

Private Pilot Ground Instruction Lesson Plan

Aeromedical Factors

Student: _____ Date: _____

Objectives:

Upon completion of this lesson, the student will:

- Have an understanding of the effects of general health and well being and medication on the pilot:
 - Effects of stress and fatigue
 - Effects of common medications
 - Effects of Alcohol and rules pertaining to its use with respect to flying
- Know the causes, symptoms and ways to avoid or correct:
 - Hypoxia
 - Hyperventilation
 - Carbon Monoxide Poisoning
 - Middle Ear Discomfort or Pain
 - Motion Sickness
 - Spatial Disorientation and Illusions
 - Decompression sickness after diving
- Know the regulations regarding pilot medical certificates.

Elements:

- General health as it relates to flying
- Medical problems that can be caused as a result of flying
- Pilot medical certificates

Schedule:

- | | |
|--|-------|
| • Introduction | 00:05 |
| • General Health, Medications, Alcohol | 00:15 |
| • Medical Problems Caused by Flying | 00:20 |
| • Medical Certificates | 00:10 |
| • Summary and Review | 00:10 |
| Total: | 01:00 |

Equipment:

- Chalkboard and Chalk

Instructor Actions:

1. Introduction
 - Present lesson objective.
 - Give an overview of what will be covered (include importance of the material)

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2. Discuss General Health, Medications, Alcohol

- Discuss the negative effects of:
 - Illnesses such as common colds, allergies, flu and the medications commonly used to treat them particularly antihistamines.
 - Stress and Fatigue; Job pressures; problems at home; lack of sleep.
 - Self medication or prescription drugs.
- Alcohol
 - No alcohol may be consumed within 8 hours before flying. This includes alcohol in medicines such as cough syrup, etc. (FAR 91.17); Longer is better.
 - Maximum blood alcohol content by weight 0.04%; Half the legal limit for driving in many states (FAR 91.17).
 - Also consider effects of hangovers
 - Passengers who have consumed alcohol shortly before flying may feel exaggerated effects at higher altitudes; FAR 91.17 also prohibits carrying passengers who are intoxicated or under the influence of drugs (not as a result of being under a doctor's care).
- Stress use of a Personal Minimums Checklist (FAA-P-8740-55)
- IM SAFE
 - Illness
 - Medication
 - Stress
 - Alcohol
 - Fatigue
 - Emotions

3. Discuss Medical Problems Caused By Flying

- Hypoxia
 - Lack of oxygen; Affects brain and vision, particularly night vision; There are four kinds of Hypoxia.
 - Symptoms might include general feeling of well-being, dizziness, headache, dullness or tunnel vision.
 - Onset is insidious, that is it tends to come on slowly and is not easy to recognize.
 - Most obvious indication may be blue/black color on fingernails.
 - A given individual will generally experience the same symptoms in the same order whenever suffering from Hypoxia.
 - Aggravated by other conditions such as anemia or smoking,
 - If it occurs, get to a lower altitude.
 - Night vision can be affected at altitudes as low as 5,000 ft.
 - FAA Flight Physiology course is highly recommended
- Hyperventilation
 - Breathing too rapidly brought on by high anxiety.
 - Occurs more frequently in student pilots
 - Causes a decrease in CO₂ in the blood, which regulates the breathing process.
 - Can be cured by consciously slowing the breathing rate by breathing into a bag or talking out loud.

