



GIRL SCOUTS OF NORTHERN CALIFORNIA

AVIATION

A GS NORCAL COUNCIL'S OWN BADGE PROGRAM

CADETTES, SENIORS & AMBASSADORS

TO EDUCATE GIRLS ON AVIATION.



PURPOSE

Aviation describes a huge field of activity ranging from people flying ultra-light airplanes for fun, to 747's flying with international airlines and military operations all over the world. These activities invite you to explore the subject in as much detail as you like.

REQUIREMENTS

To earn the Aviation Badge Patch, you must complete 8 of the 15 activities including at least one from each of Parts I to V.

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.

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AVIATION BADGE FOR CADETTE, SENIOR & AMBASSADOR GIRL SCOUTS

PART I: THE HISTORY OF AVIATION

1. Learn about the ways in which aviation has influenced history and the way we live today. List a number of these ways, then compare lists with others. Do you find that your lists are mostly alike, or have you found a wide range of influences? Were some of these influences bad or undesirable?
2. Study a person, aircraft, place, or event that was important in the history of flight. Use a scale model, art of your own creation, video clips or computer graphics, text, or whatever techniques you enjoy, to present your subject in public. Try to make it both informative and interesting to others. Possible places to display your work might include a public library, school, hobby shop, or scale modeler's society meeting or competition.
3. Learn the stories of three women who have had a significant place in the history of aviation, and be able to tell how they influenced history.
4. Your first experience with flying was probably riding an airliner. Make a list of eight or more other activities of businesses that involve flying, at least four of which should involve the smaller aircraft of the General Aviation fleet.

PART II: THE SCIENCE OF FLIGHT

5. Learn about the different categories of aircraft, such as airplane, glider, helicopter, airship (blimp) and balloon. Learn some ways in which each of these is used. Learn what keeps each of them in flight and (for at least one category) the names of the major parts and controls, and how the controls operate.
6. Visit a facility, such as a NASA laboratory or a university, where research is done either into improving the technology of flight, or using aircraft as tools to study astronomy, the atmosphere, the earth, or other subjects. Tell others of what you learn, in a paper or extra credit presentation for school, a group discussion, or a display as suggested in PART 2, above. Try to show how things might be different in the future as a result of the research work you have seen.
7. People have always been interested in the weather, but it was the needs of aviation for accurate and detailed information about how the weather would affect a flight that made the creation of the Weather Service essential. Learn how such weather conditions as clouds, fog, humidity, wind (both surface and aloft), thunderstorms, and warm or cold fronts affects an imaginary flight plan you are preparing?

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8. The human body works just fine as long as you are walking about on the ground, but has limitations that can be problems in flight. Learn about these or other problems in aviation physiology.
- As the pressure of the atmosphere decreases with altitude, it may cause problems of hypoxia or oxygen deficiency. (Have you ever experienced this in the mountains?)
 - Military pilots may feel forces on their bodies much different from the normal pull of gravity. It's fun to experience this on a roller coaster, but what kind of problems do high or low G-forces cause, and how are they solved?
 - Parts of the inner ear help you keep your balance and directions, but may be fooled by sensations of flight. Learn how this happens, and tell how you may have experienced it. Explain or demonstrate vertigo, which is an extreme case of the senses getting confused by what you are seeing and feeling. How does a pilot use an aircraft's instruments in place of some of her own senses at night or within clouds?

PART III: GETTING AROUND IN THE AIR

9. Visit an airport control tower or other traffic facility. Learn how the controllers use radar, radio, and their own visual observation to assure safety of aircraft under their control and how their facility works with other parts of the air traffic control system. Listen to the radio communications until you can recognize and understand a simple air-to-ground exchange, identifying the aircraft involved.

10. There are no street signs or highway numbers in the sky. So how do you find your way, especially when clouds block your view of the ground? Learn about navigation radio equipment such as VOR, ILS, LORAN, and GPS, and the other instruments in the aircraft that help the pilot solve this "Airborne Orienteering" problem. Study an aviation Sectional Chart, and learn how it differs from maps you have seen before. Learn to interpret some of the markings, and identify cities, airports, radio navigation facilities, and mountain peaks or other high terrain. Plot a course between two airports, measure the distance, and calculate your flight time for an imaginary trip. (If you do this before doing activities 9 or 15, what you see then may make much more sense to you.)

11. Visit a Fixed-Base Operator's facility or a flight training or research center where flight simulators are used. Learn how they are used, and what the requirements are for a good simulator. Learn from a flight instructor or experienced pilot how simulator programs available for use on home computers differ from those in training centers, what their limitations are, and how they could be used in learning to fly. Then use a PC-based or training simulator to practice some flight maneuvers until you can do them well.

