

Think Like an Engineer pt. 6

Overview

Juniors celebrate what they've learned and receive their Think Like an Engineer and Take Action awards.

Note to 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.

Fail Fast. Succeed Sooner: That's how engineers solve problems. On this Journey, Juniors will learn the Design Thinking Process through hands-on activities. They'll learn to: Brainstorm ways to solve a problem, design prototypes, test them to see what does and doesn't work, then improve their designs. To engineers, failure is a good thing because every time a design fails, you learn something and can make it better.

You can help Juniors think this way. When a Junior's prototype doesn't work, ask questions like, "Why do you think it didn't work? How can you change your design? Try again — that's what engineers do!" This approach also keeps the activity girl-led and fun because Juniors are free to invent things without feeling the pressure to make them perfect.

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

When Juniors leave a meeting, they'll remember how much fun it was to build something out of cardboard or make a Ping-Pong ball fly across the room. However,

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they may not realize that they just learned how engineers solve problems or that they're good at engineering — unless you tell them.

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

- Pointing out how they acted as engineers. (**For example:** They did rapid prototyping. When one of their prototypes didn't work, they saw that "failure" as helpful feedback and tried something else. They worked together to find solutions. They shared their designs and offered suggestions.)
- Reminding Juniors that they are *already* engineers — and that it's fun to solve problems using engineering.
- Letting them know that they have what it takes to continue exploring STEM.

These simple messages can boost Juniors' 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 Juniors will remember their whole lives. Try to capture those memories with photos or videos. Juniors love remembering all they did — and it's a great way for parents to see how Girl Scouting helps their Juniors.

And please do 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 Product Designer badge goes well with this Journey!

Girl Input: GSUSA wants to know what girls think about this program. We also want to find out how well the program worked in terms of increasing girls' interest, confidence, and competence in STEM. This information will help us to improve our program and talk about the program's impact. Please encourage your girls to take this survey so that their voices are heard. There are three ways you can help girls do this:

- **Option 1 – Girls Take The Survey At The Last Meeting:** You will need technology (ie, tablets, laptops, wi-fi) to use this option. Set aside 10-15 minutes for girls to complete the survey. Use this link: <http://www.tinyurl.com/STEMgirlENGj>
- **Option 2 - Send Survey Link To Parents:** Email parents and ask them to have their girls complete the girl survey. Here is some suggested text for your email to parents:

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Dear Parent –

GSUSA wants to know what girls think about this program. We also want to find out how well the program worked in terms of increasing girls' interest, confidence and competence in STEM. This information will help us improve our program and talk about the program's impact.

Please encourage your girl(s) to take our survey by clicking on the following link: <http://www.tinyurl.com/STEMgirlENGj>. It should only take 10-15 minutes. Depending on your girl's age, you may need to help her understand the questions. However, please do not help her select her answers – we want the responses to come from her.

If you have any questions, please email the Girl Scout Research Institute at gsresearch@girlscouts.org.

Sincerely –

- **Option 3 – Print The Survey, Have Girls Complete It, & Send The Surveys To GSUSA:** If you are unable to have girls complete the survey at the last meeting and unable to send parents the link to the survey for girls to complete, please print copies of the Girl Survey. You'll find the survey in the Meeting Aids section of this meeting.
1. Have each girl complete her own survey.
 2. Either scan the surveys and email them to: GSresearch@girlscouts.org .
- OR**
3. Mail the surveys to:
Girl Scout Research Institute
GSUSA
420 Fifth Avenue
16th floor
New York, NY 10018

Prepare Ahead

- Bring decorations and snacks.
- Bring a music system.

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- Collect all the materials Juniors created from the Journey, photos of their Take Action projects, and photos and videos you've taken along the way.
- Invite any special guests (such as people in the community who have helped the Juniors with their Take Action project).
- Send reminders to the Juniors' families.
- From your council shop or the Girl Scout website, buy the Think Like an Engineer and Take Action awards, one for each Junior.
- If your meeting location doesn't have a flag, bring a small one from home to either hang or have Juniors take turns holding.
- Choose how girls will give feedback on the Journey. Look at the three options available for girls to take the survey in the Notes to Volunteers.
- Complete your own Volunteer Survey to give feedback on the Journey. You can find this at the end of the Meeting Activity Plan.

Get Help from Your Family and Friends Network

Your Friends and Family Network can include:

- Juniors' parents, aunts, uncles, older siblings, cousins, and friends
- Other volunteers who have offered to help with the meeting.

