



Humber Valley R.C. Flyers Flight Training Handbook

Revision 3.1 April 2002

Introduction	.....	1
Lesson 1 : Radio & Field Procedures	.....	3
Lesson 2 : Aircraft Familiarization	.....	4
Lesson 3 : Flight Familiarization	.....	7
Lesson 4 : Basic Flight Maneuvers	.....	8
Lesson 5 : Accuracy Maneuvers	.....	9
Lesson 6 : Orientation Maneuvers	.....	10
Lesson 7 : Stalls	.....	12
Lesson 8 : Approaches to Landing	.....	14
Lesson 9 : Take-off	.....	15
Lesson 10 : Solo Flight	.....	15
Lesson 11 : Emergency Procedures	.....	16
Lesson 12 : Wings Program	.....	17
Progress Checklist	.....	18
Log Entries	.....	20



Introduction

Welcome to the Humber Valley Radio Control Flyers pilot training program. This program will teach you the basics of flying radio controlled model aircraft, and is MAAC's best effort to assist you in the process.

There is nothing in this program that guarantees that you will become a successful R/C pilot. Nor are there any expectations on how long it will take to complete this program. Like everything else, your success will all depend on your willingness to spend the time and practice.

This program is a series of lessons designed to build on previous lessons, to develop the skill and confidence which will allow you to thoroughly enjoy your new hobby.

Upon completion of these lessons, you will be ready to take your "A" Wings test. This test is designed to demonstrate to the club's satisfaction that you are able to control your plane safely. After passing this test, you will be allowed to fly without an instructor present.

Hopefully, the completion of your "A Wings" is only the beginning of your learning and will serve as an incentive to get out and fly. Where you go from here is up to you. Good Luck!

Reminder

You must learn to crawl before walking, and walk before running. For this reason, MAAC strongly recommends that you start your flight instruction on a trainer and then evolve to more advanced planes.

A trainer will enable you to learn easier and will simplify instruction... and your plane will last you longer with less chance of a serious crash.

Remember, even jet fighter pilots learn to fly in trainers before advancing to jets. So leave the scale planes until after you have learned to fly.

SAFETY FIRST, FUN SECOND

Instructor - Student Responsibilities

You are about to embark on the Primary Flight Training Course approved by the Model Aeronautics Association of Canada. You may seek instruction at any time from any club instructor listed on the instructor phone list.

Your instructor has met the qualifications of MAAC. He has accepted the responsibility to teach you to become a responsible and safe pilot who can be proud of his flying abilities, and be an enjoyable fellow club member. If the instructor ignores his responsibility, you may be a pilot who is a hazard to yourself and others wherever you fly.

You may not take your "A" Wings test until your instructor, or the Chief Instructor, has certified that you have completed the elements of your primary training program and you are ready for your "A" Level Wings test. You must pass your "A" Wings test before you are allowed to fly at the club field without the supervision of a club instructor.

As a student, you have shown the diligence to build your first trainer, seek out the local club and join this training program. It is your responsibility to apply yourself diligently to learn and apply the material presented in this course. By doing so, you will learn the minimum amount of information and skills to allow you to safely enjoy radio controlled flight.

Each section of this course deals with a different aspect of flying a radio controlled model aircraft. Your instructor will explain and demonstrate each element of each lesson. Where applicable he will demonstrate the element in the air using your aircraft. You will have opportunities to perform each element and receive an evaluation from your instructor.

Each lesson will be logged in the Log Book section at the end of this booklet, and your instructor will initial that the material has been reviewed with you. It is important that you keep your training program with you at all times and ensure that instructors initial elements after they have been covered.

Remember, no instruction will take place at the field without:

- 1.) This booklet
- 2.) Your Club Membership tag
- 3.) Your MAAC card

Lesson 1: Radio and Field Procedures

Purpose:

To familiarize the student with all safety aspects associated with model aircraft both on the ground and in the air.

