

Instrument Pilot Ground Instruction Lesson Plan

Preflight Preparation – Weather Information

Student: _____ Date: _____

Objectives:

Upon completion of this lesson, the student will:

- Be able to analyze and interpret aviation weather reports and charts and will be able to determine:
 - That a proposed IFR flight can be made safely given the weather conditions along the route.
 - Whether or not an alternate airport must be designated on an IFR flight plan.
 - Whether the weather forecasts at the alternate meet the regulatory requirement.
- It is assumed that the student already possesses at least a private pilot license, and therefore is at least somewhat familiar with the weather forecasting products available. The focus of this lesson, therefore is how to interpret the available information as it pertains to IFR (as opposed to VFR) flight.

Elements:

- Sources of weather information (official and unofficial)
- Area Forecasts
- Terminal Aerodrome Forecasts (TAF)
- Aviation Routine Weather Report (METAR)
- METAR/TAF Code interpretation
- AIRMETs, SIGMETs, Convective SIGMETs, Center Weather Advisories
- Weather Charts (Prognostic, Radar Summary, Surface Analysis, etc.)
- Pilot Reports
- Pilot judgement and decision making

Schedule:

• Pre-lesson briefing	00:05
• Review of available weather forecast products	00:10
• Discuss how to determine whether the flight can be made safely	00:10
– Icing possibilities	
– Convective activity	
– Turbulence	
– Personal Minimums and Go/No-go decision making	
• Discuss conditions that determine the need for an alternate	00:10
– When is an alternate needed	
– What weather conditions are required at the selected alternate	
– Is the weather at the selected alternate likely to be satisfactory	
• Analysis of current forecast products	00:20
• In-flight weather information sources	00:05
• Obtain and discuss weather briefing from Flight Service	00:15
• Make a Go/No-go decision; discuss rationale for decision	00:05
• Review of lessons learned/questions and answers	00:10
Total:	01:30

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Equipment:

- Printed weather forecast products (METAR, TAF, Area Forecast, Radar Summary Chart, Prognostic Charts, Surface Analysis Chart, Convective Outlook Chart, etc.).
- Telephone
- IFR Weather Briefing Form
- Enroute charts and appropriate approach plates

Instructor Actions:

1. Pre-lesson briefing
 - Present lesson objective and outline of the lesson.
2. Review of available weather forecast products
 - Have the student explain the information contained in and the usefulness of:
 - Area Forecast
 - METARs
 - TAFs
 - AIRMETs
 - SIGMETs
 - Convective SIGMETs
 - Center Weather Advisories
 - Winds and Temperatures Aloft
 - Pilot Reports
 - Surface Analysis Chart
 - Prognostic Charts
 - Radar Summary Chart
 - Answer questions the student might have and correct misconceptions about the products.
3. Discuss how to determine whether the flight can be made safely.
 - Convective activity – What is the probability/possibility of encountering any?
 - Icing Conditions – What is the probability/possibility of encountering any?
 - Moderate to Severe turbulence – Probability/Possibility.
 - Is there any possibility of being able to complete an approach at the destination?
 - Are the forecast conditions at the destination better than the student's personal minimums?
4. Discuss conditions that determine the need for an alternate.
 - From one hour before to one hour after the proposed arrival time, the forecast for the destination must be for ceilings above 2,000 feet and surface visibility better than 2 statute miles, or an alternate must be designated.
 - If the selected alternate airport has a precision (ILS) approach the forecast at the expected arrival time must be for 600 foot (or higher) ceilings and 2 statute miles surface visibility, unless non-standard alternate minimums apply.
 - If the selected alternate airport has only non-precision (VOR, NDB, GPS) approaches the forecast at the expected arrival time must be for 800 foot (or higher) ceilings and 2 statute miles surface visibility, unless non-standard alternate minimums apply.
 - Show examples of airports with non-standard alternate minimums.

