



Skyline Soaring Club, LLC.

Skyline Soaring Club Training Syllabus

2020

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The contents of this syllabus is the result of collaborative efforts of the Certified Flight Instructors for Skyline Soaring Club, Inc; operating out of Front Royal, VA. Feedback or corrections for the *Skyline Soaring Training Syllabus* can be sent to the Chief Flight Instructor, John Noss. john@noss.ws. Feedback is welcome, especially for suggestions on external links.

The training syllabus is a living document. Clubs that use the syllabus are **strongly encouraged** to subscribe to the **Skyline Syllabus Mailing List**. Any updates to the contents of the syllabus are automatically mailed as the changes are made. To subscribe, visit the website <https://skylinesoaring.org/mailman/listinfo/syllabus> . Nobody is permitted to send mail to that mailing list except for the site administrator, and only when updates are made to the training syllabus.

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Syllabus Usage (General)

Transition Pilots

Pilots already possessing an FAA Rating, but for a different category, (such as Airplane, Single Engine Land, Rotorcraft, Lighter-Than-Air, etc.), are *NOT* considered by the FAA as a "student pilot." This pilot is a rated pilot seeking to add a new category rating. However, as far as Skyline Soaring Club's program is concerned, the flight instructors will regard this candidate identically to an unrated student pilot. The transition pilot will be put through the same program that an ab-initio pilot would receive. The transition pilot will probably go through the training program much more quickly, but the Skyline Instructors must verify that the candidate meets or exceeds all of the requirements that a first-solo §61.87 student would before his first solo (including the pre-solo written test). Upon completion of the training program, the transition pilot will receive a §61.31 (c)(3) endorsement, and not a §61.87 endorsement, like a student pilot would.

New Pilots (Starting from Scratch)

The Training Syllabus covers all of the required areas that are specified in 14 CFR §61.87. Each lesson plan is a sample of what is to come. In each lesson plan is a section of required reading. It is understood that the student will have read each of the items in the required reading section before coming to fly with the instructor. Failure to do reading assignments ahead of time is a consistent and reliable indicator of delayed progress. Delayed progress adds unnecessary personal expense to complete the training program.

Syllabus Usage (Skyline Instructors)

Using the On-line Student Progress Report

Skyline Soaring Club stores all of the records about a student's flight training record electronically. There is no need to print the forms at the end of this document, except for reference. After the flight instruction session, the instructor will automatically be notified by e-mail of any recent flights with his students. The instructor will score the flights as appropriate, scoring each section with a score 1 through 3. A score of "1" indicates that the content was introduced. A score of "2" indicates that the student performed the maneuver or procedure. A score of "3" indicates that the candidate has performed the maneuver or procedure to the solo standards stated in the appropriate lesson plan. Scores of "4" are reserved for post-solo students directly training for their Private Pilot Practical Test.

Key:

- Not Covered
- 1 Demonstrated
- 2 Performed
- 3 Solo Proficient
- 4 Rating Proficient
- ! Critical Issue

Flights where there is significant need to address problem areas on the next flight are marked with a red exclamation point. This is not meant as a failure, but rather as an urgent indicator to the next instructor that this is an area that needs focus and attention. Once the instructor completes his report, he will be given an opportunity to write an optional essay describing details of the lesson session.

The completed lesson report is mailed to the Skyline Soaring Club instructors, as well as the student for future review and planning. The student may view his progress page at any time, and get a clear indication of what lesson segments are still required before solo flight is considered.

Syllabus Use (Non-Skyline Instructors)

Using the Training Syllabus on Paper

For non-Skyline instructors, tracking a student's progress can be done by the two forms at the end of this document.

Use the [Training Syllabus Tracking Sheet](#) to keep track of which instructors have signed off a particular section as demonstrated at solo quality. When the student has completed all areas listed as required for solo flight, the instructor and student will sign the end of the document, indicating that all instruction has been given to the satisfaction of the student.

Use the [Flight Progress Tracking Sheet](#) to track individual flights. Multiple copies of these two pages will be necessary to fully document the flight record of the student. At the right-most column of this sheet, indicate the maximum score achieved for each lesson segment. In the following example, Frank Schüler has had a total of 11 flights with 6 different instructors (which can often happen in a club environment). Each instructor gave a score of 1, 2, or 3 depending on the student's progress.

Student Name: *Frank Schiller*

Instructor's Initials		<i>PB</i>	<i>PB</i>	<i>JC</i>	<i>MS</i>	<i>BC</i>	<i>JP</i>	<i>MW</i>	Max
Date of Flights		<i>01/20</i>	<i>01/22</i>	<i>01/28</i>	<i>01/31</i>	<i>02/04</i>	<i>02/10</i>	<i>02/15</i>	—
Number of Flights		<i>2</i>	<i>1</i>	<i>2</i>	<i>2</i>	<i>1</i>	<i>2</i>	<i>1</i>	—
1a	<u>Preflight Planning / Overview</u>	<i>1</i>	<i>-</i>	<i>-</i>	<i>1</i>	<i>2</i>	<i>2</i>	<i>2</i>	<i>2</i>
1b	<u>Aeromedical Factors</u>	<i>1</i>	<i>3</i>	<i>-</i>	<i>-</i>	<i>-</i>	<i>-</i>	<i>-</i>	<i>3</i>
1c	<u>Use of Controls</u>	<i>1</i>	<i>2</i>	<i>2</i>	<i>2</i>	<i>3</i>	<i>3</i>	<i>3</i>	<i>3</i>
1d	<u>Cockpit Familiarization</u>	<i>1</i>	<i>2</i>	<i>3</i>	<i>-</i>	<i>-</i>	<i>3</i>	<i>3</i>	<i>3</i>
1e	<u>Positive Control Check</u>	<i>1</i>	<i>1</i>	<i>2</i>	<i>1</i>	<i>2</i>	<i>3</i>	<i>3</i>	<i>3</i>

Student solo is not permitted until a score of "3" has been documented and achieved for all sections listed as required for solo flight. Refer to the Training Syllabus Tracking Sheet for a list of all sections required for student solo. Once all of the appropriate sections have been demonstrated at the solo proficiency level or higher, both the student and instructor will sign the affirmation statement. This statement can be found at the end of the Training Syllabus Tracking Sheet. This indicates that both the instructor and student have successfully accomplished the full training program, and that it has been completed to their satisfaction. The instructor will keep the original signed document, and prepare a copy for the student to keep for his or her own record keeping.

Using QR Codes




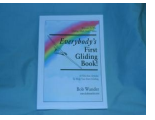
Each section in the printed version of the training syllabus contains a QRcode. The QR code is located in the upper right hand corner of each section of the syllabus (also shown here). These QR codes are included as a convenience for smart-phone equipped instructors or students who are using a printed copy of the syllabus, and are not near an Internet connected computer. While using a smart phone with a QR code reader, the savvy instructor or student can pull up the online copy of that particular page of the syllabus. Use this to follow any hyperlinks or videos that the lesson plan may include.

1a



Materials List

Before or immediately after your first lesson

<p><u>Glider Pilot Logbook</u> Soaring Society of America</p>		<p>Before or immediately after the first lesson, the student must have a Pilot Logbook. The Glider Pilot logbook is generally given to the student as a part of the FAST package. The logbook can also be purchased from the club, or purchased online from the Soaring Society of America for a modest price. Your instructor is required to legibly record any flight and ground instruction in your log book, so it is required to be with you each time you have a lesson at the club.</p>
<p><u>Glider Flying Handbook</u> FAA</p>		<p>This book is published by the Federal Aviation Administration. It is considered public domain. In electronic form, this book is available for free. The FAA publishes the entire book as a low resolution PDF, or as higher resolution versions by each chapter. Get the latest electronic version of the GFH by going to https://www.faa.gov/regulations_policies/handbooks_manuals/aircraft/glider_handbook/.</p> <p>Many of the lesson plans included in this syllabus reference certain pages in this book. You can purchase a copy of this book from the Soaring Society of America for \$29.00.</p>
<p><u>Pilots Handbook of Aeronautical Knowledge</u> FAA</p>		<p>This book is published by the Federal Aviation Administration. It is considered public domain. In electronic form, this book is available for free. This book focuses on flying airplanes. This book is included as a resource for soaring mainly because some key subjects are not adequately covered in the Glider Flying Handbook. It is not recommended that you purchase this book. Lesson plans in this training syllabus that include topics only covered in the Pilot Handbook of Aeronautical Knowledge link directly to the appropriate chapter. You are not expected to purchase this book, but you may find it a handy reference for many topics in aviation.</p>
<p><u>Everybody's First Gliding Book</u> Bob Wander</p>		<p>This book serves as an exciting introduction to soaring. It prepares you for the concepts of how to be a better student, and references many resources outside of the Materials List included in this syllabus. It is available for purchase at the Soaring Society of America, it is a part of the FAST package from the SSA, and also available for purchase from our club.</p>

Pre-Solo Materials

Student Pilot License: As you near your first solo, you will need a student pilot's certificate. If you are already a rated pilot seeking an additional category glider rating, your pilot's license will suffice. Since 1 April 2016, all student pilots must go through a TSA background check. Begin the process for getting a student pilot certificate by signing up with the FAA's Integrated Airman Certification and Rating Application (IACRA) at <https://iacra.faa.gov/IACRA/Default.aspx>.

FAR/AIM As you progress through the training program, it is highly recommended that you own a copy of the FAR/AIM. All of the regulations are online and linked throughout this syllabus, but you should still have the book for ready reference and reading.

- The latest version of the Aeronautical Information Manual is available at: https://www.faa.gov/air_traffic/publications/#manuals
- The FAA Regulations related to obtaining and keeping a pilot certificate are contained in [part 61](#).
- The latest versions of the Federal Regulations related to flight rules are contained in [part 91](#).

Local Sectional Chart You must be familiar with the airspace around our airport. There are some very complicated and dangerous airspaces near to our field, and owning a sectional is an important step toward understanding the airspace and air traffic in our area. You may use on-line sectional tools such as skyvector.com, but you may not use those charts for in-flight navigation. There are two sectional charts for our area. The Washington Sectional covers the airspace to the east and south of our base of operations. The Cincinnati chart covers the areas to the west. These charts can be purchased at our FBO, or on-line. The FAA provides an excellent resource on how to read aeronautical charts in the 12th edition of the [Chart Users Guide](#).

FAA Knowledge Exam Materials

If this is your first pilot rating, or if this is your first pilot rating at the Private Pilot level, you will need to complete a knowledge test, administered by the FAA. If you already have a Private Pilot rating for any powered aircraft, you are not required to pass the FAA knowledge exam for gliders. Please see the FAA's general information about the knowledge tests (<https://www.faa.gov/pilots/testing/>).

It is **strongly** recommended that pilots who are nearing their first solo should have their FAA knowledge test taken and

passed before or immediately following their first solo. Any delays in taking the knowledge test can severely impact the student's progress toward a rating.

There are two paths to passing the knowledge exam. The most effective technique is to enroll in a training course that focuses on the private pilot knowledge exam for gliders. If no such training course exists in your area, you may do a home-study course. If you are going through with the home-study course, please follow these recommended actions.

- Read all of the training materials listed above
 - The FAA GFH
 - The FAR and AIM
- Use a book or software specifically designed for the FAA Knowledge Test
 - Dauntless Software has an [excellent written test preparation program](#) that runs on your iPad, iPhone, or PC computer
 - ASA Test Prep (<http://www.asa2fly.com>), (includes tablet and computer software testing programs)
 - FAA's list of [sample test questions](#), or
 - Glider Pilot Ground School (<http://www.gliderpilotsgroundschool.com/gpgs-faa-exam-books.html>)

Once you have studied the material and are comfortable with the contents, have a Skyline Soaring Club instructor endorse you to take the written test. Find an FAA-approved Testing center with this FAA document: https://www.faa.gov/training_testing/testing/media/test_centers.pdf . Most testing centers usually charge around \$150 to take the written test.

FAA Practical Test Preparation

The practical test is the culmination of all that you have learned during the training process -- both the activity of flying along with the knowledge required by the FAA to be a safe airman. One way to make sure that all topics are covered during the study process is to use a test prep book specifically tailored toward the glider pilot practical test. Bob Wander's 'Made Easy' books cover this very well. There are separate books preparing the [Private Pilot](#) candidate and [Commercial Pilot](#) candidates.

Lesson 1a - Preflight Planning/Overview

1a



Lesson Objective

During this lesson, the student/candidate will become familiar with the preparation required before walking out to the flight line. This includes weather preparation, understanding weather services, go/no decision, required documents for the pilot.

Regulatory Requirement

Pre-Solo pilot (Student Pilot and Transition Pilots): [§61.87\(i\)\(1\)](#)
Private Pilot Test Candidate: [PTS](#) Area of Operation IA, IB

Content

- Collecting information required for this flight
- Weather Information systems
- Required Documents in possession of the pilot

See Also

- Lesson Plan [7g. Special Awareness Training](#)

Completion Standards

When complete, the student will:

- use WX-BRIEF to obtain a weather briefing
- be able to make a go/no-go decision based on weather briefing information
- be able to explain the hazards associated with flight in the vicinity of thunderstorms
- understand the different types of Aviation Weather services, as defined in AC [00-45G](#)
- exhibit knowledge pertaining to required documents when acting as a pilot in command (pilots license, photo ID).

Prerequisite Study

- PPL Practical Test candidates should be familiar with [AC 00-45G Aviation Weather Services](#)
- [Glider Flying Handbook \(2013\) Chapter 9](#) pages 9-21 through 9-25
- [14 CFR §61.3](#) Requirement for certificates, ratings, and authorizations.
- [14 CFR §91.103](#) Preflight action.

Required Homework

- Register as a user on www.1800wxbrief.com (need email address for username)
- Call 1-800-WX-BRIEF and get a standard VFR weather briefing for a local flight at Front Royal for the hours you plan to be flying.

Lesson 1b - Aeromedical Factors Discussion

1b



Lesson Objective

During this lesson, the instructor will have a candid discussion with the student/candidate with regards to Medical, Psychological, and Physiological factors related to safe aviation. Glider pilots are not required to have any medical certifications, but this does not mean that a pilot can fly gliders while under the influences of certain medications or while suffering from certain physiological issues.

The discussion with the instructor **MUST** include a review of illnesses, congenital, acute and chronic; as well as a discussion of the pilot's current medications. This should be done early in the pilot's training program.

Regulatory Requirement

- All pilots: [§61.53](#) Prohibition on operations during medical deficiency.
- Private Pilot Test Candidate: [PTS](#) Area of Operation I(E)

Content

- Altitude and motion sickness
- Prescription and illicit drugs
- Alcohol use
- Hypoxia (*Hypoxic, hypemic, stagnant, histotoxic*)
- Carbon Monoxide poisoning
- Pre-existing medical conditions that make the pilot unfit to fly
- Pre-existing mental conditions that make the pilot unfit to fly
- Anti-Depression Medication
- Effects of absorbed gasses when scuba diving.

Completion Standards

When complete, the student will:

- Understand and explain all of the topics above
- The pilot will personally review his medications against the lists below.

Prerequisite Study

- [14 CFR §61.15](#) Offenses involving alcohol or drugs.
- [14 CFR §61.16](#) Refusal to submit to an alcohol test or to furnish test results.
- [14 CFR §61.23](#) Medical certificates: Requirement and duration.
- [14 CFR §61.53](#) Prohibition on operations during medical deficiency.
- [14 CFR §91.13](#) Careless or reckless operation.
- [14 CFR §91.17](#) Alcohol or drugs.
- [14 CFR §91.211](#) Supplemental oxygen.
- [AIM section 8-1-1](#) Fitness for Flight. (Includes IM SAFE checklist)
- [AIM section 8-1-2](#) Effects of Altitude.
- [Beware of hypoxia](#) Airman education programs.

Other Resources

The FAA has a list compiled of approved and non-approved medications. This list can be viewed on [the AOPA website](#) (limited to AOPA members only). A free list can be found at <http://www.leftseat.com/medcat1.htm> . The SSC Instructor corps **HIGHLY** recommends that you compare these lists with your current medications **early in your training program**.

