



# Girl Scouts and GLOBE Observer Think Like a Citizen Science Journey Trees Script



*A video version of the [Trees presentation](#) [36:38] is available ([youtu.be/jY9HL8iAJ-A](https://youtu.be/jY9HL8iAJ-A)). Visit the [Girl Scout Guides](#) page ([observer.globe.gov/toolkit/guides/girl-scouts](https://observer.globe.gov/toolkit/guides/girl-scouts)) to download an MP4 file of the video. You can also use this script with the presentation slides available on the website as PDF and PPT files.*

## **Introduction:**

Hello Girl Scouts and troop leaders! We at GLOBE are very excited that you have chosen to use the GLOBE Observer app to work on your Think Like a Citizen Scientist Journey. This video can be used as a plug and play (with pauses for activities, so pay attention and pause the video while you work). Alternatively, troop leaders, service unit or council volunteers, can use this video as an example of how you might run your own program. However you choose to use this video, enjoy your Journey as you learn to Think Like a Citizen Scientist.

## **Slide 1**

Welcome to the first step in being a critical part of a growing citizen science project. Today you will learn about what it means to Think Like a Citizen Scientist, learn about the Trees Tool on the GLOBE Observer app and make your own paper clinometer.

## **Slide 2**

But first let me tell you about GLOBE and GLOBE Observer

- **GLOBE** is an international science and education program that provides students and the public worldwide with the opportunity to participate in data collection and the scientific process and contribute meaningfully to our understanding of the Earth system and global environment.
- **GLOBE Observer** app is the data entry tool that allows citizen scientists to enter their data and share observations.
- GLOBE Observer is part of GLOBE.

## **Slide 3**

Okay, speaking of the Think Like a Citizen Scientist Journey, learning about what it means to observe is the first step in thinking like a citizen scientist. Let's get started by practicing our observation skills.

When we observe, we use our senses (taste, smell, touch, hearing, and sight). Since we can't really taste, smell, hear, or touch these pictures, we are going to use our sense of sight.

#### **Slide 4**

Here are pictures of a tree to observe from a distance and then up-close.

Some possible questions to help you with your observations could be:

- Do trees have needles or leaves?
- When was this image taken?
- How tall is that tree?
- What did you notice about your tree?
- What was different about looking at a tree from a distance and then “zoomed in”?
- What colors did you see?
- What shapes or patterns did you see?
- Did you see any insects, plants, animals, lichen or fungi on your tree?
- What do you think makes your tree unique or special?

You can write down any observations you made in the chat, your science journal, or on a piece of scratch paper. If you can, you can do this same activity with any tree, not just with the photographs. This could be a great activity for a nature walk, hike, playground meeting, or even something to do in your own yard. So don't feel limited to just using these pictures. Leaders, once your Girl Scouts have finished noting their observations, ask them to share. I'm going to ask your leaders to pause the video so you have some time to finish your observations and discuss.

The [Zoom in on a Tree guide](https://go.usa.gov/xtpBa) (go.usa.gov/xtpBa) can be used as a basis for this activity.

#### **Slide 5**

Welcome back! I bet you made some really great observations. Some things I noted about this tree is that the photo was taken when the leaves had fallen from the tree (either fall, spring, or winter), the tree is deciduous and not an evergreen because it lost its leaves, the tree provides habitat for lichen and moss, the tree is in a park near a playground and soccer field, and the tree is moderately tall, but not as tall as some of the evergreens in the background. Observations can tell us a lot about something and scientists use observations in their work.

#### **Slide 6**

What do scientists do?

#### **Slide 7**

Pause the video and discuss what a scientist does.

I bet you had a great discussion on what it means to be a scientist. There are lots of different types of scientists out there, but one thing they all have in common in their research is that scientists rely on the scientific method to learn new things.

You are going to be citizen scientists, where you use the scientific method to help gather data for NASA scientists and other researchers including students or scouts like you.

### **Slide 8**

The **first part of the scientific method is to observe**. You all did a great job of observing the Tree pictures. You can do that with any tree and if you do it in-person, you can touch and smell the tree (as long as it's safe to do so – beware of poison oak!).

The next part of the scientific method is to **create a question and make a hypothesis** (i.e. your best guess at the answer to your question based on your observations).

### **Slide 9**

Let's look at these two trees.

Let's make some observations and then form a question based on those observations.

- What differences do you notice between these trees?
- What similarities?
- What do you want to know? What is your question?

### **Slide 10**

Pause the video and discuss. You can come up with your own question or you can use the one that I'll provide.

