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INTERNET RESOURCES



FAA (FEDERAL AVIATION ADMINISTRATION)
faa.gov
FAA Knowledge Exams — psixams.com
Unmanned Aircraft Systems — faa.gov/uas
NOAA Aviation Weather Center — aviationweather.gov



AOPA (AIRCRAFT OWNERS AND PILOTS ASSOCIATION)
aopa.org
AOPA Let's Go Flying! — aopa.org/letssofar
AOPA Flight Training — flighttraining.aopa.org/learntofly



EAA (EXPERIMENTAL AIRCRAFT ASSOCIATION)
eaa.org
EAA Young Eagles — young eagles.org



UAA (UNIVERSITY AVIATION ASSOCIATION)
uaa.aero



NAFI (NATIONAL ASSOCIATION OF FLIGHT INSTRUCTORS)
nafinet.org



SAFE (SOCIETY OF AVIATION AND FLIGHT EDUCATORS)
safepilots.org



AUVSI (ASSOCIATION FOR UNMANNED VEHICLES INTERNATIONAL)
auvsi.org
AUVSI XPONENTIAL — xponential.org

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Plotting Your Course



How to Become a Pilot
Start your own flying adventure.

1 First Steps Learn to Fly Checklist

- Take an introductory flight! Almost every flight school and training establishment has what is called a discovery or introductory flight. These flights are relatively inexpensive and will give you a chance to experience flight firsthand. You may even get to fly the plane yourself!
- You must be at least 16 years of age to obtain a Student Pilot Certificate and/or fly solo. You must be at least 17 years of age to take the practical test (flight test or checkride).
- You must be able to read, speak, write, and converse fluently in English.
- Find a local Aviation Medical Examiner (faa.gov/pilots/amelocator) and obtain an FAA medical certificate. Some pilots can fly using a driver's license in place of a medical certificate under the BasicMed rule.
- Ground School is where you'll learn the required aeronautical knowledge and begin preparing for your FAA Knowledge Exam. You'll study basic aerodynamics, aircraft and engine systems, weather, regulations, weight and balance, navigation, flight planning, airspace, and more.
- Your flight training will consist of a minimum of 40 hours. The actual number of hours is usually a little higher and varies among students. A minimum of 10 hours will be solo (flying by yourself).
- The Practical (Flight) Test, also called a checkride, is your "final exam." The practical test is actually two in one, consisting of exams conducted both orally and in flight.

2 Certificates and Ratings Table

Certificate or Rating	What do you want to do?	How much does it cost?	How long will it take?*
Remote	Fly unmanned aircraft (drones)	\$200	2 weeks
Sport	Day flights in light-sport aircraft	~ \$3,000	3 months
Private	Fly personal or business, travel in clear weather	~ \$7,000	4 months
Instrument	Fly personal or business, travel in clear or cloudy weather	Private certificate + ~ \$3,000	6 months
Multi-Engine	Fly higher and faster in airplanes with two engines	Private certificate + ~ \$3,000	3 months
Commercial	Get paid to fly	~ \$20,000	8 months
Flight Instructor	Teach people to fly	Commercial certificate + ~ \$2,000	12 months
Airline Transport Pilot	Be an airline captain	Could be as low as \$0, if training is paid by the airline	6 months to 4 years**

