



GIRL SCOUTS OF NORTHERN CALIFORNIA

## AGILENT SCIENCE

A GS NORCAL COUNCIL'S OWN PATCH PROGRAM

BROWNIES, JUNIORS, CADETTES, SENIORS & AMBASSADORS

TO EDUCATE, INSPIRE, AND EXCITE  
GIRLS TO BE THE SCIENTISTS AND  
ENGINEERS OF TOMORROW.



### GOAL

Agilent provides Agilent After School science kits to support nonprofit, non-governmental organizations as a means to excite and inspire the scientists and engineers of tomorrow in communities where Agilent does business.

Agilent After School Science kits are currently available for troops in selected regions only. Troop leaders in the areas outlined below may contact their local Girl Scout Council staff who works in partnership with Agilent Technologies to process the ordering of the science kits. Approved regions are:

- Santa Clara County, California
- Sonoma County, California
- Little Falls, Delaware and surrounding areas
- Denver, Colorado and surrounding areas
- Phoenix, Arizona

### REQUIREMENTS

Girl Scouts must complete three Agilent After School science kits, plus one activity from the “Service Projects” and one from the “Career Exploration” sections in this packet to earn this patch.

Subsequent patch component bars may be earned each time a girl completes an additional three science kits as follow: 4-6 science kits = *Novice*, 7-9 science kits = *Enthusiast*, 10-12 science kits = *Apprentice* and 13 – 15 = *Blossoming Scientist*. A total of 18 science kits are available from which to choose.

### ORDER INFORMATION

To order the patch for the Agilent Science Patch Program please visit [www.girlscoutsnorcal.org](http://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.

ORDER PATCHES ONLINE AT [WWW.GIRLSCOUTSNORCAL.ORG](http://WWW.GIRLSCOUTSNORCAL.ORG)  
FOR FURTHER INFORMATION ON PATCH PROGRAMS CONTACT [PATCHES@GIRLSCOUTSNORCAL.ORG](mailto:PATCHES@GIRLSCOUTSNORCAL.ORG)

# AGILENT SCIENCE PATCH REQUIREMENTS

## SERVICE PROJECTS

1. Create a book list (at least five books) for kids your age to read and learn more about science and engineering. How has a solid background of science or engineering led to great inventions? Share the list at school and your troop meeting .
2. Create a poster board describing an impressive invention or discovery. Include some background information on the inventor or discoverer .
3. Share the end product of your science kit with family members or school friends. Tell them the process you went through to complete the activity and the scientific or engineering principles you learned .
4. Girl Scout Cadettes or Seniors can help a Girl Scout Junior troop complete three Agilent After School science kits to earn a patch.

## CAREER EXPLORATION

Girls may wish to learn more about the science and engineering fields. Girls can research the fields and present their findings to their troop:

1. Find a college or university that offers science or engineering as a degree major. List all the courses required to graduate with that major .
2. Investigate several types of engineering or science careers, such as electrical engineering, chemical engineering, computer science, life science. What are some differences between the various disciplines?
3. Research three people who have made an impact in the science or engineering fields (at least one of whom is a woman). What were their interests in school? Did they always want to be a scientist or engineer? Did they face any obstacles along the way?
4. Talk to a scientist or engineer. Ask him/her about the school required to become an engineer or scientist. What types of projects does she/he work on? What is her/his favorite thing about being an engineer or scientist ?
5. Create a list of different ways science and engineering improve our daily lives. This could be done in a brainstorming session or as a discussion topic after the girls complete each kit
6. Conduct a science experiment that interests you. A wide variety of experiments can be found on [www.sciencebuddies.org](http://www.sciencebuddies.org).

## AGILENT KIT DESCRIPTIONS

### KIT DESCRIPTIONS

Each self-contained kit serves four girls, and all needed materials are included. Each girl will be able to take her project home upon completion. A science or engineering background is not necessary to successfully lead or complete the kits' activities. To help make kit selections, the following kit descriptions include a key to designate skill levels, i.e. Easy (E), Moderate (M), and More Difficult (MD).

