

# Aviation Instructor's Handbook (FAA-H-8083-9)

## Chapter 7: Planning Instructional Activity

### Introduction

Susan (learner) and Bill (flight instructor) are flying a lesson scenario which consists of a short cross-country leg to a local airport for some practice landings followed by a return to the home airport located in Class C airspace. While practicing landings at the nontowered airport, Susan notes that the ceiling is lowering, and the crosswind is beginning to increase. In his own mind, Bill is convinced that they can practice landings for another 30 minutes to an hour and still return to home base. However, instead of telling Susan this, while taxiing back after a full stop landing, he first asks her several questions.

- Has the flight situation changed since they left the home field?
- What does she think of the weather situation?
- How can we gain more information?
  - Check with Flight Service by cell phone or on the radio?
  - Stop at the local Fixed Based Operator (FBO) and call back to the home FBO to check on weather?
- Are there other issues?
  - Fuel?
  - Schedule?
- Aircraft equipment (instrument flight rules (IFR)/visual flight rules (VFR)) and pilot capability?

Susan decides that she would be more comfortable returning to the home airport and practicing landings there to stay out of the weather. Although not his plan, it is a good plan based on accurate situational awareness and good risk management skills, so Bill agrees. Susan is now beginning to gain confidence by practicing her judgment and decision-making skills. In the postflight critique, Susan leads a discussion of this and other decisions she has made in order to learn more about understanding hazards and mitigating risk.

In the past, the aviation instructor was a capable pilot or aviation technician with a general understanding of basic teaching methods and techniques. Currently, the Federal Aviation Administration (FAA) places greater emphasis on the instructor's role and skill as a teacher and mentor. The instructor should understand how to create and use lesson objectives and lesson plans. The instructor should know how to assess learning and motivate learners through proper feedback and by setting a good example. The learning that takes place is a direct result of the instructor's active lesson preparation, delivery, observation, and assessment.

Historically, aviation instruction focused on the performance of specific procedures and/or maneuvers, and measured learning with objective standards. Changing technology and innovations in learning provide today's aviation instructors with the opportunity to use new methods and teach to new standards. One of these methods, introduced in Chapter 5, The Teaching Process, is scenario-based training (SBT). While SBT is an integral component of today's aviation training, the instructor is crucial to its implementation. By emphasizing SBT, the instructor functions in the learning environment as an advisor and guide for the learner.

This chapter reviews the planning required by the professional aviation instructor as it relates to four key topics—course of training, blocks of learning, training syllabus, and lesson plans. It also explains how to integrate SBT, aeronautical decision-making (ADM), and risk management into the aviation training lesson.

### Course of Training

Whatever the method of teaching, the key to developing well-planned and organized aviation instruction includes using lesson plans and a training syllabus that meet all regulatory certification requirements. Much of the basic planning necessary for the flight instructor and maintenance instructor is provided by the knowledge and proficiency requirements published in Title 14 of the Code of Federal Regulations (14 CFR) parts 61 and 65, approved school syllabi, and the various texts, manuals, and training courses available.

As discussed in Chapter 5, The Teaching Process, a course of training is a series of studies leading to attainment of a specific goal such as a certificate of completion, graduation, or an academic degree. An instructor plans instructional content around the course of training by determining the objectives and standards, which in turn determine individual lesson plans, test items, and levels of learning. For a complete discussion of these items, see Chapter 5.

## Blocks of Learning

After the overall training objectives have been established, the next step is the identification of the blocks of learning which constitute the necessary parts of the total objective. Just as in building a pyramid, some blocks are submerged in the structure and never appear on the surface, but each is an integral and necessary part of the structure. Thus, the various blocks are not isolated subjects, but essential parts of the whole. During the process of identifying the blocks of learning to be assembled for the proposed training activity, the instructor should also examine each block to ensure it is an integral part of the structure. Extraneous blocks of instruction are expensive frills, especially in-flight instruction, and detract from, rather than assist in, the completion of the final objective.

While determining the overall training objectives is a necessary first step in the planning process, early identification of the foundation blocks of learning is also essential. Training for any such complicated and involved task as piloting or maintaining an aircraft requires the development and assembly of many segments or blocks of learning in their proper relationships. In this way, a learner can master the segments or blocks individually and can progressively combine these with other related segments until their sum meets the overall training objectives.

The blocks of learning identified during the planning and management of a training activity should be fairly consistent in scope. They should represent units of learning which can be measured and evaluated—not a sequence of periods of instruction. For example, the flight training of a private pilot might be divided into the following major blocks: achievement of the knowledge and skills necessary for solo, the knowledge and skills necessary for solo cross-country flight, and the knowledge and skills appropriate for obtaining a private pilot certificate. [Figure 7-1]



**Figure 7-1.** *The presolo stage or phase of private pilot training is comprised of several basic building blocks. These blocks of learning, which should include coordinated ground and flight training, lead up to the first solo.*

Use of the building block approach provides the learner with a boost in self-confidence. This normally occurs each time a block is completed. Otherwise, an overall goal, such as earning a mechanic's certificate, may seem unobtainable. If the larger blocks are broken down into smaller blocks of instruction, each on its own is more manageable. Humans learn from the simple to the complex. For example, a learner pilot should understand and master the technique of a normal landing prior to being introduced to short-field and soft-field landings. A helicopter pilot should be proficient in running landings before the instructor introduces a no hydraulics approach and landing.

