FLY
AVIATION

Training aid only, not flight instruction. Review it with your CFI and get their approval before you use it in training or in the airplane. Check every number against the POH and current FAA sources. Last reviewed Nov 7, 2026.

AEROMEDICAL FACTORS AND DECISION-MAKING

Private pilot · Human factors · Knowledge test, oral and real flying

AM I FIT TO FLY?

The pilot is the part of the airplane most likely to fail. Check yourself before you check the airplane. This is not medical advice: when in doubt, ask an aviation medical examiner (AME).

IMSAFE

Letter	Ask yourself	Notes
Illness	Am I sick, even a little?	A cold can mean a blocked ear or sinus on descent. Don't fly with symptoms.
Medication	Am I taking anything, prescription or over the counter?	Many cold and allergy pills cause drowsiness. See below.
Stress	Is something weighing on me?	Work, family or money worries crowd out attention in the cockpit.
Alcohol	Have I had a drink in the last 8 hours, or am I still feeling last night?	14 CFR 91.17. Many pilots use 24 hours.
Fatigue	Did I sleep well? Am I tired now?	Fatigue slows decisions and narrows attention.
Emotion / Eating	Am I upset? Have I eaten and had water?	Low blood sugar and dehydration look a lot like fatigue.

Medication

- **No medication is "probably fine" by default.** The FAA keeps a "Do Not Issue / Do Not Fly" list: drugs that should never be used while flying. Antihistamines that cause drowsiness (diphenhydramine, for example) are common examples.
- **Wait long enough for it to leave your body.** A common FAA guideline is to wait at least five times the drug's dosing interval or half-life after the last dose before flying. Your AME can tell you the right wait for a specific drug.

- **14 CFR 61.53:** you may not act as pilot in command if you know or should know of a medical condition that would make you unable to meet your medical certificate's requirements. That includes the effects of a medicine.
- **Ask an AME** before flying on any new medication, and tell your AME about everything you take.

Alcohol (14 CFR 91.17)

- No flying within **8 hours** of drinking any alcohol. "Eight hours bottle to throttle."
- No flying while **under the influence**, whatever the time.
- No flying with a **blood alcohol of 0.04% or more**.
- Hangovers still impair you after 8 hours. Many pilots and operators use **24 hours**. Alcohol also makes you more sensitive to hypoxia.

Scuba diving and blood donation

- **After scuba diving (AIM 8-1-2):** wait at least **12 hours** after a dive that did not need a controlled ascent (non-decompression), for flights up to 8,000 ft MSL. Wait **24 hours** after a dive that did need a controlled ascent (decompression stops). For flights above 8,000 ft MSL, wait at least 24 hours after any dive. Nitrogen in your blood can form bubbles at altitude (the bends).
- **Blood donation:** the common guidance is to wait at least 24 hours before flying, longer if you feel light-headed. Ask your AME.

HYPOXIA

Hypoxia means your body's tissues aren't getting enough oxygen. It comes on quietly, and the first thing it takes away is your ability to notice it.

The four types

Type	Cause	Example
Hypoxic	Not enough oxygen in the air you breathe	Altitude. The air's pressure drops, so each breath carries less oxygen
Hypemic	The blood can't carry enough oxygen	**Carbon monoxide** from an exhaust leak, anemia, recent blood donation
Stagnant	Blood isn't flowing well	High G loads, sitting still for a long time, cold
Histotoxic	Cells can't use the oxygen they get	Alcohol and some drugs

Symptoms

- Headache, drowsiness, dizziness, a feeling of well-being (euphoria) or of belligerence.
- Tingling, hot and cold flashes, blue fingernails and lips (cyanosis).
- Poor judgment, slow reactions, tunnel vision. Night vision fades first, above about 5,000 ft.
- Learn your own symptoms in an altitude chamber or a hypoxia awareness class if you can.

