



STEM is involved in more things than you know. Earning this badge really gets your brain thinking about how STEM is all around us!

- Ashley,
Girl Scout Junior

Marina Park,
Newport Beach, CA

OC COUNCIL'S OWN



STEMsational ME!

ORANGE COUNTY COUNCIL'S OWN JUNIOR BADGE

Adventure is always just around the corner for Orange County Girl Scouts! **Be yourself** as you catch a wave; **be unique** as you use your imagination to create something amazing, and **be a leader** as you share your ideas about what is important to you. Earning this badge will help you see how **Science, Technology, Engineering, and Math (STEM)** are part of everything you do and how each makes you..YOU!

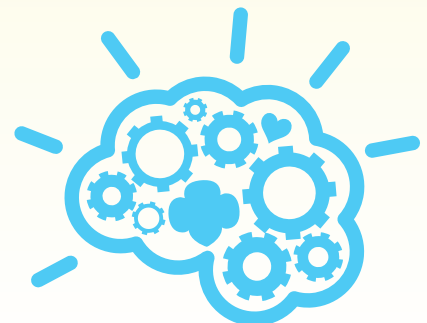
**Not only are you sensational-
you are STEMsational!**

Steps

1. Be an OCean girl
2. Use your OC imagination
3. Take an OC adventure
4. Get active in OC
5. Share your voice in OC

Purpose

When I've earned this badge,
I'll know how I use **STEM** to be **ME!**



TIPS BEFORE TAKEOFF

- ▶ In the spaces next to each option, write an S, T, E, or M depending on whether you think the activity has to do with science, technology, engineering, or math. Each option may involve more than one area of STEM- maybe even all four! *The answer key is on the back cover. No peeking until the end!*
- ▶ STEMsational ME! badge activities can be completed on your own, with a friend, with a participating company from the Girl Scouts of Orange County STEM Consortium, or other Orange County location or partner.

For More Fun: Many of the STEMsational ME! activities can be completed at the Girl Scout Leadership Center in Newport Beach and by experiencing the INSPIRE program.

"Girls Scouts will be our future scientists, engineers, and innovators. While earning your STEM badge you will learn how to explore the world around you and make things that are useful to others. Have fun solving exciting problems and learning new skills as a future scientist and engineer!"

- Paula Golden

*President of the Broadcom Foundation - Founding Member
of the Girl Scouts of Orange County STEM Consortium*

Beach Color Code

Scan the beach to look for colored flags posted on the lifeguard towers that give important water and safety information.



Red

Beach is closed to the public.



Yellow

Caution, potential dangers.



Green

Waters are safe for swimming.



Blackball

No hard surfboards allowed.



Orange

No lifeguard on duty.

For more FUN: Download the Lifeguard Flag Challenge from girlscoutsoc.org/stemsationalme

Every step has three choices. Do ONE choice to complete each step. Inspired? Do more!

STEP

1 Be an Ocean Girl

You'll enjoy sun, surf, and have fun as you explore Orange County beaches to figure out how STEM fits in. There is more than meets the eye as you discover the awesomeness of the ocean in OC and what it means to you!

CHOICES - DO ONE:

- ☐ **Soak in the Surf.** STEM Did you know that Orange County is one of our nation's top surfing destinations? Take a surf lesson at one of OC's popular surf spots, or ask a local surfer about the science behind the sport. Learn how to choose the best wave, why surfers must pay attention to the weather, the importance of gravity and buoyancy for balance, and how to avoid a wipe out. Share with a friend how you would catch the big waves.

OR

- ☐ **Read the Signs.** STEM Have you ever noticed the large signs that lifeguards set up at their stands? These signs give beachgoers important information about the weather, water, and safety. Locate a sign at your favorite OC beach, and find out what it says about beach conditions and why the public needs to know. If you have a question, ask an off-duty lifeguard.

OR

- ☐ **Look up Close.** STEM Orange County was once covered by vast oceans. The evidence is in the dirt! Visit an Orange County natural history museum or local state or regional park, and talk to a ranger or docent about the types of fossils that have been found. Then, head to an OC tide pool to observe sea life today. Do you see any similarities?

For More FUN: OC's tide pools often have marine life experts available to help you identify species in and around the pools. Contact an organization in a beach city that can help you arrange for an expert to meet your group down at the tide pools!



