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PRIVATE PILOT · AIRPLANE

Private Pilot Study Guide

Understand how the FAA tests you, not just what to memorize

Built on FAA-S-ACS-6C, Private Pilot Airplane (November 2023). Every single-engine land Area and Task in ACS order, with the how and why behind each one.

Edition 1.0 · November 2026

This free sample is from the Private Pilot Study Guide: the weather information and emergency approach and landing Tasks, each with its in-depth chapter. Free to share in this form. Independent study material, not an FAA publication, and not a substitute for your POH/AFM or flight instruction. Always verify against current FAA sources.

PA.I.C Weather Information

ACS references: 14 CFR part 91; AC 91-92; AIM; FAA-H-8083-2, FAA-H-8083-3, FAA-H-8083-25, FAA-H-8083-28

ACS objective: *To determine the applicant exhibits satisfactory knowledge, risk management, and skills associated with weather information for a flight under VFR.*

ACS note: If K2 is selected, the evaluator must assess the applicant's knowledge of at least three sub-elements.

ACS note: If K3 is selected, the evaluator must assess the applicant's knowledge of at least three sub-elements.

WHAT THE EXAMINER IS LOOKING FOR

That you can get a complete weather briefing, understand what each product is telling you, and make a defensible go/no-go decision, including knowing when to turn around.

WHAT YOU NEED TO KNOW

- **Sources.** Know where legal and useful briefings come from: Flight Service (1-800-WX-BRIEF and online) and the National Weather Service products, with AC 91-92 describing the standard briefing process. Know what a standard, abbreviated, and outlook briefing are, and why you request the first when planning a flight.
- **Observations.** METAR and SPECI (decode them fluently, including the remarks), PIREPs (urgent versus routine), and how current they are.
- **Forecasts.** TAF (valid period, change groups, how to read FM, BECMG, TEMPO and PROB), Graphical Forecasts for Aviation (GFA), winds and temperatures aloft (FB), and the convective outlook.
- **Charts.** Surface analysis, ceiling and visibility analysis, and how to use each to see fronts, pressure systems, and where visibility or ceilings are lowest.
- **Advisories.** AIRMETs (Sierra, Tango, Zulu), SIGMETs, and convective SIGMETs: what each warns about and how long it lasts.
- **Meteorology (K3).** The ACS lets the examiner choose from atmospheric stability, wind and windshear, temperature and heat exchange, moisture, air masses and fronts, clouds, turbulence, thunderstorms and microbursts, icing and the freezing level, fog, frost, and obstructions to visibility. The Note says the examiner must ask about **at least three**, so be ready for any of them. Use the Aviation Weather Handbook (FAA-H-8083-28) and the PHAK.
- **In the flight deck (K4).** What your airplane displays: ADS-B In weather (what it shows and how old it is), the limitations of any onboard weather display, and how to turn it into a decision.
- **Decision-making (R1).** Personal minimums, circumstances that make a diversion wise, and hazardous weather you will not enter (known or forecast icing, thunderstorms, turbulence you cannot handle).

WHAT YOU MAY RUN INTO

- A live briefing for the day of the test, or a set of printed products. The examiner asks, "Looking at this, would you fly? Why? What would change your mind?"
- A TAF or METAR to decode on the spot. A surface analysis chart where you have to identify a front and say what weather you expect along it.
- "Your onboard weather display shows a clear path. Do you trust it?" (Know the age of the data and why it can't replace a briefing.)
- A shifting scenario: ceilings drop as you plan, a SIGMET appears, or the winds aloft change the fuel burn.

COMMON MISTAKES

- Reading a METAR, but not drawing a conclusion from it.
- Confusing AIRMET types, or mixing up how long a TAF is valid.
- Treating an ADS-B weather display as a briefing or a source for tactical avoidance of storms.
- Having no personal minimums, or personal minimums that are the same as the regulatory minimums.

HOW TO PREPARE

- Brief a real flight every day for two weeks, even if you aren't flying. Write the go/no-go and your reasons.
- Make a one-page decoder for METAR and TAF in your own words.
- Learn three weather concepts (K3) well enough to teach them with a drawing: fronts, thunderstorm life cycle, and icing.
- Write personal minimums for ceiling, visibility, wind, and crosswind, and decide what would change them.

> **Your airplane:** Know which weather tools your airplane carries and what it can't do: ADS-B In (if installed), a portable receiver, an EFB, or nothing. Also know your airplane's icing and thunderstorm limitations (most training airplanes are not approved for flight in known icing).

Weather Information in Depth

Getting a briefing

- **Sources:** Flight Service (1-800-WX-BRIEF, or **1800wxbrief.com**), the **National Weather Service** and **Aviation Weather Center** websites, and approved flight planning apps. Many apps are fine for weather, but **know their limits**.
- **Types of briefing:** a **standard briefing** (for a planned flight, with a full set of information), an **abbreviated briefing** (to update what you have), and an **outlook briefing** (for a flight more than 6 hours ahead). Ask for a **standard** briefing for a cross-country flight.
- **What a standard briefing contains:** adverse conditions, a VFR flight not recommended statement (if it applies), synopsis, current conditions, forecast, winds aloft, NOTAMs, and ATC delays.

