

## Teacher's Background Information

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### Program 2: What Are the Major Plankton Groups?

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During this program we will learn how to identify the major groups of plankton and how each group uniquely contributes to the plankton community. Your packets include six black and white reproductions of the major phytoplankton groups, a plankton sample containing a variety of zooplankton, and **student activities** for identifications and estimates of biomass. During “live” broadcast students may want to have “Marine Plankton Concept Review Tables”, available. Three activities accompany program two: Nuts & Bolts of How To Name Things; Meeting The Marine Plankton Community; and How Much Plankton Is There In The Ocean?

There are two divisions of plankton the holoplankton (permanent plankton) and the meroplankton (temporary plankton). Holoplankton includes phytoplankton (plants and protozoans) and zooplankton, while meroplankton is only zooplankton species (usually benthic invertebrates and fish).

The major groups of phytoplankton are:

- *diatoms* are golden brown algae with chloroplasts, single celled with a glass (silica dioxide) skeleton made of two valves, occur as single cells or in chain-like colonies, two forms are elongated (pennate, usually benthic) and circular (centric, usually pelagic), store oils in cells, highly nutritious and can multiply up to 3 times a day
- *dinoflagellates* and other flagellates are very diverse, have at least one flagellum for locomotion, some are autotrophic others are not, some are plant-like, some are animal-like, and some are both; dinoflagellates have two flagella, some are toxic (red tide), disc shaped with horned cones, some are bioluminescent, can be armored with plates or unarmored without plates
- *ciliates* possess cilia for locomotion, quickly pulsate cilia to move rapidly forward and backward, a major group are tintinnids-shaped like a cone or wine glass
- *foraminiferans* possess a calcareous (calcium carbonate) test or skeleton that resembles a nautilus shell, secretes cytoplasm through holes in the test to form an outer layer called the reticulopodia (network of cytoplasmic feet used for suspension and to capture food), the tests sink to seafloor and form fossil fuel layers in the sediments (foraminiferan ooze) of shallow waters (calcareous skeletons would dissolve in deep water)
- *Actinopods: acantharians* and *radiolarians* are ball shaped with long slender spines covered with cytoplasm = axopodia, long spines provide great flotation, acantharians possess a strontium sulfate skeleton and radiolarians have a silica skeleton, radiolarian oozes are found in deep ocean waters as the silica skeletons do not dissolve under pressure

For detailed descriptions of the major groups of zooplankton refer to the **Activity: Marine Plankton Identification** and the **Vocabulary** section.

The major groups of zooplankton who are permanent residents, the HOLOPLANTON are:

- copepods
- amphipods, isopods, and cumaceans
- some gastropods (marine snails)
- chaetognaths (arrow worms)
- tunicates (salps and larvaceans)

The major groups of zooplankton who are temporary residents, the MEROPLANKTON are:

- barnacles (nauplia, cypris larval forms)
- ostracods
- crabs, shrimps, and lobsters (nauplia, zoea, and megalops larval forms)
- mysid shrimp
- bivalves and marine snails (nauplia, trochophore, veliger larval forms)
- sea urchins and sand dollars (echinopluteus larval form) sea cucumbers (auricularia, doliolaria, and pentacula larval forms) and starfish (bipinnaria, brachiolaria, and ophiopluteus larval forms)
- sea squirts (tunicates)
- fish eggs and larvae