Ask your Network to help:

- Bring snacks for the final celebration.
- Bring a camera, smart phone, or video camera to document the final celebration.
- Supply a CD player and music CDs for the final celebration.

Award Connection

Juniors will earn two awards:

- Think Like an Engineer award
- Take Action award

They receive both awards this meeting.

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

Meeting Length

90 minutes

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- 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 celebrate what they’ve learned and receive their Think Like an Engineer and Take Action awards.

Materials List

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

- **Girl Scout Promise and Law poster(s)**
- **Design Thinking Process 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 an Engineer award
- Take Action award

(Note to Volunteers: You can buy these awards from your council shop or on the GSUSA 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

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Activity 5: Closing Ceremony: Closing the Circle

- None

Detailed Activity Plan

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

Time Allotment

10 minutes

Materials

- **Girl Scout Promise and Law poster(s)**
- **Design Thinking Process 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

Steps

Have Juniors set up the meeting room by putting up posters and decorations. Make sure they greet guests as they walk in and offer them a snack.

When guests have all arrived, have Juniors give a warm welcome to their guests—by saying together: *“Welcome, everyone!”*

Activity 2: Opening Ceremony: Welcome!

Time Allotment

10 minutes

Materials

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

Steps

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Have Juniors recite the Pledge of Allegiance and the Girl Scout Promise and Law. Then, have them introduce any special guests.

Activity 3: Awards Ceremony and Celebration

Time Allotment

35 minutes

Materials

- Think Like an Engineer Award
- Take Action Award

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

Steps

Juniors stand in front of guests and share one thing that they learned while they were on the Think Like an Engineer Journey or while doing their Take Action project. They can make this into a “show and tell” by showing before and after drawings of engineers, photos or video from their Take Action project, or their Design Challenge prototypes.

Ask Juniors to stand in front of their audience.

SAY:

Can each of you give an example of something you learned on this Journey?

Give each Junior a chance to speak. If she wants to pass, she can.

SAY:

Please step forward when I say your name to accept your awards.

Lead a round of applause for each Junior as she steps forward.

SAY:

You have earned your Think Like an Engineer award, which means you learned how to see needs in the world and come up with solutions.

And you earned your Take Action award because you did something to make the world a better place.

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Now you'll start your celebration!

Include any activities — such as taking photos, dancing or singing a special song— which Juniors decided to do as part of the celebration.

Activity 4: Girl Survey

Time Allotment

10 minutes if you are doing the survey during the last meeting.

Materials

- 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

Steps

Juniors complete the Girl Survey about the Think Like an Engineer Journey.

SAY:

GSUSA wants to know what you think about this program, how you think it could be improved, and what you think of STEM in general. This is a great chance for you to help Girl Scouts create STEM programs that other girls will enjoy!

It will take about 10 – 15 minutes.

Explain to girls how they will be taking the survey – either online or by filling out a printed version.

(Note to Volunteers: We hope that all girls will complete the survey—we want every girl's voice to be heard. However, the survey is voluntary, so girls don't have to take the survey if they don't want to. Also, for young girls, we encourage you to read the questions aloud while girls individually complete the survey.)

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Activity 5: Closing Ceremony: Closing the Circle**Time Allotment**

10 minutes

Materials

- None

Steps

Have Juniors and guests stand in a Friendship Circle. Juniors lead the Closing Ceremony and end with a Friendship Squeeze.

SAY:

Juniors would like to end this Journey together with a Closing Ceremony.

Have Juniors lead the close of the meeting in the way they chose—for example, a song, poem, or a cheer.

SAY:

And now we'll finish with our Girl Scout tradition, a Friendship Squeeze.

End the meeting with a Friendship Squeeze with Juniors and guests.

THE DESIGN PROCESS

Used by engineers, inventors, and other problem solvers, the design process is a series of steps that help people think creatively and come up with solutions.



DEFINE THE NEED



BRAINSTORM



DESIGN



BUILD



REDESIGN



TEST & EVALUATE



SHARE SOLUTIONS



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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 an Engineer Journey

Glossary for Juniors

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

Brainstorming means coming up with lots of different ways to solve a problem. You can brainstorm with another person or with a team of people.

Engineers are people who solve problems. They use their imaginations to invent things like self-driving cars. They also come up with new and better ways to build things, such as bridges, buildings, and planes.

