



## Harvard Forest Schoolyard Ecology Buds, Leaves, and Global Warming

### Fall Protocol: Foliage Color and Leaf Drop

**I. Objective:** Students will record the progression of leaf color and leaf drop to monitor the end of the local growing season. (The beginning of the growing season is monitored in the spring for this project. If you do this annually, one class will pass on data to be used by next year's class.) **Leaf color and leaf drop** are determined by monitoring a consistent set of leaves regularly in order to record the dates when each of these study leaves changes color and has fallen off the tree.

#### II. Data Collection:

**A. Begin and End dates:** Ideally, fall data collection should begin the second week of September and continue until all leaves have either dropped or turned brown, which should happen by late October or early November.

**B. Data Collection Schedule:** Collect data once a week during study time. We recommend going out twice a week, if possible, when leaves are near full color, as that would pinpoint leaf drop dates more accurately.

**Note:** oak and beech often have leaves that remain on tree all winter, which is why you should consider the study complete when all leaves are brown.

**C. Observe the specific branch assigned.** Observe the 6 leaves closest to the branch tip, not counting those at the terminal bud (the bud at the very tip), which have been labeled prior to data collection (see section VIII, Site Preparation, in Project Overview).

**D. First field visit only:** Measure the length (not including leaf stem/petiole) and width of the leaf blade in centimeters for each of the 6 leaves and record on the data sheet, to see how large the leaves grew during this growing season.

**Notes:** Advise students to be careful not to remove leaves from trees accidentally. We recommend that a teacher and/or another group of students double check the accuracy of each measurement. We don't recommend measuring leaves more than once in a season to avoid over handling leaves and causing them to drop prematurely.

Leaf #	Fraction of Leaf Color (not green)				Leaf Drop
	0 – 25%	26 – 50%	51 – 75%	76 – 100%	0-not fallen 1- fallen
1					
2					
Whole Tree			X		

**E. Leaf and whole tree color:** Look at each individual leaf and record approximately what fraction has changed color (is not green). For example if slightly more than half of the leaf has changed to yellow and brown, record an X in the 51–75% box. Then make an estimate of the color change on the whole tree and record this value.

**F. Leaf Drop:**

- a. Check each of the six labeled leaves and record whether it is still on (0) or fallen (1).
- b. Total number of leaves observed: Record the total number of leaves you are studying on this branch (normally 6).
- c. Total number of leaves fallen: Record the total number of study leaves that have fallen from this branch.(0-6).

**G. Field Notes/Observations:** This part of data collection is **optional**. We have included it to model the kinds of field notes “professional scientists” use when collecting data. If you have time, you may have the students record temperature in degrees Celsius and % humidity. Students can include notes about field conditions – climate, wildlife, what is happening with other plants, moisture, snow, or human activity - that you notice while collecting data. As time allows, you may discuss this optional data with students.

**H. Teacher Note:** In order to prepare data for submission to Harvard Forest, you must combine data from all branches on the same tree to create tree-level data to enter into Excel and email to Harvard Forest.

**Contact Pamela Snow, Schoolyard Coordinator, at [psnow@fas.harvard.edu](mailto:psnow@fas.harvard.edu) or (978) 724-3302 x246 to begin your schoolyard research project.**