Time of useful consciousness

How long you can still act sensibly after losing your oxygen supply. Rough figures for a person at rest:

Altitude	Time
18,000 ft	20–30 minutes
22,000 ft	about 10 minutes
25,000 ft	3–5 minutes
30,000 ft	1–2 minutes
35,000 ft	30–60 seconds

- Our Cherokee's service ceiling is about 10,950 ft, so this matters most on a long climb or for a passenger with a heart or lung condition. The oxygen rules (14 CFR 91.211) start above 12,500 ft cabin altitude. See the Airspace Study Guide for the rule.
- **The fix:** descend, and use supplemental oxygen if you have it.

HYPERVENTILATION

Breathing too fast or too deep blows off too much carbon dioxide. It often comes from stress or fear, and it feels a lot like hypoxia.

- **Symptoms:** light-headedness, tingling in the fingers and around the mouth, muscle spasms, feeling hot or cold, and in bad cases fainting.
- **The fix:** slow your breathing on purpose. Talk out loud, or breathe into a paper bag. If you're not sure whether it's hypoxia or hyperventilation, treat it as hypoxia first: descend and use oxygen if available.

CARBON MONOXIDE

Carbon monoxide (CO) has no color, smell or taste. It binds to your blood far more tightly than oxygen, so even a small leak causes hypemic hypoxia.

- **Where it comes from in our Cherokee:** cabin heat comes from a shroud (heat muff) around the exhaust. A crack in the exhaust inside the shroud sends exhaust gas into the cabin. Winter is the risky season, because the heater runs more.
- **Carry a CO detector,** preferably an electronic one with an alarm. The stick-on spot detectors fade and are easy to miss.
- **Symptoms:** headache, drowsiness, dizziness, nausea, and in bad cases loss of muscle power and consciousness.
- **What to do: cabin heat OFF, fresh air vents OPEN, oxygen if you have it, land as soon as possible.** Tell ATC. Get the exhaust inspected before the next flight.
- More in Winter Flying in Michigan.

EAR AND SINUS BLOCK

When you climb, air in your middle ear and sinuses expands and usually escapes on its own. When you descend, air must flow back in, and a cold or allergy can block it.

- **Symptoms:** ear pain, muffled hearing, or sharp sinus pain on descent.
- **Prevention:** don't fly with a cold. Descend slowly.
- **The fix in flight:** swallow, yawn, or close your mouth, pinch your nose and gently blow (the Valsalva maneuver). If that doesn't work, climb back up a little and descend more slowly.

SPATIAL DISORIENTATION

Your inner ear senses motion, but it can be fooled. In clouds, at night or over featureless water, it will tell you something false and feel completely convincing. **The fix is always the same: believe the instruments.**

Vestibular illusions

Illusion	What happens	The danger
The leans	After a slow roll into a bank that you didn't notice, a quick roll back to level feels like a bank the other way	You lean or roll back into the original bank
Coriolis	A quick head movement during a long, constant turn feels like a roll, pitch or yaw	The most disorienting illusion. Keep head movements slow in turns
Graveyard spiral	In a long, coordinated turn the fluid in your ear stops sensing the turn. As you lose altitude, you pull back, which tightens the spiral	A descending spiral that ends in the ground
Graveyard spin	After a spin recovery, the stopped rotation feels like a spin the other way	You re-enter the original spin
Somatogravic	Quick acceleration feels like a nose-up pitch; deceleration feels like nose-down	On a go-around at night, pushing the nose down toward the ground
Inversion	A sudden level-off from a climb can feel like tumbling backward	You push the nose down
Elevator	An updraft feels like a climb; a downdraft feels like a descent	You push or pull against an altitude change that isn't there

Preventing it

- Get proper weather briefings and don't fly VFR into clouds or a dark, featureless night you aren't trained for.
- If you lose outside references, **go to the instruments right away:** wings level on the attitude indicator, then hold heading and altitude. This is why we practice basic instrument maneuvers. See Private Pilot Maneuvers.
- Keep head movements slow, especially in turns.

