



ROBOTICS

A GS NORCAL COUNCIL'S OWN BADGE PROGRAM

CADETTES, SENIORS & AMBASSADORS

TO ENCOURAGE AND INSPIRE GIRLS TO EXPLORE THE
ASHONISHING WORLD OF ROBOTICS.



PURPOSE

The term robotics covers a large field of study ranging from microchips in automatic coffee makers and automobile engines to robots that carry information or materials in the hallways of hospitals to personal satellite assistants on the space station to the Mars rover to fully autonomous rovers that can complete a given task without instructions from humans.

REQUIREMENTS

To earn an Badge patch, you must complete at least seven activities as follows:

- Two Skill Builders activities
- One Technology activity
- One Service Project activity
- One Career Exploration activity
- Two activities from any category that you choose

All members of Girl Scouts of the USA are eligible to earn the Aviation Badge.

The Aviation Badge is an official award and should be worn on the front of the vest or sash.

ORDER INFORMATION

To order the Aviation Badge please visit www.girlscoutsnorcal.org and purchase the items online. Please note that shipping and handling will be added to all online orders.

Members of Girl Scouts of Northern California will not be charged for shipping and handling if they use the GS NorCal Council's Own Order Form and have badges shipped to the closest GS NorCal store in their area for members to pick up.

ROBOTICS IP DEVELOPED BY

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ROBOTICS BADGE FOR CADETTE, SENIOR & AMBASSADOR GIRL SCOUTS

SKILL BUILDERS

1. What is a microcontroller? Research the definition of a microcontroller. Why are they useful? Where can you find them.
2. Make a list of all the programmed and programmable electronics you, your family and friends use (microwave, toaster, iron, television, etc).
3. Create a list of tools, gadgets, etc. that have been improved with the addition of programmable microcontrollers.
4. Spend sometime thinking about the fictional robots you see on television or read about in books. Pick three and write about how they were used in this fictional world. Then create your own fictional robot and explain how it would perform.
5. Scientist use robots to help them reach places humans cannot. Research three such types of robots. For example see the Personal Satellite Assistance at <http://ic.arc.nasa.gov/projects/psa/>.

TECHNOLOGY

1. There are robotic kits on the internet that either come pre-built or with all the components ready for you to put together. Find one pre-built kit and one assembly kit and in a couple of paragraphs on each kit describe the skills you will learn using the kit.
2. Write an essay on the Mars Exploration Rover. Describe the main components of it. How the engineers got it to Mars. Find out the purpose of the trip. Find the pictures taken by the rover and print them out for a poster in your room.
3. Attend a robotics competition, watch one on TV, or through a video stream, (FIRST, Botball, LEGO League or any others you can find) and describe the rules of the game. What materials are the robots made of? How many people were on the team? What was the winning strategy? What technical and social skills did the team mates display? Examples of technical skills are their usage of math, programming, and design, etc. Examples of social skills include communication skills (both verbal and non-verbal), how well they got along, and how they handled the pressures or stress of the competition?
4. Research three different kinds of products using microcontrollers that are designed to help the handicapped.
5. Find a microcontroller and program it to do something such as sense light, heat, or moisture, avoid obstacles, follow a line, turn something on or off, etc.

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ROBOTICS BADGE FOR CADETTE, SENIOR & AMBASSADOR GIRL SCOUTS CON'T.

SERVICE PROJECTS

1. Start a robotics club through your school, troop or other group. Obtain a robotics kit, build it and then based on the robots abilities have a competition. If you only have one robot between all of you, think about making an obstacle course and autonomously programming your rover to traverse it.
 2. All engineering starts with a strong foundation in mathematics. Set up a group study session in math for kids in lower grades than you.
 3. Create a poster board describing your favorite robot and display it at school and your troop meeting.
 4. Create a book list (at least ten books) for kids your age to read to find out more about robotics.
- Help a group Junior Girl Scouts build a robot.

CAREER EXPLORATION

1. Research three people who have made an impact in the robotics field (at least one of whom is a woman). Find out what career choices they made. Did they always want to be in the field of robotics?
2. Find a college or university that offers robotics or mechatronics as a degree major. List all the courses required to graduate with that major. If you live in the area, call the Chair of the Department which offers that degree major and ask for a tour of their facilities. If you don't live in the area call the Chair and ask for informational packages that she/he sends prospective students.
3. Talk to an engineer that works in the field of robotics. Ask her/him about the schooling required to get where she/he is. What types of projects does she/he work on.
4. Find out how at least two of the following careers are related to robotics: mechanical engineering, computer engineering, computer science, electrical engineering, chemical engineering, physics, systems engineering, and aerospace engineering
5. Make a list of all the jobs that you can think of that a person with a degree in robotics or mechatronics can hold. Be creative and include jobs outside of science and engineering (such as creating attractions for theme parks).

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