

CORE SUBJECTS: GEOMETRY, EARTH SCIENCE, GEOGRAPHY

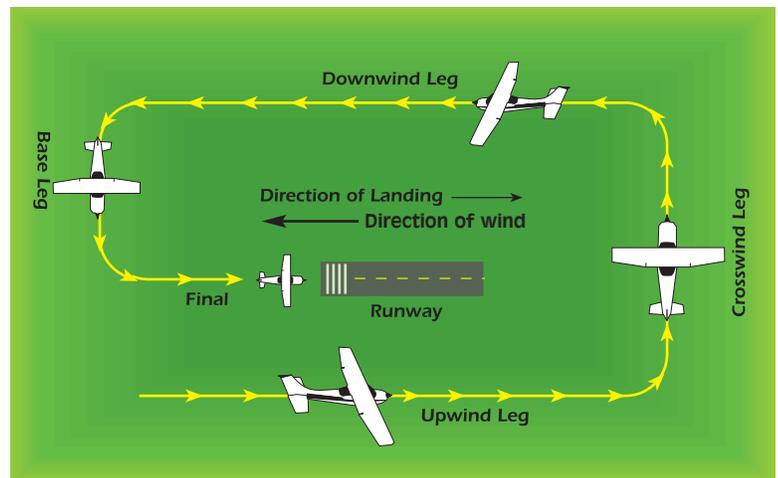
WHAT IS A TRAFFIC PATTERN?

Almost everyone has heard of airport traffic patterns, but until they become pilots few know what they are. Years ago it was recognized that, without some sort of consistent arrival and departure procedures, the risk of collisions at airports was significant, especially at airports without operating control towers. What evolved was a standard airport traffic pattern formed as a rectangle around the runway in use.

Just as there are “rules of the road” for driving a car, there are rules for how airplanes fly. This is especially important at an airport where the traffic can be very congested and confusing if there were no rules. Common to most airports, pilots fly a full traffic pattern that follow a rectangular path with five typical “legs.”

The legs start with the **upwind leg**, which runs parallel to the runway in the same direction you will land, followed by the **crosswind leg** that runs perpendicular to the runway, followed by the **downwind leg** that again runs parallel to the runway but in the opposite way you will land, followed by the **base leg**, which again runs perpendicular but on the end of the runway you will touch down, and finally the **final leg** that takes you on a straight line to the runway and your landing. Unless otherwise directed, all turns in a standard traffic pattern are made to the left.

Finding the runway specified by the control tower for landing is surprisingly easy, because runway numbers are selected to match the airplane’s compass heading on landing. Simply take the compass heading and delete one zero to find the runway number. For example, a pilot approaching Runway 27 would be landing in a westerly direction, and therefore would see 270° displayed on the magnetic compass.

