Think Like a Programmer pt. 3

Overview
Juniors connect their personal interests to computer science by sharing something they know a lot about and teaching it to a small group. The groups will then make a “rapid” prototype of an innovative idea and share it.

Notes for Volunteers:

Use The Talking Points (But Make Them Your Own): In each session, you’ll find suggested talking points under the heading “SAY.” 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.

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 Juniors 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’ll also find specific “keep it girl-led” tips in the meeting plans. They’ll help you create an experience where Juniors know they can make choices and have their voices heard.

Solve Big Problems Step By Step: On this Journey, Juniors will do hands-on activities to learn how computer programmers think through problems. They’ll learn to follow and create algorithms, break big problems down into smaller ones, and persist when faced with challenges.

You can help Juniors think this way! Encourage them to keep trying when their first few approaches to solving a problem don't work. Tell them that they can solve any problem if they break it down in smaller ones. And remind them that they can use those skills in their daily lives as well.

Leave Time For The Closing Ceremony: If Juniors are having fun doing an activity, 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 Juniors leave a meeting, they’ll remember how much fun it was to plant a seed, make a suncatcher or play a game of "Programmer Says." However, they may not realize that they just learned how algorithms work — unless you tell them. When you do that, you turn a *hands-on* activity into a *minds-on* activity. During the Closing

Ceremony, you can connect the dots for girls by:

- Pointing out how they acted as programmers. (For example: They used an algorithm to plant a seed or they created an algorithm to teach a skill to others. They struggled a bit with a challenging activity — but they persisted. Now they know that they can solve hard problems if they keep trying. They worked together to solve problems.)
- Reminding Juniors that they are *already* programmers — and that it's fun to solve problems using programming.
- Letting them know that they have what it takes to continue exploring STEM.

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 girls.

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

Program Pairing: The Junior Digital Photographer and Entertainment Technology badges go well with this Journey!

Prepare Ahead (Roughly 60 minutes)

1. **Watch a video (6 minutes)**

Computer Science is Changing Everything **activity video** (5:39)
code.org/girlscouts/PersonalInnovations/ActivityVideo

This video relates computer science to a variety of sectors and careers. It can be shown to the girls during Activity 4: Closing Ceremony: Time to Decide on Take Action. **This is optional.** You may not have the wi-fi connection or the time to show the video.

2. **Review vocabulary (2 minutes)**

This meeting includes the following vocabulary:

- **Algorithm -** a list of steps that allow you to complete a task.

- **Innovation -** a new or improved idea, device, product, etc.
- **Prototype -** a sketch of an idea or model for something new. It's the original drawing from which something real might be built or created.
- **Inventors -** people who make up new things and products.

See the **Junior Think Like a Programmer Journey Glossary** for more vocabulary and examples.

3. **Read through this guide and its Meeting Aids (15 minutes)**

This will help you get familiar with the flow of the meeting.

Read the following handouts (found in the **Meeting Aids** section):

Junior Think Like a Programmer Journey Materials List: Each meeting has its own materials list, but you can use this handout if you like to do all your supply shopping at one time. It includes all materials needed for the entire Journey.

Junior Think Like a Programmer Journey Glossary: This is a list of words that Juniors may not know and how to define them.

Think, Pair, Share: These facilitation tips will help you to make sure that every girl's voice is heard during brainstorming activities.

Take Action Guide: This handout explains the difference between Take Action and Community Service. It also includes tips to make a project sustainable and Take Action project ideas that you and your troop can use as inspiration.

4. **Gather materials (30 minutes)**

Gather materials using the Materials List for this meeting. If your meeting location doesn't have a flag, bring a small one that Juniors can take turns holding or hang in the room.

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:

- Make snacks

Award Connection

Juniors earn two awards:

- Think Like a Programmer award
- Take Action award

Juniors will earn both awards following the completion of the Take Action project and Journey in **Think Like a Programmer PT. 6.**

(Note to Volunteers: You can buy these awards from your council shop or on the Girl Scouts' website.)

Meeting Length

90 minutes

- The times given for each activity will be different depending on how many Juniors are in your troop.
- There is no snack time scheduled in these meetings, but there are 15 minutes of "wiggle room" built in for snacks or activities that run long.
- Give Juniors 10- and 5-minute warnings before they need to wrap up the last activity so you'll have time for the Closing Ceremony.

