



BACK BAY SCIENCE CENTER

Plankton

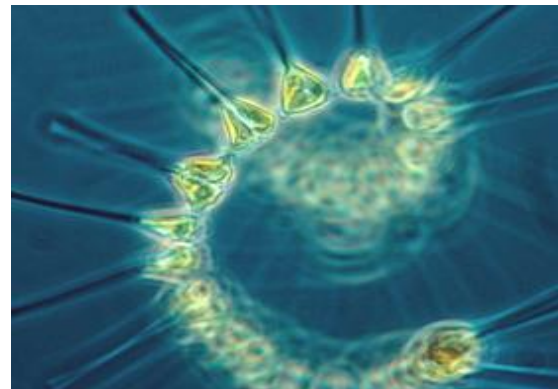
ACTIVITY I: Plankton Sampling
Methods

ACTIVITY II: Phytoplankton
Observation Lab

ACTIVITY III: Zooplankton
Observation Lab

BACKGROUND INFORMATION

The term plankton is derived from the Greek word planktos, meaning “wanderer” or “drifter” and is used to describe any organism that drifts on the ocean’s currents and whose position in the water column is determined by wind and its effects on the thermocline. They essentially are not capable of independent locomotion. Some types can produce lipids to keep them afloat while others rely on whipping tail-like projections known as flagella to keep them in the upper layer of the thermocline. Plankton come in many different varieties and forms and are uniquely important to the environment.



Plant plankton, known as phytoplankton, form the base of the food chain through their cellular respiration. They are responsible for a supreme amount of the atmospheric oxygen with estimates as high as 80%. This is due to the presence of chloroplasts in their cells that allow them to be

CALIFORNIA STATE CONTENT STANDARDS

Grades 6 – 8

6th Gr. Science:
Ecology - 5b

7th Gr Science:
Evolution – 3a
Physical Principles in Living Systems - 6d
Investigation and Experimentation - 7a

8th Gr Science:
Density and Buoyancy – 8c

Grades 9 – 12

Science:
Biology/Life Sciences –
Cell Biology 1f
Ecology 6f
Evolution – 8a, b
Biogeochemical Cycles 7a

AP Science - Science Practices SP 1.1,
1.2

Earth Science: ES 5.3
Life Science LS 3.1, 3.2

EEI P and C: IIa; IV b, c
Ocean Literacy Principles: 1g; 5d; 6e, g
Climate Literacy Principles: 2d; 4g

Background Information (Cont.)

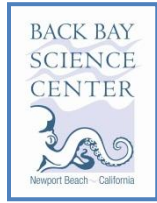
photosynthetic. Unlike other types of plankton all phytoplankton are holoplankton – they remain plankton through their whole life cycle.

Animal plankton, known as zooplankton, are the next level up on the food chain. They are the primary consumers of phytoplankton and bacteria and varied in morphology and characteristics. It is in this group that you start to see species of meroplankton – the type of animals that are only plankton at various stages in their life cycle.

As a whole, plankton are ecologically important and dangerous. They produce most of the atmospheric oxygen and serve as an important carbon sink trapping dangerous carbon emissions. They are also the base of the food chain so disruptions at that trophic level have far reaching implications further up. They can also be hazardous during algal blooms. During these times of population explosions they not only consume all of the oxygen in the water creating anoxic conditions but some species release toxins into the water that are bio-magnified up the food chain.

Extensions

1. Identify the most common species of plankton that occurred in the sample.
2. Discuss the importance of plankton as biological indicators. It is estimated that the overall population of plankton has plummeted 73% in the past 50 years alone, what could this be attributed too? Why is this such a disturbing trend? What can we do?
3. It is currently very poorly understood as to why plankton “bloom”. Develop several hypotheses and discuss how or why these hypotheses are feasible.



TEACHER GUIDE – Plankton Module

ACTIVITY: Plankton Sampling Methods

OBJECTIVES:

Students will be able to –

1. Perform the basics of plankton sampling.
2. Identify various types of plankton.
3. Distinguish between phytoplankton and zooplankton.

KEY TERMS:

Algal Bloom Anoxic Biomagnify
Cellular Respiration Chloroplast
Flagella Holoplankton Lipids
Locomotion Meroplankton
Morphology Organism
Phytoplankton Photosynthetic
Plankton Primary Producer
Thermocline Toxin Trophic Level
Water Column Zooplankton

MATERIALS:

Plankton net with detachable containers
Sample jar/container to transfer sample into
Microscope slides and covers
Pipette
Compound microscopes
Plankton ID sheets
Plankton Sampling Observation Sheets
Plankton Sampling Analysis Question Sheets
Pencils



TEACHER GUIDE – Plankton Module

ACTIVITY II: Phytoplankton Observation Lab

OBJECTIVES:

Students will be able to –

1. Identify types of planktonic locomotion.
2. Explain the ecological importance of plankton to the aquatic food web.
3. Identify some toxic plankton, and how toxins biomagnify.
4. Implement basic plating/microscopy techniques.

KEY TERMS:

Algal Bloom Anoxic Biomagnify
Cellular Respiration Chloroplast
Flagella Holoplankton Lipids
Locomotion Meroplankton
Morphology Organism
Phytoplankton Photosynthetic
Plankton Primary Producer
Thermocline Toxin Trophic Level
Water Column Zooplankton

MATERIALS:

Plankton sample
Microscope slides and covers
Pipettes
Compound microscopes
Plankton ID sheets
Phytoplankton Observation Sheets
Phytoplankton Analysis Question Sheets
Pencils



TEACHER GUIDE – Plankton Module

ACTIVITY III: Zooplankton Observation

OBJECTIVES:

Students will be able to –

1. Perform the basics of plankton sampling.
2. Identify various types of plankton.
3. Identify differences between phytoplankton and zooplankton.
4. Explain the ecological importance of plankton to the aquatic food web.
5. Implement basic plating/microscopy techniques.

KEY TERMS:

Algal Bloom Anoxic Biomagnify
Cellular Respiration Chloroplast
Flagella Holoplankton Lipids
Locomotion Meroplankton
Morphology Organism
Phytoplankton Photosynthetic
Plankton Primary Producer
Thermocline Toxin Trophic Level
Water Column Zooplankton

MATERIALS:

Microscope slides and covers
Pipettes
Compound microscopes
Plankton ID sheets
Zooplankton Observation Sheets
Zooplankton Analysis Question Sheets
Pencils