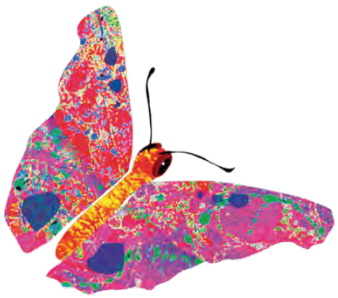
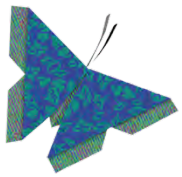
Girl Scout Ambassadors
Think Like a Citizen Scientist Leadership Journey


Discover new treatments for Alzheimer's or cancer. Track a virus in real time to learn how it spreads. Find new ways to protect wildlife from extinction.

These are only a few of the big challenges that scientists want to solve—but they need huge amounts of data to conduct their research. That's where you come in!

Citizen scientists are people who are curious about the world and want to make a difference. They volunteer to collect data and send it to scientists. As a citizen scientist, you may be asked to take photos of clouds or streams, use your smartphone to monitor water and air quality, count the butterflies in your backyard, play games to help with medical research, and much more. No matter what project you choose, you'll make the world a better place.

On this Journey, you'll:

- Find out how scientists use the scientific method to find answers to some of the most important scientific questions facing the world.
- Learn how to collect and analyze data to better understand your environment.
- Participate in a citizen science project.
- Explore the importance of observation, iteration, and collecting data over time.
- Do a Take Action project to address an issue in your community.

You'll earn two Girl Scout awards:

- Earn the Think Like a Citizen Scientist Award by completing Activities 1-3.
- Earn the Take Action Award by completing a Take Action project (Activity 4).

You'll find Take Action tips and inspiring project examples in the **6-12 Think Like a Citizen Scientist Take Action Guide**.

Table of Contents

Glossary

Analyze—to review data or information. The goal of analysis is to create conclusions that explain more about the research subject.

Citizen science—a way for everyday people (that is, they are not professional scientists) to collect information that helps scientists do research.

Conclusion—after scientists analyze their data and results from an experiment, they form a conclusion that answers their scientific question and either confirms or denies their hypothesis.

Data—information that scientists receive, collect, or observe in the field.

Hypothesis—an idea that can be tested to see if it's true. After scientists pose a scientific question, they form a hypothesis as to what they think the answer is.

Iterate—repeating a process many times. Scientists use iteration when they run multiple trials or collect data multiple times for their research.

Observation—paying close attention by using all your senses, especially sight.

Scientific method—the steps scientists take to conduct scientific research.

Scientific question—a question that can be confirmed or denied with an experiment. Scientific questions are testable.

Sustainable solution—a solution that lasts or continues.

Materials List

Activity 1: Explore the Scientific Method–Citizen Science Session 1

- Digital device to access app or website (tablet, computer, or smartphone) to share data for the citizen science project
- Other materials for your citizen science project, found on your SciStarter Dashboard or in the project's instructions.
- Field notebook from Activity 2
- Pen

Prepare Ahead:

1. Create a Girl Scout account here on SciStarter.
2. As you sign up, you'll see a Welcome Video, materials list, an estimated amount of time, and instructions for each project option.
3. Choose a citizen science project to finishing signing up and start the Journey.

Activity 2: Collect Data Over Time–Citizen Science Session 2

- Your field notes, original hypothesis, and data from Activity 1
- Digital device to access app or website (tablet, computer, or smartphone) to share data for the citizen science project(s)
- Other materials as needed, based on the citizen science project(s) you choose. You can find this information on your SciStarter Dashboard or in the project's instructions.
- Regional field guides, devices with nature identification apps, or any other additional research or information about the subject for your citizen science project
- Pen

Activity 3: Learn Something from Your Data–Citizen Science Session 3

- Your field notes, original hypothesis, and data from Activities 1 and 2
- Digital device to access app or website (tablet, computer, or smartphone) to share data for the citizen science project(s)
- Other materials as needed, based on the citizen science project(s) you choose. You can find this information on your SciStarter Dashboard or in the project's instructions.
- Regional field guides, devices with nature identification apps, or any other additional research or information about the subject for your citizen science project
- Pen

Activity 4: Take Action with Citizen Science

- **6-12 Think Like a Citizen Scientist–Take Action Guide**
- Pen
- Paper
- Any other materials you need for your Take Action project. For example, you may need a smartphone or camera if you're creating a video, a laptop if you're creating a PowerPoint presentation to deliver to your school board, city council, community partners, etc.

Activity 1: Explore the Scientific Method–Citizen Science Project Session 1

Purpose

Explore how scientists solve problems as you help real scientists with their research! In this activity, you'll complete the first of 3 observation sessions for a citizen science project.

Time Needed

30-60 minutes depending on the citizen science project you choose

Materials

- Digital device to access app or website (tablet, computer, or smartphone) to share data for the citizen science project
- Other materials for your citizen science project, found on your SciStarter Dashboard or in the project's instructions.
- Field notebook from Activity 2
- Pen

Prepare Ahead:

1. Create a Girl Scout account here on SciStarter.
2. As you sign up, you'll see a Welcome Video, materials list, an estimated amount of time, and instructions for each project option.
3. Choose a citizen science project to finishing signing up and start the Journey.

Background

Scientists study nature and conduct research to better understand how it works. They use what they learn to create solutions that help people, animals, and the environment. To learn new things and do research, scientists use a process called the scientific method.

When scientists need a lot of data for their research, they ask volunteers to collect it. Citizen science could really be called "anyone and everyone" science. It's a way for everyday people to help scientists advance research.

Citizen science brings together people of all different backgrounds to add to the world's scientific knowledge. Scientists use data from citizen scientists, just like you, to find out new things about our world. Scientists use what they learn from the data to create solutions that help others, like helping people when they're sick, keeping our communities safe from pollution, and many other things.

Activity Instructions

Part A: Sign up for SciStarter and choose a citizen science project.

Imagine a scientist wants to know more about butterflies. She wonders: Are they appearing in different areas of the country? Are there more butterflies now than there were ten years ago — or are there fewer? What's causing the change in the number of butterflies

She needs lots of data, or information, to answer that question. So she asks regular people to go outside, count the butterflies they see, and send her their data. When regular people help professional scientists with their research, that's citizen science.

For the next activity, you'll contribute to scientific research by becoming a citizen scientist. Choose a project that interests you or sounds like fun. For example, you can:

- Take photos of the sky and send them to NASA through the Globe Observer Project,
- Identify plants in your background with iNaturalist,
- Play an online game called StallCatchers to help with Alzheimer's research,
- And so much more!

SciStarter has more than 6,000 citizen science projects. We've picked a few that can be done anywhere in the country at any time of the year. Of course, you can do any project that interests you!

