



## 2016 Climate Lab Leaf Measurement Protocol



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### Leaf Measures

#### **Why you are measuring leaves:**

We can look at weather data (collected by entities such as NOAA) to determine whether a year is warmer or cooler than average, but information on organisms' responses to climate change is much harder to come by. This is where you can help!

In much of the country, many plant species drop their leaves to avoid the harsh winter weather. When spring arrives, these species then grow leaves in a process we call leaf out. For understory species and small trees it is important to leaf out earlier than the trees in the forest canopy in order to take advantage of the early spring sunlight.

As you have learned through the [Climate Lab curriculum](#), timing is an incredibly important aspect in natural systems. Leaf out timing can be influenced by several factors, including temperature. In warmer years, plants often leaf out sooner. By measuring leaves during leaf out **and** after the leaves are fully grown, we can determine how far along leaves were at a certain date. Over time, we can use the data to monitor trends in both leaf out dates and in growth rates over the course of the growing season.

#### **What you will need:**

- Measuring device capable of measuring to the nearest millimeter (an ordinary ruler with tape over the "inches" side will suffice)
- Data Sheets (found on the [Climate Lab materials page](#))

#### **How you will do it:**

You will be selecting trees, shrubs or herbs with measurable leaves in the general area of your study site. Be sure to select species that:

- are native species
- are numerous in your study site
- replace their leaves each spring
- do not have compound leaves (such as Ash, Sumac or Locust trees)

**\*\*if you have any questions about these criteria do not hesitate to contact the scientists at Manomet ([edalton@manomet.org](mailto:edalton@manomet.org))\*\***

We suggest sampling at least two different species that fit into two categories (i.e. tree, shrub, herb). This gives a broader snapshot of your school's study site and increases the amount of data we ultimately have to work with long-term. If you have time limitations, we would rather you focus on one species in order to submit a full sample (30 leaves twice in a year). Since we are interested in measuring leaves during **and** after leaf out, we suggest collecting data in early spring and in the fall. For continuity, late spring might work as an alternate date for collecting data post leaf out. Contact us if you have any questions regarding timing.

1. Select six independent plants or trees of the same species. Try to select plants that will not be altered/removed over the course of years.
2. Label these plants in a permanent manner. You will need to measure leaves on these plants twice a year for the foreseeable future, so we would suggest using metal tree tags, which we can supply you with. If available, a GPS can be used to note the specific locations, or students can create a diagram of your study site.
3. For each plant, randomly select five leaves. We suggest having the measurer close their eyes and feel for one leaf at a time. The person recording data can make sure no leaves are measured twice.
4. Measure and record length to the nearest millimeter. Do not include the petiole/ leaf stalk (see Figure 1)
5. Measure and record width to the nearest millimeter. Width should be measured at the widest part of the leaf.
6. **Once the plants have fully leafed-out, return to the same plants and repeat steps 3-5**

A brief video tutorial can be found here: <https://www.youtube.com/watch?v=T0g4MaXgado>

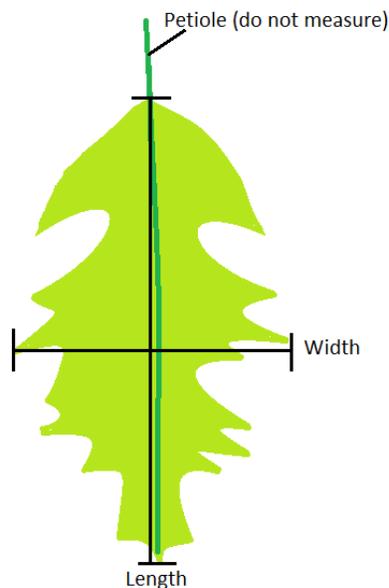


Figure 1: Appropriate measures of leaf length (not including petiole) and width at widest point.