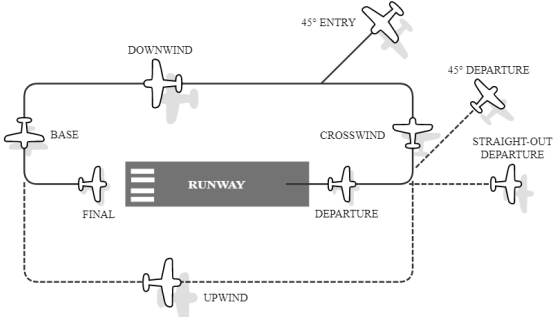


Traffic Patterns

Objective	
<p>To ensure the applicant learns the elements of an airport traffic pattern and the procedures for operating in traffic patterns at both towered and non-towered airports.</p>	
Purpose	
<p>Every VFR flight begins or ends with an airport traffic pattern. Airports are extremely busy environments, and proper adherence to proper traffic pattern procedures is critical to ensure safe operation, particularly at non-towered airports. This lesson introduces pilots to the elements of an airport traffic pattern, and the proper procedures for operating within the pattern.</p>	
Schedule	Equipment
<ul style="list-style-type: none"> ● Ground Lesson: 20 minutes ● Student Q&A: 10 minutes 	<ul style="list-style-type: none"> ● Chart Supplement ● Whiteboard / Markers (optional)
Student Actions	Instructor Actions
<ul style="list-style-type: none"> ● Ask any questions, receive study material for the next lesson. ● Watch linked video. ● Review listed references. 	<ul style="list-style-type: none"> ● Deliver the ground lesson (below). ● Answer student questions.
Completion Standards	
<ul style="list-style-type: none"> ● Student can explain the elements of the airport traffic pattern and proper airport traffic pattern procedures, including: <ul style="list-style-type: none"> ● Correct pattern distances, how to ensure adequate spacing, visual scanning and collision avoidance ● Towered pattern operations ● Non-Towered pattern operations, including how to determine runway in use, and pattern entries ● Importance of wind correction in traffic patterns ● Right-of-way rules 	

References

- ERAU SpecialVFR - "Traffic Patterns"
 - YouTube - https://www.youtube.com/watch?v=w_Bbs4K7L5U
- FAA-H-8083-3B (Airplane Flying Handbook) - Chapter 7 [Airport Traffic Patterns]
- FAA-H-8083-25B (Pilot's Handbook of Aeronautical Knowledge) - Chapter 14, Page 20-22 [Wind Direction Indicators/Traffic Patterns]
- AIM (Aeronautical Information Manual) - Chapter 4, Section 2 [Radio Communications Phraseology and Techniques], Chapter 4, Section 3 [Airport Operations]
- FAA AC 90-48D (Pilot's Role in Collision Avoidance)
- FAA AC 90-42 (Traffic Advisory Practices at Non-Towered Airports)
- FAA-S-ACS-6B (Private Pilot ACS) - Area III Task B
- FAA-S-ACS-7A (Commercial Pilot ACS) - Area III Task B
- FAA-S-8081-6D (CFI PTS) - Area VI Task B