Steps

1. Create a Girl Scout account here on SciStarter.
2. Watch the videos, look at the time, materials, and instructions, and find the perfect project for you!

Important Note: In this Journey, you'll be completing 3 observation sessions for a citizen science project. It's recommended to collect data for each session about a week apart. Depending on the project, you may need to upload data for the project each time or collect and save your data to upload altogether at the end of the third session. You can review the instructions for how to submit data for your project on your SciStarter Dashboard.

Part B: Collect data for Session 1 of your citizen science project.

Observation involves using all your senses, especially sight, to carefully notice and record details of the world around you. Observations are a type of data (or information) that scientists gather when they do research.

Scientists also ask **scientific questions** about their observations. Scientific questions are testable; they can be confirmed or denied with an experiment.

For example, imagine a scientist is studying trees. They have two questions about the tree: 1) "How tall is the tree?", and 2) "What is my favorite type of tree?" "How tall is the tree?" is a scientific questions because it asks for information about the tree. It doesn't include any personal feelings or opinions. "What is my favorite type of tree?" asks for an opinion. Scientific questions can't include personal feelings or opinions, so "What is my favorite type of tree?" isn't a scientific observation.

Once a scientist has a scientific question, they make an educated guess about what they think the answer might be. This educated guess is also called a **hypothesis.** Scientists can test a hypothesis to see what parts (if any) can be confirmed. For example, if the scientific question is, "How tall is the tree?", one hypothesis could be, "The tree is 15 feet tall." This question and hypothesis could be tested by measuring the height of the tree.

Steps

1. Define the purpose of your research. What's the subject of your citizen science project? What scientific question are you helping scientists answer? If you need to, watch the "Welcome" video from the scientists again on your SciStarter Dashboard.
2. Form your hypothesis. What do you expect to observe? What do you imagine the answer to the scientists' question might turn out to be?
3. Read the project's instructions on your SciStarter Dashboard, gather any tools or materials , and get ready to collect data!
4. Collect data for your project. Use any materials to collect data for your project. Follow the instructions, found on your SciStarter Dashboard, to make sure you correctly collect all the data scientists have asked for.
5. If you're sending your data after each observation session, log your data through your SciStarter Dashboard. Otherwise, save the data to upload at the end of Activity 3.

Activity 2: Collect Data Over Time–Citizen Science Project Session 2

Purpose

Explore the importance of data and iteration as you conduct the second session of your citizen science project.

Time Needed

30-60 minutes depending on the citizen science project you choose

Materials

- Your field notes, original hypothesis, and data from Activity 1
- Digital device to access app or website (tablet, computer, or smartphone) to share data for the citizen science project(s)
- Other materials as needed, based on the citizen science project(s) you choose. You can find this information on your SciStarter Dashboard or in the project's instructions.
- Regional field guides, devices with nature identification apps, or any other additional research or information about the subject for your citizen science project
- Pen

Background

Scientists often conduct multiple trials of an experiment or multiple observation sessions. This lets them refine their hypothesis and understand more and more about the world each time.

Activity Instructions

Part A: Review your data from Session 1 and prepare for Session 2.

When you send your data to the scientists, they'll analyze it, along with data from other citizen scientists around the world. When scientists looks for patterns and clues in their data, that's called data analysis. To analyze data, scientists might run different math formulas or statistics, create graphics, such as charts or graphs, or compare their data with research other scientists have done. Many times, they'll decide they need to collect even more data.

Just like professional scientists, citizen scientists might also observe their subjects and collect data several times. This allows them to send data to the project's scientist to analyze how things change over time.

Steps

1. Analyze your data from Activity 1. What could your data mean? What does it tell you about the subject? How does it help answer the scientific question?
2. Compare your original hypothesis with your data from Activity 1. Did your data from the first observation session support your original hypothesis? Were you surprised by anything you observed? What do you now know about the subject that you didn't know before?
3. Form a new hypothesis for Session 2. What do you expect to observe this time? Will things be the same? Will they be different? What's changed?

Your new hypothesis should be what you expect to observe during Session 2, given all you've observed, collected data on, and learned so far.

Part B: Collect and analyze data for Session 2 of your citizen science project.

Just like last time, scientists will combine your data with data from other citizen scientists around the world to analyze. With each new set of data, scientists are able to learn more and more about the subject.

As you collect data for your citizen science project, remember all the skills you're using—and that these are skills scientists use every day:

- **Observation –** you're looking very closely at the world around you.
- **Asking questions –** you're asking questions as you make observations.
- **Following methods –** you're following the steps laid out by the professional scientist to gather data for the project.
- **Gathering data –** you're writing field notes, taking photos, taking measurements, etc.
- **Analyzing data –** you'll send your data to a scientist who will combine it with data from many other people and then analyze it.

Steps

1. Review the project's instructions on your SciStarter Dashboard, gather any tools or materials , and get ready to collect data!
2. Collect data for your project. Use any materials to collect data for your project. Follow the instructions, found on your SciStarter Dashboard, to make sure you correctly collect all the data scientists have asked for.
3. If you're sending your data after each observation session, log your data through your SciStarter Dashboard. Otherwise, save the data to upload at the end of Activity 3.
4. Analyze your data. Try to answer these questions:
   - What does the new data mean?
   - What does the new data tell you about the subject?
   - How does the new data help answer the scientific question?
   - How is the new data different from the data from the first observation session? Do you see any patterns?
   - Does the new data support your hypothesis? Did you observe what you expected?

   Look at the field guides or other resources you have to see what more you can learn from your data. For example, if you're studying trees, it may be helpful to see what trees are common in your region and try to identify those you observed.

   Remember, it's okay if you can't form any conclusions about your data. You're still using the scientific method to learn even more your world, just like scientists. You'll have another chance to collect data a third time in the next activity!

Activity 3: Learn Something from Your Data–Citizen Science Project Session 3

Purpose

Explore how to analyze data to find patterns and understand more about a subject as you conduct the third and final session of your citizen science project.

Time Needed

30-60 minutes depending on the citizen science project you choose

Materials

- Your field notes, original hypothesis, and data from Activities 1 and 2
- Digital device to access app or website (tablet, computer, or smartphone) to share data for the citizen science project(s)
- Other materials as needed, based on the citizen science project(s) you choose. You can find this information on your SciStarter Dashboard or in the project's instructions.
- Regional field guides, devices with nature identification apps, or any other additional research or information about the subject for your citizen science project
- Pen

Background

Each time a scientist makes observations, they gather more and more data that can be used to support their hypotheses and form conclusions. They can use the data to create solutions to problems faced by other people, animals, and the environment.