By becoming familiar with the learner's aviation background, an instructor can plan the sequence of instruction blocks. Does the applicant have previous aeronautical experience or possess a pilot certificate in another category? This information will help the instructor design appropriate training blocks. For example, if the learner is a helicopter pilot who is transitioning to an airplane, he or she will understand speed control, but not necessarily know how to achieve it in an airplane. The instructor can plan blocks of instruction that build on what the learner already knows.

## Training Syllabus

Instructors need a practical guide to help them make sure the training is accomplished in a logical sequence and that all of the requirements are completed and properly documented. A well organized, comprehensive syllabus can fulfill these needs.

### Syllabus Format and Content

The format and organization of the syllabus may vary, but it always should be in the form of an abstract or digest of the course of training. It should contain blocks of learning to be completed in the most efficient order. Since a syllabus is intended to be a summary of a course of training, it should be fairly brief, yet comprehensive enough to cover essential information. This information is usually presented in an outline format with lesson-by-lesson coverage. Some syllabi include tables to show recommended training time for each lesson, as well as the overall minimum time requirements. [Figure 7-2]

While many instructors may develop their own training syllabi, there are many well-designed commercial products that may be used. These are found in various training manuals, approved school syllabi, and other publications available from industry.

Syllabi developed for approved flight schools contain specific information that is outlined in 14 CFR parts 141 and 142. In contrast, syllabi designed for training in other than approved schools may not provide certain details such as enrollment prerequisites, planned completion times, and descriptions of checks and tests to measure learner accomplishments for each stage of training.

Since effective training relies on organized blocks of learning, all syllabi should stress well-defined objectives and standards for each lesson. Appropriate objectives and standards should be established for the overall course, the separate ground and flight segments, and for each stage of training. Other details may be added to a syllabus in order to explain how to use it and describe the pertinent training and reference materials. Examples of the training and reference materials include textbooks, websites, video, compact discs, exams, briefings, and instructional guides.

### How to Use a Training Syllabus

Any practical training syllabus needs to be flexible and should be used primarily as a guide. Under 14 CFR part 61, the order of training can and should be altered to suit the progress of the learner and the demands of special circumstances. For example, previous experience or different rates of learning often require some alteration or repetition to fit individual learners. The syllabus should also be flexible enough so it can be adapted to weather variations, aircraft availability, and scheduling changes without disrupting the teaching process or completely suspending training.

When departing from the order prescribed by the syllabus, however, it is the responsibility of the instructor to consider how the relationships of the blocks of learning are affected. For example, if the learner is having a difficult time with normal approaches and landings, the instructor might decide to delay adding short-field landings, which were originally to be the next step in his block of instruction. To prevent the learner from becoming frustrated with his or her poor landing technique, the instructor may choose to review the block on slow flight, which offers the learner a chance to do well and regain confidence. This exercise also builds the skills necessary for the learner to master approaches and normal landings.

Each approved training course provided by a certificated aviation school should be conducted in accordance with a training syllabus specifically approved by the FAA. At certificated schools, the syllabus is a key part of the training course outline. The instructional facilities, airport, aircraft, and instructor personnel support the course of training specified in the syllabus. Compliance with the appropriate, approved syllabus is a condition for graduation from such courses. Therefore, effective use of a syllabus necessitates that it be referred to throughout the entire course of training. Both the instructor and the learner should have a copy of the approved syllabus. However, as previously mentioned, adherence to a syllabus should not be so stringent that it becomes inflexible or unchangeable. It should be flexible enough to adapt to the special needs of individual learners.

Ground training lessons and classroom lectures concentrate on the cognitive domain of learning. A typical lesson might include defining, labeling, or listing what the learner understands so far. Many of the knowledge areas are directly or indirectly concerned with safety, ADM, and judgment. Since these subjects are associated with the affective domain of learning (emotion), instructors who find a way to stress safety, ADM, and judgment, along with the traditional aviation subjects, can favorably influence a learner's attitude, beliefs, and values.

## LESSON OBJECTIVES

- Learn important safety of flight considerations.
- Become thoroughly familiar with airports, including marking and lighting aids.
- Learn the significance of airspace divisions and how to use the radio for communications.
- Understand the capabilities and use of radar and other ATC services.