Ground Lesson Outline

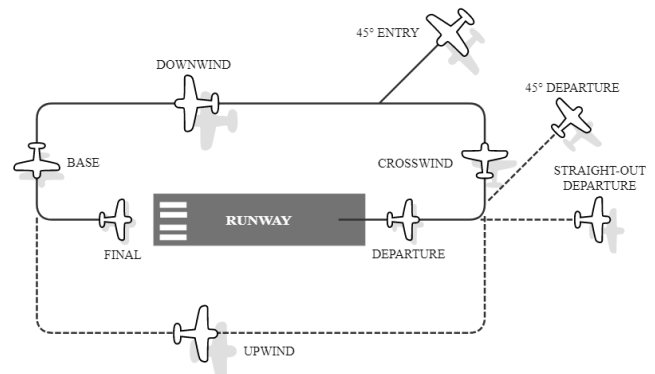
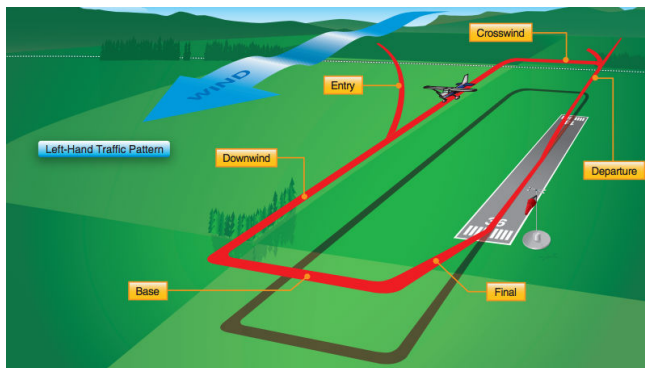
- Airport Traffic Patterns
 - Upwind, Crosswind, Downwind, Base, Final
- Traffic Pattern Procedures
 - Appropriate Distances
 - Wind Correction
 - Ensuring Adequate Spacing
 - Visual Scanning and Collision Avoidance
 - Wake Turbulence Avoidance
 - Use of Checklists
- Towered Airports
 - Pattern Entry - Usually downwind or base entry, sometimes straight-in
- Non-Towered Airports
 - Determining Runway in Use - Wind (ASOS, Windsock), CTAF
 - Traffic Pattern Direction - § 91.126 (Class G), § 91.127 (Class E)
 - Segmented Circles, Chart Supplement
 - Pattern Entry - 45 degree downwind entry preferred
 - Pattern Exit - 45 degree turn towards downwind
 - Right of Way Rules - § 91.113
- Special Air Traffic Rules - 14 CFR Part 93

Common Errors

- **Failure to comply with traffic pattern instructions, procedures, and rules.**
- Improper correction for wind drift.
- **Inadequate spacing from other traffic.**
- Poor altitude or airspeed control.

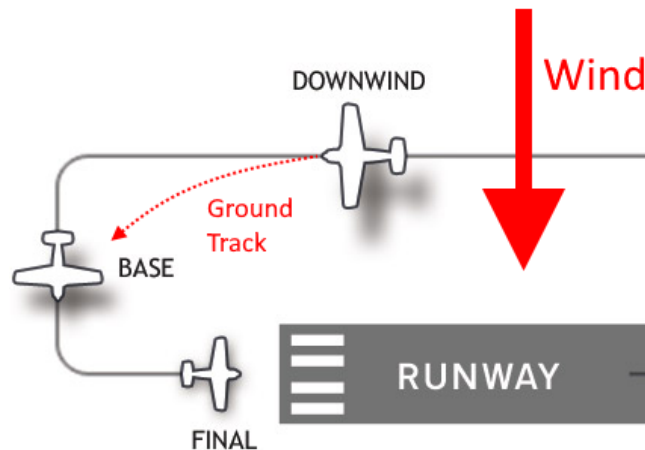
Ground Lesson Content

- Airport Traffic Patterns** - Due to the fact that at airports many airplanes are converging to the same place (the runway) simultaneously, procedures have been developed to provide order for traffic arriving and departing at airports. The *airport traffic pattern* is simply a rectangular flight path, with one of the long segments aligned with the runway. Imagine an airplane that would take off from a runway, and 'circle back' to land again on the same runway. Doing so would be called 'flying a pattern'. A traffic pattern is used to organize the flow of traffic taking off and landing on the same runway, and has 5 'legs':
 - Upwind/Departure** - As the airplane takes off, the first portion of the flight, in the same direction as the runway, is called the 'upwind' or 'departure' leg. It is called this because normally airplanes choose to take off on a runway which faces into the wind.
 - Crosswind** - As the airplane climbs, usually once it has reached 300 feet below *traffic pattern altitude* (usually 700 ft above the ground), it turns left. This is called 'crosswind', as the leg is *across* the wind.
 - Downwind** - As the airplane continues in the pattern, it turns left again, now facing opposite of how it began. This is usually *with* the wind, meaning the wind is blowing from behind, and this is called 'downwind'. This leg is flown at traffic pattern altitude, which is usually 1,000 feet above the ground.
 - Base** - As the airplane prepares to land, it begins to descend and turns left again, once it is far enough from the landing runway. This is called the 'base' leg, because this leg is the basis for, and determines how the next, final approach leg, will be started.
 - Final** - The airplane turns left once more to align with the runway. This is essentially the same as the 'Upwind' leg, but the airplane is landing instead of taking off.