Activity Instructions

Part A: Review your data from Sessions 1 & 2 and prepare for Session 3.

Observing subjects multiple times gives scientists a chance to refine their hypotheses, methods, and learn more about the subject each time. Each time a scientist conducts another research trial (or observation session!), they collect even more data to understand how the world works.

Steps

1. Review your data from Activities 1 and 2.
2. Compare your original hypothesis with your data from Activities 1 and 2. Did your data from the first two sessions support your original hypothesis? Were you surprised by anything you observed? What do you now know about the subject that you didn't know before?
3. Form a new hypothesis for Session 3. Since you've had a chance to observe your subject twice, you have two sets of data taken under different circumstances. As you go out for the third time, think about what's been different each time: How has the weather changed? What other changes have you observed?

   Your new hypothesis should be what you expect to observe during Session 3, given all you've observed, collected data on, and learned so far.

4. Review the project's instructions on your SciStarter Dashboard, gather any tools or materials , and get ready to collect data!
5. Collect data for your project. Use any materials to collect data for your project. Follow the instructions, found on your SciStarter Dashboard, to make sure you correctly collect all the data scientists have asked for.
6. Log your data through your SciStarter Dashboard. If you haven't yet sent any of your data, send the data from all 3 sessions. If you've been logging data as you complete each session, upload only your data for Session 3.
7. Analyze your data. Try to answer these questions:
   - What does the new data mean?
   - What does the new data tell you about the subject?
   - How does the new data help answer the scientific question?
   - How is the new data different from the data from the first two observation sessions?
   - Does the new data support your hypothesis? Did you observe what you expected?
   - Now that you have three sets of data, can you identify any patterns? Can you draw any conclusions?

   Use any field guides or other resources you have to see what more you can learn from your data. Remember, you may not be able to form any conclusions, and that's okay! You're still using the scientific method to learn something about your world, just like scientists. This could be as simple as identifying a plant you saw or understanding why something has changed between two of the observation sessions.
6. Watch the scientist's "Thank You" video on your SciStarter Dashboard.

Activity 4: Take Action with Citizen Science

Purpose

Use all you've learned to create a sustainable Take Action project that solves an issue in your community. Earn the award to complete the Journey!

Time Needed

60+ minutes

Materials

- **6-12 Think Like a Citizen Scientist–Take Action Guide**
- Pen
- Paper
- Any other materials you need for your Take Action project. For example, you may need to bring: A smartphone or camera if you're creating a video, a laptop if you're making PowerPoint slides for a presentation to the school board or city council, etc.

Background

You earn your "Take Action" award for doing a Take Action project that will make a difference in the world. When you do a Take Action project, you look for an issue in your community, come up with a plan to fix it, and team up to take action. Girl Scouts do Take Action projects to help make the world a better place.

You can do another citizen science project as part of your Take Action award if you either:

1. **Connect the project to your community.** For example, if you do the Stream Selfie citizen science project, you may learn that streams in your area are polluted–and then present that information to the city council and advocate for change.
2. **Use what you did on the citizen science project to educate and inspire others.** For example, if you do the Stream Selfie project, you may decide to document what you did with photos and videos and create a presentation or video to tell younger girls how fun and important citizen science is.

For more information and examples of Take Action projects, check out the **6-12 Think Like a Citizen Scientist–Take Action Guide.**

Activity Instructions

Part A: Choose a community to impact with your Take Action project.

When scientists want to start a new project, they choose the purpose of their research. For your Take Action project, you'll choose a community that you want to impact.

All of us are part of communities, such are our:

- **Local Community:** School, local officials and government, animals or animal shelters, sports organizations, veterans, community center, women and girls, immigrants, etc.
- **National Community:** Everything in our local community, the 50 states, the federal government, national parks, the military, etc.

- **Global Community:** Everything in our local and national community, all other countries, regional governments like the EU, the UN, etc.

You can define a "community" in many ways. For example, you might consider your community as your immediate neighborhood or town. However, you might also think beyond geography and explore how underrepresented groups like women and girls, people with disabilities, or veterans are part of the same communities as you.

Steps

1. Create a shortlist of communities you're a part of.
2. Choose a community to impact with your Take Action project. It may be helpful to think about the role you play in each community and how you can create change.

Part B: Choose a problem to address with your Take Action project.

Scientists conduct research projects and experiments to better understand how the world works. They use their results to create solutions that help people, animals, and the environment. Just like scientists, when you Take Action, you identify problems you observe in the world. Then, you use what you've learned to create a sustainable solution.

Steps

1. Create a list of community members. Brainstorm people, groups, and organizations that are a part of your community.
2. Create a list of problems or issues that impact your community. For example:
   - In the first part of the Journey, you made a lot of observations. Did you spot anything harmful or disrupting to nature? What did you observe?
   - What issues have you've observed in your community? This might be issues or issues you've seen, read about or heard about from others.
   - What's important to your community? What are their wants, needs, and concerns?

   Some Ideas to Get Started: Protecting animals, preserving the environment, encouraging more people to enjoy the outdoors, advocating for a lower speed limit or needed streetlight in town, raising awareness for childhood cancers, etc.
3. Narrow your list of problems to the 4-5 issues that interest you the most. Then, consider the root issue of each issue. What's your hypothesis for why each issue happens?
4. Choose 1 issue to address with your Take Action project. To help narrow down your choices, ask yourself "Which of these issues…"
   … seems the most important to my community?
   … affects the most people in my community?
   … do I find most interesting?
   … do I know the most about?
   … am I in the best position to address?
   … offers the best opportunity to develop a sustainable solution?

Part C: Collect data for your Take Action project.

Just like scientists, you can collect data for your Take Action project. By analyzing it, you can better understand your community and the problem you want to solve.

Steps

1. Consider what you know or need to find out about your problem or community. What questions do you have about each? What do you already know? What do you need to find out?

   For example, if the problem is poverty: Why are people poor? What does our community already do to combat poverty? Who does poverty impact the most in our community?

2. Make two lists for your Take Action project: 1) Things you know, and 2) Things you need to find out. Include any datapoints that help to answer these questions:

   - What's the purpose of your Take Action project?
   - What issue are you addressing?
   - Who are the community members impacted by the issue?
   - Why does the issue happen?
   - How is your community addressing the issue now?

   For example, if the issue is plastic pollution, some data points could be: The amount of plastic in the ocean or in local water sources, local organizations that already have projects in place, type of plastics that are better for the environment than others, plastic alternatives, etc.