## CONTENT

Introduce:

### Section A—Safety of Flight

- Visual Scanning
- Collision Avoidance Precautions
- Blind Spots and Aircraft Design
- Right-of-Way Rules
- Minimum Safe Altitudes
- VFR Cruising Altitudes
- Special Safety Considerations

### Section B—Airports

- Towered and Nontowered Airports
- Runway and Taxiway Markings
- Airport Signs
- Wind Direction Indicators
- Segmented Circle
- Noise Abatement Procedures
- Airport Lighting

### Section C—Airspace

- Cloud Clearance and Visibility
- Special Use and Other Airspace Areas

### Section D—Radio Communications

- VHF Communications Equipment
- Coordinated Universal Time
- Radio Procedures
- Common Traffic Advisory Frequency
- Flight Service Stations

### Section E—Radar and ATC Services

- Radar
- Transponder
- FAA Radar Systems

## COMPLETION STANDARDS

The learner will complete Private Pilot Exercises 2A, 2B, 2C, 2D, and 2E with a minimum passing score of 80%. The instructor will review each incorrect response to ensure understanding before the learner progresses to Ground Lesson 3.

**Figure 7-2.** This excerpt of a ground lesson shows a unit of ground instruction. In this example, neither the time nor the number of ground training periods to be devoted to the lesson is specified. The lesson should include three parts—objective, content, and completion standards.

Flight training lessons or aviation technical lab sessions also include knowledge areas, but they generally emphasize the psychomotor domain of learning because the learner is “doing” something. The lesson plan shown in *Figure 7-3* shows the main elements of a ground lesson for a flight learner. The affective domain of learning is also important in this type of training; a learner’s attitude toward safety, ADM, and judgment, should be a major concern of the instructor.

## Dual—Local (1.0)

Note: A view-limiting device is required for 0.2 hours of dual instrument time allocated to Flight Lesson 4.

## LESSON OBJECTIVES

- ✔ Practice the maneuvers listed for review to gain additional proficiency and demonstrate the ability to recognize and recover from stalls.
- ✔ The learner will also receive instruction and practice in the maneuvers and procedures listed for introduction, including emergency operations and additional practice of airplane control by instrument reference (IR).
- ✔ Instructor may demonstrate secondary, accelerated maneuver, crossed control, and elevator trim stalls.
- ✔ Emphasis will be on procedures related to airport operations, steep turns, slow flight, stalls, and stall recovery.

## CONTENT

Introduce:

- ☐ Systems and Equipment Malfunctions
- ☐ Emergency Procedures
- ☐ Emergency Descent
- ☐ Emergency Approach and Landing
- ☐ Emergency Equipment and Survival Gear
- ☐ Climbing and Descending Turns (VR)(IR)

Review:

- ☐ Airport and Runway Markings and Lighting
- ☐ Airspeed and Configuration Changes
- ☐ Flight at Approach Speed
- ☐ Flight at Various Airspeeds From Cruise to Slow Flight
- ☐ Maneuvering During Slow Flight
- ☐ Power-Off Stalls
- ☐ Power-On Stalls
- ☐ Normal Takeoffs and Landings
- ☐ Collision Avoidance Precautions
- ☐ Traffic Patterns

## COMPLETION STANDARDS

- ✔ Displays increased proficiency in coordinated airplane attitude control during basic maneuvers.
- ✔ Performs unassisted takeoffs.
- ✔ Demonstrates correct communications and traffic pattern procedures.
- ✔ Completes landings with instructor assistance.
- ✔ Demonstrates basic understanding of steep turns, slow flight, stalls, stall recovery, and emergency operations.
- ✔ Completes demonstrated stalls.
- ✔ Indicates basic understanding of airplane control by use of the flight instruments.

**Figure 7-3.** A flight training lesson, like a ground training lesson, should include an objective, content, and completion standards. More than one objective could, and often does, apply to a single flight lesson.

The flight training syllabus should include Risk Management instruction unique to each stage, phase, or training element to help the learner identify the risks involved and employ strategies to mitigate them. Throughout the learner's training scenarios the instructor should include increasingly more subtle risks so that the learner becomes more skilled in identifying them and able to develop effective mitigation strategies. The aviation technician syllabus should also emphasize what constitutes unsafe practices, such as the ease of introducing foreign object damage (FOD) to an aircraft when the location of tools is not monitored.

A syllabus may include several other items that add to or clarify the objective, content, or standards. A lesson may specify the recommended class time, reference or study materials, recommended sequence of training, and study assignment for the next lesson. Both ground and flight lessons may have explanatory information notes added to specific lessons. [Figure 7-4]

**Typical syllabus notes**

-  Learners should read Chapter 1 of the textbook prior to Ground Lesson 1.
-  All preflight duties and procedures will be performed and evaluated prior to each flight. Therefore, they will not appear in the content outlines.
-  The notation “VR” or “IR” is used to indicate maneuvers which should be performed by both visual references and instrument references during the conduct of integrated flight instruction.
-  A view-limiting device is required for the 0.2 hours of dual instrument time allocated to Flight Lesson 4.
-  The demonstrated stalls are not a proficiency requirement for private pilot certification. The purpose of the demonstrations is to help the learner learn how to recognize, prevent, and if necessary, recover before the stall develops into a spin. These stalls should not be practiced without a qualified flight instructor. In addition, some stalls may be prohibited in some airplanes.