The Soaring Society of America (www.ssa.org) has a safety presentation on this topic:

- <https://www.ssa.org/Default.asp?embed=https://www.soaringsafety.org/presentations/presmedical.html>

15 disqualifying medical conditions:

- <https://www.aopa.org/news-and-media/all-news/2014/january/09/fifteen-medical-disqualifications>

Lesson 1c - Use of Controls

1c

Lesson Objective

During this lesson, the Instructor will present the use of the controls in the cockpit and their effect on the control surfaces. In addition, any time there is an exchange of controls, the student and instructor must use the FAA-approved method of "Positive Exchange of Controls."



Regulatory Requirement

- Private Pilot Test Candidate: [PTS](#), Page 8, "Positive Exchange of Controls"

Content

- Positive Exchange of Controls
- Ailerons
- Elevator
- Spoilers
- Dive brakes
- Towhook release
- Rudder
- Wheelbrakes
- Trim-tab
- Empennage
- Different types of flaps

Completion Standards

When complete, the student will:

- use the "Positive Exchange of Controls" procedure whenever command of the aircraft changes
- understand and explain the functions of all above items
- describe the movement of the stick and how the control surfaces react to the stick movement.
- describe the use of the rudders
- describe the use of the spoilers
- describe the means of locking the spoilers / dive brakes

Prerequisite Study

- [Glider Flying Handbook \(2013\), Chapter 2](#); pages 2-1 through 2-10

Lesson 1d - Cockpit Familiarization

1d

Lesson Objective

The instructor will teach the components of the cockpit, instruments and seating.



Regulatory Requirement

None

Content

- Use of Instruments
- Seating positioning
- Use of seatbelt harnesses
- Use of air vents
- Adjustment of rudder pedals
- Electrical "Master" switch
- Second Electrical "Master" switch for the transponder (ASK-21)
- Radio control
- Audio variometer
- Transponder

Completion Standards

When complete, the student will:

- Understand and explain all of the equipment above

Prerequisite Study

- [Glider Flying Handbook \(2013\), Chapter 4](#); pages 4-1 through 4-18
- [ASK-21 GFM/POH](#)
- [SSC Cockpit Cards](#)
- [Transponder manual](#)

Lesson 1e - Positive Control Check

1e

Lesson Objective

The instructor will teach the procedure of the "Positive Control Check"



Regulatory Requirement

- Pre-Solo pilot (Student Pilot and Transition Pilots): [§61.87\(i\)\(1\)](#)
- Private Pilot Test Candidate: [PTS](#) Area of Operation II(C)

Content

- Purpose of the positive control check
- Relation to aircraft assembly
- Aileron check
- Spoiler check
- Elevator check
- Rudder check

Completion Standards

When complete, the student will be able to demonstrate a satisfactory positive control check

Prerequisite Study

- [Glider Flying Handbook \(2013\), Chapter 6](#) and [Appendix A](#)
- [SSC Cockpit Cards](#)
- Soaring Safety Foundation's Wing-Runner Course "[Positive Control Check](#)"

Lesson 1f - Release Mechanisms

1f

Lesson Objective

The instructor will teach the student/candidate the function of the tow release, including the differences in the Schweizer and Tost release mechanisms



Regulatory Requirement

- Pre-solo pilot: [§61.87\(i\)\(1\)](#)
- Private Pilot Test Candidate [PTS](#) II-C

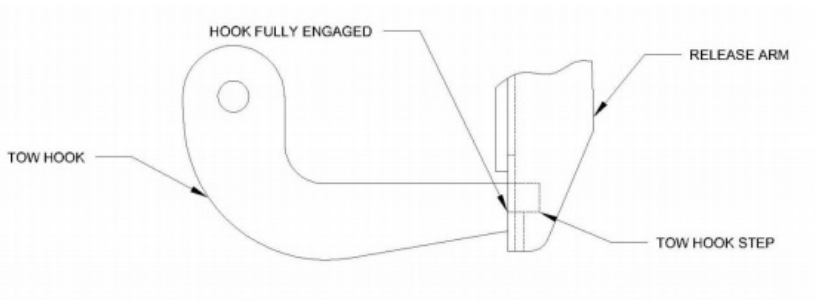
Content

- Nose hook/CG hook
- Schweizer release
- Tost release
- Back-release function of CG hooks
- Maximum and Minimum towline strengths
- Use of weak links (towplane end, glider end)
- Hazards of hooking Tost rings onto Schweizer hooks
- POH maximum line strength vs the 200% rule

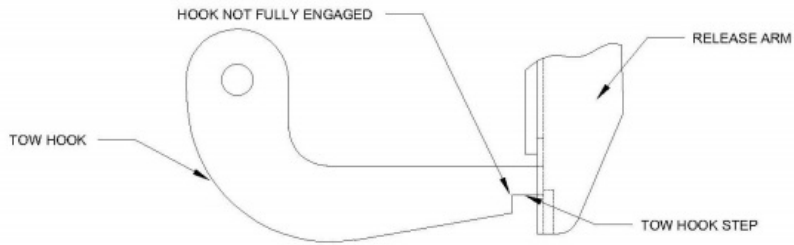
Completion Standards

The student must be able to:

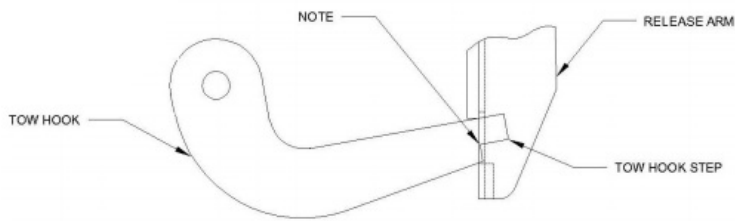
- Calculate the appropriate towline strengths
- Describe the proper use of weak links
- Recognize the correct usage of Schweizer or Tost rings for the appropriate aircraft
- Recognize the correct engagement of the Schweizer tow hook for Schweizer aircraft



VIEW A – PROPER ENGAGEMENT



VIEW B – IMPROPER ENGAGEMENT



VIEW C – IMPROPER ENGAGEMENT

Prerequisite Study

- [Glider Flying Handbook \(2013\), Chapter 6](#), Page 6-6
- [Glider Flying Handbook \(2013\), Chapter 7](#), Page 7-11, figure 7-13
- [14 CFR § 91.309](#) Towing: Gliders and unpowered ultralight vehicles.

Lesson 1g - Glider Ground Handling -- Hangar to Flightline

1g



Lesson Objective

The instructor will teach the student/candidate the proper procedure of extracting the aircraft from the hangar, and bringing the aircraft to the flight line

Regulatory Requirement

- Pre-solo pilot: [§61.87\(i\)\(2\)](#)
- Private Pilot Test Candidate [PTS](#) II-B

Content

- Opening of the Hangar doors
- Extraction from the dolly
- Towing behind the towcar, including communication with tow car driver
- Appropriate number of ground personnel
- Appropriate method of turning the glider around turns

Completion Standards

The student must be able to perform:

- safe extraction of the aircraft from the hangar
- proper use of the dolly
- safe transit of the glider from the hangar to the flightline

The student must be able to explain:

- the appropriate use of hangar doors
- the appropriate locations to grasp the aircraft
- the hazards of handling the canopy

Prerequisite Study

- [Glider Flying Handbook \(2013\), Chapter 6](#), page 6-4

Recommended Study

- [Soaring Safety Foundation Wingrunner Course](#)

Lesson 1h - Glider Ground Handling -- Flightline to Hangar

1h



Lesson Objective

The instructor will teach the student/candidate the proper procedure of returning the glider to its slot in the hangar without damage to the aircraft

Regulatory Requirement

- Pre-solo pilot: [§61.87\(i\)\(2\)](#)
- Private Pilot Test Candidate [PTS](#) II-B

Content

- opening of the hangar doors
- number of people required to safely return the glider to the hangar
- appropriate use of the dolly

Completion Standards

The student must be able to perform:

- safe insertion of the aircraft into the hangar
- proper use of the dolly

The student must be able to explain:

- the appropriate use of hangar doors
- the hazards of handling the canopy
- the appropriate locations of storing and charging the battery
- the appropriate position of the spoiler handle in the ASK-21

Prerequisite Study

- [Glider Flying Handbook \(2013\), Chapter 6](#), page 6-4

Recommended Study

- [Soaring Safety Foundation Wingrunner Course](#)

Lesson 2a - Pre-Takeoff Checklist

2a

Lesson Objective

During this lesson, the student/candidate will learn the procedures for a successful pre-takeoff checklist, including the importance of each item on the checklist.



Regulatory Requirement

- Pre-solo pilot: [§61.87\(i\)\(1\)](#)
- Private Pilot Test Candidate [PTS](#) IV-A

Content

- The importance of a Pre-Takeoff Checklist
- The difference between a "Check" list and "To Do" list
- A BB CCCCC DDD E, expanded club standard
- Alternate club standard CB SIFTT CB WET
- Use of seatbelts and seat harnesses

Completion Standards

The student must be able to perform either of the club standard checklists (at the student's preference) without prompting from the instructor

The student must be able to explain:

- the importance of a pre-takeoff checklist
- each of the items on the checklist, in order

Prerequisite Study

- [14 CFR §91.107](#) Use of safety belts , shoulder harnesses, and child restraint systems.
- [Glider Flying Handbook \(2013\), Chapter 6](#), Figure 6-15, "Prelaunch Checklist" (which differ slightly from Skyline Soaring's checklists)
- [Skyline Soaring Club Cockpit Cards](#), containing both commonly-used checklists

Lesson 2b - Attitude Flying/Scanning

2b

Lesson Objective

During this lesson, the student will understand the need for proper scanning for aircraft, using attitude to judge and determine speed and bank.



Regulatory Requirement

- Pre-solo pilot: [§61.87\(i\)\(6\)](#)
- Private Pilot Test Candidate [PTS](#), pages 5-7

Content

- Empty-field myopia
- peripheral vision
- narrow-field vision
- proper field scanning techniques
- pitch angle references
- bank angle references

Completion Standards

When complete, the student will:

- understand and explain proper scanning techniques
- understand and explain narrow-field versus peripheral vision.
- be able to explain the relationship between attitude and airspeed.
- be able to achieve and maintain airspeed primarily by reference to attitude.

Prerequisite Study

- [Vision in Flight AIM section 8-1-6](#)
- [Judgment Aspects of Collision Avoidance AIM section 8-1-8](#)
- Soaring Safety Foundation's FIRC presentation [Collision Avoidance Procedures](#) (PPT)
- AOPA's Safety Advisor [Collision Avoidance Strategies](#)

Also see

- Examples of empty-field myopia in video, ([YouTube video](#))
- [Empty Field Myopia](#) (SKYbrary.aero)
- XKCD #1080, [Visual Field](#)

Lesson 2c - Glider Daily Inspection

2c

Lesson Objective

The student/candidate will learn the importance of the glider daily inspection, the correct procedure and habits of a successful preflight.



Regulatory Requirement

- Pre-Solo pilot (Student Pilot and Transition Pilots): [§61.87\(i\)\(1\)](#)
- Private Pilot Test Candidate: [PTS](#) Area of Operation I, II(C)

Content

- Purpose and Procedures of Preflight
- Use of Preflight Checklists
- Required aircraft documents (ARROW)
- Critical Assembly Checklist
- Weight and Balance

Completion Standards

- know the role of the aircraft preflight procedure
- know how to use the POH/GFM to discern proper preflight procedures
- use loading charts to determine weight and balance limits
- understand the importance of proper weight and balance
- use appropriate checklists during preflight
- know what documents are required in the aircraft for legal flight
- know the roles of the Airworthiness and Registration Certificates

Prerequisite Study

- [Glider Flying Handbook \(2013\), Chapter 6](#), pages 6-6 and 6-7.
- [14 CFR §91.3](#) Responsibility and authority of the pilot in command.
- [14 CFR §91.7](#) Civil aircraft airworthiness.

Recommended Study

- Pilot Operating Handbook for the [ASK-21](#)
- Pilot Operating Handbook for the [SGS 1-36 Sprite](#)
- Pilot Operating Handbook for the [Discus CS](#)
- Skyline Soaring [Cockpit Cards](#) (with preflight checklists for each glider)

Lesson 2d - Airport Procedures

2d

Lesson Objective

During this lesson, the student/candidate will learn the appropriate airport procedures, including the shape of the traffic pattern. The student will learn the airport markings, and procedures for avoiding runway incursions. Candidates for the Practical test will be expected to know about Land and Hold Short (LAHSO) procedures at controlled airports.



Regulatory Requirement

- Pre-Solo pilot (Student Pilot and Transition Pilots): [§61.87\(i\)\(5\)](#)
- Private Pilot Test Candidate: [PTS](#) Area of Operation III(A,B,C)
- Local procedures and policies of management of KFRR

Content

- Airport markings
- Runway markings
- Taxiway markings
- Pattern shape and flexibility
- Adjustment of pattern shape to fit the immediate need
- Powered Air Traffic Operations

Completion Standards

When complete, the student will understand the role and function of the pattern, and most importantly the complete flexibility of the pattern. The student will also understand that the pattern is not the goal, getting the aircraft on the ground is the goal. The student will be able to explain:

- The mechanics of the pattern
- Differences between the powered traffic pattern versus glider traffic pattern
- Range of flexibility in the pattern
- General altitudes for beginning the pattern.
- Judgment of angles during pattern approach

Prerequisite Study

- [Skyline Soaring Club Operations Manual](#) Appendix B, [Front Royal Operations](#)
- [Aeronautical Information Manual](#) Chapter 4, Sections 4-3-1, 4-3-2, 4-3-3 , and 4-3-4
- [Glider Flying Handbook \(2013\), Chapter 7](#), pages 7-22 through 7-25
- FAA Advisory Circular [Recommended Standard Traffic Patterns AC 90-66A](#)
- [FAA Pilot's Handbook of Aeronautical Knowledge](#) Runway Incursion Avoidance. [Appendix 1](#)

Recommended Study

- [Aeronautical Information Manual](#)
 - [Taxiway Lights](#) AIM 2-1-11
 - [Airport Pavement Markings](#) AIM 2-3-2
 - [Runway Markings](#) AIM 2-3-3
 - [Taxiway Markings](#) AIM 2-3-4
 - [Displaced Threshold Markings](#) AIM Figure 2-3-4
 - [Taxiways Located in Runway Approach Area](#) AIM Figure 2-3-15

Further Study

- [Runway Markings \(FAA\)](#)
- [AOPA Online Courses Runway Safety \(Cool!\)](#) (Requires AOPA membership)

Lesson 2e - Cockpit Management

2e

Lesson Objective

Cockpit management relates to the organization of items in the cockpit, the briefing of passengers on the cockpit controls and use of seat harnesses. The PTS requires that candidates demonstrate the ability to brief passengers in the use of seatbelts and seat harnesses, as well as the ability to manage loose items in the cockpit.



Also of critical importance, the student will learn the appropriate actions to be taken if the canopy opens while in-flight.

Regulatory Requirement

- Private Pilot Test Candidate: [PTS](#) Area of Operation IID

Content

- Use of seat harnesses
- Passenger briefing
- Placement of objects in the cockpit
- Hazards of unsecured objects in turbulent conditions
- Appropriate use of written checklists
- Use of cell phones in-flight
- Canopy opening while in-flight

Completion Standards

When complete, the student will:

- Exhibit knowledge of the elements related to cockpit management procedures.
- Organize and arrange material and equipment in a manner making items readily available.
- Brief passengers on the use of safety belts, shoulder harnesses, and emergency procedures.
- Use all appropriate checklists.
- Explain the hazards and remedies of a canopy opening in-flight.

Prerequisite Study

- [14 CFR § 91.107](#) Use of safety belts, shoulder harnesses, and child restraint systems.
- [47 CFR § 22.925](#) Prohibition on airborne operation of cellular telephones.
- [NASA ASRS Sterile Cockpit](#) article

Lesson 2f - Aerotow Release

2f

Lesson Objective

The instructor will teach the student the appropriate procedure for aerotow release.



