

**Alaska Airlines Aviation Day  
Scouts BSA Aviation Merit Badge Worksheet**

Welcome to the Alaska Airlines Aviation Day. This worksheet is for you to use to record your responses to the requirements for completion of the Aviation Merit Badge. A few notes to remember:

1. Please print this worksheet and bring it with you to Alaska Airlines Aviation Day. There may not be copies available. Make sure to bring your own pen or pencil and write your name on the worksheet.
2. You will be able to complete all requirements of the BSA Aviation Merit Badge.
3. For requirements 2, 3 and 4 - only 2(b), 3(b), 3(c) and 4(a) are offered at this event. Other requirements are noted as "not offered at this event".
4. Follow carefully the details of requirement 5. You will have many opportunities to meet representatives from various aviation, airport and airline organizations. This is a unique opportunity, make sure you have in mind which organization, company or career you wish to identify and record to complete requirement number 5.
5. Unless advised otherwise, use this completed worksheet to meet with an Aviation Merit Badge counselor after the event, in your local Council or District to *sign off* the Merit Badge.
6. There will be a QR code on the website and at the check in area with a map of the event,
7. Be careful with paper and items you carry as it might be windy at the event. It is important not to allow any item you have to be blown away that could create FOD (Foreign Object Debris).
8. At the end of the event, be sure to check out at the Aviation Merit Badge table.
9. If you have any questions – please ask an event staff member.

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**1. Aviation Basics and Mechanics of Flight. Do the following (LOCATION: GENERAL AVIATION STUDIES BOOTH):**

- (a) Define "aircraft". Describe three kinds of aircraft today, and their typical uses.

- (b) Provide a brief overview of the evolution of flight and discuss three notable times in history important to aviation.

- (c) Explain the difference between a fixed wing and a rotary wing aircraft, and the benefits of each.

- (d) Explain the operation of piston, turbine, and jet engines.

- (e) Using a model aircraft, describe the four forces that act on an aircraft in flight.

- (f) Explain how an airfoil generates lift, specifically noting Bernoulli's principle.

- (g) Identify and describe the aerodynamic control surfaces on the aircraft of your choice and explain how they operate to control its attitude and direction of flight.

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- (h) Explain the purposes and functions of the various instruments found in a typical single-engine aircraft: attitude indicator, heading indicator, altimeter, air speed indicator, turn and bank indicator, vertical speed indicator, compass, navigation, communication, and engine performance indicators.

**2. Principles of Flight. Do ONE of the following:**

- (a) Build a model FPG-9. Get others in your troop or patrol to make their own model, then organize a competition to test the precision of flight and landing of the models. **[This requirement is not offered at this event.]**
- (b) Build a rubber-band driven balsa wood airplane. Fly the plane for 25 feet in a straight line, with a smooth landing **(2(b) LOCATION – HILLER AVIATION MUSEUM BOOTH)**.

- (c) Build (or obtain) a fuel-driven or battery-powered electric model aircraft or drone. Obtain The Recreational UAS Safety Test (TRUST) certification and fly the aircraft with a successful take-off and landing. **[This requirement is not offered at this event.]**

**3. Flight Operations. Do TWO of the following:**

- (a) Using a flight simulator software package, set a course and fly the headings you have established with a successful take-off and landing. **[This requirement is not offered at this event.]**
- (b) Under supervision, perform a preflight inspection of an aircraft **(3(b) LOCATION: MAINTENANCE AND ENGINEERING STATION)**.

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- (c) Observe and/or participate in an aircraft maintenance activity. Describe the maintenance schedule and requirements for an aircraft of your choice **(3(b) LOCATION: MAINTENANCE AND ENGINEERING STATION).**

- (d) Obtain and learn how to read an aeronautical chart. Measure a true course on the chart; correct it for magnetic variation, compass deviation, and wind drift to determine a navigational heading for an aircraft. **(3(d) LOCATION – SAN CARLOS FLIGHT CENTER BOOTH)**

- (e) With your parents or guardian's permission, take a discovery flight in an aircraft. Record the date, place, type of aircraft, and duration of flight. Report on your impressions of the flight. **[This requirement is not offered at this event.]**

**4. Airport Operations. Do ONE of the following:**

- (a) Visit an airport. After the visit, report on how the facilities are used, how runways are numbered, and how runways are determined to be "active." **(4(a) LOCATION – SFO Airport Booth, FAA Booth)**

- (b) Visit a Federal Aviation Administration facility: Airport Traffic Control Tower (ATCT), Terminal Radar Approach Control (TRACON), Air Route Traffic Control Center (ARTCC), or Flight Standards District Office (FSDO). Report on the operation and your impressions of the facility. **[This requirement is not offered at this event.]**
- (c) Visit a military aviation facility. Learn how that facility supports defense and/or civilian activities. Report on the operation and your impressions of the facility. **[This requirement is not offered at this event.]**
- (d) Visit an aviation museum or attend an air show. Report on your impressions of the museum or show, and what you learned from the experience. **[This requirement is not offered at this event; however Scouts may visit the SFO Museum and Library located at the International Terminal or other near-by aviation museums such as the Hiller Aviation Museum, San Carlos, CA; or the Oakland Aviation Museum at Oakland International Airport.]**

**5. Personal & Professional Aviation Opportunities. Do the following (LOCATIONS for 5 (a), (b), (c) – San Carlos Flight Center Booth, 5 (d) - Civil Air Patrol Booth, 5 (e) – all stations/booths):**

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- (a) Explain the following: the student pilot, the recreational pilot, the remote pilot, and the private pilot certificates.

- (b) Describe the benefits of the instrument rating.

- (c) Explain the following: the commercial pilot certificate, the airline transport pilot certificate, and certified flight instructor (CFI).

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- (d) Identify an Exploring Post and/or Civil Air Patrol facility in your area. Learn about their activities and membership requirements.

- (e) Identify three career opportunities that would use skills and knowledge in aviation. Pick one and research the training, education, certification requirements, experience, and expenses associated with entering the field. Research the prospects for employment, starting salary, advancement opportunities and career goals associated with this career. Discuss what you learned with your counselor and whether you might be interested in this career.