

PRIVATE PILOT GROUND SCHOOL

MODULE 4-R — FINAL CUMULATIVE REVIEW AND MOCK ORAL BANK

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MNEMONICS

ATOMATOFLAMES — Airspeed, Tachometer, Oil pressure, Manifold pressure, Altimeter, Temperature (liquid-cooled), Oil temperature, Fuel gauge, Landing gear indicator, Anticollision lights, Magnetic compass, ELT, Safety belts

The day-VFR equipment list in 14 CFR 91.205(b), one letter per item. Run it when an instrument or a light is broken before a flight. An item on this list that does not work grounds the airplane until the 91.213 flow is worked. The list also carries flotation gear for hire over water and shoulder harnesses by manufacture date, which the letters do not name.

AVIATE(S) — Annual, VOR check (IFR, 30 days), 100-hour (for hire), Altimeter and pitot-static (IFR, 24 months), Transponder (24 months), ELT (12 months, plus the battery), Static system

The inspections a pilot checks in the maintenance records before a flight. Each letter has its own clock: 12 calendar months for the annual and the ELT, 100 hours of time in service for the 100-hour, 24 calendar months for the transponder and the altimeter. Two of the letters apply only to IFR flight. Run it in the logbooks, not on the ramp.

East is least, west is best — Going from true to magnetic, subtract easterly variation and add westerly variation

The sign rule for variation on the heading chain. Read the isogonic line nearest the route: an easterly variation is subtracted from the true heading to get the magnetic heading, a westerly one is added. Say it at the nav log, where the chain is worked, and again on the checkride when the examiner hands you a chart.

The five Cs — Climb, communicate, confess, comply, conserve

The lost procedure in the order it is flown. Climb for the view, the radio, and the radar. Communicate on a charted frequency or 121.5. Confess that you do not know where you are, which the AIM calls an urgency condition the moment it begins. Comply with the vectors. Conserve the fuel by leaning and slowing while the position is rebuilt. The airplane is flown first, before the first C.

FLAPS — Fuses (spares), Landing light (for hire), Anticollision lights, Position lights, Source of electrical energy

The night-VFR additions in 14 CFR 91.205(c). Night requires each item on the day list plus these five. Run it before any flight that will land after sunset. A position light that does not work grounds a night flight and does not ground a day flight.

IMSAFE — Illness, Medication, Stress, Alcohol, Fatigue, Emotion (or Eating)

The personal preflight checklist — the deep look at the P in PAVE. Run it

before every flight, not only when feeling sick. Any letter that fails is a no-go about the pilot, no matter how good the airplane and the weather are.

Two of the letters carry hard regulatory numbers. Alcohol (14 CFR 91.17): no acting as a crewmember within 8 hours of consuming any alcohol, while under the influence, or with a blood or breath alcohol concentration of 0.04 or greater — and a hangover is impairment even when the clock and the number both pass. Medication (14 CFR 61.53): flying is prohibited while taking any medication or treatment that leaves you unable to meet your medical certificate's requirements. For over-the-counter drugs the FAA's guidance is concrete: if the label warns about drowsiness or operating machinery, wait at least five maximal dosing intervals after the last dose — and when in doubt, ask an AME. The other letters — Illness, Stress, Fatigue, Emotion — have no numbers, which is exactly why they demand the most honesty.

PARE — Power idle, Ailerons neutral, Rudder full opposite the rotation, Elevator forward

The first four steps of the generic spin recovery, in order. The Warrior's handbook adds two more: rudder neutral when the rotation stops, then control wheel as required to regain level flight. A pilot who stops at E flies the recovery into a dive with the rudder still in. Say all six.

PAVE — Pilot, Aircraft, enVironment, External pressures

The preflight risk checklist. Before every flight, check each of the four categories honestly: the Pilot flying, the Aircraft as it is equipped and loaded today, the enVironment the flight passes through, and the External pressures pushing on the decision. In flight, the same four categories drive the continue/divert decision.

RAIIM — Resignation, Anti-authority, Impulsivity, Invulnerability, Macho

The handle for the five hazardous attitudes. The FAA names the five but gives you no way to hold them; RAIIM is how we carry them — say the word, recover the five, then pair each with its antidote. Starting with Resignation is deliberate: it is the quietest of the five and the easiest to miss in yourself.

FACTS TO REMEMBER

KNOW THESE COLD

- The private pilot practical test has two parts — a ground portion (the oral) and a flight portion — both graded against the same ACS document.

Source: ACS-6C App 1

- You must pass the ground portion before the flight portion can begin.

Source: ACS-6C App 1

- Oral questioning does not stop when the flight starts; the evaluator may question you throughout the entire practical test.

Source: ACS-6C App 1

- The ACS is organized as Areas of Operation containing Tasks; each Task lists Knowledge (K), Risk Management (R), and Skills (S) elements plus an Objective and References.

Source: ACS-6C App 1

- An ACS code reads document.Area.Task.element — PA.I.C.K2 means Private Airplane ACS, Area I, Task C, Knowledge element 2.

Source: ACS-6C App 1

- The evaluator does not have to ask every K and R element in a Task; they sample enough to judge your mastery of that Task.

Source: ACS-6C App 1

- In each Task tested, the evaluator must cover: any elements you missed on the written, at least one K element, at least one R element, and every S element unless a note says otherwise.

Source: ACS-6C App 1

- Your knowledge test report (AKTR) lists the ACS codes of the questions you missed; expect the oral to revisit exactly those codes.

Source: ACS-6C App 1

- Each Task's References line defines fair game: anything in those listed documents can be asked under that Task.

Source: ACS-6C App 1

- The examiner works from a written plan of action covering all required Areas and Tasks, built around scenarios; problems and simulated emergencies are introduced as the scenario unfolds.

Source: ACS-6C App 1

- Expect scenario questions that make you apply and correlate knowledge; the ACS tells evaluators to use rote questions only where rote is the appropriate level.

Source: ACS-6C App 1

- Before administering the test, the evaluator verifies that your aeronautical experience meets the requirements for the certificate.

Source: ACS-6C App 1

- Completing the practical test means four things: performing every required Task, demonstrating mastery of the aircraft, staying within the approved standards, and demonstrating sound judgment.

Source: 14 CFR 61.43(a)

- Failing any single Area of Operation fails the whole practical test.

Source: 14 CFR 61.43(c),(d)

- Any action, or lack of action, that forces the evaluator to intervene to keep the flight safe is disqualifying.

Source: ACS-6C App 1

- The grading language is "consistently exceeding tolerances" and "failure to take prompt corrective action" — a brief excursion you announce and promptly fix is how the standard is designed to be met.

Source: ACS-6C App 1

- Failing to use proper visual scanning to clear the area before and during maneuvers is, by itself, a listed ground for disqualification.

Source: ACS-6C App 1

- Failure to exercise risk management is a listed ground for disqualification — the R elements are graded, not decoration.

Source: ACS-6C App 1

- A practical test has exactly three outcomes: a Temporary Airman Certificate, a Notice of Disapproval of

Application, or a Letter of Discontinuance.

Source: ACS-6C App 1

- A pass gets you a temporary certificate that day; the permanent card comes later.

Source: ACS-6C App 1

- After a failed Task the test continues only with your consent, and you keep credit for the Areas of Operation you passed.

Source: ACS-6C App 1; 14 CFR 61.43(e),(f)

- A Letter of Discontinuance (weather, illness, aircraft problem — not a failure) preserves credit for completed Areas; keep the letter and present it when the test resumes.

Source: ACS-6C App 1; 14 CFR 61.43(e)(2),(f)

- After a failure you may retest only after retraining from an authorized instructor who has determined you are proficient, and only with that instructor's retest endorsement.

Source: 14 CFR 61.49(a)

- The Notice of Disapproval lists the Areas of Operation failed, the Areas not tested, and the number of failures; the retest covers what it lists.

Source: ACS-6C App 1

- For a retest, bring: the original Notice of Disapproval (or Letter of Discontinuance), a new completed and signed application, and the additional-training endorsement.

Source: 14 CFR 61.43(f)(2)–(4)

- Your knowledge test pass is usable only within the 24 calendar months preceding the month you complete the practical test.

Source: 14 CFR 61.39(a)(1)(i)

- You must present the knowledge test report itself at the time of application.

Source: 14 CFR 61.39(a)(2)

- The instructor's practical-test endorsement certifies three things: training received and logged within the 2 calendar months preceding the month of application, that you are prepared for the test, and that you demonstrated satisfactory knowledge of every subject missed on the written.

Source: 14 CFR 61.39(a)(6)

- A completed and signed application (FAA Form 8710-1, normally through IACRA) is a prerequisite for the test.

Source: 14 CFR 61.39(a)(7); ACS-6C App 1

- You must hold at least a third-class medical certificate, if a medical certificate is required for the test.

Source: 14 CFR 61.39(a)(4) — BasicMed question flagged, see Verification record

- Bring your logbook: it must show the required training, the required aeronautical experience, and the endorsements, and the evaluator checks it before the test starts.

Source: 14 CFR 61.39(a)(3); ACS-6C App 1

- Carry your pilot (student) certificate and a government photo ID — 61.3 requires both in your physical possession or readily accessible to exercise pilot privileges.

Source: 14 CFR 61.3(a)(1),(2)

- The test aircraft must have on board a current airworthiness certificate — displayed at the cabin or cockpit entrance, legible — and an effective registration certificate.

Source: 14 CFR 91.203(a),(b)

- Bring the aircraft maintenance records: proving the airplane airworthy from its logbooks is part of the oral. (What the records mean is taught in 1-4 and 3-2; this Point is the bring-it logistics.)

Source: ACS-6C App 3; PA.I.B.K1b

- If anything on the airplane is inoperative on test day, the 91.213 determination must be made, and the inoperative item must not interfere with any required Task.

Source: ACS-6C App 3

- You provide the view-limiting device for the instrument portion of the test.

Source: ACS-6C App 3; 14 CFR 61.45(d)(2)

- The oral normally opens slowly — IACRA, identification, eligibility paperwork, aircraft records — before any knowledge question; a slow start is the normal shape of the day, not a warning sign.

Source: convention — Erick verifies at authoring

- For anything that is not a memory item, "here is where I would find it," followed by actually finding it in the correct current document, is a passing answer; the finding path itself is being tested.

Source: convention (aligned with REQUIREMENTS 3.4) — Erick verifies at authoring

- Steep turns are graded: entry altitude ± 100 feet, airspeed ± 10 knots, bank $45^\circ \pm 5^\circ$, roll-out on the entry heading $\pm 10^\circ$.

Source: ACS-6C Area V Task A

- Ground reference maneuvers are entered at 600–1,000 feet AGL and graded to altitude ± 100 feet and airspeed ± 10 knots; the evaluator selects at least one of the three maneuvers.

Source: ACS-6C Area V Task B

- Slow flight is flown at a speed where any further increase in angle of attack or load factor, or any reduction in power, would trigger a stall warning — and the assigned maneuvers must be flown without triggering it.

Source: ACS-6C Area VII Task A

- Slow flight tolerances: altitude ± 100 feet, heading $\pm 10^\circ$, airspeed $+10/-0$ knots, bank $\pm 10^\circ$.

Source: ACS-6C Area VII Task A

- On both stall Tasks, recovery comes after the full stall: acknowledge the impending-stall cues, then recover promptly once the stall occurs — recovering at the first warning is not the standard.

Source: ACS-6C Area VII Tasks B, C

- Spin awareness is oral-only: Task VII.D has no skill elements, so no spin is flown on the checkride.

Source: ACS-6C Area VII Task D

- Short-field takeoff: rotate at the recommended speed and climb at the recommended obstacle-clearance speed or $V_X +10/-5$ knots until 50 feet (or the obstacle), then $V_Y +10/-5$ knots.

Source: ACS-6C Area IV Task E

- Short-field landing: touch down within 200 feet beyond (or on) the specified point, with no side drift and the longitudinal axis aligned over the centerline.

Source: ACS-6C Area IV Task F

- PAVE names the four risk categories a pilot checks before every flight: Pilot, Aircraft, enVironment, External pressures.

Source: FAA-H-8083-2; PHAK ch. 2

- IMSAFE is the personal preflight checklist: Illness, Medication, Stress, Alcohol, Fatigue, Emotion (some FAA material uses Eating for the E — accept either).

Source: FAA-H-8083-2

- The five hazardous attitudes, in RAIIM order, are resignation, anti-authority, impulsivity, invulnerability, and macho.

Source: PHAK ch. 2

- Personal minimums are set on the ground, in calm conditions, and are stricter than the regulations; they are never renegotiated in the air.

Source: FAA-H-8083-2; PHAK ch. 2

– External pressures — get-there-itis, a waiting passenger, sunk rental money — are the PAVE category pilots are least honest about, and the standard mitigation is an out planned before takeoff (a firm alternate, a told-in-advance backup plan).

Source: FAA-H-8083-2

– Task priority in any abnormal situation is aviate, navigate, communicate — in that order.

Source: AFH ch. 18; PHAK ch. 2

– Situational awareness is an accurate picture of what is happening now and what happens next; distraction and fixation are its two main killers.

Source: PHAK ch. 2

– The go/no-go decision is not made once: it is re-made continuously in flight as continue/divert, against the same PAVE categories.

Source: FAA-H-8083-2

– The standard traffic pattern uses left turns; right traffic exists only where light signals or visual markings (or the Chart Supplement) say so.

Source: 14 CFR 91.126(b)(1); AIM 4-3-3

– The standard nontowered entry is at 45 degrees to the midpoint of the downwind, at pattern altitude.

Source: AIM 4-3-3; AC 90-66C

– Runway choice at a nontowered field: land and take off into the wind, read the sock and the pattern in use, and never assume the calm-wind runway is in use without listening first.

Source: AIM 4-3-3; AC 90-66C

– Listening to the automated weather and CTAF before entering the area is how the pattern is entered already knowing the runway, wind, and who is where.

Source: AC 90-66C; AIM 4-1-9

– See and avoid is every pilot's baseline duty whenever weather permits, IFR or VFR, radar or not.

Source: 14 CFR 91.113(b)

– Converging same-category aircraft: the one on the right has right-of-way; different categories: a balloon has right-of-way over every other category; a glider over powered aircraft; an aircraft towing or refueling others over all other powered aircraft, including airships; an airship over the remaining powered aircraft.

Source: 14 CFR 91.113(d)

– Head-on: both alter course right. Overtaking: the overtaken aircraft has right-of-way, and the overtaker passes well clear to the RIGHT.

Source: 14 CFR 91.113(e), (f)

– Landing: aircraft on final or landing have right-of-way over other traffic, and between two arriving aircraft the lower one has it — but neither rule may be abused to cut in front of or force anyone off.

Source: 14 CFR 91.113(g)

– Except for takeoff and landing, minimum altitude anywhere is one allowing an emergency landing without undue hazard to people or property if the engine fails; over other-than-congested areas the floor is 500 ft above the surface (or 500 ft from any person, vessel, vehicle, or structure over open water and sparse areas).

Source: 14 CFR 91.119(a), (c)

– Over any congested area or open-air assembly, the minimum is 1,000 ft above the highest obstacle within a 2,000 ft horizontal radius.

Source: 14 CFR 91.119(b)

– Effective scanning is a series of short, regularly spaced eye fixations — roughly 10-degree sectors held about a second each — because the eye detects nothing while sweeping.

Source: AIM 4-4-15; AC 90-48

– Traffic on a constant bearing with no relative motion is on a collision course — the target that never moves in the windshield is the one that hits you.

Source: AIM 4-4-15; AC 90-48

– Wake turbulence is wingtip vortices, generated whenever a wing makes lift, strongest behind aircraft that are **HEAVY, CLEAN, and SLOW**.

Source: AIM 7-4; PHAK ch. 14

– Vortices sink 300–500 ft per minute behind the generating aircraft, level off a few hundred feet below its path, and drift with the wind — a light quartering tailwind parks the upwind vortex on the runway.

Source: AIM 7-4

– Landing behind a larger aircraft: stay at or above its final approach path and land **BEYOND** its touchdown point.

Source: AIM 7-4

– Departing behind a larger aircraft: rotate **BEFORE** its rotation point, climb upwind of its path, and give it time — two to three minutes is the controller's standard separation for a reason.

Source: AIM 7-4

– Towered pattern operations run on tower instructions — but a clearance never transfers the see-and-avoid or wake-avoidance duty away from the PIC.

Source: 14 CFR 91.113(b); AIM 4-3-2

– A stabilized approach is on speed, in configuration, on glidepath, and aligned, with a constant descent to the aiming point — energy managed so that no large correction is needed close to the ground.

Source: AFH ch. 8 (pin-needed)

– An approach that goes unstable ends in a go-around: the go-around is planned on every approach and is a normal outcome, never an admission of failure.

Source: AFH ch. 8 (pin-needed)

– The go-around decision is made early and high — delaying it at low altitude to salvage a bad landing, in the flare or after a bounce, is how runway-loss and stall accidents happen.

Source: AFH ch. 8 (pin-needed)

– Wind correction on final is a crab transitioned to a wing-low sideslip (or a sideslip throughout): the low wing stops the drift, opposite rudder holds the nose on the centerline, and touchdown comes on the upwind main wheel first.

Source: AFH ch. 8 (pin-needed)

– A **LAHSO** clearance means land and hold short of a crossing runway or point; accepting it is the pilot in command's choice, and declining costs nothing.