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VISUAL ILLUSIONS ON APPROACH

Your eyes judge height and distance by what they expect a runway and its surroundings to look like. Change the picture and they guess wrong.

Illusion	Makes you think you are	Result
Narrow runway	Higher than you are	You fly a low approach
Wide runway	Lower than you are	You fly a high approach
Upslope runway or terrain	Higher than you are	Low approach
Downslope runway or terrain	Lower than you are	High approach
Featureless terrain, dark water, snow	Higher than you are	Low approach. At night this is the black-hole approach
Rain on the windshield	Higher than you are	Low approach
Haze	Farther away than you are	Low approach
Fog	Pitching up	You steepen the approach
Ground lights (roads, boats)	Seeing runway or approach lights	You line up on the wrong lights

At KONZ

- **The field sits by the Detroit River and Lake Erie.** On a dark night, an approach that crosses water or unlit ground gives your eyes nothing to judge height with. That is the setup for a black-hole approach.
- **Fly the numbers, not the picture.** Use the pattern altitude, your normal power settings and a stable descent rate. Check the altimeter on base and final.
- **The PAPIs are reported out of service.** Without them, your own glidepath discipline matters even more. See the KONZ Airport Guide.
- **Lights on boats and roads** near the river can look like other lights at night. Confirm the runway lights before you commit.

NIGHT VISION

Your eye has two kinds of light sensors. **Cones** sit in the center and see color and detail, but need good light. **Rods** sit around the edges and work in dim light, but see little detail and no color.

- **Night blind spot:** the center of your eye has only cones, so at night you can miss an object you look straight at.
- **Off-center viewing:** look about 5–10° to the side of what you want to see, and keep your eyes moving in small steps.

- **Dark adaptation:** rods take about **30 minutes** to adapt fully. One bright light undoes it. Keep cockpit lighting dim. Red light helps keep your adaptation but makes red markings on charts hard to read.
- **Oxygen matters:** night vision suffers from mild hypoxia even below 10,000 ft. Smoking makes it worse.
- **Autokinesis:** stare at a single light against a dark background and it seems to move. Keep your eyes moving.

MOTION SICKNESS, FATIGUE AND STRESS

These three wear down performance slowly, and you're usually the last to notice.

Motion sickness

- Comes from conflicting signals between your eyes and your inner ear. Anxiety makes it worse.
- **Fix:** open the fresh air vents, loosen tight clothing, look outside at the horizon, avoid unnecessary head movements, and land if it doesn't pass.
- Most motion sickness medicines cause drowsiness. Don't take them before you fly as pilot.

Fatigue

- **Acute** fatigue is short-term tiredness from a long day; rest fixes it. **Chronic** fatigue builds up over weeks; it needs real time off.
- Signs: missed radio calls, slow scans, sloppy flying, and accepting a bad situation.
- Plan short flights on tired days, or don't fly.

Stress

- **Acute** stress is a sudden threat, like an engine roughness. **Chronic** stress is a long-term load from life.
- Some stress keeps you sharp. Too much narrows your attention and causes mistakes.
- Manage it: know your procedures cold (see the Cherokee Flow Cards), don't fly when life is overwhelming, and set personal minimums before you face a decision.

AERONAUTICAL DECISION-MAKING

Good pilots don't rely on good luck. They use simple, repeatable ways to spot risk and act on it.

PAVE: what to check

Letter	Risk area	Questions
Pilot	You	IMSAFE. Current? Proficient in this airplane and these conditions?
Aircraft	Our Cherokee	Airworthy? Fuel? Performance at today's weight and density altitude? Equipment for this flight?
enVironment	Weather, terrain, airports, airspace	Ceilings, visibility, wind, icing, daylight. The Class B and the border near KONZ
External pressures	Why you feel you must go	Passengers waiting, a deadline, an expensive trip, showing off. The most dangerous one

3P: how to keep checking

1. **Perceive** the hazards (use PAVE).
2. **Process** each one: what could happen, and how bad would it be?
3. **Perform:** remove or reduce the risk, then check again. Repeat the whole loop throughout the flight.

