

INTRODUCTORY: PREFLIGHT

DESCRIPTION OF SESSION

In this session, participants will learn how and why to conduct a preflight inspection of an aircraft.

CATEGORY

- Exploring: Aviation
- Life Skills: Ethics
- U.S. Department of Education: Transportation

OBJECTIVES

By the end of this session, participants will be able to:

- Perform, under supervision, a preflight inspection of a light aircraft.
- Understand the importance of a preflight.

SUPPLIES

- **Preflight Checklist** activity sheet (one per participant)
- Single-engine airplane or trainer aircraft
- Gas cup
- Fuel level tester
- Documents or pictures of documents that are required to be in the plane

ADVISOR NOTE: Text in italics should be read aloud to participants. As you engage your post in activities each week, please include comments, discussions, and feedback to the group relating to **Character, Leadership, and Ethics**. These are important attributes that make a difference in the success of youth in the workplace and in life.

For safety reasons, the plane should always be kept off with the key out of the ignition. The master switch should not be turned on, especially if the group is big or seems to be misbehaving or distracted. If you choose to lower the flaps, extend them before the session begins so there is no risk of hitting heads while moving the flaps and no risk of accidental prop movement. If possible, disconnect the battery so there isn't a risk of anything moving.

If a low wing aircraft is used, make sure participants don't sit on the wing. If a high wing aircraft is used, have flaps down just a bit—about 10 to 20 degrees—high enough so that people don't hit their heads on the wings.

ACTIVITIES

Activity 1

Preflight Overview

Begin by asking: *Why would you do a preflight?* Discuss the fact that you don't have the chance in the air to look things over or to correct things that were done improperly. You can't just pull over to the side of the road and check.

Ask: *Why do you have a checklist?* It's important you don't miss anything. Having a checklist helps you maintain focus.

Activity 2

Conducting a Preflight

Pass out the **Preflight Checklist** activity sheet.

This activity involves starting at the beginning of the checklist and walking the participants through it, all while asking questions to engage them. As the Advisor walks around the plane and conducts the preflight using the checklist, participants follow along with their own copies of the checklist. Participants get a chance to touch the plane, move the rudder and touch the elevator, the ailerons, and the flaps.

The following list is intended as a sample of the types of activities and questions the Advisor might engage in with the participants.

- Begin with a safety briefing. Discuss some safety concepts such as not pinching fingers and not pulling on the prop. Explain which surfaces participants can touch and which ones are off limits. Tell participants to watch their heads when ducking under wings, moving flaps, and moving ailerons.
- Emphasize that the preflight **MUST** be done correctly, and that's what the checklist is for. Every plane needs a preflight inspection. Tell participants to watch for it the next time they take a commercial flight.
- Check for nicks and cracks.
- Don't talk about tie-downs extensively, especially if the plane is not tied down.
- While participants are looking inside the plane, check the fuel and discuss what you are looking for.
- You can choose to take an actual fuel sample, but if you don't, at least demonstrate how it works and what you're looking for: bubbles, color, debris, etc. Discuss water density and fuel density.
- Reinforce aerodynamic concepts by asking: *If you move the rudder left, what happens? What will the plane do if you raise the elevator? Lower it? What happens to the ailerons when you turn the yoke (or push on the joystick)?*
- Look at the skin of the plane, bolts, rivets, antennae, and cracks. Ask: *What kinds of cracks would cause a problem? Why?* Briefly touch on drag.
- Bounce the wing, and discuss stability, tires, and air pressure.
- Discuss the prop, flaps, and ailerons, and how ailerons work with the rudder.
- Check for bird nests and discuss this hazard.
- Check the nose strut and bounce it to check that it is not completely flat.
- Check and discuss the static air sensor, pitot tube, and stall horn, and briefly explain why they're there and what they do.
- Discuss the documents that are required to be in the plane. You can tell participants about "AROW" (airworthiness certificate, registration, pilot's operating handbook [POH], and weight and balance paperwork) as a way to help pilots remember what paperwork is required.
- Discuss how it's important to use a checklist even if you have it memorized. That way, if you get interrupted, you never forget what you did. You know where you're standing, so you know where you are on the list. Include personal policies or company policies about starting over from the beginning if you get interrupted.

If you have the time and can plan for it, make adjustments to a few things in the plane that

would need to be corrected to pass a preflight. Challenge participants to look for things that are out of the ordinary. For example, a rolled-up map in an exhaust pipe, a nest (real or simulated) in the cowling, a plugged-up static port (use tape), etc.

If time permits, discuss FAA rules about seatbelts and shoulder harnesses, especially on takeoff and landing, and FAA regulations on knowing how to exit the plane.

Constantly ask questions during the preflight. For example, rather than telling participants why you are doing something, ask them why something might need to be done. This will help engage them in the learning. Remember, “Why?” is always a good way to expand on ideas.

ADVISOR NOTE

Some sample questions are below. They are designed to help the participants apply what they have learned to their own interests. You are welcome to use these questions or develop your own questions that relate to your post or specific focus area.

