

**Private Pilot Ground Instruction Lesson Plan  
Airplane Components and Systems**

**Student:** \_\_\_\_\_

**Date:** \_\_\_\_\_

**Objectives:**

Upon completion of this lesson, the student will:

- Have a basic understanding of airplane components and systems
- Have a basic understanding of flight instruments and their functions
- Have a basic understanding of the airplane engine and related systems

**Elements:**

- Airplane Components
- Airplane Engines and Propellers
- Ignition System
- Fuel System
- Flight Instruments

**Schedule:**

- |                               |       |
|-------------------------------|-------|
| • Introduction                | 00:05 |
| • Airplane Components         | 00:10 |
| • Engines and Propellers      | 00:10 |
| • Airplane Ignition System    | 00:10 |
| • Airplane Fuel System        | 00:10 |
| • Aircraft Flight Instruments | 00:10 |
| • Summary and Review          | 00:05 |
| Total:                        | 01:00 |

**Equipment:**

- Chalkboard and Chalk
- POH For Training Airplane
- Model airplane

**Instructor Actions:**

1. Introduction
  - Present lesson objective.
  - Give an overview of what will be covered (include importance of the material)
2. Airplane Components
  - Describe the main parts of the airplane and their purpose in life:
    - Fuselage
    - Wings including ailerons and flaps
    - Empennage (Horizontal Stabilizer, Elevators, Vertical Stabilizer, Rudder)
    - Landing Gear, including nosewheel steering and braking system

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3. Airplane Engine and Propellers
  - Describe main characteristics of the reciprocating airplane engine:
    - Carbureted or Fuel Injected
    - Normal air intake and alternate intake (carburetor heat)
    - Four stroke operation
    - Oil system
    - Air cooling
    - Exhaust system
    - Starter
  - Describe characteristics of propellers:
    - Fixed pitch
    - Constant speed
    - Effective pitch versus geometric pitch and efficiency.
4. Airplane Ignition System
  - Describe main characteristics of the airplane ignition system
    - Magnetos
    - Dual systems for redundancy and better performance
5. Airplane Fuel System
  - Describe characteristics of aircraft fuel systems
    - Fuel types and colors
    - Multiple tanks and tank switching capabilities
    - Gravity feed versus pump feed
    - Mixture control
    - Throttle
    - Fuel problems (contamination by dirt or water) and how to recognize and correct.
6. Flight Instruments
  - Pitot Static Instruments
    - Explain concept of pitot pressure and static pressure
    - Airspeed
    - Altimeter
    - Vertical Speed Indicator
  - Gyroscopic Instruments
    - Vacuum System
    - Attitude Indicator
    - Heading Indicator
    - Turn Coordinator
  - Magnetic Compass
7. Summary and review
  - Go over what was discussed
  - Ask student questions to evaluate understanding
  - Answer any questions student has
  - Explain what will be covered in the next lesson and assign reading material.

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**Student Actions:**

1. Introduction
  - Ask questions concerning previous lessons and/or this one.
2. Airplane Components
3. Airplane Engine and Propellers
4. Airplane Ignition System
5. Airplane Fuel System
6. Flight Instruments
7. Summary and Review
  - Ask questions about the lesson.
  - Answer instructor's questions

**Completion Standards:**

This lesson will be completed when the student can demonstrate an adequate understanding of:

- The primary parts of an airplane and their functions.
- Airplane engines and propellers
- Airplane Ignition Systems
- Airplane Fuel Systems
- Aircraft Flight Instruments

**References:**

- Pilot's Handbook of Aeronautical Knowledge (FAA-H-8083-25); Chapters 1, 4, 5 and 6
- Handouts provided by the CFI from various resources

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**Possible Review Questions:**

Have student identify various parts of an airplane while looking at picture or drawing

The purpose of the elevators is to control \_\_\_\_\_ .

The purpose of the rudder is to control \_\_\_\_\_ .

Airplane engines are typically \_\_\_\_\_ cooled.

Typical trainer airplanes use a \_\_\_\_\_ propeller.

The source of the electricity that fires the spark plugs in an airplane engine is produced by the \_\_\_\_\_ .

Most trainer airplanes use \_\_\_\_\_ octane low-lead gasoline which is \_\_\_\_\_ in color.

The three instruments which depend on static pressure for their operation are the \_\_\_\_\_ ,  
\_\_\_\_\_ and \_\_\_\_\_ .

In addition to static pressure, the airspeed indicator also relies on \_\_\_\_\_ pressure.

The heading indicator and attitude indicator are \_\_\_\_\_ instruments which operate on \_\_\_\_\_ .

The Turn coordinator is an \_\_\_\_\_ gyroscopic instrument.