**Figure 7-4.** Information in the form of notes may be added to individual ground or flight lessons in a syllabus when they are necessary.

While a syllabus is designed to provide a road map showing how to accomplish the overall objective of a course of training, it may be useful for other purposes. As already mentioned, it can be used as a checklist to ensure that required training has successfully been completed. Thus, a syllabus can be an effective tool for recordkeeping. Enhanced syllabi, which also are designed for recordkeeping, can be very beneficial to the independent instructor.

This recordkeeping function is usually facilitated by boxes or blank spaces adjacent to the knowledge areas, procedures, or maneuvers in a lesson. Most syllabi introduce each procedure or maneuver in one lesson and review them in subsequent lessons. Some syllabi also include provisions for grading learner performance and recording both ground and flight training time. Accurate recordkeeping is necessary to keep both the learner and the instructor informed on the status of training. These records also serve as a basis for endorsements and recommendations for knowledge and practical tests. Some training syllabi or records may include coded numbers or letters for other instructors to record their evaluation of a learner’s progress and knowledge or skill level. [Figure 7-5]

| FLIGHT INSTRUCTION LOG (GLIDER)             |                           |   |   |   |             |   |   |   |   |   |    |    |    |    |    |    |    |
|---|---------------------------|---|---|---|-------------|---|---|---|---|---|----|----|----|----|----|----|----|
| Learner:                                    |                           |   |   |   | Instructor: |   |   |   |   |   |    |    |    |    |    |    |    |
|   | Flight Number             | 1 | 2 | 3 | 4           | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 |
|   | Lesson Number             |   |   |   |             |   |   |   |   |   |    |    |    |    |    |    |    |
| Glider Assembly                             |                           |   |   |   |             |   |   |   |   |   |    |    |    |    |    |    |    |
| Preflight Inspection                        |                           |   |   |   |             |   |   |   |   |   |    |    |    |    |    |    |    |
| Ground Handling                             |                           |   |   |   |             |   |   |   |   |   |    |    |    |    |    |    |    |
| Takeoff (Normal)                            |                           |   |   |   |             |   |   |   |   |   |    |    |    |    |    |    |    |
| Crosswind Takeoff                           |                           |   |   |   |             |   |   |   |   |   |    |    |    |    |    |    |    |
| Tow (High-Tow & Low-Tow)                    |                           |   |   |   |             |   |   |   |   |   |    |    |    |    |    |    |    |
| Boxing the Wake                             |                           |   |   |   |             |   |   |   |   |   |    |    |    |    |    |    |    |
| Slack Line Recovery                         |                           |   |   |   |             |   |   |   |   |   |    |    |    |    |    |    |    |
| Straight Glides                             |                           |   |   |   |             |   |   |   |   |   |    |    |    |    |    |    |    |
| Turns (Shallow & Medium)                    |                           |   |   |   |             |   |   |   |   |   |    |    |    |    |    |    |    |
| Steep Turns (50 to 60 Degrees of Bank)      |                           |   |   |   |             |   |   |   |   |   |    |    |    |    |    |    |    |
| Slow Flight & Minimum Controllable Airspeed |                           |   |   |   |             |   |   |   |   |   |    |    |    |    |    |    |    |
| Straight-Ahead Stalls                       |                           |   |   |   |             |   |   |   |   |   |    |    |    |    |    |    |    |
| Turning Stalls                              |                           |   |   |   |             |   |   |   |   |   |    |    |    |    |    |    |    |
| Accelerated Stalls                          |                           |   |   |   |             |   |   |   |   |   |    |    |    |    |    |    |    |
| Spin Recovery                               |                           |   |   |   |             |   |   |   |   |   |    |    |    |    |    |    |    |
| Traffic Pattern                             |                           |   |   |   |             |   |   |   |   |   |    |    |    |    |    |    |    |
| Use of Spoilers                             |                           |   |   |   |             |   |   |   |   |   |    |    |    |    |    |    |    |
| Forward Slips (With & Without Spoilers)     |                           |   |   |   |             |   |   |   |   |   |    |    |    |    |    |    |    |
| Landings (Normal)                           |                           |   |   |   |             |   |   |   |   |   |    |    |    |    |    |    |    |
| Crosswind Landings (Simulated)              |                           |   |   |   |             |   |   |   |   |   |    |    |    |    |    |    |    |
| Off-Airport Landings (Simulated)            |                           |   |   |   |             |   |   |   |   |   |    |    |    |    |    |    |    |
| Airspeed Control                            |                           |   |   |   |             |   |   |   |   |   |    |    |    |    |    |    |    |
| Vigilance & Collision Avoidance             |                           |   |   |   |             |   |   |   |   |   |    |    |    |    |    |    |    |
| Judgment                                    |                           |   |   |   |             |   |   |   |   |   |    |    |    |    |    |    |    |
| Use of Checklists                           |                           |   |   |   |             |   |   |   |   |   |    |    |    |    |    |    |    |
|   | Flight Time (This flight) |   |   |   |             |   |   |   |   |   |    |    |    |    |    |    |    |
|   | Total Flight Time         |   |   |   |             |   |   |   |   |   |    |    |    |    |    |    |    |

**Figure 7-5.** *Glider training log.*

Another benefit of using a syllabus is that it helps in the development of lesson plans. A well-constructed syllabus already contains much of the essential information that is required in a lesson plan, including objectives, content, and completion standards.