Objective:

At the completion of the lesson the student will be aware of all HVRCF and MAAC safety rules and field procedures. The student shall also be able to perform a pre-flying session and pre-flight check.

Elements:

HVRCF Safety & Field Rules

- 1** On arrival at the field, all transmitters will be placed on the transmitter impound shelf immediately.
- 2** Current membership and MAAC card must be hung on the proper frequency hook in order to claim a frequency for use, before switching on a transmitter.
- 3** When not in use, transmitters will be placed on the impound shelf and membership pouch removed from frequency board.
- 4** A maximum of 5 pilots are permitted on the flight line at once. Flying shall be controlled from the designated stations .
- 5** There will be no taxiing in the pit area or behind the flight line, and no flying south of or over the flight line and the pit area.
- 6** There will be no flying north of the railroad tracks.
- 7** Landing priority must be given to any pilot or student calling out "DEAD STICK!"
- 8** Pilots and students will call out loudly an intention to land (LANDING!), to taxi for takeoff (TAKING OFF!), or to retrieve a plane from the field (ON THE FIELD!), and proceed only when safe to do so.
- 9** Whenever more than two planes are in the air at one time, pilots will establish an agreed upon circuit direction. Aerobatics will be performed with due courtesy and consideration

for safety, in the general direction of the circuit, and will be away from the flight line and the pit area.

- 10 Alcohol and drug use at the field will be treated with zero tolerance and will result in expulsion from the club.
- 11 Students will not operate an engine at the field when alone.
- 12 Students must fly with a designated instructor using a buddy box. Regular pilots are not permitted to provide students with stick time.

General Rules and Member Obligations

- Operation of R/C cars is prohibited. Priority will be given to fixed wing flyers. Helicopter flying will be permitted only with the unanimous consent of all members present at the field at any given time. The operation of any helicopter, or its engine, is prohibited while any fixed wing flying is taking place.
- All powered aircraft engines must employ a muffler or produce no more than 90db noise at 10 feet.
- The gate must be kept locked at all times.
- All members and flying guests must have a valid MAAC membership to fly their aircraft.
- Members are responsible for keeping the field area clean.
- Mats or starting platforms should be used in the pit area under the engine to protect the grass from fuel, and removed from the ground when finished.
- After unloading/loading aircraft and equipment, members must move their vehicle to the parking lot without delay.
- A person deemed responsible in a crash due to neglect shall pay full value for damages.
- **FLYING HOURS:**
Monday to Saturday 8:00am to 9:00pm, Sun 9:00am to 9:00pm.
Student flying is discouraged on Sundays before 2:00pm

Lesson 2: Aircraft Familiarization

Purpose:

To teach the student how to properly pre-flight his model.

Objective:

At the completion of the lesson the student should be able to inspect his model and identify any deficiencies that could cause a malfunction or safety hazard. He will be able to start and adjust the engine properly.

Elements:

- Inspection of aircraft structure, centre of gravity and longitudinal balance.
- Inspection of radio installation.
- Inspection of all linkages and control surfaces including controls for proper throw, direction and freedom of movement.
- Engine, fuel system installation and security (including props).
- Instructor's demonstration of safe engine starting procedure and starting of engine.
- Instructor teaches student how to identify rich and lean engine settings.
- Instructor teaches student how to adjust the idle mixture to get optimum performance from that type of engine.

Evaluation:

Student should be able to perform lesson objectives.

THIS LESSON SHOULD BE REVIEWED AS NECESSARY AT THE START OF ALL LESSONS IN THE PRIMARY TRAINING COURSE.

Pre-Flight Check List

Before each flying session:

- Radio range check

Before each flight:

- Frequency Board - Peg in place
- Receiver battery - voltage check
- Radio antenna - out
- Transmitter - on and checked for interference
- Receiver - on
- Aircraft controls - transmitter operation check
- Throttle set

Start:

- Aircraft secure
- All clear - ahead (prop) and behind
- Run up - mixture set
- Idle - reliable

Pre Take-off

- Engine - full power performance OK
- Controls - free and correct
- Rate switches - set
- Trims - set for take-off
- Windsock - checked for wind direction
- Runway - clear
- Announce intention to take-off to other pilots on the flight line

Lesson 3: Flight Familiarization

Purpose:

To introduce the student to controlling the model in flight.