3. Create a data collection plan. Look at your list of "Things to find out" and make a plan to get that information. For example, you might**:**

   - **Research the issue online.** Find stats and data that tells the story of the issue. Look for information that tells you more about the causes and impact of the issue.
   - **Look at local news sources.** These give you a better idea of how the issue exists at the local level. Look for keywords, people, or organizations mentioned as they might be additional sources of information or people to connect with.
   - **Talk to others in your community.** Interview people or create surveys to collect data. This can help you find out what they know about the issue, what's important to them, and what they would like to see improved. For example, if you're talking to people about plastic pollution, ask about their everyday recycling habits – is it easier for some people to recycle their trash than others? Do they recycle at home? Why or why not?
   - **Go on a community observation walk.** See firsthand what your community knows or is doing about the issue. Look around at public spaces like schools, parks, or community centers to see what resources are available. For example, are there already awareness posters, ads on tv, or school clubs focusing on the issue? If yes, how can you offer a different perspective or a different way to deliver this message? If you're focusing on plastic pollution, what are local restaurants or businesses using for packaging? Are there trash or recycling bins in the areas of high trash at the local stream?
   - **Use what you learned doing your citizen science project.** Remember, completing a citizen science project is not enough for the Take Action project, but you can use what you learned to Take Action. For example, if you completed Stream Selfie, you may have discovered trash or pollution in your town which you can bring to your city council's attention.

4. Follow your plan to collect data for your Take Action project. Make sure to take notes and write down everything you observe and learn.

5. Organize the data for your project. Create new data lists with five categories: “Causes,” “Impacts,” “Evidence of the Problem,” “Community Resources,” and “Community Threats.”
6. Review and analyze your data. What do you now know about the community and the problem? How can you use what you’ve learned to create a Take Action project for your community?

Part D: Design your Take Action project.

Your project must 1) be a **sustainable solution** that addresses the root causes of an issue and 2) incorporate what you’ve learned throughout the Think Like a Citizen Scientist Journey.

Remember, your Take Action project doesn’t necessarily have to involve a scientific solution, such as creating an easy way to purify water, although it can. For example, you can address any issue spanning mental or physical health, food scarcity, civic engagement, the environment, online safety, and so on. But, by using what you’ve learned about citizen science and the scientific method to Take Action, you’ll be thinking like a scientist – and making the world a better place.

Steps

1. Form a hypothesis for your Take Action project. Remember, a hypothesis uses what you know about the subject to form an educated guess as to what will result from your research, experiment, or project. Your hypothesis could also be considered your goal(s) for the project. For example:
    - What impact do you think your project will have on your community?
    - What does success look like for the Take Action project?
    - What are your project’s goals?
    - How can you measure your project’s impact?
2. Brainstorm different ways you can solve the issue. Think about the impact you want to make and how you can achieve that impact with your Take Action project. Look at your data and use it to form a few ideas for your project.
3. Choose one solution to plan in detail. To help decide, ask yourself questions like:
    - Would this solution work? Why or why not?
    - Do I have the time, ability, and/or resources to plan and complete this solution?
    - If not, how can I scale it back and still design a good solution?
4. Design a plan for your Take Action project. Form a list of the major steps and to-dos to reach your goal(s). As you think of what you need to do, don’t forget to consider your data points and what would work best for your community.

    For example: If the project is about forming an environmental action group for youth, one of the steps might be finding out what already exists. Some data points could then be that the community center has a similar group for adults that you may want to connect with, there are summer camps that focus on getting kids outdoors, or there aren’t any existing environmental groups in the area.

    As you create your plan, ask yourself questions like:
    - How will I know if the project is successful? How will I know if I’ve reached my goal(s)?
    - How will I test my proposed solution with the community I’m trying to help?
    - How will I make sure the project is sustainable?
    - What resources or help will I need?

- What do I need to do to get ready for the next step of the project? Are there still questions to answer or data to collect? How will I gather the data I need?

No matter your project, you may want to get feedback on your plan from community members, do more research on the issue, and create a detailed plan, with a budget, materials list, and timeline.

Part E: Create and share your Take Action project.

It might take more time than you expected to complete your Take Action project, but that's all right! Take the time you need to create a lasting project that makes an impact on your community. You'll learn more about yourself and others if you have the time to create a project you care about, instead of rushing to finish within your original timeline.

Steps

1. Follow your plan to Take Action. For example:
   - **If you plan to make a presentation** to your school board, city council, or state legislator, you may need to write speeches, create PowerPoints, etc.
   - **If you plan to organize a debate or event** for the community to discuss the issue, you need to organize the event. You might need to create an agenda, invite community members and panelists, find a venue, etc.
   - **If you plan to do another citizen science project**, you may need to collect and record data. Remember, completing a citizen science project is not enough for the Take Action project, but you can use what you've learned from the citizen science project to Take Action–for example, if you completed Stream Selfie, you may have discovered trash or pollution to bring to the city council's attention.
2. Share your Take Action project on your SciStarter Dashboard by answering these questions:
   - What issue did you want to solve with your Take Action project?
   - What was your solution?
   - How did you make your solution sustainable? (For example: Did you educate and inspire others to follow your lead? Did you create something permanent? Did you get a rule or a law changed?)
   - Add a picture of your Take Action project!
3. Present your Take Action project. Once you've finished your project, share all you've done and learned with others. For example, you might:
   - **Organize a "Girl-Led Talk,"** where you give a speech about the Take Action project. You may also want to film your talks to share with others.
   - **Create a "Call to Action" event.** After presenting your project, invite others to pitch in to address the issue. Depending on the project, guests could sign a petition, contact government officials to share their views, donate supplies or time to keep the project going, etc.
   - **Launch a Take Action Pledge campaign,** asking others to share what they've learned about the issue and giving them a sticker or other item to remind them of their pledge.

To present your Take action project, you might want to answer questions like:

- What problem or issue did you identify for the Take Action project?
- How did you use data and the scientific method to design your project?
- How does your project benefit the community?
- How is your Take Action project sustainable?
- How can others get involved to help solve the issue?

Congratulations!

You've earned your Think Like a Citizen Scientist award, which means you learned how to solve issues and answer scientific questions like a scientist. You completed a citizen science project, where you collected and recorded data to help a real scientist to do their work!

You've also earned a Take Action award because you created a sustainable project to make the world a better place.

You can buy the awards from your council shop or the Girl Scout Shop.

Gold Award Connection

Your Take Action project can help you build skills, such a public speaking, project management, and teamwork, that will help as you take on the Gold Award. You may also be inspired to create a Gold Award project that expands on your Take Action project and amplifies the impact. For more information, check out the **Think Like a Citizen Scientist–Take Action Guide** and learn about the Gold Award here.

girl scouts

Cadette / Senior / Ambassador

GIRL SCOUT TAKE ACTION GUIDE

Think Like a Citizen Scientist Journey

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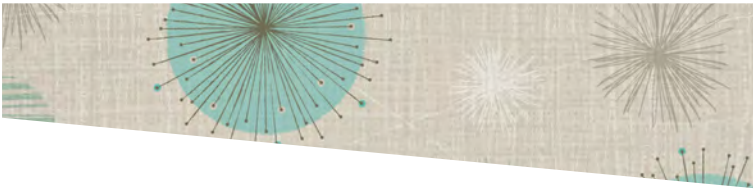

TAKE ACTION: YOUR PATH TO SILVER AND GOLD

You develop important skills when you do a Take Action project—*and* you use those skills to help others. That's inspiring!