Regulatory Requirement

- Student Pilot: 14 CFR [§61.87\(i\)\(11\)](#)
- Private Pilot Test Candidate: [PTS](#) Area of Operation IV(F)

Content

- Proper scanning before release.
- Release from aerotow.
- Confirmation that the rope has been released before starting the turn.
- Proper separation between the towplane and glider.

Completion Standards

When complete, the student will be able to:

- clear the area before release.
- especially for a pattern tow, makes sure that no other traffic will immediately conflict (without jeopardizing the stability of the aerotow).
- release with no slack in the rope
- release in the high-tow position
- confirm that the rope is away before beginning the separation turn.
- perform a *level right turn* after release.
- perform the release at the appropriate altitude.

Prerequisite Study

- [Glider Flying Handbook \(2013\), Chapter 7](#), pages 7-8 through 7-11.
- SSA Video on [Premature Termination of Tow \(PT3\)](#)

Lesson 2g - Visual Signals

2g



Lesson Objective

The candidate must know all of the ground signals used by the line crew, for different circumstances, such as take up slack, open and close the tow hook, hold, begin takeoff, stop, release towline, and emergency stop.

The candidate must also know all of the SSA standard signals used between the glider and towplane.

Regulatory Requirement

Student Pilot: 14 CFR [§61.87\(i\)\(11\)](#)

Private Pilot Test Candidate: [PTS](#) Area of Operation IIE

Content

The student/candidate will know: *The following hand signals:*

- Check controls (although not used in our club)
- Open Towhook
- Close Towhook
- Raise Wingtip
- Take up Slack
- Hold
- Begin Takeoff
- Stop Operation Immediately!
- Stop
- Release Towrope
- Stop Engine Now

The following in-flight visual signals:

- Towplane to glider:
 - Towplane is ready for takeoff
 - Something wrong with glider (Close Airbrakes!)
 - Release immediately!
 - The towplane can not release!
- Glider to towplane:
 - please turn left
 - please turn right
 - increase tow airspeed
 - decrease tow airspeed
 - the glider can not release!

Completion Standards

When complete, the student will know and be able to demonstrate all of the signals listed above.

Prerequisite Study

- [Glider Flying Handbook \(2013\) Chapter 7](#) page 7-2, Figure 7-1 (Hand Signals)
- [Glider Flying Handbook \(2013\) Chapter 7](#) page 7-3, Figure 7-2 (In-flight Signals)
- [14 CFR § 91.309\(5\)](#) Towing: Gliders and unpowered ultralight vehicles.

Additional Study

- Soaring Safety Foundation Wingrunner's Course -- [Launching the Glider](#)
- Soaring Safety Foundation Poster, "[Something is wrong with the glider](#)"
- Soaring Safety Foundation Video, "signals" ([YouTube](#))

Lesson 2h - Normal Takeoff

2h

Lesson Objective

The student will learn the procedures and skills necessary for a takeoff on aerotow. This includes the initial rollout to the beginning of the climb-out.



Regulatory Requirement

- Student Pilot: [§61.87\(i\)\(3\)](#)
- Private Pilot Test Candidate: [PTS](#) Area of Operation IV(B)

Content

- Beginning of the takeoff roll
- Glider airborne, towplane on ground
- Initial towplane climbout

Video Example

Here is an illustration of a normal takeoff, a high-definition video running 1:26. No two takeoffs will look exactly alike, but this will give you an idea of the view from the cockpit if you've never seen one: [The Takeoff](#) .

Completion Standards

When complete, the student will:

Before the glider takes off:

- avoid dragging a wingtip on the ground
- maintain directional yaw control on roll-out
- prevent the glider from ballooning on takeoff
- allow the glider to take off on its own

Before the towplane takes off, and after the glider is airborne:

- maintains proper ground track by crabbing
- maintain appropriate position above the ground while the towplane is still on the ground

After the towplane is airborne:

- establish appropriate position on tow once the towplane is airborne.

Other factors to safe take-off

- explain the relationship between temperature and takeoff performance
- explain the hazards of ballooning.
- explain the go/no-go point to continue the aerotow while the towplane is still on the take-off roll
- explain the hazards of takeoff performance on high density altitude days.

Prerequisite Study

- [Glider Flying Handbook \(2013\) Chapter 5](#), pages 5-2 through 5-7; *Factors Affecting Performance*
- [Glider Flying Handbook \(2013\) Chapter 7](#), pages 7-2 through 7-5; *Takeoff Procedures and Techniques*

Lesson 2i - Normal Aerotow

2i

Lesson Objective

The candidate must learn the correct procedures for safe conduct of normal aerotow procedures.



Regulatory Requirement

- 14 CFR [§61.87\(i\)\(12\)](#)
- Private Pilot Test Candidate: [PTS](#) Area of Operation IV(C)

Content

The candidate will learn:

- knowledge of the elements related to high-tow (slightly above the wake) positions during various phases of aerotow.
- how to make smooth and correct control applications to maintain vertical and lateral positions during high tow.
- how to maintain proper tow position during turns.
- how to use rapid and appropriate responses to maintain position during turbulent flight and prevent slack rope.

Completion Standards

When complete, the student will:

- demonstrate appropriate high-tow position during level flight
- demonstrate appropriate high-tow position during turns
- respond rapidly and correctly to any atmospheric disturbances
- explain the elements related to proper aerotow positions.

Note to students: This will take several lessons to accomplish.

Prerequisite Study

- [Glider Flying Handbook \(2013\), Chapter 7 Aerotow Climb-out And Release Procedures](#), page 7-2 through 7-11.

Lesson 2j - Straight Glide

2j

Lesson Objective

The candidate must be able to fly the glider on a specified heading, and continually maintain that heading, at a desired airspeed of the instructor's choosing. The candidate must do so with smooth control inputs, so that the glider is in constant coordinated flight.



Regulatory Requirement

- Pre-solo: 14 CFR [§61.87\(i\)\(4\), \(15\)](#)
- Private Pilot Test Candidate: [PTS](#) Area of Operation VII(A)

Content

The student will learn the elements of straight flight, which includes:

- relationship of attitude to airspeed
- the skill of tracking toward a landmark or heading at the instructor's choosing.
- the skill of maintaining wings level without inadvertent yawing motions
- the ability to adjust to atmospheric disturbances.
- maintaining a specific heading and airspeed.
- the selection of the appropriate amount of crab to counteract any winds aloft.

Completion Standards

When complete, the student will:

- exhibit knowledge of the elements related to straight glides, including the relationship of pitch attitude and airspeed.
- track toward a prominent landmark at a specified airspeed.
- demonstrate the effect of flaps, spoilers, or dive brakes, if equipped, in relation to pitch attitude and airspeed.
- exhibit smooth, coordinated control, and planning.
- maintain the specified heading, +/-10 degrees, and the specified airspeed, +/-10 knots
- when tracking to a point, select the appropriate amount of crab in crosswinds

Note: The criteria for evaluation in this section are taken directly from the [PTS](#).

Prerequisite Study

- [Glider Flying Handbook \(2013\), Chapter 7, Straight Glides](#), page 7-27.

Lesson 2k - Shallow, Medium, Steep Turns

2k



Lesson Objective

The candidate will learn the elements related to turns, specifically; shallow, medium, and steep turns. Included in this lesson plan is the relationship of dihedral effect to shallow turns, and the effect of the overbanking tendency on steep turns. It is critical to note that the candidate must always be vigilant for air traffic, and will with each and every turn, look for air traffic before initiating any turn.

Regulatory Requirement

- Pre-Solo: 14 CFR [§61.87\(i\)\(4\),\(15\)](#)
- Private Pilot Test Candidate: [PTS](#) Area of Operation VII(C)

Content

The candidate will learn:

- the effect of the overbanking tendency
- the effect of dihedral
- the definition of shallow, medium, and steep banked turns as related to dihedral effect and the overbanking tendency
- the appropriate application of aileron, elevator, and rudder to perform coordinated turns
- the appropriate use of elevator and pitch control to maintain the desired airspeed during turns
- the relationship of bank angle and load factor
- the relationship of bank angle versus turn radius
- the relationship of airspeed versus turn radius

Completion Standards

When complete, the student will:

- clear the area before each and every turn entry
 - (See [Attitude Flying / Scanning](#) lesson plan).
- exhibit knowledge of the elements related to steep turns, including load factor, effect on stall speed, and overbanking tendency.
- establish the recommended entry airspeed.
- for steep turns, enter a turn maintaining a bank angle of $45^\circ \pm 5^\circ$
- for all turns, enter a turn with smooth and coordinated control applications.
- maintains desired airspeed, ± 10 knots.
- recovers with smooth and coordinated control application within 10° of the desired heading.
- The student must describe the elements of shallow, medium and steep banked turns.
 - How much bank for each?
 - What separates the shallow from the medium?
 - What separates the medium from the steep?

Note: All criteria for evaluation are taken directly from the [Private Pilot Practical Test Standards](#).

Prerequisite Study

- [Glider Flying Handbook \(2013\), Chapter 7, Turns](#), page 7-28 through 7-32
- [Private Pilot Practical Test Standards for Gliders](#), page 7

Lesson 21 - Normal Landing

21

Lesson Objective

During this lesson the instructor will demonstrate a normal landing. The student will perform supervised landings, and when proficient, will be able to execute a normal landing without coaching or intervention from the instructor. To achieve the objective of this lesson, it will certainly take many flights.



For the purposes of training, the term *Normal Landing* in this lesson plan indicates benign atmospheric condition, and does not include crosswind, tailwind, or landing in strong headwinds.

Regulatory Requirement

- Pre-Solo: 14 CFR [§61.87\(i\)\(16\)](#)
- Private Pilot Test Candidate: [PTS](#) IV(Q)

Content

- Line up with the runway
- Flare at the appropriate height
- Use of speed brakes, dive brakes, flaps
- Runway centerline alignment
- Smooth touchdown
- Appropriate speed on final approach
- Appropriate speed on touchdown
- Hazards of landing at too high of an airspeed
- Hazards of approaching the runway at too low of an airspeed.

Video Example

Here is an illustration of a reasonable pattern and landing, running 5:29 (you can skip the approach if you're more interested in the final/flare portion). It's not a perfect landing (a little off the centerline) but provides the view of a stabilized approach and flare.

- [A Normal Landing.](#)

Completion Standards

When complete, the student will:

- be able to execute a normal landing without coaching from the instructor.
- execute a landing in which the successful outcome is never in doubt.

Lesson 3a - Aerotow High-Low Transition

3a

Lesson Objective

The student will learn how to perform from high tow to low tow, and back to high tow, while transitioning directly through the tow plane's wake.



Regulatory Requirement

- Pre-Solo: [§61.87\(i\)\(12\)](#)
- Private Pilot Teste Candidate [PTS](#) IV-C

Content

- Appearance of tow plane in high tow
- Appearance of tow plane in low tow
- Effects of tow plane's wake on the glider
- Rate at which the glider must descend through the tow plane's wake.
- When to stop descending
- When the glider is too low relative to the towplane

Completion Standards

The student must be able to perform:

- a successful transition from high tow to low tow.
- a successful transition from low tow to high tow.

Common Errors

- Rushing the maneuver too quickly, causing slack,
- Allowing the glider to rise up too quickly, getting into a very high tow position

Prerequisite Study

- [Glider Flying Handbook \(2013\), Chapter 7](#), pages 7-6 and 7-12

Lesson 3b - Before-Landing Checklist

3b

Lesson Objective

Regulatory Requirement

- [§61.87\(i\)\(16\)](#)
- Private Pilot [Practical Test Standard](#) IV-(Q) (8)



Content

- The student will learn the necessity and procedure for the memorized checklist executed before entering the pattern.

Completion Standards

The student must be able to perform:

- The FUSTALL checklist *before* entering the pattern
- All items on the checklist with smooth transition between the steps and authority.

The student must be able to explain:

- The purpose of the FUSTALL checklist
- The reasons why **F**laps and **U**ndercarriage are included, even though the aircraft lacks flaps and a retractable landing gear

Prerequisite Study

- **FUSTALL:**
 - **F**laps -- Set to the landing setting.
 - **U**ndercarriage -- down and locked (down and welded)
 - **S**peed -- Set to the landing speed.
 - **T**rim -- Set to maintain the landing speed.
 - **A**ir brakes -- Verify they work before you need them. Open and symmetrical deployment.
 - **L**ookout -- Look to the traffic pattern to ensure proper separation
 - **L**anding -- Look to the landing runway to ensure it is clear

Note that some instructors include an extra "A" for altitude after "Trim".
- [Glider Flying Handbook \(2013\), Chapter 7](#), page 7-22

Lesson 3c - Traffic Pattern

3c

Lesson Objective

The student will learn the shape, go ahead-points, and most of all, the flexibility of the pattern.



Non-Goals

The student will **NOT** focus on bad habits such as rigid adherence to specific altitudes at certain points in the pattern. It must also be stressed that rigid, square perfection is **NOT** the goal of the pattern. Every pattern is different, and it must be viewed as a tool to the primary and ultimate goal -- **getting to the runway safely**.

Regulatory Requirement

- [§61.87\(i\)\(10\),\(16\)](#)
- Private Pilot [Practical Test Standard](#) IV-Q

Content

- Entry point
- Entry altitude
- Entry leg
- Downwind leg
- Base leg
- Final approach
- Flexibility in pattern construction and TLAR
- Ground tracking with reference to the aiming point

Completion Standards

The student must be able to perform:

- A pattern to the satisfaction of the instructor, without aid from the instructor.

The student must be able to explain:

- That the primary ultimate goal of the pattern is to reach the runway!
- The procedure for a normal pattern
- The situations when a pattern is not appropriate
- The means of abbreviating a pattern

Prerequisite Study

- [Glider Flying Handbook \(2013\), Chapter 7](#), page 7-22
- SSA Video: [Nice View From Up Here](#) (too high on final)
- SSA Video: [A Bit of a Stretch](#) (too low on final)
- SSA Video: [Stall/Spin Base to Final](#)

Lesson 3d - Minimum Controllable Airspeed

3d

Lesson Objective

The student will learn how to fly the glider on the cusp of a stall -- without allowing the glider to actually stall. If performed correctly, the glider will show many or all of the six signs of a stall. Also, the student will be expected to perform shallow-banked turns while flying in Minimum Controllable Airspeed (MCA).



Regulatory Requirement

- [§61.87\(i\)\(8\)](#)
- Private Pilot [Practical Test Standard](#) V-A
- Private Pilot [Practical Test Standard](#) IX-A

Content

- Performance of the glider at MCA in level flight.
- Performance of the glider at MCA during turns.
- Performance of the glider at MCA without causing the aircraft to stall.
- Performance of the glider at MCA while showing the six signs of a stall (without stalling).

Completion Standards

The student must be able to perform:

- Appropriate clearing turns before the maneuver
- MCA in level flight
- MCA in turns.

Prerequisite Study

- [Glider Flying Handbook \(2013\), Chapter 7](#), page 7-31 "Maneuvering at Minimum Controllable Airspeed"

Lesson 3e - Turns to a Heading

3e

Lesson Objective

The student will learn the procedures for turning out on a heading. The student will also learn the different types of error with a magnetic compass.



Regulatory Requirement

- **Pre-solo:** This is not required for solo
- **Private Pilot:** Private Pilot [Practical Test Standard](#) VII-B

Content

- The candidate will clear the area before turning.
- The student will be able to turn to any heading described by the instructor, such as 000, 090, 180, 270.
- Magnetic deviation (the compass in the aircraft is deviant)
- Magnetic variation (the variation varies from place to place)
- Compass acceleration error (ANDS)
 - Accelerate -> North
 - Decelerate -> South
- ...and turning error (UNOS)
 - Undershoot for Northerly headings
 - Overshoot for Southerly headings.
- relationship of turning error to latitude.
- the use of a compass card

Completion Standards

The student must be able to perform:

- Turns to any desired heading specified by the instructor

The student must be able to:

- explain compass dip error
- explain turning error
- show differences between magnetic deviation and variation
- identify magnetic variation on an aeronautical sectional
- explain when the magnetic compass displays the correct heading

Prerequisite Study

- [Glider Flying Handbook \(2013\), Chapter 4](#), page 4-16
- [Glider Flying Handbook \(2013\), Chapter 7](#), page 7-28 "Turns"
- [Pilot Handbook of Aeronautical Knowledge \(2016\), Chapter 8](#), page 8-23, Magnetic Compass

Further Study

- National Geophysical Data Center's [world map of magnetic declination](#) (variation)

Lesson 3f - Forward Stall

3f

Lesson Objective

The student will learn what causes a stall, how to perform a stall, how to recover from a stall. This lesson includes stalls with brakes open. This lesson does not include turning or cross-controlled stalls.