## Lesson Plans

A lesson plan is an organized outline for a single instructional period. It is a necessary guide for the instructor because it tells what to do, in what order to do it, and what procedure to use in teaching the material of a lesson. Lesson plans should be prepared for each training period and be developed to show specific knowledge and/or skills to be taught.

A mental outline of a lesson is not a lesson plan. A lesson plan should be put into writing. Another instructor should be able to take the lesson plan and know what to do in conducting the same period of instruction. Written out, the lesson plan can be analyzed for adequacy and completeness.

Lesson plans make excellent recordkeeping forms that can become a permanent part of a pilot's training record. They can be formatted for the instructor to carry in the aircraft and include a checklist for indicating what portions of the lesson were completed, date of completion, the flight instructor's signature, and time flown. The lesson plan can also have a notation section for flight instructor comments.

A training folder for each learner helps an instructor keep all pertinent data in one place. The folder should include items such as lesson plans, training requirements, flight or ground instruction received, 14 CFR part 61 requirements met, solo endorsements, and any other training information. Many training records are now recorded and maintained electronically. These records should be kept for at least 3 years. Good recordkeeping also provides each instructor with the number of learners he or she has trained, which is helpful information for an instructor who needs to renew his or her certificate.

### **Purpose of the Lesson Plan**

Lesson plans are designed to assure that each learner receives the best possible instruction under the existing conditions. Lesson plans help instructors keep a constant check on their own activity, as well as that of their learners. The development of lesson plans by instructors signifies, in effect, that they have taught the lessons to themselves prior to attempting to teach the lessons to learners. An adequate lesson plan, when properly used, should:

- Assure a wise selection of material and the elimination of unimportant details.
- Make certain that due consideration is given to each part of the lesson.
- Aid the instructor in presenting the material in a suitable sequence for efficient learning.
- Provide an outline of the teaching procedure to be used.
- Serve as a means of relating the lesson to the objectives of the course of training.
- Give the inexperienced instructor confidence.
- Promote uniformity of instruction regardless of the instructor or the date on which the lesson is given.

### **Characteristics of a Well-Planned Lesson**

The quality of planning affects the quality of results. Successful professionals understand that the price of excellence is hard work and thorough preparation. The effective instructor realizes that the time and energy spent in planning and preparing each lesson is well worth the effort in the long run.

A complete cycle of planning usually includes several steps. After the objective is determined, the instructor researches the subject as it is defined by the objective. Once the research is complete, the instructor determines the method of instruction and identifies a useful lesson planning format. The decision of how to organize the lesson and the selection of suitable support material come next. The final steps include assembling training aids and writing the lesson plan outline. One technique for writing the lesson plan outline is to prepare the beginning and ending first. Then, complete the outline and revise as required. A lesson plan should be a working document that can and should be revised as changes occur or are needed.

The following are some of the important characteristics that should be reflected in all well-planned lessons.

**Unity**—each lesson should be a unified segment of instruction. A lesson is concerned with certain limited objectives, which are stated in terms of desired learning outcomes. All teaching procedures and materials should be selected to attain these objectives.

**Content**—each lesson should contain new material. However, the new facts, principles, procedures, or skills should be related to the lesson previously presented. A short review of earlier lessons is usually necessary, particularly in-flight training.

**Scope**—each lesson should be reasonable in scope. A person can master only a few principles or skills at a time, the number depending on complexity. Presenting too much material in a lesson results in confusion; presenting too little material results in inefficiency.

**Practicality**—each lesson should be planned in terms of the conditions under which the training is to be conducted. Lesson plans conducted in an airplane or ground trainer will differ from those conducted in a classroom. Also, the kinds and quantities of instructional aids available have a great influence on lesson planning and instructional procedures.

**Flexibility**—although the lesson plan provides an outline and sequence for the training to be conducted, a degree of flexibility should be incorporated. For example, the outline of content may include blank spaces for add-on material, if required.

Relation to course of training—each lesson should be planned and taught so that its relation to the course objectives is clear to each learner. For example, a lesson on short-field takeoffs and landings should be related to both the certification and safety objectives of the course of training.

Instructional steps—every lesson, when adequately developed, falls logically into the four steps of the teaching process: preparation, presentation, application, and review and evaluation.

### **How to Use a Lesson Plan Properly**

Be familiar with the lesson plan. The instructor should study each step of the plan and should be thoroughly familiar with as much information related to the subject as possible.

