Time Needed:

1 class period

Materials:

- White unlined paper.
- An assortment of crayons. Every student will need access to black, light brown, dark brown, and tan crayons.

The question you will answer in this FACTivity is: How do yearly weather conditions affect the way a tree's growth rings look? The objective of this FACTivity is to learn how to interpret tree rings. You will gain an understanding of what environmental factors can affect tree rings, and you will use your creativity and knowledge to create a cross-section of a tree, based on information given in the FACTivity.

Your teacher will provide the following background (or you may read it on your own):

In doing the research for this article, the scientists used tree rings that had been analyzed by dendrochronologists. Tree ring analysis requires observation and pattern recognition. Each year of its life, a tree creates a tree ring that has two parts: a light part and a dark part. The light part is called the early wood. It is created during the spring and early summer when there is usually more water available. The dark rings are called late wood. The late wood is created during the summer and sometimes in early autumn. The late-wood rings are thinner and darker than the early-wood rings because the tree does not grow as much during this time. One early-wood and one late-wood ring signify 1 year of growth for the tree.

Tree-ring width varies with growing conditions, for example the rings are wider if a lot of water is available, and they are thinner during times of low rainfall. Disease or an insect invasion can stress the tree resulting in less growth and thinner rings. Fire can leave a scar that will appear in the rings (**See figures 11-13**).

Figure 11. Tree cross-section showing fire scars. Photo courtesy of Peter M. Brown.

Scientists are able to study yearly weather conditions from observing tree rings. Scientists are also able to observe the tree rings and identify when insect invasions and damage from storms occurred.

Brainstorm with other students about the different events a tree could experience during a year of growth. How might the event affect the tree rings? For example, drought equals thinner tree rings, normal conditions will result in thicker tree rings, and insect damage could leave a scar and result in thinner tree rings.

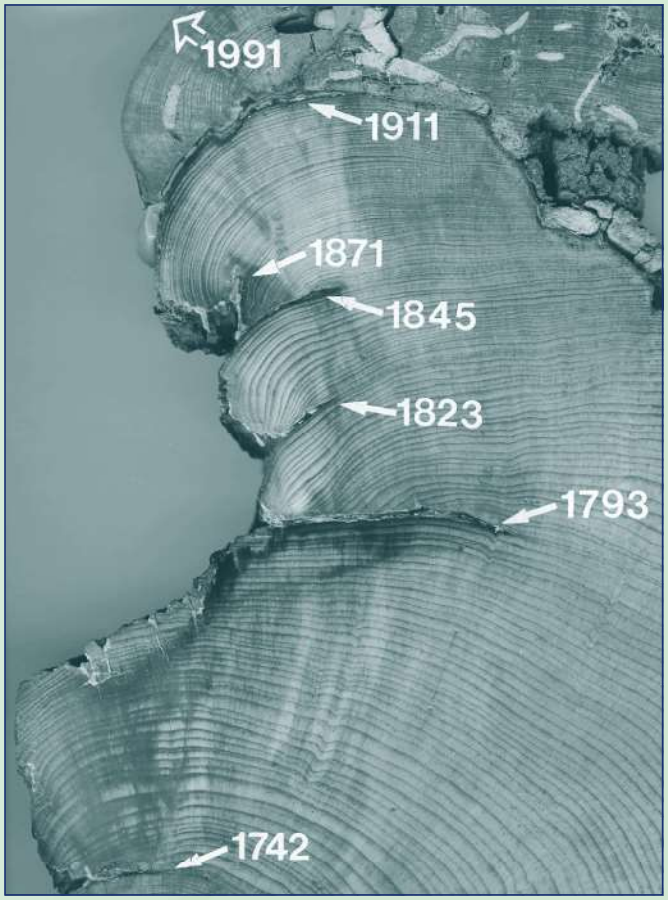

Figure 12. Tree cross-section showing insect damage. Photo courtesy of Peter M. Brown.

Scenario: Scientists have the following information about the weather and other conditions that happened every year during the life of one tree. The scientists need your help to predict what the tree rings might look like during a 25-year period. Here is your opportunity to test the skills that many dendrochronologists use every day!

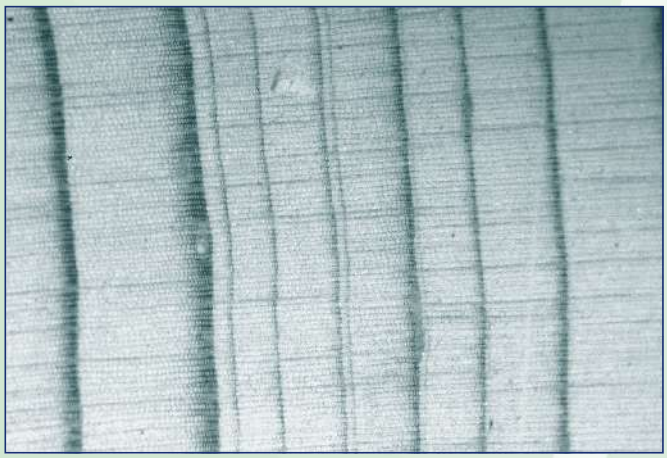

Figure 13. Tree cross-section showing years of plentiful rainfall and low rainfall. Photo courtesy of Peter M. Brown.

Refer to the chart below for the yearly conditions over the 25 years. Use a sheet of paper and crayons. Remember that one tree year includes two rings: an early-wood ring and a late-wood ring.

Based on the chart below, draw a cross-section of a tree. Remember that the tree rings for each year may look different, depending on the weather or other conditions for that year.

Compare your completed tree cross-sections with other students. Should the cross-sections look similar? Why or why not? If they do not look similar, how are they different? Why are they different?

The 25-year period of information about weather, insect, and fire for one tree.

Year	Condition	Year	Condition	Year	Condition	Year	Condition	Year	Condition
1	Normal	6	Insect damage	11	Heavy Rain	16	Insect damage	21	Fire
2	Normal	7	Normal	12	Normal	17	Normal	22	Normal
3	Drought	8	Normal	13	Normal	18	Fire	23	Normal
4	Normal	9	Fire	14	Fire	19	Normal	24	Fire
5	Fire	10	Normal	15	Drought	20	Normal	25	Insect damage

Key to conditions:

Drought = little to no rain

Normal = adequate rain and no other major problems

Heavy rain = above average rain fall

Insect damage = invasion by insects with damage to tree

Fire = hot fire that did not kill tree

Extension

Draw another tree cross-section. This time, consider what a tree might look like growing 50 years from now in a changing climate. Explain why you drew the tree cross-section the way you did. What yearly weather and other conditions will affect tree-ring growth in the future?

For additional information and another FACTivity about dendrochronology, see "Back To the Future" in this *Natural Inquirer* edition.