# 18A Time and Tree Rings

## *Do tree rings tell a story?*

If you look at the cross-section of a tree, you will see tree rings. Tree rings tell a story about the growing conditions of the tree. The number of rings that a tree has equals its age.

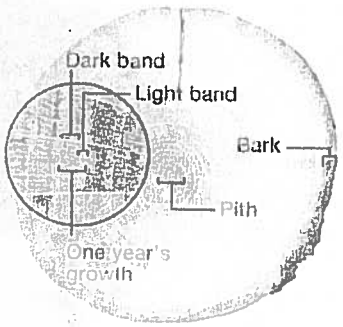
Careful examination of tree rings can give detailed information about the age of a piece of wood and the growing conditions a tree experienced during its life time. Scientists compare tree rings to a catalog of tree ring history to figure out the age of certain wooden objects like old ships, log cabins, and archeological artifacts. In this investigation, you will determine the age and growing conditions of several samples of wood by examining tree rings and tree core samples yourself.

### *Materials*

- Microscope slide of a tree cross-section
- Tree cross section
- 7 paper strips representing tree cores, a set of 4 and a set of 3 (included as a graphic in the lab)
- Two blank pieces of paper
- Graph paper
- Scissors
- Tape
- Metric ruler (with millimeter ruling)
- Colored pencils
- Magnifying lens

## 1 How do trees grow?

Each year, a tree gets larger by one ring. It is easy to count tree rings because each ring has a light and a dark band.




Tree rings (and the individual light and dark bands) vary in width depending on the growing climate. Wet, warm years allow for more growth than cool, dry years. A wide ring means the tree grew during a wet year. A narrow ring band means the tree grew during a cool, dry year.

**a.** Look at the microscope slide of the tree cross-section. Use the magnifying lens to help you see the details. Write a short paragraph describing what you see.

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**b.** You will see small holes in the tree cross-section. What are these holes? Come up with a hypothesis that answers this question.

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**c.** Looking at the slide with your eyes, how many tree rings do you see?

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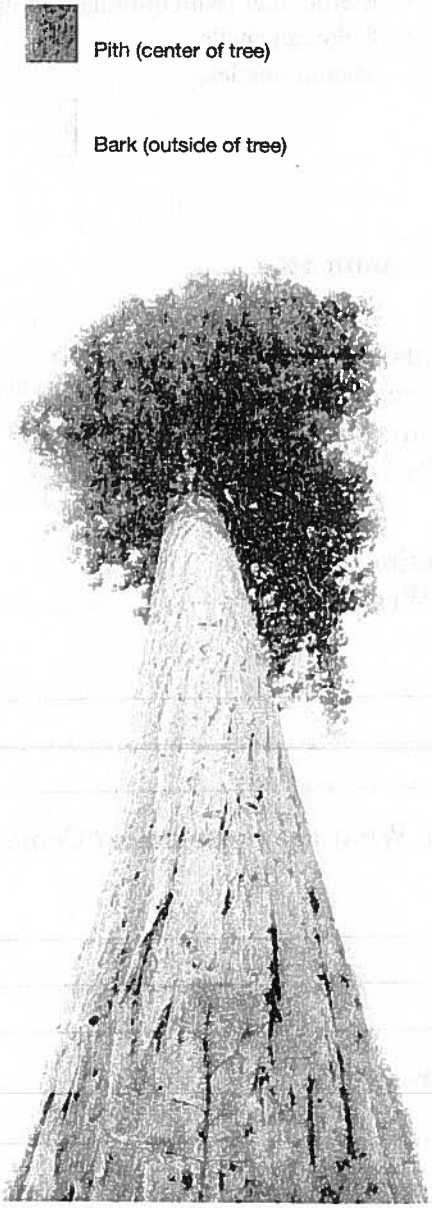
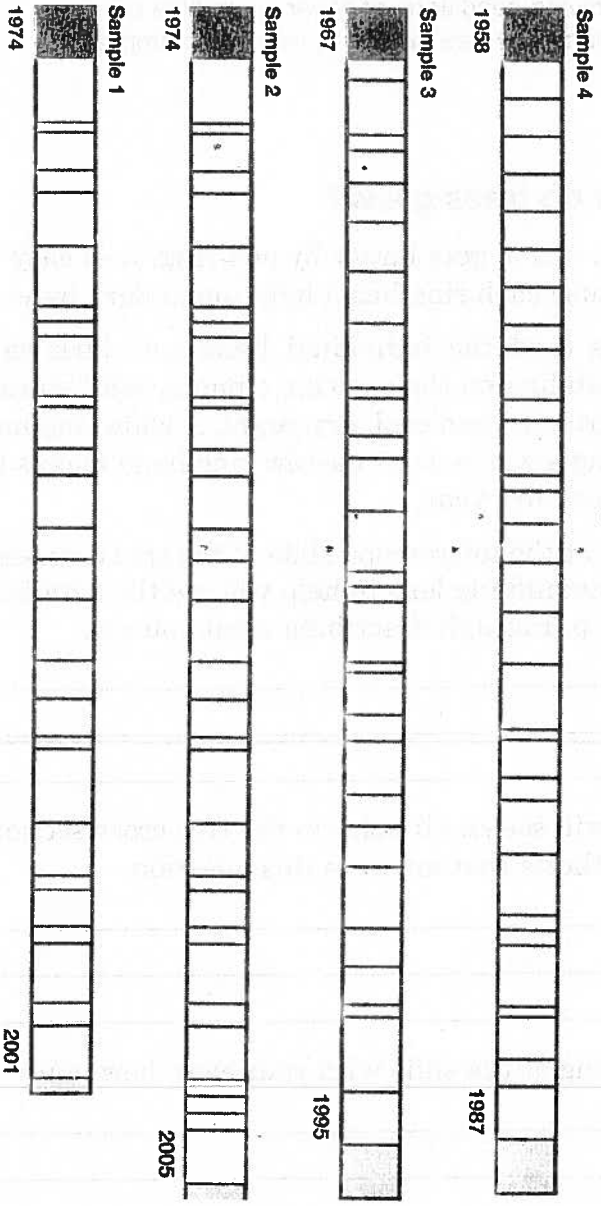
## 2 Investigating tree rings