DECIDE: when something changes

1. Detect that something has changed.
2. Estimate whether you need to act.
3. Choose a safe outcome.
4. Identify the actions that get you there.
5. Do it.
6. Evaluate the result, and start again.

The five hazardous attitudes

Attitude	Sounds like	Antidote
Anti-authority	"Don't tell me what to do."	**"Follow the rules. They are usually right."**
Impulsivity	"Do something, quickly!"	**"Not so fast. Think first."**
Invulnerability	"It won't happen to me."	**"It could happen to me."**
Macho	"I can do it. Watch this."	**"Taking chances is foolish."**
Resignation	"What's the use?"	**"I'm not helpless. I can make a difference."**

Risk management

- Rate each hazard by **likelihood** (how probable is it?) and **severity** (how bad if it happens?).

- **Low likelihood, low severity:** accept it and watch it.
- **High likelihood or high severity:** reduce it before you go. Change the time, route, altitude or load, add fuel, bring a CFI, or wait.
- **High likelihood and high severity:** don't go.
- Several small risks add up. Three "low" items on one flight can make a high-risk flight.

Single-pilot resource management (SRM)

- **Use everything available:** ATC and flight following, Flight Service, the AWOS, PIREPs, your EFB, checklists and other pilots on the ground.
- **Manage workload:** brief the approach, set radios and get the ATIS before you get busy. Do things early.
- **Situational awareness:** always know where you are, what the airplane is doing, what the weather is doing, and where you will go if something fails.
- **Automation:** GPS and moving maps help, but know how to fly and navigate without them, and keep your eyes outside.
- **CFIT** (controlled flight into terrain) happens when a working airplane is flown into the ground. Know your altitudes, especially at night and in low visibility. Near KONZ, also know the tall towers and obstacles on your route.

PERSONAL MINIMUMS WORKSHEET

Personal minimums are limits you set for yourself, tighter than the regulations, before you face a decision. Write them down and stick to them. The numbers below are **examples to talk through with your CFI**, not rules.

Item	Student pilot (solo)	New private pilot	Experienced pilot	Mine
Ceiling (day)	3,500 ft AGL	3,000 ft AGL	2,000 ft AGL	____
Visibility (day)	7 sm	5 sm	5 sm	____
Ceiling and visibility (night)	No solo night	5,000 ft / 10 sm	3,000 ft / 7 sm	____
Surface wind	10 kt	15 kt	20 kt	____
Crosswind component	5 kt	8 kt	12 kt	____
Gust spread	None	5 kt	10 kt	____
Fuel at landing	1 hour	1 hour	45 minutes	____
Recent experience	Within 2 weeks of dual	3 landings in 30 days	Current per 61.57 plus a recent flight	____
Sleep before flying	8 hours	8 hours	7 hours	____
Icing, thunderstorms	Never	Never	Never	Never

- Set your minimums on the ground, in calm conditions, not on the day of a flight you want to make.
- Tighten them for an unfamiliar airport, a new airplane, night, or a long day.
- Review them with your CFI after every flight review or new experience.

SCENARIO: A WINTER EVENING FLIGHT FROM KONZ

You planned a short evening flight with a friend in our Cherokee in January. Work the decision through PAVE.

The facts

- You got off work late and slept poorly last night.
- Sunset is about 5:30 pm. It's 4:45 pm. You're a new private pilot with 4 hours of night time.
- AWOS: wind 310 at 14 gusting 22, visibility 6 sm in light snow, ceiling 3,200 ft, temperature 25 °F.
- Wind from 310° is a direct crosswind on Runway 4/22 (17/35 is closed).
- The airplane is airworthy. It sat outside today and has a light layer of frost.
- Your friend is excited and has already told family about the flight.