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- Discuss factors associated with selecting a good alternate:
 - Is the alternate in the same geographical area and likely to have weather just as poor as the original destination.
 - Are there perhaps some significant geographical features that differentiate the destination from the alternate? For example one is a coastal area, the other is not; Are they separated by higher terrain that would make a difference in the weather.
- 5. Analysis of current forecast products.
 - Demonstrate how to use all of the available information to put together the “big picture” of what will be expected along the route of flight and at the destination and alternate.
- 6. Discuss availability of in-flight weather services:
 - EFAS (Flight Watch)
 - Flight Service
 - HIWAS
- 7. Obtain and discuss weather briefing from Flight Service
 - Have the student call Flight Service to obtain a live briefing for the proposed flight.
 - Discuss how the information obtained from Flight Service agrees with or disagrees with the printed information obtained earlier.
- 8. Make a Go/No-go decision
 - Have the student make a Go/No-go decision for the flight
 - Discuss the student’s rationale for the decision.
- 9. Post Lesson Debriefing
 - Critique student’s rationale for the Go/No-go decision.
 - Review the material covered in the class
 - Answer student questions.
 - Ask student questions to evaluate what was learned.
 - Explain what will be covered in the next lesson and assign reading material.

Student Actions:

1. Pre-lesson briefing
 - Ask for clarification of the lesson objective and outline if necessary.
2. Review of available weather forecast products
 - Explain the purpose and usefulness of each of the printed forecasts products available.
 - Ask for clarification of items not fully understood.
3. Discuss how to determine whether the flight can be made safely.
 - The student will determine the probability/possibility of encountering any convective activity along the proposed route.
 - The student will determine the probability/possibility of encountering any icing along the proposed route.
 - The student will determine the probability/possibility of encountering any moderate or severe along the proposed route
 - The student will determine the probability/possibility of successfully completing an instrument approach at the destination.
 - The student will determine if forecasts at the destination are within his or her personal minimums.

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4. Discuss conditions that determine the need for an alternate.
 - Student will describe the forecast conditions at the destination and determine whether or not an alternate is necessary.
 - Student will describe the forecast conditions at the proposed alternate that determine whether the airport can be designated as an alternate.
5. Analysis of current forecast products.
 - Student and Instructor will discuss how to use all of the available information to put together the “big picture” of what will be expected along the route of flight and at the destination and alternate.
6. Discuss availability of in-flight weather services:
 - EFAS (Flight Watch)
 - Flight Service
 - HIWAS
7. Obtain and discuss weather briefing from Flight Service
 - The student call Flight Service to obtain a live briefing for the proposed flight.
 - The student and instructor will discuss how the information obtained from Flight Service agrees with or disagrees with the printed information obtained earlier.
8. Make a Go/No-go decision
 - The student make a Go/No-go decision for the flight and explain his or her rationale for the decision.
9. Post Lesson Debriefing
 - Ask for clarification of anything that is not fully understood
 - Answer instructors questions to evaluate what was learned.
 - Ask any questions pertaining to the next lesson.

Completion Standards:

This lesson will be completed when the student is able to analyze all available weather information and make a competent Go/No-go decision..

Common Errors:

- Student fails to obtain a full weather briefing or fails to ask the briefer for clarification.
- Student fails to obtain NOTAMs (Local, Distant and FDC).
- Student fails to determine where areas of VFR weather are likely to exist
- Go/No-go decision making flawed

References:

- Pilot’s Handbook of Aeronautical Knowledge (FAA-H-8083-25); Chapters 9 and 10
- Aviation Weather Handbook
- Instrument Procedures Handbook (FAA-H-8261-1A); 2-6 – 2-12
- INSTRUMENT PTS Area of Operation I Task A.

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Possible Review Questions:

Interpret the following METAR:

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KRDG 041454Z AUTO 33007KT 6SM HZ SCT018 BKN025 27/22 A2982 RMK AO2  
SLP100 T02670222 55003 TSNO
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We plan to arrive at Reading, Pa at 1330Z. Do we need to designate an alternate? Why or why not?

We're planning a flight to Allentown, Pa and we were required to designate an alternate. Is Reading an acceptable alternate at 1100Z? Why or why not?

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KRDG 040649Z 040706 VRB04KT P6SM BKN005 BKN015  
TEMPO 0709 3SM BR SCT005 BKN015  
FM0900 VRB03KT 3SM BR BKN005  
TEMPO 0913 1SM BR BKN005  
FM1300 29007KT 5SM HZ SCT010 BKN020  
TEMPO 1315 BKN045 PROB30 1518 3SM TSRA OVC008CB  
FM2000 34015KT P6SM BKN040
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You're planning a flight from Central Jersey Regional (47N) to Richmond, VA (KRIC) shortly after the valid time on the Surface Analysis Chart below. What flight hazards would you be likely to encounter along the way?