When you Take Action, you learn how to:

- Advocate for change
- Analyze data
- Communicate with others
- Craft persuasive arguments
- Create budgets
- Design for sustainability
- Develop timelines
- Empathize with others
- Give presentations and speeches
- Make good decisions
- Manage projects
- Negotiate with others
- Research root causes of issues
- Solve problems
- Think critically
- Work as a team

These are exactly the kind of skills that colleges, universities, and businesses hope to find on college and job applications!

They'll also give you a strong foundation for earning the Silver and Gold Awards, two of Girl Scouts' highest awards. That's because Take Action projects help you develop as a leader.

By doing a Take Action project, you may also discover an issue that's especially meaningful to you and that you'd like to expand to earn your Silver or Gold Award.

To do this, think about how you can amplify what you've already done—how can you help more people, get more support from other organizations, reach new communities, or find other ways to lift your Take Action project to the level of a Silver or Gold Award project.

As a Silver Award Girl Scout, you're advancing on the path to leadership and are eligible to earn your Gold Award. As a Gold Award Girl Scout, you've achieved the highest award in Girl Scouts and are eligible to be selected as a National Gold Award Girl Scout.

And it all starts with Take Action!

As a Cadette, you can earn the Silver Award by creating a project with a small team of girls or on your own. As a Senior or Ambassador, you earn the Gold Award by creating an individual project and organizing a support team.

THE BENEFITS OF GOING GOLD

Higher Education and Career

- Distinguish yourself in the college admissions process
- Earn college scholarships
- Enter the military one rank higher

Life Skills

- Be seen as a role model and distinguished leader
- Master time management skills
- Make the world a better place

Community

- Use your vision for change
- Tackle an issue, locally or globally
- Establish a lifetime network
- Create your community legacy with a sustainable solution to a problem

Ready to get started? *Turn the page* to find out how you can design a project that has lasting impact.

HOW TO MAKE YOUR PROJECT SUSTAINABLE

People sometimes wonder about the difference between a community service project and a Take Action project. Here's how you can explain this to others:

Community Service makes the world better by addressing a problem "right now." For example, collecting cans of food for a food pantry will feed people "right now." Gathering toys for a homeless family shelter will make kids happy "right now." Providing clothing and toiletries to people after a fire or flood will help them "right now." These acts of kindness are important ways to help people—right now.

Take Action makes the world better by coming up with a solution that is sustainable. That means that the problem continues to be addressed, even after the project is over. Developing a sustainable solution is the key difference between community service and Take Action projects.

When you Take Action, you work as a team to:

- Identify a problem
- Research the root causes of the problem
- Come up with a sustainable solution
- Develop a team plan
- Put the plan into action
- Reflect on what worked, what didn't and what you've learned

Here are three ways to create sustainable change:

1

Make your solution permanent.

2

Educate and inspire others to be part of the change.

3

Change a rule, regulation or law.

Here's an example of how to go beyond community service in order to Take Action:

Your team has identified a problem: there's too much trash in the local park. If you go to the park and pick up trash, you will have solved the problem for today—but there will be more trash to pick up tomorrow. That's not sustainable.

So what do you do?

Explore *why* there's so much trash. Here are a few ways you might do that:

Talk to people who work at the park in different kinds of jobs, from the park manager to the groundskeeper. What do they already know about why there's so much trash?

- What do they think causes this problem?
- What solutions have they already tried?
- If those solutions didn't work, what did they learn?

Do a walk-through of the park to understand what visitors experience.

- How far do you have to walk to find a trash can?
- How easy is it to find a trash can?
- Is it difficult or easy to collect your trash and carry it around the park?

Interview park visitors about their experience.

- Why do they think there's a trash problem?
- What are their ideas about how to fix it?
- Record their answers and add them to your research.

Create a digital survey.

- Use social media to encourage people to share their complaints and ideas for solutions.
- Take your tablet to the park and ask people to take your survey in real time.
- Analyze your data and use them to brainstorm solutions.

Research the kind of trash problems that all parks—from community parks to national parks —deal with.

- Are there any studies or articles about how parks have tried to fix the problem?
- Which solutions worked and why?
- Which ones didn't and why?

Here's what you might discover:

- There aren't enough trash cans in the park.
- There *are* enough trash cans—but they're hard to find.
- The trash cans are not placed in convenient locations, so people have to walk out of their way to throw away trash.
- People don't realize the importance of putting trash in the trash cans.

Here's how you might address these issues:

- Make a presentation to the city council to present your data and advocate for your chosen solution.
- Create an anti-littering public awareness campaign.
- Design and build interactive garbage cans that make it fun to toss away trash. (For inspiration: Search online for "the fun theory" or "the world's deepest bin.")

Turn the page to start exploring your own.

YOUR TAKE ACTION TALENT INVENTORY

What are your talents—painting portraits, coding, creating fun events, public speaking, writing, organizing groups of people, creating budgets, speaking another language, playing a musical instrument?

What do you do for fun—skateboarding, building drones, sewing costumes, cooking, doing karaoke, hiking, playing games on your phone, listening to music?

You can use what you're good at (your talents and skills) and what you do in your spare time (your interests) when you design your Take Action project. You'll have fun and people will be inspired by the enthusiasm you bring to your project.

Check each talent or interest you can use to Take Action—then add a few more!

