

**Winnipeg Headingley Aero Modellers**

**Now ...**

**How Do I Do This?**

**[ Basic Flying Training ]**

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# Basic Flying Training

## Objective

The objective of the **Basic Flying Training** syllabus is to provide Instructor Pilots with a direction for the orderly presentation of basic flying training to a beginning student. It is intended that, upon successful completion of the training exercises, the student will graduate as a safe and qualified model airplane pilot.

## Liability

*The Instructor Pilot is to ensure that, before any flights are undertaken, the student pilot clearly understands that WHAM and its staff of Instructor Pilots will assume no liability for any damage to airplanes or objects with which the training airplane may come into contact during any training session.*

## Exercise Briefings

To ensure that the student understands what will take place during the air exercise, a pre-flight briefing should be carried out. This is essentially a practical briefing, using the “**Pilot’s Guide**” and “**Things About Airplanes ....**” where appropriate, and including the important aspects:

- a. what we are going to do,
- b. how we are going to do it, and,
- c. safety considerations.

The pre-flight briefing should be conducted just prior to the air exercise.

A quick post-flight de-briefing should be conducted at the conclusion of the air exercise. It is essential to give the student an opportunity to discuss and obtain clarification of any points involved in the lesson. Study assignments to help the student prepare for the next lesson should be made as part of the post-flight de-briefing.

## Lesson Plans

Lesson plans for the Basic Flying Training syllabus provide a ready reference for the Instructor Pilot. It is essential that an adequate level of student competency in each exercise be achieved prior to proceeding to the next lesson.

It should be understood that each Lesson Plan does not necessarily constitute a single flight – the number of flights will vary according to the Lesson Plan content and the student’s ability.

The suggested training exercise content for each of the Lesson Plans is as follows:

- Lesson Plan 1 ..... Training Exercises 1, 2, 3, 4
- Lesson Plan 2 ..... Training Exercises 5, 6
- Lesson Plan 3 ..... Training Exercises 7, 8
- Lesson Plan 4 ..... Training Exercises 9, 10
- Lesson Plan 5 ..... Training Exercise 11, 12, 13
- Lesson Plan 6 ..... Training Exercise 14.

## **Exercise 1 - Safety of Operations**

### **Objective**

To introduce the student to the WHAM airfield environment and the safety related requirements during flying operations.

### **Essential Background**

1. Explain:
  - a. the airfield layout,
  - b. the pit area,
  - c. the landmarks around the perimeter of the airfield which will be used during the training exercises, and,
  - d. the safety related requirements for flying operations.
2. Answer any questions the student may have regarding the airfield, its operation and the expected safe practices of pilots.

### **Advice to Instructors**

1. Avoid going into detail which may confuse or overload the student.
2. Use the Pilot's Guide – General Information and Airmanship to assist in the student's understanding.
3. Particular emphasis should be placed on safe practices within the pit area.

## **Exercise 2 - Preparation of the Airplane for Flight**

### **Objective**

To teach the student how to determine the airplane's readiness for safe flight.

### **Essential Background**

1. Identify the items considered critical to the safe operation of the airplane.
2. Explain how each item is to be checked for its flight readiness.

### **Advice to Instructors**

1. As the airplane to be used for training is likely one which has been built and/or assembled by the student, it is essential that the airplane be critically examined for:
  - a. structural integrity,
  - b. correct installation and operation of all controls,
  - c. secure and correct installation of all radio components,
  - d. the charge state of the transmitter and airborne batteries,
  - e. the security of the engine installation, and,
  - f. weight and balance.
2. Encourage the student to use a checklist if it appears it would be helpful.
3. Explain the operation of the radio and its relationship to each of the airplane's controls.
4. Demonstrate how to conduct a radio range check.
5. Demonstrate how to safely start the engine and determine its readiness for flight.
6. During this exercise, attempt to ascertain the level of the student's general knowledge about airplanes, how they work and fly. This will assist in determining the level at which to present the training in the remaining exercises.

### **Exercise 3 - Airplane Trimming Flight**

#### **Objective**

To investigate the flying characteristics of the training airplane, if it is unfamiliar to the instructor, and determine what, if any, corrections or adjustments are required before the airplane can be used as a stable training platform.

#### **Essential Background**

1. Explain the necessity for the airplane to fly in a stable and predictable manner in order to be useful for training.
2. Explain how the airplane will be flown in order to determine whether any corrections or adjustments are required.