Reading a METAR

Element	Example	Meaning
Station and time	KOWP 271353Z	Station identifier, the 27th day of the month, 1353 UTC.
Wind	18012G22KT	From 180 true at 12 knots, gusting 22.
Visibility	10SM	Ten statute miles.
Weather	-RA BR	Light rain, mist.
Sky	FEW025 BKN040 OVC055	Few at 2,500, broken at 4,000, overcast at 5,500 AGL. The **ceiling** is the lowest broken or overcast layer.
Temp/dewpoint	18/16	18°C and 16°C. A spread of **3°C or less** suggests fog or low cloud.
Altimeter	A2992	29.92 inHg.

*Flight categories: **VFR** (ceiling above 3,000 ft and visibility above 5 SM), **MVFR** (1,000 to 3,000 ft or 3 to 5 SM), **IFR** (500 to under 1,000 ft or 1 to under 3 SM), and **LIFR** (under 500 ft or under 1 SM). A VFR pilot should treat **MVFR** with caution and **IFR** as a no-go.*

TAF and other products

- A **TAF** forecasts the weather for an airport and a 5-mile radius for about 24 or 30 hours. Know the change groups: **FM** (from, a rapid change), **BECMG** (becoming, gradual), **TEMPO** (temporary fluctuations under an hour), and **PROB** (probability).
- **PIREPs** give actual cloud tops, turbulence, and icing reports.
- **AIRMETs** (Sierra for IFR and mountain obscuration, Tango for turbulence and winds, Zulu for icing) and **SIGMETs** (severe weather for all aircraft) tell you about hazardous conditions along your route.
- **Graphical Forecasts for Aviation (GFA)**, **surface analysis**, **prog charts**, and **radar** give you the larger picture. **Winds and temperatures aloft** are used for groundspeed and fuel planning.
- **Cockpit weather** (ADS-B In or other datalink) is **delayed** and is a **supplement**, not a replacement for a briefing.

Weather hazards for VFR pilots

Hazard	What it is	What to do
VFR into IMC	A VFR pilot continues into conditions that are below VFR minimums. A leading cause of fatal general aviation accidents.	Decide **before** flight and set personal minimums. Turn around early (see the Task on instrument maneuvers).

Hazard	What it is	What to do
Thunderstorms	Severe turbulence, hail, lightning, microbursts, windshear, and tornadoes.	Stay **at least 20 NM** from severe storms. Never fly under the anvil or try to fly through a line of storms.
Low-level windshear and microbursts	Sudden changes in wind direction or speed near the ground, often with thunderstorms or frontal passage.	Add airspeed on approach in gusty winds, and delay the flight when the wind or storms are a concern.
Fog	Forms when the temperature and dewpoint are close. Radiation fog forms on clear, calm nights.	Check the spread and the trend. Fly early or late with caution.
Icing	Visible moisture and temperatures near or below freezing.	Most trainers are not approved for known icing. Avoid visible moisture near and below freezing.
Turbulence and mountain wave	Wind over terrain or heat-driven convection.	Slow to maneuvering speed, and avoid ridges in strong winds.
Density altitude	High temperature and elevation reduce performance.	Compute performance and avoid midday takeoffs on hot days in high terrain.

Fronts and air masses

- A **warm front** brings wide areas of low ceilings and steady precipitation. A **cold front** brings a narrow band of thunderstorms and a sharp wind shift, followed by clearing.
- **Stationary** fronts and **occluded** fronts bring prolonged low weather.
- A **high pressure** system generally means good weather, and a **low pressure** system generally means clouds and precipitation.

Personal weather minimums

A VFR pilot should write personal minimums that are **stricter** than the regulatory ones, depending on experience. For example, many new pilots choose a **ceiling of 3,000 ft** and **visibility of 5 SM** for cross-country flights, a **maximum crosswind** that matches their demonstrated skill, and no flight when **gusts** exceed a set number of knots. Your minimums should rise (not fall) when you are fatigued or the flight is new for you.

PA.IX.B Emergency Approach and Landing (Simulated) (ASEL, ASES)

ACS references: FAA-H-8083-2, FAA-H-8083-3, FAA-H-8083-25; POH/AFM

ACS objective: *To determine the applicant exhibits satisfactory knowledge, risk management, and skills associated with emergency approach and landing procedures.*

ACS note: See Appendix 2: Safety of Flight.

WHAT THE EXAMINER IS LOOKING FOR

The right first actions, a good choice of landing area, and a controlled, stabilized approach to it, with the decision to land (or go around, if it is a drill) made at a safe altitude.