Regulatory Requirement

- [§61.87\(i\)\(14\)](#)
- Private Pilot [Practical Test Standard](#) IX-B

Content

- Stall as related to a critical angle of attack
- stall as related to airspeed
- stall as related to pitch
- stalls at low G loading
- stalls at high G loading
- stalls at high airspeeds (verbal ok)
- recovery from stall
- imminent stall
- hazards at low altitude
- hazard of stalls in the pattern
- use of spoilers during a stall, stall speed as related to spoiler deployment

Completion Standards

The student must be able to perform:

- proper clearing turns before executing stall maneuvers
- a normal, forward stall and appropriate recovery
- a normal, forward stall with air brakes open, and appropriate recovery.

The student must be able to explain:

- the hazards of a stall
- relationship to airspeed and loading
- critical angle of attack and why it has nothing to do with speed

Prerequisite Study

- [Glider Flying Handbook \(2013\), Chapter 3](#), pages 3-17 "Stalls"
- [Glider Flying Handbook \(2013\), Chapter 7](#), pages 7-32 "Stall Recognition and Recovery"

Lesson 3g - Turning Stall

3g

Lesson Objective

The student will learn the entry and recovery from a stall with and without airbrakes



Regulatory Requirement

- [§61.87\(i\)\(14\)](#)
- Private Pilot [Practical Test Standard](#) IX-B

Content

- hazards at low altitude
- hazard of stalls in the pattern
- use of spoilers during a stall, stall speed as related to spoiler deployment
- appropriate recovery from a turning stall.

Completion Standards

The student must be able to perform:

- a turning stall and appropriate recovery
- a turning stall with air brakes open, and appropriate recovery.

The student must be able to explain:

- relationship of a stall to the angle of bank

Prerequisite Study

- [Glider Flying Handbook \(2013\), Chapter 3](#), pages 3-17 "Stalls"
- [Glider Flying Handbook \(2013\), Chapter 7](#), pages 7-32 "Stall Recognition and Recovery"

Lesson 3h - Spirals, Descents, Unusual Attitude Recovery, Spins (optional)

3h



Lesson Objective

The student will learn typical modes of entry into, and methods of recovery from, unusual attitudes including spins and spiral dives. The student will also learn the concept and limitations of the "benign spiral" descent mode. As an optional task for post-solo (and for rated pilots), spins may be demonstrated and practiced if requirements are met.

Regulatory Requirement

Student Pilot Candidates: (Maneuvers and procedures for pre-solo flight training in a glider) [§61.87\(i\)\(15\)](#)

Content

Instructor demonstration:

- Overbanking tendency into spiral dive entry
- Spiral dive entry from spin or departure (from controlled flight) conditions
- Initial slow-speed aft-stick-limited spiral dive
- Transition to high-speed g-limited spiral dive
- Spiral dive recovery procedure
- Nose-high slow airspeed recovery procedure
- Initiation of benign spiral descent mode

Student practice:

- Nose-low steep bank unusual attitude recovery
- Nose-high low-speed unusual attitude recovery
- Initiation of benign spiral descent mode

Completion Standards

The student must be able to explain:

- How spiral dives might develop from a nose-low overbanking turn, or following a spin recovery
- The differences between spiral dives and spins
- The recovery technique from a spiral dive, and hazards of incorrect techniques
- How spins might develop, and the general recovery technique from a spin
- The recovery technique from a nose-high low-air-speed unusual attitude
- The benefits and limitations of a benign spiral descent mode

The student must be able to perform:

- Recovery from a nose-low steeply banked attitude, including spiral dive (relax aft stick pressure, roll wings level, stick smoothly aft until nose above horizon)
- Recovery from a nose-high low-air-speed unusual attitude (neutral elevator and ailerons, rudder to minimize yaw, roll wings level after nose falls to horizon)
- Initiation of an intentional benign spiral descent mode (full spoilers, trim slightly aft, hands off stick, feet off rudders)

Prerequisite Study

- [Glider Flying Handbook \(2013\), Chapter 8](#), page 8-15 "Spiral Dives" and "Spins"
- [Soaring Safety Foundation, Flight Safety Videos](#), "Stall/Spin" (2) and "Spiral Dive", including pop-up "Instructor Guides"

Recommended Study

- [Airplane Flying Handbook, Chapter 4](#), "Maintaining Aircraft Control: Upset Prevention and Recovery"
- [Pilot's Handbook of Aeronautical Knowledge](#), page 5-20, "Spiral Instability"
- [Skylines, June 2005](#) "Stay Safe in Wave", article about benign spirals

- [Benign Spirals](#) forum reference to Knauff glider transition book
- [Unload for Control](#) forum reference to Rutan article
- SSA Video: [Spiral Dive](#)

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## Optional Spin Task

To demonstrate and practice spins, only the club ASK-21 N321K with spin kit attachment may be used. Spins may be demonstrated and practiced after solo but before a checkride, if desired, or this task may be flown at any time by rated pilots (with instructor).

## Spin Sortie Preparation and Special Instructions

- Study N321K POH, including TN4B with two attachments, for spin description, entry and recovery procedure, restrictions, and spin kit details
- Ensure aileron and elevator seals are taped and air-tight
- Briefing on spin entry and recovery procedures required before flight
- Weigh-in on day of flight at the airfield, as dressed for flight
- Compute CG and number of spin kit disks to achieve 73% aft CG (16") without exceeding MAGW
- Install spin kit bolt, disks, nut, and pin before flight
- Remove spin kit bolt, disks, nut, and pin after flight
- Recommend at least a 4000' AGL tow (5000' AGL preferred) to allow for multiple spins, if practical
- Typical altitude loss per turn in a spin is 200', up to 250'
- Typical altitude loss during recovery is less than 300' from initiation of recovery through return to normal flight attitude
- Minimum altitude to initiate spin recovery is 2500' AGL (know the elevation of the ground below!)
- Minimum planned altitude to complete spin recovery is 2000' AGL

## Content

Instructor demonstration:

- CG calculation and spin kit installation
- Spin entry and recovery (if needed, 1-turn spin recommended)

Student practice:

- Slow flight
- Stall from slow flight (note stall speed, needed for normal spin entry)
- Spin entry and recovery (2-turn spin recommended)

## Completion Standards

The student must be able to explain:

- How aft CG affects the susceptibility of the glider to enter, sustain, and recover from spins
- The importance of keeping spoilers closed and locked during dive recovery
- How to calculate the CG and desired number of spin kit weights
- The recovery technique from a spin, and hazards of incorrect techniques

The student must be able to perform:

- Recovery from a normally entered spin

## Prerequisite Study

All study items listed above, plus:

- Skyline Soaring POH for ASK-21 N321K including TN4b spin kit details, procedures, restrictions
- Skyline Soaring cockpit cards for ASK-21 N321K
- Skyline Soaring weight and balance worksheet and/or spreadsheet for ASK-21 N321K

## Recommended Study

- [AOPA on spins](#)
- [FAA Advisory Circular on Spin Training](#)

- [FAA Airplane Handbook, Spin Awareness](#)
- [Spinning, by Kai Gertsen](#)

# Lesson 4a - Collision, Wind Shear & Wake Turbulence Avoidance

4a



## Lesson Objective

The student will review scanning techniques. The student will learn of the hazards of wind shear; the student will learn the hazards of wake turbulence.

## Regulatory Requirement

- [§61.87\(i\)\(6\)](#)
- Private Pilot [Practical Test Standard](#) IV-G

## Content

- Wake Turbulence Generation, Strength, Behavior, Problem Areas and Avoidance
- Wind Shear, definition and impact on aircraft performance (especially on final!)
- Collision avoidance, see and be seen.
- Review scanning techniques [lesson 2b](#)

## Completion Standards

The student must be able to perform:

- Appropriate scanning techniques throughout every flight
- Appropriate situational awareness of windshear and wake turbulence

The student must be able to explain:

- Risk factors in midair collisions (especially as related to gliders)
- Collision avoidance technology
- the factors that create wake turbulence
- the factors that create the strongest wake turbulence
- how to avoid wake turbulence
- what wind shear is, and how it relates to aircraft performance.

## Prerequisite Study

- [Collision Avoidance in Gliders, SSF](#)
- [Advisory Circular AC90-48C](#) Collision Avoidance (1983) (Cancelled)
- [Advisory Circular AC 90-48D](#) Pilots' Role in Collision Avoidance
- [Aeronautical Information Manual](#)
  - [AIM 7-1-25](#) Wind Shear PIREPS
  - [AIM 7-3-1](#) Wake Turbulence -- General
  - [AIM 7-3-2](#) Vortex Generation
  - [AIM 7-3-3](#) Vortex Strength
  - [AIM 7-3-4](#) Vortex Behavior
  - [AIM 7-3-5](#) Operational Problem Areas
  - [AIM 7-3-6](#) Vortex Avoidance Procedures

## Recommended Study

- [Flight Maneuvers](#), Soaring Safety Foundation -- Describes the effect of wind and wind shear on a final approach.
- [Pilot and Air Traffic Controller Guide to Wake Turbulence](#) (www.FAA.gov)
- Accident analysis of a wake-turbulence event ([YouTube](#))
- 747 landing into fog, showing wingtip vortices ([YouTube](#))

# Lesson 4b - Radio Procedures

4b



## Lesson Objective

Our soaring environment requires us to use the correct radio procedures to interact with the Unicom, ground, and communicate with the towpilot.

## Regulatory Requirement

- **Pre-Solo:** *Not required by regulations, but you must master this before solo at Front Royal.*
- **Private:** [PTS](#) III-A.

## Content

- General Radio Procedures
- Phonetic Alphabet
- Radio calls in the pattern
- Communication with the Tow Plane
- Technique for radio use
- Awareness of ATC Light signals.

*Note:* Even though the vast majority of glider pilots will *never* see ATC light signals in practice, the PTS states that instructors are required to teach ATC light signals to Practical Test candidates. The PTS candidate should at least be aware of ATC light signals. View [§91.125](#).

## Completion Standards

The student must be able to perform:

- preflight radio check
- switch frequencies in both types of radios in SSC gliders (use of either the swap button or channel knob)
- understand the importance of checking the AWOS/ASOS before each takeoff
- understand the importance of checking the AWOS/ASOS after any long flight
- radio announcements when taking the active runway (staging for takeoff)
- *while in the air* -- the student must say flawless announcement of each portion of the landing pattern, without stumbling, searching for words, or having to pause the landing pattern's procedures to summon the correct radio calls.
- meaningful communication with the Front Royal Unicom.
- pre-takeoff radio check with tow pilot.
- all radio communication should not be at the cost of flying the aircraft. Flying the glider is the first and foremost priority.

The student must be able to:

- Recite the Aviation phonetic alphabet.
- With quizzing from the instructor, the student must demonstrate the ability to quickly convert any random letter into the appropriate phonetic alphabet equivalent.

## Prerequisite Study

- [§91.125](#) ATC Light signals. (See note above)
- [Aeronautical Information Manual](#)
  - [AIM 4-2-1](#) Radio Procedures, General.
  - [AIM 4-2-2](#) Radio Technique.
  - [AIM 4-2-3](#) Contact Procedures.
  - [AIM 4-2-4](#) Aircraft Call Signs
  - [AIM 4-2-7](#) Phonetic Alphabet  
(*Please don't waste your time learning the Morse code equivalents*)
  - [AIM 4-2-8](#) Figures
  - [AIM 4-2-9](#) Altitudes and Flight Levels
  - [AIM 4-2-10](#) Directions

## Samples



Some Sample radio calls might be:

- Listen to AWOS/ASOS before takeoff:
  - Switch to 121.85 at FRR
  - Set and check altimeter
  - Note winds, compare with windsock and/or tetrahedron
  - Switch back to CTAF frequency
- Radio Check:
  - "Front Royal Glider niner four echo radio check"
  - "glider niner four echo, eight-six-six, you are loud and clear, how me?"
- Staging for takeoff:
  - "Front Royal, glider niner four echo, staging for take-off two-eight. Front Royal"
- Initial Entry ("*on the 45*") Leg:
  - "Front Royal Traffic. Glider [four-seven]-niner-four-echo. On the Entry Leg, Landing Runway two-eight. Right hand traffic. Glider. Front Royal"
  - "Front Royal Traffic. Glider [four seven]-niner-four-echo. On the forty-five for Right Traffic two-eight. Front Royal"
- Downwind leg samples
  - "Front Royal Traffic. Glider niner-four-echo. Downwind Leg, runway two-eight. Right hand traffic. Glider. Front Royal"
  - "Front Royal Traffic. Glider niner-four-echo. Downwind Leg, runway two-eight. Landing on the grass. Right hand traffic. Glider. Front Royal"
  - "Front Royal Traffic. Glider niner-four-echo. Right Downwind two-eight. Front Royal"
- Base Leg samples
  - "Front Royal Traffic. Glider niner-four-echo. Base Leg, Runway two-eight. Right hand traffic. Glider. Front Royal"
  - "Front Royal Traffic. Glider niner-four-echo. Base Leg, Runway two-eight, landing on the grass. Right hand traffic. Glider. Front Royal"
  - [Front Royal Traffic], glider niner-four-echo right base two-eight Front Royal
- Final Leg samples:
  - "Front Royal Traffic. Glider 94 echo. Final. Runway two-eight. Glider. Front Royal"
  - "Front Royal Traffic. Glider 94 echo. Final. Runway two-eight, landing on the grass. Glider. Front Royal"

## Further Study

- AOPA's "[Say It Right](#) " Mastering Radio Communication. Available for free with registration.

# Lesson 4c - Minimum Sink

4c

## Lesson Objective

The lesson will learn the minimum sink speeds, how they relate to bank angle, and the importance of using the correct minimum sink speeds.



## Regulatory Requirement

- **Pre-Solo:** 14 CFR [§61.87\(i\)\(8\)](#)
- **Private Pilot Candidate:** [PTS](#) V(A)

## Content

- Minimum sink speed for each club aircraft
- Minimum sink speed for differing bank angles
- Glide ratio at minimum sink. Compare with glide ratio at Max L/D
- Minimum sink speed at the minimum pilot weight (solo) and at the glider's maximum gross weight

## Completion Standards

The student must be able to perform:

- Straight and Level flight at minimum sink speed
- 30° bank turns at minimum sink speed.
- 45° bank turns at minimum sink speed.

The student must be able to explain:

- The effect of bank angle to minimum sink speed.
- The effect of aircraft loading to minimum sink speed.

## Prerequisite Study

- [Glider Flight Manual \(2013\), Chapter 7](#), "Minimum Sink Airspeed" Page 7-36
- [SSC Cockpit Cards](#)

# Lesson 4d - Slips: Forward, Side, Turning (w/ & w/o airbrakes)

4d



## Lesson Objective

The student must learn and demonstrate slips before solo. Proper slip technique must also be demonstrated on the practical exam. The student will get the opportunity to practice slips, and must understand the difference between the different types of slips. The student will also learn when the use of a slip is appropriate, and when it is not appropriate.

