Aeronautical Information Manual

Session Time: Two, 50-minute sessions

DESIRED RESULTS

ESSENTIAL UNDERSTANDINGS

The regulatory environment consists of both regulatory and advisory publications, including the Federal Aviation Regulations (FARs), Aeronautical Information Manual (AIM), advisory circulars (ACs), airworthiness directives (ADs), Notices to Airmen (NOTAMs), and NTSB Part 830.

The Federal Aviation Administration (FAA) and National Transportation Safety Board (NTSB) produce documents with which pilots must familiarize themselves.

ESSENTIAL QUESTIONS

1. Where do pilots find the rules and regulations that govern aviation in the United States?

LEARNING GOALS

Students Will Know

- The purpose of the FAA's AIM.
- The types of information provided by the AIM.

Students Will Be Able To

- *Identify* the types of information contained in the AIM. [DOK-L1]
- *Apply concepts* learned from the AIM to scenarios presented by the teacher. [DOK-L4]

ASSESSMENT EVIDENCE

Warm-up
Students will learn the 10 chapters in the AIM, with an emphasis on Chapters 1–8, and brainstorm questions that each chapter answers.

Formative Assessment
Students will locate specific information in the AIM and identify the chapter, section, and subsection.

Summative Assessment
Students will answer FAA Knowledge Test-type questions pertaining to material covered in Chapters 1–8 of the AIM.

LESSON PREPARATION

MATERIALS/RESOURCES

- Aeronautical Information Manual Presentation
- Aeronautical Information Manual Student Activity 1
- Aeronautical Information Manual Student Activity 2
- Aeronautical Information Manual Student Activity 3
- Aeronautical Information Manual Student Activity 4
- Aeronautical Information Manual Teacher Notes 1
- Aeronautical Information Manual Teacher Notes 2
- Aeronautical Information Manual Teacher Notes 3
- Aeronautical Information Manual Teacher Notes 4
- Aeronautical Information Manual Teaching Aid
- **Aeronautical Information Manual:** https://www.faa.gov/air_traffic/publications/atpubs/aim_html/index.html

LESSON SUMMARY

Lesson 1: Aeronautical Information Manual
Lesson 2: ACs, ADs, NOTAMs, and the NTSB

Session 1 begins with a warm-up in which students review the chapter titles of the AIM, and then list the topics they think are covered and the questions answered in each section. Students then work in small groups to look up answers to questions in the AIM.

Students will then receive an overview of each of the first eight chapters of the AIM, learning the purpose and general content of each chapter. At the conclusion of this part of the lesson, students will complete a formative assessment in which they use the AIM to answer questions about each chapter.

After a brief review, Session 2 features an activity in which students are divided into 8 groups. Groups travel from station to station, using each chapter of the AIM to answer scenario-based questions about piloting knowledge. Finally, students answer a series of FAA Knowledge Test-type questions, based on the AIM chapters covered in class.

BACKGROUND

For pilots, the AIM is one of the most-referenced FAA publications. While the FARs are the go-to place for rules and regulations, the AIM is where pilots go to learn about standard procedures and best practices. In short, the AIM is where pilots go to learn or confirm how to get things done.

Divided into 10 chapters, the AIM contains many of the details that pilots need in order to fly safely in the United States. Additionally, the AIM provides extensive information about such topics as human factors, safety procedures, the smooth flow of traffic through the NAS, pilot-controller communications, and information about accident and hazard reporting.

MISCONCEPTIONS

Students may think there is only one source for aviation regulations. However, there are multiple sources of regulatory and advisory publications that pilots adhere to.

Many pilots think that the AIM carries no regulatory weight—that is essentially a list of suggestions that pilots are encouraged, but not required, to follow. While it is technically correct that the AIM is not a publication of regulations, violating any of the procedures or recommendations found in the AIM can result in the FAA taking action against the pilots, just as though they had violated a rule from the FAR. For all practical purposes, pilots are encouraged to consider the provisions of the AIM as carrying the same weight as the regulations in the FARs.