Juniors connect their personal interests to computer science by sharing something they know a lot about and teaching it to a small group. The groups will then make a "rapid" prototype of an innovative idea and share it.

Materials List

Activity 1: As Girls Arrive: Tech Collages

- Magazines and catalogs, tech or regular
- Scissors
- Glue sticks
- Construction paper

- Optional: Stickers, other things to add into the collages

Activity 2: Opening Ceremony: Reviewing Our Take Action Ideas

- Flag
- List of Take Action ideas from last meeting
- Index Cards (Slips of paper, post-its, or a whiteboard and marker)
- Pens
- Tape
- Optional: Poster Board with the Girl Scout Promise and Law

Activity 3: Personal Innovations

- Post-its or slips of paper and tape (at least one for each girl)
- Markers, pens, or pencils
- Poster paper for sharing innovations (one for each girl)
- **Personal Innovations Activity Guide** (one for each girl)
- Markers, pens, or pencils
- Tape to hang posters

Activity 5: Closing Ceremony: Friendship Circle

- Juniors' Take Action ideas on index cards.
- Optional: Computer/tablet or other device with ability to show girls the *Computer Science is Changing Everything* video

Awards

Juniors do not receive any awards in this meeting.

Detailed Activity Plan

Activity 1: As Girls Arrive: Tech Collages

Time Allotment

10 Minutes

Materials

- Magazines and catalogs, tech or regular
- Scissors
- Paper
- Markers or crayons

Steps
Welcome Juniors, and have them look through the magazines to find examples of how technology has changed different products we use every day.

SAY:
Today, we're going to focus on technology, innovation, and developing new products!

Take a look at these magazines. See if you can find pictures that show how products have changed because of technology.

For example, you might find a picture of a regular wristwatch and a smart watch, or a picture of an old-fashioned phone and a smartphone.

If you can't find what you're thinking of, you can draw it!

Activity 2: Opening Ceremony: Reviewing Our Take Action Ideas

Time Allotment
15 Minutes

Materials
- Flag
- List of Take Action ideas from last meeting
- Index Cards (Slips of paper, post-its, or a whiteboard and marker)
- Pens
- Tape
- Optional: Poster Board with the Girl Scout Promise and Law

Steps
Recite the Pledge of Allegiance and the Promise and Law

Conduct any troop business.

Have Juniors write their Take Action ideas on index cards to start contemplating their choices and learn about decision-making.

Review Take Action ideas by posting them up on a board or wall so Juniors can make a decision during the Closing Ceremony.

SAY:
Doing a Take Action project is a little bit like adding technology to a product, isn't it? Adding technology can make a product better. Taking Action definitely makes the world better!

Over the last meetings, you came up with a list of ways that you might like to Take Action. Let's go over your list.

Give Juniors a chance to make more suggestions.

Write the ideas down on index cards. Use short descriptions instead of the whole idea. For example: "Make Save Water Poster." or "Skit About Kindness."

Have Juniors tape the new index cards on the wall with the others so they can look at them and think about them.

SAY:
Have you ever made a decision before? For example, have you been asked to pick a dessert for your family to eat or to choose a game to play with your friends? Tell us about it.

Give Juniors a chance to answer.

SAY:
In our Closing Ceremony, you'll make a decision as a team about what Take Action project you want to do. Until then, think about what project you like and why.

Activity 3: Personal Innovations

Time Allotment
40 Minutes

Materials
- Post-its or slips of paper and tape (at least one for each girl)
- Poster paper for sharing innovations (one for each girl)
- **Personal Innovations Activity Guide** (one for each girl)
- Markers, pens, or pencils
- Tape to hang posters

Steps

Discover Your Special Skill. (5 minutes)

Introduce Juniors to the activity.

SAY:
Today we're going to share our talents and teach others to do something we are good at.

What's something that you know a lot about? Something that you could teach somebody?

There is something that you probably know a lot about - maybe you feel like you know more about than most people.

Keep It Girl-Led: Let girls answer, but be mindful of what they choose. For the next activity, girls will be breaking down each of these chosen interests into step-by-step instructions to teach others.

Girls may say: I am good at playing soccer, I know how to dance, I'm good at bugging my older brother, I'm good at drawing, etc.