## Regulatory Requirement

- **Pre-solo Candidate:** [§61.87\(i\)\(7\)](#)
- **Private Candidate:** [PTS IV \(R\)](#)

## Content

- Turning slips
- Forward slips
- Side slips
- Difference between a slip and a skid
- Hazards of slipping
- Hazards of skidding
- Why slipping is safer than skidding

## Completion Standards

The student must be able to perform:

- Turning Slips (no airbrakes)
- Turning Slips (with airbrakes)
- Forward Slips (no airbrakes)
- Forward Slips (with airbrakes)
- Side Slips (no airbrakes)
- Side Slips (with airbrakes)

The student must be able to explain:

- the differences between slips and skids
- the hazards of slips (when a slip is NOT appropriate)
- the benefits of slips
- when it is appropriate for a turning or side slip

## Prerequisite Study

- [Glider Flying Manual](#) - Figure 7-26 "Slipping Turn" -- Page 7-25
- [Glider Flying Manual](#) - Figure 7-27 "Skidding Turn" -- Page 7-25
- [Glider Flying Manual](#) - "Slips" page 3-12
- [Glider Flying Manual](#) - "Forward Slip" page 3-13
- [Glider Flying Manual](#) - "Side Slip" page 3-13

# Lesson 4e - Best L/D; Speed to Fly

4e



## Lesson Objective

The lesson will learn the concept of speed to fly -- the most appropriate speed given lift, headwind, tailwind or sink.

## Regulatory Requirement

- **Pre-Solo:** 14 CFR [§61.87\(i\)\(8\)](#)
- **Private Pilot Candidate:** [PTS](#) V(B)

## Materials

- Skyline Soaring [Cockpit Cards](#) contain polars for all club aircraft
  - Dual and Solo speeds for the two-seat gliders

## Content

- Best L/D in still air for each aircraft
- Skills to calculate the best L/D for a given headwind, tailwind, lift or sink
- Compare with glide ratio at max L/D versus slower and faster speeds
- Effect of the aircraft's weight and the glide ratio of the glider
- Effect of the aircraft's loading and the max L/D speed

## Completion Standards

The student must be able to perform:

- Calculations using a flight polar to determine the best L/D airspeed in the following circumstances:
  - still air
  - 10, 20, 30 knot headwind
  - 10, 20, 30 knot tailwind
  - 5 knots sink
  - 5 knots lift
  - Combinations of lift/sink and headwind/tailwind

The student must be able to explain:

- The effect of loading and the max L/D speed

## Prerequisite Study

- [Glider Flying Handbook \(2013\), Chapter 3](#), Page 3-8 "Glide Ratio"
- [Glider Flying Handbook \(2013\), Chapter 5](#), Page 5-8 "Glider Polars"
- [Glider Flying Handbook \(2013\), Chapter 7](#), Page 7-37 "Speed to Fly"
- [Performance Airspeeds for the Soaring Challenged](#)

## Further Study

- Glider Polars and Speed-to-Fly; Wander Books (Available through the club, and [online](#) )
- [Online tutorial](#)

# Lesson 4f - Boxing the Wake

4f

## Lesson Objective

The lesson will allow the student to demonstrate maneuvering behind the tow plane to different established positioning with regard to the tow plane's wake. The maneuvers will be done in a fashion that is described by the FAA's Practical Test Standards: "Maneuvers the glider, while on tow, slightly outside the towplane's wake in a rectangular, box-like pattern."



## Regulatory Requirement

- Student Pilot [§61.87\(i\)\(12\)](#)
- Private Pilot [Practical Test Standard](#) IV(E)

## Content

- Positions of the glider behind the towplane
- High and Low-tow positions (also see lesson plan 3a -- [Hi-Low Tow Transition](#) )
- Low-left, low-right, high-right, high-left

## Procedures

There is no rush for this procedure. It is more important to take your time and get to all of the points on tow in a controlled and precise manner. As a matter of convention and habit, Skyline Instructors and students usually combine the tasks of the [Hi-Low Tow transition](#) with the boxing of the wake with the following procedure:

- Before starting, as a courtesy, call the tow-plane on the radio, "90866, this is 341 Kilo-Sierra, we're going to box the wake"
- Wait until the towplane has begun straight and level flight.
- Perform transition through the wake into low tow position.
- Proceed to low left tow position. Hold for three seconds.
- Proceed to high left tow position. Hold this position for at least three seconds.
- Proceed to high right tow position. Hold for three seconds.
- Proceed to low right tow position. Hold for three seconds.
- Proceed to center low tow position. Hold for three seconds.
- Return to normal high tow position, going back through the wake.

The maneuver can be in either a clockwise or counter-clockwise direction.

**NOTE:** During the practical test the examiner may ask for you to perform the maneuvers of "High-Low Tow Transition" separately from "Boxing the Wake." In this circumstance, boxing the wake does **NOT** include transitioning through the wake at the beginning of the maneuver. The candidate would maneuver around the wake without ever making contact with the tow plane's wake.

If the box-wake maneuver is being performed separately from the [Hi-Low Tow Transition](#), execute the following procedure. The following example is for clockwise direction. Either direction is possible.

- Before starting, as a courtesy, call the towplane on the radio, and wait for it to attain straight and level flight.
- Move from normal high tow position to the high-right tow position. Pause for three seconds.
- Move to low right tow position. Pause for three seconds.
- Move directly to low left tow position, without pausing at the low tow position. Pause at the corner.
- Proceed from low left tow position to high-left. Pause for three seconds.
- Complete the maneuver by returning to the normal high tow position.

Generally speaking, the low tow position behind the Pawnee is indicated when the horizontal stabilizer is lined up with the tow pilot's rear view mirror. Behind the Husky, the low tow position is achieved when the elevator is lined up with the wing. For both tow planes, the glider pilot knows that he has gone far enough to the side when the tail wheel and main wheels appear to line up.

## Completion Standards

The candidate must:

1. Exhibit knowledge of the elements related to boxing the wake (maneuvering around the wake).
2. Maneuver the glider, while on tow, slightly outside the towplane's wake in a rectangular, box-like pattern.

3. Maintain proper control and coordination.

## Prerequisite Study

- [Glider Flying Handbook \(2013\), Chapter 7](#), page 7-12
- Soaring Safety Foundation -- "SSF PTS Boxing the Wake" ([YouTube](#))

## Hints

- You have reached low tow position when the horizontal stabilizer appears to cut through the rear-view mirror on the tow plane.
- You have gone out far enough to the side when the tail-wheel and the main wheel line up.
- A common error is to not maintain the horizontal position when moving from low-left to high-left and vice-versa. Give a little bank to prevent getting pulled back to the center

## Video Illustration

- HD Video (1:58) of a normal boxing the wake maneuver: [Boxing the Wake](#) .

# Lesson 4g - Crosswind Takeoff

4g



## Lesson Objective

The student must be able to take off with slight to moderate cross-winds. During the takeoff roll, the pilot must exhibit control to maintain runway centerline. After take-off, but before the towplane has left the ground, the candidate must crab into the wind to maintain runway centerline. After the towplane is in the air, the glider should resume normal high-tow position. During this maneuver, the candidate must maintain appropriate position at all times.

## Regulatory Requirement

- Pre-Solo Candidate: [§61.87\(i\)\(3\)](#)
- Practical Candidate: [PTS IV-B](#)

## Content

- Take-off in cross-wind conditions
- Wing-runner positioning of the wing during take-off
- Positioning of the glider on the runway in especially windy conditions (slightly downwind of the centerline)

## Completion Standards

To determine that the applicant:

1. Can listen to the AWOS/ASOS winds and determine the approximate crosswind component.
  1. 10 degrees is about one tenth
  2. 20 degrees is about one third
  3. 30 degrees is exactly half
  4. 45 degrees is 70%
  5. 60 degrees is 85%
  6. 70-90 degrees, use full speed
2. Exhibits knowledge of the elements related to normal and crosswind takeoff, including configurations and tow positions.
3. Uses proper signals for takeoff.
4. Lifts off at an appropriate airspeed.
5. Maintains proper position until towplane lifts off.
6. Maintains directional control and proper wind-drift correction throughout the takeoff.
7. Maintains proper alignment with the towplane.

## Prerequisite Study

- [Glider Flying Handbook \(2013\), Chapter 7](#), Page 7-5 "Crosswind Takeoff"

# Lesson 4h - Crosswind Landing

4h



## Lesson Objective

The student must be able to land with slight to moderate cross-winds. The pilot must exhibit control to maintain runway centerline on approach, flare, and touchdown. On landing and roll-out, the candidate must maintain runway centerline, despite the crosswind. The candidate may use slip or crab to correct for the crosswind component on the approach.

## Regulatory Requirement

- **Pre-Solo:** [§61.87\(i\)\(16\)](#)
- **Private Practical Candidate:** [PTS,IV-Q](#)

## Content

- Side-Slip to correct for crosswind
- Crab to correct for crosswind

## Completion Standards

To determine that the applicant:

1. Can listen to the AWOS/ASOS winds and determine the approximate crosswind component.
  1. 10 degrees is about one tenth
  2. 20 degrees is about one third
  3. 30 degrees is exactly half
  4. 45 degrees is 70%
  5. 60 degrees is 85%
  6. 70-90 degrees, use full speed
2. Exhibits knowledge of the elements related to normal and crosswind approach and landing procedures.
3. Adjusts flaps, spoilers, or dive brakes, as appropriate.
4. Maintains recommended approach airspeed, +10/-5 knots.
5. Maintains crosswind correction and directional control throughout the approach and landing.
6. Makes smooth, timely, and positive control application during
7. the roundout and touchdown.
8. Touches down smoothly within the designated landing area, with no appreciable drift, and with the longitudinal axis aligned with the desired landing path, stopping short of and within 200 feet (120 meters) of a designated point.
9. Maintains control during the after-landing roll.
10. Completes appropriate checklists.

## Prerequisite Study

- [Glider Flying Handbook \(2013\), Chapter 7](#), Page 7-25 "Crosswind Landing"

## Video Illustration

- Soaring Safety Foundation "SSF 9 - Crosswind Landing" ([YouTube](#))
  - For discussion with your instructor, see the "Instructor Guide" link under the embedded Video at [Soaringsafety.org](#)



# Lesson 4i - Unassisted Takeoff

4i

## Lesson Objective

Although this is not required by any of the Practical Test Standards, nor is it required by 61.87 for pre-solo knowledge, knowing how to take-off without a wing-runner can be a useful skill to have. The candidate will learn the procedures for a safe take-off without a wing-runner, and will learn when it is safer not to take-off without a wing-runner (such as from a CG-tow-hook only glider)



## Regulatory Requirement

- **Pre-Solo:** *None*
- **Private Candidates:** *None*

## Content

- Position of stick and rudder before and during takeoff
- The hazards of unassisted take-off with a CG-hook equipped glider

## Completion Standards

- The candidate must be able to take off the glider without a wing runner

# Lesson 4j - Covered Instrument Landings

4j



## Lesson Objective

The student will learn what to do if some of the flight instruments become inoperable. If the altimeter becomes inoperative, the student will use visual cues to determine altitude, and guide the glider to a safe landing. If the airspeed indicator stops working, then the candidate will use reference to attitude and slipstream noise to judge airspeed.

The student should also be able to explain the situations which could lead to each of these instruments failing.

## Regulatory Requirement

- Pre-Solo: [§61.87\(i\)\(9\)](#)
- Private Pilot Candidate: [PTS X-A](#)

## Content

- Landing with the altimeter covered.
- Landing with the airspeed indicator covered.

## Completion Standards

The student must be able to perform:

- A safe landing with the altimeter covered.
- A safe landing with the airspeed indicator covered.

## Prerequisite Study

- [Glider Flying Handbook \(2013\), Chapter 7](#), Page 8-20 "Flight Instrument Malfunctions"

# Lesson 4k - Precision Landings and Stops

4k

## Lesson Objective

This lesson will show the student the ability to land on a specific point, and stop within a specified distance, determined by the instructor. This is training for the event of an unplanned off-airport landing.



## Regulatory Requirement

- **Pre-Solo:** [§61.87\(i\)\(16\)](#)
- **Private Practical Candidate:** [PTS](#) X-A

## Completion Standards

The student will complete this task when he/she exhibits knowledge of the elements related to a simulated off-airport landing, including selection of a suitable landing area and the procedures used to accomplish an off-airport landing. The simulated off-airport landing can be demonstrated by a landing on the grass. The precision touch-down and stops can be evaluated with markers in the grass. We usually use four paint can lids spaced 30 paces apart, lined up on the center of the grass strip, touching down in an area adjacent to the runway numbers on the paved runway. The usual stop is somewhere adjacent to the fuel farm

## Prerequisite Study

- [Glider Flying Handbook \(2013\), Chapter 8](#), Page 8-18 "Off-Field Landing Procedures"

## Further Study

- Landing Out: [The Final Four Minutes](#) , Don Ingraham Available for purchase from the club

# Lesson 4l - Slips to Landing (w/ & w/o airbrakes)

4l

## Lesson Objective

This lesson is to have the student demonstrate the ability to use either a forward slip (previously practiced at altitude in [Lesson 4d](#)), on the final approach. Use the forward slip primarily for altitude loss, and the side slip for runway alignment or lateral re-positioning.



## Regulatory Requirement

- **Pre-Solo:** [§61.87\(i\)\(17\)](#)
- **Private Pilot Candidate:** [PTS](#) IV(R)

## Completion Standards

The student must be able to perform:

- A forward slip on the final leg of the approach to landing
- A side slip on the final leg of the approach to landing

## Prerequisite Study

- [Glider Flying Handbook \(2013\), Chapter 7](#), Page 7-25 "Slips"
- [Glider Flying Handbook \(2013\), Chapter 8](#), Page 8-24 "Spoiler / Divebrake malfunctions"

## Video Illustration

- Soaring Safety Foundation "SSF PTS Slip to Land" ([YouTube](#))

## Also See

- Lesson 4d: "[Slips, forward, side, turning, with and without airbrakes](#)"
- Lesson 4h: "[Crosswind Landing](#)"

# Lesson 5a - Thermal

5a

## Lesson Objective

In our club, most of the flights that last longer than 20 minutes exploit thermal lift to gain or sustain altitude. This lesson plan introduces thermal soaring techniques, predicting thermal behavior, and gives the candidate the ability to locate and use thermal lift. This lesson also will give techniques to return to a lost thermal.



## Regulatory Requirement

- [§61.87\(i\)\(18\)](#)
- [Private Pilot Practical Test Standard](#) VI-A

## Content

## Completion Standards

### **Practical Test Standards for Thermal Flight:**

1. Exhibits knowledge of the elements related to thermal soaring. Recognizes the indications of, and the presence of, a thermal.
2. Analyzes the thermal structure and determines the direction to turn to remain within the thermal.
3. Exhibits coordinated control and planning when entering and maneuvering to remain within the thermal.
4. Applies correct techniques to re-enter the thermal, if lift is lost.
5. Remains oriented to ground references, wind, and other aircraft.
6. Maintains proper airspeeds in and between thermals.

### **The student must be able to perform**

- Thermal flight without advice from the Instructor
- The ability to locate and exploit thermal lift

The student must be able to explain:

- Hazards associated with thermalling in gaggles
- Use of meteorological signs
- Use of visual cues, such as birds, gliders, smoke streamers

## Prerequisite Study

- [Glider Flying Handbook \(2013\)](#),
  - [Chapter 9](#) "Thermal Soaring Weather", page 9-6
  - [Chapter 9](#) "Thermal Shape and Structure", page 9-6
  - [Chapter 9](#) "Atmospheric Stability", page 9-7
  - [Chapter 9](#) "Air Masses Conducive to Thermal Soaring", page 9-9
  - [Chapter 9](#) "Cloud Streets", page 9-9
  - [Chapter 10](#) "Thermal Soaring", page 10-2

## Recommended Study

- "[The art of Thermalling... Made Easy](#) " -- Bob Wander book available on-line or for purchase from the club.
- "[Thermals](#) ", Rolf Hertenstein -- available for purchase online.
- "[Climb Performance Handicapping](#) ", Judah Milgram. This article discusses climb performance, how much to bank in what kind of thermals.
- <https://www.youtube.com/watch?v=UzUo89eAPsU> British lecture on thermalling technique.

## Further Reading

- Bob Sallada's [Thermalling Helper](#) (Skyline Members Only)
- COMET program -- a good course for learning more about how to interpret Skew-T Log P diagrams <http://www.meted.ucar.edu/mesoprim/skewt/>
- [The Soaring Engine](#); Volume One by G. Dale

# Lesson 5b - Ridge

5b

## Lesson Objective

Most students do not get to experience ridge soaring, even at our club. Skyline Soaring offers an excellent training ridge nearby. During the Spring and Fall months, the nearby Massanutten ridge comes alive with strong lift, safe land-out fields. Unfortunately, this activity also is accompanied by hazards.



