

# Private Pilot Flight Instruction Lesson Plan

## Ground Reference Maneuvers

Student: \_\_\_\_\_ Date: \_\_\_\_\_

### Objectives:

Upon completion of this lesson the student will:

- Be able to perform ground reference maneuvers (S Turns, Turns around a point and Rectangular patterns) compensating for the effect of the wind on the flight path.
- Improve their situational awareness skills including traffic avoidance and emergency landing site awareness.
- Improve division of attention skills.

### Elements:

- Compensating for the effects of wind on the flight path.
- Situational awareness.
- Division of attention
- Smoothness of aircraft control.

### Schedule:

- |  |       |
|--|-------|
| • Pre-lesson briefing                    | 00:10 |
| • Pre-Flight and flight to practice area | 00:10 |
| • Turns Around a Point                   | 00:10 |
| • S Turns                                | 00:10 |
| • Tracking a straight line               | 00:05 |
| • Rectangular Pattern                    | 00:10 |
| • Flight back to airport                 | 00:10 |
| • Post-flight procedures                 | 00:10 |
| • Post-lesson debriefing                 | 00:15 |
| Total:                                   | 01:30 |

### Equipment:

- Model airplane and/or chalkboard to demonstrate maneuvers

### Instructor Actions:

1. Pre-lesson briefing
  - Present lesson objective.
  - Describe what will take place during the lesson.
  - Explain wind-drift circles using chalkboard.
  - Explain crabbing technique using chalkboard and/or model airplane (use boat in the stream example if necessary)
  - Explain ground-reference maneuvers using model airplane and/or chalkboard

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2. Pre-flight and flight to practice area
  - Use the opportunity to reinforce the student's general flying skills. Review any operational areas which the student might be having difficulty with.
  - Review the maneuvers again.
  - Have student compute approximate wind speed and direction at the altitude at which the maneuvers will be performed.
3. Turns Around a Point
  - Demonstrate and explain wind-drift circles.
  - Have student select an appropriate landmark (tree, silo, etc.) within gliding distance of an emergency landing site around which the maneuver will be performed.
  - Have student determine the direction from which the entry into the maneuver will be made.
  - Demonstrate and explain the maneuver.
  - Help student as required to fly the maneuver properly. Altitude should be maintained throughout the maneuver (600 to 1,000 ft. +/- 100 ft.). Perform the maneuver both to the left and to the right.
4. S Turns
  - Have student select an appropriate road or railroad track over which the maneuver will be performed; i.e. one that is perpendicular to the wind direction and within gliding distance to an emergency landing site.
  - Have student determine the direction from which the entry into the maneuver will be made.
  - Demonstrate and explain the maneuver.
  - Help student as required to fly the maneuver properly. Altitude should be maintained throughout the maneuver (600 to 1,000 ft. +/- 100 ft.). Wings should be level at the point where the airplane crosses the reference road and the flight path at the crossing point should be perpendicular to the reference road.
5. Tracking a straight line
  - Demonstrate and explain how to crab the airplane to compensate for the effect of the wind while flying along a straight road or railroad track that is perpendicular to the wind direction.
  - Have student practice tracking a course (in both directions) parallel to a straight road or railroad track that lies perpendicular to the direction of the wind.
6. Rectangular Pattern
  - Have student select an appropriate field or area around which the maneuver will be performed.
  - Have student determine which leg will be the "downwind" leg and set up an appropriate (45<sup>0</sup>) entry to the pattern.
  - Help student as required to fly the maneuver properly. Altitude should be maintained throughout the maneuver +/- 100 feet and airspeed +/- 10 Knots.
  - Ask student what he or she would do in the event of an engine failure.
  - Fly the pattern in both directions.
7. Return flight
  - Observe student's use of techniques already learned during flight.
  - Answer student's questions about the lesson.
8. Post-flight

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### 9. Post Lesson Debriefing

- Review what was learned and critique students performance of maneuvers with constructive suggestions to improve technique.
- Ask student questions to evaluate understanding of the lesson.
- Answer student questions
- Explain what will be covered in the next lesson and assign reading material.

## Student Actions:

### 1. Pre-lesson briefing

- Ask questions concerning previous lessons and/or this one.

### 2. Pre-flight and flight to practice area

- Perform pre-flight and pre-takeoff procedures using appropriate checklists
- Takeoff and fly to practice area on headings (+/- 15<sup>0</sup>) and at altitudes (+/- 200 ft.) specified by the instructor.

### 3. Turns Around a Point

- Determines the wind direction and speed at the altitude at which the maneuver will be performed.
- Selects an appropriate reference point (tree, silo, etc.) within gliding distance of an emergency landing site around which to perform the maneuver.
- Enters the maneuver downwind at an altitude of 600 to 1,000 ft. AGL at an appropriate distance from the reference point.
- Applies wind drift correction such that the ground track is a constant radius circle around the reference point.
- Maintains altitude +/- 100ft. and airspeed +/- 10 Knots. The maximum bank angle should not exceed 45<sup>0</sup>.
- Performs the maneuver both to the left and to the right.

### 4. S Turns

- Determines the wind direction and speed at the altitude at which the maneuver will be performed.
- Selects a road or railroad track perpendicular to the wind direction over which to perform the maneuver.
- Enters the maneuver downwind between 600 ft. and 1,000 ft. AGL.
- Maintains altitude +/- 100 ft. throughout the maneuver.
- Applies appropriate wind drift correction so the ground track is a constant radius semicircle on each side of the reference line.
- Crosses the reference line wings level perpendicular to the line after each semicircle.

### 5. Tracking a straight line

- Fly parallel (in both directions) to straight road or railroad track that lies perpendicular to the wind direction, crabbing the airplane to compensate for the wind.

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6. Rectangular Pattern
  - Determine wind direction and speed at altitude at which the maneuver will be performed
  - Selects an appropriate reference area within gliding distance of an emergency landing site.
  - Enters the “downwind” leg at a 45° angle.
  - Applies appropriate wind drift correction throughout the maneuver so as to maintain a rectangular ground track around the reference area.
  - Maintains altitude +/- 100 ft. and airspeed +/- 10 Knots.
  - Performs the maneuver using both left and right hand turns.
7. Return flight from practice area
  - Navigate from practice area back to airport.
8. Post-flight procedures
  - Perform post-flight procedures using appropriate checklists.
9. Post-flight debriefing.
  - Ask questions about the lesson.

### Completion Standards:

This lesson will be completed when the student is able to perform the maneuvers within the limits described in *Student Actions*.

### Common Errors:

- Staring at the reference point; failing to scan properly.
- Altitude control; ground shyness.
- Poor coordination; Trying to compensate for errors with the rudder.
- Improper wind-drift correction.

### References:

- Airplane Flying Handbook (FAA-H-8083-3A); Chapter 6
- PRIVATE PILOT – ASEL PTS Area of Operation VI, Tasks A, B, C

### Possible Review Questions:

When performing S-Turns or Turns around a point, the steepest bank angle is needed when the airplane is flying \_\_\_\_\_. Why?

Low altitude maneuvers should be performed within gliding distance of an \_\_\_\_\_ .

When flying a rectangular pattern, the turns from the downwind leg to the base leg will be \_\_\_\_\_ 90°. Why?

When flying a rectangular pattern, the turns from the upwind to the crosswind leg will be \_\_\_\_\_ 90°. Why?