1. **Tree cross-section:**
   Now, look at the tree cross-section. Use a magnifying lens to help you see the rings. Notice the width of the bands. Look at the bark and the pith. See if you can figure out the age of the tree. Remember that one ring (one year's growth) includes a light band and a dark band. Discuss what you see with your group. *NOTE: The pith and bark are not counted in determining the age of a sample. The youngest wood is under the bark.*
2. **Tree cores:**
   Obtain copies of the four paper strips below and cut them out. The strips represent tree cores from four different trees. The trees are the same species and grew in the same woodland.



3. Determine the age of each tree by counting the rings (one ring includes a wide light band and dark line). Record your answers in Table 1.

**Table 1: Tree core data**

| Sample | Age of Tree | Year Cut or Cored | Year Growth Began |
|---|---|---|---|
| 1 | | | |
| 2 | | | |
| 3 | | | |
| 4 | | | |

4. Look for patterns in the rings. Line up all the samples by matching the patterns before taping them onto a blank piece of paper. Color the overlapping sections so you don't lose track. Figure out the age of each tree and record this information, and the years that the trees began growing and were cut in Table 1.
   Note: These matching patterns indicate the trees grew in the same woodland and help prove what the climate was like in the past for that area.
5. **More tree cores:**
   Now look at the three new tree cores (see next page). Write down the age of each core. Then, cut out the paper strips and line them up according to the corresponding dates that overlap on each sample.
6. Measure the width in millimeters of each tree ring, and record your measurements for each year in Table 2. Two years have already been done for you: 2006 and 2005.

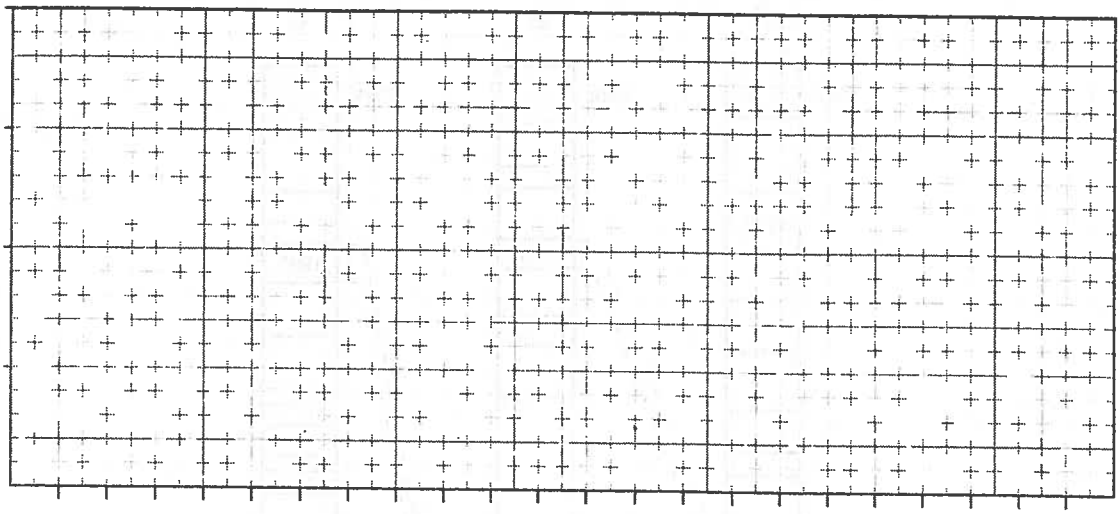
**Table 2: Tree core data**

| Year | Tree ring width (mm) | Year | Tree ring width (mm) | Year | Tree ring width (mm) |
|---|---|---|---|---|---|
| 2006 | 10 mm | 1993 | | 1980 | |
| 2005 | 8 mm | 1992 | | 1979 | |
| 2004 | | 1991 | | 1978 | |
| 2003 | | 1990 | | 1977 | |
| 2002 | | 1989 | | 1976 | |
| 2001 | | 1988 | | 1975 | |
| 2000 | | 1987 | | 1974 | |
| 1999 | | 1986 | | 1973 | |
| 1998 | | 1985 | | 1972 | |
| 1997 | | 1984 | | 1971 | |
| 1996 | | 1983 | | 1970 | |
| 1995 | | 1982 | | | |
| 1994 | | 1981 | | | |