WHAT YOU NEED TO KNOW

- **Immediate actions (K1).** Fly the airplane: establish best glide speed (trim for it). Pick a field. Try to restore power (fuel selector, mixture, carburetor heat or alternate air, magnetos, primer, fuel pump). Then, if no restart, secure the engine (fuel off, mixture, ignition, master as per POH), then communicate (121.5 or ATC, and a transponder code of 7700), and brief passengers. The ELT may activate on landing.
- **Glide airspeed (K2).** Best glide speed gives the most distance. Minimum sink speed gives the most time. They are different speeds. Wind changes the distance you can cover over the ground (a headwind reduces it, a tailwind increases it).
- **Atmospheric effects (K3) and stabilized approach (K4).** Density altitude, wind, and your energy state: how you manage the glide and the pattern from high and low key positions (or similar) so you arrive in a position to land.
- **ELTs and distress (K5, K6).** How an ELT works, how it is activated, and how ATC helps aircraft in distress.
- **Risk (R1 to R6).** The altitude, wind, terrain, obstacles, and distance. Keep the plan flexible. Avoid configuring too early. Low-altitude maneuvering and the risk of a stall/spin when turning to a field.
- **On the test.** The examiner will simulate the failure by reducing power (and may later set a throttle to a simulated idle). You are expected to fly the approach to a point at which a landing is assured, where the examiner will have you go around at a safe height.

WHAT YOU MAY RUN INTO

- The examiner pulls the throttle and says "engine failure." You pick the field, run the flow, and fly the approach.
- A change in the situation: the field you selected has a problem (animals, a fence, a slope).
- A question on how the glide distance changes with wind, or with a windmilling propeller.

COMMON MISTAKES

- Letting the speed bleed off while looking for a field.
- Spending too long on the restart and not enough on the landing.
- Not flying the best glide speed (± 10 kt).
- Turning too tightly and too low.

HOW TO PREPARE

- Memorize your best glide speed, and your flow: glide, pick, fix, communicate, secure.
- Pick fields on every flight, and say them out loud.
- Practice simulated engine failures from different altitudes, with a safe minimum.

> **Your airplane:** Best glide speed and the engine-failure checklist are **your airplane's**. Typical values: about 68 KIAS for a 172S and about 73 KIAS for a PA-28-181. Confirm in your POH. Also know whether your airplane has carburetor heat or alternate air as a restart step.

Engine Failure and Emergency Landing in Depth

The first moments

When the engine fails, fly the airplane first. Lower the nose to the best glide speed (Vg), and trim. Then pick a landing site, run the checklist, communicate, and prepare for landing.

Step	Action
1. Fly	**Pitch** for the best glide speed and trim.
2. Pick	Choose a landing site (a field, road, or airport) within gliding distance, into the wind if possible, with a clear approach.
3. Plan	Plan a pattern to arrive at the site at the proper altitude (a key position, such as a downwind position abeam the touchdown point).
4. Checklist	Run the emergency checklist (from memory or from the POH): fuel selector (to a tank with fuel), mixture rich, carburetor heat on, primer locked, magnetos (BOTH or try each), boost pump on, and the throttle and master.
5. Communicate	Call 121.5 or the current ATC: "Mayday, Mayday, Mayday," your position, and your intentions. Squawk 7700.
6. Configure	**Unlatch the doors** (to prevent jamming in a crash), tighten the belts, and brief the passengers. Flaps at the last moment if the field is assured.
7. Land	**Fly the approach** and land with the best control. Fuel selector off, mixture off, and master off before touchdown (if the POH says so).

Glide performance

- A typical light airplane glides about 9 to 10 feet forward for each foot of altitude, in still air. From 3,000 ft AGL, that is 4 to 5 NM, at the best glide speed and with the propeller windmilling (a stopped propeller is a little better).
- **A headwind** reduces the distance, and a tailwind extends it. Flaps and gear reduce the glide, and a turn costs altitude.
- **Do not stretch the glide** with a lower speed. Never stall to reach a field.

Engine failure after takeoff

- At a low altitude (below about 1,000 ft AGL in most trainers), land straight ahead, or within 30 degrees of the runway heading.
- **A turn back** to the runway requires enough altitude and a good understanding of the airplane's performance. It is a risk, and many accidents result from a stall or spin in the turn. If you plan to turn back, decide the minimum altitude before the flight and practice at a safe altitude.
- **Always** brief the plan before takeoff.

The off-airport landing

- **Fields:** plowed fields (landing along the furrows), grass or pasture, and roads are possible. Crops, fences, wires, trees, and soft ground are hazards.
- **Water:** if you must ditch, land into the wind or parallel to the swells, and escape as soon as it stops.
- **Trees:** touch down at the slowest speed, with the wings level, cushioned by the branches.
- **After landing:** evacuate, and move away from the airplane. Turn on the ELT if it did not activate.

That was a sample.

The full guide explains every Task the same way.

The full Private Pilot Study Guide (115 pages) includes:

- Every Private Pilot Airplane ACS Area and Task, in ACS order
- An in-depth chapter for each Task, like the one in this sample
- How the checkride works and a step-by-step way to study the ACS
- A numbers-to-know quick reference and a checkride scenario bank

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