## Regulatory Requirement

- None
- [Private Pilot Practical Test Standard](#) VI-B

## Content

- Slope Soaring Techniques
- Hazards associated with ridge soaring
- Techniques for entering and leaving the ridge lift.
- Other lift sources that combine with ridge lift (thermal, wave)
- Transitioning between ridges

## Completion Standards

### ***Practical Standards for Ridge Soaring:***

Objective. To determine that the applicant:

1. Exhibits knowledge of the elements related to ridge and slope soaring.
2. Recognizes terrain features and wind conditions which create orographic lift.
3. Enters the area of lift properly.
4. Estimates height and maintains a safe distance from the terrain.
5. Exhibits smooth, coordinated control, and planning to remain within the area of lift.
6. Uses correct technique to re-enter the area of lift, if lift is lost.

## Prerequisite Study

- [Glider Flying Handbook \(2013\)](#)
  - [Chapter 9](#), "Weather for Slope Soaring", page 9-14
  - [Chapter 10](#), "Ridge and Slope Soaring" (Techniques), 10-10

# Lesson 5c - Wave

5c

## Lesson Objective

Wave Soaring is not common throughout the United States, especially in the flatlands of the midwest and southeast. However rare wave lift may be for some regions, Skyline Soaring is blessed with 20 to 30 flyable days with wave lift every year. However, since we operate only on weekends and occasional weekdays, the total number of days we can use this lift is reduced. During this lesson plan, the student will learn the basics of wave formation, techniques of soaring in wave, and the hazards associated with rotor turbulence and the extreme sink of the lee side of the wave.



## Regulatory Requirement

- **Pre-Solo:** *None*
- **Private Pilot Candidate:** [PTS](#) VI-C, C1(j)

## Content

- Wave Soaring Techniques
- Wave lift formation
- Oxygen systems
- Hypothermia
- Hypoxia

## Completion Standards

### Practical Test Standards:

Objective. To determine that the applicant:

1. Exhibits knowledge of the elements related to wave soaring.
2. Locates and enters the area of lift.
3. Exhibits smooth, coordinated control, and planning to remain within the area of lift.
4. Uses correct technique to re-enter the area of lift, if lift is lost.
5. Remains oriented to ground references, wind, and other aircraft.
6. Recognizes and avoids areas of possible extreme turbulence.
7. Maintains proper airspeeds.
8. Coordinates with ATC, as appropriate.

The student must be able to explain

- Mechanics of lee-wave formation
- Meteorological conditions that produce wave lift
- Hazards of wave flying

## Prerequisite Study

- [§91.211](#) Supplemental oxygen.
- [Glider Flying Handbook \(2013\), Chapter 9](#), page 9-16 "Wave Soaring Weather"
- [Glider Flying Handbook \(2013\), Chapter 10](#), Page 10-16 "Wave Soaring"
- [Wikipedia article on Lee Waves](#)
- [Wikipedia article on Lenticular Clouds](#)
- [Wikipedia article on Föhn Winds](#)
- [Potential Dangers in Wave Soaring](#)

## Recommended Study

- [Skyline Soaring Club's Wave Window](#)

## Further Reading

- **Practical Wave Flying**, Mark Palmer -- [available on-line](#) or through the club for purchase
- **SKYLINES**, [July 2009](#), written by George Hazelrigg.

- <http://www.meted.ucar.edu/mesoprim/mtnwave/> COMET program -- a good course for learning more about downslope wave meteorology



# Lesson 6a - Slack Line

6a

## Lesson Objective

Inevitably, the glider pilot may be faced with the situation of slack line in the tow rope. These situations happen especially during gusty conditions, during towplane malfunctions (towplane decelerating), getting terribly out of position, rapid towplane banking, or just flying cross-country on aerotow. The instructor may call the tow pilot and ask him to reduce his rate of climb, and will demonstrate getting into slack rope situations, and how to deal with them smoothly.



## Regulatory Requirement

- **Pre-Solo:** [§61.87\(i\)\(2\)](#)
- **Private Pilot:** [PTS](#) IV-D

## Content

- There are at least four recovery modes of slack rope:
  - Do nothing (only suitable for momentary slack situations)
  - Yaw away from the slack (not very useful on CG hook equipped gliders)
  - Pull dive-brakes (especially suitable for cross country aerotow, or over-run situations)
  - Release (most desperate act for the unrecoverable situation)
- Failure to recover from significant slack correctly can cause the rope to break
- Entanglement of the rope around the glider's fuselage or wing is unacceptable, and the procedure must be aborted before this situation can develop.
- Release if the slack in the rope ever gets to the wing, to avoid wing entanglement

## Completion Standards

### **Practical Test Standards:**

Objective. To determine that the student:

1. Exhibits knowledge hazards, and
2. Recognizes smooth corrective situations.

The student must be able to perform:

- Slack line recovery as described above and in the Glider Flying Handbook.

The student must be able to explain:

- Hazards of wing or fuselage entanglement
- Hazards of unexpected rope break
- The four slack line recovery modes for various situations

## Prerequisite Study

- [Glider Flying Handbook \(2013\), Chapter 8](#), Page 8-13 "Slack Line"

## Video Illustration

- Soaring Safety Foundation "SSF PTS Slack Line Recovery" ([YouTube](#))

# Lesson 6b - Aerotow Emergency Procedures

6b



## Lesson Objective

Aerotow emergency procedures include: glider can not release, towplane can not release, towplane power failure (at various times in the flight), abort of take-off near the ground, rope breaks. During this lesson segment, the student will learn the tools of recovery from these situations.

## Regulatory Requirement

- **Pre-Solo:** [§61.87\(i\)\(2\)](#)
- **Private Pilot:** [PTS](#) IV-D

## Content

- Tow-plane wave-off
- Spoilers opening on tow
- Tow-plane signal "something is wrong with the glider"
- Towplane abnormal power on takeoff or climb
- Inadvertent release from tow
- Glider release failure
- Towplane release failure

## Completion Standards

### **Practical Test Standards:**

Objective. To determine that the applicant:

1. Exhibits knowledge of the elements related to aerotow abnormal occurrences, for various situations, such as—
  1. towplane power loss during takeoff.
  2. towline break.
  3. towplane power failure at altitude.
  4. glider release failure.
  5. glider and towplane release failure.
2. Demonstrates simulated aerotow abnormal occurrences as required by the examiner.

The student must be able to perform:

- Successful recognition of towplane power loss on takeoff or climb-out
- Successful rope break recovery.

The student must be able to explain:

- Appropriate signals on aerotow for
  - Glider can not release
  - Towplane can not release
  - Something is wrong with the glider
- Procedure for the double-release failure scenario (however unlikely)
- Hazards of moving the glider too high on aerotow.

## Prerequisite Study

- [Glider Flying Handbook \(2013\), Chapter 8](#), Page 8-8 "Aerotow Abnormal and Emergency Procedures"
- [Glider Flying Handbook \(2013\), Chapter 8](#), Page 8-21 "Glider Canopy Opens Unexpectedly"
- YouTube Video -- Canopy opening in flight <http://www.youtube.com/watch?v=r0I75OZmA-0>

# Lesson 6c - V-Speeds

6c



## Lesson Objective

The candidate will learn the differences between Maneuvering Speed ( $V_A$ ), Normal Operating Speed ( $V_{NO}$ ), and Never-Exceed Speed ( $V_{NE}$ ). The candidate will identify what hazards are associated with each airspeed. The instructor and student will fly together in dual practice, and accelerate to  $V_A$ , for at least a few moments, to get a feel for the stick sensitivity at this speed. Flight to  $V_{NE}$  is **NOT** required.

## Regulatory Requirement

- **Pre-Solo:** [§61.87\(i\)\(8\)](#) "Flights at various airspeeds"
- **Private Pilot:** [PTS](#) - V

## Completion Standards

The student must be able to perform:

- successful demonstration of flight to the  $V_A$  and/or  $V_{NO}$  speeds, appropriate for the conditions and the glider

The student must be able to:

- recite the maneuvering speed for the club gliders
- explain the differences between Maximum Structural Cruising Speed and Maneuvering Speed
- explain the hazards with rapid, excessive control movement **below**  $V_A$
- explain the hazards associated with rapid control movement above  $V_A$
- explain the relationship between  $V_{NE}$  and altitude.

## Prerequisite Study

- Schleicher ASK 21 manual Write down:  $V_{NE}$  & maximum control deflection,  $V_B$ ,  $V_M$ ,  $V_{LE}$ ,  $V_{S1}$ ,  $V_{S0}$ , V Lift Off, V most favorable aero tow speed, V most favorable approach speed.
- [§ 1.2](#) Abbreviations and symbols.
- [Pilot Handbook of Aeronautical Knowledge Chapter 11](#) page 11-18 "Performance Speeds"
- [V-Speeds](#) -- Wikipedia article on V-Speeds
- [FAA Special Airworthiness Bulletin](#) dated January 18, 2011 -- clarification on the meaning of  $V_A$
- [The Myth of Maneuvering Speed](#) -- Flying Magazine

## Further Study

- Wing Flutter Videos
  - RC Sailplane with Flutter ([YouTube](#))
  - Boeing 747 Wind Tunnel Flutter testing ([YouTube](#))
  - [Fluttertest](#) From the DG Website

# Lesson 6d - Rope Breaks

6d

## Lesson Objective



During the normal course of operating gliders on aerotow, the rope occasionally breaks before the pilot desires to release from the towplane. The aim of this lesson is to immediately react to the rope break and land the glider in a safe manner. The term PT3 (Premature Termination of The Tow) is often used instead of "rope break" to include all modes of failure included in this lesson plan. Ideally, the candidate will have performed at least three PT3 flights, each one in a different mode of flight. At around 50 feet (with straight ahead landing). At or around 200-300 feet, for a 180 return-to-base, and above 300 feet for an abbreviated pattern.

## Regulatory Requirement

- Pre-solo Candidate: [61.87\(i\)\(9\),\(19\)](#)
- Private Candidate: [PTS IV\(G\)](#)

## Content

- Rope breaks below 50 feet, at 200-300 feet and above 300 feet

## Completion Standards

The student must be able to:

- discuss the actions taken during a rope break and stop below 50 feet
- perform a simulated rope break between 200 and 300 feet (and safe return to the field)
- perform a premature termination of the tow above 300 feet, landing where appropriate
- make radio calls, as appropriate
- maintain a safe speed and bank angle during the return to the field
- judge heights and lands the aircraft safely without instructor intervention.

## Prerequisite Study

- [Glider Flying Handbook \(2013\), Chapter 8](#), Page 8-10 "Towing Failures"

## Recommended Study

- Joe Parrish, "Rope Breaks: Lessons Learned from the Space Shuttle", SOARING, April 1998 page 22, [Freely Available on-line](#)
- Soaring Safety Foundation: [Premature Termination of the Tow](#)

# Pilot Induced Oscillations

6e

## Lesson Objective

It is common for new pilots to experience Pilot-Induced Oscillations, usually in the pitch axis. The PIO can happen in any phase of flight, but the most dangerous is in the final moments of flight, or during the ground roll-out. The instructor will discuss strategies with the student on minimizing the probability of having a high-energy landing turn into a PIO that can damage the tail boom.



## Regulatory Requirement

none

## Content

- Pilot Induced Oscillations on Launch (pitch)
- Pilot Induced Oscillations on Landing (pitch)
- Pilot Induced Oscillations in flight (dutch roll)
- PIO prevention strategies
- Forcing the glider back onto the runway at too high of a speed
- Minimum energy landing strategies

## Completion Standards

The candidate must be able to consistently land the glider at minimum energy (with spoilers deployed).

For the ASK-21 trainers, our club instructors emphasize the two-point landing technique: tail wheel and main wheel landing simultaneously. The "fly-it-on" landing strategy is *highly* discouraged for these gliders, although note that it is appropriate for this technique when landing Schweizer gliders.

## Prerequisite Study

- [Glider Flying Handbook \(2013\)](#) Pilot-Induced Oscillations, page 8-2
- <http://www.soaringsafety.org/briefings/grobpio.html> Soaring Safety Foundation article on landing PIO.
- <http://tinyurl.com/Glider-PIO> Video clip of student landing (too fast) in Grob-103, which turns into PIO. Review this with an instructor! Also <https://www.youtube.com/embed/cX4oFDEKm94>

# Lesson 7a - Downwind Landing

7a



## Lesson Objective

Optimally, gliders will land into the wind. Occasionally, the glider must be landed with a tailwind. This lesson plan covers the issues related to a downwind landing. On downwind approaches, a shallower approach angle should be used, depending on obstacles in the approach path. Use the spoilers/dive brakes and perhaps a forward slip as necessary to achieve the desired glide path.

## Regulatory Requirement

- [§61.87\(i\)\(16\)](#)
- Private Pilot Practical Test Standard IV(S)

## Content

- Uses shallower approach path than normal
- Uses spoilers and slips as necessary to attain desired glide path
- Judges angles and descent rates correctly
- Corrects for increased ground speed and loss of control effectiveness at higher ground speeds.

## Completion Standards

The student must be able to perform:

- a satisfactory downwind landing.
- maintains positive control of the glider on landing and roll-out.
- judges angles correctly, and uses brakes or slip as appropriate

The student must be able to explain:

- effect of a downwind landing on the glide ratio
- effect of a downwind landing on the loss of controls at higher ground speeds
- hazards of landing in excessive tail winds.

## Prerequisite Study

- [Glider Flying Handbook \(2013\), Chapter 7](#), Page 7-27 "Downwind Landing"
- [Glider Flying Handbook \(2013\), Chapter 8](#), Page 8-12 "Tow failure above return to Runway Altitude"

# Lesson 7b - Landing Roll-out and Clearing Runway

7b



## Lesson Objective

This lesson focuses on the portion of the flight after touching down on the runway. Unlike most glider operations in the US, this club operates mostly on the paved surface, which has the extra hazard of runway lights. While operating at Front Royal, it is critical to maintain a roll-out along the runway's center-line. Clearing the runway MUST never be done before the glider has come to a complete stop.

## Regulatory Requirement

- [§61.87\(i\)\(2\)](#)
- [Private Pilot Practical Test Standard II-B](#)
- [Private Pilot Practical Test Standard IV-Q](#)
- Club and FBO rules
- 14 CFR [§91.113](#) requires that pilots observe right-of-way rules that include timely clearance of an active runway after landing, so as to not interfere with an aircraft trying to land. In a glider, that may not be all that easy, but it does not relieve the pilot in command of making a reasonable attempt to clear the runway, even though he cannot "taxi" in the conventional meaning of the word.
- Club rules prohibit "taxiing" off the paved runway onto the grass or a paved taxi way (unless there is some serious and immediate safety issue presented which requires such action).
- Local airport rules require that, when possible, gliders roll out to the mid-field turnoff before clearing the runway.
- Club pilots are required to be able to perform landings on the grass "emergency area", the first 1700 feet or so to the immediate north of runway 27. When landing on the grass, DO NOT roll out to the mid-field turnoff to avoid blocking other traffic using that turnoff.

## Completion Standards

The student must be able to perform:

- Taxiing the glider after touch down to the mid-field runway, remaining sufficiently close to the centerline as to avoid striking runway lights with the glider
- Expeditiously clearing the active runway after landing, with or without assistance from a ground crew.
- Landing on the grass "emergency area"
- When landing in the grass area, to demonstrate avoidance of obstructions during roll-out and control of the roll-out direction of the glider
- Proper positioning of the flight controls for crosswind conditions

# Lesson 7c - Assembly

7c

## Lesson Objective

For most privately-owned gliders, assembly is a daily part of the glider flying ritual. Understanding how to assemble the glider safely is critical to safety. Logistics often prevent the candidate from assembling the club's two seaters, but the candidate should at the very least be knowledgeable in the assembly and disassembly procedures of the club's two seaters. The task of assembly can be done on a private member's glider instead.