DIFFERENTIATION

To promote student comprehension of the information found in the AIM, have students document the chapter content in a note-taking graphic organizer. Give students an opportunity to quiz a partner before the Formative Assessment.

To reinforce learning in the EXTEND section, have each of the groups choose a speaker for their group. The groups should talk through their response to the scenario. Prompt other groups to determine if they agree with the presenting group's answer and provide feedback for why the answer is correct or incorrect. Thinking aloud allows students to solidify their comprehension of a topic.

LEARNING PLAN

ENGAGE

Teacher Material: Aeronautical Information Manual Presentation

Session 1

Slides 1-3: Introduce the topic and learning objectives of the lesson.

Slide 4: Conduct the **Warm-Up**.

Warm-Up

The slide lists the titles of chapters 1–10 of the AIM. Explain that topics found in chapters 1–8 often appear in the FAA Private Pilot Knowledge Test. As you identify each chapter, ask students to list the types of information they think will be found in that chapter and the kinds of questions that chapter might answer. In the next part of the lesson, students will search the AIM for the answers to specific questions.

- Chapter 1: Air Navigation
    - This chapter describes the types of electronic aids that pilots use to navigate, including VOR and GPS.
- Chapter 2: Aeronautical Lighting and Other Airport Visual Aids
    - This chapter describes the various approach and runway lighting systems, as well as signage and markings, runway and taxiway paint colors, and other visual aids for pilots at airports.
- Chapter 3: Airspace
    - This chapter describes the various classes of the NAS (A, B, C, D, E, G), as well as VFR weather minimums.
- Chapter 4: Air Traffic Control
    - This chapter explains the structure and purpose of all air traffic control facilities, including control towers, approach control, and center control.
- Chapter 5: Air Traffic Procedures
    - This chapter describes departure, en route, approach, and arrival procedures, primarily for IFR flight; however, many of the practices are recommended for VFR flight as well.
- Chapter 6: Emergency Procedures
    - This chapter explains what to do when emergencies occur, how to seek assistance from ATC, what a pilot should do if intercepted by military or law enforcement aircraft, and how to deal with loss of communications.

- Chapter 7: Safety of Flight
    - This chapter delves deeply into weather reporting and forecasting, including in-flight weather advisories, and various hazards to flight such as bird strikes and volcanic ash.
- Chapter 8: Medical Facts for Pilots
    - This chapter discusses the concept of fitness for flight, as well as the effects on flight safety of such factors as loss of oxygen at altitude, carbon monoxide, various illusions, and spatial disorientation.
- Chapter 9: Aeronautical Charts and Related Publications
    - This chapter provides detailed information about the various charts available to pilots, including foreign charts for international flights, and explains how to obtain these charts.
- Chapter 10: Helicopter Operations
    - The rules and procedures for helicopters are slightly different from those for airplanes. This chapter details those differences for both VFR and IFR operations and explains landing zone safety procedures and special considerations for night and emergency operations.

The AIM also contains three appendices: a blank form for reporting accidents involving birds or other wildlife, a blank form for reporting volcanic activity, and a list of abbreviations and acronyms.

EXPLORE

Teacher Materials: Aeronautical Information Manual Presentation, Aeronautical Information Manual Teacher Notes 1
Student Materials: Aeronautical Information Manual Student Activity 1, **Aeronautical Information Manual (print or electronic)**

Slide 5: Divide students into small groups and distribute **Aeronautical Information Manual Student Activity 1**. The Student Activity contains eight questions: one for each of the first eight chapters of the AIM. The questions are not in the order of the AIM chapters. In their groups, students should figure out which chapter of the AIM contains the answer to each question; then, they should locate the answer and record it on their activity. Correct answers are found in **Aeronautical Information Manual Teacher Notes 1**.

When groups finish, discuss the answers as a class. Ask students to explain how they figured out where each answer is located, and emphasize that pilots must know how to find the answers to questions by referencing the AIM.