SAY:

*Now, can you think of something that you could teach to somebody else in, say, 15 minutes? For example, you couldn't teach someone everything they need to know about playing soccer, right? But you **could** teach them how to kick a ball right into the net.*

Let's take one minute to write down something you could teach somebody else, based on what you're really good at.

If girls need more direction, **SAY:**

Maybe you know how to draw a house, make a cootie-catcher, make a smoothie, do a dance move, shoot a basket, etc.

Give each girl a Post-it note or a slip of paper you can tape to the wall. Give the girls 1 minute to write what they could teach and stick it on the wall.

Once all of the girls have put up their Post-its, have the girls read each other's ideas. You may want to save time by reading the ideas to the girls.

Create Algorithms to Teach Others. (10 minutes)

Explain how girls can create algorithms to teach others what they are good at.

SAY:

Would anyone like to learn a new skill from someone else in our troop?

Girls may say: Yes, I'd like to learn to play basketball, etc.

Great! Does anyone have an idea how we could teach each other?

Let girls answer. Guide them toward connecting learning a new thing with following a set of steps or instructions.

Girls may say: Yes, we follow directions, listen to each other, etc.

That's right! We give each other instructions or algorithms to follow. Can anyone remind me what an algorithm is? **(Answer: An algorithm is a set of steps that allow you to complete a task.)**

Now, you are going to create an algorithm to teach others your interest.

Divide girls into groups of 3 – 4. Try to group girls with different interests.

For example, group girls who have topics such as: "soccer," “dancing," “smoothies," “cootie-catchers.”

Girls spend about ten minutes creating a series of steps (3 or more) to teach the others in her group.

As the girls work, circle around to make sure everyone's steps make sense and are feasible. If their interest seems too broad, help them narrow down the task to make creating the algorithm easier.

Example: "Shooting baskets" is more specific then "Playing basketball" so may be easier to create an algorithm for.

SAY:
Okay, now it's time for us to learn from each other.

You're going to take turns teaching the other girls in your group.

Each one of you will get 2 minutes to take your group through the steps of your algorithm.

The rest of your group will list to your algorithm and act out the instructions.

Keep track of time. Give each girl two minutes to teach. Let girls know when they have 15 seconds left.

Make sure every girl gets a chance to lead her group.

Brainstorm Technological Innovations. (10 minutes)

Encourage girls to see how technology and innovation plays a role in their lives.

SAY:
Did anyone teach your group about something that involved technology? Maybe how to play a video game or use a device?

Girls may say: Yes, I like to play video games, I like to use apps on a phone or tablet, etc.

People say that technology is all around us, that it affects everything we do. Is this true?

Girls may say: Yes, we all have cell phones, our homes have technology, etc.

How do you think these technologies were created? Who thought of them?

Girls may say: People create new inventions when they have a problem, when they have an idea for something that would be fun, etc.

That's right! People who make up new things are called inventors.

When they make something new or improve something, that's called innovation.

Can you give any examples of technological innovations?

Girls may say: Cars that drive themselves, robots that clean the house, etc.

Great! Now we're going to get back into your groups.

Think of the skills you just learned. As a group, come up with a way that technology could be used to make it easier or more fun.

Example: For basketball or shooting baskets, girls might say they' like to design a ball with the technology to help it more accurately go into the basket.

Rapid Prototyping. (15 minutes)

Explain rapid prototyping to girls before they began to design their ideas.

SAY:
Now, we're going to do something called "rapid prototyping."

A "prototype" is a rough model of your idea or innovation that you can show to other people.

It can be as simple as a drawing or it can be created with common materials such as cardboard, paper, string, rubber bands, etc.

When you make different prototypes of your idea, you can see what works and what doesn't.

Remember, this is a rapid prototype! That means you're going to be working fast! That way you can quickly see what works and what doesn't.

You have 5 minutes to sketch your idea. I'll let you know when you have one minute left. Go!

Watch the time as girls quickly sketch their ideas.

Give girls a 1-minute warning.

At the end of 5 minutes, have girls tape their sketches to the wall. It's okay if the prototype isn't completely finished; this activity is meant to give girls a chance to experience rapid prototyping.

Have a short "gallery walk" so girls can see each other's ideas. If there's time, have girls quickly explain their ideas.

Activity 4: Closing Ceremony: Time to Decide on Take Action!