Objective:

To allow the student to become familiar with the model's controls and their use in flight.

Elements:

- On the ground, instructor will familiarize the student with the controls (pitch, yaw and power) and the affect they have on the aircraft in flight.
- The buddy box procedures used by the instructor to take control of the aircraft from the student will be explained.
- Instructor flies and lands the student's model to evaluate its performance and air worthiness. This flight determines any changes necessary for control throws and trims. If the instructor can trim the aircraft without landing, control of the aircraft will be passed to the student.
- With the assistance and direction of the instructor, the student will start the process of becoming familiar with the controls.
- The student will strive to keep the model in level flight and follow turning instructions given by the instructor.
- It is the student's responsibility to request the instructor take control of the plane... in time for the instructor to take corrective action to prevent a crash.

Concentrate on flying within your ability. If you become dis-oriented or confused, pass control back to the instructor.

Evaluation:

The lesson is complete when the instructor has determined that the student is able to determine and execute proper control inputs to achieve a desired change in the model's attitude. Proficiency and accurate control are not critical at this point.

Lesson 4: Basic Flight Maneuvers

Purpose:

To acquaint the student with the basic flight maneuvers.

Objective:

To teach the student to properly control the model during basic maneuvering.

Elements:

- Level flight and trim (aileron and elevator)
- Banked turns (30 degrees)
- Straight climbs (add power and trim)
- Climbing turns
- Gliding (idle power and trim)
- Disorientation (silhouette and control reversal issues with in-bound aircraft)

Note:

An explanation of disorientation issues, and the use of trim should precede this lesson. The five maneuvers should be taught in the order listed if possible.

Evaluation:

The lesson is complete when the student can perform the maneuvers without assistance from the instructor. Each maneuver should be executed with a reasonable degree of accuracy. For example, turns should be fairly smooth and altitude maintained fairly well.

Lesson 5: Accuracy Maneuvers

Purpose:

To teach the student to perform the five basic maneuvers to a standard that will develop proficiency in their execution.

Objective:

To develop the skill and ability of the student to control the model in a specific manner.

Elements:

- Level flight, maintaining heading and altitude.
- Level flight at reduced power, maintaining heading, altitude and trim.
- Left and right turns to specific headings.
- Climbing turns to specific headings.
- Use of rudder for turns and maintaining straight flight at slower speeds.
- Power off (idle) glides that require the student to maneuver the model to a specific area and approximate altitude.

Example: Have the student close the throttle over the east end of the field at 200 ft and glide to the west end at an altitude of about 100 ft.

Note:

The object is to develop skill and ability, AND an awareness of the model's position relative to directions and altitude. Mechanical precision is not critical at this stage. Review disorientation and control reversal issues as necessary.

Evaluation:

The lesson is complete when the student can maneuver the model at the instructor's direction, and can demonstrate an ability to control the model in an accurate manner.

Lesson 6: Orientation Maneuvers

Purpose:

To develop the judgment, skill and ability necessary for the student to make his first landing.

Objective:

To teach the student to control the model regardless of its heading or direction relative to himself.

Elements:

- Figure 8 - the student must fly a figure 8 pattern consisting of two 360 degree turns, one left and one right. The student must place the maneuver in front of himself at a safe distance and altitude.
- The student must fly a rectangular pattern at a safe altitude, with the upwind leg crossing the landing area. Club policies regarding observance of the traffic pattern will be discussed and explained.
- The student will perform a procedure turn

Note:

The instructor will designate the size, altitude, and distance of all three maneuvers.

Evaluation:

The lesson is complete when the student can fly the Figure 8 without experiencing disorientation and can fly both right and left rectangular patterns and procedure turns consistently and accurately.