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PART IV: CAREERS AND COMMUNITY SERVICE IN AVIATION

12. Careers in aviation range all the way from airline captain or military fighter pilot to food service or reservations clerk. Research one that you find interesting. Talk to someone in the field if possible. Learn what education, physical abilities, etc. are required. List advantages and disadvantages of the job. After learning more about it, would you like to enter this career?

13. Learn about the work of one the volunteer service organizations involving aviation, such as Flying Doctors, Angel Flight, Civil Air Patrol, or The Environmental Air Force. How could you contribute to the group, now?

14. The Private Pilot license is what most people earn to begin flying. What do you need to do to get your license? What would it cost? How long does it take?

PART V: CAREERS AND COMMUNITY SERVICE IN AVIATION

15. While taking a flying trip, an airport, or talking to a pilot, notice how ground and flight crews use some of the things you have learned about to assure a safe and efficient flight. You may be able to notice the numbers and occupations of people in the ground and flight crews (activity 12), watch how the movements of the control surfaces affect flight (5), listen in on air-to-ground communications and notice the aircraft being routed after takeoff and before landing (9,10), try to compare the “feel” of the ride and unexpected changes in route or schedule with the weather conditions (7), and perhaps get a look at the pilots’ instruments and controls (5,10)?

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NOTES ON WOMEN IN AVIATION

FOR USE WITH PART I, ACTIVITY 2 OR 3

What, exactly, does it take to earn a ‘significant place in history’? I wrote up the activity before I thought about it, and suddenly realized I did not have an answer, myself. No women’s names come to mind as inventors or designers during the first 50 years of flight, perhaps because engineering was long viewed as a man’s profession. (As late as 1950, only about 1% of engineers were women.) A few women engineers did important work for NASA (and its predecessor NACA) in the early years, including Doris Ehret and Alberta Alksne, but scarcely anyone outside the aeronautical engineering field has ever heard of them. No famous American test pilots have been women, although Hannah Rietsch did important work in her native Germany during the Second World War and the remarkable Jacqueline Auriol flew in France until the 1960’s. It’s when you think about the adventurers, the people who made the flights that had never been tried before, that you find well-known American women. Amelia Earhart was the most famous and popular, but others included speed-record setter Laura Ingalls (who also became the first person to fly completely around the South American continent), and Ruth Nichols (who set several altitude records in the early 1930’s, one of which is still unbroken).

The most remarkable woman aviator of all was Jacqueline Cochran, who grew up as an orphan in extreme poverty, learned to fly at 20 years old, taking only three weeks to accomplish it, and went on to set more records than any other aviator, male or female. During World War II, she felt that women should have a chance to serve their country by flying, just as men did, and organized the Women’s Airforce Service Pilots (the “WASPs”). After the war ended, women were not allowed to fly again in military services for over 30 years, but Cochran still managed to set records using military aircraft, and became the first woman to fly faster than sound, and later at twice the speed of sound. You can read about her career in *WASPs*, Vera S. Williams (published by Motorbooks International) which is available at the Santa Clara Library, or *The Northrop Story*, by Richard Sanders Allen (Schiffer Aviation History), or start with an encyclopedia.

The record-setting of the 1930’s had helped make people aware of aviation’s possibilities, and this continued in the 1960’s with round-the-world flights in ordinary light airplanes such as you might see at any small airport by American Jerrie Mock, and Sheila Scott from Britain. (Read their stories in *Women With Wings*, by Mary Cadogan, Academy Press.)

The first airline stewardess (“flight attendant”) was Ellen Church, hired in 1930, but it wasn’t until 1984 that the first American woman became airline captain, Lynn Ripplemeyer and Beverly Burns. Their stories and those of the first women military pilots are mentioned in *Women With Wings*, as are many whom are not mentioned here.

THINGS YOU MIGHT HEAR ON THE RADIO

FOR USE WITH PART III, ACTIVITY 9 OR PART V, ACTIVITY 15

1. Starting out: Pilot calls “Reid Hillview ground, Cessna November one-seven-zero-zero delta at the fuel pits with Charlie. Taxi for takeoff.” (Who you are, where you are, and what you want to do. You told them you have weather info “Charlie”.)

Ground controller comes back. “Cessna zero-zero-delta, taxi on one for runway three-zero right.” (Taxi on taxiway one, to the southeast end of the runways. You will be taking off on the right hand runway marked “30” for a compass heading of 300 degrees when you start your takeoff.)