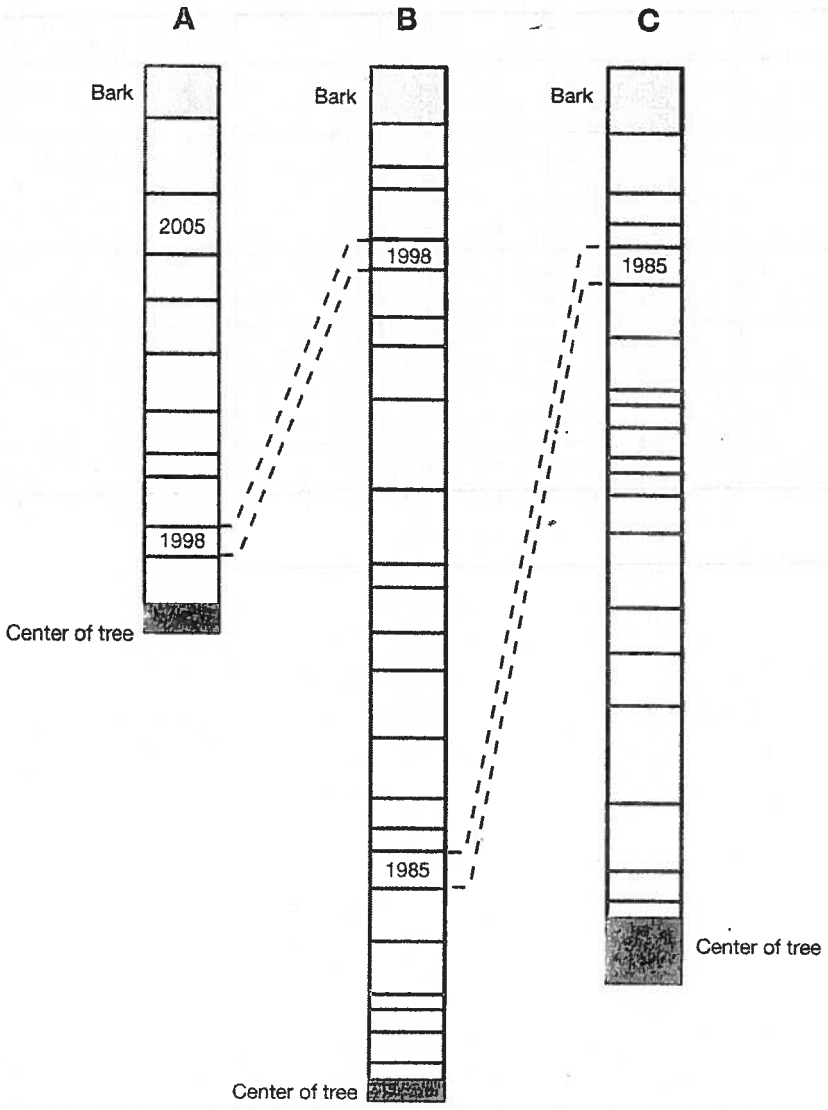
7. Make a graph of your tree core data. Plot the ring-width in millimeters on the *y*-axis against the year on the *x*-axis. One ring includes a wide light band and dark line. Label the graph appropriately.

Title: _____

*y-axis:* _____



*x-axis:* _____




## 3 Thinking about what you observed

**The set of four ring cores:**

**a.** What kind of growing season existed for the first four cores in 1967? How can you tell?

**b.** If poor tree growth is mainly caused by drought, which years were probably drought years? How can you tell?

**c.** Did this woodland have more years of drought or plentiful rainfall?

**d.** Why might a climatologist be interested in tree ring data from this woodland?

**The set of three ring cores:**

**a.** What does your graph show about the three cores (A, B, and C) and the climate?

## 4 Exploring on your own

**a.** Global climate change (caused by an increase of carbon dioxide in the atmosphere) is a current environmental topic that concerns scientists. The result of global climate change is an increase in Earth's average temperature. Due to global climate change, what differences would you expect to see between tree rings of today and tree rings in the future (100 years from now)?

**b.** What factors can influence the growth of trees? List all the factors you can think of.

**c.** Trees are like the history books of a forest. But, what other objects in nature can we observe and measure to tell us something about certain environments? You may want to go to an outdoor location to brainstorm answers to this question.

**d.** What is a dendrochronologist and what does one do?