* Flying 2-3 times a week
** Some airlines provide career-track flight training

3 Choosing a Flight School and Instructor

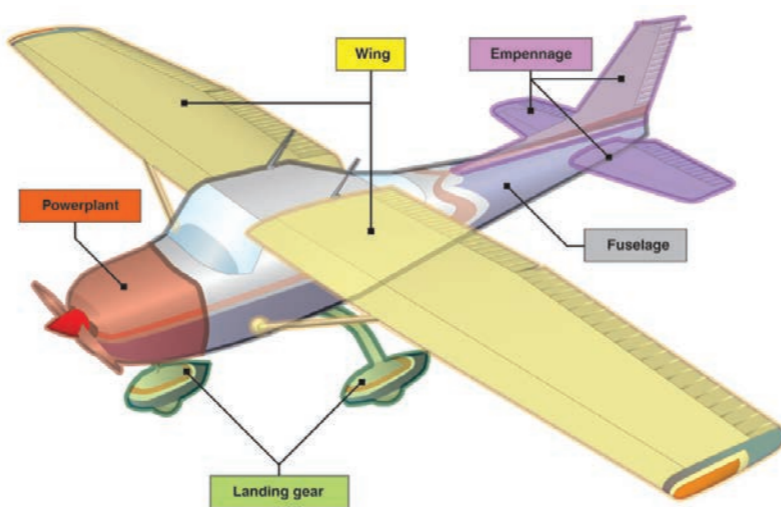
There are many ways to go about finding a flight school and instructor. The National Association of Flight Instructors (NAFI) and Society of Aviation and Flight Educators (SAFE) are excellent resources. You can also conduct an internet search to find flight schools in your area. If you have a friend or acquaintance who is a pilot, give them a call. Pilots love to share their passion for aviation!

Then visit several schools and take a look around to get a feel for their operations in general. Some schools are large training organizations with huge aircraft fleets where everyone is dressed in pressed button-down shirts and epaulets, while others are small operations with one or two aircraft that live next to a grass strip. The majority of schools fall somewhere in this spectrum. The important thing is that you find a training establishment that feels right for you.

As you narrow your search, take an introductory or "discovery" flight. These are offered at reduced cost so prospective pilots can get an introduction to the world of flight to see if they want to pursue flight training. These flights will give you an opportunity to spend time with an instructor and get an idea of how the school conducts business.

When you select a school, sit down with a few different instructors there and discuss how your training will proceed. It's important that you feel comfortable with your instructor. Each will have a different teaching style, so don't be discouraged if you don't hit it off with a particular one immediately. You'll find that most instructors are professional, knowledgeable, and conscientious (the traits you should find in any good pilot).

4 Parts of an Airplane



5 Aeronautical Knowledge

VFR (Visual Flight Rules) The set of regulations applicable to visual flight.

IFR (Instrument Flight Rules) The set of regulations applicable to instrument flight. (See next question.)

CAN I FLY INTO THAT CLOUD? Well, NO (at least not at first). "Blind flight," as it was referred to many years ago, simply means flight without visual references such as the horizon, sky, ground, etc. Without visual references a pilot must rely solely on instruments to safely maneuver and navigate the skies. Many atmospheric phenomena and obscurities can contribute to "instrument conditions" such as clouds, rain, fog, smog, haze, smoke, snow, and even volcanic ash. How does a pilot fly and find the airport without looking outside? INSTRUMENTS!

INSTRUMENT FLIGHT can only be conducted by pilots specifically trained and properly certified to do so. An instrument rating can be added to a private or commercial pilot certificate by taking additional training, passing the instrument knowledge test, and passing the instrument practical test. Due to the unique demands of flying on instruments, pilots must stay instrument current to be legal to fly on an instrument flight plan. The aircraft itself must also be properly equipped for instrument flight.

Instrument "Six Pack"



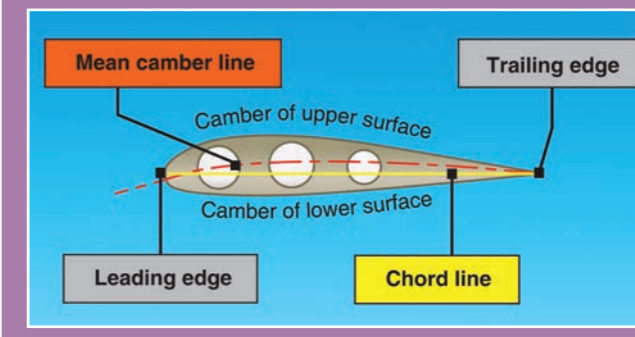
I'M NO MATH WHIZ! One of the biggest misconceptions about learning to fly is that you need to be some kind of math prodigy. Nothing could be further from the truth. Pilots find the most useful application of math concepts are rules of thumb, which are mostly calculated with basic multiplication, division, addition, and subtraction.

