Tree Rings, Ice Cores, and Varves

Tree Rings

- Tree trunks display alternating bands of light-colored, low-density summer growth and dark, high-density winter growth.
- The width of these rings varies with the conditions present that year, and shows the general temperature and humidity of the time.
- All the trees in an area during a given time period show the same patterns in their tree rings.

Study Tip

All of these methods used to date events involve analyzing patterns on an object. Tree rings, ice cores, and varves keep track of time the same way a prison inmate may write tally marks on the wall. By looking at the patterns, a person is able to estimate a time frame of an event's occurrence.

By counting the number of rings that a tree has, it is possible to find out how many years the tree had lived.

Ice Cores

- The alternation between snowfall in the winter and dust accumulation in the summer leads to a snow-dust pattern that appears within the ice.
- In order to see the patterns within the ice, scientists drill deep into the ice sheets, producing **ice cores** hundreds of meters long.
- Analysis of the ice tells how concentrations of atmospheric gases changed overtime, which can yield clues about the climate.

An ice core section shows annual layers

Varves

- **Varves** are alternating layers of sediment, with thick deposits of sediment during the summer and thin, clay rich layers during the winter

Ancient varve sediments in a rock outcrop

- Scientists analyze varves to learn clues about past climate conditions.
- A warmer summer may yield a very thick sediment layer, whereas a cooler summer may yield a thinner layer.

Concept Check

- How do seasonal differences change what we see in tree rings, ice cores, and varves? Describe in detail how each is formed.