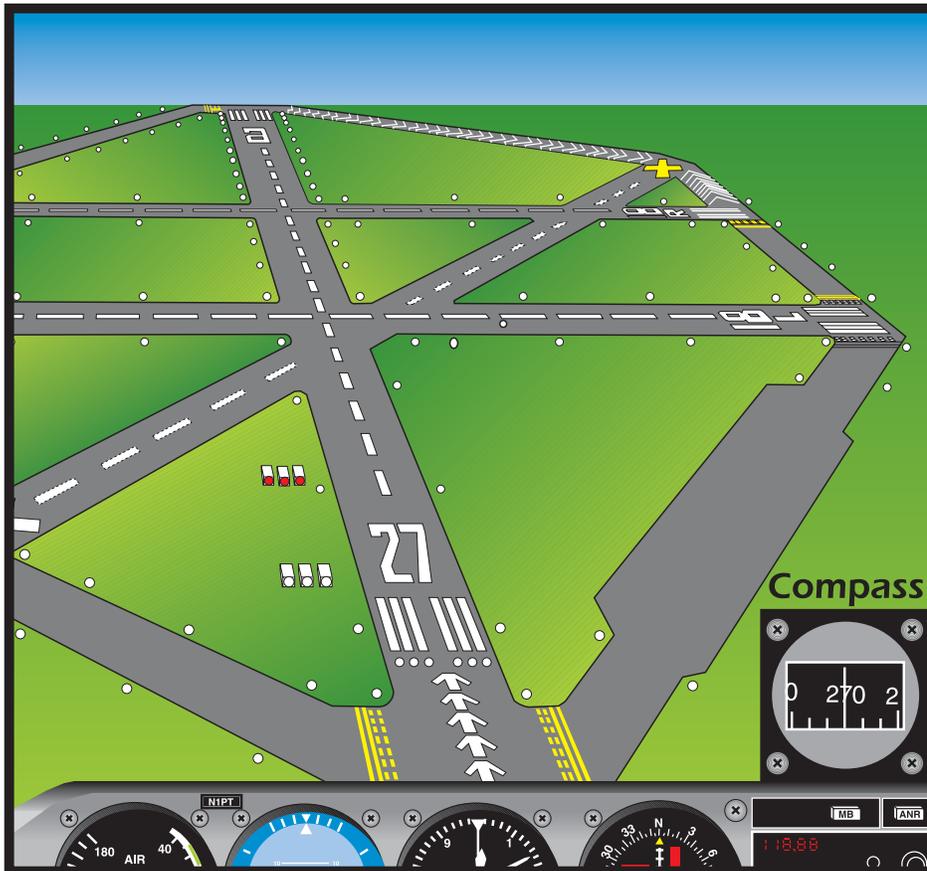


Approaching that same runway from the opposite direction, however, you would see “9” painted on the runway, and 090° on your compass. That’s because there’s always a 180° difference in numbers on each end of a runway. (The runway in this example would be known as “Runway 27/9.”)

In most cases, the runway in use is selected to allow the pilot to land most directly into the wind since pilots always want to land

into the wind, if possible. So, if the wind is blowing from the west in this example, the pilot will want to land on Runway 27. If it’s from the east, Runway 9 is preferable. And, if the wind is from the south? Runway 18 would be preferred, if there is one; otherwise, the pilot will need to make a “crosswind landing.”

Note: adapted from “You Can Fly!” by Gregory N. Brown and Laurel Lippert



ACTIVITY: Draw your own traffic pattern

Photocopy this activity for classroom use.
Go to www.aopa.org/path for student worksheets.

TEACHERS:

From this activity, students will learn how an airport traffic pattern works by tracing its path.

Students will use a protractor and compass to determine wind direction and runway locations.

MATERIALS:

Big pieces of chalk

Protractor/Compass

Open areas of concrete or asphalt away from traffic, such as a corner of the parking lot

Copies of this sheet with traffic pattern diagram (from excerpt)

TO DO IT:

- ▶ Divide students into teams of three or four.
- ▶ Each team gets chalk with which to draw a runway on the concrete.
- ▶ Now draw a traffic pattern using the picture on page 45 as a guide.
- ▶ Label each leg of the pattern, and mark the runway numbers on the runway.
- ▶ Figure out what direction the wind is coming from. If the wind is calm, pick a runway direction, and practice walking the pattern, climbing, turning, leveling off, and descending as an airplane would to land.
- ▶ Draw another runway that intersects the first. You can use a protractor to measure the angles the two runways cross each other and the angle at the wind crosses a given runway. This translates into the amount of crosswind that the pilot will need to manage during landing.

If you can't take your students outside, try this same exercise on the blackboard or on individual sheets of paper. Just skip "walking" the traffic pattern

QUESTIONS:

- 1 On what leg is the airplane moving the...
 - a. fastest over the ground?
 - b. slowest over the ground?
2. Why would a pilot want to land into the wind?
3. How would a crosswind affect the ground track of the airplane in the traffic pattern?
4. What happens when there is more than one airplane coming in to land? Not all airports have control towers, so how do you think the pilots would sort it out?

ANSWERS:

1a. On the downwind leg, because the wind pushes the airplane from behind. **1b.** Groundspeed is slowest flying into wind on the final approach. **2.** Just as a person gets pushed back or slowed down when walking into the wind, an airplane slows when wind is coming directly at its front. A slower groundspeed at touchdown means the airplane can stop in less runway. **3.** Since wind pushes the airplane from the side when the airplane flies across the wind, the airplane's track over the ground is angled as well. Pilots correct for this by pointing the nose of the airplane into the wind a few degrees. **4.** Pilots use the radio to talk to each other, giving position reports and letting other pilots know what they intend to do. Regulations stipulate which aircraft have the right of way, depending on what kind of aircraft it is and where the aircraft are in the traffic pattern.

Note: Adapted from "Women/Leaders Take Flight" seminar, presented by Linda Castner.