Time Allotment
10 Minutes

Materials

- Juniors' Take Action ideas on index cards.
- Optional: Computer/tablet or other device with ability to show girls the *Computer Science is Changing Everything* videops

Steps
Have Juniors form a Friendship Circle.

Encourage girls to reflect on their prototypes and technology before choosing a Take Action project.

SAY:
You all have different interest and talents.

You've been learning about how computer programmers think.

Now you can see how programmers can use technology to invent or improve something that's related to their interests and talents.

Lead a quick reflection on what girls just learned. This will help girls make a connection between what they like and technology.

Optional: Show the *Computer Science is Changing Everything* video here.

SAY:
How did it feel to work together? What worked? What didn't?

How could you use prototyping in your day-to-day life?

What's the most exciting thing you could invent or teach others through an algorithm?

Have Juniors look at the index cards of their Take Action ideas, discuss their choices as a group, and then make a decision.

SAY:
Now, you will decide as a team what you want to do.

Give Juniors a chance to talk about the ideas they like (or don't like).

If they disagree, help them to build their conflict-resolution skills.

Remind Juniors to speak with respect, listen to other people, and perhaps even develop a new idea together that everyone likes.

Although it takes a little longer for Juniors to come to a team decision, this process will help them learn to compromise. Instead of stepping in and making the decision for them, help them talk about the pros and cons of each project.

To help Juniors zero in on their top choices, ask open-ended questions, such as:

- *Which of these project ideas sounds like the most fun?*
- *Which projects would help you learn something new?*
- *Which ones will make you feel proud when you're done?*

To help Juniors think about which projects are realistic, ask open-ended questions, such as:

- *Are there any ideas that might be hard to do right now?*
- *It will probably cost a lot of money to do X. As a troop, you have $X to spend. What do you think you should do? You could put it on a list to do later or you could come up with another idea that doesn't cost so much. What do you think?*

If Juniors are divided between a few ideas, ask them to choose one top idea and keep the others as backups. You can also have them vote — just make sure that anyone whose idea wasn't chosen knows that it was a good idea and that it might be used later.

Juniors may reach an agreement quickly. If they don't, note the top 2 or 3 ideas and facilitate an agreement using "fist to five":

- *If you're holding up 5 fingers, you love it!*
- *4 fingers — it's good.*
- *3 fingers — you're OK with the idea.*
- *2 fingers — you're OK with it but perhaps want to make a little change.*
- *1 finger — you'd like to talk about making more changes.*
- *And a closed fist – no fingers – you really don't like it!*

SAY:
It's great that you worked together to decide on a project. What was that like for you?

Give Juniors a chance to respond.

SAY:
You've learned a lot in our last few meetings about how programmers solve problems with Computational Thinking. What was the coolest thing you learned? Was there anything that surprised you?

At our next meeting, you'll plan your Take Action project. Does anyone remember how Take Action is similar to Computational Thinking? **(Answer: Find a need, break it into smaller pieces, and work together to create a program/plan to solve.)**

End the meeting with a Friendship Squeeze.

girl scouts

The Girl Scout Promise

On my honor, I will try:

To serve God and my country,

To help people at all times,

And to live by the Girl Scout Law.

The Girl Scout Law

I will do my best to be

honest and fair,

friendly and helpful,

considerate and caring,

courageous and strong, and

responsible for what I say and do,

and to

respect myself and others,

respect authority,

use resources wisely,

make the world a better place, and

be a sister to every Girl Scout.

Think Like a Programmer Journey

Take Action Guide

What's the difference between a community service project and a Take Action project?

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

Take Action encourages girls to develop a project that is sustainable. That means that the problem continues to be addressed, even after the project is over. Sustainability simply means coming up with a solution that lasts.

For example, girls might want to do something about trash in a local park. If they go to the park and pick up trash, they've solved the problem for today — but there will be more trash to pick up tomorrow.

Instead, girls could explore why there's so much trash. Here's what they might discover:

1. There aren't enough trash cans in the park.
2. The trash cans are hard to find.
3. People have to walk out of their way to throw away trash because of where the cans are placed.
4. People don't realize the importance of putting trash in the trash cans.

Here's how girls might address these issues:

- **Issues 1 – 3:** Make a presentation to the city council to report on their findings and suggest adding more trash cans or moving them to more visible or convenient positions.
- **Issue 4:** Create a public awareness campaign that encourages people to use the trash cans instead of littering.
- **Variation:** Older girls may want to design interactive garbage cans that make tossing your trash fun. Do an online search for "the fun theory" or "the world's deepest bin" to see this in action.