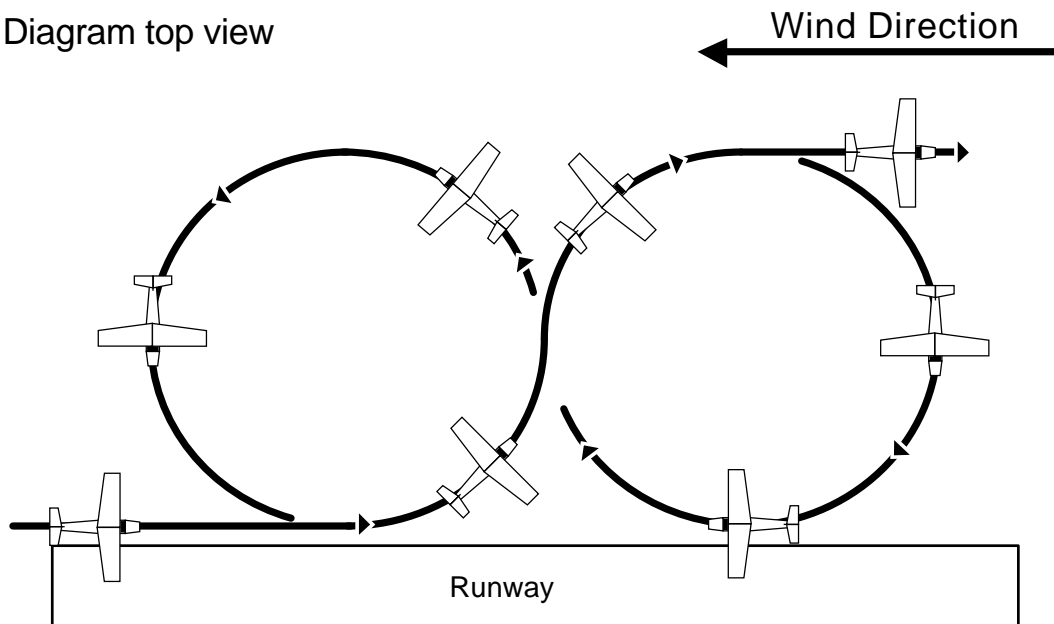
Reference Diagrams:

Flat Figure Eight:

The model will attain altitude and must be flown parallel to the runway to a point at the centre-line of the runway. Model then makes a 90 degree turn in a direction away from the flight line, levels its wings, and then makes a 360 degree flat turn to the right or left. When the model returns to its original heading away from the flight line, it makes a second 360 degree flat turn in the opposite

direction to the first 360 degree turn. The maneuver is complete when the model levels its wings after the second 360 degree turn.