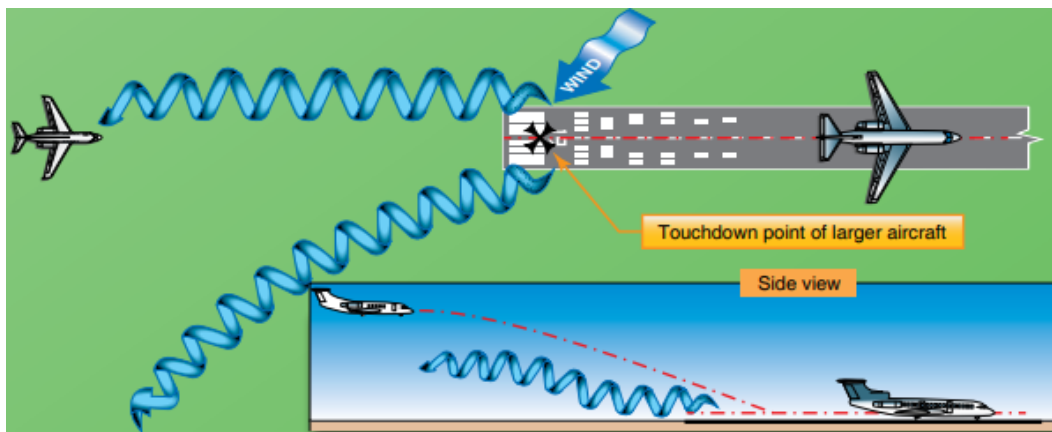


- Traffic Pattern Procedures** - In order to ensure safe operation in the traffic pattern, certain procedures must always be followed when flying in a traffic pattern.
 - Appropriate Distances**
 - Downwind** should generally be flown about 1 mile from the runway. Excessively wide downwind legs can lead to following traffic losing visual or accidentally cutting ahead in the pattern, which can create a very dangerous collision risk!
 - Final** should be at least 1 mile generally. This can be setup by not turning base until the runway is visually approximately at the midpoint between the wing and the tail.
 - Wind Correction** - It is essential to remember that wind correction should be applied on all legs of the pattern. In a strong crosswind situation, significant wind correction angles may be required. A crosswind from the downwind pattern side is particularly dangerous since it pushes

the airplane towards the runway and causes the base leg to be shorter than normal and causes a danger of overshooting final. **These situations frequently lead to stall/spin accidents on the base to final turn!**



- **Ensuring Adequate Spacing** - Maintain visual contact with the traffic ahead in the pattern at all times. Generally a 1 mile following distance is best. Distance should be estimated at key points in the pattern:
 - Do not turn **crosswind** until reaching 300 feet below pattern altitude and the traffic ahead is approaching the turn to downwind.
 - Do not turn **base** until the traffic ahead is beginning to turn final.
 - On **downwind**, if the distance to the traffic ahead is closing, deploy flaps and slow down early. If this does not ease the spacing, it may be necessary to exit and rejoin the pattern.
- **Visual Scanning and Collision Avoidance** - It is important to visually scan for traffic at all times when near an airport traffic pattern!
- **Wake Turbulence Avoidance** - It is extremely important to provide greater-than-normal spacing when operating near large or heavy aircraft. Spacing on final can be extended by extending the downwind leg and delaying the turn to base. **Aim to fly above the glide path of the larger aircraft at all times!**