What are the steps of a Take Action project?

Girls team up to:

- Identify a problem
- Come up with a sustainable solution
- Develop a team plan
- Put the plan into action
- Reflect on what they learned

Keep It Girl-Led: Girls should actively participate in each step in order for this to be girl-led. Younger girls will need more guidance, but they can and should decide as a team what problem they want to address.

How do girls make their project sustainable?

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.

How can I help girls come up with Take Action Ideas?

Next are some specific examples you can use to help girls understand what sustainable Take Action projects look like.

Keep It Girl-Led: These examples are intended to give a sense of what a Take Action project could look like. **Please do not choose a project from this list for girls to do!** Instead, guide them to brainstorm ideas, get feedback, and come up with a plan. Girls will learn key leadership skills, such as decision-making, compromise, conflict resolution, and teamwork, when their Take Action project is girl-led.

Computer Science/STEM Take Action Ideas

Issue: Some girls think computer science is hard or boring or just for boys.

- **Solution: Educate and inspire others.** Create a girls' coding club that meets at lunchtime or recess. Teach other girls how to play with tangrams or learn algorithms by making functional suncatchers.

Issue: Some kids think computer science is too hard to understand.

- **Solution: Educate and inspire others.** Make a video to explain algorithms, using fun examples like baking a cake, planting a flower or giving directions. Show it to your class at school or to a group of friends.

Issue: More kids need to know that how computer programmers can help others and make the world a better place

- **Solution: Educate and inspire others.** Do some research about people who used code to help others, and then create a video or slideshow to show at your school.

Issue: Not everyone knows about women who changed the world using their knowledge of computer science.

- **Solution: Educate and inspire others.** Research the "hidden figures" in your community. They might be women who have helped shape history, like those portrayed in the movie Hidden Figures. Or you might want to profile computer science teachers who have made a difference by mentoring and encouraging girls. You could create a display about their accomplishments for a library or community center or make a video about them and show it at school.

Issue: More people need to know how exciting and fun STEM can be.

- **Solution 1: Educate and inspire others.** Create a list of great books, movies and documentaries that focus on STEM. Make copies for teachers to hand out or make posters for the school library.
- **Solution 2: Educate and inspire others.** Create a short play based on one of the books and perform it for your class or school.

Other Ideas for Take Action

Issue: More kids need to know that engineering is a fun, creative way to help others.

- **Solution 1: Educate and inspire others.** For show-and-tell, explain what you've learned about how engineers help others, then lead a design challenge activity with your class.
- **Solution 2: Make it permanent.** Partner with a teacher or principal to create an "engineering space" at school where kids can make prototypes and share ideas for new inventions. Put out a call for donations of recyclable materials or cheap prototyping supplies (cardboard boxes, tape, string, paper towel tubes, etc.) to stock the space.

Issue: It's hard for new students to meet people and make friends at school.

- **Solution: Make it permanent.** Design and build "buddy benches." Partner with the school to have the benches installed on the playground so kids who want to make new friends can find each other.

Issue: Parents often run their engines outside the school as they wait to pick up or drop off their children, which pollutes the air.

- **Solution: Change a rule, regulation or law.** 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.

Issue: We could conserve water if more people collected rain water and used it to water plants.

- **Solution 1: Make it permanent.** Make rain collection devices for family or friends that can be installed in their yards. Give them a list of different ways to use rain water and how they're helping the Earth.
- **Solution 2: Educate and inspire others.** Create a handout, video tutorial, or show-and-tell presentation about how to make a rain collection device, how to use rain water and how that helps the Earth.

Issue: The local park doesn't have a swing for children with disabilities.

- **Solution: Make it permanent.** Make a presentation to the city council explaining the problem and offering to use troop money from the cookie sale to help pay for the swing.
- **Extra Inspiration:** Do an online search for "How One Brownie Troop Became Social Entrepreneurs.")

Issue: There's no sidewalk along a street near the elementary school, which makes it dangerous for children to walk home.

- **Solution: Make it permanent.** Make a presentation to the city council about the problem and suggest that they build a sidewalk. (Note: Even if the council doesn't vote to create a sidewalk, the girls have earned their Take Action award because they came up with a sustainable solution and took action through their presentation.)
- **Extra Inspiration:** Do an online search for "Girl Scout Brownies Convince City Hall to Build Sidewalk."