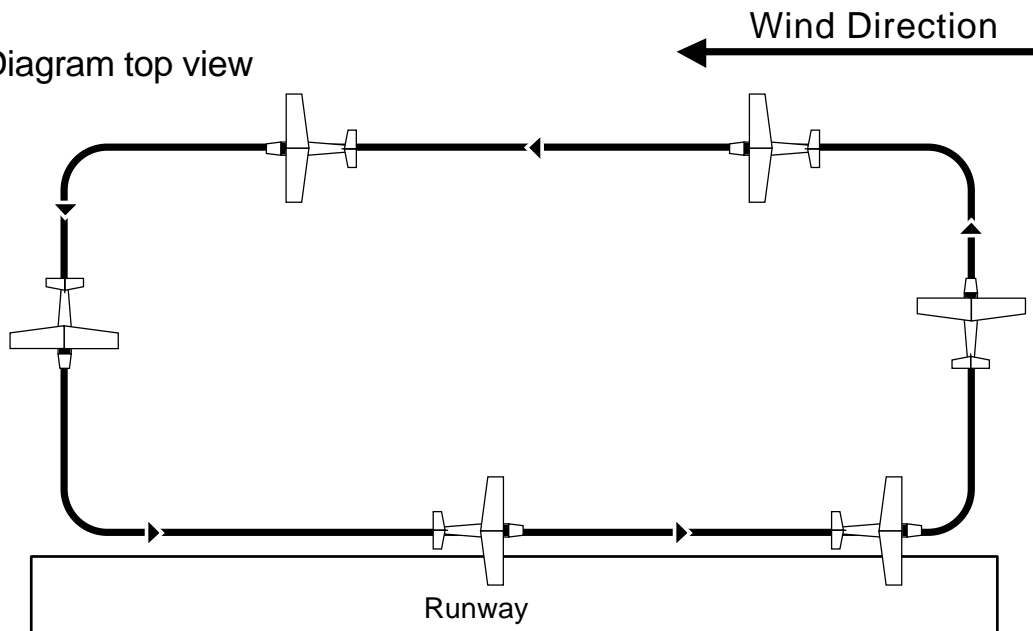
Diagram top view



Rectangular Pattern:

The maneuver begins with the model flying straight and level into the wind parallel to the runway. At the far end of the runway, the model turns 90 degrees away from the flightline for the first cross-wind leg. The model makes a second 90 degree turn into the down wind leg. The model makes a third 90 degree turn into the second cross-wind leg. The model makes a fourth 90 degree turn into the wind and continues on to the starting position of the maneuver.

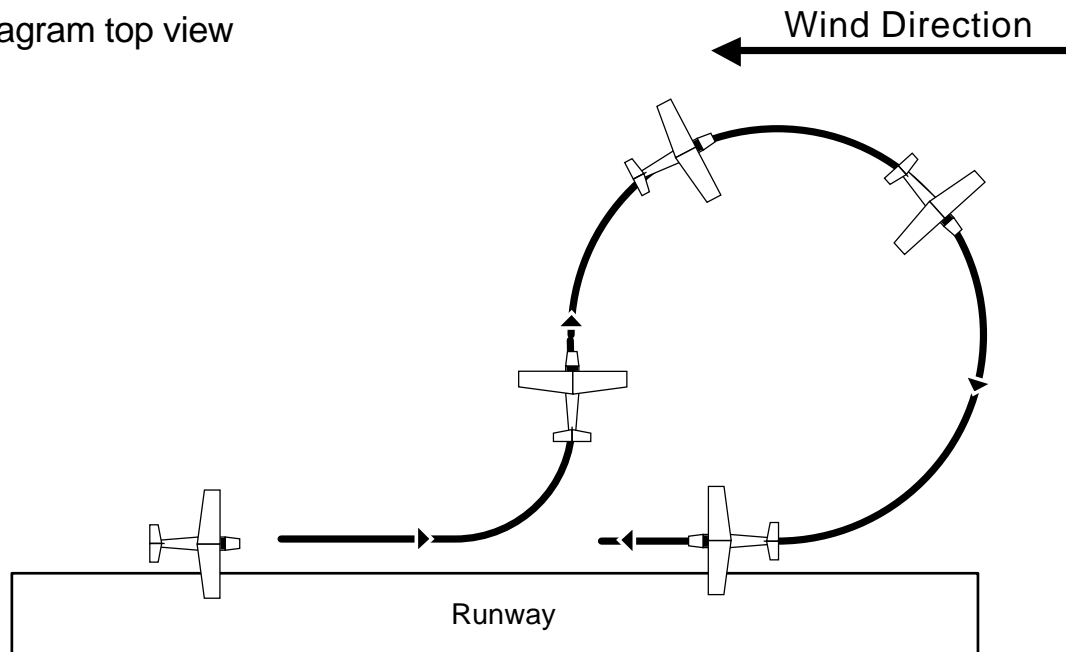
Diagram top view



Procedure Turn:

After the Straight Flight Out, model makes a 90 degree turn away from the flight line followed by a 270 degree turn in the opposite direction back to the reverse flight path of the Straight Flight Out.

Diagram top view



Lesson 7: Stalls

Purpose:

To develop the student's understanding of stalls, their cause, how to avoid them.