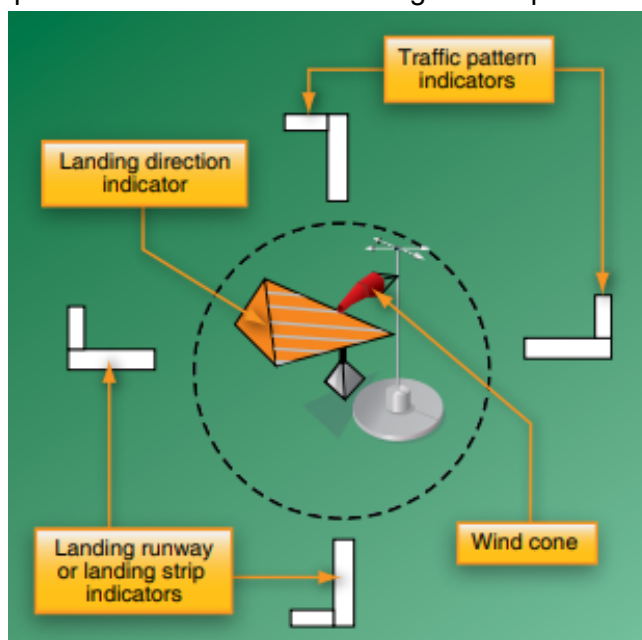


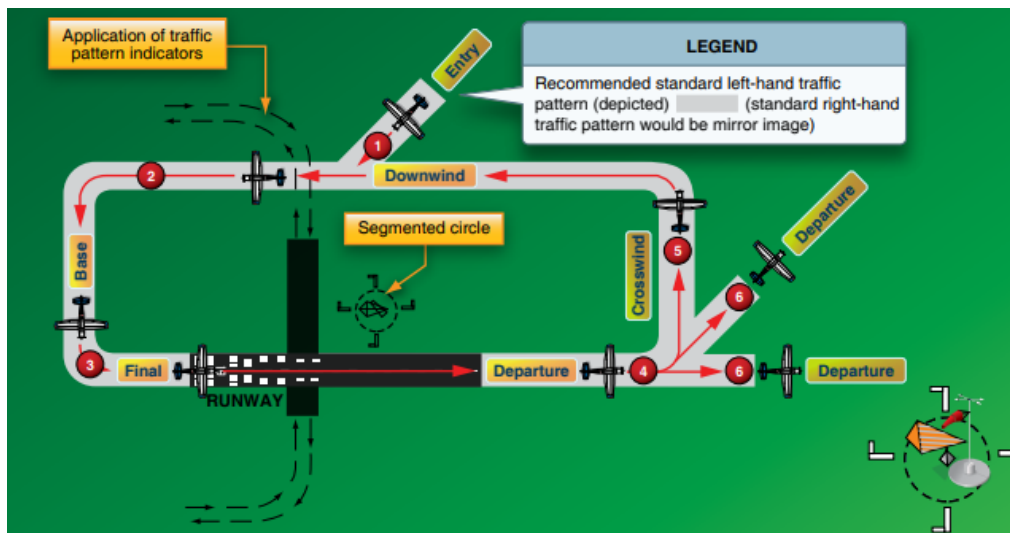
- **Use of Checklists** - Pilots must develop a habit of always performing a before landing checklist at the same points in the pattern. **Always perform a before landing check on downwind.**
- **Towered Airports** - Operating at towered airports is generally easiest because ATC is responsible for sequencing traffic and determining the runway in use.
 - **Pattern Entry** - ATC will provide instructions for joining the pattern, which is usually a downwind or base entry. Depending on traffic, ATC sometimes allows straight-in arrivals.

- **Non-Towered Airports** - Non-towered airports can be fairly chaotic and dangerous environments, and the vast majority of mid-air collisions occur at non-towered airports in clear, daytime conditions. Extreme vigilance by pilots is required.
 - **Determining Runway in Use** - There is no concept of an 'active' runway at a non-towered airport. Pilots cooperatively decide (via the Common Traffic Advisory Frequency) which runway will be used. Generally the runway best aligned with the wind will be used, by listening to the ASOS (Automated Surface Observation System) if one is available, or looking at the windsock or wind direction devices.