Use the lesson plan as a guide. The lesson plan is an outline for conducting an instructional period. It assures that pertinent materials are at hand and that the presentation is accomplished with order and unity. Having a plan prevents the instructor from getting off track, omitting essential points, and introducing irrelevant material. Learners have a right to expect an instructor to give the same attention to teaching that they give to learning. The most certain means of achieving teaching success is to have a carefully reviewed lesson plan.

Adapt the lesson plan to the class or learner. In teaching a class, the instructor may find that the procedures outlined in the lesson plan are not leading to the desired results. In this situation, the instructor should change the approach. There is no certain way of predicting the reactions of different groups of learners. An approach that has been successful with one group may not be equally successful with another.

A lesson plan for an instructional flight period should be appropriate to the background, flight experience, and ability of the particular learner. A lesson plan may have to be modified considerably during flight, due to deficiencies in the learner's knowledge or poor mastery of elements essential to the effective completion of the lesson. In some cases, the entire lesson plan may have to be abandoned in favor of review.

Revise the lesson plan periodically. After a lesson plan has been prepared for a training period, a continuous revision may be necessary. This is true for a number of reasons such as availability or non-availability of instructional aids, changes in regulations, or new manuals and textbooks.

### **Lesson Plan Formats**

The format and style of a lesson plan depends on several factors. Certainly, the subject matter helps determine how a lesson is presented and what teaching method is used. Individual lesson plans may be quite simple for one-on-one training, or they may be elaborate and complicated for large, structured classroom lessons. Preferably, each lesson should have somewhat limited objectives that are achievable within a reasonable period of time. This principle should apply to both ground and flight training. However, as previously noted, aviation training is not simple. It involves all three domains of learning, and the objectives usually include the higher levels of learning, at least at the application level.

In spite of need for varied subject coverage, diverse teaching methods, and relatively high-level learning objectives, most aviation lesson plans have the common characteristics already discussed. All should include objectives, content to support the objectives, and completion standards. Various authorities often divide the main headings into several subheadings; terminology, even for the main headings, varies extensively. For example, completion standards may be called assessment, review and feedback, performance evaluation, or some other related term.

Commercially developed lesson plans are acceptable for most training situations, including use by flight instructor applicants during their practical tests. However, all instructors should recognize that even well-designed preprinted lesson plans may need to be modified. Therefore, instructors are encouraged to use creativity when adapting preprinted lesson plans or when developing their own lesson plans for specific learners or training circumstances.

In the traditional lesson plan illustrated by *Figure 7-6*, the objective is “The learner will learn to control for wind drift.” According to the plan, the instructor reviews topics already covered including heading, speed, angle of bank, altitude, terrain, and wind direction plus velocity. This explanation is followed by a demonstration and repeated practice of a specific flight maneuver, such as turns around a point or S-turns across the road until the maneuver can be consistently accomplished in a safe and effective manner within a specified limit of heading, altitude, and airspeed. At the end of this lesson, the learner is only capable of practicing the maneuver with assistance from the instructor.

The traditional type of training lesson plan with its focus on the task and maneuver or procedure continues to meet many aviation learning requirements, but as discussed earlier in the chapter, it is being augmented by more realistic and fluid forms of problem-based learning such as SBT. For the flight instructor, this type of training does not preclude traditional maneuver-based training. Rather, flight maneuvers are integrated into the flight scenarios and conducted as they would occur in the real world. Those maneuvers requiring repetition are still taught during concentrated settings; once learned, they are then integrated into realistic flight situations.

For the aviation technician instructor, SBT enhances traditional classroom instruction. By integrating SBT into the lesson, learners are required to deal with problems they will encounter in the real world.

## Traditional Lesson Plan

### LESSON OBJECTIVE

The learner will learn to control for wind drift.

### COMPLETION STANDARDS

The learner will demonstrate the ability to consistently control for wind drift in a safe and effective manner within a specified limit of heading, altitude, and airspeed.

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### CONTENT

Preflight Discussion:

- ✔ Lesson objective and completion standards
- ✔ Normal checklist procedures
- ✔ Weather analysis

Review:

- ✔ Heading
- ✔ Speed
- ✔ Angle of bank
- ✔ Altitude
- ✔ Terrain
- ✔ Wind direction plus velocity

Introduction:

- ✔ Aerodynamics Demonstration
  - i. Turns around a point
  - ii. S-turns across a road

Postflight Discussion:

- ✔ Critique learner performance, preview next lesson, and give study assignment

Figure 7-6. Example of a traditional training lesson plan.

## Scenario-Based Training (SBT)

Improper pilot decisions cause a significant percentage of all accidents and the majority of fatal accidents in light single- and twin-engine aircraft. The goal of SBT is to challenge the learner or transitioning pilot with a variety of flight scenarios to improve decision-making skills. These scenarios train the pilot to manage the resources available in the flight deck, consider hazards, exercise sound judgment, and make timely decisions that promote safety.