### **Slide 11**

Our question could be, "Can tree height tell you which tree is older?"

### **Slide 12**

The hypothesis is your answer to that question. So let's make a hypothesis. We have a few options:

1. Yes
2. No

What do you think?

### **Slide 13**

Leaders, please pause the video while you discuss with your troop.

### **Slide 14**

I made the hypothesis that no, tree height can't tell me which tree is older.

### **Slide 15**

I need more information. For example, I would want to know when these trees were planted? Which one is older? How tall are they? Are there other trees that are short and old and some that are tall and young?

### Slide 16

One thing I do know is that tree age can be determined by the number of tree rings. For each year of growth cycle a tree gets a ring. So without cutting down these trees, I may not be able to get an precise age of these trees. Also, as you can see by these photos, the width of the rings can vary depending on the type of tree and the conditions in which it is growing. But how could I collect data to answer my hypothesis? I would have to measure a lot of tree heights of known ages and then look at all that data and look for patterns or trends.

### Slide 17

So, how do scientists know if their hypothesis is correct? They have to **collect and analyze data**. The more data they have the better their results will be because it helps filter out some of the outliers (the mistakes, errors, or oddball data – kind of like if I was measuring Favorite girl scout cookies. The more people I sell cookies to, the better my data.

### Slide 18

For example, here is a pie chart showing real data from my troop sales. This Girl Scout made a single sale to one family (who love Samoas and don't like Thin Mints). But are Samoas the most popular cookie sold by Girl Scouts nationwide? With this data my hypothesis should be yes! But is it? How could I get a better data set?

I could collect more data. The pie chart on the right is the data for my entire troop's sales. This is a much better data set because it has 1,559 packages of cookies sold – 1,554 more boxes than my single sale. With this much data, I could look at which ones I sold the most of and be able to make a better conclusion to my hypothesis than if I'd only sold 1 or 2 boxes. The more data that is collected, the better. So are Samoas the most popular according to this data? No. Thin mints are. Your troop can do this same exercise with your troop sales! If you added your data to this data, we'd have an even better data set!

In the pictures of the two trees, we only have these two data points, so we can't make a conclusion about all trees, we can only make a conclusion about the two trees. And we'd need a method to see how old the trees are.

### Slide 19

So, to make the hypothesis of tall trees are older than short trees, I'd have to have measured a LOT of tree heights, and been able to count their tree rings (or at least measure their circumference – that's the length around the tree – like your arms hugging a tree. For NASA scientists, we rely on a lot of data. And this is where you can come in. You can be citizen scientists – measuring both tree height and trunk circumference. All these pictures on this map are data points where citizen scientists have taken observations of tree heights around the world. You can also take these observations and add to this robust data set.

### Slide 20

Let me introduce to you the GLOBE Observer Trees tool.

[GLOBE Observer: Tree Height video](https://youtu.be/pMV9COMYtSg) [1:20] (youtu.be/pMV9COMYtSg)

### Slide 21

This next video will show you how the tree height tool works and what satellite data your measurements are compared to.

[GLOBE Observer: Trees Promo video](https://youtu.be/_pE26h4xlu) [1:06] (youtu.be/\_pE26h4xlu)

**Slide 22**

Now, I know I just showed you how to use the app, but scientists also use another method to measure tree height and we are going to make our own tree measuring device – a clinometer.

**Slide 23**

Here is a list of the materials you need. If you have them now, you can build it with us, if not, you can easily make your own later. Pause the video if you need to collect the materials and want to build along with us.

Brian Campbell from NASA GLOBE Observer and his son will walk you through how to build the clinometer and use it to measure tree heights. This is one method of measuring trees. A clinometer measures angles that can be used to calculate tree height! The GLOBE Observer app uses your phone as a clinometer, and it uses the internal algorithm in the app to calculate the height. No math required.

[Build a Clinometer Instructions](https://go.usa.gov/xtE7w) (go.usa.gov/xtE7w)  
[“Paper Clinometer Activity Video”](https://youtu.be/Ky6KhGLw1AU) [12:29] (youtu.be/Ky6KhGLw1AU)

**Slide 24**

A clinometer is helpful for measuring trees, but the GLOBE Observer Trees tool has a clinometer built in. You can use your paper clinometer to compare your results from the app! This helps make your data even stronger, since you are validating that your instruments are working (if they get the same result).

**Slide 25**

Now that you have a paper clinometer, lets learn how to use the app so you can compare your results from your tree height measurements. This video will show you how to take an observation with GLOBE Observer when you download the app.