EXPLAIN

Teacher Materials: Aeronautical Information Manual Presentation, Aeronautical Information Manual Teacher Notes 2
Student Materials: Aeronautical Information Manual Student Activity 2, **Aeronautical Information Manual (print or electronic)**

Slide 6: The Aeronautical Information Manual (AIM) occupies a unique place in a pilot's library. Although the AIM is not strictly a regulatory document like the FARs, its procedures and recommendations carry almost as much weight. Violating the various provisions of the AIM can cause the FAA to take action against a pilot in much the same way as would happen following a violation of the FARs. As a result, the AIM is often considered *de facto* regulatory—that is, regulatory in practice if not in statute. Many pilots look to the AIM as the authoritative source of basic flight information and details on ATC procedures.

The goal of the AIM is to provide a central source of aeronautical information that promotes safety, efficiency, and uniformity of procedures. Pilots refer to the AIM on a regular basis to have their questions answered or to have their technical knowledge confirmed or enhanced.

Teaching Tips

The AIM is a lengthy and dense document. Take some time to review the table of contents with students:

- https://www.faa.gov/air_traffic/publications/atpubs/aim_html/index.html

The AIM is organized in such a way as to help users find and reference the information they need as easily and quickly as possible.

- Chapters (1–10) are divided into numbered sections. Some chapters have only one section, but some have more than one.
- Sections are divided into numbered subsections, which may be further divided into lettered paragraphs and numbered sub-paragraphs.
- Thus, any passage in the AIM can be identified by—at a minimum—its chapter, section, and subsection identifiers, and if necessary, its paragraph and sub-paragraph identifiers.
    - For example, chapter 9, section 1, subsection 3 (9-1-3) names selected charts that are available from the Aeronautical Information Services division of the FAA.
    - Another passage in the AIM explains how to avoid collisions by recognizing high-hazard areas. This passage can be found in chapter 8, section 1, subsection 8, paragraph f. This passage would be referenced as 8-1-8(f).
        - Note that paragraph f is itself divided into sub-paragraphs 1 and 2. These would be referenced as 8-1-8(f)(1) and 8-1-8(f)(2).

Slide 7: Chapter 1 of the AIM is titled Air Navigation. It is divided into two sections:

1. Navigation Aids
    a. This section explains how to use VOR, GPS, NDB, ILS, and other navigation systems, as well as how they are structured. It also discusses radar and other methods of tracking aircraft and weather, as well as wide-area and ground-based augmentation systems (WAAS and GBAS).
2. Performance Based Navigation
    a. This section explains Required Navigation Performance and identifies standards that the FAA requires when aircraft are navigating using satellite technology or legacy RNAV equipment.

Slide 8: Chapter 2 of the AIM is titled Aeronautical Lighting and other Airport Visual Aids. It is divided into three sections:

1. Airport Lighting Aids
    a. This section specifies the requirements and specifications for a broad range of airport lighting systems, including approach lights, in-runway lighting, and visual approach path indicators (like VASI and PAPI systems).

2.

Air Navigation and Obstruction Lighting

a. This section discusses light beacons and course lighting, as well as the specifications for the lights that illuminate obstructions like buildings, towers, and cranes.

3.

Airport Marking Aids and Signs

a. This section describes the various types of lighting and signs that appear at airports, such as runway and taxiway lights and directional and locational signage.

Slide 9: Chapter 3 of the AIM is titled **Airspace**. It is divided into five sections:

1.

General

a. This section gives basic information on the concept and dimensions of airspace, as well as basic VFR weather minimums for the various classes of airspace.

2.

Controlled Airspace

a.This section details the classes of controlled airspace (A, B, C, D, E) and their operational requirements.

3.

Class G Airspace

a.This section explains the general concept of uncontrolled airspace and the operational requirements for operating in Class G when flying IFR and VFR.

4.

Special Use Airspace

a. This section discusses other types of airspace, such as prohibited, restricted, military operations, and alert areas, as well as airspace associated with national security.

5.

Other Airspace Areas

a. This section describes special circumstances that apply to airspaces, such as TFRs, military training routes (MTRs), parachute jumping areas, and special radar areas.

Slide 10: Chapter 4 of the AIM is titled Air Traffic Control. It is divided into seven sections:

1.

