15. PRE-FLIGHT ACTIVITY

Many cadets are not only new to flying, they will be visiting a general aviation airport for the first time. During this activity, cadets learn about the airport's anatomy. This optional activity is a good way to occupy cadets as they wait their turn to fly. Further, it provides cadet officers and NCOs with a leadership opportunity.

Suggested Instructor(s)

- A pilot, aerospace officer, or similar individual should draw upon his or her knowledge to conduct the ground activities listed below.
- Cadet Officers and NCOs could assist in leading the ground activities below, if they are knowledgeable about flying.

Duration of Preflight Activities

Approximately 45 minutes, but can be adjusted to fit the time available

Objectives

1. Identify key features of a general aviation airport and describe their function
2. Identify key features of an aeronautical sectional chart
3. Assist the instructor in observing the weather conditions and obtaining a forecast
4. Defend the idea that aviators need to be healthy, drug-free, and alert
5. Actively observe an aircraft preflight

Best Practices to Consider

- Create a sortie schedule in advance to make efficient use of the aircraft and to limit the cadets' down-time on the ground.
- Divide the cadets into groups of 2-4 cadets so that they may all have a good view of the aircraft preflight.
- Fly 2 cadets at a time (if the aircraft allows). Fly to a neighboring field, land, have the front seat cadet move to the back seat and vice versa, then return to the home field.
- Start the day by having the first group of cadets complete this Preflight Activity, which should take about an hour. Then send them off to fly. Shortly after the first group launches, the second group should arrive and begin this Preflight Activity. Repeat the cycle as many times as needed.

Pre-Flight Activity Lesson Outline

1. Examine the Airport's Anatomy (10 min)
This might be the cadets' first trip to a small airfield. Find a safe location with a good view of the field to point out and explain the function of the following features (where applicable):

- Windsock
- Active runways
- Taxiways
- Beacon
- Runway markers
- FBOs (fixed base operators)
- Tower
- ILS (instrument landing system)

2. Review the Aeronautical Chart (10 min)
Have the cadets locate their airport on a sectional chart. Point out important features in the area, such as mountains, restricted airspace, VORs, etc. If flying to another airport, have the cadets locate it on the chart and determine the heading they'll be flying each way.

3. Observe the Weather (10 min)
Have the cadets assist the pilot in command (PIC) or ground instructor in checking the weather conditions, winds aloft, radar, etc.

4. Drug Free Ethic (2 min)
The PIC should pause to mention the importance of following a drug-free ethic. Drugs and alcohol don't mix with flying. On a similar note, crew rest is important, too. Pilots need to be healthy and fully alert.

5. Restroom Break (10 min)
Last chance for the fliers to use the facilities.

6. Preflight (20 min)
The Pilot-in-Command (or anyone knowledgeable about flying) should lead the cadets through a basic preflight and safety briefing.* Explain what is being checked and why. Conduct the standard passenger briefing. Encourage the cadets to ask questions.

** Of course, the PIC maintains responsibility for pre-flighting the aircraft. But to save time, each group of 2-4 cadets might "preflight" one aircraft on the ground, while another aircraft, pre-flighted once by the PIC, is used for the actual flying.*

CADET ORIENTATION FLIGHT SYLLABUS

POWERED 1 SYLLABUS 6

Themes: Ground handling, preflight, take-off & landing
Estimated Time: 0.7 hours
Cadet Textbook Reference: *Aerospace Dimensions*, Module 1

1. **Ground Handling**
   a. Demonstrate proper ground handling; identify those surface areas that are not to be touched.

2. **Preflight Inspection**
   a. Show and tell while performing a routine pre-flight inspection.
   b. Identify the required documents that must be kept on board.
   c. Show and tell about the airplane's basic anatomy.
   d. Discuss principles for staying safe during this flight.

3. **Before Take-Off:**
   a. Using the checklist, show and tell about routine cockpit checks.
   b. Explain the sequence of events prior to take-off.

4. **Take-Off**
   a. Discuss airplane position during takeoff roll and initial climb; demonstrate rudder controls.
   b. Describe emergency actions to be taken at different altitudes, as discussed during the "before take-off" checklist.

5. **In-Flight** (minimum altitude of 2500' AGL)
   a. Show and tell about the use of flight controls.
   b. Point out the airplane's attitude in relation to the horizon and different airspeeds.
   c. Identify familiar landmarks, ground features, and the position of the airport with respect to the airplane's altitude and position.

POWERED 1 SYLLABUS 6

6. **Approach to Landing**
   a. Explain the approach to the traffic pattern; explain the reasons for a standardized entry procedure and perform the before landing check.
   b. Discuss the elements of the traffic pattern.
   c. Discuss the final approach and the importance of maintaining the correct airspeed.

