Visualized Flight Maneuvers Handbook
For Low Wing Aircraft
Third Edition
For Instructors and Students

Aviation Supplies & Academics, Inc.
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Objective: Takeoff and climb out to the downwind leg of the traffic pattern.

Task: Check Manufacturer Recommendations

1. Complete preflight inspection (see Page 4)
2. Complete starting airplane check (see Page 6)
3. Taxi to the upwind runway

4. Complete before-takeoff check (see Page 6a)
5. Wing flaps 0° for normal takeoff

6. Know local airport traffic pattern and altitude procedures
7. Practice situational awareness and runway incursion avoidance procedures

8. Obtain takeoff and departure clearances, if required
9. Look out and check that runway and approaches are all clear

10. Line up on runway centerline, nose wheel straight
11. Select a reference point straight ahead for tracking

12. Apply full throttle smoothly and positively
13. Keep heels on floor, and toes on rudder pedals, not brakes
14. Keep straight with rudder
15. Keep wings level with aileron
16. Check RPM for full power
17. Check engine instruments are in the green arc
18. Ease the weight off nose wheel as elevator becomes effective
• Leave runway at lift-off speed

Manufacturer Recommended lift-off speed _____ knots
• Use right rudder to offset torque as required

• Keep right hand on the throttle

• Establish the attitude that results in $V_Y$ with full throttle
  Manufacturer Recommended $V_Y$ _____ knots
• Trim off any control pressure

• Maintain wings level with aileron, coordinate with rudder

• Retract gear after positive rate of climb is established, and a landing cannot be made on remaining runway
• Scan for traffic
• Maintain a straight track over the extended runway centerline

• Beyond end of runway and within 300 feet of traffic pattern altitude, make a climbing turn to crosswind leg (bank angle 20° maximum)
• Allow for wind drift to keep a square pattern
• Maintain climb speed and continue to climb to pattern altitude
• Level off at pattern altitude
• Scan for traffic

• Within 1/2 to 1 mile from the runway, make a medium turn to downwind leg (bank angle 30° maximum)
• Scan for traffic
• To depart the traffic pattern, either climb straight out from the upwind leg, or turn 45° beyond the departure end of the runway after reaching pattern altitude

Evaluation:
• Use 0° (normal takeoff) flap setting
• Clear area and align airplane on runway centerline
• Advance throttle smoothly to takeoff power
• Rotate and lift off at the recommended airspeed and accelerate to $V_Y$
• Establish pitch attitude for $V_Y$ and maintain $V_Y$ during the climb (+10/-5 knots for Private and Sport, ±5 knots for Commercial and CFI)
• Retract landing gear after a positive rate of climb is established
• Maintain takeoff power to a safe maneuvering altitude
• Maintain directional control and proper wind-drift correction throughout takeoff and climb
• Comply with noise abatement procedures
• Complete the appropriate checklist
**ELEVATOR TRIM STALLS**

*(CFI only)*

**Objective:** Demonstrate what can happen when full power is applied for a go-around while not maintaining positive control of the airplane.

**Task:** Check Manufacturer Recommendations

1. Find practice area where terrain is appropriate for maneuvering, emergency landing area available
2. Select an altitude that allows maneuver to be completed no lower than 1,500 feet AGL
3. Clear area for other aircraft
4. Extend landing gear
5. Extend flaps, 1/2 to full
6. Trim airplane for level hands-off flight

2. Carburetor heat on (fully out), or as required
   - Power to IDLE (throttle fully out)
   - Establish glide attitude and best glide speed
     *Manufacturer Recommended best glide speed _______ knots*
   - Re-trim airplane for the glide, as would be done during a landing approach (nose-up trim)

3. Advance throttle smoothly to maximum power
   - Carburetor heat off (fully in)

4. The combined force of thrust, torque, and back elevator trim cause the nose to rise sharply and turn to the left
   - Do not attempt to correct these forces

5. When pitch attitude increases above the normal climbing attitude, and it is apparent a stall is imminent, apply forward pressure to the control column

6. With airplane held in the normal climbing attitude, adjust trim to relieve the heavy control pressures
   - Maintain wings-level with coordinated aileron and rudder
   - Complete normal go-around and level-off procedures
   - Retract gear and flaps (in increments) as airspeed reaches \( V_Y \)
   - Resume normal flight attitude, power, and airspeed with minimum loss of altitude

**Evaluation:**
- Demonstrate and simultaneously explain elevator trim stalls, in selected landing gear and flap configurations, from an instructional standpoint
- Analyze and correct simulated common errors related to elevator trim stalls in selected landing gear and flap configurations
**SECONDARY STALLS**

*(CFI only)*

**Objective:** Demonstrate what happens when stall recovery is attempted before the airplane has regained sufficient flying speed.

