Federal Aviation Administration

Initial En Route Qualification Training

Instructor
Lesson 20
Aircraft Characteristics

Course 50148001

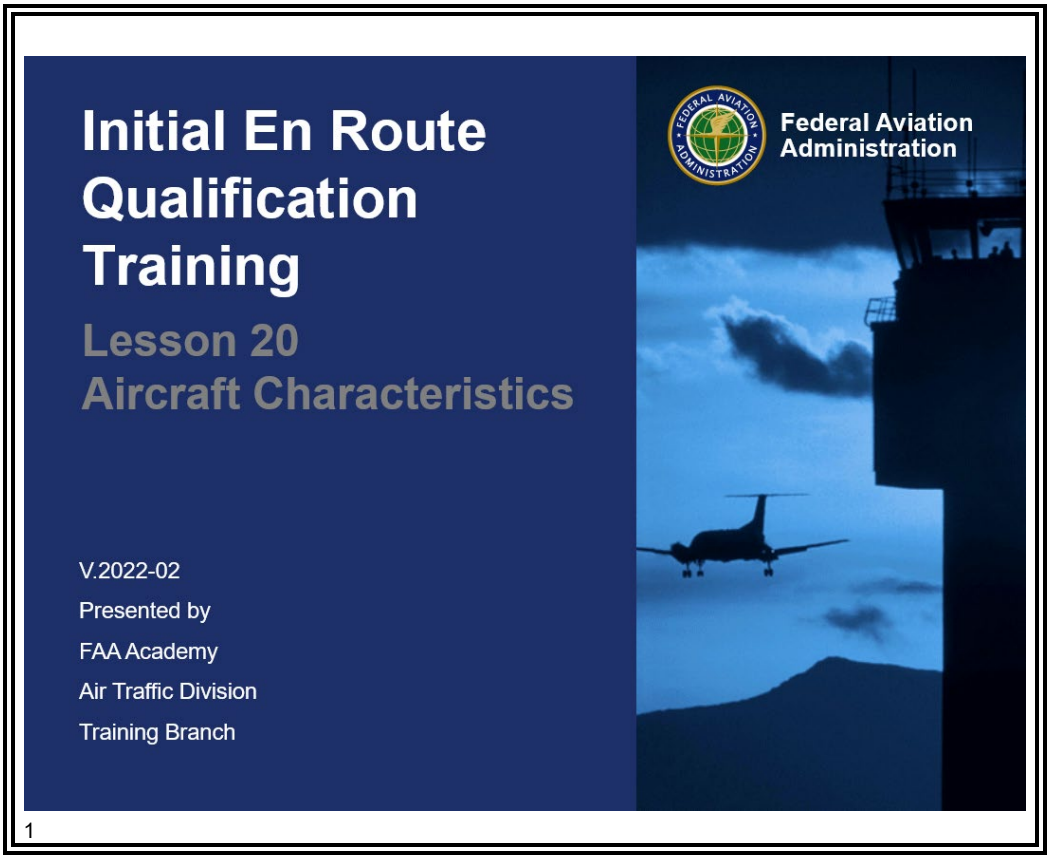
LESSON PLAN DATA SHEET

COURSE NAME:	INITIAL EN ROUTE QUALIFICATION TRAINING
COURSE NUMBER:	50148001
LESSON TITLE:	AIRCRAFT CHARACTERISTICS
DURATION:	2+30 HOURS
DATE REVISED:	2022-02
VERSION:	V.2022-02
REFERENCE(S):	FAA ORDER JO 7110.65, AIR TRAFFIC CONTROL; ATG-2, TRI-OPTION CONTROLLER REFERENCE AIRCRAFT MANUAL
HANDOUT(S):	NONE
EXERCISE(S)/ ACTIVITY(S):	AIRCRAFT CHARACTERISTICS ELEARNING
END-OF-LESSON TEST:	NONE
PERFORMANCE TEST:	NONE
MATERIALS:	NONE
OTHER PERTINENT INFORMATION:	*INSTRUCTOR KEY FOR THE ELEARNING(S) IS INCLUDED AS AN APPENDIX IN THIS DOCUMENT;* AN AIRCRAFT CHARACTERISTICS STUDY CHART IS INCLUDED AS AN APPENDIX

