

MULTI-LEVEL

Think Like a Citizen Scientist Journey

NOTES TO VOLUNTEERS

On this Journey, girls will learn how scientists use the scientific method to find answers to scientific questions and solve problems. They'll practice making observations and collecting data to better understand their environment before they take part in a citizen science project.

Throughout the Journey, girls will also Take Action. They'll brainstorm issues they care about and problems in their communities, digging deeper to explore the root issues and impact. They'll decide on one problem to address as a group. After, they'll plan, create, and present their sustainable Take Action project.

About the Journey:

Use the Talking Points (But Make Them Your Own): In each meeting, you'll find suggested talking points under the heading "Things to Know." Some volunteers, especially new ones, find it helpful to follow the script. Others use the talking points as a guide and deliver the information in their own words. Either way is just fine.

Girl Leaders: At this point, your girls might be ready to lead the meetings, and that's fantastic! To help, you might decide as a troop on girl leaders for each of the Journey meetings. Share the meeting plan and meeting aids with your girl leaders with plenty of time before the meeting to give time to prepare to lead. If they have any ideas or ways to improve the activities for their Girl Scout sisters, give them the opportunity to try it out!

Be Prepared (It's What Girl Scouts Do!): Each meeting includes a "Prepare Ahead" section that includes a materials list and what kind of set-up is required. Read it in advance so you have enough time to gather supplies and enlist help, if needed.

Use Girl Scouts' Three Processes: Girl-led, learning by doing, cooperative learning: These three processes are the key to making sure girls have fun in Girl Scouts and keep coming back.

"Learning by doing" and "cooperative learning" are built into this Journey, thanks to the hands-on activities and tips. You can look for ways to keep the Journey "girl-led", whether it's helping to prepare or lead a meeting, having girls lead the discussion about the issues they'd like to work on for the Take Action project, or planning the final celebration. They'll help you create an experience where girls know they can make choices and have their voices heard.

Observe. Record Data. Analyze Data.: On this Journey, girls will do hands-on activities to learn about citizen science and the scientific method. They'll learn how to observe closely, record their observations, and analyze what they've learned. They'll put what they've learned into practice by doing a citizen science project.

When they send in the data they collect, girls are doing

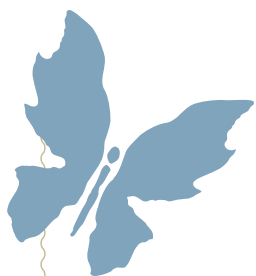
something very important. Their data will help a real-life scientist to do real-life research. They will join thousands — even millions! — of other people who have also done the project and sent in their data. That's how science works — gathering millions of pieces of information and then figuring out how it all fits together. And it all starts with observing, recording, and analyzing data.

Leave Time for the Closing Ceremony: If girls are having fun doing a Design Challenge, you may be tempted to skip the Closing Ceremony so they can keep going—but the Closing Ceremony is absolutely key to their learning. Here's why:

When girls leave a meeting, they'll remember how much fun it was to play an observation game or go outside and take pictures of clouds. However, they may not realize that they just learned how scientists make discoveries — unless you tell them.

That's why the Closing Ceremony is so important. It's where you can connect the dots for girls by:

- *Pointing out how they acted as citizen scientists. For example: They noticed dozens of details, small and large, about nature as they did their project. (You might tell them that children are actually better at citizen science than many adults! That's because children see the world in a fresh way — they don't fall into the habit of seeing what they expect to see.) The girls may have scribbled notes, taken pictures and recorded sounds. They thought about what they discovered.*
- *Reminding girls that they are already scientists, because they're naturally curious about the world. (Think of how many times girls ask "why" — why is the sky blue, why is it cold in winter and hot in summer, why aren't there giraffes in Iowa?) Encourage girls to try to find answers to their questions by observing the world around them and asking questions about what they notice.*
- *Letting them know that they have what it takes to continue exploring STEM.*



When you do that, you turn a *hands-on* activity into a *minds-on* activity. These simple messages can boost girls' confidence and interest in STEM — and end the meeting on an upbeat note!

