



Aviation Merit Badge Day

Example Camp Program

Duration: Full-day event (7 hours)

Participants: 10-12 Scouts

Structure: Series of stations/activities covering all merit badge requirements

Schedule Overview *

Time	Activity
8:30 - 9:00 AM	Check-In - introductions, objectives, schedule, etc.
9:00 - 10:20 AM	Ground School
10:20 - 10:30 AM	Break
10:30 - 12:00 PM	Principles of Flight
12:00 - 1:00 PM	Lunch Break
1:00 - 4:00 PM	Airport Visit
4:00 - 5:00 PM	Personal & Professional Opportunities
5:00 PM	Closing Ceremony (Q&A, Badge Completion Certificates, extracurricular options)

* The example above uses the Charlotte Douglas International Airport, wind tunnel, and an airplane museum. Use what is available in your region to accomplish requirements.

Detailed Station Descriptions

Station 1: Ground School

- Review multimedia presentation for Requirement 1 (pages 1-19)
- Test for understanding after each requirement
- **Requirements Covered:** 1 (a-h)

Station 2: Principles of Flight

- Build & Fly FPG-9's (see info in counselor presentation); or
- Build & Fly balsa planes (see info in counselor presentation); or
- Build & Fly drones (see below for detailed support)
- Allow students to try a flight simulator (if available)
- **Requirements Covered:** 2 (a/b/c); 3 (a)

Station 3: Airport Visit

- Airport tour – learn about runway naming, reading charts, etc.
- Maintenance hangar – view maintenance activity
- Preflight an airplane
- Discovery flight (if available)
- **Requirements Covered:** 3 (b/c/d/e); 4 (a)

Station 4: Personal & Professional Opportunities

- Review multimedia presentation for Requirement 5 (pages 31-36)
- Q&A
- **Requirements Covered:** 5 (a-d)

Resource Needs:

- FPG-9 materials, or balsa wood airplane kits
(available on Amazon: <https://a.co/d/g808mHf>)
- Drones (see below)
- Completion certificates, Wings awards
(available on Amazon: <https://a.co/d/7LzseVt>)
- Others at your discretion

Aviation Merit Badge

Drone Program

Aviation Merit Badge: Requirement 2 (c)

Requirement: Build (or obtain) and fly a fuel-driven or battery-powered electric model aircraft or drone. Describe safety rules for building and flying remote aircraft. Describe safety rules for fuel and/or battery packs.

Materials Needed:

- **Drone(s).** We recommend using the DJI Tello drone which was relatively inexpensive (~\$100) and extremely easy to set up and use. Ideally, each scout would pay a program fee so that you can provide each scout their own drone – but if not, easily shared. (<https://www.ryzeroobotics.com/tello>)

- **Charging station.** The batteries only last for ~15 minutes of flight time, and while 3 batteries are provided, they seem to drain quickly! Recommended setup:
 - o Charging station: <https://tinyurl.com/5n8buxre>
 - o Charging cables: <https://tinyurl.com/5asss8n5>
 - **Obstacle course.** It's actually quite easy to make your own from tables, chairs, hula-hoops, etc.
 - **Helipads.** These are completely optional, but very fun – especially if you set up an obstacle course race: <https://tinyurl.com/hrx96nx8>
 - **Mobile device(s).** The drones connect to, and are controlled by, the mobile device. You may have to tweak the phone's cellular settings, based on the phone/service provider. The drone connects to the phone via its own Wi-Fi (not Bluetooth)
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Activity:

Drone Safety Rules:

- **Building/Flying:** All Scouts must complete the FAA-approved TRUST drone safety course: (https://www.faa.gov/uas/recreational_flyers/knowledge_test_updates).
- **Battery Packs:** Review these materials with the Scouts: <https://pilotinstitute.com/drone-battery-safety/>

Drone Set-Up

- Make sure the battery packs are fully charged!
- Mark each drone with the Scout's last name, so they do not get mixed up. I used an Avery label-maker.
- One at a time (so Wi-Fi names do not get mixed up), connect the phones to the drone. Download the Tello app and follow the instructions. Once connected, rename the Wi-Fi to the Scout's name to avoid confusion.
- Have one counselor teach the basic instructions for flying the drone, while the second counselor begins connecting the next Scout to their drone.

Individual Flights:

- Allow each Scout to fly their drone for 15-30 minutes; they may need to change battery packs.
- Identify safety concerns. Start indoors (if possible); then, when the Scout has sufficient proficiency, allow them to fly the drone outside in a clear field. Avoid trees!
- Once they are comfortable with the drone operation (will vary by Scout), then show them how to take/record photos and videos on their phone. Be safety aware along with guidelines of flying drones in your area.

Racing

- Once all Scouts are proficient with flying their drones, and recording photos/videos, they are ready to race!
- Place two helipads on one end of the room (or field, if you need to do this outdoors). Create two duplicate obstacle courses. Pair up Scouts according to their abilities and have them race!
- For the first round of races, allow the Scouts to “follow” their drones – and recover them as needed. For future races, make it more challenging by requiring them to operate the drone by looking at their phone ONLY – i.e., they cannot physically see the drone, only watching the video from the drone’s perspective. Then, if they “crash”, it’s game over for them!

Follow Up

- Ask the Scouts for feedback – what did they think? What was easy for them, most difficult? What could have been better with the activity?
- Share some of the opportunities for careers in piloting drones – real estate, surveillance, geographic surveying, etc.
- Encourage them to fly their drones at camp, take photos/videos and share them with the Camp Director!