#### KIT 1 – STEADY HAND GAME (M)

The girls will explore the fundamentals of electricity. They build an electrical circuit that includes an energy source, resistance, a light and a switch. The completed assembly is also a steady hand game that the girls will have fun playing and demonstrating to family and friends. *Content area: Electricity and Switches.*

#### KIT 2 – NEWTON'S ROCKET CAR (MD)

The focus of this kit is on the careful assembly of a balloon-powered car that provides a practical application of Newton's third law of motion. After they have completed their cars and considered the importance of axles, bearings, and symmetry, the girls will have a lot of fun racing them around the room. *Content area: Motion and Design.*

#### KIT 3 – OWL PELLETS (E)

This hands-on investigation allows girls to take apart their own owl pellets and classify the bones, skulls, and other skeletal remains of mice, shrews, and small birds. They carefully observe and match the remains while engaged in discussions about the food web, animal behavior and skeletal anatomy. *Content area: Food Chains.*

#### KIT 4 – PERISCOPES (E)

This activity introduces the girls to the basic properties of reflection. They experiment with mirrors, reflection, geometric shapes and symmetrical words and images. The session continues with each girl constructing her own periscope and having a great time finding ways to apply the tool. *Content area: Reflection and Symmetry.*

#### KIT 5 – DEEP SEA DIVERS (E)

The principles of flotation, air pressure and density are introduced in this kit. Build divers using balloons, paper clips, and weights and place them in a one-liter bottle for "deep sea diving." Includes some measurement and data collection. *Content area: Flotation and Density.*

#### KIT 6 – KALIMBA (THUMB PIANO) (MD)

Explore the fundamentals of sound through the vibration of metal and wood. Build your own thumb piano and have the opportunity to discover the concepts of vibration, frequency and pitch. Sheet music is provided for the girls to begin to master their new musical instruments. *Content area: Properties of Sound.*

## AGILENT KIT DESCRIPTIONS CON'T.

### **KIT 7 – CATCH A THIEF (E)**

This kit will encourage girls to use their investigative and problem-solving skills to solve a crime. Using paper chromatography, the students reveal the underlying composition of the four suspects' pens and, utilizing the same scientific process on the ransom note, they identify the criminal. *Content area: Crime Chemistry.*

### **KIT 8 – TIME SHADOWS (E)**

This kit will provide an opportunity for girls to build their own sundials and simulate the “time shadow” created by the rotating Earth. The shape of the earth, their location on it, and how a compass works are considered in this kit. Flashlights are even provided.

*Content area: Earth Rotation.*

### **KIT 9 – OOBLECK (E)**

As the girls take part in this activity, they learn to think like scientists as they investigate the properties of a strange substance called Oobleck. Once the girls have determined the key characteristics of the substance, they are given the challenge of designing a craft capable of handling these strange properties. *Content area: Solids and Liquids.*

### **KIT 10 – ELECTRONIC MATCHING GAME (M)**

This kit provides the girls with an opportunity to build an electrical circuit that serves as an electronic checker for matching questions and answers. Girls will install wires, resistors, LEDs, nuts, bolts and batteries to create their own electronic matching game. *Content area: Electricity and Circuits.*

### **KIT 11 – THE LIGHT HOUSE (MD)**

Girls will assemble both house and lamp assemblies. With rays of light emerging from the sides of their houses, girls will set up experiments to discover properties of light including the reflection, refraction, and conversion of light rays. *Content area: Properties of Light.*

### **KIT 12 – INVISIBLE FORCES (MD)**

With this kit, the girls will have the opportunity to study these behaviors and investigate the forces of magnets attracting or repelling certain objects, compass needles, and electricity. They will try to “see” the invisible forces at work by observing the effects of their experiments. In the end, girls will build their own electric motor. *Content area: Magnetism and Electricity.*

## AGILENT KIT DESCRIPTIONS CON'T.

### **KIT 13 – NIGHT AND DAY (M)**

Girls create their own model of the earth, spinning on its axis and changing its seasonal position relative to the sun. They will observe the cause and effect relationship that these movements have on our days and nights, our years, and our lives. *Content area: Earth's Rotation and Seasonal Changes.*

### **KIT 14 – PIECES OF EARTH – PARTS 1 AND 2 (E)**

Girls will examine minerals to find 12 important rocks and minerals found on earth. They will observe and analyze properties of minerals and develop an understanding of the rock cycle. Pieces of Earth consist of two kits. Completion of both science kits qualify as completion of the Pieces of Earth science kit. *Content area: Rock and Minerals.*