#### **Advice to Instructors**

1. Encourage the student to participate in the trimming flight to the maximum extent possible, consistent with safety and the student's general knowledge.
2. Demonstrate how to taxi the airplane from the pit area to the active runway, and how to check directional control, especially if the airplane is equipped with a tricycle undercarriage. If practical, perform a high speed taxi test on the active runway to further determine directional controllability and engine power output.
3. Fly the airplane to a safe altitude and conduct a full controllability check to determine the required trim inputs to achieve "hands off" straight and level flight.
4. When satisfied, land the airplane and return it to the pit area. Explain and demonstrate how to make the required corrections and adjustments to the airplane to achieve a neutral trim switch status. It may be necessary to fly the airplane again to check the results of any changes made to the controls.

## **Exercise 4 - Taxiing**

### **Objective**

To teach safe maneuvering of the airplane on the ground.

### **Essential Background**

Explain:

- a. the use of minimum power to start the airplane moving,
- b. the use of the rudder control for steering,
- c. speed control considerations, and,
- d. the use of the flight controls to assist in handling the airplane under strong wind conditions.

### **Advice to Instructors**

1. Stress that the airplane should not be taxied if there is any doubt as to whether control of the airplane can be maintained.
2. Emphasize that the airplane should not be taxied at an excessive speed.
3. Emphasize that constant attention should be paid to the wind direction, particularly while turning from downwind into wind.

### **Ground Instruction**

Demonstrate how to:

1. Start the airplane moving and control speed.
2. Steer the airplane.
3. Position the flight controls while taxiing.

## **Exercise 5 - Attitudes and Movements of the Airplane**

### **Objective**

To teach the range of attitudes through which the airplane will normally be operated and how the movements necessary to achieve and maintain the desired attitudes of flight are produced and controlled.

### **Essential Background**

1. Define attitudes of the airplane with reference to the horizon.
2. Define straight and level flight as the reference datum for all movements.
3. Describe the range of normal pitch attitudes in relation to the reference datum.
4. Define pitching movements.
5. Explain how the pitching movement is produced and controlled by the elevators.
6. Describe the range of normal bank attitudes in relation to the reference datum.
7. Define rolling movements.
8. Explain how the rolling movement is produced and controlled by the ailerons.
9. Describe combinations of pitch and bank attitudes.
10. Define yawing movements.
11. Explain how yawing movements are produced and controlled by the rudder.
12. Describe how yawing movements can be used to produce and control bank attitudes.
13. Introduce and explain the concept of "control reversal" which is evident when the airplane is flying towards the student.

## **Advice to Instructors**

1. As this is the student's first flight training exercise, spare no pains to explain everything carefully.
2. If the student's radio system permits the use of one of the Club's Buddy Boxes, explain how it is to be used to pass control of the airplane back and forth between student and instructor. Otherwise, explain how the transmitter is to be physically moved between student and instructor to effect passing of control of the airplane.
3. Avoid the tendency to stretch this exercise out too much as it contains a lot of detail. Keep it simple but meaningful.
4. Throughout this exercise the airplane should be maintained in a comfortable race-track pattern, keeping the airplane as close in as practical.

## **Air Instruction**

1. Establish straight and level flight and point out how it is used as a reference datum.
2. Demonstrate the normal range of pitch attitudes, using the elevators to produce and control the pitching movement.
3. Demonstrate the normal range of bank attitudes, using ailerons to produce and control the rolling movement.
4. Demonstrate various combinations of pitch and bank attitudes; pitching while in a banked attitude, rolling while in various pitch attitudes.
5. Demonstrate the yawing movement and how it can be used to produce and control roll.
6. Have the student practice simple flight maneuvers using the basic principles of this exercise. Practice sessions should be of relatively short duration in the initial stages. As the student's confidence grows, the practice sessions can be extended.
7. The concept of "control reversal" should be introduced and demonstrated in a manner so as to not overload the student at this stage.

## **Exercise 6 - Straight and Level Flight**

### **Objective**

To teach the student to fly the airplane straight and level (constant heading and a selected altitude), at various airspeeds.

To teach the student the combination of attitude and power to achieve straight and level flight.

### **Essential Background**

1. Explain considerations for straight flight:
  - a. control of yaw using rudder to offset the effect of power changes,
  - b. the necessity to keep wings level using ailerons, and,
  - c. the use of trim.
2. Explain considerations for level flight:
  - a. to increase speed, increase power and lower the nose,
  - b. to decrease speed, reduce power and raise the nose, and,
  - c. the use of trim.

### **Advice to Instructors**

1. Give the student ample time to practice this exercise.
2. Develop more fully the “control reversal” phenomena as the airplane flies towards the student.

### **Air Instruction**

1. For straight flight:
  - a. establish straight and level flight and point out references,
  - b. demonstrate the results of not keeping wings level, and,
  - c. demonstrate the need to control yaw during power changes. Depending upon the airplane’s characteristics, the yaw resulting

from power changes may not be discernable and a great deal of effort should not be spent trying to give a convincing demonstration.

