



Meroplankton Match-up

Objectives: This can be used as a stand-alone manipulative that doesn't require a presenter or as a fun intro to a more in-depth discussion of plankton. Participants will be introduced to the concept of plankton and make the connection between metamorphosis of planktonic creatures and more familiar animals like butterflies. They will be encouraged to think critically about adaptations and ocean zones. If used by an educator as part of a discussion, other plankton topics will also be covered.

Time needed: 10 minutes

Target age: 4-10

Materials needed:

- pictures of matched adult and juvenile meroplankton pairs (Examples include sea star, crab, fish, snail, etc. Note that coloring can present complications – either making it too easy if adult and juvenile are colored the same or making it confusing if they are mismatched. One solution is to color adults realistically and leave juveniles uncolored.)
- Board upon which is a brief description of plankton and meroplankton. Also on the board, adults of the meroplankton pairs are affixed, while juveniles are free to be mixed up (They might have Velcro or magnets.). There might also be a question or two (i.e. What adaptations might an animal have to stay near the water's surface? Think about what you might do to keep from sinking in a swimming pool).

Description: Many children have heard of plankton, but most don't really know what defines plankton or how plankton is important to the environment and to themselves. This simple activity raises some thought provoking questions and can be used as a springboard to discussion of other plankton concepts. Participants will read a description of plankton and meroplankton, and then be asked to match the juveniles to their adult phases. If this activity is presented by an educator, some or all of the following should be discussed: a comparison of phytoplankton and zooplankton, the importance of plankton to humans (as producers of oxygen, as part of our food web), a discussion about adaptations, metamorphosis, size scale, distribution, zonation and environmental factors such as light, etc.

Extensions:

- A discussion about the fact that 'plankton' is not a taxonomic classification
- A basic discussion of adaptation can be developed into an introduction to the concept of evolution.
- This activity might extend into a discussion of organisms as resources, noting that sometimes animals that we consider to be 'resources' require different (management) perspectives during different life stages.
- Discussion might include human impacts on the organisms and their habitats, and in turn, on humans (For example, excess nutrients or oil spills).
- Discussion might include Harmful Algal Blooms (HABs)
- Discussion might include the role of plankton in sediment formation.
- For more advanced participants, discussion might include plankton as a carbon sink.

Standards: ***National Science Education Standards:**

Unifying Concepts and Processes – Change, constancy, and measurement; Form and function

K-4

Life Science – Characteristics of organisms; Life cycles of organisms; Organisms and environments

Ocean Literacy: Essential Principles and Fundamental Concepts:

5. *The ocean supports a great diversity of life and ecosystems.* – a. Ocean life ranges in size from the smallest virus to the largest animal that has lived on Earth, the blue whale.; 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 habitats are defined by environmental factors. Due to interactions of abiotic factors such as salinity, temperature, oxygen, pH, light, nutrients, pressure, substrate, and circulation, ocean life is not evenly distributed temporally or spatially, i.e., it is “patchy”. Some regions of the ocean support more diverse and abundant life than anywhere of Earth, while much of the ocean is considered a desert.

Extensions:**NSES:**

Unifying Concepts and Processes – Systems, order, and organization; Evolution and equilibrium

K-4

Science as Inquiry – Abilities necessary to do scientific inquiry

Science in Personal and Social Perspectives – Characteristics and changes in populations; Types of resources; Changes in environments

History and Nature of Science – Science as a human endeavor

Ocean Literacy:

1. *The Earth has one big ocean with many features.* – h. Although the ocean is large, it is finite and resources are limited.
2. *The ocean and life in the ocean shape the features of the Earth.* – a. Many earth materials and geochemical cycles originate in the ocean. Many of the sedimentary rocks now exposed on land were formed in the ocean. Ocean life laid down the vast volume of siliceous and carbonate rocks.
3. *The ocean is a major influence on weather and climate.* – e. The ocean dominates the Earth’s carbon cycle. Half the primary productivity on Earth takes place in the sunlit layers of the ocean and the ocean absorbs roughly half of all carbon dioxide added to the atmosphere.
4. *The ocean makes Earth habitable.* – a. Most of the oxygen in the atmosphere originally came from the activities of photosynthetic organisms in the ocean.
5. *The ocean supports a great diversity of life and ecosystems.* – b. Most life in the ocean exists as microbes. Microbes are the most important primary producers in the ocean. Not only are they the most abundant life form in the ocean, they have extremely fast growth rates and life cycles.
6. *The ocean and humans are inextricably interconnected.* – a. The ocean affects every human life. It supplies . . . nearly all Earth’s oxygen. It moderates the Earth’s climate . . . and affects human health.; e. Humans affect the ocean in a variety of ways. Laws, regulations and resource management affect what is taken out and put into the ocean. Human development and activity leads to pollutions (point source, non-point source . . .) . . . ; f. Coastal regions are susceptible to natural hazards (. . .); g. Everyone is responsible for caring for the ocean. The ocean sustains life on Earth and humans must live in ways that sustain the ocean. Individual and collective actions are needed to effectively manage ocean resources for all.