WHAT IS A STALL? When an airplane stalls, it does not just fall out of the sky. In most cases, simply letting go of the flight controls will correct the situation, returning the aircraft to normal flight. Don't think of "stall" here the same way you would think of an engine stalling—these are two completely different things. An airplane "stall" refers to a separation of airflow from the surface of a wing when the critical angle of attack (see next question) has been exceeded.

OK. NOW PLEASE TELL ME WHAT "CRITICAL ANGLE OF ATTACK" MEANS. Angle of attack is the angle formed between the wing's chord line and the relative wind. Relative wind is caused by the motion of the aircraft through the air. It's always parallel and opposite to the aircraft's flight path.

We're all familiar with relative wind although we might not realize it. Relative wind is what you feel when you stick your hand out of a car's window motoring down the highway. It may be a totally calm day with absolutely no wind to speak of, but if that car is traveling at 60 MPH your hand will feel a relative wind of the same speed.

The chord line of a wing is an imaginary line drawn between the wing's leading and trailing edges.



The critical angle of attack is the angle beyond which airflow can no longer follow the wing's shape and therefore separates, causing a loss of lift.

6 Aircraft Systems How the Parts of an Airplane Work Together

ENGINE: The engine's primary purpose is to provide thrust. In propeller-driven aircraft, the engine turns a propeller, which then provides thrust to move the aircraft forward. As a result of this forward motion, the wings create lift to keep the aircraft aloft. The engine also drives other systems vital to the aircraft's safe and efficient operation.

IGNITION: The ignition system is an integrated part of the engine and is responsible for supplying the spark that ignites the engine's mixture of fuel and air. Unlike an automobile ignition system, an aircraft's is self-contained. Once an aircraft engine has been started with the battery, the electrical system could fail entirely and the engine would happily continue to run. Additionally, aircraft engines actually have two separate ignition systems, which provide redundancy in case one system should become inoperative.

ELECTRICAL: The electrical system supplies power to the aircraft's radios and navigation equipment, applicable instruments, lights, fuel pumps, flap motors, landing gear motors, etc. Aircraft are typically equipped with an alternator or generator that supplies power to the electrical system and keeps the battery charged.

INSTRUMENTS: Known somewhat affectionately as the "six pack," the standard/basic flight instruments in most cockpits are: airspeed indicator, attitude indicator, altimeter, turn coordinator, heading indicator, and vertical speed indicator. Most aircraft also have a compass (often considered the seventh in the basic group). As a student pilot, you'll learn about each individual instrument, what drives them, and how to read them.

FUEL: Fuel is the engine's sustenance. You will learn how to determine the grade of fuel appropriate to the aircraft you fly, its weight, and how many gallons per hour the engine burns, which is necessary to ensure that the aircraft is properly fueled before every flight.

Glass Cockpit



DISPLAY: General aviation has gone through somewhat of a paradigm shift in recent years as the "glass cockpit" has proliferated in the market. Glass cockpits use electronic displays similar to the LCD monitors commonly used with personal computers. Once found only in transport category aircraft, these sophisticated systems have found their way into even some of the smallest training aircraft.

FAQ

Is it hard to learn to fly?

No. People of all ages, abilities and backgrounds have learned to fly. It's fun, and from the beginning of your training, you get to do most of the actual flying! While it is not a difficult skill to learn, it does require a degree of discipline, patience, and commitment.

What is the first step to becoming a pilot?

First, you should decide what you want to fly (for example, airplane, helicopter, glider, powered parachute, balloon, weight-shift control, drone, etc.), and for what purpose (recreation, career, personal transportation, etc.). These decisions will dictate the type of certificate you will need to obtain. Different types of pilot certificates are available depending on the level of certification you are seeking. Pilot certificates include Student, Remote, Sport, Private, Commercial, Flight Instructor, and Airline Transport Pilot.

When can I start flying?