[“How to Take a Trees Observation”](https://youtu.be/ZaUxc-Aal4Y) video [8:21] (youtu.be/ZaUxc-Aal4Y)

**Slide 26**

If you want to get started as a GLOBE Observer, ask your troop leader to register your troop through SciStarter, then send you the link to set up your accounts.

[URL to set up a SciStarter account](https://scistarter.com/girlscouts/volunteer/landing) (scistarter.com/girlscouts/volunteer/landing)

**Slide 27**

Once you have a troop SciStarter account, you will choose which citizen science opportunity interests you – If you want to use the GLOBE Observer app to measure trees, choose “GLOBE Observer Trees.” There are a lot of different citizen science projects (including others with NASA) and others with GLOBE Observer: Trees, Land Cover, Clouds, and Mosquito Habitat Mapper, that you may be interested in contributing data to as well.

### **Slide 28**

Once you've chosen your project, then you need to download the app. It's available on Google Play or at the App Store.

[Download the app](https://observer.globe.gov/get-the-app) ([observer.globe.gov/get-the-app](https://observer.globe.gov/get-the-app)) and register as a GLOBE observer. Then collect your data.

So now you've learned to Think Like a Citizen Scientist by observing, collecting and analyzing data. The next step is to collect and analyze your own data by using the app.

### **Slide 29**

Then, as you work toward completing your Think Like a Citizen Scientist Journey, consider how you might use your data to take action.

What kind of take action projects could you think of doing?

- Plant a tree and track its growth. (Bonus points because this also completes steps in the [Girl Scout Tree Promise](https://www.girlscouts.org/en/activities-for-girls/for-every-girl/tree-promise.html), [www.girlscouts.org/en/activities-for-girls/for-every-girl/tree-promise.html](https://www.girlscouts.org/en/activities-for-girls/for-every-girl/tree-promise.html)).
- Create a program to teach other Girl Scouts about a tree or tree species that is important to you.
- Start a hiking group and take tree height observations as part of your walk.
- If you know of a place that is undergoing changes (a new building being built, a development, a place where regrowth is happening after a landslide or forest fire – of course only after it is safe to do so) monitor that change with scheduled observations.
- On a road trip take tree height observations of trees at your stops along the way. You could even use this information to make observations about tree height in different locations
- Take tree height and land cover observations from the same place in different seasons, then compare the changes to the tree height from year to year and look for differences between the images to learn more about seasonal effects on the land.
- Create a [GLOBE Team](https://www.globe.gov/globe-community/globe-teams) ([www.globe.gov/globe-community/globe-teams](https://www.globe.gov/globe-community/globe-teams)) for your troop, council, or service unit and take observations that are grouped together

### **Slide 30**

We would also love for you to share your Take Action projects inspired by GLOBE Observer. Please share on social media or email us at GLOBE Observer.

### Slide 31

What I love about Girl Scouts is that you all leave the world a better place. I for one am really excited that you are leading the future for us. Thanks for joining the NASA GLOBE Observer and Girl Scouts Think Like a Citizen Scientist Journey!

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Follow up email for your troop:

Thanks for joining the NASA GLOBE Observer and Girl Scouts Think Like a Citizen Scientist Journey!

I mentioned a few links in the presentation that you may want to revisit, and I've included a "How To Guide" to help your troop leaders or parents get you started.

- [Earth Observatory for Kids](http://earthobservatory.nasa.gov/eokids) (earthobservatory.nasa.gov/eokids) – articles and activities for kids 9 – 14 years old. Explore how NASA uses satellites to learn more about Earth.
- [GLOBE Observer app link](http://observer.globe.gov/get-the-app) (observer.globe.gov/get-the-app) or download from the App Store or Google Play.
- [GLOBE Visualization System](http://vis.globe.gov) (vis.globe.gov) to see other citizen science data from GLOBE Observers around the world. You can look for tree height pictures or check out data from the other GLOBE tools.
- [NASA Worldview](http://worldview.earthdata.nasa.gov) (worldview.earthdata.nasa.gov) to explore current and past satellite data (yes, you can view data as early as today in near real time).
- [GLOBE Teams](http://www.globe.gov/globe-community/globe-teams) (www.globe.gov/globe-community/globe-teams)
- [Girl Scout Tree Promise](http://www.girlscouts.org/en/activities-for-girls/for-every-girl/tree-promise.html) (www.girlscouts.org/en/activities-for-girls/for-every-girl/tree-promise.html)
- [How to Take a Tree Height Observation](https://youtu.be/ZaUxc-AaI4Y) video (youtu.be/ZaUxc-AaI4Y)