Water Life Finder 1934 Girl Scout Proficiency Badge Book

Purpose: To study the plants, animals, and marine life at a local beach and assess man's impact on the region.



STEP 2 Use your OC imagination

Tap into your creative side as you experience STEM!
From fireworks to fashion to the fine arts, STEM plays an
important role in what you love to do. Imagine that!

CHOICES - DO ONE:

- ☐ **Be inspired by a local OC artist.** Visit a local gallery or watch a music or theater performance on one of OC's famous stages to observe an artist's work in action. Then, identify the STEM used. For visual arts, such as painting, drawings, or sculpture, find out which media the artist used and how his/her art was made. For performance art, learn about choreography or the STEM behind setting the stage. Get inspired and create art in his/her style. Then, share your work and newfound STEM skills with someone in your community.

For More FUN: Visit the Girl Scout Leadership Center and experience the INSPIRE program to hear from a set and costume designer about how she uses STEM in her work.



Great places to view art in Orange County

Before you go: Ask an adult to find out from the museum or gallery which art displays are age appropriate.

- Orange County Museum of Art
- Chuck Jones Gallery
- Bowers Museum and Kidseum
- Sawdust Art Festival
- MUZEO Museum and Cultural Arts Center



OR

- ☐ **Get with the program.** STEM Ever wonder how Disneyland gets its fireworks display to coordinate with music and projected animations, or how Knott's Berry Farm uses 4D screens to create its attractions? The magic happens behind the scenes with computer programming, also known as coding! Learn about coding and how it can be used to create something amazing by interviewing an OC computer programmer. Then, visit an OC theme park to see the effects of computer programming in action. Try the basics through a step-by-step beginner computer program, like one of the online projects on madewithcode.com.

OR

- ☐ **Redesign, refashion, and reinvent.** STEM Make a used article of clothing new again by changing how it looks. Try a traditional technique such as tie-dye, or give your fashion statement a modern twist by adding battery-operated lights or temperature-changing paint. After you've upcycled, visit an OC handmade marketplace to see how other local designers have turned something old into something new.

For More FUN: Engineer an article of clothing into something completely different, like converting a t-shirt into a tote bag or a sock into a stuffed toy!

"My interest in technology started as a kid, programming a picture of a holiday tree on the TRS-80, a small computer my dad brought home. I hadn't thought about a career in technology before then, but I've enjoyed every minute of it since."

- Renee Bergeron
Sr. Vice President,
Global Cloud Channel,
Ingram Micro



With an adult, go online to tinyurl.com/stemsationalpins to check out GirlscoutSOC's STEMsational ME! Pinterest Board for more ideas!



(Step 2, Choice 3)

Tie-Dye Fashion

The term “upcycle” means to re-purpose and recycle discarded or dated items to make them new again. Many people enjoy upcycling clothing, furniture, paper goods, and old technologies. Tie-Dye is a fun and colorful way to upcycle your old clothes!

Be sure to get permission from an adult before altering your personal items!

Materials:

- A light-colored garment (shirt, socks, etc.). 100% cotton works best.
- Safety Goggles
- Gloves
- 3 gallon bucket or applicator squeeze bottle (one per color)
- Rubber bands (approx. 20 per shirt) or string
- Disposable plastic tablecloth or garbage bags
- Fabric dye (dye kits can be purchased at your local craft store)
- Soda ash (optional)
- Salt
- Hot water
- Long handled, stainless steel spoon or stick



“From computerized embroidery machines that sew on your Girl Scout patches to high-tech printers that put the design on your favorite T-shirt, technology plays a major role in bringing fashion to life.”

- Andrew Oransky
President, Roland DGA




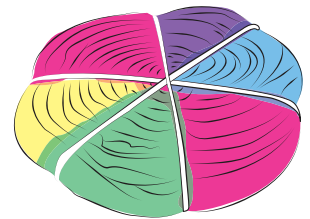
BASIC TIE-DYE STEPS:

1. Protect your workspace and yourself.

Dye will stain any surface it soaks into, so cover surfaces with plastic, and be sure to wear plastic or rubber gloves and safety goggles while handling dye.

2. Twist and tie your garment tightly with rubber bands.

Twist the fabric in sections and secure each section with string or rubber bands.  Search for ideas on GSOC's Pinterest page at tinyurl.com/stemsationalpins.



