

## Chapter 13

## ENRICHMENT

Use with Section 3

# • Middle and Recent Earth History

## Autumn Leaves



It's remarkable to find 17 million-year-old fossil leaves. It's more remarkable to find 17 million-year-old leaves themselves. But such leaves have been found. According to the scientist who reported this discovery, Edward Golenberg, about 17 million years ago a storm tore autumn leaves from trees growing near a lake in what is now northern Idaho. The leaves, some green and some red, settled into the cold, oxygen-free sediment at the bottom of the lake. The absence of oxygen keeps bacteria from growing, and bacteria cause plants to decay. The leaves were quickly covered with mud. Over time, the lake dried up. The mud turned to rock, and the leaves were sealed away from destruction for millions of years.

Golenberg found that the rock-encased leaves immediately fell apart when the rocks were

broken. But he was able to save some parts by placing them in a solution. This allowed scientists to study the genetic material that made up these ancient plants. The appearance of the leaves indicated that they were an extinct species of magnolia. Examination of the genetic material supported this theory.

This ancient magnolia, like the magnolias of today, is an angiosperm. The seeds of angiosperms are enclosed in a seed case. Insects and birds and sometimes wind carry angiosperm pollen from flower to flower to fertilize the plants. After fertilization, the flowers close and the developing seeds are protected. Gymnosperms, the other kind of seed-producing plant, produce seeds with no seed case. Conifers such as pine and fir trees are typical gymnosperms. The flowers of gymnosperms are hardly noticeable, and gymnosperms depend on wind and gravity for pollination.

Although some scientists believe that angiosperms evolved from gymnosperms, the question of when and how angiosperms like the ancient magnolias first appeared is still a mystery. To date, no magnolia-like flower fossils have been found.

1. How does Golenberg's discovery differ from most discoveries that reveal information about ancient plants? \_\_\_\_\_  
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2. The flowers of angiosperms are more obvious than those of gymnosperms. Why do you think this is the case? \_\_\_\_\_  
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3. Do you think trees in autumn looked very different 17 million years ago than they do today? Explain. \_\_\_\_\_  
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