Source: AIM 4-3-11

– Accept **LAHSO** only after comparing the published available landing distance (ALD) against your real landing performance with margin — and student pilots flying solo should not accept **LAHSO** at all.

Source: AIM 4-3-11

– The standard self-announce call has four parts: who you're calling (airport traffic), who you are, where you are, what you intend — ending with the airport name again.

Source: AIM 4-1-9

– A first call to any controller carries: who they are, who you are, where you are (with ATIS letter when arriving), and what you want.

Source: AIM 4-2-3

– Standard responses: **WILCO** (will comply), **UNABLE**, **SAY AGAIN**, **STAND BY** — and **STAND BY** is not an answer to a hold-short instruction.

Source: AIM 4-2-1; Pilot/Controller Glossary

- Runway assignments, hold-short instructions, and "line up and wait" must be read back with the runway number and call sign — full readback, every time.

Source: AIM 4-3-18; AC 91-73

- "Line up and wait" clears you ONTO the runway but not to take off; if no takeoff clearance follows promptly, ask.

Source: AIM 4-3 (LUAW); Pilot/Controller Glossary

- An ATC clearance is not a command to violate anything: the PIC refuses with UNABLE when a clearance would compromise safety, and an amended clearance is requested when needed.

Source: AIM 4-4-1; 14 CFR 91.3

- Light gun, steady green: on the ground — cleared for takeoff; in flight — cleared to land.

Source: 14 CFR 91.125; AIM 4-3-13

- Light gun, flashing green: on the ground — cleared to taxi; in flight — return for landing (steady green will follow at the proper time).

Source: 14 CFR 91.125; AIM 4-3-13

- Light gun, steady red: on the ground — stop; in flight — give way to other aircraft and continue circling.

Source: 14 CFR 91.125; AIM 4-3-13

- Light gun, flashing red: on the ground — taxi clear of the runway in use; in flight — airport unsafe, do not land.

Source: 14 CFR 91.125; AIM 4-3-13

- Acknowledging light signals: in daylight, rock the wings (on the ground, move ailerons/rudder); at night, flash the landing or navigation lights.

Source: AIM 4-3-13

- The transponder squawks 1200 for VFR unless assigned otherwise, with altitude reporting (Mode C/ALT) on whenever airborne.

Source: AIM 4-1-20; 14 CFR 91.215(c)

- Emergency squawk codes: 7500 hijacking, 7600 lost communications, 7700 emergency.

Source: AIM 6-4-2, 6-2-4

- VFR flight following (radar traffic advisories) is requested from approach/center, given workload permitting, and never transfers see-and-avoid to the controller.

Source: AIM 4-1-15, 4-1-16

- MAYDAY (repeated three times) declares distress; PAN-PAN declares urgency; either gets priority handling, and a controller can also be told plainly "declaring an emergency."

Source: AIM 6-3-1, 6-3-2

- Declaring an emergency costs nothing by rule — the only paperwork is a report IF the Administrator requests one; hesitation to declare is the actual hazard.

Source: 14 CFR 91.3(c); AIM 6-1-1

- Blocked or garbled radio calls are normal: never act on a clearance you are not sure was yours; confirm with call sign, because two similar call signs on frequency is a standard accident setup.

Source: AIM 4-2-3; AC 91-73

- Red signs with white letters are mandatory instruction signs — the runway holding position sign is the one that keeps you alive.

Source: AIM 2-3-8

- Black signs with yellow letters tell you where you ARE (location); yellow signs with black letters and arrows tell you where things GO (direction/destination).

Source: AIM 2-3-9, 2-3-10

- The runway holding position marking is four yellow lines: two solid, two dashed. Solid side = hold here; dashed side = you are ON the runway, cross and clear.

Source: AIM 2-3-5

- At a towered airport you cross a runway holding position marking only with an explicit clearance for THAT runway; at a nontowered airport, only after looking both ways down the runway and final.

Source: AIM 2-3-5; AC 91-73

- A displaced threshold (arrows leading to a solid bar) may be used for taxi and takeoff, but landings touch down beyond the bar.

Source: AIM 2-3-3

- The airport rotating beacon flashes white-green for a lighted civilian land airport; military is two whites and a green.

Source: AIM 2-1-9

- Runway edge lights are white (turning amber in the final 2,000 ft or half the runway on instrument runways); threshold lights show green to arrivals, and the far end shows red.

Source: AIM 2-1-4

- VASI: red over white, you're all right (on glidepath); white over white too high, red over red too low.

Source: AIM 2-1-2

- PAPI: four lights in a row — two white two red on path; more whites high, more reds low.

Source: AIM 2-1-2

- Pilot-controlled lighting: key the mic on the CTAF — 7 clicks highest intensity, 5 medium, 3 low; the lights run on a 15-minute timer.

Source: AIM 2-1-8

- Before taxi: airport diagram out, expected route drawn or spoken, hot spots (charted circled areas of past confusion) identified.

Source: AC 91-73; Chart Supplement

- NOTAMs are checked before taxi for closed runways and taxiways, unlighted obstacles, and construction — the diagram shows what was, NOTAMs show what is.

Source: AIM 5-1-3; AC 91-73

- Night and low-visibility taxi discipline: slower, progressive taxi instructions if unsure, follow the greens, and stop the airplane the moment position is uncertain.

Source: AC 91-73; AIM 4-3-18

- Runway incursion defense in one sentence: know where you are, know where you're cleared to, read back anything involving a runway, and never cross a red sign or red lights without resolving the doubt.

Source: AC 91-73; AIM 2-3-5

- Expectation bias on taxi routes — hearing yesterday's route in today's clearance — is defeated by writing the clearance down and following the written version, not the remembered one.

Source: AC 91-73

- U.S. airspace comes in six classes, A through G (there is no F in the U.S.), plus special use areas — every point in the sky is in exactly one class.

Source: PHAK ch. 15; AIM 3-1-1

- Class A is the high-altitude en route structure from 18,000 ft MSL to FL600, IFR only — it is not drawn on the sectional because it is everywhere above 18,000.

Source: PHAK ch. 15; AIM 3-2-2

- Class B surrounds the nation's busiest airports, shaped like an upside-down wedding cake, drawn with solid blue lines on the sectional.

Source: PHAK ch. 15; sectional legend

- Class C surrounds busy airports with radar approach control, drawn with solid magenta lines.

Source: PHAK ch. 15; sectional legend

- Class D surrounds smaller airports with an operating control tower, drawn with a dashed blue line, its ceiling printed in a dashed blue box.

Source: PHAK ch. 15; AIM 3-2-5

- Class D is tied to the tower's operating hours: when a part-time tower closes, the airspace becomes E or G per the Chart Supplement.

Source: AIM 3-2-5; Chart Supplement

- Salinas is Class D while the tower operates; when the tower is closed it is Class G at the surface with Class E starting at 700 ft AGL (verified against JO 7400.11, 2026-08-18).

Source: JO 7400.11

- Class E is controlled airspace that isn't A, B, C, or D — most of the map. The magenta vignette (faded band) means E starts at 700 ft AGL inside it; elsewhere E typically starts at 1,200 ft AGL.

Source: PHAK ch. 15; sectional legend

- Class G is the uncontrolled leftover between the surface and the overlying Class E floor — ATC issues no clearances there.

Source: PHAK ch. 15; AIM 3-3-1

- "Controlled" means ATC services and IFR separation exist there — it does not mean VFR aircraft need permission everywhere; what each class demands of a VFR pilot is Phase 2 material.

Source: PHAK ch. 15

- The sectional legend decodes every symbol on the chart — the recognition habit is: unknown line or box, open the legend, not guess.

Source: Sectional chart legend

- A silent radio is diagnosed before it is declared dead: volume and squelch, correct frequency, correct radio selected, audio panel switches, headset plugs, hand mic as backup.

Source: AIM 4-2-13

- Receiver-only failure: transmit intentions in the blind ("transmitting blind"), state position and intentions, and watch for light gun signals.

Source: AIM 4-2-13; AIM 6-4-1

- Transmitter-only failure: acknowledge ATC by rocking wings (day) or flashing lights (night) and comply with light-gun instructions.

Source: AIM 4-3-13

- If the radio dies, squawk 7600 — the transponder tells ATC what the radio cannot.

Source: AIM 6-4-2

- Lost communication under VFR is not, by itself, an emergency: fly the airplane, stay VFR, and work the arrival plan — the airplane never needed the radio to fly.

Source: AIM 6-4-1

- NORDO arrival at a towered field (the 91.126(d)/91.129(d) rule): you may operate and land if weather is at or above basic VFR minimums, you keep visual contact with the tower, and you receive a clearance to land — the steady green light.

Source: 14 CFR 91.129(d)(2); 14 CFR 91.126(d)

- The NORDO towered arrival technique: remain clear, observe the flow and runway in use, enter the pattern conforming to it, and watch the tower for the light gun on downwind and final.

Source: AIM 4-3-13; AIM 4-2-13

- Flashing red or no light on final means go around and re-enter — landing without the green at a towered field is landing without a clearance.

Source: 14 CFR 91.129(d)(2)(iii); AIM 4-3-13

- If the silence came from the electrical system (ammeter discharge, dimming panel), the problem is bigger than the radio: shed load, plan battery minutes, and prefer landing over troubleshooting (system work is 1-9's drill).

Source: PA-28-151 POH sec. 4; AIM 6-4-1

- Prevention habits: radio check before taxi, both radios tuned when two exist, frequencies pre-set for the route, and the light-gun table reviewed cold before every tower-field solo.

Source: AIM 4-3-13

- When the engine quits, the first act is airspeed: pitch for best glide and trim for it — altitude is spent buying time and distance, never speed above or below the number.

Source: PA-28-151 POH 4-2; AFH ch. 18

- The Warrior's best glide speed is 85 MPH; once the field is made, the book slows to 76.

Source: PA-28-151 POH 4-2

- Altitude is the option-maker: know the glide cone at pattern altitude versus cruise, and the practical consequence — climb-outs and low passes shrink the menu to what's ahead.

Source: PHAK ch. 11; AFH ch. 18

- The Warrior restart flow (POH 4-1, seven items): hold at least 85 MPH, fuel selector to a tank containing fuel, electric fuel pump on, mixture rich, carb heat on, engine gauges checked for cause, primer checked locked.

Source: PA-28-151 POH 4-1

- Fuel starvation (fuel aboard, not reaching the engine — wrong tank, selector between detents, pump failure) is a leading cause of power loss, and it is nearly always pilot-preventable.

Source: PHAK ch. 7; AFH ch. 18

- Carburetor ice forms in high humidity across a wide temperature band (roughly 20–70°F OAT), most readily at low power; in a fixed-pitch airplane it shows as a slow RPM decay and roughness.

Source: PHAK ch. 7; PA-28-151 POH sec. 4

- Carb heat response is full on and LEAVE IT ON: the melting ice will briefly worsen the roughness before power returns — pulling the heat back off at the stumble is the trap.

Source: PHAK ch. 7; PA-28-151 POH sec. 4

- Rough engine at altitude: fly airspeed first, pick the field second, run the checklist third — at 6,500 ft there is time, and the order is the answer.

Source: PA-28-151 POH 4-1, 4-2

- The same symptom at 1,000 ft in the pattern inverts the answer: land. Fuel-selector changes at low altitude are specifically warned against — an error costs the recovery time you no longer have.

Source: PA-28-151 POH Operating Tips 3

- Field selection priorities: wind direction, field length and surface, slope, obstacles on the approach, and proximity to help — decided high, held low.

Source: AFH ch. 18

- Commit to the chosen field: changing fields late is a leading way survivable forced landings become stall/spin accidents — switch only for a clearly better option found early.

Source: AFH ch. 18

- The forced-landing pattern is energy management: arrive abeam the touchdown point at a planned altitude, fly a normal-looking base and final, and hold flaps until the field is assured.

Source: AFH ch. 18

- Engine failure on the takeoff roll: throttle idle, brake, stop straight ahead — every takeoff carries a briefed abort point where the numbers must be there.

Source: AFH ch. 5

- Engine failure after liftoff, low: lower the nose immediately and land within roughly 30 degrees either side of the nose — obstacles are accepted; stall/spin is not.

Source: AFH ch. 5, ch. 18

- Load factor in the gliding turnback is the killer mechanism: steepening the bank to make the runway raises stall speed exactly when airspeed is bleeding — the 1-5 math flown for real.

Source: PHAK ch. 5; AFH ch. 18

- Once down is assured, secure the airplane: fuel off, mixture cut, mags off, master off after flaps, door unlatched before touchdown per the POH — and belts tight, passengers braced.

Source: PA-28-151 POH 4-2; AFH ch. 18

- Diversion triggers: weather closing ahead or behind, fuel below the planned line, a sick passenger or pilot, a rough engine or system doubt, a closing airport, or lost situational awareness.

Source: PHAK ch. 16; FAA-H-8083-2

- The diversion decision is cheapest early: every mile flown toward deteriorating conditions spends fuel, daylight, and options — the module rule is divert while it is still an inconvenience.

Source: FAA-H-8083-2; PHAK ch. 2

- Alternate selection weighs weather at the alternate, runway length and surface, fuel to reach it with reserve intact, terrain en route, services, and familiarity.

Source: PHAK ch. 16

- Nearest is not always best: a strip two minutes closer loses to a longer runway with fuel, phone, and weather reporting — unless the emergency says otherwise.

Source: PHAK ch. 16; AFH ch. 18

- Personal minimums are the diversion tripwires: when a pre-set number (ceiling, visibility, fuel, daylight) is crossed, the divert decision was already made on the ground.

Source: FAA-H-8083-2

- Deviating from a flight plan or an ATC instruction is allowed when the situation requires it — tell ATC what you need; amend, don't silently wander.

Source: 14 CFR 91.3; AIM 4-4-1

- Heads-down replanning is the diversion's collision trap: eyes out on a schedule, and the reroute worked in pieces — aviate, navigate, communicate holds rank.

Source: AC 90-48; PHAK ch. 2

- Fly the airplane through the turn first: new heading, altitude appropriate to the new course and terrain, THEN the math, THEN the radio call.

Source: AFH ch. 9; PHAK ch. 16

- The fuel reserve is protected, not spent: a diversion that lands with the reserve intact was flown correctly; a destination reached by burning into the reserve was a gamble that happened to pay.

Source: PHAK ch. 16; FAA-H-8083-2

- On a solo, the diversion brief is pre-loaded: before takeoff the student can name the alternate for each leg and the condition that sends them there — nobody is aboard to catch the hesitation.

Source: FAA-H-8083-2; North Aero practice

– External pressure is the diversion's real opponent — the meeting, the rental return time, the passenger's schedule; the counter is announcing the alternate as part of the plan so diverting is keeping a promise, not breaking one.

Source: FAA-H-8083-2; PHAK ch. 2

– The pilot in command is directly responsible for, and the final authority as to, the operation of the aircraft.

Source: 14 CFR 91.3(a)

– In an in-flight emergency requiring immediate action, the PIC may deviate from any rule of Part 91 to the extent required to meet that emergency.

Source: 14 CFR 91.3(b)

– An NTSB "accident" is an occurrence between boarding with intent to fly and disembarking, in which a person suffers death or serious injury or the aircraft receives substantial damage.

Source: 49 CFR 830.2

– Accidents require immediate notification to the nearest NTSB office; so do listed serious incidents even when no accident occurred.

Source: 49 CFR 830.5

– The written NTSB report (Form 6120.1) is due within 10 days of an accident, or after 7 days if an overdue aircraft is still missing; for an incident, a report is filed only if the NTSB requests it.

Source: 49 CFR 830.15

– Medical certificates come in three classes — first (airline transport privileges), second (commercial), third (private, recreational, student).

Source: 14 CFR 61.23(a); PHAK ch. 17

– For a pilot under 40 on the exam date, a third-class medical lasts through the end of the 60th month after the month of the exam.

Source: 14 CFR 61.23(d)

– For a pilot 40 or older on the exam date, a third-class medical lasts through the end of the 24th month after the month of the exam.

Source: 14 CFR 61.23(d)

– A pilot may not fly during any known medical deficiency: whoever knows, or has reason to know, of a condition that would make them unable to operate safely is grounded by rule, whatever their medical certificate says.

Source: 14 CFR 61.53(a)

– BasicMed qualification: have held any FAA medical after July 14, 2006, hold a valid U.S. driver's license, complete the online medical course every 24 calendar months, and get the CMEC physician exam every 48 months.

Source: 14 CFR 61.23(c)(3); 14 CFR 68.3, 68.5

– BasicMed aircraft limits: authorized to carry not more than 7 occupants, maximum takeoff weight 12,500 lb or less, and no more than 6 passengers on board.

Source: 14 CFR 61.113(i)(1)

– To exercise pilot privileges you must have your pilot certificate in physical possession or readily accessible in the aircraft.

Source: 14 CFR 61.3(a)(1)

– Certificate, medical, and photo ID must be presented on request to the FAA, the NTSB, any federal, state, or local law enforcement officer, or the TSA.

Source: 14 CFR 61.3(l)

– A flight review is required within the preceding 24 calendar months to act as PIC, and its minimum is 1 hour of

flight training plus 1 hour of ground training.

Source: 14 CFR 61.56(a), (c)

– To carry other people, a pilot needs three takeoffs and landings within the preceding 90 days as sole manipulator, in the same category, class, and type (if required).

Source: 14 CFR 61.57(a)

– Night currency requires three takeoffs and three landings to a full stop, made 1 hour after sunset to 1 hour before sunrise, within the preceding 90 days.