Objective:

To teach the student to recognize and recover from stalls.

Elements:

- Pre-flight discussion of stalls. What causes them, and how to recover.
- Practice of stalls by the student, with power and without power.
- Stalls in turns (Take-off, departure stalls)

Note:

Take-off and departure stalls are almost impossible to set up with most trainers, but do occur in more advanced models. Therefore, it is recommended that power be reduced to about 1/3 throttle and a steep climbing turn entered. The stall entry will look similar to a spin entry with the model rolling towards the high wing. During this lesson it should be emphasized to the student that a stall can occur at any airspeed and is a function of angle of attack.

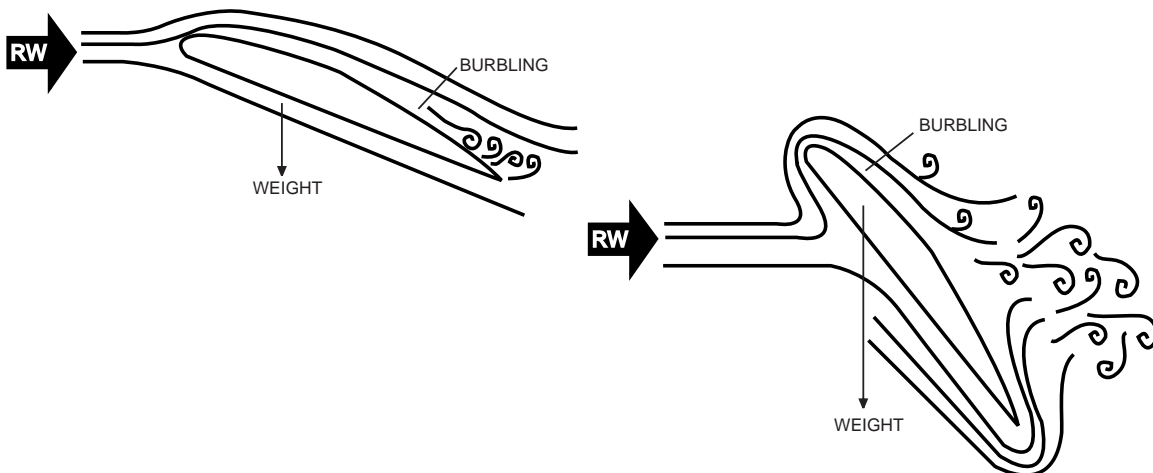
Evaluation:

The lesson is complete when the student understands the cause of stalls and has demonstrated the lesson elements and proper recovery.

Reference: Stalls

Sufficient airspeed must be maintained in flight to produce enough lift to support the airplane without requiring too large an angle of attack. At a specific angle of attack, called the critical angle of attack, air going over a wing will separate from the wing or "burble" (see drawing), causing the wing to lose its lift (stall). The airspeed at which the wing will not support the airplane without exceeding this critical angle of attack is called the stalling speed.

This speed will vary with changes in wing configuration (flap position). Excessive load factors caused by sudden maneuvers, steep banks, and wind gusts can also cause the aircraft to exceed the critical angle of attack and thus stall at any airspeed and any attitude. Smooth flow of air over the airfoil and control surfaces must be maintained to control the airplane.



Lesson 8: Approaches to Landing

Purpose:

To prepare the student for his first landing.

Objective:

To develop the student's ability to visualize and perform a stable and controlled approach and landing.

Elements:

- Review of Lesson 6. (Slow Flight and Gliding)
- Discussion of proper landing techniques.
- Student flies a rectangular pattern as in Lesson 6, but reduces power and establishes an appropriate glide on the base leg and continues the approach until over the end of the runway, at which point he is to add power and go around. The minimum altitude at the end of the maneuver should be no less than 20 ft.
- As the student becomes comfortable with the maneuver, the altitude should be lowered until the instructor is confident that the model can glide to the runway with the power off (idle).
- Landing. At this point the instructor will tell the student to continue the approach and land.