☞ ***NOTE:*** *As you prepare for this lesson, recall and be prepared to talk about examples and personal experiences that illustrate or explain the teaching points in the lesson.*

INTRODUCTION

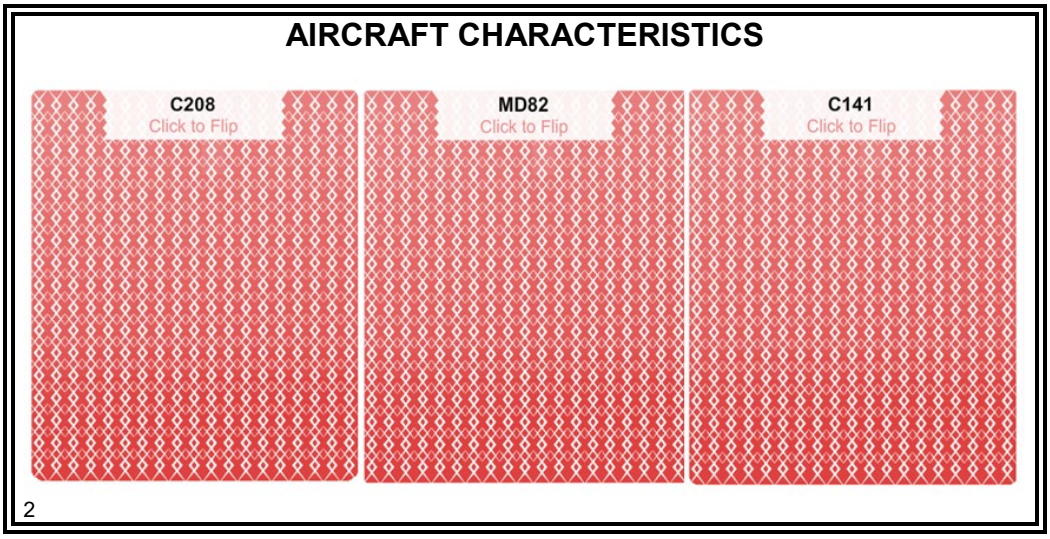
Gain Attention



In order for you to properly apply the specific skills taught in the previous lessons, it is critical you understand the key characteristics of the aircraft you will be responsible for as an En Route controller.

INTRODUCTION *(Continued)*

Opening Scenario



Critical to your job as an air traffic controller is the capability to recognize key aircraft performance characteristics quickly. Being proficient in identifying aircraft capabilities and limitations enables you to recognize potential problems and make appropriate decisions. By learning this foundational knowledge, you will expand your ability to interpret information presented to you.

Purpose

The purpose of this lesson is to enhance your ability to differentiate and recognize aircraft characteristics.

INTRODUCTION *(Continued)*

Lesson Objectives

LESSON OBJECTIVES

- At the end of this lesson, you will be:
  - Familiar with the aircraft designators for each aircraft and their key characteristics, including:
    - → Aircraft type
    - → Weight class
    - → Number and type of engine
    - → Climb rate
    - → Cruise speed
  - Able to order selected aircraft by climb rate and cruise speed and categorize aircraft by type engine

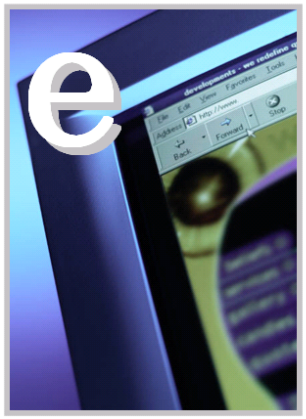
3

☞ ***NOTE*:** *Teach from the graphic.*

ACTIVITY: AIRCRAFT CHARACTERISTICS

Activity

AIRCRAFT CHARACTERISTICS ACTIVITY



Purpose: to become familiar with common aircraft and their characteristics

4

☞ ***NOTE:*** *Have the students access the IET eLearning menu and select the activity for Lesson 20.*

Description

The learning activity begins with an overview of key aircraft characteristics. The second part of the activity is comprised of a variety of interactive modules to help you learn these characteristics.