3. Mix your dyes.

Prepare fabric dye according to package instructions. Dye can be mixed in larger buckets that garments are dipped into or poured into applicator bottles to squirt the dye onto fabric. Add a cup of salt to each batch to enhance the color.

4. Soak garments in hot water or soda ash solution.

With an adult's help, soak fabric in hot water or soda ash solution for 5 to 15 minutes. Then remove and wring out excess water.

5. Add some color!

For one color, soak fabric in dye bath and stir frequently with a long-handled stainless-steel spoon or stick. For two or more colors, dip and hold each section in dye. If using applicator bottles, carefully squirt the dye directly onto your fabric.

6. Let it rest.

Squeeze out excess dye, and let fabric rest for 10 to 30 minutes, depending on how deep you want the color.

7. Wash it out.

Rinse fabric under warm water, then gradually apply cooler water until it runs clear. Wash your tie-dyed items separate from other laundry in cold water.

STEM in Action

By twisting and folding your fabric, you are engineering how the design will turn out. Mixing the colors, soaking in soda ash, and letting the dye rest to set in the fabric is the science of it all! What kinds of patterns showed up in your tie-dye garment?



Boat Building Challenge

(Step 3, Choice 1)

Orange County's transportation doesn't stop at the beach! Take a trip to one of OC's many marinas or boat yards to observe the different parts of a boat. Then build your own and see if it floats.

Here's what to do:

- Collect recyclables, such as plastic bottles, cardboard, or aluminum foil.
- Test your recyclables in a bin of water or a sink to decide which materials will work best for building your boat.
- Use your recyclables to build your boat.
- Test the buoyancy of your boat in water and see if it floats!

For More FUN: Test your boat in the water at the Girl Scout Leadership Center. Then explore the Balboa Bay in one of our kayaks.

STEP 3 Take an OC adventure

Be an OC girl on the go and explore STEM in your community. Discover your favorite way to get from here to there, and stop for delicious treats and incredible experiences along the way.

CHOICES - DO ONE:

- ☐ **Land, sky, and sea.** STEM Hop aboard an OC train like the Pacific Surfliner or Metrolink. Observe the ticketing process, how the train starts and stops, and the train's automatic features. Then visit an OC airport or air museum, or speak with an OC aerospace professional, to find out more about the STEM that goes into Orange County's super highway in the sky. Talk with a friend about how you prefer to travel and why.

OR 

- ☐ **Keep cool in the OC sun.** STEM Whether you scream for ice cream, flip for frozen yogurt, or get silly for shave ice, your task is to identify the STEM involved in all that frozen goodness. Visit an Orange County frozen dessert shop and ask a staff member to explain how the shop makes and stores its tasty treats and the secret to creating the perfect scoop or swirl. Next, make your own frozen dessert and see for yourself how science, technology, engineering, and math are involved.

OR 

- ☐ **Field trip planning fun.** STEM Every great adventure starts with a great plan! Select a field trip location from GSOC's Field Trip Resource Guide or choose another location in Orange County to visit with your troop or group. Build a budget to put your adventure into action. Be sure to factor in all costs, including admission fees, gas for transportation, and meals and snacks. Have an adult review your budget before you call it final.

"Save small amounts of money in the days, weeks, and months leading up to your trip. Ask an adult to help you save and watch your money grow!"

- Raina Dong

Associate Director in Portfolio Management, PAAMCO

Find GSOC's Field Trip Resource Guide by going to girlscoutsoc.org and searching "Field Trips" in the Forms & Docs search bar.

Fantastic Frozen STEM

(Step 3, Choice 2)

Any great recipe starts with science and math... with a little technology and engineering stirred in. Use the recipes below to mix up STEM in the kitchen and make your favorite frozen treats.

HOMEMADE ICE CREAM RECIPE

Ingredients:

- 1 1/2 c. half and half
- 1 tbsp. sugar
- 1/4 tsp. vanilla
- 1/2 c. rock salt
- 3 c. ice
- 1 gallon-size zip-top bag
- 1 pint-size zip-top bag
- Dish towel



What You Do:

1. Start by filling the gallon-size zip-top bag with half the ice. Sprinkle half of the rock salt over the ice.
2. Measure and pour the half and half into the small pint-size bag, along with the vanilla and sugar. Seal the bag tightly and place it inside the gallon-size bag.
3. Pack the rest of the ice around the cream-filled baggie and then sprinkle the ice with the rest of the rock salt.
4. Zip the top of the gallon-size bag, wrap it in the dish towel, and shake, shake, shake!
5. Check the bag after two minutes to see your ice cream forming.
6. Remove the ice cream from the bag of salted ice and enjoy!



