The ARNOLD ARBORETUM of HARVARD UNIVERSITY

The Arboretum for Educators

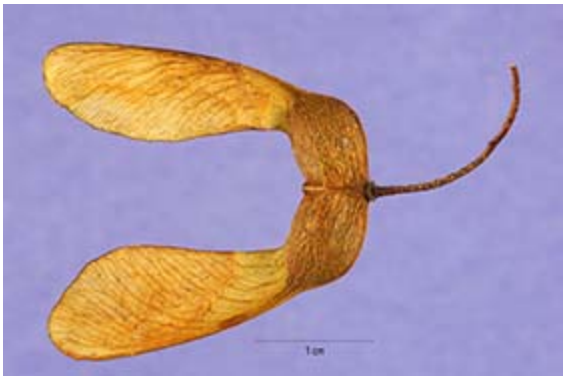
Resources for Teachers, Students, and Families

September 2025

During the 2025–2026 school year the Arboretum for Educators will feature one native tree species per month, highlighting recognizable features and sharing interesting facts. This will be followed by Outdoor Journaling suggestions and related Science Labs. Embark on a yearlong tree investigation and **outdoor journaling program**: can you “collect” all 10 trees by June?

Norway Maple Leaf and Samara

The **Norway maple** is a non-native tree from Europe and Western Asia introduced to North America in the mid-1700’s. It is considered invasive in some areas. It is recognized by its broad 5 lobed leaves that have pointed tips with 1–3 side teeth, and long leaf stalk (petiole) that secretes a milky sap when broken. It also produces a huge quantity of fruit known as samaras. These double-winged flattened seeds are fairly large and spread almost 180˚. These are common street trees.



Sugar Maple Leaf and Samara

The **sugar maple**, a native of the hardwood forests of eastern US and Canada, is best known for being the primary source of maple syrup and for its brightly colored fall foliage. Sugar maple leaves also have 5 lobes, but their tips are rounded. Another difference from the Norway maple is that the petiole has a clear sap when broken. The seeds of the double-winged samaras are more ball shaped and the 2 wings are positioned almost parallel to each other. A warming climate is threatening maple syrup production and seed germination, since both aspects require hard freezes and sustained low temperatures for sap transport and seed germination, respectively.

Red Maple Leaf and Samara

The **red maple** is named for its brilliant autumn foliage! It inhabits swamps and moist slopes, as well as disturbed landscapes, and is a rapid-growing tree. The leaves usually have 3 lobes and the spaces between the lobes (sinuses or clefts) are shallow and sharp angled; the margins are coarsely serrated, whereas the margins of both Norway and sugar maples are smooth. Also, the underside of the leaves are whitish and can be hairy, and the petiole is red! The samaras are relatively small, about 1 inch long each, and also reddish.

Outdoor Journal Activities

Use the images and descriptions to identify these maple species around your school and neighborhood. Visit them regularly throughout the season with a journal to document your discoveries.

- Create some leaf rubbings or press leaves to **create your own herbarium voucher**.
- Note the date when the leaves begin to change, and the location of the colored leaves within the tree: are leaves on the outer edges turning first, or only leaves along a specific branch? What percentage of leaves have changed on any given day? How long is the color change season from the first to the last?
- Notice when leaf drop begins and how long it takes for the tree to become bare. Does this relate to the daily and nightly temperatures somehow?
- Can you replicate the leaf color wheel using this image and sugar maple leaves?

Science Labs

Leaf Chromatography: A leaf's function is to photosynthesize sugars for growth. However, when colder temperatures and shorter days approach, deciduous trees get ready to shed their leaves as an adaptation to surviving winter. Leaves export sugars from the leaf into its tree trunk and down to the roots. As chlorophyll fades, other pigments show up. **This video and featured experiment** will help students understand the chemistry and the science behind color change in Autumn.

Samara Investigations: In Massachusetts, the Kindergarten–Grade 2 Engineering and Technology Standard 1.3 states: Analyze data from tests of two objects designed to solve the same design problem to compare the strengths and weaknesses of how each object performs.

Students of any age can collect a large sample of maple samaras found in the landscape and conduct 'flight tests." Toss different samaras from a consistent height and **observe the flight path of each fruit** , determine its hang time (the time it stays aloft), and record observations on a large chart. Use arrows and diagrams to describe the various flights paths. Notice the placement of the seed within the fruit structure, the shape of the wings, size, dryness, and other attributes of each samara that contribute to the many variables to consider during testing. Taken together, this data could be used to engineer the "perfect" winged seed – one that will stay aloft the longest in order to catch the wind and disperse furthest away from the parent tree.

Arboretum Happenings

Caterpillar Lab

Sept. 13 and 14
11am–4pm
Hunnewell Lecture Hall
Experience a full weekend packed with caterpillar displays, free-exploration programming, digital microscopes, and experienced educators on hand to give you insights into these amazing animals.

Learn More

MassQ Ball: Color

Oct. 4
10am–4pm
Bussey Street Gate
MassQ Ball 2025: Color is an intergenerational, cross-cultural celebration of the arts and culture of Boston's many communities of color.

Learn More