As defined in Chapter 5, SBT is a training method that uses a highly structured script of real world experiences to address aviation training objectives in an operational environment. Such training can include initial training, transition training, upgrade training, recurrent training, and special training. Since humans develop cognitive skills through active interaction with the world, an effective aviation instructor uses the maneuver- or procedure-based approach but presents the objectives in a scenario situation.

Although some flight instructors have used the SBT approach as a teaching method for many years, the current emphasis on SBT in aviation training reflects education research that shows learning is more effective when participants are actively involved in the learning process.

Single-Pilot Resource Management (SRM) requires the learner or transitioning pilot to practice the decision-making process in real-world situations. It combines traditional task and maneuver-based training with SBT to enhance ADM, risk management, and SRM skills without compromising basic aeronautical skills. Instead of training pilots to pass practical tests, this program focuses on expertly managed real-world challenges.

## **Duties, Responsibilities, and Authority of the Aviation Instructor**

The duties, responsibilities, and authority of the aviation instructor include the following:

1. Orient new learners to the SBT approach.
2. Help the learner become a confident planner and a critical self-evaluator of performance.
3. Help the learner understand the knowledge requirements present in real world applications.
4. Diagnose learning difficulties and help the individual overcome them.
5. Evaluate learner progress and maintain appropriate records.
6. Provide continuous review of learning.

The aviation instructor is the key to the success of SBT. Remember, the overall learning objective is for the learner to be ready to exercise sound judgment and make good decisions. For example, the flight instructor should be ready to turn the responsibility for planning and execution of the flight over to the learner as soon as possible. The flight instructor continues to demonstrate and instruct skill maneuvers in the traditional manner; but, when the learner begins to make decisions, the flight instructor should revert to the role of mentor and learning facilitator.

## **SBT Lesson Plan**

The SBT lesson plan differs from the traditional lesson plan. *[Figure 7-7]* In this example, the instructor pilot tells the learner to plan for arrival at a specific nontowered airport. The planning should take into consideration the possible wind conditions, arrival paths, airport information and communication procedures, available runways, recommended traffic patterns, courses of action, and preparation for unexpected situations. Upon arrival at the airport, the learner makes decisions (with guidance and feedback, as necessary) to safely enter and fly the traffic pattern. This is followed by a discussion of what was done, why it was done, the consequences, other possible courses of action, and how it applies to other airports. In contrast to the learner who trained under the traditional lesson plan, the learner who trains under the SBT format is not only capable of a specific flight maneuver, he or she is now capable of detailing a safe arrival at any nontowered airport in a variety of wind condition.

## **Pre-Scenario Planning**

For SBT instruction to be effective, it is vital that the aviation instructor and learner establish the following information:

Flight scenario:

- Scenario destination(s)
- Desired learning outcomes
- Desired level of learner performance
- Possible inflight scenario changes

Nonflight scenario:

- Narrative of the task goal
- Desired learning outcomes
- Desired level of learner performance
- Possible scenario changes

## Scenario-Based Training Lesson Plan

### Type of Training

Initial

### Maneuver or Training Objective

Plan for arrival at a specific nontowered airport.

### Scenario

Prepare to fly to the Enterprise Municipal Airport (EDN) in order to visit the Army Aviation Museum at Fort Rucker.

### Completion Standards

The learner is capable of explaining the safe arrival at any nontowered airport in any wind condition.

### Possible Hazards or Considerations

- Ground-based obstructions/hazards
- Wind conditions
- Visibility/ceiling
- Engine-out procedures
- Airport traffic

### Mitigation Strategies and Resources

(Every hazard or consideration should be addressed through the use of some mitigating strategy or resource. Those provided below serve only as an example to illustrate the system safety methodology.)

#### Ground-based obstructions/hazards:

The instructor and learner will review all available resources, including sectional/terminal area charts, A/FD, and Notices To Airmen (NOTAMs). Using aircraft performance data found in the POH/FM, the potential impact of any obstructions or hazards during departure, en route, and arrival will be assessed and a strategy developed to address any concerns.

#### Wind conditions:

The instructor and learner will use the aircraft POH/FM and assess the runway environment prior to making a determination. This would also be an excellent catalyst for a discussion of personal minimums and any additional training requirements.

#### Visibility/ceiling:

The instructor and learner will discuss the impact of visibility/ceiling as it relates to departure, en route, and landing at a nontowered airport in various wind conditions. For example, if circumstances demand the conduct of a circling approach under marginal VFR conditions, does the learner have the confidence and proficiency to fly a tight pattern while managing airspeed, aircraft coordination, etc? Under such circumstances, would it be more desirable to conduct a straight-in approach with a slight tailwind (if that is even an option)? How much wind would be too much? What other variables/options should be considered (perhaps a diversion to a more suitable airport)?

#### Engine-out procedures:

Should an engine fail or partial loss of power occur, the learner and instructor should discuss and simulate in a manner consistent with safety, engine-out procedures as part of a comprehensive training program.

