



## Where The Sunlight Goes: An Exploration of Tree Leaves

### Grades:

2 – 3

### Duration:

30 – 40 minutes.

*In this activity, you will gather and test how much light passes through the different types of leaves in your neighborhood by utilizing*

*[Google's Science Journal app](#).*

### Have You Ever Noticed Sunlight Passing Through Leaves?

As one of the few planets that can sustain life, Earth hosts a huge variety of life, most of which require light to grow and thrive. One of the best and most obvious examples of this is trees. Even among trees, there are a great many varieties. If you take a look around your own neighborhood, you will likely notice many different types of trees with many different types of leaves.

Many people turn to trees for shade when it's hot out because the leaves block the rays of the sun, but while we may benefit from this, leaves have a very important job to do for the survival of the tree: they must capture the light energy from the sun to power the process of photosynthesis. During photosynthesis, the light energy from the sun powers the chemical reaction to combine carbon dioxide in the air with water. This creates oxygen, which animals breathe, and starchy carbohydrates, which are the energy-packed building blocks of all trees.

Trees that grow in different climates develop different ways of using sunlight for photosynthesis. You can tell a lot about a tree just from the shape of its leaves and how much sunlight each leaf will let through.

### What Trees Are In Your Neighborhood?

When you walk through your neighborhood, what trees do you see? (Adult supervision required. Classroom teachers can collect leaves for their students if desired.) Gather one leaf from at least three different trees that you see. Most of the time you can just grab a leaf that has fallen to the ground, but if the branches are low enough, make sure to pluck the leaf from the stem. One of the first things to notice is, whether the stem has multiple leaves attached or just one.

### New York Hall of Science

47-01 111th Street  
Queens, NY 11368-2950  
718 699 0005  
Fax: 718 699 1341  
[www.nysci.org](http://www.nysci.org)

## Identifying Your Green Neighbors

Once you've collected some leaves, it's time to identify them. In the past, this used to be a slow and sometimes difficult process, but today there are lots of tools on the Internet that make it easy. Here is a brief list of some such tools:

<https://www.arboday.org/trees/whattree/>

<http://www.oplin.org/tree/leaf/byleaf.html>

<http://www.leaf-id.com/>

<https://gobotany.newenglandwild.org/simple/>

If you've collected many leaves, it may be helpful to label them as you learn what they are. An easy way to do this is with masking tape and a pen.

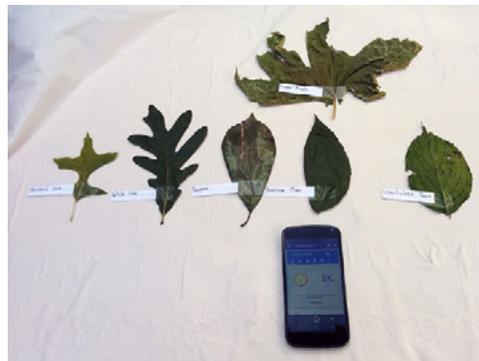
Now that you know some of the species of trees in your neighborhood, you can read up about those trees to learn more, but it's so much more fun to explore first-hand using the leaves you have.

## Leaf Translucency

As we have learned, leaves block the sun's rays, creating shade, but some sunlight passes through leaves. How much sunlight passes through depends on how many features the leaf has. Let's take a look at the leaves that you have.

For this activity you will need the following materials:

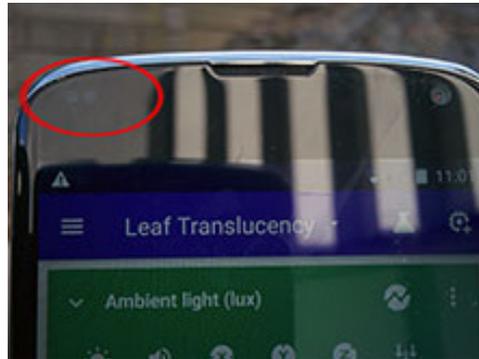
- A cell phone or tablet with the Google Science Journal app.
- The leaves you have gathered.
- A flat surface either outdoors or in daylight (a flashlight can be used if done indoors).



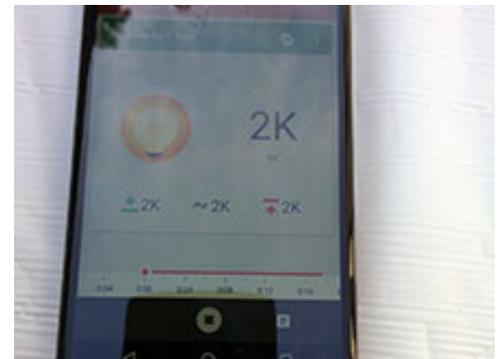
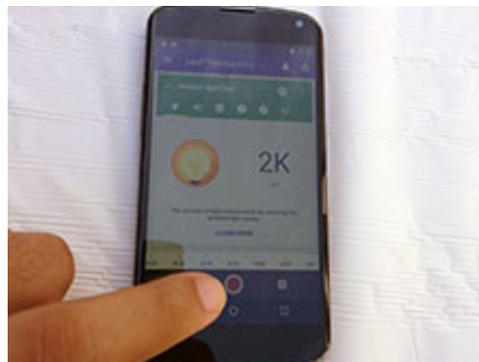
Make sure the Google Science Journal app (GSJ app) is measuring light or Lux which a measurement of how much light is reaching a given surface.