Source: 14 CFR 61.57(b)

– A private pilot may not act as PIC for compensation or hire, and may not pay less than a pro rata share of fuel, oil, airport expenditures, or rental fees when sharing costs with passengers.

Source: 14 CFR 61.113(a), (c)

– ARROW names the documents that must be aboard: Airworthiness certificate, Registration, Radio station license (international flights only), Operating limitations, Weight and balance data.

Source: 14 CFR 91.203(a); 14 CFR 91.9(b)

– Airworthy means two things at once: the aircraft conforms to its type design AND is in condition for safe operation. Either prong alone is not enough.

Source: 14 CFR 3.5(a)

– No person may operate a civil aircraft unless it is airworthy, and the PIC is the one responsible for determining the aircraft is in condition for safe flight.

Source: 14 CFR 91.7(a), (b)

– The owner or operator is primarily responsible for maintaining the aircraft in airworthy condition; the PIC is responsible for determining it is safe for this flight — two different duties held by two different people.

Source: 14 CFR 91.403(a); 14 CFR 91.7(b)

– Day VFR requires a fuel gauge indicating the quantity in each tank — one dead fuel gauge grounds a two-tank airplane until the rule is worked.

Source: 14 CFR 91.205(b)(9)

– Night VFR requires everything on the day list plus approved position lights and an approved red or white anticollision light system.

Source: 14 CFR 91.205(c)(1)–(3)

– Night VFR requires one electric landing light only if the aircraft is operated for hire.

Source: 14 CFR 91.205(c)(4)

– Finding installed equipment inoperative invokes 91.213 and a decision flow before flight — the flow itself is taught with full airworthiness in 3-2; the Phase 1 rule is: a broken airplane is not flown until that flow is worked with the school.

Source: 14 CFR 91.213

– An annual inspection within the preceding 12 calendar months is required to operate any aircraft.

Source: 14 CFR 91.409(a)

– A 100-hour inspection is required only when carrying any person (other than a crewmember) for hire, or when giving flight instruction for hire in an aircraft that instructor provides.

Source: 14 CFR 91.409(b)

– ELT batteries must be replaced (or recharged) after more than 1 cumulative hour of use, or when 50 percent of their useful life has expired.

Source: 14 CFR 91.207(c)

– Fuel is sumped to catch water and sediment: water sits at the bottom as a clear bubble, and the sample is

checked for color, smell, and grade before every first flight and after each fueling.

Source: AFH ch. 2; PA-28-151 POH (preflight)

– "Is it legal" and "is it safe" are different questions, and the PIC must answer both yes before flying — equipment can pass every rule and still be wrong for tonight's flight.

Source: 14 CFR 91.213(d)(4); FAA-H-8083-2

– Angle of attack is the angle between the wing's chord line and the relative wind — not the angle to the horizon.

Source: PHAK ch. 4

– A wing stalls when it exceeds its critical angle of attack — and only then. It can happen at any airspeed, any attitude, and any weight.

Source: PHAK ch. 5

– Load factor is lift divided by weight, measured in Gs; in a level 60-degree-bank turn it is 2.0 regardless of airplane type.

Source: PHAK ch. 5

– Stall speed rises with the square root of load factor — at 60 degrees of bank, stall speed is about 1.41 times the wings-level number.

Source: PHAK ch. 5

– The Warrior proves the math in its own book: flaps-up stall 64.5 MPH level becomes 91 MPH at 60 degrees of bank (64.5×1.41).

Source: PA-28-151 AFM 3-7

– Uncoordinated flight (ball out of center) means the airplane is slipping or skidding — and a stall in uncoordinated flight is how spins start.

Source: PHAK ch. 5; AFH ch. 5

– The left-turning tendencies are torque, P-factor, spiraling slipstream, and gyroscopic precession; right rudder is the answer.

Source: PHAK ch. 5

– Ground effect within about one wingspan of the surface reduces induced drag: the airplane can lift off before it can climb, and it floats in the flare.

Source: PHAK ch. 5

– Stall recovery fundamentals, in order: reduce angle of attack (pitch down), level the wings with coordinated controls, add power as needed, return to the desired flightpath.

Source: AFH ch. 5

– The base-to-final cross-control stall is the classic fatal spin entry: overshooting final, holding bank off with opposite aileron while skidding with inside rudder, slow — the inside wing stalls first with no altitude to recover.

Source: AFH ch. 5

– An accelerated stall is a stall above normal stall speed from added load factor — steep turns and abrupt pull-ups.

Source: AFH ch. 5

– An elevator trim stall is the go-around trap: full power with landing trim pitches the nose hard up — push forward, retrim, then climb.

Source: AFH ch. 5

– A spin is an aggravated stall with autorotation: one wing more deeply stalled than the other. No stall, no spin — and the yaw came from somewhere.

Source: AFH ch. 5; AC 61-67

- Generic spin recovery is PARE: Power idle, Ailerons neutral, Rudder full opposite the rotation, Elevator briskly forward — then rudder neutral when rotation stops, and ease out of the dive. (Mnemonic object.)

Source: AFH ch. 5; AC 61-67

- Intentional spins are prohibited in the Warrior in both Normal and Utility categories — prohibited is not the same as impossible, which is why recovery is memorized anyway.

Source: PA-28-151 AFM 3-4, 3-5

- Va, maneuvering speed, is the maximum speed for full deflection of a single control — 124 MPH placarded in the Warrior.

Source: PA-28-151 AFM 3-2

- Key Warrior limit speeds: Vne 176 MPH (never exceed, red line), Vno 140 (top of green, smooth air only above), Vs1 64.5 (clean stall), Vso 58 (landing configuration stall). All MPH calibrated.

Source: PA-28-151 AFM 3-2

- High density altitude degrades everything at once — engine power, propeller thrust, and lift — so the same indicated airspeeds produce longer rolls and shallower climbs.

Source: PHAK ch. 11

- Stall practice altitude rule: recover no lower than 1,500 ft AGL in a single-engine airplane (the ACS completion standard).

Source: FAA-S-ACS-6C VII

- Distraction is the documented first link in most inadvertent stall/spin chains — the defense is dividing attention deliberately and letting the maneuver wait.

Source: AFH ch. 5; AC 61-67

- The Warrior's pitch control is a stabilator — the whole horizontal tail moves — with an anti-servo tab that adds control feel and doubles as the trim tab.

Source: PA-28-151 POH sec. 2; PHAK ch. 6

- Warrior flaps are manual: a spring-loaded handle between the front seats, settings 10, 25, and 40 degrees, cable-operated — no motor to fail, and instant retraction if needed.

Source: PA-28-151 POH 2-6

- The Warrior's engine is a Lycoming O-320-E3D: four cylinders, horizontally opposed, 319.8 cubic inches, air-cooled, carbureted, producing 150 hp at 2700 RPM.

Source: PA-28-151 POH 1-2

- Ignition is two engine-driven magnetos, fully independent of the electrical system — the engine keeps running with the master switch off.

Source: PHAK ch. 7

- Two magnetos and two spark plugs per cylinder exist for redundancy and better combustion — which is exactly what the runup mag check verifies.

Source: PHAK ch. 7

- The carburetor mixes fuel and air by venturi suction — and cools itself doing it, which is why carburetor ice exists (recognition and response are taught in 1-15).

Source: PHAK ch. 7

- Carburetor heat routes unfiltered warm air to the carburetor: it melts and prevents carb ice, costs some power, and enriches the mixture while on.

Source: PHAK ch. 7; PA-28-151 POH sec. 2

- The Warrior holds 50 gallons in two 25-gallon wing tanks, 24 usable each — 48 usable. Two gallons of unusable fuel is not a reserve.

Source: PA-28-151 POH 1-2, 2-7

- The Warrior's fuel selector has LEFT, RIGHT, and OFF — there is no BOTH. Fuel management means switching tanks on a schedule, and getting the selector wrong means the engine stops.

Source: PA-28-151 POH 2-7

- The electric fuel pump is ON for all takeoffs and landings and when switching tanks; it backs up the engine-driven pump.

Source: PA-28-151 POH 2-7; AFM 3-5

- Oil lubricates, cools, cleans, and seals; the Warrior's wet-sump system holds 8 quarts, with a published minimum safe quantity of 2 quarts.

Source: PA-28-151 POH 10-8

- Before takeoff, the PIC must brief passengers on safety belts and shoulder harnesses and confirm they are fastened for taxi, takeoff, and landing.

Source: 14 CFR 91.107(a)

- Checklists are used as do-verify flows or read-do lists, but they are USED — memory is for immediate-action items only, and the checklist backs it up afterward.

Source: PHAK ch. 2; AFH ch. 1

- Passengers are briefed on sterile-cockpit moments: no questions during takeoff, landing, or radio work — and the brief is given before engine start, when they can hear it.

Source: FAA-H-8083-2; AFH ch. 2

- Engine start follows the POH for the condition — cold, hot, or flooded each has its own prime/throttle/mixture recipe, and guessing floods or fires it.

Source: PA-28-151 POH sec. 7 (starting checklists)

- Before turning the prop: brakes set, area clear front and rear, and a loud "CLEAR PROP" with time for an answer. The propeller is treated as live whenever the mags are not verified off.

Source: AFH ch. 2; PHAK ch. 7

- The mag check verifies each ignition system alone within the POH's allowed RPM drop and difference; a dead-smooth zero drop is also a failure (the switch may not be grounding).

Source: PA-28-151 POH sec. 7; PHAK ch. 7

- Shutdown and securing follow the POH: avionics off, mixture idle-cutoff, mags off, master off — then control lock, tie-downs, chocks, and pitot cover. An untied airplane is one gust from a claim.

Source: PA-28-151 POH sec. 7; AFH ch. 2

- The pitot-static instruments are the airspeed indicator, altimeter, and vertical speed indicator; the gyroscopic instruments are the attitude indicator, heading indicator, and turn coordinator; the magnetic compass stands alone.

Source: PHAK ch. 8

- The airspeed indicator is the only instrument that uses both pitot (ram) and static pressure — it displays their difference.

Source: PHAK ch. 8

- Indicated airspeed is what the dial shows; calibrated corrects it for installation error; true airspeed corrects calibrated for density altitude.

Source: PHAK ch. 8

- Airspeed indicator markings: white arc V_{so} to V_{fe} (flap range), green arc V_{s1} to V_{no} (normal), yellow arc caution (smooth air only), red line V_{ne}.

Source: PHAK ch. 8; PA-28-151 AFM 3-2

- Altimeter setting is updated in flight to the nearest reporting station; standard sea-level pressure is 29.92 inches Hg.

Source: PHAK ch. 8; 14 CFR 91.121

- One inch of altimeter setting is worth roughly 1,000 feet of indicated altitude.

Source: PHAK ch. 8

- Flying from high pressure toward low pressure (or hot to cold) without resetting makes the altimeter read higher than you are: "high to low, look out below."

Source: PHAK ch. 8

- The altitude vocabulary: indicated (dial), pressure (29.92 set), density (pressure corrected for temperature), true (above sea level), absolute (above ground).

Source: PHAK ch. 8

- The attitude indicator is the only instrument giving pitch and bank directly; its gyro holds rigid in space while the case moves around it.

Source: PHAK ch. 8

- The heading indicator drifts from gyro precession and must be realigned with the magnetic compass every 10–15 minutes, in straight-and-level unaccelerated flight.

Source: PHAK ch. 8

- Standard rate is 3 degrees per second — a full circle in two minutes — marked by the turn coordinator's index.

Source: PHAK ch. 8

- The inclinometer ball shows coordination: ball toward the inside of the turn is a slip, toward the outside is a skid — step on the ball.

Source: PHAK ch. 8

- A left turn with the ball out to the right is a skid: too much left rudder for the bank — and the skidded, slow version of this picture is the base-to-final killer.

Source: PHAK ch. 8

- Magnetic variation is the angle between true and magnetic north; deviation is the compass error from the airplane's own fields, corrected by the card below the compass.

Source: PHAK ch. 8

- Compass acceleration error (northern hemisphere, east/west headings): Accelerate-North, Decelerate-South — ANDS. (Mnemonic object.)

Source: PHAK ch. 8

- Compass turning error: turning from a northerly heading the compass lags (shows a turn the opposite way at first); from a southerly heading it leads — Undershoot North, Overshoot South (UNOS). (Mnemonic object.)

Source: PHAK ch. 8

- The magnetic compass is reliable only in straight, level, unaccelerated flight — every other moment it is lying by a known recipe.

Source: PHAK ch. 8

- The instrument cross-check (scan) keeps the eyes moving through the panel with the attitude indicator as hub; staring at one instrument is fixation, skipping one is omission, and trusting one too much is emphasis.

Source: IFH ch. 6; PHAK ch. 8

- Instruments are read as a committee: no single indication is acted on until a second instrument confirms it — that is how a failed instrument is caught before it flies the airplane.

Source: IFH ch. 6

- Spatial disorientation is the body's motion sensors disagreeing with reality; without a visible horizon, the inner ear cannot be trusted at all.

Source: PHAK ch. 17; AIM 8-1-5

- The leans: after a slow, unnoticed bank is corrected, the body swears the airplane is now banked the other way — the most common disorientation illusion.

Source: PHAK ch. 17; AIM 8-1-5

- The graveyard spiral: in a prolonged banked descent the turn sensation fades; pulling up without leveling the wings only tightens the spiral.

Source: PHAK ch. 17

- The somatogravic illusion: rapid acceleration feels like pitching up (and deceleration like pitching down) — the killer version is pushing over after a night or IMC takeoff.

Source: PHAK ch. 17; AIM 8-1-5

- The black-hole approach: a featureless dark area short of the runway invites a long, low descent into terrain — fly the glidepath aids, not the picture.

Source: PHAK ch. 17

- Hypoxia is oxygen starvation of the brain; its cruelty is that the first symptom is often euphoria and impaired judgment — the victim feels fine.

Source: PHAK ch. 17; AIM 8-1-2

- Carbon monoxide reaches the cabin through a cracked exhaust and the heater shroud; it is odorless, and its headache/drowsiness builds slowly.

Source: PHAK ch. 17; AIM 8-1-4

- CO response: heat off, vents and windows open, land as soon as practicable, oxygen if available.

Source: AIM 8-1-4; PHAK ch. 17

- After scuba diving, wait 12 hours before flying up to 8,000 ft cabin altitude (24 hours if the diving required decompression stops), and 24 hours before flying above 8,000 ft.

Source: AIM 8-1-2

- The alcohol rule: no flying within 8 hours of any alcohol, with 0.04 blood alcohol or any degree of impairment grounding you regardless of the clock.

Source: 14 CFR 91.17(a)

- Medications rule of thumb: no flying on any drug whose effects or underlying condition are disqualifying; for over-the-counter drugs, when in doubt, ask the AME — sedating antihistamines are the classic trap.

Source: 14 CFR 61.53; AIM 8-1-1

- Nose-high recovery on instruments, in order: add power, lower the nose, level the wings, return to level flight.

Source: IFH ch. 7; AFH ch. 17

- Nose-low recovery on instruments, in order: power to idle, level the wings, THEN ease out of the dive — pulling first tightens the spiral and loads the wings.

Source: IFH ch. 7; AFH ch. 17

- Before recovering, read the attitude off the panel as a committee (attitude indicator confirmed by airspeed trend, altimeter, VSI, turn coordinator) — recovering from the wrong attitude is how upsets kill.

Source: IFH ch. 7

- Inadvertent VFR into IMC is escaped by the numbers: believe the instruments, level the wings, begin a coordinated 180-degree level turn back to visual conditions, and climb only for terrain.

Source: AFH ch. 17; PHAK ch. 17

- VFR-into-IMC is among GA's most lethal scenarios; the survival move is made BEFORE entry — turning around while the ground is still visible.

Source: PHAK ch. 17; FAA-H-8083-2

- Lost in deteriorating conditions, the play is CONFESS early: tell ATC, accept help, declare an emergency if

needed — assistance exists and using it is airmanship, not failure.

Source: AIM 6-1-1; PHAK ch. 17

- The ammeter tells the story: charging after start is normal recovery; a persistent discharge in cruise means the alternator has quit and the battery is now a countdown timer.

Source: PA-28-151 POH sec. 2; PHAK ch. 7

- Total electrical failure does not stop the engine (magnetos are self-powered); it takes the radios, transponder, flaps-if-electric, and lights — the lost-communications drill in 1-14 is the electrical-failure drill.

Source: PHAK ch. 7; PA-28-151 POH sec. 4

- Alternator failure response: verify with the ammeter, try one reset per the POH, then shed load and plan for the battery's remaining minutes — daylight VFR gets home, night needs a landing sooner.

Source: PA-28-151 POH sec. 4

- A blocked pitot tube (drain also blocked) turns the airspeed indicator into an altimeter: indication climbs as the airplane climbs — the classic insect-nest or icing signature.

Source: PHAK ch. 8

- Blocked static ports freeze the altimeter, zero the VSI, and make the airspeed indicator lie (reads low above the blockage altitude, high below it).

Source: PHAK ch. 8

- Vacuum failure is insidious: the attitude indicator dies slowly, tilting by degrees, and a pilot following it rolls with it — the suction gauge and instrument disagreement are the tells.

Source: PHAK ch. 8; IFH ch. 5

- Suspect instrument failure procedure: cross-check the committee, identify the liar by what agrees, then cover the failed instrument so it cannot recapture the scan.