Services Available to Pilots

a. This section details the various procedures and methods for controlling air traffic, including services that the FAA and others—e.g., control towers, approach control facilities, air route traffic control centers, and flight service stations—provide to pilots.

2.

Radio Communications Phraseology and Techniques

a. This section details standardized communication procedures and radio techniques, as well as the proper use of the transponder for surveillance and emergency communication.

3.

Airport Operations

a. This section details procedures that pilots employ at airports, including traffic patterns and the different operational considerations at towered vs. nontowered airports.

4.

ATC Clearances and Aircraft Separation

a. This section details ATC requirements for keeping aircraft separated in flight and procedures for issuing clearances to IFR and VFR traffic.

5.

Surveillance Systems

a. This section discusses the various types of radar and ADS-B aircraft surveillance and monitoring equipment and explains how to operate this equipment.

6.

Operational Policy/Procedures for Reduced Vertical Separation Minimum (RVSM) in the Domestic U.S., Alaska, Offshore Airspace and the San Juan FIR

a. This section details special procedures when operating in Class A airspace and when in the vicinity of severe weather or turbulence.

7.

Operational Policy/Procedures for the Gulf of Mexico 50 NM Lateral Separation Initiative

a. This section details special procedures for operating over the Gulf of Mexico.

Slide 11: Chapter 5 of the AIM is titled Air Traffic Procedures. It is divided into six sections:

1.

Preflight

a. This section covers a wide array of information important to flight safety. Key topics include preflight preparation and the filing of VFR and IFR flight plans.

2.

Departure Procedures

a. This section discusses the procedures for departing an airport.

3.

En route Procedures

a. This section discusses the procedures for flying en route segments.

4.

Arrival Procedures

a. This section discusses the procedures for arriving at the destination.

5.

Pilot/Controller Roles and Responsibilities

a. This section describes the responsibilities that pilots and controllers have regarding procedures, clearances, approaches, and collision avoidance.

b. Special emphasis is placed on the NOTAM system and the requirement that pilots be familiar with all pertinent NOTAMs before beginning a flight. Remind students that the NOTAM system advises pilots of such things as the presence of TFRs, other flight restrictions, navaid or communication outages, and frequency changes.

6.

National Security and Interception Procedures

a. This section of the AIM describes how pilots should respond when intercepted by military or law enforcement aircraft.

Slide 12: Chapter 6 of the AIM is titled Emergency Procedures. It is divided into five sections:

1.

General

a. This section describes the proper procedures for requesting assistance and explains that the pilot has authority to deviate from regulations as needed to meet an emergency.

2.

Emergency Services Available to Pilots

a. This section describes procedures to use in an emergency including operation of an emergency locator transmitter (ELT) and communication with search and rescue personnel.

3.

Distress and Urgency Procedures

a. This section describes emergency radio communications, ditching procedures, and what to do in the case of a hijacking.

4.

Two-way Radio Communications Failure

a. This section details procedures to follow if radio communications between ATC and the pilot have been lost, as well as the various transponder codes that can be utilized to communicate during radio failure or emergencies. Procedures for re-establishing radio contact and using the “Guard” frequency (121.5 MHz) are also discussed.

5.

Aircraft Rescue and Fire Fighting Communications

a. This section details the various procedures used by air rescue and firefighting personnel, including the use of call signs, special frequencies, and hand signals.

Slide 13: Chapter 7 of the AIM is titled Safety of Flight. It is divided into six sections:

1.

Meteorology

a. Weather is covered extensively in this section, since it remains a leading cause of aviation accidents. A particularly important topic is thunderstorm avoidance.

2.

Altimeter Setting Procedures

a. This section explains the proper use of the altimeter and describes various instrument errors.

3.

Wake Turbulence

a. This section describes the causes of wake turbulence and explains how pilots can avoid this hazard. Special emphasis is given to pilot responsibilities during preflight planning.

4.

Bird Hazards and Flight Over National Refuges, Parks, and Forests

a. This section describes hazards associated with birds and details procedures for flight over national parks. Requirements for reporting bird activity and bird strikes are also covered.

5.