### **KIT 15 – BREATHTAKING MODELS (M)**

Girls will use models to understand the human process of obtaining and using oxygen. They will experiment with one model and build a second. The girls will learn about the process of moving air into and out of the lungs. *Content area: Biology.*

### **KIT 16 – AIRPLANES (MD)**

Girls will construct their own rubber-band-powered airplane. They work together to understand principles of flight. Certain variables will be introduced to deepen their understanding of forces at work on a plane. *Content area: Aerodynamics*

### **KIT 17 – OIL SPILL (E)**

Girls will create a model seashore and experience the impact of an oil spill. They will investigate ways to contain and clean up the spill, and will end this activity by brainstorming less risky and cleaner energy sources. *Content area: Environmental Science*

### **KIT 18 – SOLAR ENERGY (MD)**

Girls will explore clean energy sources, specifically considering solar energy. Using a solar cell and motor, the girls will experiment with the collection of light and conversion to mechanical motions. *Content area: Physics.*

## LEADER'S GUIDE

- ❖ Each kit contains supplies for a team of four girls.
- ❖ Make sure you are familiar with the materials and the instruction sheet information included in each kit before doing the activity with the girls. The instruction sheet is intended for the adult/facilitator. It provides you with some basic topic information and some key questions to get the girls engaged in the topic.  
*\*\* It is strongly recommended that the leader complete the activity prior to implementation to be familiar with the activity.*
- ❖ To help leader organize their activities, the kit descriptions include a symbol that help identify the level of difficulty.
- ❖ Have the activity supplies laid out. You could have one girl pick up the supplies for the group she is working with.
- ❖ These kits work best if you model the steps as you go. This will give the girls a better understanding of what needs to be done.
  - ❖ Ask open-ended questions:
    - ❖ What do you think about ....?
    - ❖ What would happen in ....?
    - ❖ How can we find out ....?
    - ❖ How could you be sure that ....?
    - ❖ How many ways can we ....?
    - ❖ What do you think the result will be?
- ❖ Encourage the girls to make a hypothesis (a guess about what will happen).
- ❖ Invite questioning.
- ❖ Encourage a number of alternative answers rather than focusing on one “correct” answer.
- ❖ Evaluation – have teams address the following:
  - ❖ What would they do differently?
  - ❖ How did the team work?
  - ❖ Did they help each other?
  - ❖ What did they learn?
  - ❖ How would they evaluate the activity?

# BADGE LINKS FOR AGILENT AFTER SCHOOL SCIENCE KITS

## GIRL SCOUT JUNIOR LEVEL

Science Kit	Badge Link
Electronic Matching Game	Making it Matter Toymaker
Kalimba	Music Fan Science Sleuth Making Music
Oobleck	Making it Matter
Owl Pellets	Wildlife
Deep Sea Diver	Science Sleuth
Steady Hand Game	Making it Matter

## GIRL SCOUT CADETTE LEVEL

Science Kit	Badge Link
Owl pellets	All About Birds
All kits except Oobleck and Owl Pellets	Why in the World
Steady Hand Game Electronic Matching Game	Inventions and Inquiry
Time Shadows	It's About Time

# AGILENT SCIENCE PATCH PROGRAM EVALUATION

Troop Leader \_\_\_\_\_ Troop# \_\_\_\_\_ GS Level \_\_\_\_\_

Phone Number \_\_\_\_\_ # of girls participating in program \_\_\_\_ Date \_\_\_\_\_

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 San Jose Girl Scout office in order to purchase your patches.**

List the 3 Agilent Science kits your troop did to complete this patch program?

\_\_\_\_\_  
\_\_\_\_\_

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

\_\_\_\_\_  
\_\_\_\_\_

Which activities was your troop's most favorite? Why

\_\_\_\_\_  
\_\_\_\_\_

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

\_\_\_\_\_  
\_\_\_\_\_

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

\_\_\_\_\_  
\_\_\_\_\_

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

\_\_\_\_\_  
\_\_\_\_\_

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

Any additional comments:

\_\_\_\_\_  
\_\_\_\_\_