Source: IFH ch. 6

- The Warrior has no ice protection and is prohibited from flight into known icing; its anti-ice equipment is limited to pitot heat (if installed) and carb heat.

Source: PA-28-151 POH; PHAK ch. 7

- Supplemental oxygen regulation: required crew use above 12,500 ft cabin altitude past 30 minutes, crew use at all times above 14,000, and every occupant must be PROVIDED oxygen above 15,000.

Source: 14 CFR 91.211

- Startle is expected: the first response to any bang, light, or silence is fly the airplane — pitch, power, trim — then diagnose.

Source: AFH ch. 18

- An emergency descent is flown for cabin fire, smoke, or medical emergency: power idle, configure per the POH, bank to keep the belly's blind spot clear, descend at the appropriate limit speed for the air.

Source: AFH ch. 18; PA-28-151 POH sec. 4

- Engine fire in flight: fuel selector OFF, mixture idle-cutoff, fuel pump off, cabin heat off — the engine is being starved on purpose, and the flight is now a forced landing (1-15).

Source: PA-28-151 POH sec. 4

- Electrical fire: master off first (kill the source), extinguisher on the fire, ventilate after — then decide what, if anything, gets switched back on to land.

Source: PA-28-151 POH sec. 4; AFH ch. 18

- A door popping open in flight is noise, not aerodynamics: the Warrior flies normally — fly the pattern, land, close it on the ground.

Source: PA-28-151 POH; AFH ch. 18

- The ELT activates on impact G-forces, transmits on 121.5 and (406 models) satellite-monitored 406 MHz, and can be armed, tested, or switched on manually from the unit or a panel remote.

Source: AIM 6-2-5; 14 CFR 91.207

- Survival gear is packed for the terrain and season overflow, not the departure weather: the planning figure is surviving 48 to 72 hours — water, clothing/shelter, signaling.

Source: PHAK ch. 2; AFH ch. 18

- After any forced landing, the survival sequence is people first, then fire risk, then signal: activate the ELT, stay with the aircraft, and make yourself findable.

Source: AIM 6-2-5; AFH ch. 18

- Before every flight, the pilot in command must become familiar with all available information concerning that flight.

Source: 14 CFR 91.103

- For a flight away from the vicinity of an airport, preflight action must include fuel requirements.

Source: 14 CFR 91.103(a)

- For a flight away from the vicinity of an airport, preflight action must include alternatives available if the planned flight cannot be completed.

Source: 14 CFR 91.103(a)

- NOTAMs, including TFRs, are part of "all available information" and must be checked before every cross-country flight.

Source: 14 CFR 91.103; AIM 5-1-3

- Sectional charts expire on a published 56-day cycle; planning on an out-of-date chart risks missing new towers, frequencies, and airspace.

Source: Aeronautical Chart User's Guide

- Route selection weighs emergency options — terrain, airports along the way, and glide range — against the shortest straight line.

Source: PHAK ch. 16

- An EFB may replace paper charts for VFR flight if the pilot verifies the chart and database currency before flight.

Source: AC 91-78

- EFB failure must be planned for: charge state, a backup device or paper chart, and heat/sunlight shutdown risk.

Source: AC 91-78

- Cruising altitude must clear terrain and obstacles along the whole route; the quadrangle MEF on a sectional gives the elevation of the highest feature in that quadrangle.

Source: PHAK ch. 16

- The MEF is not a safe cruising altitude by itself — it carries no buffer; the pilot adds a clearance margin above it.

Source: PHAK ch. 16

- In level VFR cruise more than 3,000 ft above the surface, a magnetic course of 0–179° requires an odd-thousand MSL altitude plus 500 ft.

Source: 14 CFR 91.159

- In level VFR cruise more than 3,000 ft above the surface, a magnetic course of 180–359° requires an even-thousand MSL altitude plus 500 ft.

Source: 14 CFR 91.159

- Time en route for a leg equals leg distance divided by groundspeed.

Source: PHAK ch. 16

- Groundspeed is true airspeed corrected for wind: a headwind component lowers it, a tailwind component raises it.

Source: PHAK ch. 16

- Flight-plan times and ETAs are figured in UTC (Zulu); local time converts to UTC by the zone offset, watching the date change.

Source: AIM 4-2-12

- Leg fuel equals leg time multiplied by the POH fuel-burn rate for the chosen power setting.

Source: POH/AFM sect. 5

- Total fuel required is taxi/runup plus climb plus cruise legs plus descent plus the legal reserve — and the tanks' usable fuel must cover all of it.

Source: 14 CFR 91.151; POH

- Day VFR fuel minimum: enough to fly to the first point of intended landing plus 30 minutes at normal cruising speed.

Source: 14 CFR 91.151(a)

- Night VFR fuel minimum: enough to fly to the first point of intended landing plus 45 minutes at normal cruising speed.

Source: 14 CFR 91.151(a)

- The 91.151 reserve is a legal floor, not a plan; North Aero planning sets a larger personal fuel reserve, fixed before flight.

Source: 14 CFR 91.151; personal minimums doctrine

- Usable fuel, not total fuel, is the planning number: unusable fuel cannot reliably reach the engine in flight attitudes.

Source: POH/AFM sect. 2

- A VFR flight plan exists for search and rescue: it tells Flight Service where to look and when to start looking.

Source: AIM 5-1-4

- Filing does not activate a VFR flight plan: the pilot opens it after departure by radio, phone, or EFB link to Flight Service.

Source: AIM 5-1-4

- Closing a VFR flight plan is the pilot's job; tower controllers do not close it for you.

Source: AIM 5-1-14

- If a VFR flight plan is not closed within 30 minutes after ETA, search and rescue procedures begin.

Source: AIM 5-1-14

- An intercepted aircraft follows the interceptor's visual signals: rocking wings from the interceptor means "you have been intercepted — follow me."

Source: AIM 5-6

- If intercepted: maintain a steady course, attempt contact on 121.5 MHz, squawk 7700 if unable to communicate, and notify ATC.

Source: AIM 5-6

- The Pilot leg of PAVE on a cross-country adds duration exposure: fatigue, food and water, and currency for the length and conditions of the trip.

Source: PHAK ch. 2

- The Aircraft leg asks whether this airplane is equipped and legal for this route: avionics, lighting for the arrival

time, inspections current, performance adequate.

Source: PHAK ch. 2

– The enVironment leg is evaluated leg by leg — weather, terrain, airspace, and obstacles along the whole route, not just at the endpoints.

Source: PHAK ch. 2

– A reason you "must" arrive is itself a risk factor; the mitigation is alternatives arranged before takeoff — an extra day, a backup ride, a planned alternate.

Source: PHAK ch. 2

– VFR flight following is workload-permitting: ATC can refuse or drop it, and radar and radio coverage have floors — it is a service, not a guarantee.

Source: AIM 4-1-15

– No ATC service relieves a VFR pilot of see-and-avoid, terrain avoidance, or airspace compliance.

Source: AIM 4-1-15; 14 CFR 91.113

– Night cross-country planning raises the altitude floor: terrain and obstacles you cannot see demand a larger clearance margin than day.

Source: AFH night ops ch.

– Night cross-country checkpoints must be lighted or self-announcing — airports, beacons, towns, major highways — never section lines or dry creeks.

Source: AFH night ops ch.

– On a VFR cross-country the two run together: dead reckoning predicts, pilotage confirms — neither alone is the plan.

Source: PHAK ch. 16

– The required foundation for solo cross-country is charts plus pilotage and dead reckoning with a magnetic compass; electronic navigation rides on top of it, never in place of it.

Source: 14 CFR 61.93(e)(1)

– Variation is the angle between true north and magnetic north at your location, shown by isogonic lines on the chart.

Source: PHAK ch. 16

– "East is least, west is best": going from true to magnetic, subtract easterly variation and add westerly.

Source: PHAK ch. 16 (Mnemonic)

– The heading chain runs: true course, plus or minus wind correction gives true heading; plus or minus variation gives magnetic heading; plus or minus deviation gives compass heading.

Source: PHAK ch. 16

– The wind correction angle points the nose into the wind just enough to keep the ground track on the course line.

Source: PHAK ch. 16

– A good checkpoint is unique, visible from cruise altitude, and on or near the course line.

Source: PHAK ch. 16

– Line features crossing the course (rivers, highways, railroads) make natural timing gates; line features parallel to the course confirm track and bound drift.

Source: PHAK ch. 16

– True course is measured with a plotter against a meridian near the midpoint of the leg.

Source: PHAK ch. 16

– True airspeed is calibrated airspeed corrected for density altitude; it rises roughly 2% per 1,000 ft of altitude

for the same calibrated airspeed.

Source: PHAK ch. 11

– Cruise power selection trades speed against fuel flow and range; the POH cruise-performance table is the menu.

Source: POH/AFM sect. 5

– The wind side of the flight computer solves wind correction angle and groundspeed from forecast wind, TAS, and true course.

Source: PHAK ch. 16

– Actual groundspeed equals the distance between two checkpoints divided by the time between them.

Source: PHAK ch. 16

– A groundspeed slower than planned recomputes destination fuel first and the schedule second.

Source: PHAK ch. 16

– A VOR broadcasts 360 radials oriented to magnetic north; a radial always points FROM the station.

Source: PHAK ch. 16; AIM 1-1-3

– A VOR must be identified by its Morse (or voice) identifier before use; a missing identifier means the facility is unusable, often for maintenance.

Source: AIM 1-1-3

– With a course set in the OBS, the CDI shows displacement from that course, and the TO/FROM flag shows whether flying the course would take you to or from the station.

Source: PHAK ch. 16

– CDI sensing is correct only when the selected course roughly matches the direction of flight; flying the reciprocal of the selected course gives reverse sensing.

Source: PHAK ch. 16

– To fix position with one VOR: center the needle with a FROM indication — the course window then reads the radial you are on.

Source: PHAK ch. 16

– Radials from two VORs cross at exactly one place: a two-VOR cross-fix is a position without any visual landmark.

Source: PHAK ch. 16

– VOR reception is line-of-sight: range grows with altitude, and terrain can block it down low.

Source: AIM 1-1-3

– GPS position comes from satellite ranging; the receiver needs four satellites for a three-dimensional fix.

Source: AIM 1-1-17; PHAK ch. 16

– RAIM is the receiver's integrity self-check: it detects when a satellite signal cannot be trusted; without RAIM the position is unmonitored.

Source: AIM 1-1-17

– A RAIM-loss or integrity annunciation in flight means the GPS position is unverified: crosscheck it, or revert to pilotage, dead reckoning, or VOR.

Source: AIM 1-1-17

– No regulation requires a current GPS database for VFR, but stale airspace and frequency data is a trap: an out-of-date database must be covered by chart crosscheck.

Source: AIM 1-1-17

– Handheld and tablet GPS are situational-awareness aids only: not certified, not primary navigation, and their failure modes (battery, signal, heat) travel with them.

Source: AC 91-78

- VFR flight following provides traffic advisories and safety alerts, workload permitting; request it from approach or center with position, altitude, and destination.

Source: AIM 4-1-15

- Traffic advisories come as clock positions relative to your ground track — "traffic, two o'clock, five miles" — so the search sector shifts with your wind correction.

Source: AIM 4-1-15

- "Radar service terminated, squawk VFR" ends the service: navigation, terrain, and traffic are all yours again, with no handoff coming.

Source: AIM 4-1-15

- Mode A sends the four-digit squawk; Mode C adds pressure altitude; Mode S adds selective interrogation and data link.

Source: AIM 4-1-20

- Squawk 1200 is VFR; 7500 is hijack, 7600 lost communications, 7700 emergency — and avoid spinning the knobs through them.

Source: AIM 4-1-20

- ADS-B In (optional) receives TIS-B traffic and FIS-B weather; TIS-B shows only transponder- or ADS-B-equipped targets with coverage — it never shows every aircraft.

Source: AIM 4-5-7

- If an operable transponder is installed, it runs with altitude reporting whenever airborne in controlled airspace.

Source: 14 CFR 91.215(c)

- Program the navigator before the runway: a mis-set GPS flight plan flown faithfully is the modern way to get lost.

Source: PHAK ch. 16

- On any nav-signal loss (flag, integrity warning, frozen EFB): say it out loud, hold the last crosschecked heading, and rebuild from pilotage and dead reckoning.

Source: PHAK ch. 16

- The lost-procedure spine is the five Cs: climb, communicate, confess, comply, conserve.

Source: AFH (Mnemonic 5 Cs)

- Climbing when lost improves both the view and radio/navaid reception.

Source: AFH

- Position rebuilds from the last known fix: time flown times groundspeed bounds the circle you must be in; then match large features to the chart.

Source: PHAK ch. 16

- A VOR cross-fix or the GPS nearest page resolves position without any visual match at all.

Source: PHAK ch. 16

- Any ATC radar facility can locate you and vector you; 121.5 and squawk 7700 exist for exactly this — asking early is airmanship, not failure.

Source: AIM 6-2-1

- The escalation triggers are concrete: fuel below plan, darkness coming, or weather lowering — any one of them means ask for help now or declare.

Source: AIM 6-1-2

- A lost airplane still needs flying: set safe altitude and power first, keep eyes out — circling a landmark head-down over a chart is a collision setup.

Source: AFH

- Unplanned fuel or power consumption while navigating (headwind, rich mixture, deviations) is caught by the checkpoint fuel log, and the response is the fuel decision point, not hope.

Source: PHAK ch. 16

- Performance numbers come from POH section 5 charts and tables, entered with actual weight, wind, temperature, and altitude — never from memory.

Source: POH/AFM sect. 5

- When conditions fall between table rows, interpolate — and when in doubt, round every input in the conservative direction.

Source: PHAK ch. 11

- The chart's conditions and notes are part of the data (paved level dry runway, flap setting, leaning technique); different conditions void the number.

Source: POH/AFM sect. 5

- Book performance was flown by test pilots in a new airplane; a worn trainer flown by a private pilot will not match it, so margin is added, not hoped for.

Source: AFH; PHAK ch. 11

- Pressure altitude is the altimeter reading with 29.92 set; it is the entry point for most performance charts.

Source: PHAK ch. 11

- Density altitude is pressure altitude corrected for nonstandard temperature: the altitude the airplane thinks it is at.

Source: PHAK ch. 11

- Standard sea-level atmosphere is 15 °C (59 °F) and 29.92 inHg (1013.25 hPa) — the yardstick every performance chart measures against.

Source: PHAK ch. 11

- Hot, high, or humid each raise density altitude alone — all three are not needed; a merely hot day at a low-elevation field has killed airplanes.

Source: AWH FAA-H-8083-28; NWS (1% guide)

- High density altitude cuts performance three ways at once: less lift from the wing, less thrust from the propeller, less power from the engine.

Source: PHAK ch. 11 (1% guide)

- A headwind component shortens takeoff and landing distance; a tailwind lengthens it far more per knot — the POH tailwind penalty always outweighs the headwind credit.

Source: POH/AFM sect. 5

- Only the wind components count: the crosswind chart splits reported wind into a headwind component and a crosswind component.

Source: PHAK ch. 11

- Published short- and soft-field performance assumes the POH technique exactly — speeds, flap setting, braking; sloppy speeds add distance no chart shows.

Source: POH/AFM; AFH

- Takeoff flaps per POH shorten ground roll but flatten climb; landing flaps steepen the approach and slow the touchdown.

Source: POH/AFM

- Grass, soft, wet, or contaminated runways add roll; where the POH gives correction factors they are used, and where it does not, margin covers the guess.

Source: POH/AFM notes

- Runway slope matters in both directions: uphill takeoff and downhill landing each lengthen the distance that is critical.

Source: PHAK ch. 11

- Ground effect reduces induced drag within about a wingspan of the surface: an overloaded or high-DA airplane can lift off in ground effect and still be unable to climb out of it.

Source: PHAK ch. 5/11 (1-5 principles)

- Forward CG: more stable and nose-heavy — higher stall speed, more flare force needed, lower cruise speed.

Source: PHAK ch. 10

- Aft CG: less stable, slightly faster cruise — and degraded stall and spin recovery.

Source: PHAK ch. 10

- CG behind the aft limit can make spin recovery impossible; it is the deadliest weight-and-balance error.

Source: PHAK ch. 10

- Stall speed rises with the square root of load factor: 60° of bank in level flight is 2 g, and stall speed grows about 41%.

Source: PHAK ch. 5 (1-5 principles)

- Stall speed rises with weight; every stall and performance table is keyed to a weight.

Source: POH/AFM sect. 5

- Weight times arm equals moment; CG equals total moment divided by total weight.

Source: PHAK ch. 10

- The datum is the manufacturer's reference line; every arm in the airplane measures from it.

Source: PHAK ch. 10

- Basic empty weight includes unusable fuel and (in modern GAMA-format POHs) full oil — confirm what your airplane's figure includes before using it.

Source: PHAK ch. 10; POH sect. 6

- The airplane's current weighing record and equipment list — not the POH sample problem — is the legal source of empty weight and moment.

Source: POH sect. 6; PHAK ch. 10

- Useful load is maximum weight minus basic empty weight: crew, passengers, baggage, and usable fuel all come out of it.

Source: PHAK ch. 10

- Avgas weighs 6 lb per US gallon; oil weighs 7.5 lb per gallon.

Source: PHAK ch. 10

- The loading envelope chart is the verdict: plot weight against CG or moment, and the point must sit inside the envelope.