Potential Flight Hazards

a. This section discusses a wide range of potential flight hazards, including flight in congested areas, flight over mountains, and flight in conditions of reduced visibility.

6.

Safety, Accident, and Hazard Reports

a. This section details procedures for participation in the Aviation Safety Reporting Program, as well as reports on near mid-air collisions and UFO sightings.

This chapter also explains how pilots can give hazard reports and other pilots reports (PIREPs) to advise or warn other pilots operating in the same area. PIREPs are seen as the most accurate, up-to-date weather information available.

Slide 14: Chapter 8 of the AIM is titled Medical Facts for Pilots. It consists of only one section:

1.
Fitness for Flight
   a. Pilots must be able to perform their duties without having a medical emergency or condition that hampers their abilities. This chapter deals with several conditions that could affect a pilot's fitness for flight. These include the symptoms and effects of hypoxia, a common problem at altitude, as well as hyperventilation and carbon monoxide poisoning. The chapter also explains methods for avoiding and remedying these and other conditions.
   b. Visual illusions—especially at night, during conditions of reduced visibility, or while flying on instruments—are also discussed.

Slide 15: Complete the **Formative Assessment**.

Formative Assessment

Distribute **Aeronautical Information Manual Student Activity 2**; students should also have access to an online or print copy of the AIM. Students can complete this activity individually or in small groups. Correct answers are located in **Aeronautical Information Manual Teacher Notes 2**.

[DOK-L1; *identify*]

EXTEND

Teacher Materials: Aeronautical Information Manual Presentation, Aeronautical Information Manual Teacher Notes 3
Student Materials: Aeronautical Information Manual Student Activity 3, **Aeronautical Information Manual (print or electronic)**

Session 2

Slides 16-17: Remind students that the AIM serves as the FAA's primary guide for aviation information and procedures. Although it is not regulatory—that is, its provisions are not part of the Federal Aviation Regulations—pilots are expected to follow the AIM's guidance. Failure to do so can result in the FAA taking action against the pilot. The goal of the AIM is to keep pilots informed of aviation dos and don'ts, and to maximize safety by promoting consistency and uniformity in how departures, arrivals, approaches, and other procedures are performed by pilots.

The AIM's table of contents and clear organization into chapters, sections, and subsections make it relatively easy for pilots to locate the information they need quickly. Remind students that while the AIM consists of 10 chapters, only the first eight chapters are assessed on the FAA's Private Pilot Knowledge Test.

While still on Slide 16, give students a few minutes to list the first eight chapters of the AIM; students can either identify the chapter titles or describe their focus. When students finish, show Slide 17 and quickly review the chapters as a class.

Slide 18: Distribute **Aeronautical Information Manual Student Activity 3** and divide students into eight groups; assign each group to a station that represents one of the first eight AIM chapters. Each station should have a copy of the AIM (printed or electronic) and the relevant scenario(s) for that station's chapter of the AIM, as detailed in **Aeronautical**

Information Manual Teacher Notes 3. Student groups should rotate through the stations, using the AIM to look up the relevant information to answer the question(s) for each scenario. Correct answers are provided in **Aeronautical Information Manual Teacher Notes 3**.

EVALUATE

Teacher Materials: Aeronautical Information Manual Presentation, Aeronautical Information Manual Teacher Notes 4
Student Materials: Aeronautical Information Manual Student Activity 4, **Aeronautical Information Manual (print or electronic)**

Slides 19-38: Conduct the **Summative Assessment**.

Summative Assessment

Distribute **Aeronautical Information Manual Student Activity 4**, which contains sample FAA Knowledge Test-type questions. Students should complete the activity individually; then, discuss the answers as a class by proceeding, one question at a time, through slides 19-38.

If time permits, students should answer the short-response and class discussion questions in the Going Further section of the assessment. **Aeronautical Information Manual Teacher Notes 4** also identifies the correct answers and provides rationales for the incorrect answers.

Rather than distribute the activity, you may simply use slides 19-38 to quiz the entire class; students can respond to each correct answer in a manner you choose.