#### Airport traffic:

Traffic at both towered and nontowered airports often necessitates wide variations in landing patterns. While issues stemming from airport traffic may largely be addressed through sound flying technique, the instructor can take an otherwise routine lesson and introduce other risk elements, thus promoting the learner's development of critical decision-making skills.

### Fly the Scenario

#### Postflight Review

This review should include a dialogue between the instructor pilot and the learner or transitioning pilot encompassing the flight scenario. Generally, the instructor pilot should lead the discussion with questions that generate reflective thinking on how the overall flight went. The instructor pilot should use this to assist in evaluating the learner or transitioning pilot's assessment skills, judgment, and decision-making skills. Typically, the discussion should begin with learner self-critique; the instructor pilot enables the learner to solve the problems and draw conclusions. Based on this analysis, the learner and instructor pilot should discuss methods for improvement, even on those items that were considered successful.

**Figure 7-7.** SBT lesson plan.

The aviation industry is moving from traditional knowledge-related learning outcomes to an emphasis on increased internalized learning in which learners assess situations and react appropriately. Enhancement of knowledge and understanding usually accompanies a dynamic learning experience.

Reality is the ultimate learning situation and SBT attempts to get as close as possible to this ideal. It addresses learning that occurs in a context or situation. It is based on the concept of situated cognition, which is the idea that knowledge cannot be known and fully understood independent of its context. In other words, humans learn better from realistic situations where they are counted on to perform.

For example, realistic cross-country flight scenarios planned and executed by the pilot in training with assistance from the flight instructor begin the early development of flight deck management skills, situational awareness, and ADM. Continued engagement by the learner in the planning, executing, and assessment of each scenario reinforces development throughout the training. It is important to remember the learner is responsible for planning the flight scenario from a menu of short cross-country flights developed by the training provider. While the flight instructor will certainly assist the learner in aircraft performance data, weight and balance, and general aircraft layout prior to the first lesson, the sooner the learner assumes these responsibilities, the better the learning environment. The scenario descriptions offered in the FAA generic syllabi are a starting point for the training provider. Scenarios can be tailored for the local weather and terrain conditions and are most effective when they replicate the environment most likely encountered by the learners.

SBT is a compilation of basic learning theory, adult learning concepts, and the best of the traditional aviation training procedures. Above all, it is about learning complex tasks in a realistic environment at a pace and in a structure the individual learner can comprehend and process. [Figure 7-8] Good teaching techniques are still important, but only if they aid in learning. More detailed information about SBT can be found at [www.faa.gov/training\\_testing/training/fits/more/](http://www.faa.gov/training_testing/training/fits/more/).

#### The Main Points To Remember About Scenario-Based Training

- ✦ SBT is situated in a real context and is based on the idea that knowledge cannot be gained and fully integrated independent of its context.
- ✦ SBT accords with a performance improvement and behavior change philosophy of the learning function.
- ✦ SBT is different from traditional instructional design; one must be aware of the differences to successfully employ SBT.
- ✦ Most learning solutions should employ both traditional training and SBT.
- ✦ Traditional learning elements should enhance the SBT elements.
- ✦ It is essential to place boundaries around scenarios to make the transitions between scenarios and traditional learning as efficient as possible.
- ✦ Open-ended qualitative learner feedback is key to successful scenario revision, but revisions should not further complicate the scenario unless highly justified.

**Figure 7-8.** Points to remember about scenario-based training.

## Single-Pilot Resource Management

SRM is the art and science of managing all the resources (both on-board the aircraft and from outside sources) available to a single pilot (prior and during flight) to ensure that the successful outcome of the flight is never in doubt.

The emergence of very light jet (VLJ) aircraft may also affect air travel. [Figure 7-9] Central to their economic success is the concept of single-pilot operations. Since the aircraft is heavily automated, the pilot's workload may actually be less than the current workload in some high performance single-engine aircraft. This allows more time for the pilot to gather and analyze information about weather, winds, landing conditions, fuel state, pilot physical condition, and passenger desires.



**Figure 7-9.** *Very light jet aircraft in flight.*

However, unless the pilot is trained to manage all of these factors and to let the aircraft automation assist, the workload may be very high. SRM training helps the pilot maintain situational awareness by managing the automation and associated aircraft control and navigation tasks. This enables the pilot to accurately assess, manage risk, and make accurate and timely decisions. SBT enhances SRM because SBT helps pilots learn how to gather information, analyze it, and make decisions.

## Chapter Summary

As indicated by this chapter, it is possible to develop well-planned and organized instruction by using a training syllabus and lesson plans that meet all regulatory certification requirements. By identifying and incorporating “blocks of learning” into the teaching of objectives, the instructor can plan lessons that build on prior knowledge. Maneuver and/or procedure training coupled with SBT will help the aviation instructor train professional aviators and technicians who are able to gather and analyze information to aid in making good aeronautical decisions and decrease risk factors, leading to a successful flight or maintenance outcome.

As this training program evolves and new resources are introduced, aviation instructors may access web-based documents such as the generic transition syllabus at [www.faa.gov/](http://www.faa.gov/).