Source: POH sect. 6

- Fuel burn moves both weight and CG in flight: a loading legal at takeoff can leave the envelope later — check takeoff and landing conditions both.

Source: PHAK ch. 10

- The weight-shift formula: weight moved times distance moved equals total weight times CG change.

Source: PHAK ch. 10

- Overweight operation costs everything at once: longer takeoff, shallower climb, higher stall speed, less structural margin — and it voids the performance charts.

Source: PHAK ch. 10/11

- Baggage-area placards are structural limits: the floor and tiedowns are certified only to the placarded weight.

Source: POH sect. 2

- Operating limitations bind wherever they appear: POH section 2, placards, and instrument markings all carry regulatory force.

Source: 14 CFR 91.9; POH sect. 2

- The airspeed limits: Vne never exceed (red line), Vno maximum structural cruise (top of green), Va maneuvering (not marked on the dial), Vfe maximum flaps extended (top of white).

Source: PHAK ch. 8; POH sect. 2

- Vy climbs give the most altitude per minute; Vx the most altitude per distance — obstacle-clearance planning uses Vx numbers.

Source: POH sect. 5; PHAK ch. 11

- Climb rate falls as you go up; service ceiling is the altitude where the best rate has decayed to 100 fpm.

Source: PHAK ch. 11

- Takeoff and landing "over a 50-ft obstacle" columns include the air segment; the ground-roll column alone understates the runway needed when anything stands off the end.

Source: POH sect. 5

- Runway and takeoff-path selection is a computed decision — aircraft performance and limitations, distance available, surface, and wind, weighed against pilot capability — made before taxi, not at the hold-short line.

Source: POH/AFM sect. 5; AFH (pin-needed)

- Density altitude follows the airplane around the pattern: a go-around at a high-density-altitude field may barely climb, so the go-around path and obstacle picture are part of the runway decision.

Source: PHAK ch. 11 (pin-needed)

- The regulatory driver for weather briefing is 91.103: weather reports AND forecasts are required preflight information for any flight away from the airport's vicinity.

Source: 14 CFR 91.103(a)

- The two official outlets are aviationweather.gov (Aviation Weather Center) for products and Flight Service (1800wxbrief.com / 1-800-WX-BRIEF) for briefings.

Source: AIM 7-1-5; AC 91-92

- A self-briefing from official sources is regulatorily compliant — a phone call to a briefer is one way to meet 91.103, not the only way.

Source: AIM 7-1-5a; AC 91-92

- Weather can be updated in flight — Flight Service by radio and FIS-B datalink — but nothing available in flight replaces the preflight briefing.

Source: AIM 7-1-5f; AC 00-63B

- A standard briefing is the complete picture, requested closest to departure time, for any flight.

Source: AIM 7-1-5

- An abbreviated briefing updates an earlier briefing or answers specific items — it rides on top of a standard one, never in place of it.

Source: AIM 7-1-5

- An outlook briefing applies when departure is six or more hours away, and it is for planning purposes only.

Source: AIM 7-1-5d

- An outlook briefing is never a launch briefing: get a standard briefing near departure time.

Source: AIM 7-1-5d (1% material)

- A briefer (or self-brief form) needs: aircraft ID and type, VFR, departure point and time, route, altitude, destination, and ETE.

Source: AC 91-92

- A briefing is weather plus aeronautical information: NOTAMs and TFRs ride in it, so a blue-sky day can still be a no-go on a runway closure or a TFR.

Source: AC 91-92

- "VFR flight not recommended" is advisory in nature; the go/no-go decision rests solely with the pilot — it is a strong data point, not an order.

Source: AIM 7-1-5b

- The self-brief runs in a fixed order: synopsis, then hazards, then current weather, then forecasts, then winds, then decide and document.

Source: AC 91-92 (Erick doctrine, depth std.)

- A METAR is a routine surface observation, typically hourly: it is history, not forecast.

Source: AWH FAA-H-8083-28

- A SPECI is an unscheduled special observation: its existence alone says something changed fast.

Source: AWH FAA-H-8083-28

- METAR wind reads dddffKT in degrees true and knots; G marks gusts, VRB variable, 00000KT calm.

Source: AWH FAA-H-8083-28

- METAR visibility is in statute miles, including fractions (1 1/2SM).

Source: AWH FAA-H-8083-28

- Weather codes carry an intensity prefix: minus is light, none is moderate, plus is heavy — and the letter pairs are learnable (RA rain, SN snow, BR mist, FG fog, HZ haze, TS thunderstorm).

Source: AWH FAA-H-8083-28

- Sky condition comes in eighths: FEW 1–2, SCT 3–4, BKN 5–7, OVC 8, with heights in hundreds of feet AGL.

Source: AWH FAA-H-8083-28

- A ceiling is the lowest broken or overcast layer (or vertical visibility); scattered is not a ceiling.

Source: AWH FAA-H-8083-28

- Temperature and dewpoint report in whole degrees Celsius; an M prefix means below zero.

Source: AWH FAA-H-8083-28

- A closing temperature–dewpoint spread across successive METARs is the fog warning: a small spread on a clear, calm evening reads "expect fog by morning."

Source: AWH FAA-H-8083-28 (mechanism -> 3-3)

- The altimeter group (A2992 = 29.92 inHg) is set before flight, and the altimeter should then read field elevation.

Source: AWH FAA-H-8083-28

- The briefing covers stations along the whole route, not just the endpoints: en route METARs are where the surprise lives.

Source: AC 91-92

- A TAF is an aerodrome forecast for the area within 5 SM of the airport — it says nothing about the en route segment.

Source: AWH FAA-H-8083-28

- TAFs issue four times daily on the 6-hour cycle, valid 24 hours (30 at some airports).

Source: aviationweather.gov TAF docs

- TAF groups read day-plus-hour Zulu: the header carries issuance time and a ddhh/ddhh validity window.

Source: AWH FAA-H-8083-28

- FM means a rapid change to a new prevailing condition at that time.

Source: AWH FAA-H-8083-28

- TEMPO means temporary fluctuations, each lasting less than an hour and covering less than half the period.

Source: AWH FAA-H-8083-28

- PROB30 marks a 30-percent chance of the bracketed conditions in that window — low odds, real enough to plan around.

Source: AWH FAA-H-8083-28

- The flight-category quick look: VFR is ceiling above 3,000 and visibility above 5; MVFR 1,000–3,000 and/or 3–5; IFR 500 to below 1,000 and/or 1 to below 3; LIFR below 500 and/or below 1.

Source: AIM 7-1-7

- MVFR is a decision zone, not a green light: legal VFR can still sit below personal minimums.

Source: AIM 7-1-7; personal minimums doctrine

- The briefing's adverse-conditions section is the no-go trigger list: known or forecast icing or turbulence aloft, or convection, in a non-deiced trainer reads "no" — before any product decoding.

Source: AC 91-92; AWH FAA-H-8083-28

- Winds aloft from the briefing feed the nav log, and a strong disagreement between winds aloft and surface wind warns of shear and turbulence in the climb and descent.

Source: AWH FAA-H-8083-28 (decode -> 3-4)

- Personal weather minimums are written numbers — ceiling, visibility, wind and crosswind — set before flight, sitting above the legal minimums.

Source: AC 91-92 §8.2; NA Personal Minimums Sheet

- The personal-minimums comparison is mechanical: forecast versus the written number; the number does not renegotiate on the ramp.

Source: NA Personal Minimums Sheet (internal)

- Weather worse than briefed and trending below personal minimums IS the circumstance that makes diversion prudent — recognizing it is 2-4's job; flying the diversion is 1-16's.

Source: AC 91-92

- Every product has an age: a METAR is minutes to an hour old, and a forecast's confidence decays through its period — check issue times, not just contents.

Source: AWH FAA-H-8083-28

- The go/no-go is stated as a conclusion falling out of the framework — brief, compare, decide, document — never as a feeling about the sky.

Source: AC 91-92 (Erick doctrine, depth std.)

- Class B draws as solid blue rings; each shelf is labeled ceiling-over-floor in hundreds of feet MSL (100/40 = 10,000 over 4,000).

Source: PHAK ch. 15; Chart User's Guide

- Class C dimensions: typically a 5-NM-radius surface core and a 10-NM shelf from about 1,200 to 4,000 ft above the airport.

Source: PHAK ch. 15

- The boxed Class D ceiling figure reads in hundreds of feet MSL; the airspace typically runs up to 2,500 ft above the field.

Source: PHAK ch. 15

- Class E to the surface draws as a dashed magenta circle around the airport.

Source: PHAK ch. 15

- Inside magenta vignette (shading), Class E begins at 700 ft AGL; outside it, Class E generally begins at 1,200

ft AGL.

Source: PHAK ch. 15

- Below the Class E floor is Class G — a thin layer at most airports, thicker in the mountain West.

Source: PHAK ch. 15

- Class A begins at 18,000 ft MSL everywhere: IFR clearance and instrument rating territory, with no VFR operations.

Source: PHAK ch. 15

- Airport symbol color is the tower key: blue airports have (or share) an operating control tower, magenta airports do not.

Source: Chart User's Guide

- Class G carries no ATC communication requirement; self-announcing on CTAF is procedure and good sense, not a legal entry gate.

Source: 14 CFR 91.126; AIM 4-1-9

- Class E en route has no communication requirement for VFR aircraft.

Source: 14 CFR 91.127

- Class D entry requires two-way radio communications established BEFORE entering, and maintained inside.

Source: 14 CFR 91.129(c)

- Class C entry takes the same established-communications test as D, plus an altitude-reporting transponder and ADS-B Out.

Source: 14 CFR 91.130(c); 91.215; 91.225

- Class B entry requires an explicit ATC clearance into the Class B — hearing your callsign is not enough.

Source: 14 CFR 91.131(a)

- Class B requires at least a private pilot certificate, or a student pilot with the specific ground and flight training and a logbook endorsement under 61.95, dated within the preceding 90 days and naming that Class B.

Source: 14 CFR 91.131(b); 61.95

- An altitude-reporting (Mode C) transponder and ADS-B Out are required in Class A, B, and C, and at and above 10,000 ft MSL except at and below 2,500 ft AGL.

Source: 14 CFR 91.215(b); 91.225

- The Mode C veil: within 30 NM of a listed Class B primary airport, surface to 10,000 ft MSL, transponder-with-altitude and ADS-B Out are required even under or outside the shelves.

Source: 14 CFR 91.215(b)(2); 91.225(d)(2)

- The speed cap below 10,000 ft MSL is 250 KIAS.

Source: 14 CFR 91.117(a)

- At or below 2,500 ft AGL within 4 NM of a Class C or D primary airport, the cap is 200 KIAS (does not apply inside Class B).

Source: 14 CFR 91.117(b)

- Under a Class B shelf or in a VFR corridor through Class B, the cap is 200 KIAS.

Source: 14 CFR 91.117(c)

- The everyday minimums ("3-152s"): Class C, D, and E below 10,000 ft MSL take 3 SM visibility and 500 below, 1,000 above, 2,000 ft horizontal from clouds.

Source: 14 CFR 91.155(a)

- Class B takes 3 SM and CLEAR of clouds — the exception that works because everyone inside holds an ATC clearance.

Source: 14 CFR 91.155(a)

- Class G in the daytime, at or below 1,200 ft AGL: 1 SM and clear of clouds.

Source: 14 CFR 91.155(a)

- Class G at night takes 3 SM and 500/1,000/2,000 — darkness strips away the Class G discount.

Source: 14 CFR 91.155(a)

- When the ceiling is under 1,000 ft, VFR flight beneath it is prohibited within the lateral boundaries of controlled airspace designated to the surface for an airport.

Source: 14 CFR 91.155(c)

- To take off, land, or enter the pattern inside a B/C/D/E surface area under VFR, ground visibility must be at least 3 SM (flight visibility 3 SM if ground visibility is not reported).

Source: 14 CFR 91.155(d)

- The preflight use of 91.155: destination METAR/TAF ceiling and visibility against the surface-area rule — 1,000 and 3 is the pair that decides whether the field is legally enterable VFR.

Source: 14 CFR 91.155(c)-(d)

- Cloud clearance buffers exist for see-and-avoid: an IFR aircraft can appear out of that cloud, and 500/1,000/2,000 is your reaction time.

Source: PHAK ch. 15

- Special use airspace prints on the sectional with hatched borders and an R-, P-, A-, or MOA label; the chart-edge panel gives its altitudes, times, and controlling agency — identify and check, with the operating rules in 3-5.

Source: Chart User's Guide; PHAK ch. 15

- TFRs never print on the sectional: they live in NOTAMs and current EFB overlays, which is why the NOTAM check is an airspace check.

Source: 14 CFR 91.103; AIM 3-5

- Shelf floors and ceilings on the chart are MSL numbers: convert against local terrain before ducking under a shelf that is lower above the ground than it looks.

Source: PHAK ch. 15

- The Class E floor is a minimums boundary too: below the vignette you hold G minimums (1 SM clear, day); climbing through 700 or 1,200 AGL the 3-152s attach.

Source: 14 CFR 91.155; PHAK ch. 15

- Airspace risk is a position problem: the ring only bites if you don't know you're in it — boundaries are fixed to landmarks and GPS overlays before flight.

Source: PHAK ch. 15

- Cones serve center vision, color, and detail, and need light; rods serve peripheral and dim-light vision, detect motion, and see no color.

Source: PHAK ch. 17; AIM 8-1-6

- The night blind spot: rods are absent at the center of vision, so a light stared at directly at night can disappear.

Source: PHAK ch. 17

- Night scanning is off-center: look about 5-10° to the side of what you want to see.

Source: PHAK ch. 17; AIM 8-1-6

- Full dark adaptation takes about 30 minutes — and seconds of bright white light can erase it.

Source: PHAK ch. 17

- Preserving adaptation is procedure: cockpit lights dim, flashlight filtered, eyes shielded from strobes, landing lights, and lightning.

Source: PHAK ch. 17

- Red light preserves night vision but washes out red and magenta chart print; dim white is the chart-reading compromise.

Source: PHAK ch. 17

- A lighted civil land airport beacon flashes white and green.

Source: AIM 2-1-10

- A military airport beacon shows two quick white flashes between the green.

Source: AIM 2-1-10

- Runway edge lights are white; from the approach the threshold shows green and the far end shows red.

Source: AIM 2-1-4/2-1-5

- Taxiway edge lights are blue; taxiway centerline lights, where installed, are green.

Source: AIM 2-1-9

- Two-bar VASI: red over white is on the glide path; white over white high; red over red low ("red over red, you're dead").

Source: AIM 2-1-2

- Four-light PAPI: two white and two red is on path; more white is high, more red is low.

Source: AIM 2-1-2

- Pilot-controlled lighting keys on the CTAF: 7 clicks for high intensity, 5 medium, 3 low — and the lights time out (typically 15 minutes), so key again on final.

Source: AIM 2-1-8

- Obstructions light with steady or flashing red at night and white strobes by day or night — and a lit tower's guy wires are unlit and reach far to the sides of it.

Source: AIM 2-2-3

- Aircraft position lights: red on the left wingtip, green on the right, white on the tail.

Source: 14 CFR 91.205(c); AIM 4-3-23

- Position lights must be lighted from sunset to sunrise — and an aircraft parked or moved in a night operations area must be lighted, illuminated, or in a marked area.

Source: 14 CFR 91.209(a)

- Anticollision lights run for all operations, day and night, unless the PIC determines that turning them off is in the interest of safety (strobes in cloud or on a crowded ramp).

Source: 14 CFR 91.209(b)

- Night VFR equipment is the day list plus: approved position lights, an approved anticollision light system, a landing light if operated for hire, an adequate electrical source, and spare fuses.

Source: 14 CFR 91.205(c)

- Logging night time runs on the civil-twilight clock: night is the time between the end of evening civil twilight and the beginning of morning civil twilight.

Source: 14 CFR 1.1

- Night passenger currency runs on its own clock: 1 hour after sunset to 1 hour before sunrise.

Source: 14 CFR 61.57(b)

- To carry others at night, the PIC needs three takeoffs and three landings to a FULL STOP, in the currency window, within the preceding 90 days, as sole manipulator, in the same category, class, and type if a type rating is required.

Source: 14 CFR 61.57(b)

- Day currency landings may be touch-and-go; night landings must be full-stop — and night full-stops count toward day currency, never the reverse.

Source: 14 CFR 61.57(a)-(b)

- Personal night equipment starts with two flashlights — white for the preflight, red or dim for the cockpit — plus spare batteries.

Source: AFH night ops ch.

- The night cockpit is organized before dark: charts and EFB night mode set, frequencies staged, flashlight within reach — fumbling for gear is the signature night distraction.

Source: AFH night ops ch.

- Night pilotage runs on lighted features — beacons, towns, highways; unlighted landmarks are simply gone.

Source: AFH night ops ch.

- Distances and heights deceive at night: obstacle and terrain clearance comes from the chart and altimeter, not from the view.

Source: AFH night ops ch.

- On dark-terrain legs the instruments corroborate what the window cannot: attitude and altimeter crosscheck guards the lost horizon (1-8's skills, applied at night).

Source: AFH night ops ch.

- Finding the airport at night is beacon-first, runway-lights-second; the beacon is visible far beyond the runway environment.

Source: AIM 2-1-10

- Night weather risk is a visibility-of-weather problem: clouds you cannot see, so the METAR/TAF picture and the disappearing-lights check replace your eyes, and night personal minimums run higher than day.