Right away! All you have to do is find a flight instructor and sign up for an introductory lesson. You don't need a student pilot certificate or a medical certificate to take flying lessons.

When will I need to get a student pilot certificate?

You will need to obtain your student pilot certificate prior to flying solo.

Am I eligible for a student pilot certificate?

To be eligible for a student pilot certificate, an applicant must be at least 16 years of age for other than the operation of a glider or balloon, at least 14 years of age for the operation of a glider or balloon, and be able to read, speak, write, and understand the English language.

When can I start learning?

Right now! You don't need an instructor or flight school to begin your education. You can learn a lot on your own. Visit asa2fly.com where you can find books, software, videos and online programs to learn at your own pace, on your own time.

Where can I find the best flight school for me?

The only way to find this out is to do research on your own. Not every flight school follows the same format, and no instructor teaches the same way. Visit a flight school in your area and ask questions about their programs. Talk to an instructor and get a "feel" for the flight school's environment. It would be best if you can visit more than one school so that you can compare differences and find the right fit for you.

7 Fundamentals of Flight

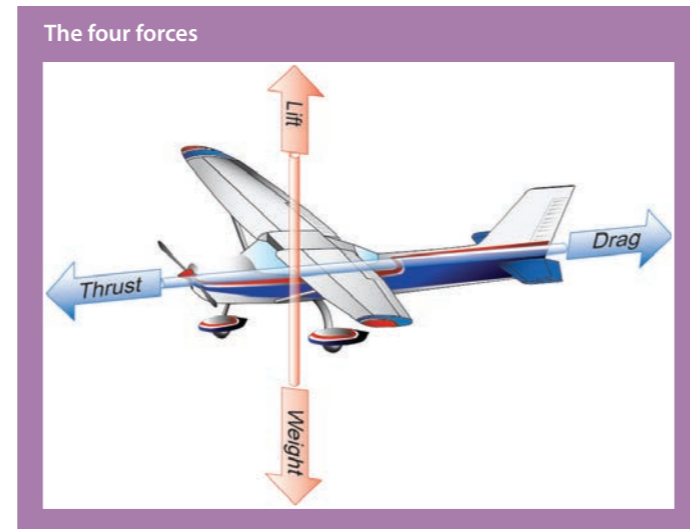
Like many people, you have probably looked up in the sky at an airplane flying overhead and wondered, how is that even possible? What principles are behind the magic that is flight? Let's begin with the four forces acting on an airplane.

LIFT: An aircraft is kept aloft by what is called "lift." Lift is the force that acts in an upward direction (perpendicular to the top surface of the wing). An aircraft's wing produces lift by reacting to the air it moves through.

THRUST: Thrust is the forward aerodynamic force produced by a propeller, fan, or turbojet engine as it forces a mass of air to the rear, behind the airplane. A propeller produces its thrust by accelerating a large mass of air by a relatively small amount.

WEIGHT: Weight (gravity) acts opposite to lift. Just as you, I, or any object have weight, so does an aircraft. Although the concept of "weight and balance,"—how weight distribution and limitations affect aircraft performance and stability. Every flight you take involves this factor as you consider the weight of the aircraft, fuel, passengers, and cargo.

DRAG: Drag is an aerodynamic force acting in the same plane as the relative wind striking an airfoil. Two basic types of drag act on an aircraft in flight: induced drag and parasite drag.