Issue: There have been several accidents at a busy intersection that doesn't have a stoplight.

- **Solution: Make it permanent.** Research the number of accidents and make a presentation to the city council, asking that they have a stoplight installed.

Issue: The local shelter is having a hard time getting rescue animals adopted.

- **Solution: Educate and inspire others.** Use your photography skills to create pet portraits for the shelter's web site. Use your writing skills to craft heart-warming bios for each portrait.

Need more ideas?

Check out Girls Changing the World on the GSUSA web site. Girls post their Take Action and Bronze/Silver/Gold Award projects on this site. You can search by project topic or grade level. (And after the troop has done their project, please post it so they can inspire other girls!)

33 Ways to Take Action!

Make your solution permanent.

1. Make and install something outside (benches, bird houses, dog run, ropes course, sensory trail for children with disabilities, Little Library, etc.)
2. Plant something (butterfly garden, tree, wind chime garden, etc.)
3. Make something inside (Maker Space, reading room, etc.)
4. Create a collection (children's books children's hospital or family shelter, oral histories for town museum, etc.)
5. Advocate for building a permanent community improvement (sidewalk, bridge, park, streetlights, stoplight, etc.)

Educate and inspire others to be part of the change.

6. Do a show-and-tell
7. Create a poster campaign
8. Perform a skit
9. Make a "how to" handout
10. Draw a comic
11. Give a speech
12. Write and perform a song
13. Make an animated movie
14. Make a live-action movie
15. Make a presentation
16. Create a workshop (perhaps in partnership with a local business or organization) to teach a skill such as coding, camping, canoeing, robotics, sewing, car care, healthy eating, gardening, home repair, budgeting, etc.
17. Create a workshop to teach others about healthy living (exercise, nutrition, mental health, etc.)
18. Create a social media campaign
19. Make video tutorials to teach a skill
20. Organize an email campaign
21. Organize a petition
22. Organize an event (concert, play, poetry slam, art exhibit, sporting event, field day) to raise awareness about an issue
23. Make a "playbook" to help others follow your lead (how to mentor robotics teams, organize a workshop or event, advocate to city council, create an online petition, change a law, etc.)
24. Make an app that helps people take action on an issue
25. Create a web site
26. Write an op-ed or letter to the editor of a newspaper or magazine
27. Start a blog

Change a rule, regulation or law.

28. Make a presentation to your school principal
29. Make a presentation to your school board
30. Make a presentation to your city council
31. Speak up at your representative's town hall meeting
32. Create an online petition
33. Advocate for a law with your state government

Think Like a Programmer Journey

Glossary for Juniors

Juniors may not know some of the words used on this Journey. Here are definitions you can share with them:

Computational thinking is the thought process involved in solving a problem and expressing its solution(s) in a way that a computer—human or machine—can effectively carry it out.

An **algorithm** is a list of steps that you can follow to finish a task. A recipe is an example of an algorithm; it tells you how to cook a dish by following step-by-step instructions.

A **program** is an algorithm that has been coded into something that can be run by a machine.

Debugging is finding and fixing problems in your algorithm or program.

A **function** is a piece of code that you can easily call over and over again.

A **variable** is a placeholder for a piece of information that can change.

Decomposition is when you break a hard problem up into smaller, easier ones.

A **pattern** is a theme that is repeated many times.

Abstraction is removing the details from a solution so that it can work for many problems.

Innovation is a new or improved idea, device, product, etc.

A **prototype** is a sketch of an idea or model for something new. It's the original drawing from which something real might be built or created.

In computer science, a **conditional** is a statement that tells a computer how to act in specific situations., i.e. IF this happens, THEN the computer does this.

Think Like a Programmer Journey

Materials List

Think Like a Programmer 1

Activity 1: As Girls Arrive: Create Your Own Code

- Paper
- Pens or pencils

Activity 2: Opening Ceremony: Jump Into Computational Thinking!