- ☐ create a comic
- ☐ start a blog
- ☐ design a website
- ☐ code an app
- ☐ develop a workshop
- ☐ design a prototype for a new invention
- ☐ create a social media campaign
- ☐ organize a "girl-led talks" event
- ☐ build a maker space
- ☐ organize a panel discussion or debate
- ☐ make a movie
- ☐ design an exhibit
- ☐ write a book
- ☐ organize an online community
- ☐ create an artwork
- ☐ invent a new product
- ☐ make a playbook
- ☐ create a 'zine
- ☐ circulate a petition
- ☐ create a volunteer group
- ☐ invent a new process
- ☐ organize a volunteer effort
- ☐ design a video game
- ☐ create an online class
- ☐ create digital surveys and analyze the data
- ☐ create a data base
- ☐ make an infographic
- ☐ hold a storytelling festival
- ☐ advocate for a new law
- ☐ change an existing law
- ☐ build a playground
- ☐ create an art gallery
- ☐ organize a community event
- ☐ Other ideas:

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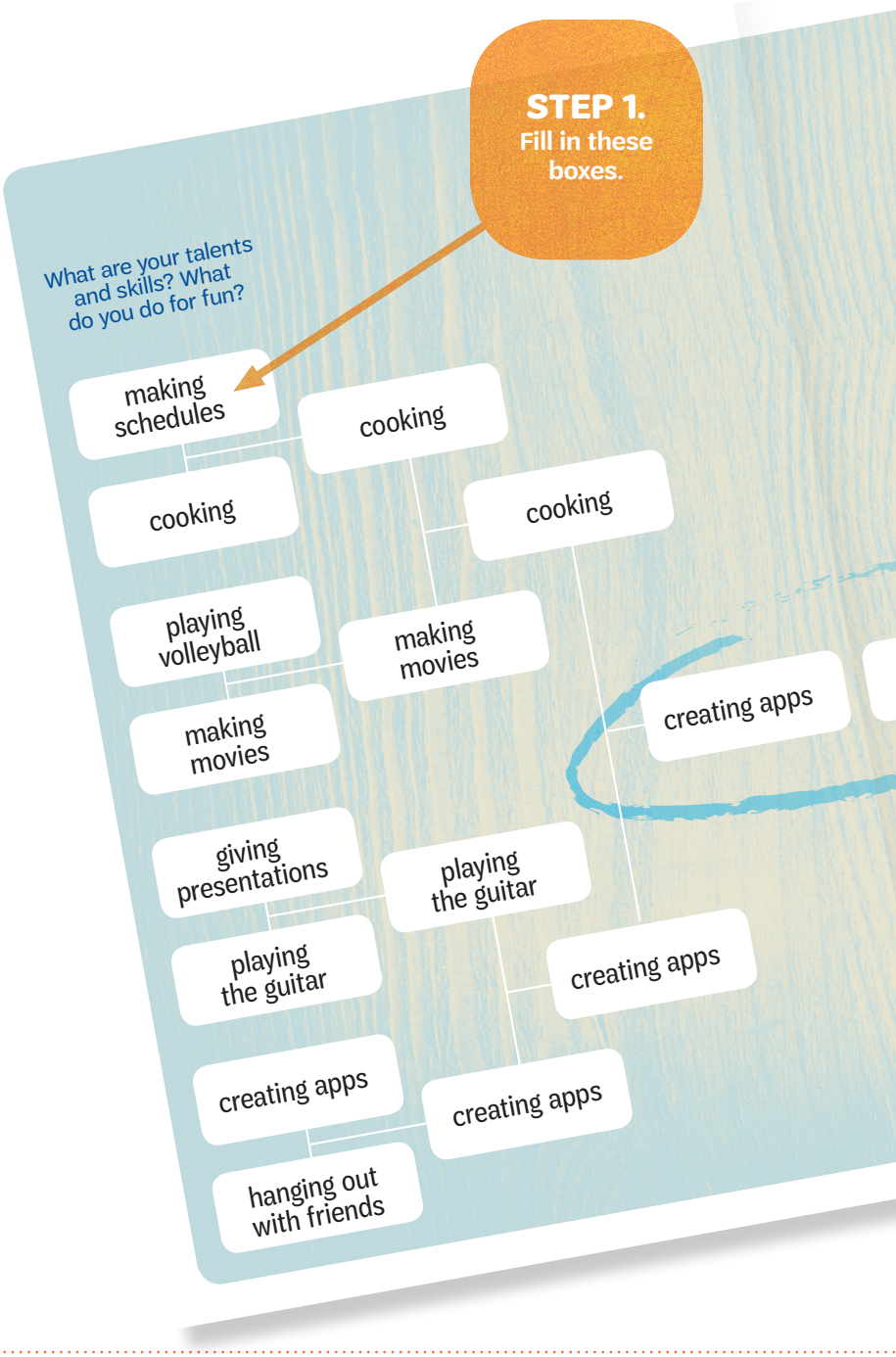
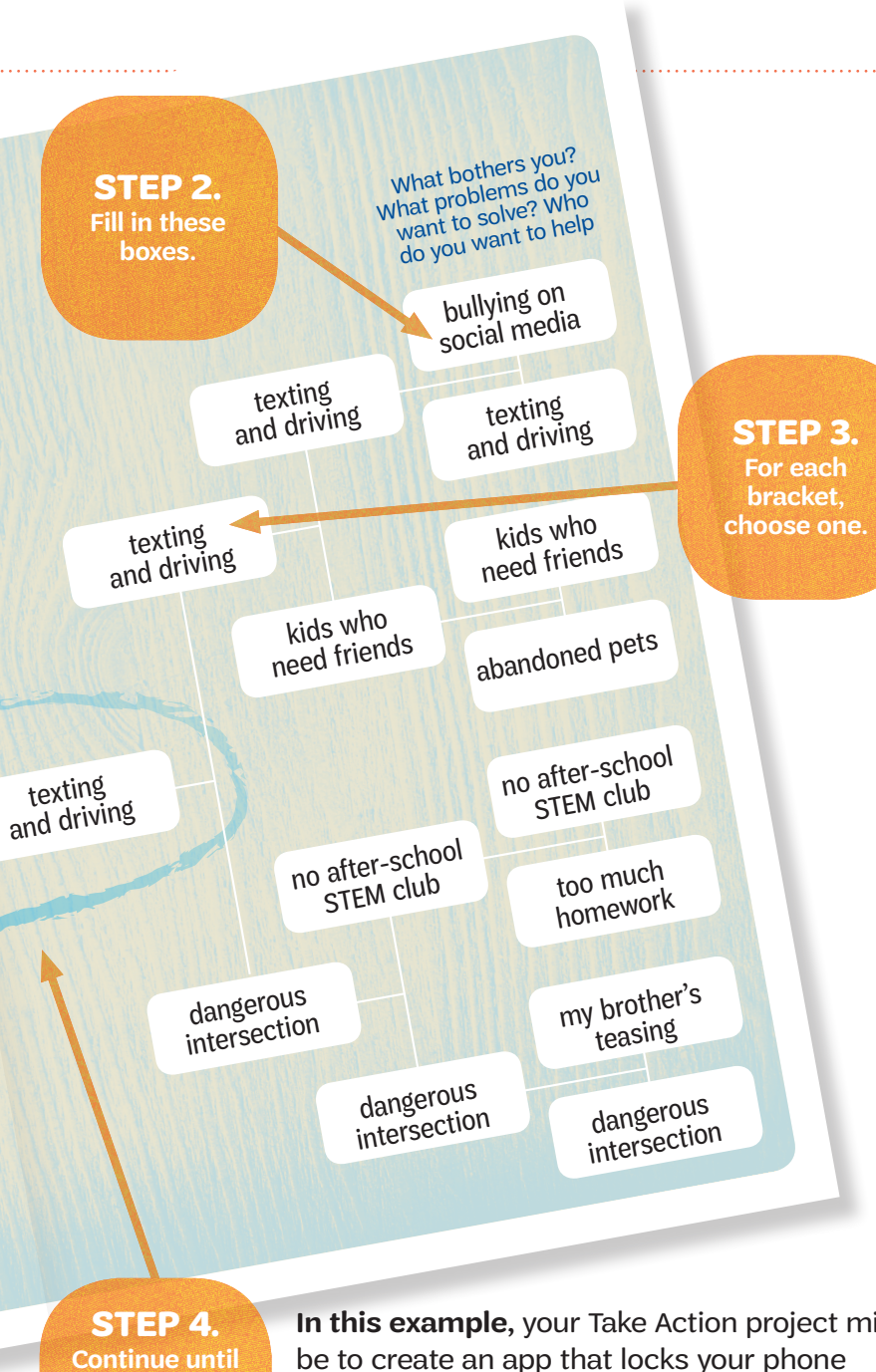
How can you match your talents and interests with an issue you care about? ***Turn the page to find out!***