2. For level flight – constant altitude, establish straight and level flight and demonstrate how to maintain altitude using the relationship between power and attitude.

## **Exercise 7 - Climbing**

### **Objective**

To teach the student to make the airplane climb and level off at a selected altitude.

### **Essential Background**

1. Define and give practical examples in the use of a normal climb.
2. Review slipstream effect and control of yaw and how uncontrolled yaw may produce roll.
3. Explain how to enter a climb from level flight: attitude – power – trim.
4. Explain how to return to level flight: attitude – power – trim.
5. Explain the precautions necessary due to ground effect and the hazards of entering a climb too soon after lift-off at low airspeed.
6. Explain how to enter a climb safely after a bailed approach: power – attitude – trim.

### **Advice to Instructors**

1. Monitor the student carefully and correct any bad habits before they become entrenched, especially during climbs close to the ground.
2. Insist on the use of rudder to prevent yaw.
3. Ensure solid proficiency is achieved in entering a climb from a bailed approach, paying special attention to directional control of the airplane and an awareness of the proximity of the pit area.

### **Air Instruction**

1. Demonstrate how to enter a climb:
  - a. establish level flight,
  - b. establish pitch attitude for a normal climb and set climb power,
  - c. keep straight, and,
  - d. the use of trim.

2. Demonstrate how to resume level flight:
  - a. lower the nose to the level attitude and allow the airspeed to increase,
  - b. keep straight and maintain altitude,
  - c. reduce power, and,
  - d. the use of trim.
3. Demonstrate entering a straight ahead climb from a bailed approach.

## **Exercise 8 - Descending or Gliding**

### **Objective**

To teach the student to make the airplane descend or glide and level off at a selected altitude, and to maintain a constant path during descent.

### **Essential Background**

1. Define and give specific examples in the use of a normal descent.
2. Explain how to make the airplane descend from level flight: power – attitude – trim.
3. Explain how to return to level flight from a descent: power – attitude – trim.
4. Explain the effects of wind on gliding distance.
5. Explain how, during a descent, power can be used to adjust the rate of descent.

### **Advice to Instructors**

1. This is a progressive exercise, and no attempt should be made to teach all aspects of descending in one demonstration.
2. Give the student ample time to practice to ensure proficiency.
3. Special emphasis should be given to directional control while in descending flight towards the student position.

### **Air Instruction**

1. Demonstrate how to enter a power-off descent from level flight:
  - a. establish level flight,
  - b. reduce power to idle – keeping straight,
  - c. maintain the level attitude until the airplane has slowed, then place the airplane in the descending attitude, and,
  - d. the use of trim.

2. Demonstrate how to resume level flight from a descent:
  - a. adjust pitch to the level attitude, add power, keep straight, and,
  - b. the use of trim.
3. Demonstrate how to enter a power-on descent:
  - a. use of the same procedure as in entering a power-off descent, except that the power is reduced to a setting above idle,
  - b. keep the descending attitude shallow, and,
  - c. show how the correct combinations of attitude and power produce the desired flight path.

## **Exercise 9 - Turns**

### **Objective**

To teach gentle, medium, steep, climbing and descending turns and turns to selected headings.

### **Essential Background**

1. Define angles of bank as applied to a training airplane:
  - a. gentle – up to 15 degrees of bank,
  - b. medium – 15 to 30 degrees of bank, and,
  - c. steep – beyond 30 degrees of bank.
2. Review control of adverse yaw resulting from aileron drag.
3. Explain how to enter and stay in a level turn, maintaining bank and pitch attitudes.
4. Explain how to exit a level turn, maintaining balanced flight.
5. Explain steep turns
  - a. why additional lift must be produced to maintain level flight as the bank angle is increased, and,
  - b. relationship between speed and the radius of turn – minimum radius turns and the use of power.

### **Advice to Instructors**

1. It is important that turns be practiced in both directions.
2. Some steep descending turns should be practiced at lower altitudes.

### **Air Instruction**

1. Demonstrate, and have the student practice turns, especially steep turns, at a safe altitude as it is likely the student will allow the airplane to enter spiral dives in the initial stages.
2. To relax the student, encourage some straight and level flight between turning exercises.
3. Keep the airplane as close in as practical in order that the student can readily see the airplane during the turning exercises.

## **Exercise 10 - Slow Flight**

### **Objective**

To teach precise control of the airplane while operating at reduced airspeeds, developing coordination and instilling confidence in handling the airplane.

