



Phytopia: Discovery of the Marine Ecosystem

Directions:

- A. Insert your CD, and click on the “Phytopia” icon to start the program.
- B. Move the microscope viewer to select “Phyto Factors.”
- C. You will view an introductory movie. While watching this movie, take notes on the important environmental conditions that affect phytoplankton growth. We’ve helped you with your note taking by providing the guide below. As you take notes below, you can pause, rewind, or forward the movie with the control buttons below the movie screen.

Notes:

- I. Environmental Factors that Affect Phytoplankton Growth and Distribution
 - a. Sunlight
 - b. Wind driven **currents** (*noun*) which can impact:
 - i. Temperature
 - ii. **Nutrients** (*noun*)
- II. Phytoplankton Survival Requirements
 - a. Carbon – Choose one: **abundant** OR can be limited
 - b. **Light** – Choose one: abundant OR **can be limited**
 - c. **Nutrients** – Choose one: abundant OR **can be limited**
- III. Sunlight
 - a. Define “photic zone” – **upper region of ocean where phytoplankton can absorb sunlight**
 - b. Depth of photic zone is determined by **the incoming sun angle, and the amount of dissolved material and suspended particles in the water**
 - c. Tropical oceans appear very blue because there aren’t a lot of **phytoplankton** (*noun*) in the water and the photic zone is **deep** (*adjective*).
 - d. More productive waters have more **phytoplankton** (*plural noun*) which scatter and absorb the sunlight, making the photic zone **shallower** (*adjective*).
 - e. Ocean colors during a strong bloom – **milky white, red, purple (or other colors)**

IV. Nutrients

- a. Nutrients accumulate in deeper waters
- b. Nutrients are brought up to photic zone by **winds** (*noun*), **currents** (*noun*), and **tides** (*noun*).

V. Blooms

- a. Adequate sunlight and nutrients can cause blooms of **phytoplankton** (*noun*).
- b. Blooms of phytoplankton will deplete **nutrients** (*noun*) in the photic zone.
- c. Continued heating by the sun causes the upper ocean to become **less dense** (*adjective*).
- d. Define “thermocline” – **physical barrier (caused by density differences) that separates the warmer surface water from the cooler, nutrient-rich water below**
- e. **Dinoflagellates** (*noun*) can swim through the thermocline so they can travel between the sunlit surface waters and the deeper nutrient-rich waters.
- f. **Zooplankton** (*noun*) feed on phytoplankton.
- g. All organisms eventually die and decompose, and contribute to the pool of **nutrients** (*noun*) in the ocean.