## Where The Sunlight Goes: An Exploration of Tree Leaves

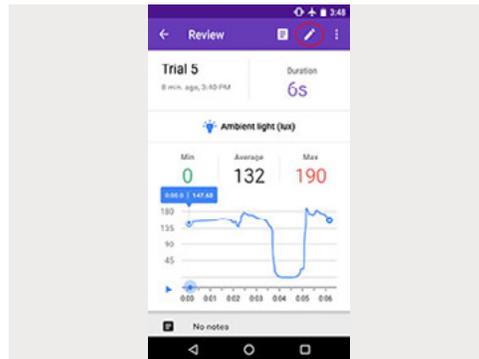
The light from any source loses intensity the farther away from that source it travels. To give you an idea of the amount of Lux you may experience daily, the full moon provides approximately 1 Lux of illumination while direct sunlight is approximately 30,000 Lux. Average daylight might be around 3,000 Lux (see image above). Your cell phone or device uses the Lux sensor to determine how bright to display the screen; the brighter the ambient light, the brighter the display. Determine where the Lux sensor is located on your cell phone or device. You can place the tip of your finger over various places along the edge of your phone; when you notice the Lux meter reading drop to zero you've found the location of the sensor (see image below).



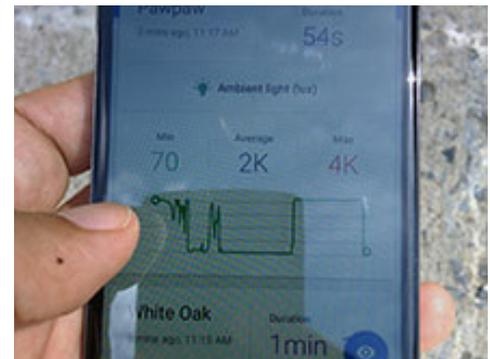
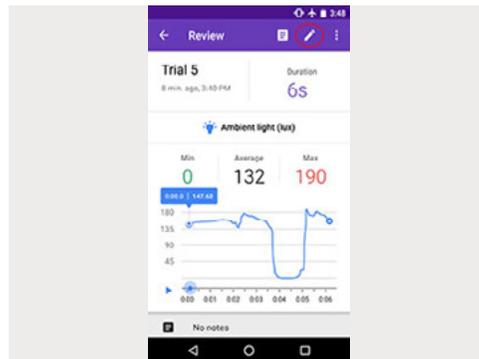
1. Hit the record button located at the bottom of the Google Science Journal app to begin recording your first observation.



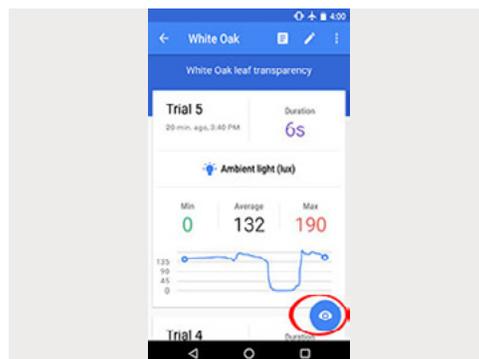
2. Place a leaf over the Lux sensor, being careful not to place your finger over the sensor.



3. Press stop on the recording (same button as record) and then press the edit pencil icon (see below) on the top right to name the trial. It's best to name it after the tree the leaf belonged to.



4. Press the back arrow in the top left to return to your observation recording, then tap the eye icon to continue with your observations (see image below).



Repeat the process until you have seen how much light gets through each leaf or, in other words, the translucency of each leaf.

### What Does Leaf Translucency Tell Me?

There are many things that affect the translucency of a leaf. In fact, the more features a leaf has, the less translucent it is likely to be. On one end of the spectrum are thin leaves that are very translucent. These tend to be leaves that grow in fair weather climates where the leaves have access to sunlight, moisture, and rich nutrient-dense soil. One example of this is a mint leaf. On the other end of the spectrum are dense leaves that are much less transparent. These leaves tend to grow in harsher climates that challenge growth in one way or another. One example is an aloe leaf. Aloe plants have fleshy leaves that hold water to sustain the plant during a drought. To help prevent water loss through to the leaves and to reflect excess light away from the plant, aloes have a waxy coating on the outside of the leaves.

So what features did you notice on the leaves you gathered? Did any of them have a fuzzy coating or a waxy coating which can help it to reduce water loss? Were the leaves large, allowing it to collect as much sunlight as possible, or small, narrow and compact, reducing its surface area to gather less sunlight and stay cooler?

Chances are that many of the leaves you have collected share many similarities since they are growing in the same climate. However, even in the same climate, there is variation in trees and different trees develop different adaptations for dealing with their surroundings. Often, the evidence of these adaptations is in the leaves.

### More On Things That Grow In Your Neighborhood

We hope you have enjoyed exploring tree leaves in your neighborhood. In your adventures gathering leaves, you may have noticed a lot more than just trees growing. There are a great many plants that grow in whatever climate you may live in, even in cracks on the ground. If you expand your observations to include bugs, insects, and other wildlife, you will begin to see the network that exists around you that you may have overlooked before. Consider the fact that all these things need the light from the sun in some way or other. We encourage you to continue exploring your living environment and growing right along with it.

*An Exploration of Tree Leaves activity is made possible with support from [Making & Science](#), an initiative of Google.*