NOTE: For review purposes a study chart is included as Appendix A. Your ability to recall common characteristics such as designators, weight classes, engine types, climb rates, and cruise rates enhances your ability to keep aircraft moving safely and expediently within your sector.

Directions

Access the IET eLearning menu. Select **Lesson 20 – Aircraft Characteristics** and click on each title to launch the activities.

Time Allotted

2+30 Hours

☞ **NOTE:** Refer to Appendix B for the Instructor Key for this eLearning activity.

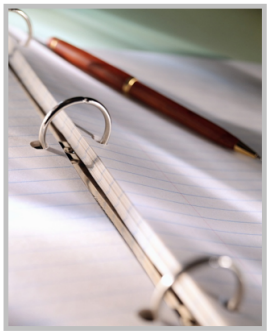
IN CONCLUSION

Lesson Review

LESSON REVIEW

This lesson covered common aircraft and their characteristics including:

- Aircraft type
- Weight class
- Number and type of engine
- Climb rate
- Cruise speed



5

☞ ***NOTE:*** *Teach from graphic. Review and elaborate briefly on the topics covered in this lesson.*

APPENDIX A: AIRCRAFT CHARACTERISTICS STUDY CHART

Aircraft		Data					Image
Designator	*Aircraft Model*	*Weight Class*	*Number & Type of Engines*	*Climb Rate (FPM)*	*Cruise Speed (KTAS)*	*Comment*	
BE36	Beech Bonanza	S	1/Prop	1000-1200	160-190	B36T = Turboprop	
C172	Cessna Skyhawk	S	1/Prop	600-800	120-150		
C182	Cessna Skylane	S	1/Prop	800-1000	120-150		
C210	Cessna Centurion	S	1/Prop	800-1000	160-190	P210 = Pressurized; C10T = Pressurized and Turboprop	

Continued on next page

APPENDIX A: AIRCRAFT CHARACTERISTICS STUDY CHART *(Continued)*

Aircraft		Data					Image
Designator	*Aircraft Model*	*Weight Class*	*Number & Type of Engines*	*Climb Rate (FPM)*	*Cruise Speed (KTAS)*	*Comment*	
PA24	Piper Comanche	S	1/Prop	1000-1200	120-150		
PA32	Piper Cherokee	S	1/Prop	800-1000	160-190		
PA46	Piper Malibu	S	1/Prop	1100-1400	160-200	P46T = Turboprop	
SR22	Cirrus SR-22	S	1/Prop	1000-1200	160-190		

Continued on next page

APPENDIX A: AIRCRAFT CHARACTERISTICS STUDY CHART *(Continued)*

Aircraft		Data					Image
Designator	*Aircraft Model*	*Weight Class*	*Number & Type of Engines*	*Climb Rate (FPM)*	*Cruise Speed (KTAS)*	*Comment*	
BE58	Beech Baron	S	2/Prop	1400-1700	160-200		
C421	Cessna Golden Eagle	S	2/Prop	1400-1700	200-240	C21T = Turboprop	
PA31	Piper Navajo	S	2/Prop	1400-1700	160-200		
PA34	Piper Seneca	S	2/Prop	1100-1400	160-200		