SHAVE ICE

Ingredients:

- 1 1/2 c. sugar
- 1 1/2 c. water
- 2 pkg. unsweetened powdered drink mix packet
- 5 lbs. of ice (about 6 ice cube trays)



What You Do:

1. Start by making the syrup. In a saucepan, combine the sugar and water and bring to a full boil for about 1 min.
2. Remove from heat, cool slightly, and add the 2 packets of unsweetened drink mix.
3. Once cooled, transfer to a container for pouring and chill in the fridge.
4. Now you are ready to shave the ice! Most shave ice shops use a special machine to get the shave ice effect. At home, use a food processor to grind ice down to the smallest pieces. Ice should be smaller than a pea.
5. Add your "shave ice" to a bowl and pour the chilled syrup over the ice.

STEM in Action

Ice cream chemistry: Why do we need salt for this sweet treat? Without the salt, the ice wouldn't dip below 32° F, the temperature needed for freezing cream into ice cream. The freezing point of salt water is lower than regular water, so adding all that salt is essential!

“Kaiser Permanente has reduced its water use by 15% over the past three years through rainwater collection, low-flow sinks and toilets, and drought-resistant landscaping.”

-John E. Stratman, Jr., MPA
Senior Director,
Kaiser Permanente
Orange County

STEP 4 Get active in OC

Whether you're a sporty girl, a girl who loves to shop, an environmentally aware girl, or all of these, it's time to get active in OC. Find out why STEM is important in everything you do - from physical activities that improve your health to social activities that improve our world.

CHOICES - DO ONE:

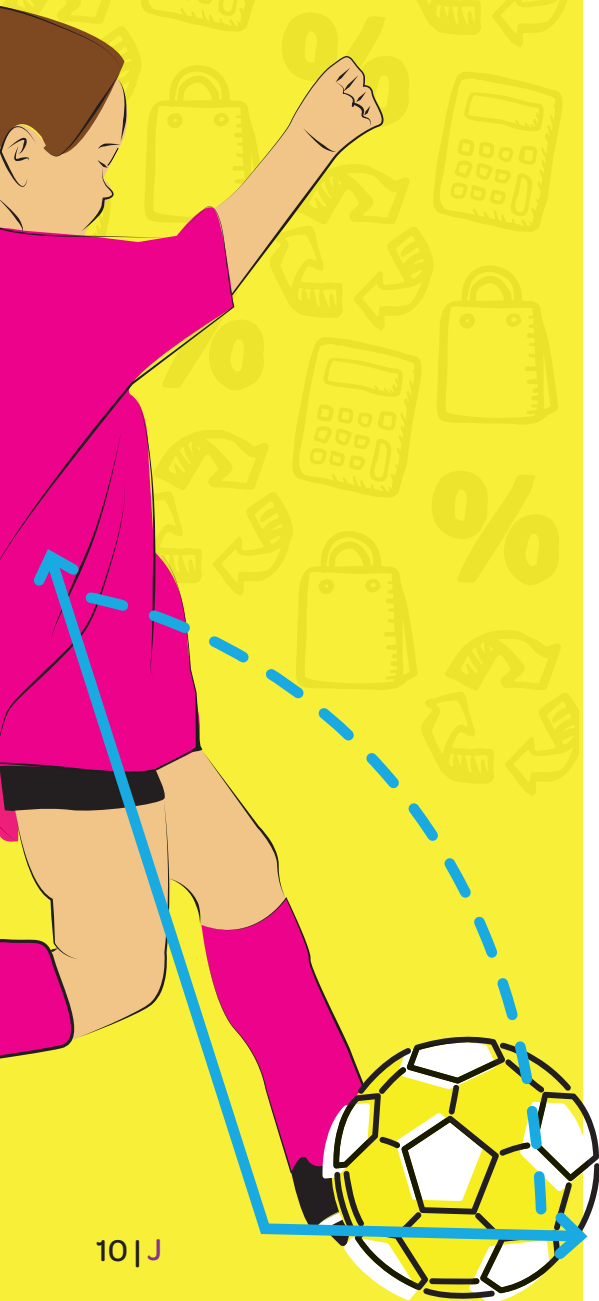
☐ **Shopping survey.** **STEM** Orange County has lots of places to shop. Visit an OC mall or shopping center and calculate the percentage of each category of stores. For example: 60% of the stores in the center may be women's clothing stores, 10% may be toy stores, 5% may be restaurants. Then determine who likes to shop there (e.g., moms, kids, college students, others). Think about how the existing retailers and restaurants could be changed to provide a better shopping experience. Explain your decision to a buddy. For tips on percentages, check out mathisfun.com/percentage-menu.