Source: AFH night ops ch.; NA Personal Minimums Sheet

- Night taxi is slower and lower-trust: blue edges and green centerline, the airport diagram out, progressive taxi available for the asking.

Source: AFH night ops ch.

- Night ground light discipline for the taxi/landing light: on whenever the airplane is moving, courtesy-off when facing another aircraft head-on.

Source: AIM 4-3-23

- Strobes stay off during taxi and come on when entering the runway.

Source: AIM 4-3-23

- Night runway incursion defense: hold-short lines are harder to see, so position is verified against lighting, signage, and the diagram — unsure means stop and ask.

Source: AIM 2-3-5

- Seeing another aircraft's red and green together means it is coming toward you.

Source: AIM 4-3-23

- Seeing red alone: you face its left side — it is crossing from your right to your left.

Source: AIM 4-3-23

- Seeing green alone: it is crossing from your left to your right.

Source: AIM 4-3-23

- Seeing white alone: it is moving away from you — or you are overtaking it.

Source: AIM 4-3-23

- Autokinesis: a single light stared at in the dark appears to move; the fix is to keep the eyes scanning, never staring.

Source: AIM 8-1-5

- False horizon: sloping cloud decks, lit shorelines, or highway strings masquerade as the horizon; the attitude

indicator settles the argument.

Source: AIM 8-1-5

- The black-hole approach: a lighted runway across dark, featureless terrain invites a dangerously LOW approach — fly the VGSI or a computed descent, not the picture.

Source: AIM 8-1-5; AFH

- Roads and light strings get mistaken for runways at night; the beacon, the layout, and the CTAF picture confirm before descent continues.

Source: AFH night ops ch.

- Night collision avoidance is slower and geometric: overlapping off-center scan segments, with position-light logic replacing silhouette recognition.

Source: AIM 8-1-6

- Night currency is the legal floor; night proficiency — recent night landings, this airplane, this airport — is the personal-minimums question, asked separately.

Source: 14 CFR 61.57(b); PHAK ch. 2

- A dead position light after sunset grounds the flight unless the 91.213 inoperative-equipment process clears it — "it worked in daylight" is not a dispatch theory.

Source: 14 CFR 91.209; 91.213 (1-4/3-2 process)

- Night forced landing doctrine: glide toward lighted areas or a known airport, configure early, and save the landing light for late — darkness hides the surface until it matters.

Source: AFH night ops ch.

- Solo flight requires a logbook endorsement for the specific make and model of aircraft to be flown.

*Source: 61.87(n) eCFR**

- The solo endorsement must come from an authorized instructor who gave training within the 90 days before the flight.

*Source: 61.87(n) eCFR**

- Before any solo flight, the student confirms the solo endorsement is still inside its 90-day window — there is no grace period.

*Source: 61.87(n) eCFR**

- The solo endorsement stays current only while an authorized instructor updates the student's logbook every 90 days.

*Source: 61.87(p)(4) eCFR**

- A student pilot may not act as pilot in command with a passenger aboard.

*Source: 61.89(a)(1) eCFR**

- Solo by day requires flight or surface visibility of at least 3 statute miles.

*Source: 61.89(a)(6) eCFR**

- Solo at night requires flight or surface visibility of at least 5 statute miles.

*Source: 61.89(a)(6) eCFR**

- A student pilot may not fly when the flight cannot be made with visual reference to the surface.

*Source: 61.89(a)(7) eCFR**

- Climbing above a solid cloud layer on a solo flight is prohibited even in clear air, because surface reference is lost.

Source: 61.89(a)(7) eCFR; answer key item 27*

- Any limitation an authorized instructor writes in the student's logbook is binding — wind, ceiling, route, or anything else.

*Source: 61.89(a)(8) eCFR**

- "Airworthy" is a two-part legal test: the aircraft conforms to its type design AND is in a condition for safe operation.

Source: 14 CFR 3.5(a) TB

- The owner or operator is primarily responsible for maintaining the aircraft in an airworthy condition.

*Source: 91.403(a) eCFR**

- The pilot in command is responsible for determining whether the aircraft is in condition for safe flight.

*Source: 91.7(b) eCFR**

- After any maintenance, the aircraft may not be operated until it has been approved for return to service by an authorized person.

*Source: 91.407(a)(1) eCFR**

- "Calendar month" arithmetic: a 12-calendar-month interval runs to the last day of the month, not to the anniversary date.

*Source: 91.409(a) eCFR**

- The 100-hour inspection is required only when carrying persons for hire, or when giving flight instruction for hire in an aircraft the instructor provides.

*Source: 91.409(b) eCFR**

- An annual inspection can substitute for a 100-hour inspection, but a 100-hour never substitutes for an annual.

*Source: 91.409(a),(b) eCFR**

- The 100-hour limit may be exceeded by up to 10 hours, and only while en route to a place where the inspection can be done.

*Source: 91.409(b) eCFR**

- A maintenance record entry needs a description of the work, the completion date, and the signature, certificate number, and certificate kind of the person approving return to service.

*Source: 43.9(a) eCFR**

- Deciding an airplane is legal to fly requires reading its maintenance records — the cockpit documents alone cannot prove it.

Source: 91.409, 91.417 eCFR; TB*

- An airworthiness directive is a regulation: operating a product that does not comply violates part 39.

Source: 39.7 TB

- AD compliance is required at all times, not just at inspections — an aircraft can be inspection-legal and AD-unairworthy at the same time.

Source: AC 39-7D ¶11a TB

- A special flight permit lets an aircraft that does not currently meet airworthiness requirements, but is capable of safe flight, fly to a place where repairs or storage can be done.

Source: 21.197(a) TB

- A private pilot may perform preventive maintenance on an aircraft they own or operate, as long as it is not used under parts 121, 129, or 135.

*Source: 43.3(g) eCFR**

- The preventive maintenance list in part 43 Appendix A(c) is exclusive: if a task is not on the list, it is not preventive maintenance.

Source: 43 App. A(c) eCFR; AC 43-12A TB*

- When equipment is found inoperative, the governing rule is 91.213 — 91.205 enters later, inside the process, never first.

Source: 91.213 eCFR; AC 91-67A TB*

- Three legal paths to fly with inoperative equipment: an approved MEL with letter of authorization, the 91.213(d) process, or a special flight permit.

Source: AC 91-67A TB

- 91.213(d) screen one: the item must not be part of the VFR-day type certification instruments and equipment.

*Source: 91.213(d)(2)(i) eCFR**

- 91.213(d) screen three: the item must not be required by 91.205 or any other rule for the specific kind of flight being conducted.

*Source: 91.213(d)(2)(iii) eCFR**

- Disposition: the item is either removed, the cockpit control placarded, and the work recorded — or deactivated and placarded "Inoperative."

*Source: 91.213(d)(3) eCFR**

- Final step: a certificated pilot or mechanic determines the inoperative item is not a hazard to the aircraft.

*Source: 91.213(d)(4) eCFR**

- Legal is not the same as safe: after the 91.213 paperwork, the PIC's hazard judgment and 91.7(b) still decide the flight.

*Source: 91.213(d)(4), 91.7(b) eCFR**

- A standard airworthiness certificate stays valid only as long as maintenance is performed per parts 43 and 91 — its blank expiration is conditional, not eternal.

Source: 21.181(a)(1) TB

- Aircraft registration expires 7 years after the last day of the month it was issued (the old 3-year answer is stale).

Source: 47.40(a) TB

- Temperature normally falls with altitude at an average of about 2°C per 1,000 feet — the standard (environmental) lapse rate.

Source: AWH ch. 6 TC

- Rising air cools by expansion with no heat exchange — the adiabatic process that builds every cloud.

Source: NWS "How Clouds Form"; AWH TC

- Radiation fog: clear night, light wind, moist air — forms in low spots, burns off after sunrise.

Source: AWH ch. 18 TC

- Advection fog: moist air flowing over a cooler surface — needs wind, can persist for days and move onshore at night.

Source: AWH ch. 18 TC

- Dry adiabatic lapse rate: about 3°C per 1,000 feet for unsaturated rising air.

Source: AWH ch. 6 TC

- Saturated rising air cools more slowly (roughly 1.2–3°C per 1,000 feet) because condensation releases latent heat.

Source: AWH TC

- Dewpoint is the temperature air must cool to for saturation — the real moisture number.

Source: NWS La Crosse; AWH TC

- The temperature–dewpoint spread predicts fog, cloud bases, and structural ice before they appear.

Source: AWH ch. 6/12 TC

- In a rising convective parcel the spread closes about 2.5°C per 1,000 feet, so cumulus bases sit near (spread $\div 2.5$) $\times$ 1,000 feet.

Source: AWH ch. 6/12 TC

- Condensation releases latent heat, and that release is the fuel of thunderstorms.

Source: AWH TC

- Freezing rain at your altitude means a warmer-than-freezing layer is above you.

Source: AWH TC

- Stability is the atmosphere's resistance to vertical motion — it either enhances or suppresses rising air.

Source: AWH 13.1 TC

- The parcel test: a lifted parcel that stays warmer than its surroundings keeps rising; one that turns cooler sinks back.

Source: NWS Parcel Theory; AWH 13.2 TC

- An inversion — temperature rising with height — marks strongly stable air.

Source: AWH 5.8.3 TC

- Stable air signature: smooth, stratiform clouds, steady precipitation, poor visibility.

Source: AWH TC

- Unstable air signature: turbulence, cumuliform clouds, showery precipitation, good visibility.

Source: AWH TC

- Wind is air sliding from high pressure toward low pressure.

Source: NWS Origin of Wind TC

- Above the friction layer, wind blows roughly parallel to the isobars.

Source: AWH TC

- Surface friction slows the wind and angles it across the isobars toward low pressure.

Source: AWH TC

- Northern Hemisphere circulation: clockwise and outward around highs, counterclockwise and inward around lows.

Source: NWS TC

- Mountain waves form when strong wind crosses a ridge into stable air on the far side.

Source: AWH 16.2 TC

- Wind shear can occur at any altitude and in any direction — it is not only a thunderstorm product.

Source: AWH ch. 19 TC

- A shear that removes headwind on final costs airspeed and lift at the worst possible time.

Source: AWH TC

- A front is the boundary zone between two air masses — a zone with depth, not a wall.

Source: AWH 11.3; TC (misconception #10)

- Frontal passage signs: wind shift, temperature change, and a pressure fall then rise.

Source: AWH 11.3 TC

- Cold front: steep and fast — a narrow band of showery, sometimes violent weather, then rapid clearing.

Source: AWH 11.3.2 TC

- Warm front: shallow and slow — widespread layered cloud and steady precipitation arriving far ahead of the surface front.

Source: AWH 11.3 TC

- Winter warm fronts are the freezing-rain factory: rain falls from the warm layer aloft into freezing air below.

Source: AWH TC

- Occluded front: a faster cold front overtakes a warm front and lifts it, mixing both fronts' weather.

Source: AWH 11.3.4 TC

- Turbulence has four causes: convective, mechanical, frontal, and wind shear.

Source: AWH ch. 19 TC

- Turbulence intensities are defined terms: light, moderate, severe, extreme.

Source: AWH 19.1 TC

- A thunderstorm needs three ingredients: moisture, instability, and a lifting action.

Source: NWS; AWH 22 TC

- Life cycle: cumulus stage (updrafts), mature stage (precipitation begins, updrafts and downdrafts together), dissipating stage (downdrafts).

Source: AWH 22.3 TC

- The mature stage is the most violent, and surface precipitation marks its start.

Source: AWH 22.3 TC

- Avoid severe storms by at least 20 miles, and do not fly between echoes less than 40 miles apart.

Source: AWH 22.8.2 TC

- Never fly under a thunderstorm or under its anvil.

Source: AWH 22.8.2 TC

- A microburst is a small, intense downdraft — descent rates to 6,000 feet per minute.

Source: AWH TC

- Flying through a microburst swings you from headwind to tailwind — a 30-to-90-knot airspeed loss.

Source: AWH TC

- Structural icing needs two things: visible moisture and aircraft surface temperature at or below freezing.

Source: AC 91-74B TC

- Clear ice: large supercooled drops (freezing rain) spread before freezing — heavy, hard, hard to see.

Source: AC 91-74B; AWH TC

- Rime ice: small drops freeze on impact — rough, milky, builds on leading edges.

Source: AC 91-74B; AWH TC

- Freezing rain produces the fastest ice accumulation of any condition.

Source: AWH TC

- Carburetor ice is a warm-day hazard: most likely below about 70°F in humid air, possible up to 100°F — not a freezing-weather problem.

Source: PHAK ch. 7 TC (misconception #8)

- Fog is a cloud at the surface: visibility below 5/8 statute mile.

Source: AWH ch. 18 TC

- Fog rarely forms until the temperature–dewpoint spread closes to about 2°C or less.

Source: AWH TC

- The Aviation Weather Center is the product source; Leidos Flight Service is the briefing and consultation service; EFB apps aggregate both.

Source: AC 91-92; AIM 7-1-5 TC*

- Flight Watch and HIWAS no longer exist; today's inflight sources are FSS on 122.2, FIS-B, and ARTCC hazardous-weather broadcasts.

Source: AIM 7-1-5f, 7-1-8 TC*

- A PIREP is the only direct observation of conditions aloft; UA marks routine, UUA marks urgent.

Source: AWH 24.5 TC

- PIREP decode runs on slash codes: /OV location, /TM time, /FL altitude, /TP type, /SK sky, /TA temperature, /WV wind, /TB turbulence, /IC icing.

Source: AWH 24.5 TC

- AIRMETs advise of widespread conditions hazardous especially to VFR pilots and operators of sensitive aircraft.

Source: AWH ch. 26 TC

- AIRMET Sierra: IFR conditions and mountain obscuration.

Source: AWH ch. 26 TC

- AIRMET Tango: moderate turbulence and strong surface winds.

Source: AWH ch. 26 TC

- AIRMET Zulu: moderate icing and freezing level.

Source: AWH ch. 26 TC

- A SIGMET warns of non-convective conditions severe for all aircraft: severe icing, severe or extreme turbulence, dust or sandstorms, volcanic ash.

Source: AWH ch. 26 TC

- A Convective SIGMET covers severe thunderstorms, embedded thunderstorms, and lines of storms.

Source: AWH ch. 26 TC

- Any Convective SIGMET implies severe or greater turbulence, severe icing, and low-level wind shear.

Source: AWH (verbatim rule) TC

- The Graphical Forecasts for Aviation (GFA) is the interactive replacement for the old text Area Forecast over the CONUS.

Source: AWH TC

- The Surface Analysis Chart shows observed pressure systems and front positions — what is, not what will be.

Source: AWH 25.2.3 TC

- Prog charts show forecast front and pressure positions at future times.

Source: AWH ch. 25 TC

- Winds and Temperatures Aloft (FB): direction in tens of degrees TRUE, speed in knots, temperature in Celsius.

Source: AWH 27.2.1 TC

- FB blanks: no wind forecast within 1,500 feet of station elevation; no temperature within 2,500 feet.

Source: AWH 27.2.1 TC

- FB code 9900 means light and variable.

Source: AWH 27.2.1 TC

- The SPC Convective Outlook grades storm risk: TSTM, MRGL, SLGT, ENH, MDT, HIGH.

Source: SPC/NWS TC

- Scheduled TAFs are issued four times daily, every six hours.

Source: AWH TC

- An amended TAF (TAF AMD) supersedes and cancels the previous TAF — always check for the amendment.

Source: AWH (verbatim) TC

- Weather radar (NEXRAD) shows precipitation, not clouds — an empty radar picture is not proof of VMC.

Source: AWH 22.8.2 TC

- Satellite imagery shows clouds; radar shows precipitation — two different questions.

Source: AWH TC

- Datalink radar is always at least 7 to 8 minutes older than its time stamp.
Source: AC 00-63B (verbatim) TC
- Datalink weather is for broad strategic avoidance only — never for tactical storm penetration.
Source: AC 00-63B TC
- FIS-B is free over 978 UAT ADS-B In: METARs, TAFs, NEXRAD, AIRMETs, SIGMETs, NOTAMs, and more.
Source: AIM 7-1-9; AC 00-63B App A TC*
- FIS-B does not replace a preflight briefing.
Source: AC 00-63B TC
- An outlook briefing is for planning only — get a standard briefing closer to departure.
Source: AIM 7-1-5d; AC 91-92 8.1 TC*
- "VFR flight not recommended" is advisory — the final decision rests solely with the pilot, which is why it must be taken seriously, not outsourced.
Source: AIM 7-1-5b TC*
- A clean current METAR does not override a worsening TAF — the trend outranks the snapshot.
Source: TC (misconception #5; ratified trend element)
- Every weather product has a valid time and an issue time — reading one without the other is reading fiction.
Source: AWH ch. 24-27 TC
- Class A runs from 18,000 feet MSL up to and including FL600.
Source: AIM 3-2-2*
- Class A operations must be IFR under an ATC clearance — there is no VFR in Class A.
*Source: 91.135 eCFR**
- Class B: surface to about 10,000 feet MSL around the busiest airports, individually tailored in layered shelves.
Source: AIM 3-2-3*
- Class B entry requires an ATC clearance before entering.
*Source: 91.131(a)(1) eCFR**
- Two-way radio contact alone is not a Class B clearance — you need the words "cleared into Class Bravo."
Source: 91.131(a)(1); AIM 3-2-3*
- Class B equipment: two-way radio, transponder with Mode C, and ADS-B Out.
*Source: 91.131(c),(d) eCFR**
- To take off or land in Class B, the PIC must hold at least a private certificate — or a student/recreational/sport pilot with the 61.94/61.95 training and endorsement.
*Source: 91.131(b) eCFR**
- The Mode C veil: within 30 NM of a Class B primary airport, surface to 10,000 feet, transponder with Mode C and ADS-B Out are required.
*Source: 91.215(b)(2), 91.225(d)(2) eCFR**
- Flying beneath a Class B shelf requires no clearance, but the veil's equipment rules still apply.
*Source: 91.131, 91.215(b)(2) eCFR**
- Class C: airports with a tower and radar approach control — usually a 5 NM core from the surface to 4,000 feet above the airport, and a 10 NM shelf from 1,200 to 4,000 feet above it.
Source: AIM 3-2-4*
- Class C equipment: two-way radio, transponder with Mode C, and ADS-B Out.
*Source: 91.130(d), 91.215, 91.225 eCFR**
- Class D: airports with an operating control tower — surface to about 2,500 feet above the airport, individually

tailored.