### **Essential Background**

1. Define slow flight and give examples of when it may be encountered, eg., recovery from a bad landing.
2. Explain considerations for slow flight:
  - a. power and attitude relationship, and,
  - b. diminishing response to control inputs.

### **Advice to Instructors**

1. Slow flight practice should be performed at an airspeed just above the stall to enable the student to get the sense of sloppy and diminishing response to control inputs.
2. Directional control is an important consideration and every effort should be made to control direction with coordinated rudder and aileron inputs.
3. Emphasize the need for coordination and smoothness of control inputs to achieve the desired performance.

### **Air Instruction**

1. Demonstrate, in straight and level flight:
  - a. the need for an increase in power and an adjustment in pitch attitude to maintain altitude and airspeed,
  - b. control response while in slow flight, and,
  - c. control of yaw and roll with rudder.
2. Demonstrate slow flight turns – level, climbing and descending.

## **Exercise 11 - The Take – Off**

### **Objective**

To teach the techniques to get the airplane safely airborne.

### **Essential Background**

1. For nose wheel and tail wheel configured airplanes, explain the following as applicable:
  - a. torque,
  - b. slipstream effect,
  - c. asymmetric thrust,
  - d. gyroscopic effect during rotation,
  - e. wheel-barrowing, and
  - f. ground-looping tendency.

### **Advice to Instructors**

1. Events happen quickly during take-off, therefore adequate preparatory ground instruction is particularly important in this exercise.
2. Impress upon the student the importance of the first few feet of ground run. If a good straight start to the run is made, keeping straight through the full take-off run will be easier.
3. The student's confidence in controlling the airplane should be reasonably high prior to this exercise.

### **Air Instruction**

1. Demonstrate a normal take-off to the student, landing the airplane as soon as practical.
2. Allow the student to make corrections, assisting as necessary in the interests of control and safety.

## **Exercise 12 - The Circuit**

### **Objective**

To teach a normal circuit pattern.

### **Essential Background**

1. Explain the elements of a circuit pattern, including appropriate directions, distances and heights.
2. Explain how to fly the circuit pattern, using the various landmarks around the perimeter of the airfield as turning markers.

### **Advice to Instructors**

1. Insist on an increasing level of accuracy of airplane handling and airmanship during this exercise.
2. The ability to make a correct decision to overshoot rather than commit to a bad landing is essential in this exercise.
3. Proficiency in both left and right handed circuits should be achieved.

### **Air Instruction**

1. Demonstrate how to fly an accurate rectangular circuit – correcting for drift as applicable.
2. Demonstrate how making a decision to overshoot the landing approach as early as possible enables a smooth re-entry to the circuit.

## **Exercise 13 - The Approach and Landing**

### **Objective**

To teach the techniques to safely land the airplane under various conditions.

### **Essential Background**

1. Explain considerations for:
  - a. cross-wind landings,
  - b. touch-and-go and stop-and-go landings, and,
2. Explain:
  - a. the use of power to achieve the desired descent path, and,
  - b. how to recognize whether the airplane is under-shooting or over-shooting the intended spot for landing.

### **Advice to Instructors**

1. The student should be taught to size up the situation as early as possible before landing, taking into consideration the effects of wind, obstacles and traffic.
2. Landings are a continuous challenge. Encourage the student to watch others and learn from their mistakes.
3. Allow the student to correct his own mistakes as much as possible, but be ready to take control, consistent with safety and damage to the airplane.
4. The student should be taught to strive for an approach that requires minimal power variation.

### **Air Instruction**

1. Demonstrate the establishment of the landing approach line, using the various landmarks near the approach end of the runway in use.
2. Once established in a descent, insist on increasing accuracy in keeping the wings level as the airplane approaches.

3. Demonstrate how to use power and pitch attitude to correct for conditions of under-shooting or over-shooting the spot of intended landing.
4. Demonstrate how to safely over-shoot from a balked approach or aborted landing.

## **Exercise 14 - The First Solo**

### **Objective**

To determine whether the student is prepared to safely carry out a first solo flight.

### **Essential Background**

No separate ground training is required for this exercise.

### **Advice to Instructors**

1. Keep advice to a basic minimum.
2. Ensure the student is confident in his ability to control the airplane in all phases of the first solo flight.
3. Ensure the conditions are suitable for the first solo.
4. As this exercise marks the conclusion of the Basic Flying Training syllabus, care should be taken in determining whether the student requires any further supervision or training before declaring him as a graduate pilot. As long as the student exhibits safe flying habits and is sufficiently confident to safely continue on his own, then the course is complete.

### **Air Instruction**

1. Carry out supervised circuits with the student until satisfied with competency and that suitable conditions exist.
2. Send the student on the first solo flight.