REFLECTION

- *Why do you think it's more important to do a thorough preflight before each flight than it is to thoroughly check for problems with your car before each time you drive? (Point out that you can't just pull to the side of the road, get your cell phone out, and call for help. You need to land first!)*
- *Many private pilots share a plane, either with partner owners or within a flying club. Why do you think doing a preflight check has particular importance in these situations? (If you weren't the last person to fly the plane, you don't know if something happened to it during its last flight that might affect the safe outcome of the next one.)*

ADVISOR AND OFFICER REVIEW

After the meeting, address the following:

- Identify what was successful about the meeting.
- Identify what needed improvement.
- Schedule an officer and Advisor planning meeting to prepare for the next post meeting or activity.

Content for this session provided by Youth Aviation Adventure (www.youthaviationadventure.org).

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RESOURCES
Activity 1
Preflight Checklist

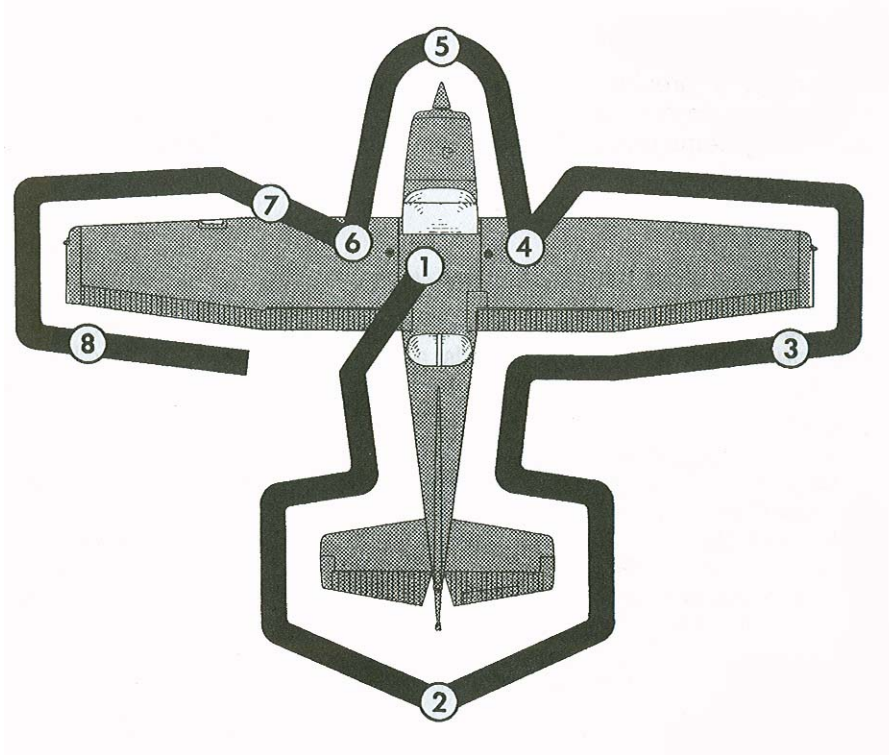


Image courtesy of Cessna

When a pilot performs a preflight inspection on an airplane, he or she walks around the plane, inspecting a variety of items, according to the plane's POH, or Pilot Operating Handbook. Each plane is different. This diagram is from a Cessna 172 high-wing plane. Each number corresponds to a part of the plane the pilot needs to check. On the next page is a brief description of what the pilot does at each of the numbered areas.

Sample Checklist

1 – Cabin

Control lock—remove

Ignition switch—off

Master switch—on (check landing and taxi lights, navigation lights, and rotating beacon; extend flaps)

Fuel quantity indicator—check quantity

Master switch—off

Fuel shutoff valve—on

2 – Empennage

Rudder gust lock—remove

Tail tie-down—disconnect

Control surfaces—check freedom of movement and security

3 – Right wing trailing edge

Aileron—check freedom of movement and security

Flap—check security

4 – Right wing

Wing tie-down—disconnect

Main wheel tire—check proper inflation and brake line

Fuel sump—drain sample and check for water, contamination, and proper fuel grade

Fuel quantity—check visually

Fuel filler cap—secure

5 – Nose

Engine oil level—check; should not have less than 4 quarts

Fuel strainer—take sample and check for water, foreign matter, and contamination; be sure strainer fuel drain is closed

Propeller and spinner—check for nicks and security

Air intake—check for absence of foreign matter, and that it's clean and clear

Landing light—check for cleanliness

Nose wheel strut and tire—check for security and proper inflation

Static source opening (left side fuselage)—check for stoppage

6 – Left wing

Main wheel tire—check proper inflation and brake line

Fuel sump—drain sample and check for water, contamination, and proper fuel grade

Fuel quantity—check visually

Fuel filler cap—secure

7 – Left wing leading edge

Pitot tube—remove cover and check for stoppage

Stall warning opening—check for stoppage

Fuel tank vent opening—check for stoppage

Wing tie-down—disconnect

8 – Left wing trailing edge

Aileron—check freedom of movement and security

Flap—check security