## Regulatory Requirement

- [§61.87\(i\)\(13\)](#)
- [Private Pilot Practical Test Standard II\(A\)](#)

## Content

- The safe and correct assembly of a glider, using appropriate tools, checklists, and crew members.

## Completion Standards

The student must be able to perform:

- Exhibits knowledge of the elements related to assembly procedures.
- Selects a suitable assembly area and provides sufficient crew members for assembly.
- Follows an appropriate checklist.
- Uses proper tools.
- Handles components properly.
- Cleans and lubricates parts, as appropriate.
- Accounts for all tools and parts at the completion of assembly.
- Performs post-assembly inspection, including a positive control check.

The student must be able to explain:

- the hazards of an incorrect hookup
- some of the common mistakes during assembly.
- hazards of distractions

## Prerequisite Study

- [Glider Flying Handbook \(2013\), Chapter 6](#), Page 6-2 "Assembly and Storage Techniques"
- [ASK-21 Flight Manual](#), assembly section, page 42
- [Discus CS Assembly Slides](#)



# Lesson 7d - Post-Flight Inspection

7d

## Lesson Objective

After the glider is done flying for the day, it needs to be inspected to see if any new damage has happened during the flying day. Also, it is important to wash the wings with clean rags and water to remove any dead bugs that have accumulated on the wing surfaces



## Regulatory Requirement

- **Pre-Solo:** *none*
- **Private Candidate:** [PTS XI\(A\)](#)

## Content

- Inspection of the glider after flying it for the day
- Correct procedure for cleaning the glider
- Correct procedure for cleaning the glider's canopies

## Completion Standards

The student must be able to perform:

- satisfactory post-flight inspection
- satisfactory cleaning of the wings and flight surfaces

The student must be able to explain:

- importance of keeping a clean glider.

# Lesson 7e - Disassembly

7e

## Lesson Objective

For most privately-owned gliders, assembly is a daily part of the glider flying ritual. By the end of the flying day, or when the glider has made an off-airport landing, the glider must be correctly disassembled and stored in its trailer correctly.



## Regulatory Requirement

- [§61.87\(i\)\(13\)](#)

## Content

- The safe and correct disassembly of a glider, using appropriate tools, checklists, and crewmembers.

## Completion Standards

The student must be able to perform:

- Exhibits knowledge of the elements related to after-landing and securing procedures, including local and ATC operations, ramp safety, parking hand signals, shutdown (if appropriate),
- securing, and postflight inspection.
- Selects a suitable parking area while considering wind and safety of nearby persons and property.
- Taxies to parking area and performs engine shutdown, if applicable.
- Services the glider, if applicable.
- Secures the glider properly.
- Performs a satisfactory postflight inspection.
- Completes the prescribed checklist.

The student must be able to explain:

- the hazards of an incorrect installation into the trailer

## Prerequisite Study

- [Glider Flying Handbook \(2013\), Chapter 6](#), Page 6-4 "Tiedown and Securing"
- [ASK-21 Flight Manual](#), rigging and de-rigging section, page 42
- [Discus CS Assembly Slides](#)

# Lesson 7f - Pre-Solo Written Test

7f

## Lesson Objective

Students are required by 61.87(b) to pass a written test. The test must address the student pilot's knowledge of-



applicable sections of parts 61 and 91 of this chapter; airspace rules and procedures for the airport where the solo flight will be performed; and flight characteristics and operational limitations for the make and model of aircraft to be flown.

## Regulatory Requirement

- **Pre-Solo:** [§61.87\(b\)](#)
- **Private Pilot Candidate:** *None*
  - *Even though Private Pilot members who do not hold a glider category rating are not required to pass a written solo test by 61.87(b), club rules dictate that all transition pilots still need to pass the written test.*

## Content

- The pre-solo pilot will successfully complete a different written test for each glider to be soloed.
- Incorrect answers will be reviewed with the instructor and student
- Once the Pre-solo test is completed, the instructor will give an endorsement similar to [AC 61-65GH](#) Appendix A, Endorsement A.3

### **Pre-solo aeronautical knowledge: section 61.87(b).**

I certify that [First name, MI, Last name] has satisfactorily completed the pre-solo knowledge test of § 61.87(b) for the [make and model (M/M) aircraft].

/s/ [date] J. J. Jones 987654321CFI Exp. 12-31-19

# Lesson 7g - Special Awareness Training

7g

## Lesson Objective

All pilots operating aircraft within 60 nautical miles of the Washington VOR/DME must have successfully completed the FAA's Special Awareness Training. This training is only on-line, and successful completion results in a certificate. This must be done by all pilots in Skyline Soaring Club. This training need only be accomplished once.



## Regulatory Requirement

- All Operations: [§91.161](#)

## Content

- All club members who act as operators of any aircraft operated out of Front Royal (KFRR) must complete the Special Awareness Training required for pilots operating within 60 nm of the Washington VOR/DME.
- Create an account at <http://www.faasafety.gov>. Log in to your new account. Once you have an account, the training course and test is at this URL: [http://www.faasafety.gov/gslac/ALC/course\\_catalog.aspx?categoryId=11](http://www.faasafety.gov/gslac/ALC/course_catalog.aspx?categoryId=11)
- Sign up for the course named "DC SFRA", The course is named "ALC-405", presented by the AFS-850 National FAASTeam.
- Successful completion will allow the candidate to print out the certificate, and earn 1/2 credit toward that candidate's FAA WINGS program.
- The certificate should be included in the candidate's logbook or other flight-related documents.

# Lesson 7h - Checkride Rating Endorsement

7h



## Lesson Objective

The objective of this lesson is the completion of training for the Private Pilot or Commercial Pilot certificate with a glider category rating as evidenced by an instructor sign-off for the practical test.

## Regulatory Requirements

- For Private Pilot: Part [14 CFR Part 61 Subpart E](#) (§61.102 through §61.113)
- For Commercial Pilot: [14 CFR Part 61 Subpart F](#) (§61.121 through §61.133)

## Content

The instructor will certify completion of all training requirements by verifying that all lesson elements 1 through 7 of the Student Progress Report are completed to the Rating level.

The instructor will verify that the student has passed the required knowledge test.

The instructor will conduct a minimum of three flights with the student preparatory for the practical test, covering the required elements of [§61.107](#) for the Private Pilot certificate or [§61.127](#) for the Commercial Pilot certificate.

The instructor will verify that the student's logbook contains signoffs for aero tow, glider assembly/disassembly, and solo flight in the glider to be used for the practical test, and verify that the student's student license is correctly endorsed.

The instructor will assist the student in the preparation of the Application for an Airman Certificate using IACRA (<https://iacra.faa.gov/iacra/>). Paper versions of the 8710-1 application are no longer accepted.

## Required Endorsements

1. Current solo endorsement for glider category, in the glider to be used for the practical test
2. Aerotow launch procedures endorsement
3. Written test report, signed by the instructor indicating training has been given for the missed question areas
4. Endorsement for taking the practical test

## Endorsement Examples

### Solo Endorsement for a Student Pilot:

Required by § 61.87(c). [AC 61-65H](#) A.6 and / or [AC 61-65H](#) A.7 *This endorsement must be current!*

I certify that [First name, MI, Last name] has received the required training to qualify for solo flying. I have determined [he or she] meets the applicable requirements of § 61.87(n) and is proficient to make solo flights in [M/M].  
/s/ [date] J. J. Jones 987654321CFI Exp. 12-31-19

- or -

I certify that [First name, MI, Last name] has received the required training to qualify for solo flying. I have determined that [he or she] meets the applicable requirements of § 61.87(p) and is proficient to make solo flights in [M/M].  
/s/ [date] J. J. Jones 987654321CFI Exp. 12-31-19

### Solo Endorsement for Transition Pilots:

Required when acting as PIC of an aircraft in solo operations when the pilot does not hold an appropriate category/class rating: § 61.31(d)(2). [AC 61-65H](#) A.72

I certify that [First name, MI, Last name] has received the training as required by § 61.31(d)(2) to serve as a pilot in command in a [specific category and class of aircraft]. I have determined that [he or she] is prepared to solo that [M/M] aircraft. Limitations: [optional].  
/s/ [date] J. J. Jones 987654321CFI Exp. 12-31-19

### Launch procedures for operating a glider:

Required by § 61.31(j). [AC 61-65H](#) A.79

I certify that [First name, MI, Last name], [grade of pilot certificate], [certificate number], has received the required training in a [glider M/M] for [launch procedure]. I have determined that [he or she] is proficient in [list the launch procedure].

/s/ [date] J. J. Jones 987654321CFI Exp. 12-31-19

### **Endorsements for Private Pilot Practical Test:**

Prerequisites for practical test: Title 14 of the Code of Federal Regulations (14 CFR) part 61, § 61.39(a)(6)(i) and (ii).

[AC 61-65H](#) A.1

I certify that [First name, MI, Last name] has received and logged training time within 2 calendar-months preceding the month of application in preparation for the practical test and [he or she] is prepared for the required practical test for the issuance of [applicable] certificate.

/s/ [date] J. J. Jones 987654321CFI Exp. 12-31-19

Review of deficiencies identified on airman knowledge test: § 61.39(a)(6)(iii) as required. [AC 61-65H](#) A.2

I certify that [First name, MI, Last name] has demonstrated satisfactory knowledge of the subject areas in which [he or she] was deficient on the [applicable] airman knowledge test.

/s/ [date] J. J. Jones 987654321CFI Exp. 12-31-19

Flight proficiency/practical test: §§ 61.103(f), 61.107(b), and 61.109. [AC 61-65H](#) A.33

I certify that [First name, MI, Last name] has received the required training in accordance with §§ 61.107 and 61.109. I have determined [he or she] is prepared for the [name of] practical test.

/s/ [date] J. J. Jones 987654321CFI Exp. 12-31-19

### **Endorsements for Commercial Pilot Practical Test:**

Prerequisites for practical test: Title 14 of the Code of Federal Regulations (14 CFR) part 61, § 61.39(a)(6)(i) and (ii).

[AC 61-65H](#) A.1

I certify that [First name, MI, Last name] has received and logged training time within 2 calendar-months preceding the month of application in preparation for the practical test and [he or she] is prepared for the required practical test for the issuance of [applicable] certificate.

/s/ [date] J. J. Jones 987654321CFI Exp. 12-31-19

Review of deficiencies identified on airman knowledge test: § 61.39(a)(6)(iii) as required. [AC 61-65H](#) A.2

I certify that [First name, MI, Last name] has demonstrated satisfactory knowledge of the subject areas in which [he or she] was deficient on the [applicable] airman knowledge test.

/s/ [date] J. J. Jones 987654321CFI Exp. 12-31-19

Required by §§ 61.123(e), 61.127, and 61.129. [AC 61-65H](#) A.35

I certify that [First name, MI, Last name] has received the required training of §§ 61.127 and 61.129. I have determined that [he or she] is prepared for the [name of] practical test.

/s/ [date] J. J. Jones 987654321CFI Exp. 12-31-19

# Lesson 8a - First Solo and the "A" Badge

8a



## Lesson Objective

Once you solo, you are well on your way to getting an "A" badge. Receiving the "A" badge is not automatic. All Skyline Soaring Club Instructors are certified Soaring Society of America Instructors (SSAI), and can issue you your first "A" badge after solo.

## Regulatory Requirement

- **Pre-Solo:** *None*
- **Private Pilot Candidate:** *None*

## Completion Standards

### *Preflight Phase*

Applicant Demonstrates Knowledge of:

- Sailplane Nomenclature
- Sailplane Handling Procedures
- Sailplane Pre-flight Check
- Airport Rules and Federal Aviation Regulations
- Tow Equipment, Signals, and Procedures
- Hook-up of Towline
- Launch Signals
- Pilot Responsibilities

Applicant Possesses:

- Valid FAA Pilot Certificate
- Pilot Logbook or Suitable Permanent Record
- Appropriate Endorsements from [Advisory Circular 61-65GH](#) (see below)

### *Presolo Phase*

Applicant Has Completed the Following Minimum Flight Training Program:

- Familiarization Flight
- Cockpit Check Procedure
- Effects of Controls - Ground and Flight
- Takeoff Procedures - Normal and Crosswind
- Flight During Tow
- Straight Gliding Flight
- Shallow Turns
- Circuit Procedures and Landing Patterns
- Landing Procedures - Normal, Downwind, and Crosswind
- Moderate and Steep Turns Up to 720 Degrees in Both Directions
- Stall Recognition and Recovery
- Conditions of Spin Entry and Recovery
- Effective Use of Spoilers/Flaps/Slips
- Emergency Procedures
- Oral Examination on Federal Aviation Regulations
- Solo Flight

## Required Sign-offs from the Instructor Before Solo

- Pilots with a Student Pilots license require:
  - If the student pilot certificate is paper, then the instructor's signature must be placed on the student pilot certificate. An endorsement must be made for each aircraft to be soloed.
  - If the student pilot certificate is plastic, no endorsement is necessary on the certificate.
  - Endorsement for the Pre-solo written test (See [Lesson 7f](#))  
[AC 61-65GH](#) Endorsement A.3

**Pre-solo aeronautical knowledge: section §61.87(b).**

I certify that [First name, MI, Last name] has satisfactorily completed the pre-solo knowledge test of section §61.87(b) for the [make and model (M/M) aircraft].

/s/ [date] J. J. Jones 987654321CFI Exp. 12-31-19

- Endorsement for safe solo-flight AC61-65H Endorsement A.4

**Pre-solo flight training: section §61.87(c).**

I certify that [First name, MI, Last name] has received the required pre-solo flight training in a [M/M aircraft]. I have determined [he or she] has demonstrated satisfactory proficiency and safety on the maneuvers and procedures required by §61.87 in this or similar make and model of aircraft to be flown.

/s/ [date] J. J. Jones 987654321CFI Exp. 12-31-19

- Endorsement for aero-tow AC61-65H Endorsement A.78

**Launch procedures for operating a glider: section §61.31(j).**

I certify that [First name, MI, Last name], [grade of pilot certificate], [certificate number], has received the required training in a [glider M/M] for [launch procedure]. I have determined that [he or she] is proficient in [list the launch procedure].

/s/ [date] J. J. Jones 987654321CFI Exp. 12-31-19

- Pilots with at least a Private Pilot rating in a different category require:

- Endorsement for aero-tow AC61-65H Endorsement A.79

**Launch procedures for operating a glider: section §61.31(j).**

I certify that [First name, MI, Last name], [grade of pilot certificate], [certificate number], has received the required training in a [glider M/M] for [launch procedure]. I have determined that [he or she] is proficient in [list the launch procedure].

/s/ [date] J. J. Jones 987654321CFI Exp. 12-31-19

- Endorsement for solo when applicant does not hold a category rating, AC61-65H Endorsement A.72

**To act as pilot in command of an aircraft in solo operations when the pilot does not hold an appropriate category/class rating: §61.31(d)(3).**

I certify that [First name, MI, Last name] has received the training as required by § 61.31(d)(2) to serve as a pilot in command in a [specific category and class of aircraft]. I have determined that [he or she] is prepared to solo that [M/M] aircraft. Limitations: [optional].

/s/ [date] J. J. Jones 987654321CFI Exp. 12-31-19



# Lesson 8b - The "B" Badge

8b

## Lesson Objective

After solo, the Student/Candidate must demonstrate the ability to use lift sources to prolong a glider flight.



## Regulatory Requirement

- **Pre-Solo:** *None*
- **Private Pilot Candidate:** *None*

## Completion Standards

- Soaring ability by a solo flight of at least 30 minutes duration after release from a 2,000-foot tow
  - add 1½ minutes per 100 foot tow altitude above 2,000 feet.
- After the flight, the candidate will submit his logbook for review to a Club SSA Instructor, and he will issue the "B" Badge.

## Further Reading

- Soaring Society of America's "[ABC Bronze Training Program](#)"

# Lesson 8c - The "C" Badge

8c

## Lesson Objective

After solo, the Student/Candidate must demonstrate the ability to use lift sources to prolong a glider flight. There are also dual-flight requirements for the "C" badge.