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- Carbon Monoxide Poisoning
 - CO is present in the exhaust gasses and can be induced into the cockpit by leaks in the exhaust system.
 - Particularly a problem in the winter as cabin heat is produced by air ducted over the exhaust system.
 - CO poisoning reduces the ability of the blood to carry oxygen and therefore can produce all the same symptoms as Hypoxia.
 - If suspected, get on the ground ASAP and seek medical help. It can take days to rid the body of the CO.
 - Use CO detectors in the cockpit.
- Middle Ear Discomfort or Pain
 - Caused by an imbalance of pressure outside and in the inner ear (Eustachian tube)
 - Can be aggravated by colds or allergies which prevent the Eustachian tube from opening completely.
 - Can be aggravated by rapid ascents or descents
 - Can usually be cleared by swallowing, yawning, or trying to exhale with nose and mouth held shut; valvula maneuver.
 - If trouble persists several hours after landing consult a doctor.
 - Similar problems can occur with the sinuses, particularly when suffering from a cold or allergies.
- Motion Sickness
 - Generally not a problem for experienced pilots, but more common in student pilots or passengers.
 - Caused by continued stimulation of the inner ear, and aggravated by conflicting signals from the eyes.
 - Avoid over the counter or prescription motion sickness drugs; they cause drowsiness.
 - Open air vents, loosen clothing, use oxygen, keep eyes outside and avoid rapid head movements
- Spatial Disorientation and Illusions
 - Occurs when the ability to see the natural horizon is impaired by clouds, haze, darkness, etc. or from various optical illusions such as:
 - Upsloping or downsloping cloud decks or terrain.
 - Reflections from water, particularly at night.
 - Inability to determine airplane attitude by feel; senses lie to you.
 - Fly by reference to instruments.
 - Avoid low visibility situations.
 - Other illusions that may not cause spatial disorientation, but that the pilot should be aware of
 - Reduced visibility causes things to appear farther away than they really are or the airplane to appear to be at a higher altitude than it really is.
 - Wider or narrower runways than the pilot is accustomed to.
- Decompression Sickness (Bends)
 - Caused by the release of Nitrogen trapped in the blood while diving and breathing compressed air.
 - Divers should wait at least 12 hours after a dive not requiring a controlled ascent before flying at altitudes above 8,000 ft.
 - Divers should wait at least 24 hours after a dive requiring a controlled ascent before flying at altitudes above 8,000 ft.

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4. Discuss Rules Related to Medical Certificates
 - How to obtain a medical certificate and Student Pilot's License
 - Classes and duration of medical certificates.
 - Medical certificate is invalid in the event of any change in health status that would prevent one from obtaining a medical certificate.
 - In some cases, waivers can be obtained for certain medical problems that might otherwise prevent one from obtaining a certificate.
5. Summary and Review
 - Review and summarize material covered
 - Answer student questions
 - Evaluate student understanding by asking questions.
 - Explain what will be covered in the next lesson and assign reading material.

Student Actions:

1. Introduction
 - Ask questions concerning previous lessons and/or this one.
2. General Health, Medications, Alcohol
3. Medical Problems Caused By Flying
4. Rules Related to Medical Certificates
5. 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 effects of general health and well being and medication on the pilot:
- The causes, symptoms and ways to avoid or correct:
 - Hypoxia
 - Hyperventilation
 - Carbon Monoxide Poisoning
 - Middle Ear Discomfort or Pain
 - Motion Sickness
 - Spatial Disorientation and Illusions
 - Decompression sickness after diving
- The regulations regarding pilot medical certificates.

References:

- Pilot's Handbook of Aeronautical Knowledge (FAA-H-8083-25); Chapter 15
- Glider Flying Handbook (FAA-H-8083-13); Pages 1-10 – 1-16
- Medical Handbook for Pilots (AC-67-2)

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Possible Review Questions:

Alcohol of any kind must not be consumed _____ hours before flying.

Before flying, the pilot should use a _____ checklist to determine whether or not they are safe to fly.

Hypoxia is a lack of _____ .

Night vision can begin to deteriorate at altitudes as low as _____ feet.

Hyperventilation can be corrected by consciously _____ the breathing rate.

Carbon Monoxide is more common in the _____ months.

Motion sickness is caused by continued stimulation of the _____ .

Spatial disorientation is primarily a problem in _____ conditions.

A third class medical certificate is good for _____ years if the holder was less than 40 years old when the certificate was issued, and for _____ years if over 40.