Source: AIM 3-2-5*

- Class D requires only a two-way radio — no transponder or ADS-B from the class itself.

*Source: 91.129 eCFR**

- Class E is all controlled airspace that is not A, B, C, or D.

Source: AIM 3-2-6*

- A magenta vignette means Class E begins at 700 feet AGL; a blue vignette means 1,200 feet AGL.

Source: AIM 3-2-5/3-2-6*

- A dashed magenta line is a Class E surface area — controlled airspace to the ground for an airport.

Source: AIM 3-2-6*

- Class E ends at, but does not include, 18,000 feet MSL.

Source: AIM 3-2-6*

- VFR flight in Class E has no entry or communication requirement — the control is for IFR separation.

Source: AIM 3-2-6*

- Class G is uncontrolled airspace — everything not designated A through E.

Source: AIM 3-2-1*

- Class G above 1,200 AGL and below 10,000 MSL, day: 1 statute mile; 500/1,000/2,000.

*Source: 91.155(a) eCFR**

- Class G above 1,200 AGL and below 10,000 MSL, night: 3 statute miles; 500/1,000/2,000.

*Source: 91.155(a) eCFR**

- Class G above 1,200 AGL and at or above 10,000 MSL: 5 statute miles; 1,000/1,000/1 statute mile.

*Source: 91.155(a) eCFR**

- Under a surface-designated controlled airspace ceiling below 1,000 feet, VFR flight beneath the ceiling is prohibited.

*Source: 91.155(c) eCFR**

- To take off, land, or enter the pattern under VFR in a B/C/D/E surface area, ground visibility must be at least 3 statute miles (flight visibility if none is reported).

*Source: 91.155(d) eCFR**

- Special VFR lets you operate below basic VFR minimums inside the lateral bounds of a surface area, below 10,000 feet MSL.

*Source: 91.157(a) eCFR**

- Special VFR requires an ATC clearance — and the pilot must ask; ATC never offers it.

Source: 91.157(b)(1) eCFR; AIM* 4-4-6*

- Special VFR minimums: 1 statute mile flight visibility, clear of clouds.

*Source: 91.157(b)(2),(3) eCFR**

- Special VFR takeoff or landing needs ground visibility of at least 1 statute mile — or flight visibility of 1 mile if ground visibility is not reported.

*Source: 91.157(c) eCFR**

- Special VFR between sunset and sunrise requires an instrument-rated pilot and an IFR-equipped aircraft.

*Source: 91.157(b)(4) eCFR**

- Prohibited areas (P-numbers) ban flight entirely for security reasons.

Source: AIM 3-4-2*

- Restricted areas (R-numbers) contain invisible hazards — artillery, gunnery, guided missiles; entry when

active requires the controlling agency's authorization.

Source: AIM 3-4-3*

- Warning areas (W-numbers) carry restricted-area hazards over international waters, from 3 NM offshore outward.

Source: AIM 3-4-4*

- MOAs separate military training from IFR traffic; VFR flight may enter, but check activity and use extreme caution.

Source: AIM 3-4-5*

- Controlled firing areas suspend their activity when spotters see an aircraft coming — which is why they are not charted.

Source: AIM 3-4-7*

- TFRs are issued by NOTAM — they never appear on the printed chart.

*Source: 91.137(a) eCFR**

- 91.137 TFRs protect three things: people and property near a surface hazard, disaster relief aircraft, and the airspace over events that draw sightseers.

*Source: 91.137(a)(1)–(3) eCFR**

- Large sporting events carry a standing security TFR (commonly 3 NM and 3,000 feet AGL over major stadium events); the exact terms live in the current FDC NOTAM, so check it — the figures are not in a regulation.

*Source: standing FDC NOTAM (check current NOTAM at briefing); 99.7 eCFR**

- Presidential and VIP TFRs move with the person; violating one gets an armed escort.

*Source: 91.141 eCFR**

- Entering an ADIZ requires a filed and activated flight plan — DVFR for a VFR flight.

*Source: 99.11 eCFR**

- Transponder with Mode C is required at and above 10,000 feet MSL (except at and below 2,500 AGL), everywhere in the 48 states.

*Source: 91.215(b)(5)(i) eCFR**

- The airspace boundary is where the airplane is, not where the pilot thinks it is — fix position against the chart before the line, every time.

Source: NA; PA.I.E.R1

- The riskiest airspace is the kind you did not know was there: preflight the whole route's airspace, including what a diversion would enter.

Source: NA; PA.I.E.R1

- For a student pilot, any flight beyond 25 NM from the departure airport triggers the 61.93 solo cross-country rules.

*Source: 61.93(a)(1)(i) eCFR**

- Landing anywhere other than the airport you took off from also triggers 61.93 — distance does not matter.

*Source: 61.93(a)(1)(ii) eCFR**

- The student must comply with every limitation in the instructor's cross-country endorsement.

*Source: 61.93(a)(2)(iv) eCFR**

- Flying outside the endorsement's stated limitations violates 61.93 — the limitations are regulation, not advice.

*Source: 61.93(a)(2)(iv) eCFR**

- The 25 NM practice-airport exception lets a student fly solo to one nearby airport for takeoff-and-landing practice only.

*Source: 61.93(b)(1) eCFR**

- The repeated-route exception: specific solo cross-countries to an airport within 50 NM may repeat without a fresh per-flight endorsement.

*Source: 61.93(b)(2) eCFR**

- Endorsement one: a one-time solo cross-country endorsement for the category of aircraft.

*Source: 61.93(c)(1) eCFR**

- Endorsement two: a one-time solo cross-country endorsement for the specific make and model.

*Source: 61.93(c)(2) eCFR**

- Endorsement three: a per-flight endorsement after an instructor reviews that flight's cross-country planning.

*Source: 61.93(c)(3) eCFR**

- The per-flight endorsement names the make and model, states the planning is correct and the student prepared under the known conditions, and states the instructor's limitations are met.

*Source: 61.93(c)(3) eCFR**

- Before permitting a solo cross-country, the instructor must determine the planning is correct for the flight.

*Source: 61.93(d)(1) eCFR**

- The instructor must review current and forecast weather and determine the flight can be completed under VFR.

*Source: 61.93(d)(2) eCFR**

- 61.93(e) lists twelve required cross-country training subjects, from chart navigation with a magnetic compass to control by instrument reference.

*Source: 61.93(e) eCFR**

- For private pilot aeronautical experience, "cross-country time" requires a landing more than 50 NM straight-line from the original departure point.

*Source: 61.1 (cross-country time)(ii) eCFR**

- The certificate requires 10 hours of solo flight time in the areas of operation.

*Source: 61.109(a) eCFR**

- Five of those solo hours must be cross-country time.

*Source: 61.109(a)(5)(i) eCFR**

- The long solo cross-country must total at least 150 NM.

*Source: 61.109(a)(5)(ii) eCFR**

- The long solo cross-country must include full-stop landings at three points.

*Source: 61.109(a)(5)(ii) eCFR**

- One segment of the long solo cross-country must be a straight-line distance of more than 50 NM between its takeoff and landing points.

*Source: 61.109(a)(5)(ii) eCFR**

- The certificate also requires three solo takeoffs and three full-stop landings at an airport with an operating control tower.

*Source: 61.109(a)(5)(iii) eCFR**

- Plan fuel to land with a personal reserve well above the legal minimum — the legal reserve is a violation line, not a planning target.

Source: 91.151; NA

- If weather deteriorates en route below what the flight was endorsed for, the plan is land or turn back — continuing is both illegal and the classic fatal chain.

*Source: 61.93, 61.89 eCFR**

- On every solo cross-country the student must carry the pilot logbook, the student pilot certificate, and any

other required record, as evidence of the clearances and endorsements.

*Source: 61.51(i)(2) eCFR**

- The private pilot certificate itself requires age 17 — passing the written early does not move that date.

*Source: 61.103(a) eCFR**

- Test content aligns to the ACS, which is incorporated by reference into part 61 — the ACS is the study map.

*Source: 61.14(b)(3); ACS-6C App 1 KTF**

- The AKTR prints an ACS code for every question you missed.

*Source: ACS-6C App 1; Testing Matrix KTF**

- Your examiner reads those AKTR codes too: deficient areas get retested at the practical, and the pre-checkride endorsement must certify they were retrained.

*Source: 61.39(a)(6)(iii) eCFR**

- Authorization to test is an instructor's endorsement certifying ground training or home study completed and the applicant prepared.

*Source: 61.35(a)(1), 61.103(d) eCFR**

- The knowledge test must be passed within the 24 calendar months preceding the month of the practical test.

*Source: 61.39(a)(1)(i) eCFR**

- You present the AKTR when you apply for the practical test.

*Source: 61.39(a)(2) eCFR**

- After a failure, retesting requires additional training and an endorsement from the instructor who gave it.

*Source: 61.49(a) eCFR**

- Normal takeoff configuration is the POH's — flap setting, trim, and controls positioned for the wind — set and checked before taking the runway, not after full power.

Source: POH/AFM sect. 4 (pin-needed); AFH ch. 5 (pin-needed)

- The short-field takeoff starts at the very beginning of the usable runway in the POH's short-field configuration — runway behind you is distance the chart assumed you had.

Source: AFH ch. 5 (pin-needed); POH/AFM sect. 4 (pin-needed)

- Short-field technique: hold the brakes, set full power, check the engine instruments, then release — the roll begins with the engine already proven.

Source: AFH ch. 5 (pin-needed)

- Rotate at the POH speed and climb at the obstacle-clearance speed until the obstacle is cleared, then lower the nose to VY — pulling off early or climbing steep and slow trades away the margin the chart assumed.

Source: AFH ch. 5 (pin-needed); POH/AFM sect. 4/5 (pin-needed)

- Soft-field takeoff configuration: the POH flap setting with full aft yoke before the roll begins — the elevator lifts the nosewheel out of the drag as soon as it can fly.

Source: AFH ch. 5 (pin-needed)

- The soft-field takeoff is a weight transfer: from wheels to wings as early as possible, because a wheel in soft surface is drag and a wing in clean air is lift.

Source: AFH ch. 5 (pin-needed)

- Lift off in ground effect below normal climb speed, then level to accelerate within ground effect — climbing out before reaching climb speed settles the airplane back onto the surface.

Source: AFH ch. 5 (pin-needed)

- Soft-field landing: touch down at the minimum controllable speed, hold the nosewheel off with elevator, and keep the airplane rolling — an airplane stopped on a soft surface may be an airplane staying there.

Source: AFH ch. 8 (pin-needed)

- The short-field approach is flown to a chosen touchdown point at the POH speed — extra knots become float, and float is touchdown distance you cannot get back.

Source: AFH ch. 8 (pin-needed)

- A forward slip exists to steepen the descent without gaining airspeed — used when high on final, against an obstacle, or when flaps are unavailable or unwise.

Source: AFH ch. 8 (pin-needed)

- In a slip the fuselage's side does the work: altitude is spent as drag while pitch holds the approach speed — energy management by geometry, not by airspeed.

Source: AFH ch. 8 (pin-needed)

- Wind correction in a forward slip: slip toward the crosswind — low wing into the wind, opposite rudder — so that removing the slip leaves the crosswind correction already in place.

Source: AFH ch. 8 (pin-needed)

- The slip comes out before touchdown with the longitudinal axis aligned to the runway — touching down misaligned side-loads the landing gear.

Source: AFH ch. 8 (pin-needed)

- The go-around begins with immediate, smooth, full power and pitch to arrest the descent — everything else waits.

Source: AFH ch. 8 (pin-needed)

- Go-around configuration is cleaned up in stages per the POH — flaps come up incrementally, after the descent is stopped and the speed is safe; dumping all flap at once settles the airplane. (The trim-force trap is 1-5.p24.)

Source: AFH ch. 8 (pin-needed); POH/AFM sect. 4 (pin-needed)

- Steep-turn entry: clear the area, then roll to 45 degrees, adding power and back pressure as the bank passes about 30 — the doubled load factor demands more lift and more thrust.

Source: AFH ch. 9 (pin-needed)

- Lead the steep-turn rollout by about half the bank angle — begin rolling out roughly 20 degrees before the entry heading.

Source: AFH ch. 9 (pin-needed)

- Altitude loss in a steep turn is corrected bank-first: shallow the bank, raise the nose, then re-establish — pulling harder at 45 degrees only tightens the descending spiral. (Overbanking mechanism: 1-5.p43.)

Source: AFH ch. 9 (pin-needed)

- Ground reference maneuvers exist to teach wind-drift correction — holding a chosen ground track while the wind works on the airplane, the skill the traffic pattern is made of.

Source: AFH ch. 6 (pin-needed)

- The bank in a ground-reference turn tracks groundspeed: steepest turning downwind, where groundspeed is highest, and shallowest turning upwind.

Source: AFH ch. 6 (pin-needed)

- Straight segments of a ground-reference maneuver are held with a crab into the wind, and the maneuver is entered downwind — the steepest bank comes first, while attention is freshest.

Source: AFH ch. 6 (pin-needed)

- Division of attention is the graded risk of the maneuvering Tasks: track the reference with brief glances while flying the airplane by attitude — fixation on the point, at low altitude, is the built-in trap.

Source: AFH ch. 6 (pin-needed); FAA-S-ACS-6C V

GOING DEEPER

- The twelve ACS Areas of Operation match the twelve areas of operation in 61.107(b)(1) one for one.

Source: ACS-6C App 1; 14 CFR 61.107(b)(1)

- For an element with sub-elements, the evaluator can satisfy the one-K rule by choosing the parent plus at least one sub-element (for example K1 plus K1e).

Source: ACS-6C App 1

- The evaluator may combine Tasks and elements into one scenario, and may suspend a scenario and come back to it later.

Source: ACS-6C App 1

- The test is conducted under the ACS edition and regulations current on the date of the test — not the ones current when you trained.

Source: ACS-6C App 1; 14 CFR 61.43(a)(1)

- If a Task is incomplete or its outcome uncertain, the evaluator must have you repeat it — but instruction, practice, or repeating a failed Task during the test is not permitted.

Source: ACS-6C App 1

- Credit from a discontinued test lasts 60 days: pass the remainder within that period or the credit is gone.

Source: 14 CFR 61.43(f)(1)

- If all increments of the practical test are not completed within 2 calendar months after the month you began it, you must retake the entire test.

Source: 14 CFR 61.39(g),(h)

- The test aircraft itself must qualify under 61.45 — confirm this when scheduling, not on test morning.

Source: ACS-6C App 3; 14 CFR 61.45 (not fetched this session — verify at authoring)

- You must communicate in English clearly and understandably throughout (the FAA Aviation English Language Standard); doubt about this stops or fails the test.

Source: ACS-6C App 1 (AELS); AC 60-28

- Steep turn entry speed is the manufacturer's recommended airspeed or, if none is published, no more than VA.

Source: ACS-6C Area V Task A

- Stall setup standards: heading $\pm 10^\circ$ in straight flight; bank not exceeding 20° , $\pm 10^\circ$, in turning flight, while inducing the stall.

Source: ACS-6C Area VII Tasks B, C

- Power-on stalls are set up at no less than 65 percent power.

Source: ACS-6C Area VII Task C

- Short-field approach speed: the manufacturer's published approach speed or, in its absence, no more than 1.3 VS0, +10/-5 knots, with gust factor applied.

Source: ACS-6C Area IV Task F

- If fuel pressure is absent after the flow, recheck the fuel selector position — the most common restart is the tank you should have been on.

Source: PA-28-151 POH 4-1

- The "impossible turn" is a briefed number, not an instinct: below the pre-briefed turnback altitude the answer is ahead, because the 180-plus-realignment costs hundreds of feet and the gliding turn raises stall speed.

Source: AFH ch. 5; FAA-H-8083-2

- 91.3(b) is the legal floor under all of it: in the emergency, the PIC may deviate from any Part 91 rule to the extent required — altitude minimums included.

Source: 14 CFR 91.3(b); 14 CFR 91.119(a)

- Tell ATC "minimum fuel" when reaching destination with less than reserve becomes possible — it is an advisory, not an emergency; declare the emergency when priority handling is actually needed.

Source: AIM 5-5 (minimum fuel); Pilot/Controller Glossary

- Medical duration is counted in calendar months, so the certificate dies at month-end: an exam on September 23 expires September 30 of the target year, not September 23.

Source: 14 CFR 61.23(d)

- Since December 2024 the currency rule says carrying "persons," not "passengers" — Part 61 now defines a passenger, and instructors and checkride examiners fall outside the definition.