A **prototype** is a quick way to show your idea to others or to try it out. It can be as simple as a drawing or it can be made with everyday materials like cardboard, paper, string, rubber bands, etc.

Seismic is something caused by earth's vibrations. It can be caused by nature, like an earthquake, or something artificial, like how the ground vibrates when an airplane takes off.

Think Like an Engineer Journey

Materials List

Think Like an Engineer 1

Activity 1: As Girls Arrive: Engineers Create

- Magazines and catalogs that focus on science and technology or ones that include products, such as cars, devices, architecture, gadgets, etc.
- Scissors

Activity 2: Opening Ceremony: Jump Into Design Thinking!

- Flag
- **Design Thinking Process** poster
- Optional: Poster Board with the Girl Scout Promise and Law

Activity 3: Design Challenge: Paper Structure

- **Design Thinking Process** poster

For each pair of girls:

- Masking or duct tape
- 8 sheets of newspapers
- Four or 5 heavy books
- 1 piece of cardboard (about the size of a piece of copy paper); use it as a platform for the books.
- Twelve-inch ruler to measure height of the structure
- Paper and pencil

Think Like an Engineer 2

Activity 1: As Girls Arrive: Design Like an Engineer

- Paper
- Pens, pencils, markers

Activity 2: Opening Ceremony: Engineers to the Rescue!

- Flag
- **Design Thinking Process** poster
- Optional: Poster Board with the Girl Scout Promise and Law

Activity 3: Design Challenge: Emergency Shelter

- Handout of **Examples of Shelters** (**Note to Volunteers:** Don't show this to until after Juniors have designed their shelter.)

For each team of girls to create a shelter to fit one person:

- 2-4 cardboard sheets (roughly the size of copy paper)
- 16 five-foot bamboo plant stakes or wooden dowels (these are available at garden centers and hardware stores. If unable to find, look for bendable plastic or aluminum rods or poles.)
- 3-4 large garbage bags, cut open into sheets
- Scissors
- Duct tape
- String
- Paper and pencil

(Note to Volunteers: Instead of building a life-size emergency shelter, you can have Juniors create a doll-size shelter and adapt materials accordingly. Optional: Bring dolls for girls to fit inside their shelters.)

Think Like an Engineer Journey

Materials List

Think Like an Engineer 2 (continued)

Activity 4: Closing Ceremony: Brainstorming Our Take Action Project

- List of Juniors' Take Action ideas from Think Like an Engineer 1
- **Take Action Guide**

Think Like an Engineer 3

Activity 1: As Girls Arrive: Shake It Up

- Music from a CD player or another system
- For more fun: Play the song, "Shake, Rattle and Roll"

Activity 2: Opening Ceremony: Choosing Our Take Action Project

- Flag
- List of Take Action ideas from last meeting
- Optional: Poster Board with the Girl Scout Promise and Law

Activity 3: Design Challenge: Pop Fly

- **Ring of Fire map**

For each team of 3-4 girls:

- 20-30 wooden or plastic coffee stirrers (5-6 inches)
- 1/4 lb. modeling clay, Plasticine preferred
- Manila file folder or 8.5 x 11" piece of thin cardboard
- Ruler to measure height of structure
- Pencils and Paper

Volunteer: In advance, make one Shake Table for each team of girls. The directions for "How to Build a Shake Table" is a Meeting Aid.

- 2 pieces of sturdy cardboard (about 8 1/2 by 11 inches)
- 2 thick rubber bands
- 2 tennis (or rubber) balls
- 2 large binder clips
- Ruler or paint stirrer to make a handle
- Masking tape

Activity 4: Closing Ceremony: Shake Dance Contest

- Music

Think Like an Engineer 4

Activity 2: Opening Ceremony: Designing for a Better World

- Flag
- **Design Thinking Process** poster
- Optional: Poster Board with the Girl Scout Promise and Law

Think Like an Engineer Journey

Materials List

Think Like an Engineer 4 (continued)

Activity 3: Designing Our Take Action Project

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

Think Like an Engineer 5

Activity 1: As Girls Arrive: Power Poster

- Poster board
- Colored markers

Activity 2: Opening Ceremony: Why is Our Project Important?

- Flag
- **Design Thinking Process** poster
- 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 an Engineer 6

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

- **Girl Scout Promise and Law** poster(s)
- **Design Thinking Process** 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 an Engineer 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