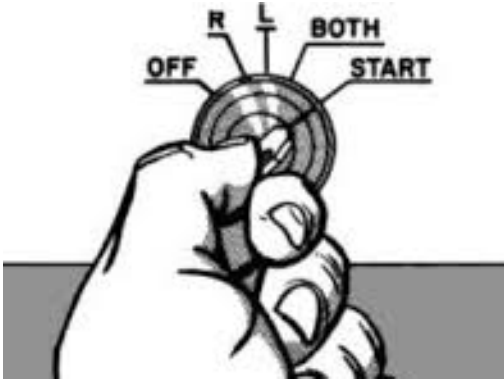


Engine Starting

Objective	
<p>To ensure the applicant learns the elements of and can exhibit a clear understanding of the engine start procedure and how to perform the procedure properly.</p>	
Purpose	
<p>Starting an airplane engine is easy, but it is more complicated than starting a car. Spinning propellers and hard-starting carbureted engines provide unique challenges. This lesson introduces aspiring pilots to the engine start procedure, factors that complicate starting, and emergency procedures in case of an engine fire.</p>	
Schedule	Equipment
<ul style="list-style-type: none"> ● Ground Lesson: 5 minutes - <i>In the Airplane</i> ● Initial <ul style="list-style-type: none"> ■ Before Flight: 5 minutes - <i>Introduction and Demonstration</i> ● Every Flight <ul style="list-style-type: none"> ■ Before Flight: 5 minutes - <i>Student Performs</i> 	<ul style="list-style-type: none"> ● Airplane Checklist
Student Actions	Instructor Actions
<ul style="list-style-type: none"> ● Ask any questions, receive study material for the next lesson. ● Watch linked video. ● Review listed references. 	<ul style="list-style-type: none"> ● Deliver the ground lesson (below). ● Demonstrate the procedure in the airplane. ● Debrief after each flight.
Completion Standards	
<ul style="list-style-type: none"> ● Ground: Student can explain the purpose of the procedure and how to execute it properly. ● Flight: Student can explain and perform the procedure including the following: <ul style="list-style-type: none"> ● Ensures that the area around the airplane and propeller is clear. ● Primes the engine before start, as needed. ● Performs the engine start checklist, and starts the engine. ● Manipulates the engine controls to aid a successful start. ● After start, verifies correct engine indications. ● What to do in case of an engine fire during start. 	

References

- Ryan Binns - "Cessna 172P Engine Start Checklist"
 - YouTube - <https://www.youtube.com/watch?v=UyYyTQqJvGc>
- FAA-H-8083-3C (Airplane Flying Handbook) - Chapter 2, Page 16 [Engine Starting], Chapter 2, Page 16-17 [Hand Propping]
- Airplane POH - Section 4 [Normal Procedures], Section 3 [Emergency Procedures/Fire During Start]
- FAA-S-ACS-6C (Private Pilot ACS) - Area II Task C
- FAA-S-ACS-7B (Commercial Pilot ACS) - Area II Task C
- FAA-S-ACS-25 (CFI ACS) - Area V Task C

Ground Lesson Outline

- Before Starting Safety Precautions
 - Final Walk-Around
 - Ensure Tow Bar, Chocks Removed, etc.
 - Anti-Collision Beacon - Turn ON
 - Set Brakes
 - "Clear" call
 - Visually Clear Prop Area
- Engine Start Checklist
 - Importance of Checklist Usage
 - "Read and Do" Checklist Usage
 - Touch controls to confirm
 - Basic Start Procedure
 - Mixture Rich, Throttle ¼", Prime (as necessary), Master On, Mags to Start
 - Use of Throttle and Mixture Controls during Cranking
 - Dangers of Overpriming - Updraft Carburetor, Engine Fire
 - Ensure Proper Engine Indications
- Starting Difficulties
 - Effect of Atmospheric Conditions - Hot/Cold Start
 - Overpriming
 - Dead Battery / Starting with External Power
 - Starter Duty Cycle - Crank for max 10 seconds, wait 30 seconds between
 - No Start - Mags Off, Master Off, Mixture Cutoff
 - Engine Fire - Mixture Cutoff, Throttle Full, Continue Cranking!
 - If not extinguished, evacuate
- Hand Propping - Extremely dangerous and very difficult with many common trainers
 - Do not attempt if you are not familiar!

Common Errors

- **Failure to properly use the appropriate checklist.**
- Failure to use safety precautions related to starting.
- **Improper adjustment of engine controls during start.**
- Failure to assure proper clearance of the propeller.