



Cabrillo Marine Aquarium Lesson Plan

Grade Level: Grades 2 and 4

Title: Meroplankton Match-Up

Objective: Students learn about larval and adult stages of zooplankton in the ocean.

California Science Standards: 2nd: 2a, 2b, 4a 4th: 2a, 2b, 3b, 3d

Time to Complete: 20 minutes

Materials Provided by CMA Ocean Discovery Kits: *Worksheet: Meroplankton Match-Up* (2 versions), *Photo: Pacific Rock Crab - adult*, *Photo: Pacific Rock Crab larvae – zoea larvae*, *Photo: Purple Sea Urchin - adult*, *Photo: Purple Sea Urchin larvae – pluteus larvae*, Who am I? Meroplankton Cards, Specimens: Adult Stage in ODK

Materials Provided by Teacher: Copies of worksheet and answer key

Vocabulary: Plankton, zooplankton, phytoplankton, meroplankton, holoplankton, invertebrate

Background Information: Read Aloud & Discuss with Students

In the ocean, many plants and animals spend part or all of their lives floating in the water as plankton. Plankton are at the mercy of the waves, tides, and currents. The study of plankton is termed planktology. The word *plankton* describes organisms in the water column that cannot swim against a current. Plankton size can range from a 100-foot chain of jellies to the smallest microscopic plants and animals in the ocean. The word *plankton* is derived from the Greek word for ‘wanderer.’

Plankton live in oceans as well as fresh water. Animal plankton are called zooplankton. Plant-like organisms are called phytoplankton. Phytoplankton are producers, photosynthesizing to make their own food and becoming a food source for zooplankton.

Categorizing plankton, we can also group them based on whether the organism continues to move in the water in the same way its whole life cycle or if it changes body style and on how it moves through the water during its life cycle.

Zooplankton can be divided into two sub-groups. Holoplankton are animal plankton that spend their entire life as plankton. Meroplankton do not stay planktonic their whole life.

Meroplankton are only planktonic for part of their life cycle and at some point become nektonic (able to swim against a current) or benthic (attached/sea floor existence). Examples

of meroplankton include larvae of sea urchins, sea stars, crustaceans, marine worms, and many fish (nektonic).

There are two types of animals that fall into the group called meroplankton. Invertebrates are examples like sea stars, sea urchins, crabs, sea anemones, sand crabs, sea snails, sea slugs, and clams. Vertebrates include the many types of fish that have a planktonic stage.

Lesson Outline: Meroplankton Match-Up

Many organisms are plankton during their larval stages and grow to be very different-looking organisms as adults. In this activity, students will match pictures of larval and adult animals.

Lesson Procedures:

1. Each group of students is given a worksheet with a set of larval and adult plankton pictures.
2. Students pair the larval and adult pictures and then check their answers to a key given at the end of the activity.

Lesson Wrap-up: Discussion & Questions

1. How do the larval and adult pictures of a single organism compare? Ask students to describe similarities of the larval and adult stage and give details.
2. How did students determine which larval picture went with which adult picture? Ask them to give specific examples.
3. What are the similarities between the larvae and the adult organisms? What are the differences?
4. When the body structure of the organism changes, how might that affect the animal's ability to eat, move, find shelter, and escape predators? Use specific examples such as "how does life change for a fish versus a sea star?" For example, a fish would be a better swimmer, eat larger prey, and be able to follow food sources to different areas because it can now swim against a current in the adult stage. A sea star can attach to rocks or live on the sea floor and (except for the brittle sea stars) will no longer be eating plankton.

Lesson Extensions: Make Your Own Plankton

Plankton are not strong swimmers yet have adaptations for floating, moving, and being able to catch food. Explain that plants use the energy of the sun, and zooplankton eat phytoplankton and other zooplankton. Students can choose whether their plankton make their energy from the sun, or obtain energy by eating other organisms. When asking students to invent their own plankton, they will have to make decisions about how the organism gets energy, about its body structure to aid in survival, and about its life cycle (does it stay plankton its whole life?). They can then make a picture of it and describe how it survives. See link to 'making your own plankton' for additional ideas or materials.

References:

- Summary of Phytoplankton and Zooplankton
<http://www.nhptv.org/natureworks/nwep6d.htm>
- Ideas for simple 'making your own plankton' activity
<http://www.gma.org/onlocation/globecactiv.html>