## Regulatory Requirement

- **Pre-Solo:** *None*
- **Private Pilot Candidate:** *None*

## Completion Standards

Applicant has completed the following flight training:

- Dual soaring practice, including instruction in techniques for soaring thermals, ridge soaring, and wave (simulated flight and/or ground instruction may be used when suitable conditions do not exist).
- Has knowledge of:
  - Cross-country Procedures
  - Sailplane Assembly, Disassembly, and Retrieves
  - Hazards of Cross-country Flying
- Demonstrates soaring ability by solo flight of at least 60 minutes duration after release from a 2,000 foot tow
  - add 1½ minutes per 100 foot of tow above 2,000 feet
- While accompanied by an SSA Instructor, demonstrate the following:
  - Make a simulated off-field landing from the approach without reference to the altimeter
  - Perform an accuracy landing from the approach, touching down and coming to a complete stop within an area no greater than 500 feet in length.

## Further Reading

- Soaring Society of America's "[ABC Bronze Training Program](#)"

# Lesson 8d - The "Bronze" Badge

8d

## Lesson Objective

In order to do cross-country flight in any club equipment, club rules dictate that the candidate must have a sign-off for that cross-country flight. A bronze badge meets many of the requirements, and demonstrates the candidate's skills necessary from safe cross-country flight.



## Regulatory Requirement

- **Pre-Solo:** *None*
- **Private Pilot Candidate:** *None*

## Completion Standards

### *Cross-Country Readiness*

Applicant Must:

- Complete the ABC Training Program with the C badge awarded.
- Log at Least 15 solo hours in gliders. This time must include 30 solo flights with at least 10 flights flown in a single-place glider if possible.
- Log at least 2 flights, each having duration of two hours or more.
- Perform at least 3 solo spot landings in a glider witnessed by an SSAI. The accuracy and distance parameters established should be based on glider performance data, current winds, runway surface, and density altitude. As a guideline, a maximum distance of 400 feet would be acceptable for a Schweizer 2-33 Glider.
- Log dual time in gliders with an Instructor during which at least 2 accuracy landings are made without reference to the altimeter to simulate off-field landings.
- Pass a closed-book written examination covering cross-country techniques and knowledge. The minimum passing score is 80%. This examination is administered only by an SSAI.

## Further Reading

- Soaring Society of America's "[ABC Bronze Training Program](#)"
- Soaring Safety Foundation's "[Bronze Badge Study Guide](#) "
- British Gliding Association's collection of "[Off] [Field Landing](#)" articles
- British Gliding Association's collection of videos relating to "[Field Landings](#)"

## External Resource

- <https://www.soaringsafety.org/learning/bronzebadge.html> - Study Guide and location of the official SSA Bronze Badge written test

# Lesson 9a - Proficiency or Stage Check

9a

## Lesson Objective

To assist members in achieving a reasonable level of proficiency and safety, whether at the beginning of the soaring season, or any time required by club special currency requirements.



## Regulatory Requirement

- Skyline Soaring Club Operations Manual, para 3.1.5 'Special Currency Requirements'
- Recommended by the [Soaring Safety Foundation](#)

## Content

- Review of procedures and maneuvers selected at the discretion of the CFI providing the check flight.

## Completion Standards

The member will demonstrate a level of safety in performance acceptable to the CFI conducting the review.

## Prerequisite Study

- None

## Further Reading

- Bob Wander's book, [Glider BFR and Spring Checkout](#)

# Lesson 9b - 61.56 Flight Review

9b

## Lesson Objective

To assure that all Club members are fully compliant with the regulatory requirements (q.v.) for flight reviews, including biennial flight and ground training as appropriate to the member's ratings and status.



## Regulatory Requirement

- [§61.56](#) (No pilot may act as pilot in command without being in compliance with this regulation.)

## Content

Review of general operating and flight rules of CFR 14 FAR 91; a review of maneuvers and procedures that, at the discretion of the CFI providing the review, are necessary for the safe exercise of the privileges of the member's certificate.

It must include one hour of ground instruction covering part 91. The contents of the ground instruction are up to the instructor to decide.

It must also include one hour of flight instruction. If one hour of flight instruction is not practical, glider pilots may substitute at least three flights "to pattern altitude".

Pilots who hold a current CFI rating and who have satisfactorily completed a renewal of a flight instructor certificate under the provisions in §61.197 need are **exempt** from the one hour of ground instruction, as per 61.56(f).

## Completion Standards

The completion standards are at the discretion of the flight instructor providing the review.

## Required Sign-offs for Flight Review

After the successful completion of the flight review, the instructor will indicate so with a logbook endorsement. Below is a sample sign-off with text taken from FAA Advisory Circular 61-65G. The flight review is only valid for pilots possessing an airman rating with the glider category.

- Endorsement of successful 61.56 Flight Review, [AC 61-65H Endorsement A.65](#)

### Completion of a flight review: section §61.56(a) and (c).

I certify that (First name, MI, Last name), (grade of pilot certificate), (certificate number), has satisfactorily completed a flight review of § 61.56(a) on (date).  
/s/ [date] J. J. Jones 987654321CFI Exp. 12-31-19

**NOTE:** No logbook entry reflecting unsatisfactory performance on a flight review is required. Simply log instruction received in this circumstance.

## Prerequisite Study

- 14 CFR [§61.56](#)
- Review [14 CFR part 91](#), Emphasizing on these regs:
  - [§91.7](#) Civil aircraft airworthiness
  - [§91.9](#) Civil aircraft flight manual, marking, and placard requirements.
  - [§91.13](#) Careless or reckless operation.
  - [§91.15](#) Dropping objects.
  - [§91.17](#) Alcohol or drugs.
  - [§91.103](#) Preflight action.
  - [§91.111](#) Operating near other aircraft.
  - [§91.113](#) Right-of-way rules: Except water operations.
  - [§91.161](#) Special awareness training required for pilots flying under visual flight rules within a 60-nautical mile radius of the Washington, DC VOR/DME.
  - [§91.211](#) Supplemental oxygen.
  - [§91.303](#) Aerobatic flight.
  - [§91.307](#) Parachutes and parachuting.
  - [§91.309](#) Towing: Gliders and unpowered ultralight vehicles.
  - [§91.319](#) Aircraft having experimental certificates: Operating limitations.

## Recommended Study

- "[Glider BFR And Spring Checkout](#) ", by Bob Wander

# Training Syllabus Tracking Sheet

| Lesson | Phase                                                                | FAR Requirement | PTS Area    | Instructor Sign-Off and Date |
|--------|----------------------------------------------------------------------|-----------------|-------------|------------------------------|
| 1      | Before We Fly                                                        |                 |             |                              |
| 1a     | <a href="#">Preflight Planning / Overview</a>                        | 61.87(i)(1)     | I           |                              |
| 1b     | <a href="#">Aeromedical Factors Discussion</a>                       |                 | I(E)        |                              |
| 1c     | <a href="#">Use of Controls</a>                                      |                 |             |                              |
| 1d     | <a href="#">Cockpit Familiarization</a>                              |                 |             |                              |
| 1e     | <a href="#">Positive Control Check</a>                               | 61.87(i)(1)     | II(C)       |                              |
| 1f     | <a href="#">Release Mechanisms</a>                                   | 61.87(i)(1)     | II(C)       |                              |
| 1g     | <a href="#">Handling - Hangar to Flightline</a>                      | 61.87(i)(2)     | II(B)       |                              |
| 1h     | <a href="#">Handling - Flightline to Hangar</a>                      | 61.87(i)(2)     | II(B)       |                              |
| 2      | First Flights                                                        |                 |             |                              |
| 2a     | <a href="#">Pre Takeoff Checklist</a>                                | 61.87(i)(1)     | IV(A)       |                              |
| 2b     | <a href="#">Attitude Flying / Scanning</a>                           | 61.87(i)(6)     |             |                              |
| 2c     | <a href="#">Glider Daily Inspection</a>                              | 61.87(i)(1)     | I, II(C)    |                              |
| 2d     | <a href="#">Airport Procedures</a>                                   | 61.87(i)(5)     | III(A,B,C)  |                              |
| 2e     | <a href="#">Cockpit Management</a>                                   |                 | II(D)       |                              |
| 2f     | <a href="#">Aerotow Release</a>                                      | 61.87(i)(11)    | IV(F)       |                              |
| 2g     | <a href="#">Visual Signals</a>                                       | 61.87(i)(11)    | II(E)       |                              |
| 2h     | <a href="#">Normal Takeoff</a>                                       | 61.87(i)(3)     | IV(B)       |                              |
| 2i     | <a href="#">Normal Aerotow</a>                                       | 61.87(i)(12)    | IV(C)       |                              |
| 2j     | <a href="#">Straight Glide</a>                                       | 61.87(i)(4)     | VII(A)      |                              |
| 2k     | <a href="#">Shallow, Medium, Steep Turns</a>                         | 61.87(i)(4)     | VII(C)      |                              |
| 2l     | <a href="#">Normal Landing</a>                                       | 61.87(i)(16)    | IV(Q)       |                              |
| 3      | Core Flights                                                         |                 |             |                              |
| 3a     | <a href="#">Hi-Low Tow Transition</a>                                | 61.87(i)(12)    | IV(C)       |                              |
| 3b     | <a href="#">Before-landing Checklist</a>                             | 61.87(i)(16)    | IV(Q)(8)    |                              |
| 3c     | <a href="#">Traffic Pattern</a>                                      | 61.87(i)(10,16) | IV(Q)       |                              |
| 3d     | <a href="#">Minimum Controllable Airspeed</a>                        | 61.87(i)(8)     | V(A), IX(A) |                              |
| 3e     | <a href="#">Turns to Heading</a>                                     |                 | VII(B)      |                              |
| 3f     | <a href="#">Forward Stall, with and without airbrakes</a>            | 61.87(i)(14)    | IX(B)       |                              |
| 3g     | <a href="#">Turning Stall, with and without airbrakes</a>            | 61.87(i)(14)    | IX(B)       |                              |
| 3h     | <a href="#">Spirals, Descents</a>                                    | 61.87(i)(15)    |             |                              |
| 4      | Advanced Skills                                                      |                 |             |                              |
| 4a     | <a href="#">Collision, Windshear &amp; Wake Turbulence Avoidance</a> | 61.87(i)(6)     | IV(G)       |                              |
| 4b     | <a href="#">Radio Procedures</a>                                     |                 | III(A)      |                              |
| 4c     | <a href="#">Minimum Sink</a>                                         | 61.87(i)(8)     | V(A)        |                              |
| 4d     | <a href="#">Slips: Forward, Side, Turning</a>                        | 61.87(i)(7)     | IV(R)       |                              |
| 4e     | <a href="#">Best L/D; Speed-to-fly</a>                               | 61.87(i)(8)     | V(B)        |                              |
| 4f     | <a href="#">Boxing the Wake</a>                                      | 61.87(i)(12)    | IV(E)       |                              |
| 4g     | <a href="#">Crosswind Takeoff</a>                                    | 61.87(i)(3)     | IV(B)       |                              |
| 4h     | <a href="#">Crosswind Landing</a>                                    | 61.87(i)(16)    | IV(Q)       |                              |
| 4i     | <a href="#">Unassisted Takeoff</a>                                   |                 |             |                              |
| 4j     | <a href="#">Covered Instrument Landings</a>                          | 61.87(i)(9)     | X(A)        |                              |
| 4k     | <a href="#">Precision Landings and Stops</a>                         | 61.87(i)(16)    | X(A)        |                              |
| 4l     | <a href="#">Slips to Landing</a>                                     | 61.87(i)(17)    | IV(R)       |                              |
| 5      | Soaring Techniques                                                   |                 |             |                              |
| 5a     | <a href="#">Thermal</a>                                              | 61.87(i)(18)    | VI(A)       |                              |
| 5b     | <a href="#">Ridge</a>                                                |                 | VI(B)       |                              |

|    |                                              |                  |        |  |
|----|----------------------------------------------|------------------|--------|--|
| 5c | <a href="#">Wave</a>                         |                  | VI(C)  |  |
| 6  | Unusual Attitudes and Emergencies            |                  |        |  |
| 6a | <a href="#">Slack Line</a>                   | 61.87(i)(9),(19) | IV(D)  |  |
| 6b | <a href="#">Aerotow Emergency Procedures</a> | 61.87(i)(9),(19) | IV(G)  |  |
| 6c | <a href="#">V-Speeds</a>                     | 61.87(i)(8)      | V      |  |
| 6d | <a href="#">Rope Breaks</a>                  | 61.87(i)(9),(19) | IV(G)  |  |
| 6e | <a href="#">Pilot-Induced Oscillations</a>   |                  |        |  |
| 7  | Finishing Touches                            |                  |        |  |
| 7a | <a href="#">Downwind Landing</a>             | 61.87(i)(16)     | IV(S)  |  |
| 7b | <a href="#">Taxiing and Clearing Runway</a>  | 61.87(i)(2)      | XI     |  |
| 7c | <a href="#">Assembly</a>                     | 61.87(i)(13)     | II(A)  |  |
| 7d | <a href="#">Postflight Inspection</a>        |                  | XI(A)  |  |
| 7e | <a href="#">Disassembly</a>                  | 61.87(i)(13)     |        |  |
| 7f | <a href="#">Pre-Solo Written Test</a>        | 61.87(b)         |        |  |
| 7g | <a href="#">Special Awareness Training</a>   | 91.161           | 91.161 |  |
| 7h | <a href="#">Checkride Rating Endorsement</a> |                  | PTS p5 |  |
| 8  | Solo and Badges                              |                  |        |  |
| 8a | <a href="#">First Solo and the A Badge</a>   |                  |        |  |
| 8b | <a href="#">The B Badge</a>                  |                  |        |  |
| 8c | <a href="#">The C Badge</a>                  |                  |        |  |
| 8d | <a href="#">The Bronze Badge</a>             |                  |        |  |
| 9  | Continuing Training                          |                  |        |  |
| 9a | <a href="#">Proficiency or Stage Check</a>   |                  |        |  |
| 9b | <a href="#">Flight Review</a>                |                  |        |  |

I affirm that I, \_\_\_\_\_,  
have received satisfactory and complete instruction for solo flight, including  
all applicable topics listed above, and as also as defined in 14 CFR 61.87(i),  
61.107(a), and 61.107(b).

Student's Signature, \_\_\_\_\_, Date \_\_\_\_\_

Instructor's Signature, \_\_\_\_\_ Date \_\_\_\_\_.





|    |                                              |  |  |  |  |  |  |  |  |
|----|----------------------------------------------|--|--|--|--|--|--|--|--|
| 6d | <a href="#">Rope Breaks</a>                  |  |  |  |  |  |  |  |  |
| 6e | <a href="#">Pilot-Induced Oscillations</a>   |  |  |  |  |  |  |  |  |
| 7a | <a href="#">Downwind Landing</a>             |  |  |  |  |  |  |  |  |
| 7b | <a href="#">Taxiing and Clearing Runway</a>  |  |  |  |  |  |  |  |  |
| 7c | <a href="#">Assembly</a>                     |  |  |  |  |  |  |  |  |
| 7d | <a href="#">Postflight Inspection</a>        |  |  |  |  |  |  |  |  |
| 7e | <a href="#">Disassembly</a>                  |  |  |  |  |  |  |  |  |
| 7f | <a href="#">Pre-Solo Written Test</a>        |  |  |  |  |  |  |  |  |
| 7g | <a href="#">Special Awareness Training</a>   |  |  |  |  |  |  |  |  |
| 7h | <a href="#">Checkride Rating Endorsement</a> |  |  |  |  |  |  |  |  |
| 8a | <a href="#">First Solo, A Badge</a>          |  |  |  |  |  |  |  |  |
| 8b | <a href="#">The B Badge</a>                  |  |  |  |  |  |  |  |  |
| 8c | <a href="#">The C Badge</a>                  |  |  |  |  |  |  |  |  |
| 8d | <a href="#">The Bronze Badge</a>             |  |  |  |  |  |  |  |  |
| 9a | <a href="#">Proficiency or Stage Check</a>   |  |  |  |  |  |  |  |  |
| 9b | <a href="#">Flight Review</a>                |  |  |  |  |  |  |  |  |