BSA Aviation Merit Badge Counselors,

Thank you for assisting scouts earning the Aviation Merit Badge at the Lone Star Flight Museum. This guidebook is designed to help scouts through the requirements using our exhibits and displays. With your guidance, they will be able to complete all requirements of the badge, except one, within their museum visit. The final requirement can easily be completed at home or in a Troop meeting.

Plan for the bulk of the requirements to take about 2 hours. This should leave plenty of time during your visit to slow down and enjoy looking at the historic planes. One of the unique things about Lone Star Flight Museum is that all our planes are flight worthy (except the PHI helicopter and two small wooden planes). If you visit on a Saturday, weather permitting, you will see some of our planes fly. Scouts will also be able to take as much time as they want in the simulators. We encourage you to use the museum to inspire and educate youth about aviation and the future careers within this exciting field.

This guidebook is designed to assist you and the scouts. How they fulfill the requirements is up to you as their counselor. Scouts can write notes in the guidebook or orally explain and describe their thoughts to you. Staff and volunteers are usually available to give directions and information, but you are the counselor of record for the scouts' work. You will be required to know and follow all BSA Merit Badge Counselor rules and requirements and sign off the Blue Cards.

To complete Requirement 2, the flight simulators in the Aviation Learning Center are open on Saturdays and Sundays for free; however, they are occasionally closed. When you plan your visit, email education@lonestarflight.org to make sure the simulators will be open. The Aviation Learning Center is home to a real plane, the Mooney Ovation that can be inspected to fulfill requirement 2d. This part of the center is not normally open to the public, but if you notify us that you are coming to work on the badge, staff can give you access for the inspection. When you arrive at the museum, check in with the ALC staff to see if you should fly your simulation before or after your other merit badge work.

Requirement 2b and d

b. Under supervision, perform a preflight inspection of a light airplane.

d. Using one of many flight simulator software packages available for computers. "fly" the course and heading you established in requirement 2c or another course you have plotted.
Not completed at LSFM:

Requirement 3

Do ONE of the following:


b. 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 should be completed on your own outside of Lone Star Flight Museum.

http://amaflightschool.org/diy/fpg-9-foam-glider

Notes:

Requirement 1a

Aircraft types represented in the museum: prop plane, jet plane, helicopter, drone, glider, hang glider, balloon, and space shuttle.

Scouts can access the LSFM Guest WiFi network to do research while at the museum. Go to the Guest Services desk to get the password.
Aviation Merit Badge Guidebook
Create a flight plan from Ellington Field to Scholes Airport in Galveston. Select sight markers to guide you to the airport.
Requirement 1a

*Define “aircraft”. Describe some kinds and uses of aircraft today.*

What does the word “aircraft” mean? Google the word.

While visiting the museum, list the different kinds of aircraft you see in the hangars or read about in the Flight Academy and Texas Aviation Heritage exhibits. (List kinds of aircraft not names of aircraft, and not all aircraft are airplanes.) See how many you can name – the official count is 8.

________________________________________________________
________________________________________________________
________________________________________________________
________________________________________________________

Something to think about: Is a rocket or lunar lander an aircraft?

**Go to the Flight Academy, enter the theater in the center of the exhibit.**

Watch the video to start learning about aviation.

**Exit the theater to your right, find the area called Principles of Flight.**

Requirement 1b

*Point out on a model airplane the forces that act on an airplane in flight.*

Read the exhibit panels titled *What is Weight?, What is Lift?, What is Thrust?, and What is Drag?*

Make a paper airplane and fly it. Describe how each of the four forces effects the flight of your plane.

Weight: __________________________________________________________

Lift: __________________________________________________________

Thrust: __________________________________________________________

Drag: __________________________________________________________
Requirement 1c

Explain how an airfoil generates lift, how the primary control surfaces (ailerons, elevators, and rudder) affect the airplane's attitude, and how a propeller produces thrust.

Go to the opposite side of the Flight Academy and find the area titled Design and Engineering.

Read the panels titled Different Wing Shapes, The Airfoil, and What is Aerodynamics?. Explore the Airfoil Shapes display.

Notes and drawings:

Go back to the other side and find the display under the Lift Velocity panel.

Use the hands-on display to explain how an airfoil creates lift.

Return to the Design and Engineering area.

Read the panel titled Flight Control Surfaces. Explain how the surfaces move the plane.

The ailerons control

The elevators control

The rudder controls

Read the panel titled Propellers. Use the hands-on display to explain how a propeller works.
Requirement 1d

Demonstrate how the control surfaces of an airplane are used for takeoff, straight climb, level turn, climbing turn, descending turn, straight descent, and landing.

Read the panel **Moving in 3 Dimensions**. Use the hands-on display to demonstrate how to do the moves listed in Requirement 1d.

Requirement 1a

Explain the operation of piston, turboprop, and jet engines.

Find the display showing different **Engine Types**. Read about each engine type and explain how they work.

Piston

Turbo Prop

Jet engine

Requirement 5

Find out about three career opportunities in aviation. Pick one and find out the education, training, and experience required for this profession. Discuss this with your counselor, and explain why this profession might interest you.

Go to the theater entrance near the hang glider activity.

Read the panel titled **Careers in Aviation**.

List at least 3 career opportunities:

_________________________________________

_________________________________________

_________________________________________
Go to the area titled Ground Training.

Look at the panels titled So You want to Become a Pilot?, Air Traffic Control (on table), and How to Become a Pilot, and on the green outer theater wall Military Aviation, Commercial Aviation, and Space Age.

Discuss with your counselor the types of careers within aviation. Research one of the jobs and report to you counselor what you learned about education, training, and experience required.

Use your smartphone camera or QR Reader app to access web sites. Careers in Aviation Video Series is a set of videos with people describing what it’s like to do their jobs, Aviation Jobs and Salaries is an articles describing some of the most common jobs in aviation, and Indeed.com Aviation Jobs links to jobs within the aviation field currently available within Texas.

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Leave the Flight Academy and enter the Texas Aviation Heritage exhibit.

(Receipt to look for different kinds of aircraft)

Requirement 4c

Visit an aviation museum or attend an air show. Report on your impressions of the museum or show.

What did you find most interesting about the Texas Aviation Heritage exhibit?

________________________________________________________________________

________________________________________________________________________

________________________________________________________________________
Find the Texas Aviation Hall of Fame inside the Texas Aviation Heritage exhibit

Describe the accomplishments of one of the Hall of Fame members that you find interesting.


Go to the Waltrip and Heritage Hangars to explore the planes.

Describe what is most interesting about the war planes.


Note: When you take pictures of a plane, also take a picture of the information placard so you have the name and other information.