Example: Take Action Decision Bracket

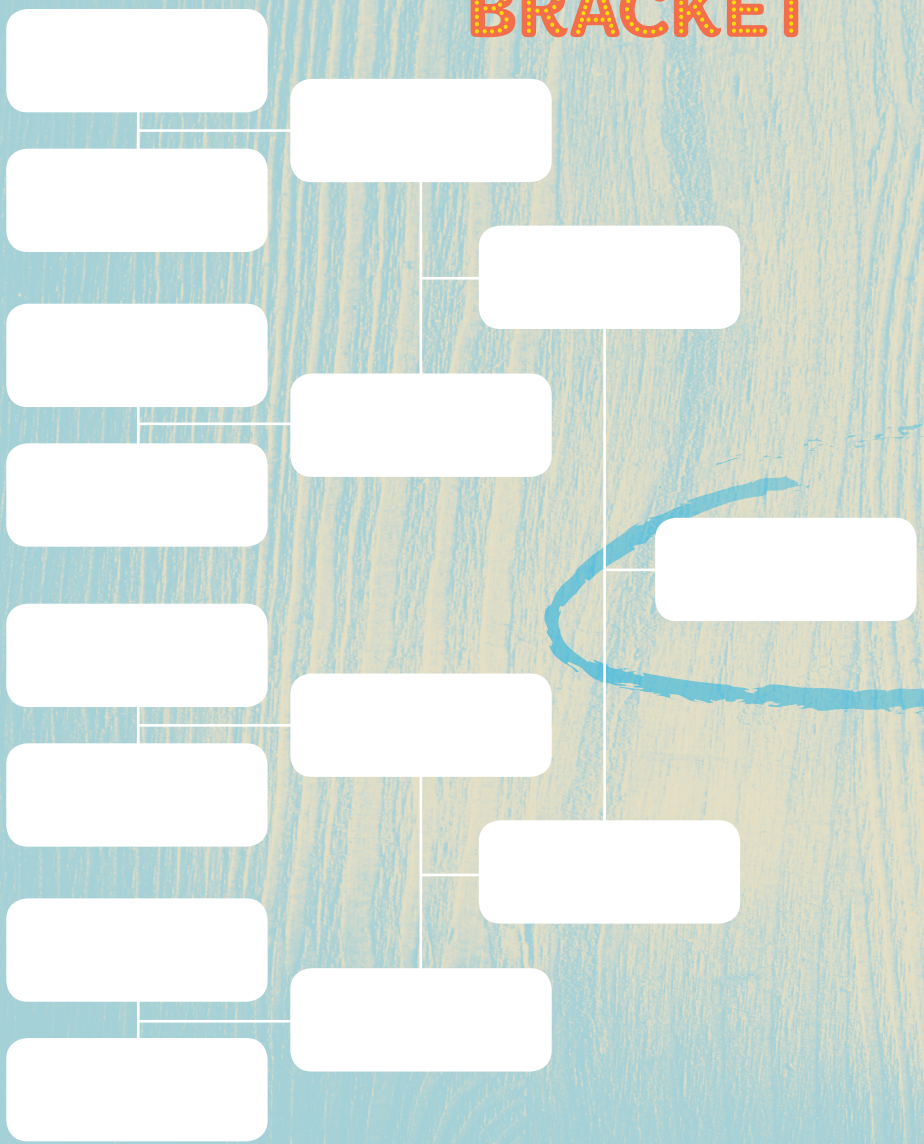




In this example, your Take Action project might be to create an app that locks your phone before you drive, then sends a unique code to someone who's not in the car. You can't use your phone until the person with the code unlocks it.

YOUR TAKE ACTION DECISION BRACKET

What are your talents and skills? What do you do for fun?



What bothers you? What problems do you want to solve? Who do you want to help

Combine the final pair to create your Take Action project!

Want more Take Action project examples? *Turn the page!*

HOW TO FIND TAKE ACTION INSPIRATION

Follow the news. Watch news on TV, read newspapers and magazines, listen to the radio, follow social media, or subscribe to blogs and news feeds—it doesn't really matter how you tune into what's happening in the world. What matters is that, when you do, you hear inspiring stories about people who:

- stood up and spoke out to advocate for change
- invented a product—such as a language-learning app, new medical device, or robot that assists people with disabilities—that helps others
- created bonds between people of different backgrounds so they could solve problems together
- built something useful—such as a bike path, playground, public garden, or maker space—to improve their community

Keep a list of stories that inspire you. How can you address the same issues or use a similar approach to Take Action in your community?

Find out what other Girl Scouts have done. Many Take Action and Silver Award projects are posted on Girl Scout council web sites and social media. You can also attend council recognition ceremonies and meet other Girl Scouts who took action in meaningful ways.

Fill out Your Take Action Talent Inventory on page 8. You'll be inspired to Take Action—and have more fun!—when you create projects that use your talents, interests, and hobbies to change the world.

Try out Your Take Action Decision Bracket on page 12. Use this interactive exercise to combine your talents/interests and the issues you care about. Play as many times as you like—you may be surprised by the ideas this generates!

If you're working with a team of girls on a Silver Award project, this could also be a fun way to narrow down your ideas. If you're working solo on a project, this is a good way to quickly come up with lots of possible "talent/issue" combinations.

Get inspired by some Take Action project examples, starting on page 16. Some are actual projects done by Girl Scouts; others are examples that can serve as thought-starters. Use them as inspiration as you explore the problems you want to address in your own community.

