How to teach a Ground Lesson on a Technical Subject

From the *"Flight Instructors Training Manual"* at RealCFI.com

During the CFI check ride, applicants are required to "teach" on a technical subject area (such as navigation, aerodynamics, airport operations etc.) referencing, at a minimum techniques and principles of fundamentals of instruction as outlined in the ACS. The outline below will help cover most of the required Areas of Operations and Elements on FOI.

CFI researches subject and organizes material

- Known to unknown, simple to complex, past to present
- Outline key facts and definitions (rote items used to discuss subject matter)
- Identify critical Concepts
- Develop scenarios that incorporate use of knowledge

References- make list of key references, chapter, and page for items above

Develop quiz questions to help student identify and learn material

Facts and definitions (what questions)
Concepts and process (How and why questions)
Scenarios to put all the information together and use in practical way

Create Lesson Plan

Purpose/Motivation why learning this? What practical application?
Objectives of Lesson -Use ACS and PHAK – see earlier how to develop

- Elements – outline what key items are to be covered
- Materials- teaching aids, forms, tools to needed to complete lesson
- Schedule- how long the lesson will take (everyone wants to know!)

Instructor Actions (Content)

- Notes useful to the instructor about what to cover, in what order
- Student Actions - expect from the student -summarize learning objectives

Conclusion and Evaluation:

- Written Quiz -review homework questions
- Oral questions What for facts/definitions, How and why for concepts
- **Scenario to put it all together- see below**

Completion standards – did we meet objectives? Use ACS as minimum
Risk Assessment and Mitigation

Big Scenario is still presented simply: You are going to take your mother to see your sister in Cedar Rapids Iowa and take her to dinner. Plan a cross country.

The Actual Ground lesson: After all the preparation as described above, then the student or group of students are ready for the lesson. This is a Guided discussion. *The CFI is asking the questions.*

- **Determine the students have the "BIG" picture or organizational structure:**
  - **"**How do you prepare for this Cross Country? Describe the process"

- **Once they have outlined the process, take each component and ask them questions:**
  - How did you pick your way points?
  - How did you get the TC? Then take me through to the CH
  - How did you determine the Altitude? What factors did you consider?
  - Show me how you determined the TAS with the performance charts.
  - How did you calculate Pressure Altitude? What is a standard temperature aloft?
  - Show me how you determined your fuel burn.
  - How would you determine if we needed to divert?
  - If we arrived at our destination and the fuel pumps were inoperative, would we have enough fuel to return?
  - How would you assess if your calculations are reasonable?
  - Let's go through the take off and landing calculations. What factors are affecting them?
  - Let's review the airspace along the route. What are the entry requirements for the controlled airspace along the route including airports? Equipment requirements? Any special use airspace we need to consider?

- **Risk Assessment:** Have them describe the elements of the PAVE check list and how they evaluated, assessed, and mitigated risks. This helps them become familiar with all the available information of the flight and do a risk assessment.

- **The Pilot requirements** would be currency, proficiency, required documents and the IMSAFE check list.

- **Aircraft**- have them describe verifying airworthiness and preflight where they may find broken equipment to deal with

- **enVironment**: good place to use NWCRAFT and complete a navigation log and use the performance charts. You can review their understanding of weather, NOTAMs, aircraft performance, Fuel planning, and possible diversions.

- **External Factors and other items**. Operational pitfalls and pressures.

- **After the preflight planning, get to the actual flight and explore the scenario**

- **Examples Scenarios for a Cross-Country Navigation Lesson Plan:**

- **After student plans XC,** then walk through the scenario starting with how they are going to plan to taxi to runway (runway incursions, hotspots, airport operations, and signage)

- **After simulated take off, provide various scenarios** about airspace, entry requirements, and equipment, how to divert, where to get frequencies, radar services. Look at chart symbols and use chart supplement to get further information or maybe call FSS for weather update at destination.

- **Provide equipment malfunctions** and how to evaluate and possibly divert. Consider loss of oil pressure. , what would you do now? Then this discussion can determine if they understand aircraft systems and lead to partial or complete power loss. Then aerodynamics of glide, drag, lift, stalls, spins etc. can be explored. If power loss, how to divert, enter patterns, pick a field or runway, ADM etc. It can be taken almost anywhere CFI wishes to explore.

- **Arriving at the destination** requires radio comms, pattern entry, maybe wake turbulence scenario as larger aircraft takes off or lands in front of them.

- **Finally, after getting to the FBO**, how did we determine there would be fuel, crew cars, and maintenance services before we left? Now we are staying longer than we thought and it is nighttime.

- **Return flight at night**. How do we prepare to return at night? What are the risks? How to mitigate? Night operations can be explored. Illusions of flight?

- **Aircraft system malfunctions**. On the way back might be a great time to have a low voltage indication and explore aircraft systems or develop headache and sleepiness. Hypoxia? Carbon monoxide? Now what?