

Scout Name: _____

Unit: _____



AVIATION

Merit Badge Workbook



This workbook will aid in demonstrating what you have learned about aviation to your merit badge counselor at the EAA AirVenture Museum. Using a copy of the BSA Aviation Merit Badge Pamphlet (2014 Version), please complete this entire workbook.

To avoid partial sign offs remember it is the Scouts responsibility to make sure that the entire workbook is filled out and complete BEFORE the event -- NO exceptions. Merit Badges are earned, not given.

1. Do the following:

a. Define "aircraft."

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| |

Describe some kinds and uses of aircraft today.

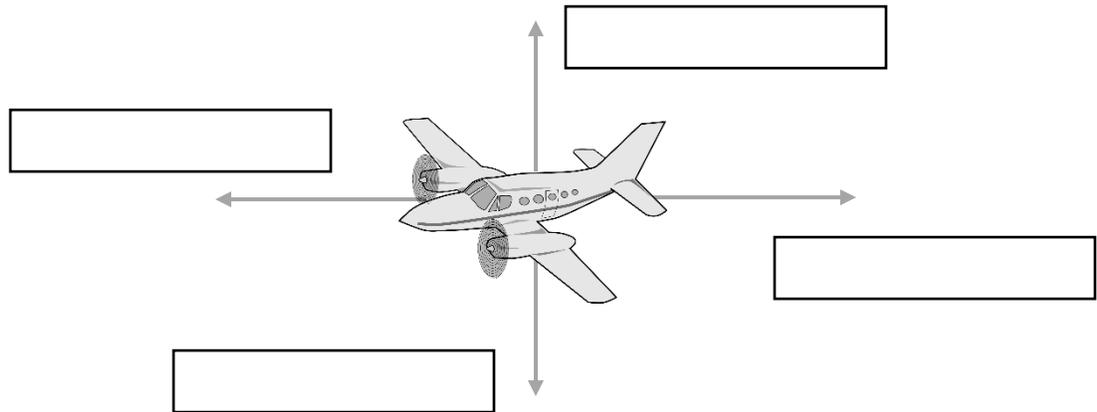
| Kind of Aircraft | Uses |
|------------------|------|
| | |
| | |
| | |

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

| Engine Type | Operation |
|-------------|-----------|
| Piston | |
| | |
| | |
| Turboprop | |
| | |
| | |
| Jet | |
| | |
| | |

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

Label the following diagram with the four forces of flight.



c. 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.

| Question | Explanation |
|---|---|
| How does an airfoil generate lift? | <hr/> |
| How do the primary control surfaces affect the airplane's attitude? | <hr/> |
| How does a propeller produce thrust? | <hr/> |

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

| Maneuver | Description of Control Surfaces | | |
|------------------|---------------------------------|-----------|---------|
| | Ailerons | Elevators | Rudders |
| Takeoff | | | |
| Straight Climb | | | |
| Level Turn | | | |
| Climbing Turn | | | |
| Descending Turn | | | |
| Straight Descent | | | |
| Landing | | | |

- e. Explain the following: the sport pilot, the recreational pilot, and the private pilot certificates; the instrument rating.

| Certification/Rating | Description |
|--------------------------------|-------------|
| Sport Pilot Certificate | |
| Recreational Pilot Certificate | |
| Private Pilot Certificate | |
| Instrument Rating | |

2. Do the following:

- e. Explain the purposes and functions of the various instruments found in a typical single-engine aircraft.

| Instrument | Function |
|--------------------------------|----------|
| Attitude Indicator | |
| Heading Indicator | |
| Altimeter | |
| Airspeed Indicator | |
| Turn and Bank Indicator | |
| Vertical Speed Indicator (VSI) | |
| Compass | |
| Navigation (GPS and VOR) | |
| Communication Radios | |
| Tachometer | |
| Oil Pressure Gauge | |
| Oil Temperature Gauge | |

5. Find out about three career opportunities in aviation.

Write the names of the careers below.

| | | |
|--|--|--|
| | | |
|--|--|--|

Pick one and find out about education, training, and experience required for this profession.

| Career | Education, Training, and Experience Required |
|--------|--|
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Be prepared to discuss this with your merit badge counselor at the EAA AirVenture Museum, and explain why this profession might interest you.

During the event at the EAA AirVenture Museum, you will also complete the following requirements:

- 2.b. Under supervision, perform a preflight inspection of a light airplane.
- 3.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.
- 4.c. Visit an aviation museum. Report on your impressions of the museum.