Once you've chosen an issue you feel passionate about, it's time to put your imagination, creativity, and leadership skills to work—and come up with your own way to Take Action!

Turn the page for examples of Take Action projects.

TAKE ACTION PROJECT EXAMPLES

In the Think Like a Citizen Scientist Journey, you learned about citizen science, the scientific method, and how scientists use both to answer scientific questions, solve problems, and learn more about the world.

When you develop a Take Action project, you can use what you learned: how to observe problems in your community, collect data and research about the problem, develop a possible solution, and put it into action. If your chosen solution doesn't work right away, you use data and feedback to make it better.

The Take Action project you do as part of this Journey doesn't necessarily have to be about citizen science (although it certainly can be!).

You may choose to address issues related to mental or physical health, food scarcity, civic engagement, the environment, online safety, and so on. No matter the topic, if you use what you learned about citizen science to develop your project, you'll be thinking like a scientist—and making the world a better place.

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The following examples [illegible]

Use them as inspiration as you develop a project about something that you care about.

1

Issue: More people need to know how they can do citizen science projects to help scientists learn about the world. If more people participated, scientists would have more data to analyze!

Solution: Educate and inspire others by sharing your experience and what you've learned about citizen science. For example, you might organize a citizen science activity at your school, local library, or community center. Or, you might organize a Citizen Science Day at your school or in your town. You can set up Citizen Science Stations with handouts explaining different projects (and materials, if needed). Then, invite everyone to choose a project, collect data, and upload it.

Sustainability: Educate and inspire others.

2

Issue: Farmers need to conserve water during droughts while also sustaining their businesses

Solution: A Girl Scout Ambassador from Northern California developed soil moisture sensors and readers to help farmers conserve water and use less groundwater. The sensors are planted into the soil; they allow farmers to read and determine the moisture level in the soil. Based on this technology, farmers on average saved 25 percent of their monthly water use. Now, the Girl Scout is in the process of patenting her product and has created a Facebook site and video log to show others how they could replicate her project globally.

Sustainability: Make your solution permanent.

3 **Issue: It's difficult to see stars and planets at night — even in a park — if there are too many street or other man-made light sources nearby.**

Solution: A Girl Scout Ambassador from Virginia decided to get a state park designated a "dark sky park" by the International Dark-Sky Association. A "dark sky park" has a protected nocturnal environment that leads to clear, starry sky views. To earn her Gold Award, she changed the park's lights and added motion sensors and shields so they didn't emit as much light. She also created posters for the park cabins to let visitors know how the changes were reducing light pollution.

Sustainability: Make your solution permanent; educate and inspire others.

4 **Issue: More than 500 million straws are thrown away each day in the U.S. alone.**

Solution: For her Gold Award project, a Girl Scout in California formed a nonprofit, Jr Ocean Guardians, to share her passion to save our oceans with other kids. The Girl Scout and her team hosted beach cleanups and educated others about the issue of plastic waste and the importance of recycling. But, she didn't stop there! She advocated to CEOs of businesses like Alaska Airlines and Starbucks to stop using plastic straws. She also reach out to her local and state governments, and the California Coastal Commission unanimously approved her "No Straw November" Resolution. The following year, both the California State Senate and Assembly officially passed SCR-139 No Straw November to officially recognize November in California as No Straw November!

Sustainability: Educate and inspire others; change a rule or law.

5

Issue: Students don't always feel they have a voice in issues that affect them at school.

Solution: Use what you learned about data collection to create a survey that the school administration can use to poll students and collect data on a regular basis. Develop a database of responses, analyze the data, and create reports that can be shared with students, teachers, and administrators. Train school staff members to use your tools so they can continue to be used even after you graduate.

Sustainability: Educate and inspire others.

6

Issue: Perhaps you've done a citizen science project that's really sparked your interest. For example, maybe you've discovered that a river near your town is polluted or that bees are dying off and our food supply is threatened. Perhaps you've realized that monarch butterflies are in danger because the milkweed plant, their main source of food, is disappearing.

Solution: Create a video, presentation, skit, event, poster campaign, movie, etc. to tell people about the problem — and give them several ways they can take action to address it. Or, do some research and find out how changing a local law or regulation could address the problem. Make a presentation to your city council, start a petition drive, or advocate to your government at the state level for a change in laws or regulations to address the problem.

Sustainability: Educate and inspire others; change a rule or law.

7

Issue: Through your citizen science project, you learned about the dangers of air pollution. Then, you observed that parents often run their engines outside the school as they wait to pick up or drop off their children - this pollutes the air.

Solution: Make a presentation to the school board or administrators about why this is a problem and suggest a new rule that makes the pick-up/drop-off area a "no idling" zone.

Sustainability: Change a rule or law.

8

Issue: "Food deserts" are areas where access to affordable, healthy food is limited because grocery stores are too far away. Approximately 2.3 million people (2.2% of all US households) live in low-income, rural areas that are more than 10 miles from a supermarket. With limited options, many people living in food deserts get meals from fast-food restaurants.

Solution: Collect data from your community to find out what resources there are to start a community garden in your neighborhood. Or, you might learn by talking to community members that there's already a local garden whose work you can lift up and support. By spreading the word to your community and gathering volunteers to help tend the garden over time, you can help to provide healthy, affordable, and sustainable food options to others.

Sustainability: Educate and inspire others; make your solution permanent.

9

Issue: Name the issue — ocean-polluting plastics, middle-school bullying, girls opting out of STEM classes, homeless families, the health risks of obesity, the need for citizen engagement, the danger of cybersecurity breaches, and so on — and you'll find girls who want to find a solution.

Solution: Everyone's heard of TED Talks, the inspiring and informative speeches given by people with a mission to change the world. Create a "Girl-Led Talks" event that features girls speaking out on an issue they care about. Film the talks and post them to an online site to spread the word far and wide.

Sustainability: Educate and inspire others.

10

Issue: Communities are often economically and racially segregated, which can lead to a divided community.

Solution: A Girl Scout Ambassador in Florida used her hospitality skills to ease tensions in her racially and economically diverse area by building bridges among her peers. She hosted a dinner party for 120 students from 12 public and private high schools. The dinner party brought everyone together for critical conversations about how to prevent bullying and strengthen relationships that promote peace, equality, truth, and unity, both among the students themselves and within the community at large.

Sustainability: Educate and inspire others.

CHANGE THE WORLD—THROUGH CITIZEN SCIENCE!

Citizen scientists can:

- make a direct contribution to scientific research
- collect data to help scientists answer scientific questions
- gather and use data to make a difference for people, animals, and the environment
- connect people around the world
- and much more!