OR 

☐ **Water recycle.** **STEM** You may already recycle cans, bottles, and paper, but what about water? Orange County has a large and growing population and is suffering a drought. Our scientists and engineers have to invent smart ways to make sure OC residents have enough water. Visit a local water treatment or water recycling center to find out about the STEM involved in “Toilet to Tap” and other ways Orange County's water is reused for people and plants. What can you do to keep water from going to waste?

OR 

☐ **Grip it, kick it, bump it.** **STEM** Discover the STEM behind OC's most popular sports, such as soccer, volleyball, gymnastics, and water polo. Talk to an OC athlete about the science and math involved, such as the angle of your body, the speed or spin of the ball, or the technology in the equipment. Then, try one or more sports yourself, practicing moves with a friend, coach, or experienced player.



STEP 5 Share your voice in OC

A pitch is a presentation you create to convince others to back your cause, support your idea, or join your team. By giving a strong pitch, professionals gain funding for new projects or support for new ideas. Now it's your turn to give a pitch or see one in action!

CHOICES - DO ONE:

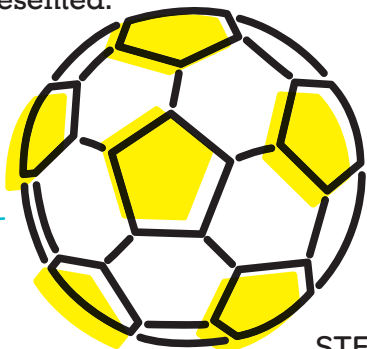
- ☐ **Create a pitch and give it.** STEM Come up with a pitch idea on a topic you care about from another step in this badge. For example, you may want to get people excited about reducing water waste in their homes, improving transportation in Orange County, or adding a store to your favorite shopping mall. Whatever topic you choose, back your presentation with facts, and tailor your pitch to the interests of your audience. Be ready to answer tough questions!

OR

- ☐ **Have a peer pitch to you.** STEM Have a friend who is also working on the STEMsational ME! badge deliver a pitch to you. Ask her to share a new idea or try to convince you of an important change that should be made in Orange County. If you have a suggestion to strengthen her pitch, give kind and considerate feedback, and let her know what you liked about her pitch.

OR

- ☐ **Watch a real pitch.** STEM Attend a city council meeting or visit a local business to observe a real-life pitch in Orange County. Write down three things that impressed you as important parts of the pitch, techniques the speaker used to convince the audience, or something unique about how the pitch was presented.



"People in STEM professions often pitch new technologies and ideas for improving the way we work, live, and play."

- Lacey Gaitan
Community Relations Manager,
Cox Communications

Now that I've earned this badge, I can give service by:

- Educating others about how STEM is involved in everything in OC — from the ocean to fashion to ice cream.
- Showing a group of Daisies or Brownies how using their imagination is a big part of STEM.
- Giving a pitch to encourage others to use STEM to take action in their communities.

I'm Inspired to:



GIRL SCOUTS OF ORANGE COUNTY
STEM CONSORTIUM

Thank you to the Girl Scouts of Orange County's
2016 STEM Consortium
for its support and partnership in the creation of the
STEMsational ME! badge exclusively for OC Juniors.

Broadcom Foundation | Capital Group | Cox Communications
Ingram Micro | Kaiser Permanente Orange County | PAAMCO | Roland DGA

Each activity for this badge has spaces for you to write whether you think the activity involves S, T, E, or M, or a combination of more than one. Talk with a friend or with your troop or group about how science, technology, engineering, and math can have a role in each of the activities.

Answer Key: All activities include S, T, E, and M!