**Task:** Check Manufacturer Recommendations

1. Find practice area where terrain is appropriate for maneuvering, emergency landing area available
2. Select an altitude that allows maneuver to be completed no lower than 1,500 feet AGL
3. Clear area for other aircraft

2. Perform a stall

   - At full stall, release back pressure

3. Pull back on the control column before the airplane has regained sufficient flying speed

   - Allow airplane to stall for a second time
   - At full stall, release back pressure
   - Add full power

4. Maintain wings-level with coordinated aileron and rudder

   - Allow airspeed to build before returning to straight-and-level flight
   - Resume normal flight attitude, power, and airspeed with minimum loss of altitude
   - Practice from both a power-on and power-off stalled condition

**Evaluation:**

- Demonstrate and simultaneously explain secondary stalls, in selected landing gear and flap configuration, from an instructional standpoint
- Analyze and correct simulated common errors related to secondary stalls in selected landing gear and flap configurations
**LAZY EIGHTS**

(Commercial and CFI)

**Objective:** With constant change in control pressure due to changing combinations of climbing and descending turns at varying airspeeds, experience the full performance range of the airplane while flying a lazy eight pattern.

**Task:**

1. Find practice area where terrain is appropriate for maneuvering, emergency landing area available
2. Set power to obtain maneuvering speed ($V_A$), cruise speed, or manufacturer recommended speed (whichever is less)
3. Select an altitude that allows maneuver to be performed no lower than 1,500 feet AGL, or manufacturer recommended (whichever is higher)
4. Clear area for other aircraft
5. Trim airplane for level hands-off flight
6. Fly crosswind and select an upwind reference point abeam the wing tip
7. Raise the nose above the horizon and begin a climb
8. Slowly roll in bank, and enter a coordinated climbing turn into the wind
9. Pass the 45° reference point with maximum nose-up for maneuver
10. Increase bank angle through 15°
11. Speed is decreasing
12. Pitch attitude begins decreasing
13. Bank angle continues to increase

Continued
4. Arrive at maximum bank angle 30° at 90° reference point
   - Pitch attitude is momentarily level
   - Take note of minimum airspeed
   - Take note of maximum altitude
   - Pitch continues to decrease
   - Bank decreases
   - Speed increases

5. Pass the 135° reference point with the lowest nose attitude for the maneuver
   - Reduce bank angle through 15°
   - Speed continues to increase
   - Pitch begins increasing
   - Bank angle continues to decrease

6. At the 180° reference point, airplane is momentarily level
   - Altitude is same as entry altitude
   - Airspeed is same as entry airspeed
   - Begin to raise the nose
   - Gently roll bank in the opposite direction

7. Pass the 45° reference point with maximum nose-up for maneuver
   - Increase the bank angle through 15°
   - Speed is decreasing
   - Pitch attitude begins decreasing
   - Bank angle continues to increase

8. Arrive at maximum bank angle 30° at 90° reference point
   - Pitch attitude is momentarily level
   - Take note of minimum airspeed
   - Take note of maximum altitude
   - Pitch continues to decrease
   - Bank decreases
   - Speed increases

9. Pass the 135° reference point with the lowest nose attitude for maneuver
   - Reduce bank angle through 15°
   - Speed continues to increase
   - Pitch begins increasing
   - Bank angle continues to decrease

10. At the 180° reference point, airplane is wings-level
    - Altitude is same as entry altitude
    - Airspeed is same as entry airspeed
    - Resume straight-and-level flight

Evaluation:
- Select an altitude that allows the task to be performed no lower than 1,500 feet AGL or the manufacturer's recommended altitude, whichever is higher
- Select a prominent 90° reference point in the distance
- Establish the recommended entry power and airspeed
- Plan to be and remain oriented while maneuvering the airplane with positive, accurate control, and demonstrate mastery of the airplane
- Achieve the following throughout the task—
  a. Constant change of pitch, bank, and turn rate
  b. Altitude and airspeed consistent at the 90°-points, ±100 feet and ±10 knots respectively
  c. Through proper power setting, attain starting altitude and airspeed at the completion of maneuver, ±100 feet and ±10 knots respectively
  d. Heading tolerance ±10° at each 180° point
- Continue task through at least two 180° circuits and resume straight-and-level flight
- Maintain coordination throughout maneuver
- Correct for torque effect in right and left turns
- Loops should be symmetrical
- Pitch and bank attitude should have a constant rate of change throughout the maneuver