Working it

- **Pilot:** tired (F in IMSAFE), low night experience. **Risk up.**

- **Aircraft:** frost on the wings must be removed completely; no time before dark. Cabin heat will run, so check the CO detector. **Risk up.**
- **enVironment:** a direct crosswind gusting to 22 kt with a gust spread of 8 kt, snow showers, darkness, and an approach over dark water and snow (black-hole conditions). This is beyond the example new-private minimums above. **Risk high.**
- **External pressures:** a waiting passenger and a promise to family. **This is the pressure pushing you to go.**
- **Decision: no-go.** Several hazards stack up, and the crosswind alone exceeds a sensible personal limit. Offer a daytime flight on a calm weekend instead. Saying no is a pilot skill.

SELF-CHECK

Tap a question to see the answer.

What does IMSAFE stand for?

Illness, Medication, Stress, Alcohol, Fatigue, Emotion (or Eating).

What are the alcohol rules in 14 CFR 91.17?

No flying within 8 hours of drinking, while under the influence, or with a blood alcohol of 0.04% or more.

How long should you wait to fly after a non-decompression scuba dive?

At least 12 hours for flights up to 8,000 ft MSL. After a decompression dive, 24 hours. Above 8,000 ft MSL, 24 hours after any dive (AIM 8-1-2).

Name the four types of hypoxia.

Hypoxic (altitude), hypemic (blood can't carry oxygen, for example carbon monoxide), stagnant (poor blood flow) and histotoxic (cells can't use oxygen, for example alcohol).

What type of hypoxia does carbon monoxide cause?

Hypemic hypoxia. CO binds to the blood in place of oxygen.

You smell exhaust and get a headache in cruise with the heat on. What do you do?

Cabin heat off, fresh air vents open, oxygen if available, land as soon as possible, and tell ATC. Have the exhaust inspected before flying again.

How do you tell hyperventilation from hypoxia, and what do you do?

The symptoms overlap. If unsure, treat it as hypoxia: descend and use oxygen. For hyperventilation, slow your breathing on purpose or talk out loud.

What is the graveyard spiral?

In a long, coordinated turn the inner ear stops sensing the turn. Losing altitude, the pilot pulls back, which tightens the descending spiral. Fix: level the wings on the attitude indicator first.

Which illusion makes you fly a low approach to a narrow runway?

The narrow-runway illusion makes you think you are higher than you are, so you fly too low.

What is a black-hole approach and why does it matter at KONZ?

An approach at night over dark water or featureless ground, with few lights to judge height. It makes pilots fly too low. KONZ sits by the river and Lake Erie, so fly the numbers and watch the altimeter.

How long do your eyes take to adapt to darkness?

About 30 minutes for the rods to adapt fully. A bright light undoes it.

Why use off-center viewing at night?

The center of the eye has only cones, which need good light. Looking 5–10° to the side puts the object on the rods, which work in dim light.

What does PAVE stand for?

Pilot, Aircraft, enVironment, External pressures.

What is the antidote to the macho attitude?

"Taking chances is foolish."

What are the steps of the 3P model?

Perceive the hazards, process the risk, perform risk management. Then repeat throughout the flight.

SOURCES

These are summaries. Check the current editions, and ask an AME about anything medical.

- Pilot's Handbook of Aeronautical Knowledge (FAA-H-8083-25), Chapter 2 (Aeronautical Decision-Making) and Chapter 17 (Aeromedical Factors).
- Aeronautical Information Manual, Chapter 8 (Medical Facts for Pilots).
- Risk Management Handbook (FAA-H-8083-2).
- 14 CFR 61.53 (medical deficiency), 91.17 (alcohol and drugs) and 91.211 (supplemental oxygen).

- FAA guidance for AMEs on medications ("Do Not Issue / Do Not Fly").

Training aid only, not flight instruction. The POH in the airplane and its placards win: check every number against them, and fly with your CFI.