



UNDERSTANDING THE NUTRIENT CYCLE

NAME

GROUP MEMBERS



PLEASE READ ESSENTIAL QUESTIONS TO CONSIDER WHILE CONDUCTING THE EXPERIMENT:

What is an upwelling? How do wind patterns and currents affect the nutrients in the ocean?
How do Phytoplankton benefit from the nutrient cycle?

READ THE BACKGROUND INFO:

Dense, cold water is normally found deep in the ocean. The remains of dead, decomposing organisms sink to the ocean bottom making the deep ocean waters rich in nutrients. However, phytoplankton, which are the basis for the oceanic food web, live in the upper, warmer sunlit layers of the ocean and need these nutrients to live. The process of upwelling brings nutrients nearer to the surface. Upwelling occurs when offshore winds move the warmer surface water away from the shoreline, allowing the cooler water to rise or upwell. Where upwelling occurs, marine life is rich.



YOUR GROUP WILL NEED:

- 2 rectangular transparent pans at least 4 inches deep
- water pitcher (or something to carry water in)
- food coloring
- ice
- water
- pipette
- plastic cup
- flexible drinking straw for each student in group
- ruler

**DIRECTIONS FOR NUTRIENT CYCLE EXPERIMENT:**

- Using the pitcher, fill both pans with room-temperature (or warmer) water to about 1-2 inches from the top.
- Do not bother the pans for about 5 minutes so the water can settle.
- While the water in the pans is settling, prepare the plastic cup with 3-5 drops of food coloring and a handful of ice. Fill the cup with water 2 inches from the top of the cup and gently mix with straw.
- Fill the pipette with the colored ice water and release a few drops at the bottom (near one end) of each pan. This will represent the nutrient-rich water. Try and release the same amount in each pan! Observe the water, how are the different temperatures of water reacting to each other? Write your observations:

- Rest the straw on the opposite end from the colored water of ONE pan. Gently blow across the top (not into) the water, creating offshore waves. This will represent the wind. Compare the difference between the two pans. What happens to the “nutrient-rich” water when the surface water is moved away by the wind? Write and draw your observations:

**WHAT CONCLUSIONS CAN YOU MAKE ABOUT OUR ESSENTIAL QUESTIONS?**

What is an upwelling?

**WHAT CONCLUSIONS CAN YOU MAKE ABOUT OUR ESSENTIAL QUESTIONS? (CONT'D)**

How do wind patterns and currents affect the nutrients in the ocean?

How do phytoplankton benefit from the nutrient cycle?