2. After preflight checks: “Reid Hillview tower, Cessna one-seven-zero-zero delta, ready for takeoff.” (This is a different controller, so give her your full number. You don’t have to say Charlie because the ground controller made sure you had the information, already.)

Tower controller comes back “Cessna zero-zero delta, hold short for a Piper on base.” (There’s a Piper aircraft on the final turn of the landing pattern. I’m keeping you off the runway until it’s down.)

After the Piper passes by, tower calls “Cessna zero-zero delta, taxi into position and hold. Squawk two-two-five-five.” (Line up and get ready but don’t start your takeoff yet. Turn on your radar transponder and set the code to 2255.) Then, “Cessna 0-0 delta, cleared for takeoff.” (You don’t have to answer, you just roll.)

3. You’re about to leave the airport control zone, and the system will continue following you on radar. Controller calls “Cessna 0-0 delta, contact Oakland Center on one-two-three-point six-five. Squawk four one five five.” (She gave you a new radio frequency and transponder code.) You call “0-0 delta squawking 4155. Thank you, ma’am. G’day,” she says.

You switch frequencies to 123.65 megacycles, and call “Oakland Center, Cessna 1-7-0-0 delta out of Reid Hillview at three-thousand, VFR for Sacramento.”

Center comes back “Cessna 0-0 delta, squawk ident.” You push a button on the transponder that lights up your blip on their radar screen, and they come back “0-0 delta, radar contact.” (You’re VFR, so they won’t say any more to you unless there is traffic that looks like a collision hazard.)

4. You’re an airliner captain headed east over Nevada. “Southwest 246, descend to and maintain flight level two-niner-zero, contact Salt Lake Center on one-three-four-point-zero-zero. G’day.” Your response: “Oakland, Southwest 2-4-6, out of three-one-zero for two-niner-zero. Going to salt Lake. G’day.” (Controller wanted you to descend to 29,000 feet, and gave you a new frequency. You let them know that you were descending, already leaving 31,000 feet, and signed off for the day.)

SOME RESOURCES TO CALL ON FOR THE AVIATION INTEREST PATCH

There are some activities in this interest patch that may be difficult to do by yourself, fortunately, there are a number of groups and programs around that you could call on. For example, people who fly small aircraft would probably be glad to show you around them and help you pass some of the activities from 9 to 15 are:

- “The Ninety-Nines,” an organization entirely for women involved in aviation, and they try especially to encourage girls’ interest. Contact Majorie Johnson at 408-243-2098.
- The Experimental Aircraft Association, contact Ron French at 408-226-5200 (work) or 408-259-8843 (home). The EAA through a program called “Young Eagles,” is trying to introduce young people to aviation, and he has already helped set up several programs for troops. The group also has several “Eagles” events at various airports each year.
- The Antique Aircraft Association, contact John McMains at 399-9122 (work). These are people interested in restoring and flying old aircraft, but many fly modern ones also. This group puts on a big Antique Show at Watsonville airport each year in May, which you may enjoy. Another person active in EAA is Sharon Hunt, of Country Girl Scout Council 287-4170 (work).
- The Santa Clara County Airman’s Association. Again, Sharon Hunt at the Scout Office is involved and willing to help.
- San Jose State University School of Aviation might be a place to learn about some careers. Contact Anita Kohfeld at 924-6580.
- A fixed-base operator or flight school such as Amelia Reid at Reid-Hillview Airport (251-4939) or West Valley Flying Club at Palo Alto Airport (talk to Ann Elsbach at 415-856-2030) might be good places to talk about activities 11 or 14.

AMONG THE OTHER ACTIVITIES, YOU MAY FIND THESE IDEAS USEFUL

If you are interested in NASA and would like to do activity 6, contact Bob Miller, a retired engineer (and Assistant Leader of GS Troop 217) at 408-252-7842, and we may be able to arrange a personal tour. If several girls are interested, we might plan an evening meeting to cover a number of different topics.

- Groups listed earlier may be able to arrange a visit to a control tower or other traffic control facility (activity 9), but if this doesn’t work for you, the crew at the tower at Reid-Hillview has been very helpful, and you may be able to set up an individual visit. Call 272-0800.
- If you do activity 7 on your own, you may wish to listen to an automated telephone weather briefing. You can get this from a touch-tone phone by calling 1-800-WXBRIEF, and following the instructions. (You push # and * after picking a menu item.)
- To do activity 13, you may wish to contact Sharon Hunt at the GS office to get in contact with Angel Flight Doctors, or with Mark Seymour or Scott Behringer of the Environmental Air Force, at 408-987-7373.