8 Airspace and Weather

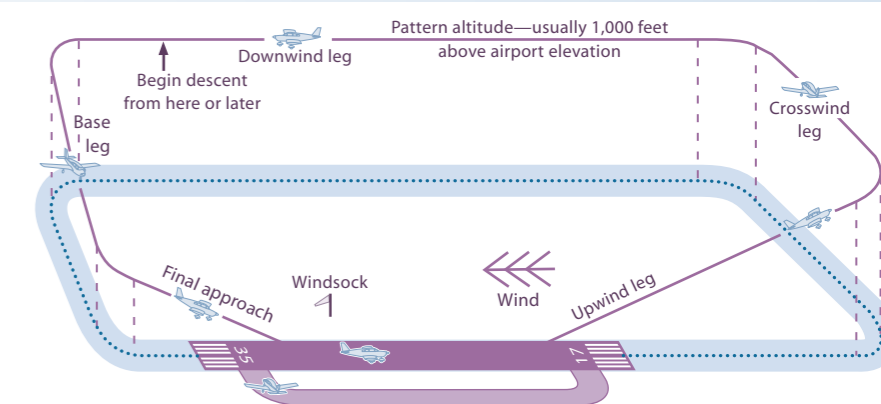
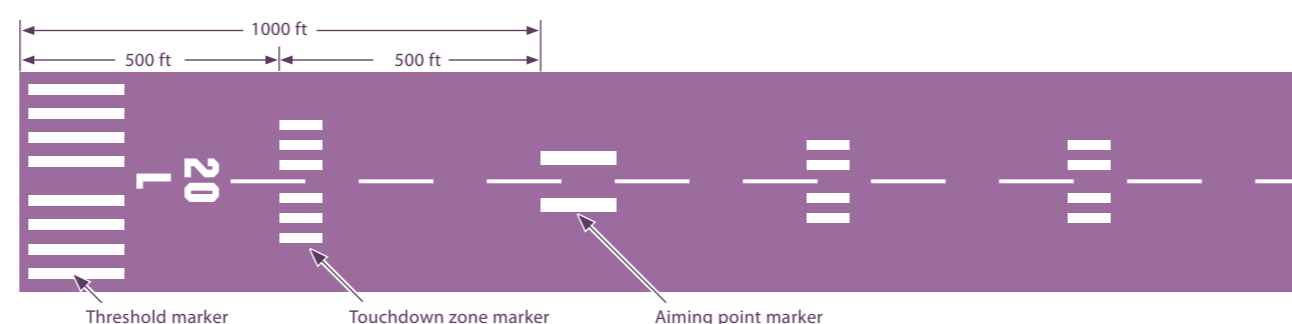
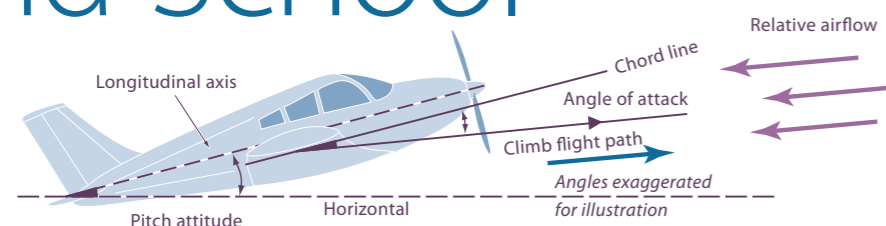
AIRSPACE: Aviation's airspace structure is designed in a logical manner to ensure the safe operation of aircraft in the National Airspace System, based on generally how much traffic is in a particular area and the type of operations conducted there. To determine under what conditions a pilot may fly in each area, specific rules are in place to keep aircraft separated from each other, as well as from terrain and man-made objects such as antennas. This diagram shows a cross-section of the major airspace classes. Needless to say, it is mandatory that pilots understand airspace nomenclature and become thoroughly familiar with the operational requirements of the various segments. You'll become an expert map reader, relying on the charts to help you determine what airspace you'll be operating in.



WEATHER:

It goes without saying that pilots have a keen interest in the weather. One of the great aspects of becoming a pilot is that you too will become familiar with this fascinating subject. As a pilot, you'll find yourself monitoring the weather almost subconsciously. Suddenly all those lines, symbols, Highs and Lows on the six o'clock news weather map will start to make sense and the dynamics of temperature, pressure, and wind take on special significance—you'll begin to see the big picture as never before. You'll learn how clouds are formed and probably most importantly, what they mean for your next flight. It has been said that clouds are like "signposts in the sky" enabling pilots to get a feel for the state of the atmosphere just by glancing up.

Things you'll see in Ground School



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