- **Traffic Pattern Direction** - The FARs (§ 91.126 (Class G), § 91.127 (Class E)) require that all traffic patterns at non-towered airports be flown using **left traffic** unless the Chart Supplement or a traffic pattern indicator requires right traffic.
 - **Segmented Circles** - Some airports include *segmented circles* or other traffic pattern indicators which visually depict the traffic pattern direction for each runway. The 'L' shape represents the Base and Final legs of the pattern.





- **Chart Supplement** - The *Chart Supplement* (formerly the Airport/Facility Directory) will indicate whether Right Traffic is required for a particular runway.
- **Pattern Entry** - While not required, a 45 degree downwind entry preferred
- **Pattern Exit** - While not required, a 45 degree turn towards downwind

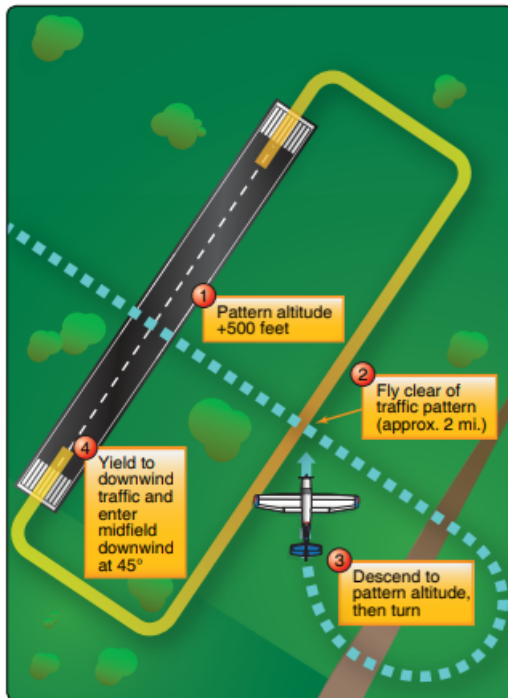


Figure 14-2. Preferred Entry-Crossing Midfield.

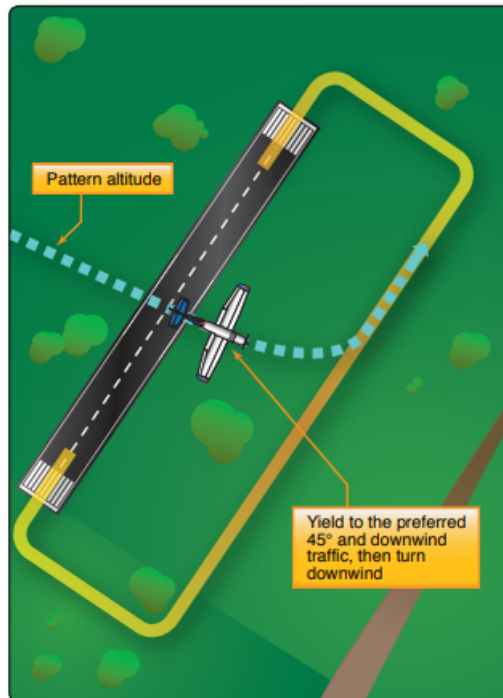


Figure 14-3. Alternate Midfield Entry.

- **Right of Way Rules** - The FARs (§ 91.113) require pilots to follow the established right-of-way rules when operating at non-towered airports. Generally, airplanes on final have right-of-way, and airplanes at lower altitudes have right-of-way. However, **pilots are not to take advantage of this rule to 'cut in line' in the traffic pattern!**
- **Special Air Traffic Rules** - 14 CFR Part 93 - Some airports are specifically designated in the FARs as having special rules governing the traffic pattern procedures at those airports. Pilots must review Part 93 to ensure that they comply with these rules when operating at those airports.