Tell Your Troop Story: As a Girl Scout leader, you're designing experiences that girls will remember their whole lives. Try to capture those memories with photos or videos. Girls love remembering all they did, and it's a great way for parents to see how Girl Scouting helps their Girl Scouts!

And please do share your photos and videos with GSUSA by emailing them to STEM@girlscouts.org (with photo releases if at all possible!).

To Prepare for the Meetings:

Before each meeting, you'll find an Overview, notes to Prepare Ahead, and a Materials List, all specific to that meeting.

Before each meeting, read through the meeting plan and any meeting aids. This will help you become familiar with the flow of the meeting. Each meeting continues 4 activities: 1) As Everyone Arrives activity, 2) Opening Ceremony, 3) STEM/Take Action Project activity, 4) Closing Ceremony.

The activities contain these important sections:

- Before the activity, set out the “**Materials**” that you'll need, including any samples or printables.
- The “**Steps**” tell you how to carry out the activity. For each step, first read it through and then follow the instructions.
- The “**Things to Know**” will give you background information to help you understand the activity.

As you prepare, it's important to understand the activity steps and Things to Know, but feel free to adapt the activities to fit your troop, meeting time allotment, and available materials.

Handouts specific to the meetings are listed in the Prepare Ahead section of each meeting.

In addition, the following handouts are available in the Meeting Aids for every meeting:

- **Multi-Level 6-12 Think Like a Citizen Scientist Journey – Materials List:** Each meeting has its own materials list. However, if you like to do all your supply shopping at one time, use this handout. It includes the materials needed for the entire Journey.
- **Multi-Level 6-12 Think Like a Citizen Scientist Journey – Glossary:** This is a list of words introduced in this Journey with definitions.
- **Take Action Guide:** The Take Action Guide helps girls see how Take Action projects help them develop the skills to develop a great Silver or Gold Award. The guide includes tips on making a project sustainable and examples of Take Action projects to spark girls' imaginations. It also includes interactive elements that help girls identify problems they want to solve and the talents and skills they can use to Take Action.
- **How to Use SciStarter for the Journey:** In partnership with GSUSA, SciStarter has created a special dashboard for Volunteers and Girl Scouts working on the Journey. This guide gives information on the citizen science project options and information on signing up for and navigating SciStarter.
- **Benefits of a Multi-Level Troop:** This handout highlights the benefits of running a multi-level troop. It also offers practical advice for facilitating STEM Journeys with girls at different grade levels.
- **Think, Pair, Share:** These facilitation tips will help you ensure that every girl's voice is heard during brainstorming activities.

Go over new words girls can learn. In the Prepare Ahead section for each meeting, you'll see a list of words girls may or may not know and how to define them. You can find a full list of vocabulary for the Journey in the **Multi-Level 6-12 Think Like a Citizen Scientist Journey – Glossary**.

Gather materials for the meeting. Before each meeting, gather materials for the meeting's activities. If your meeting location doesn't have a flag, bring a small one that you can take turns holding or hang in the room.

Each meeting includes its own materials list. However, if you like to do all your supply shopping at one time, use the **Multi-Level 6-12 Think Like a Citizen Scientist Journey – Materials List** handout. It includes the materials needed for the entire Journey.

Journey and Meeting Length

- This Journey has been designed to fit into six, 90-minute troop meetings.
- You can adjust times for each activity as needed.
- Give girls 10- and 5-minute warnings before they need to wrap up the last activity so you'll have time for the Closing Ceremony.

Get Help from Your Family and Friends Network

Your Friends and Family Network can include:

- Girls' parents, aunts, uncles, older siblings, etc.
- Other volunteers who have offered to help with the meeting.

Ask your Network to help:

- Bring supplies or other materials for the meetings.
- Assist with STEM activities or support girls as they work on their Take Action project.