Continued on next page

APPENDIX A: AIRCRAFT CHARACTERISTICS STUDY CHART *(Continued)*

Aircraft		Data					Image
Designator	*Aircraft Model*	*Weight Class*	*Number & Type of Engines*	*Climb Rate (FPM)*	*Cruise Speed (KTAS)*	*Comment*	
C208	Cessna Caravan	S	1/Turboprop	1100-1400	160-200	Commonly used in skydiving operations	
PC12	Pilatus Eagle	S	1/Turboprop	1500-2000	200-240	Generally outperforms other single engine turboprops	
BE9T	Beech King Air	S	2/Turboprop	1800-2400	200-240	The BE10 and BE20 are also King Airs that perform from 20-30% better in climb rate and cruise speed.	
B190	Beech 1900	S	2/Turboprop	1800-2400	240-270		

Continued on next page

APPENDIX A: AIRCRAFT CHARACTERISTICS STUDY CHART (*Continued*)

Aircraft		Data					Image
Designator	*Aircraft Model*	*Weight Class*	*Number & Type of Engines*	*Climb Rate (FPM)*	*Cruise Speed (KTAS)*	*Comment*	
B350	Beech Super King Air	S	2/Turboprop	2700-3000	270-300		
C441	Cessna Conquest	S	2/Turboprop	2700-4200	240-270	Cessna 400 series aircraft consist of both twin props and turboprops.	
DH8A DH8B DH8C	Dehavilland-8	L	2/Turboprop	1400-1700	240-270	DH8s normally climb or descend at lower rates than most other twin turboprops; however, the DH8D performs much better than the other DH8s and climbs at almost twice the rate.	

Continued on next page

APPENDIX A: AIRCRAFT CHARACTERISTICS STUDY CHART *(Continued)*

Aircraft		Data					Image
Designator	*Aircraft Model*	*Weight Class*	*Number & Type of Engines*	*Climb Rate (FPM)*	*Cruise Speed (KTAS)*	*Comment*	
DH8D	Dehavilland Dash 8	L	2/Turboprop	2400-2600	270-300	DH8s normally climb or descend at lower rates than most other twin turboprops; however, the DH8D performs much better than the other DH8s and climbs at almost twice the rate.	
SF34	Saab 340	L	2/Turboprop	1800-2400	240-270		
SW4	Fairchild Metro	S	2/Turboprop	1800-2400	240-270		
C130	Lockheed Hercules C-130	L	4/Turboprop	1400-1700	300-340	Military Cargo; "C" stands for cargo; IT IS NOT A CESSNA	

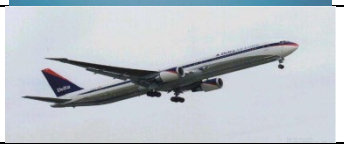
Continued on next page

APPENDIX A: AIRCRAFT CHARACTERISTICS STUDY CHART *(Continued)*

Aircraft		Data					Image
Designator	*Aircraft Model*	*Weight Class*	*Number & Type of Engines*	*Climb Rate (FPM)*	*Cruise Speed (KTAS)*	*Comment*	
F16	General Dynamics Fighting Falcon	L	1/Jet	8000-10000	460+	Similar aircraft: F15, F18, and F117; Military Fighter; capable of high rates of climb/descent; notice that an F16 has one engine	
A320	Airbus 320	L	2/Jets	3000-3500	430-450	Similar aircraft: A319, and A321	
BE40	Beech Beechjet	S	2/Jets	3000-3500	430-450		
B712	Boeing 717 200 Series	L	2/Jets	2000-3000	430-450		

Continued on next page

APPENDIX A: AIRCRAFT CHARACTERISTICS STUDY CHART *(Continued)*

Aircraft		Data					Image
Designator	*Aircraft Model*	*Weight Class*	*Number & Type of Engines*	*Climb Rate (FPM)*	*Cruise Speed (KTAS)*	*Comment*	
B738	Boeing 737-800	L	2/Jets	3000-3500	430-450	Similar aircraft: B731 through B739; the most common are B737 and B738; B731 and B732 perform significantly worse than the others	
B753	Boeing 757-300	L	2/Jets	2000-3000	460+	Special wake turbulence procedures apply.	
B772	Boeing 777	H	2/Jets	2000-3000	460+	Similar aircraft: B773	
B763	Boeing 767-300	H	2/Jets	3000-3500	460+	Similar aircraft: B762, and B764	