Source: 14 CFR 61.57(a), (b); 14 CFR 61.1

- Logging PIC and acting as PIC are two separate ledgers: a pilot logs PIC as sole manipulator of an aircraft they are rated for, even when someone else is acting PIC.

Source: 14 CFR 61.51(e); Chief Counsel (Speranza, 2009)

- The common purpose test for cost sharing: the pilot must have their own independent reason to make the flight — a pilot who would not have flown but for splitting the cost is sharing illegally.

Source: AC 61-142 para 9.2

- Advertising flights to the public — including on social media — is "holding out," which requires a commercial operation; sharing is legal only within a defined group you already know.

Source: AC 61-142 para 10.2

- Three different clocks define "night": position lights on sunset-to-sunrise, logging night from end of evening civil twilight, and night currency landings 1 hour after sunset to 1 hour before sunrise.

Source: 14 CFR 91.209(a); 14 CFR 1.1; 14 CFR 61.57(b)

- A standard airworthiness certificate stays effective only as long as maintenance, preventive maintenance, and alterations are performed per Parts 43 and 91 — its blank expiration is conditional, not eternal.

Source: 14 CFR 21.181(a)(1)

- Day VFR requires a manifold pressure gauge for each altitude engine and a temperature gauge for each liquid-cooled engine — neither applies to the Warrior, and knowing why is the point.

Source: 14 CFR 91.205(b)(6), (8)

- The 100-hour limit may be exceeded by up to 10 hours only to reach a place where the inspection can be done, and the overrun counts against the NEXT 100 hours.

Source: 14 CFR 91.409(b)

- An annual may substitute for a 100-hour inspection, but a 100-hour may never substitute for an annual — same checklist scope, different signer.

Source: 14 CFR 91.409(b); 14 CFR 43 App. D; 14 CFR 65.95

- A ferry (special flight) permit is itself a special airworthiness certificate — the full permit machinery is taught in 3-2.

Source: 14 CFR 21.175(b)(4); 14 CFR 21.197

- Flying slower than best-glide/max-endurance speed puts the airplane in the region of reversed command: more power is needed to fly slower.

Source: PHAK ch. 11; AFH ch. 5

- The Warrior's book recovery has six steps, not four: after throttle idle, ailerons neutral, full opposite rudder, control wheel full forward — then rudder neutral when rotation stops, and smooth back pressure to level. Stopping at "stick forward" flies the recovery into a split-S.

Source: PA-28-151 AFM 3-5

- V_a decreases as weight decreases: a lighter airplane stalls at a lower speed, so it can reach damaging load factors at lower airspeeds.

Source: PHAK ch. 5

- The electric pump stays OFF in cruise so an engine-driven pump failure shows itself immediately (as a pressure drop) instead of hiding behind the backup.

Source: PA-28-151 POH Operating Tips 7

- The POH minimum is not the dispatch minimum: North Aero sets its own higher number for the day, and the pilot should be able to explain the difference.

Source: PA-28-151 POH 10-8

- Control and performance: set attitude and power first, then trim, then cross-check the performance instruments to confirm — attitude flying works identically on instruments.

Source: IFH ch. 6

- The four hypoxia types: hypoxic (altitude — not enough O₂ pressure), hypemic (blood can't carry it — CO, anemia), stagnant (blood isn't moving — G-loads), histotoxic (cells can't use it — alcohol, cyanide).

Source: PHAK ch. 17

- The hypoxia-versus-hyperventilation differential: if oxygen is available and symptoms persist on it, suspect hyperventilation; when in doubt treat for both — O₂ on, breathe slow, descend.

Source: PHAK ch. 17; AIM 8-1-3

- Eight hours is a floor, not a clearance: the AIM's guidance is 12 to 24 hours bottle-to-throttle, and a hangover is impairment even at 0.00.

Source: AIM 8-1-1; 14 CFR 91.17(a)(3)

- FAA guidance after a new medication: wait at least five maximal dosing intervals before flying, so side effects show on the ground.

Source: FAA OTC medication guidance; AIM 8-1-1

- Emergency descent speed discipline: smooth air allows up to V_{no}/V_{ne} judgment per the POH; turbulence caps it at V_a logic — speed is survival time, but not past the airframe's limits.

Source: AFH ch. 18; PA-28-151 AFM 3-2

- ELT ground testing is confined to the first 5 minutes after the hour, three audio sweeps maximum; after any hard landing, monitor 121.5 to check for inadvertent activation.

Source: AIM 6-2-5

- VFR cruising altitudes key to magnetic course, not heading: the wind correction you fly never changes which altitudes are legal.

Source: 14 CFR 91.159

- A fuel decision point is computed before flight: a named point where, if fuel is below plan, the flight lands and refuels — the decision is made on the ground, not renegotiated in the air.

Source: AC 91-92 §8 doctrine

- Winds aloft forecasts and METAR winds are in degrees true; winds voiced by a tower or ATIS are magnetic.

Source: AWH FAA-H-8083-28; AIM

- A persistent planned-vs-actual heading disagreement means the wind is not as forecast: update the wind correction angle rather than re-intercepting again and again.

Source: PHAK ch. 16

- VOR accuracy checks are required for IFR (91.171), not VFR — but a VOT ground check ($\pm 4^\circ$ tolerance) is the free habit that catches a lying receiver.

Source: 14 CFR 91.171; AIM 1-1-4

- DME and GPS distances are slant range: directly over a station at altitude, the readout shows your altitude in miles, not zero.

Source: PHAK ch. 16

– RAIM needs a fifth satellite to detect a faulty signal and a sixth to isolate and exclude it; barometric aiding can stand in for one satellite.

Source: AIM 1-1-17

– GPS interference and jamming are real (military test NOTAMs); a sudden unexplained GPS anomaly means crosscheck against ground references immediately.

Source: AIM 1-1-17; GPS NOTAMs

– Mode C reports pressure altitude; ATC's computer applies the correction — the pilot never adjusts the transponder for the altimeter setting.

Source: AIM 4-1-20

– A standing safety factor on computed takeoff and landing distance (North Aero teaches +50%) turns book numbers into planning numbers.

Source: AFH; internal doctrine

– An abort point is chosen before takeoff: a spot on the runway where, if the airplane is not flying or not accelerating on plan, the takeoff stops.

Source: AFH

– Density altitude rises roughly 120 ft for every 1 °C above standard temperature.

Source: PHAK ch. 11 (1% guide)

– Humidity is the weakest of the three levers — fully saturated warm air is only about half a percent to one percent less dense — real, but temperature and altitude dominate.

Source: NWS High Density Altitude (1% guide)

– High density altitude is a landing problem too: the same indicated approach speed means higher true and ground speed, so the runway goes by faster and the rollout is longer.

Source: 1% guide; PHAK ch. 11

– Max demonstrated crosswind component is a demonstrated value, not a limitation — but beyond it you are the test pilot.

Source: POH/AFM sect. 4

– Maneuvering speed V_a decreases as weight decreases: a lightly loaded airplane has a lower V_a , not a higher one.

Source: POH/AFM; PHAK ch. 5

– Many trainers hold utility-category approval only inside a smaller weight-and-CG envelope, and the steeper maneuvers that category approves are legal only there. The Warrior's placard prohibits spins in both categories.

Source: POH sect. 2; PA-28-151 placards

– V_a promises that a single, full deflection of one control below it stalls the airplane before breaking it — it is no guarantee for repeated or combined inputs.

Source: PHAK ch. 5

– Certified limit load factors, flaps up: normal category +3.8/-1.52 g; utility +4.4/-1.76 g.

Source: PHAK ch. 5; POH sect. 2

– Maximum range and maximum endurance live at different power settings: going far and staying up long are different plans.

Source: PHAK ch. 11; POH sect. 5

– EFB weather is aggregated NWS/FAA data: convenient, but when the app's summary and the raw product disagree, the product is the authority.

Source: AC 91-92 (1% material)

– Flight Watch (122.0) and HIWAS are gone; the current AIM no longer mentions either, and materials still

teaching them are out of date.

Source: AIM (verified absence, 2026-07-12)

- The briefing cadence: outlook early, standard close to departure, abbreviated again if the picture is over an hour old or the weather is questionable.

Source: AC 91-92 §8.1

- VV (vertical visibility) means the sky is obscured: an indefinite ceiling with no layer base to sneak under.

Source: AWH FAA-H-8083-28

- AO2 in remarks means an automated station with a precipitation discriminator; automated stations can miss what a human observer would catch, like a distant thunderstorm.

Source: AWH FAA-H-8083-28

- An amended TAF (TAF AMD) supersedes and cancels the previous TAF the moment it issues — planning never continues on the old one.

Source: aviationweather.gov TAF docs (verbatim, 2026-07-12)

- CB is the only cloud type a TAF names; its appearance is a convective warning for that window.

Source: AWH FAA-H-8083-28

- The continue/divert decision point is set before launch: the place, plus the conditions there that trigger the divert.

Source: AC 91-92 (Erick doctrine, depth std.)

- About two-thirds of GA accidents in reduced-visibility weather are fatal: the go/no-go call is the highest-leverage safety decision a private pilot makes.

Source: NTSB SA-020

- A minus sign before the boxed Class D figure means "up to but not including" that altitude.

Source: Chart User's Guide

- Communications are established when the controller says your callsign: "N123AB, standby" is established; "aircraft calling, standby" is not.

Source: AIM 3-2-1

- The Class B words matter: without "cleared into the Class Bravo," you stay out — vectors, a squawk, or flight following do not open the door.

Source: AIM 3-2-3

- A short list of the busiest Class B airports prohibits student-pilot operations entirely, endorsement or not.

Source: 14 CFR 91.131; pt. 91 app. D §4

- Above the ceiling of Class B or C, up to 10,000 ft MSL within their lateral boundaries, the transponder and ADS-B requirements still apply.

Source: 14 CFR 91.215(b)(4); 91.225(d)(3)

- ADS-B Out mirrors the transponder airspace and adds Class E at and above 10,000 ft MSL (minus the 2,500-AGL cushion) and 3,000+ MSL over the Gulf within 12 NM of the coast.

Source: 14 CFR 91.225(d)

- Flying into rule airspace without the equipment takes an ATC authorization arranged in advance (ADAPT for ADS-B) — not a request made airborne at the boundary.

Source: 14 CFR 91.215(d); 91.225(g)

- At and above 10,000 ft MSL the minimums jump to 5 SM and 1,000/1,000/1 SM, because the 250-knot cap is gone and closure rates double.

Source: 14 CFR 91.155(a); 91.117(a)

- After a possible airspace deviation: fly the airplane, comply with ATC, and file a NASA ASRS report within 10

days — the safety system's learning channel, with sanction protection attached.

Source: AC 00-46

– Night vision is the first thing mild hypoxia takes, well below the altitudes of daytime symptoms; supplemental oxygen above about 5,000 ft at night is the FAA's recommendation.

Source: PHAK ch. 17; AIM 8-1-2

– Carbon monoxide, smoking, fatigue, and low blood sugar each degrade night vision before they produce any other symptom you would notice.

Source: PHAK ch. 17

– Beacon color codes extend past land airports: white/yellow marks a water airport, green/yellow/white a heliport.

Source: AIM 2-1-10

– An airport beacon running in daytime in B/C/D/E surface airspace often means weather below basic VFR minimums — advisory, not guaranteed, and no substitute for a METAR.

Source: AIM 2-1-10

– The landing light is required at night only when the flight is for hire — a private night flight without one is legal, and still unwise.

Source: 14 CFR 91.205(c)(4)

– The fuse requirement is specific: one spare set, or three spare fuses of each kind required, accessible to the pilot in flight.

Source: 14 CFR 91.205(c)(6)

– Three definitions of night, three different clocks: civil twilight for logging (1.1), sunset-to-sunrise for lights (91.209), sunset+1 to sunrise-1 for currency (61.57(b)) — knowing which clock a question runs on is the exam trap.

Source: 14 CFR 1.1; 91.209; 61.57(b)

– The recency rule now says "carrying persons," not "passengers" — the wording changed in the November 2024 rule, and older materials carry the old word.

Source: 14 CFR 61.57(a)-(b) (Amdt. 61-157)

– Ground lights disappearing along a line means something — cloud, ridge, fog bank — now stands between you and them: the night IMC/CFIT tripwire.

Source: AFH night ops ch.

– Unusually bright runway lighting makes the runway seem closer than it is; unrecognized, the result is a high approach — the mirror error to the black hole.

Source: AIM 8-1-5

– A failed landing light in flight is a technique change, not an emergency: normal approach, flare read from the runway-edge picture.

Source: AFH night ops ch.

– Night fuel practice is fatter than the 45-minute floor: reserves grow and fuel stops are planned where fuel is actually available at that hour — FBO and self-serve hours live in the Chart Supplement.

Source: Chart Supplement; 14 CFR 91.151

– The student pilot's visibility limits are stricter than basic VFR — a day that is legal for a private pilot can still be illegal for a student solo.

*Source: 61.89(a)(6), 91.155 eCFR**

– Solo privileges live in the logbook, not on the certificate: the endorsements are the authorization, and on solo cross-countries the logbook and student certificate must be carried as evidence of them.

*Source: 61.87, 61.51(i)(2) eCFR**

– The mechanic's signature approves return to service only for the work performed — it is not a statement that the whole aircraft is airworthy.

*Source: 43.9(a)(4) eCFR**

– Stability is judged by comparing the environmental lapse rate to the adiabatic rates — the answer almost no one gives by the numbers.

Source: AWH ch. 13; TC (DPE gauge)

– Conditional instability: air that is stable while dry becomes unstable once lifted to saturation.

Source: AWH 13.3.4 TC

– Low-level wind shear is defined as 10 knots or more per 100 feet in a layer more than 200 feet thick, within 2,000 feet of the surface.

Source: AWH 19.2.4.1 TC

– Warm-front occlusions are the embedded-thunderstorm factory: storms hide inside stratiform decks.

Source: AWH 11.3.4 TC

– Most icing lives between 0 and -20°C; half of all reports fall between -8 and -12°C; icing is rare below -40°C.

Source: AWH TC

– Convective SIGMETs are issued hourly at 55 past and are valid up to 2 hours.

Source: AWH TC

– Coded winds (METAR, TAF, FB) are TRUE north; voice winds (ATIS, tower, AWOS) and runway numbers are MAGNETIC.

Source: AWH Table 3-5 TC

– The mosaic can be 15 to 20 minutes older than even the age it displays — it shows where the weather was.

Source: AWH 22.8.2 TC

– At the dozen busiest Class B primary airports (appendix D §4: ATL, ORD, LAX, SFO, DCA, and others), only a private certificate or better may take off or land — no student endorsement works there.

Source: 91.131(b)(2) eCFR; AIM* 3-2-3*

– If the controller answers with your callsign — even just "(callsign), standby" — communications are established and you may enter Class C; a reply without your callsign establishes nothing.

Source: AIM 3-2-4 (positive case verbatim; converse is the note's plain implication)*

– The 10,000-foot rows (5 SM, 111) apply only above 1,200 AGL — over high terrain, the low-altitude Class G rows can reach above 10,000 MSL.

*Source: 91.155(a) eCFR**

– Night exception: an airplane in Class G at night, in the pattern within 1/2 mile of the runway, may operate with 1 statute mile and clear of clouds.

*Source: 91.155(b)(2) eCFR**

– ADS-B Out mirrors the transponder map and adds Class E at/above 10,000 (except below 2,500 AGL) and the Gulf shelf at/above 3,000 MSL within 12 NM.

*Source: 91.225(d) eCFR**

– Even on the repeated 50 NM route, the student still needs the current 61.87 solo endorsement and the 61.93(c) cross-country endorsements.

*Source: 61.93(b)(2)(iii),(iv) eCFR**

– "Known conditions" means the per-flight endorsement expires with the conditions: if the weather changes materially, the review that authorized the flight no longer describes it.

*Source: 61.93(c)(3)(ii) eCFR**

– A 45-NM hop with a landing logs as a 61.93 cross-country event but earns zero 61.109 cross-country time —

the two 50/25 mile rules answer different questions.

*Source: 61.1, 61.93 eCFR**

– The 150 NM is total route distance, but the >50 NM test is straight-line between two of the landing points — a triangle can pass the first and fail the second.

*Source: 61.109(a)(5)(ii) eCFR**

– A graduation certificate from an FAA-certificated pilot school is the alternative authorization.

*Source: 61.71(a); Testing Matrix KTF**

– The written rewards precise number recall; the oral rewards understanding — study the numbers for this test, the mechanisms for the checkride.

Source: NA (genre convention)

– The knowledge test is one of three evaluations; K and R elements are primarily evaluated at the knowledge test, then probed again orally.

*Source: ACS-6C App 1 KTF**

– A sustained slip can unport a fuel-tank outlet and interrupt fuel flow — know the POH's slip limitations and which tank is feeding before holding one.

Source: POH/AFM (pin-needed); AFH ch. 8 (pin-needed)

– Slips with flaps extended are restricted or cautioned against in some types — disturbed airflow over the tail can bring pitch oscillation or a tail stall; the POH's word governs.

Source: POH/AFM (pin-needed); AFH ch. 8 (pin-needed)

– In a slip the airspeed indicator may misread from disturbed static and pitot flow — hold the known pitch attitude and carry margin rather than chasing the needle.

Source: AFH ch. 8 (pin-needed); POH/AFM (pin-needed)