



Girl Scouts®
Where Girls Grow Strong™

Girl Scouts of Santa Clara County



Robotics

Interest Patch Program

Girl Scouts

every girl, everywhere

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Robotics Interest Project

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. This



interest project will help you explore the astonishing world of robotics.

Skill Builders

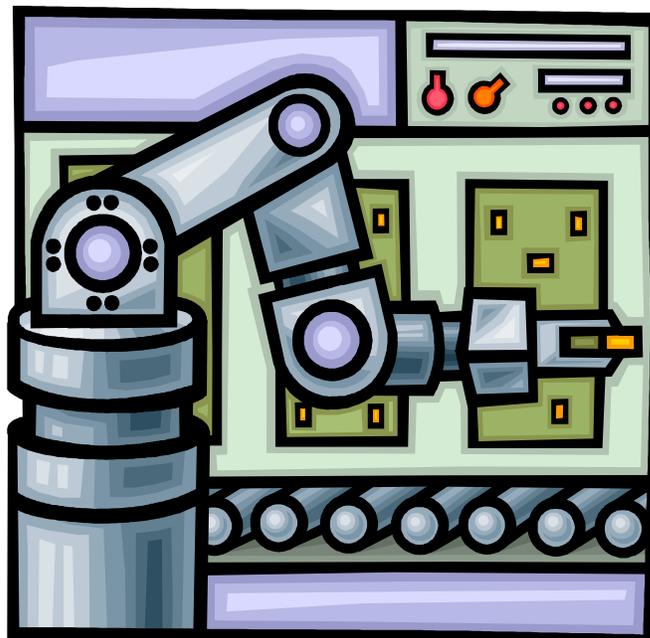
1. What is a microcontroller? Research the definition of a microcontroller. Why are they useful? Where can you find them?
2. Make a list of all the programmed and programmable electronics you, your family and friends use (microwave, toaster, iron, television, etc).
3. Create a list of tools, gadgets, 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.

Scientists 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.

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.



Service Projects

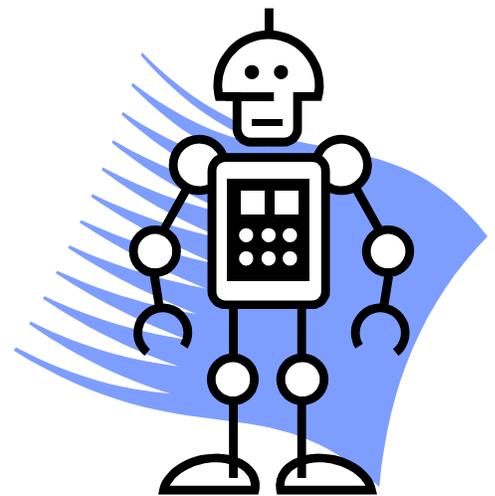
1. Start a robotics club through your school, troop or other group. Obtain a robotics kit, build it and then based on the robots abilities have a competition. If you only have one robot between all of you, think about making an obstacle course and autonomously programming your rover to traverse it.
2. 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.

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).



And Beyond...

If you found the robotics interest project electrifying why not try another science, technology, or math interest project:

- Build a Better Future
- Inventions and Inquiries
- Why in the World
- Math, Maps, and More
- Space Exploration
- Planet Power
- Architecture and Environmental Design
- Exploring the Net
- Computers in Everyday Life

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Partnership with Girl Scouts of Santa Clara County

Robotics Patch Program Evaluation

Name of Patch Program _____ Date _____

Troop Leader _____ Troop # _____ GS Level _____

Phone Number _____ Number of girls participating in program _____

Thank you for participating in this exciting patch program. Part of the process of evaluation is to determine if we met the program goals, as well as your needs as a troop leader. By completing the following evaluation, you will assist us in improving the program for future participants. Discuss the following questions with your troop and record their responses. **Completed form must be presented to the Girl Scout office in order to purchase your patches.**

1. Which activities did your troop do to complete this patch? (You may list by section and number)

2. List 3 or more things that your troop learned by participating in this patch program:

3. List any areas of increase in knowledge that you observed by your troop participating in this patch program: _____

4. Which activities were your troop's most favorite? Why?

5. Which activity was your troop's least favorite? Why?

a. If you could add to any of the activities, what would you add?

b. If you could change any activities you wanted, what would you change?

6. Would you recommend this patch program to other troop leaders? ____ Yes ____ No

Any additional comments: _____

THANK YOU!