Note:

The chances of a successful landing will be increased if the instructor reminds the student to keep the power at idle. It may be necessary to talk the student through the flare and touchdown.

Evaluation:

The lesson is complete when the student has successfully landed the model several times and is comfortable with the maneuver.

Lesson 9: Take-off

Purpose:

To teach the student how to make a normal take-off.

Objective:

To teach the student how to control the model during take-off.

Elements:

- Discussion of the effects of torque during take-off and initial climb.
- Use of rudder.
- Use of throttle.
- Use of elevator.
- Student makes a normal take-off IN TO WIND.

Evaluation:

The lesson is complete when the student has successfully taken off and established a normal climb with adequate airspeed. He must also demonstrate adequate directional control during take-off.

Lesson 10: Solo Flight

Purpose:

Confidence building exercise

Objective:

The student is to perform a solo flight demonstrating the knowledge and skill objectives of the previous nine lessons to the instructor.

Elements:

- Pre-flight discussion to answer questions and resolve any problems that concern the student about the lesson.

- Student performs a flight, under the instructor's supervision, starting with a thorough pre-flight and ending with the transmitter back in the impound.
- Instructors monitors the student's performance, and is on the buddy box, but assists only if necessary.

Evaluation:

The lesson is complete when the student has demonstrated a practical knowledge of all course objectives AND has observed all safety and field operating rules, and has successfully flown his model unassisted.

Lesson 11: Emergency Procedures

Purpose:

To prepare the student for the unexpected

Objective:

To acquaint the student with safe procedures to be used in emergencies.

Elements:

- Discussion of possible in-flight problems & how to deal with them.
- Unusual altitude training (optional) : loops and/or rolls
- Student performs simulated dead stick landing
- Cross wind take-offs and landings (optional)

Evaluation:

The elements of this lesson are only suggestions and there is no minimum performance requirement. The objective is to provide the student with insights that will assist him in safely dealing with the unexpected. Experience will teach him the rest.

If the student doesn't learn, the instructor hasn't taught!

Lesson 12: Wings Program

Purpose:

To allow the student to achieve and demonstrate flight proficiency.

Objective:

At the completion of the lesson the student will be familiar with the Wings program and be able to practice the "A" level wings maneuvers in preparation for the "A" level wings flight proficiency tests.

Elements:

- Discussion of Wings program levels "A" through "D".
- Discussion of "A" wings maneuvers. Take off, straight flight, flat figure eight, 360 degree landing circuit, landing under power, and maneuver downgrades.
- Supervised flight in which student practices and demonstrates "A" Wings maneuvers.
- Review and critique.

Evaluation:

The student should understand how to perform each of the "A" Wings maneuvers.

The Final Step:

When the instructor has certified that the student has successfully completed the training program, the student may then request to take the "A" Wings Program flight test, according to the Wings Program manual. When the student passes the "A" flight test, he is "cleared" as a regular pilot and may fly his aircraft at the club field without supervision.

GOOD LUCK! and GOOD FLYING!!



Progress Check List

To be presented to Instructor prior to each day's flight training. The instructor will initial each item as it is successfully completed

Flight Proficiency

INSTRUCTORS NOTE: You are to demonstrate each step of the particular lesson to be learned. Show the student what it looks like. When the student understands the control input sequences and reasons for them, then give him control.

Instructor is to initial and date each lesson segment when the student has shown he/she has mastered it.

		initial	date
Lesson 1:	Safety rules		
	Club rules		
	Pre-Flight		
Lesson 2:	Airworthiness check		
	Engine start procedures		
Lesson 3:	Ground handling (taxiing)		
	Basic control understanding		
Lesson 4:	Level flight & trim		
	Banked turns		
	Straight climb		
	Climbing turns		
	Gliding		
	Disorientation		
Lesson 5:	Slow flying		
	Slow flight trim		
	Turns to specified headings		
Lesson 6:	Figure 8		
	Rectangular pattern		
	Procedure Turn		