[DOK-L4; *apply concepts*]

Summative Assessment Scoring Rubric

- Follows assignment instructions
- Postings show evidence of one or more of the following:
    - Knowledge of the general topics covered in Chapters 1–8 of the AIM
    - Understanding of the numerical identification system of the AIM
    - Ability to locate specific information found in the AIM and cite its location
- Contributions show understanding of the informational topics covered in the AIM
- Contributions show ability to apply student knowledge to the solution of problems

Points Performance Levels

9-10 Uses the AIM correctly. Use the AIM correctly to look up the answers to the questions. Notes the correct chapters, sections, and lessons. Answers 9-10 questions correctly.
7-8 Uses the AIM correctly with minor gaps in understanding. Use the AIM correctly to look up the answers. Notes most of the correct chapters, sections, and lessons are given. Answers 7-8 questions correctly.
5-6 Uses the AIM with many gaps in understanding. Use the AIM to look up the answers to the questions. Notes some of the correct chapters, sections, and lessons. Answers 5-6 questions correctly.
0-4 Uses the AIM incorrectly. Does not appear to have used the AIM. Fails to find the correct chapters, sections, and lessons. Answers 0-4 questions correctly.

STANDARDS ALIGNMENT

COMMON CORE STATE STANDARDS

- **RST.11-12.2** - Determine the central ideas or conclusions of a text; summarize complex concepts, processes, or information presented in a text by paraphrasing them in simpler but still accurate terms.
- **RST.11-12.4** - Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to *grades 11-12 texts and topics*.
- **RST.11-12.9** - Synthesize information from a range of sources (e.g., texts, experiments, simulations) into a coherent understanding of a process, phenomenon, or concept, resolving conflicting information when possible.
- **RST.11-12.9** - Synthesize information from a range of sources (e.g., texts, experiments, simulations) into a coherent understanding of a process, phenomenon, or concept, resolving conflicting information when possible.
- **WHST.11-12.6** - Use technology, including the Internet, to produce, publish, and update individual or shared writing products in response to ongoing feedback, including new arguments or information.
- **WHST.11-12.7** - Conduct short as well as more sustained research projects to answer a question (including a self-generated question) or solve a problem; narrow or broaden the inquiry when appropriate; synthesize multiple sources on the subject, demonstrating understanding of the subject under investigation.
- **WHST.11-12.8** - Gather relevant information from multiple authoritative print and digital sources, using advanced searches effectively; assess the strengths and limitations of each source in terms of the specific task, purpose, and audience; integrate information into the text selectively to maintain the flow of ideas, avoiding plagiarism and overreliance on any one source and following a standard format for citation.
- **WHST.11-12.9** - Draw evidence from informational texts to support analysis, reflection, and research.

FAA AIRMAN CERTIFICATION STANDARDS

PRIVATE PILOT

I. Preflight Preparation

Task B. Airworthiness Requirements

- Knowledge - The applicant demonstrates understanding of:
    - **PA.I.B.K1** - General airworthiness requirements and compliance for airplanes, including:
        - **PA.I.B.K1c** - Airworthiness Directives and Special Airworthiness Information Bulletins

Task E. National Airspace System

- Knowledge - The applicant demonstrates understanding of:
    - **PA.I.E.K3** - Special use airspace (SUA), special flight rules areas (SFRA), temporary flight restrictions (TFR), and other airspace areas.

II. Preflight Procedures

Task D. Taxiing (ASEL, AMEL)

- Knowledge - The applicant demonstrates understanding of:
    - **PA.II.D.K1** - The applicant demonstrates understanding of current airport aeronautical references and information resources such as the Chart Supplement, airport diagram, and NOTAMS

III. Airport and Seaplane Base Operations

Task A. Communications, Light Signals, and Runway Lighting Systems

- Knowledge - The applicant demonstrates understanding of:

- **PA.III.A.K8** - The applicant demonstrates understanding of National Transportation Safety Board (NTSB) accident/incident reporting.

REFERENCES

https://www.faa.gov/air_traffic/publications/atpubs/aim_html/index.html

https://www.cfinotebook.net/notebook/publications-and-references/aeronautical-information-manual