- Flag
- Optional: Poster Board with the Girl Scout Promise and Law

Activity 3: Tangram Algorithms

- **Tangram Set & Algorithm Card Images Pack** (one for each girl)
- Scratch paper for writing algorithms or building images
- Markers, pens, or pencils
- Scissors
- Optional: Sets of tangrams to use as example
- Optional: Computer, tablet or other device with ability to show girls the Unplugged – Tangram Algorithms video
- Optional: If your troop has never used Tangram pieces, you can choose to do an example for them or even have an entire Tangram activity. Search the internet for activities that girls can play in reality (using real tangrams) or play online.
- Optional: **Worksheet: Tangram Algorithms** (one for each girl)
  An "assessment worksheet" sounds a lot like school, but girls will probably see this as a fun puzzle page. If there's time, girls could do the activities in the meeting or you could give each girl a copy to take home. Perhaps they'd like to show their families what they learned about programs, debugging, functions, and variables by doing the worksheet together.

Activity 4: Closing Ceremony: Programmers, Awards & Take Action

- **Take Action Guide**

Think Like a Programmer 2

Activity 1: As Girls Arrive: Snack Algorithms

(**Note to Volunteers:** For this activity, girls will create algorithms for snacks. We've provided several options, so please choose one or another alternative that works for your girls' dietary restrictions.)

- Bowls or cups
- Option 1: Various small snacks like crackers, pretzels, marshmallows, chocolate chips, dried fruit, etc. that could go into trail mix.
- Option 2: Crackers, spreads, and toppings to create cracker bite snacks.
- Option 3: Celery, spreads, and topping to create Ants on a Log.
- Paper
- Pencils

Activity 2: Opening Ceremony: Programmers to the Rescue!

- Flag
- Optional: Poster Board with the Girl Scout Promise and Law

Think Like a Programmer Journey

Materials List

Think Like a Programmer 2 (continued)

Activity 3: Solving Challenges with Computational Thinking

- **Mad Glibs Abstraction Worksheet** (one for each girl)
- Markers, pens, or pencils
- Pens, Pencils, & Scissors
- **Functional Suncatchers Skills Sheet** (one for each group)
- Create a suncatcher to use as an example for the activity
- Prepare a program and two skills with blank steps on a large paper or blackboard for the girls to help you fill in. (Sample can be found on the **Functional Suncatchers Skills Sheet**)
- Optional: Computer, tablet or other device with ability to show girls the Unplugged: Mad Glibs activity and Unplugged – Functional Suncatchers videos
- Optional: **Worksheet: Mad Glibs Assessment** (one for each girl)
  An "assessment worksheet" sounds a lot like school, but girls will probably see this as a fun puzzle page. If there's time, girls could do the activities in the meeting or you could give each girl a copy to take home. Perhaps they'd like to show their families what they learned about programs, debugging, functions, and variables by doing the worksheet together.
- Optional: **Worksheet: Functional Suncatchers** (one for each girl)
  An "assessment worksheet" sounds a lot like school, but girls will probably see this as a fun puzzle page. If there's time, girls could do the activities in the meeting or you could give each girl a copy to take home. Perhaps they'd like to show their families what they learned about programs, debugging, functions, and variables by doing the worksheet together.

For each functional suncatcher:

- One foot of string, thread, or fishing line
- 2-4 beads
- 2-4 other accessories (buttons, hoops, spacers)
- One special bead, prism, button, or girl-made sun charm

Activity 4: Closing Ceremony: Brainstorming Our Take Action Project

- List of Juniors' Take Action ideas from Think Like a Programmer 1
- **Take Action Guide**

Think Like a Programmer 3

Activity 1: As Girls Arrive: Tech Collages

- Magazines and catalogs, tech or regular
- Scissors
- Glue sticks
- Construction paper
- Optional: Stickers, other things to add into the collages

Activity 2: Opening Ceremony: Reviewing Our Take Action Ideas

- Flag
- List of Take Action ideas from last meeting

Think Like a Programmer Journey

Materials List

Think Like a Programmer 3 (continued)

Activity 2: Opening Ceremony: Reviewing Our Take Action Ideas (continued)

- Index Cards (Slips of paper, post-its, or a whiteboard and marker)
- Pens
- Tape
- Optional: Poster Board with the Girl Scout Promise and Law

Activity 3: Personal Innovations

- Post-its or slips of paper and tape (at least one for each girl)
- Markers, pens, or pencils
- Poster paper for sharing innovations (one for each girl)
- **Personal Innovations Activity Guide** (one for each girl)
- Markers, pens, or pencils
- Tape to hang posters

Activity 4: Closing Ceremony: Time to Decide on Take Action!