7. **Landing & Roll-Out**
   a. Explain the landing attitude.
   b. Point out the correct procedure for landing roll-out.

8. **Post Flight:** Questions & Answers

CADET ORIENTATION FLIGHT SYLLABUS

POWERED 2 SYLLABUS 7

Themes: Normal flight maneuvers
Estimated Time: 1.0 hours
Cadet Textbook Reference: *Aerospace Dimensions*, Module 1

1. **Preflight**
   a. Discuss previously completed flights, as appropriate.
   b. Discuss principles for staying safe during this flight.
2. **In-Flight** (minimum altitude of 2500' AGL)
   a. Trim for level flight; point out the stability of the aircraft in hands-off flight.
   b. Emphasize attitude flying.
   c. Show and tell about the trim controls and straight flying to a checkpoint using visual references.
   d. Discuss the effects of lift, drag, and gravity on the airplane.
   e. Discuss the relationship of lift, angle of attack, and relative wind.
   f. Demonstrate a shallow banked turn and point out how the airplane will maintain the turn with controls neutral.
   g. Explain load factor during turns.
3. **Post Flight:** Questions & Answers

CADET ORIENTATION FLIGHT SYLLABUS

POWERED 3 SYLLABUS 8

Themes: Advanced flight maneuvers
Estimated Time: 1.0 hours
Cadet Textbook Reference: *Aerospace Dimensions*, Module 1

1. **Preflight**
   a. Discuss previously completed flights, as appropriate.
   b. Discuss principles for staying safe during this flight.
2. **In-Flight** (minimum altitude of 2500' AGL)
   a. Perform climbing turns, emphasizing collision avoidance.
   b. Demonstrate slow flight (minimum controllable airspeed - MCA).
   c. Demonstrate straight ahead and turning stalls, as appropriate.

      All stalls are to be imminent stalls (first aerodynamic indication of an oncoming stall, which is usually the stall warning alarm); back seat passengers are not allowed when demonstrating stalls.
   d. Demonstrate medium and steep bank turns; discuss proper rudder coordination and control stick requirements to keep the nose up.
   e. Explain load factor during turns.
   f. Discuss steep spirals and spins; emphasize the difference and dangers of excessive load factors in steep spirals.
   g. Demonstrate ground reference maneuvers used in search activities (parallel track, S-turns, expanding square).
3. **Post Flight:** Questions & Answers

CADET ORIENTATION FLIGHT SYLLABUS

POWERED 4 SYLLABUS 9

Themes: Use of instruments in flight
Estimated Time: 0.7 hours
Cadet Textbook Reference: *Aerospace Dimensions*, Module 2

1. **Preflight**
   a. Discuss previously completed flights, as appropriate.
   b. Discuss principles for staying safe during this flight.
   c. Explain the use of basic navigation instruments (clock, altimeter, airspeed indicator, and magnetic compass).
   d. Explain the pitot/static system and its relationship to the airspeed indicator, altimeter, and vertical velocity indicator.

2. **In-Flight** (minimum altitude of 2500' AGL)
   a. Explain the difference between absolute altitude (AGL), true altitude (MSL) and pressure altitude (PA).
   b. Demonstrate how to read the altimeter.
   c. Demonstrate how to read the airspeed indicator; discuss indicated airspeed, true airspeed, and ground speed.
   d. Point out how attitude and airspeed are related.
   e. Demonstrate how shallow climbs and descents affect the vertical velocity and airspeed indicators.
   f. Demonstrate turns using the magnetic compass; discuss compass turning errors – variation, deviation, magnetic dip, and oscillation error.

3. **Post Flight:** Questions & Answers

CADET ORIENTATION FLIGHT SYLLABUS

POWERED 5 SYLLABUS 10

Themes: Weather
Estimated Time: 0.7 hours
Cadet Textbook Reference: *Aerospace Dimensions*, Module 3

1. **Preflight**
   a. Discuss previously completed flights, as appropriate.
   b. Discuss principles for staying safe during this flight.
   c. Discuss cloud types and their effect upon flight.
   d. Discuss how terrain affects air stability.
   e. Demonstrate preflight weather briefing and discuss its importance.

2. **In-Flight**
   a. Demonstrate effects that weather has upon flying.
   b. Demonstrate the crab method (forward slip) to compensate for wind.
   c. Discuss wake turbulence avoidance.
   d. Demonstrate temperature differences at a few altitudes and discuss how altitude affects rate of climb.

3. **Post Flight:** Questions & Answers