving by the success of their plankton. Evaluate notebook sketches and responses for completeness, neatness, and comprehension.