

ECOSYSTEMS ARE LIKE PYRAMIDS



The Atlantic puffins on Machias Seal Island (Canada).

Along the North Atlantic coast, from Labrador south to Maine, a cold current of water sweeps down from the North Pole, producing an upwelling of nutrients from the ocean depths to the sunlit surface. This upwelling of nutritious compounds profoundly affects the life and times of birds called puffins, among others. These natural fertilizers spur the growth of phytoplankton, the «meadow» of the sea. The most abundant components of the phytoplankton are diatoms, which contain droplets of oil. Since oil is less dense than water, as a consequence, the diatoms float near the surface, where they absorb the Sun's rays.

Zooplankton graze on the phytoplankton. The most numerous organisms in the zooplankton are copepods, minute crustaceans less than 2 millimetres long. Shrimp and other larger invertebrates feed on the vast microscopic herds of copepods that move through the water. Fish larvae, herring and other small fish are next in the line, and they are eaten, in turn, by larger animals. Because there are fewer large animals than small ones, these interactions can be depicted in the form of a pyramid: the puffins (*Fratercula arctica*; figure) are at the top of one such pyramid.

A puffin looks somewhat like a penguin, because likewise it is upright, with its feet placed well back under the body. The reason they look

like penguins, of course, is that they earn their living in a similar way. On land, puffins move with ease as they scramble over the rocks, using the claws at the ends of their webbed feet to grip the surface. In the water, they are superb swimmers, powered by their short, strong wings as they dive into and breast-stroke their way through schools of fish.

During the mating season, the bird's bill is ornamented with vivid red, yellow, and black plates. Puffin pairs raise their chicks in huge, multispecies colonies of sea birds. At summer's end, they head to sea and spend the long, dark winter months harvesting the ocean's riches, never touching land until the following spring.

Leggi attentamente il testo e rispondi alle domande che seguono.

- A** Why does a diatom float?
- B** Why do puffins resemble penguins?