Award Connection

Girls earn two awards:

- Think Like a Citizen Scientist award
- Take Action award

Girls earn both awards following the completion of the Take Action project and Journey in **Think Like a Citizen Scientist PT. 6**.

Note to Volunteers: You can purchase the awards from the [Girl Scouts Shop](#) or from your council.



Think Like a Citizen Scientist

JOURNEY BREAKDOWN

THINK LIKE A CITIZEN SCIENTIST PT. 1

- 1: **As Everyone Arrives:** Scientific Discoveries
- 2: **Opening Ceremony:** Journey Introduction
- 3: **STEM Activity:** Observe to Learn About Your Environment
- 4: **Closing Ceremony:** Use Observation to Spot Problems

- Girls begin the Think Like a Citizen Scientist Journey by learning how scientists use the scientific method to answer scientific questions and solve problems.
- They learn about citizen science and how it helps other people, animals, and the environment.
- They make observations, form scientific questions and hypotheses, and create a plan to test a hypothesis they have about their environment.
- They brainstorm ideas for their Take Action project.

THINK LIKE A CITIZEN SCIENTIST PT. 2

- 1: **As Everyone Arrives:** Communities All Around Us
- 2: **Opening Ceremony:** Identify Your Community for the Take Action Project
- 3: **STEM Activity:** Test Your Hypothesis
- 4: **Closing Ceremony:** Take Action Like Scientists

- Girls choose a citizen science project to complete in Think Like a Citizen Scientist Pt. 3.
- They expand the design of their experiment from Think Like a Citizen Scientist Pt. 1 to include tools to collect and measure data.
- They test their hypothesis and compare their results against the original hypothesis to form a conclusion.
- They identify the community they want to impact with their Take Action Project.
- They brainstorm sustainable Take Action projects, sharing problems they've observed in their community.



THINK LIKE A CITIZEN SCIENTIST PT. 3

1: As Everyone Arrives: Hypothesize Root Causes

2: Opening Ceremony: Identify the Problem for Our Take Action Project

3: STEM Activity: Conduct Your Citizen Science Project

4: Closing Ceremony: Create Impact for Others

- Girls conduct their citizen science project from SciStarter.
- They explore the root causes of the community problems they've discussed for Take Action.
- They review their ideas and decide on a Take Action project.
- They reflect on the impact they want to create and form next steps for the Take Action project.

THINK LIKE A CITIZEN SCIENTIST PT. 4

1: As Everyone Arrives: Dream Experiment

2: Opening Ceremony: How to Take Action Like a Citizen Scientist

3: Design Our Take Action Project

4: Closing Ceremony: Share Our Project Plan

- Girls form a hypothesis to define the goals and intended impact of their Take Action project.
- They brainstorm data they have or can collect to inform their Take Action project.
- They decide how to measure and evaluate the success and impact of their project.
- They plan the Take Action project.

THINK LIKE A CITIZEN SCIENTIST PT. 5

1: As Everyone Arrives: Get Ready to Take Action!

2: Opening Ceremony: Review Our Plan to Take Action

3: Create Our Take Action Project

4: Closing Ceremony: Plan to Celebrate!

- Girls review their plans for the Take Action project from Think Like a Citizen Scientist Pt. 4.
- They create their Take Action project and project presentation.
- They plan the awards ceremony & celebration for Think Like a Citizen Scientist Pt. 6.

THINK LIKE A CITIZEN SCIENTIST PT. 6

1: As Everyone Arrives
Prepare for the Celebration

2: Opening Ceremony
Welcome!

3: Take Action Project Presentation & Awards Ceremony

4: Closing Ceremony: Think Like a Citizen Scientist

- Girls prepare the meeting room for the celebration and welcome guests.
 - They present their Take Action project.
 - They celebrate and share what they've learned throughout the Think Like a Citizen Scientist Journey.
 - They earn their Think Like a Citizen Scientist and Take Action awards.
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