- Juniors' Take Action ideas on index cards.
- Optional: Computer/tablet or other device with ability to show girls the Computer Science is Changing Everything video

Think Like a Programmer 4

Activity 1: As Girls Arrive: Innovate Your Take Action!

- Paper
- Pencils, crayons and markers

Activity 2: Opening Ceremony: Programming for a Better World

- Flag
- Optional: Poster Board with the Girl Scout Promise and Law

Activity 3: Designing Our Take Action Project

- Large pieces of paper or poster boards
- Markers
- Post-It notes
- Pens/pencils

Think Like a Programmer 5

Activity 1: As Girls Arrive: Improv with Conditionals

- Notecards with different statements written on them from the **Conditional Examples Sheet** (at least two for each pair of girls)

Think Like a Programmer Journey

Materials List

Think Like a Programmer 5 (continued)

Activity 2: Opening Ceremony: If We Take Action, Then We Make a Difference!

- Flag
- Optional: Poster Board with the Girl Scout Promise and Law

Activity 3: Creating Our Take Action Project

- Any materials Juniors need for their Take Action project

Think Like a Programmer 6

Activity 1: As Girls Arrive: Get Ready to Celebrate!

- **Girl Scout Promise and Law** poster(s)
- Any items Juniors want to display (such as photos or videos from their Take Action project)
- Photos and videos from the Journey meetings
- Music system
- Decorations
- Snacks

Activity 2: Opening Ceremony: Welcome!

- Flag
- Optional: Poster Board with the Girl Scout Promise and Law

Activity 3: Awards Ceremony and Celebration

- Think Like a Programmer award
- Take Action award

(**Note to Volunteers:** You can buy these awards from your council shop or on the Girl Scouts' website.)

Activity 4: Girl Survey

- If girls are taking the survey online: Laptop/tablet
- If girls are filling out the survey on paper: Copies of Girl Survey (pdf available in Meeting Aids) and pen or pencil

Brainstorming Tips: Think, Pair, Share

How to Run a Think, Pair, Share Activity:

Tell girls that they're going to brainstorm answers to your question using "Think, Pair, Share."

Lead girls through the basic steps by telling them they will:

1. **Break into small groups.**

2. **Listen to the question or prompt.**

3. **Think about their answers.**
   - Girls may want to write their answers down.
   - Twenty seconds should be enough time, since girls will need to sit quietly.

4. **Pair with other girls.**
   - Girls talk with one to three other girls (depending on group size), making sure everyone has a chance to share their answers. If there's time, it's OK for girls to ask questions about each other's answers.
   - For pairs, 20 seconds should be enough time. If your troop enjoys discussion, consider extending this to 1 to 2 minutes.

5. **Share with the group.**
   - Girls share their answers with the larger group.
   - This can be completed in 20 – 30 seconds, but will run longer based on group size and how the group sharing is done.

There are two ways to set up group sharing:

- **Strongly Recommended:** One girl shares the best/most interesting/summary answer for the group. This approach is great if you're running short on time. It also helps develop conflict resolution and compromise skills.
- **Optional:** Each girl shares her partner's answer. This helps girls develop active listening skills, but will run longer because all girls are sharing.

Name(s)_____ Date _____

Activity Guide - Personal Innovations

Technological innovation is about recognizing a problem that needs to be solved, or recognizing something needs improving and then building a tool to solve it.

As a troop we're going to see how innovative we can be, and we'll share our ideas through something called "rapid prototyping." ***(Prototype*** *is a fancy word that means a preliminary sketch of an idea or model for something new. It's the original drawing from which something real might be built or created.)*

First: Looking at the list of 4 interests at your table, let's **think about how technology is impacted by, or related to, those interests.**

How could **technology** improve your interest to make it **better, faster,** or **easier** to use?

What is a **problem**, or aspect of your interest, that a **creative or innovative technology might help solve**, or at least make better?

Interest	Improvements	Problems

Next: As a group, nominate the idea you've discussed that you think would be the *most interesting to everyone else* in the troop.

Start to sketch it out on a poster. Make a visual representation of your ideas. Remember this is a rapid prototype, just something to quickly convey the idea. Feel free to jot down ideas or sketches in the space below:

Brainstorming and Notes