Continued on next page

APPENDIX A: AIRCRAFT CHARACTERISTICS STUDY CHART *(Continued)*

Aircraft		Data					Image
Designator	*Aircraft Model*	*Weight Class*	*Number & Type of Engines*	*Climb Rate (FPM)*	*Cruise Speed (KTAS)*	*Comment*	
CRJ2	Canadair Jet - CRJ200	L	2/Jets	2000-2500	400-420	Similar aircraft: CRJ1	
CRJ9	Canadair Jet – CRJ-900	L	2/Jets	2000-3000	430-450	Similar aircraft: CRJ7; the CRJ7 and CRJ9 cruise about 20 knots faster than the CRJ1 and CRJ2	
C510	Cessna Citation Mustang	S	2/Jets	2000-3000	320-360	One of several aircraft termed "Very Light Jets"(VLJ); although these are jets, they significantly underperform airliners and most corporate jets	

Continued on next page

APPENDIX A: AIRCRAFT CHARACTERISTICS STUDY CHART *(Continued)*

Aircraft		Data					Image
Designator	*Aircraft Model*	*Weight Class*	*Number & Type of Engines*	*Climb Rate (FPM)*	*Cruise Speed (KTAS)*	*Comment*	
C750	Cessna 750 Citation 10	S	2/Jets	3500-4000	460+	There are many models of Citation jets starting with the 500 series up to the 750; the C500 is a low performing jet that may perform similar to a twin turboprop; the C560, 600 series, and the C750 are high performance corporate jets	
EA50	Eclipse 500	S	2/Jets	2000-3000	320-390	One of several aircraft termed "Very Light Jets"(VLJ); although these are jets, they significantly underperform airliners and most corporate jets	
E145	Embraer EMB-145	L	2/Jets	2000-3000	430-450	Similar aircraft: E135 and E140	
E190	Embraer EMB-190	L	2/Jets	2000-2500	430-450	Similar aircraft: E170	

Continued on next page

APPENDIX A: AIRCRAFT CHARACTERISTICS STUDY CHART *(Continued)*

Aircraft		Data					Image
Designator	*Aircraft Model*	*Weight Class*	*Number & Type of Engines*	*Climb Rate (FPM)*	*Cruise Speed (KTAS)*	*Comment*	
E3TF	Boeing E-3A Sentry	H	4/Jets	3000-3500	430-450	Military airborne reconnaissance aircraft based on a Boeing 707 platform	
GLF4	Gulfstream	L	2/Jets	4000-5000	460+	Similar aircraft: GLF5; they are high performance corporate jets	
LJ55	Gates Lear Jet 55	S	2/Jets	4000-5000	430-450	Similar aircraft: LJ23, LJ24, LJ35, LJ60, and others; they are high performance corporate jets	
MD82	McDonnell-Douglas MD-82	L	2/Jets	3000-3500	430-450	Similar aircraft: MD83, and MD88	

Continued on next page

APPENDIX A: AIRCRAFT CHARACTERISTICS STUDY CHART *(Continued)*

Aircraft		Data					Image
Designator	*Aircraft Model*	*Weight Class*	*Number & Type of Engines*	*Climb Rate (FPM)*	*Cruise Speed (KTAS)*	*Comment*	
T37	Cessna T-37	S	2/Jets	3000-3500	320-390	Military Trainer; performs similar to a Citation C500	
T38	Northrop Talon AT-38	S	2/Jets	8000-10000	460+	Military Trainer	
A343	Airbus 340	H	4/Jets	3000-3500	460+	Similar aircraft: A342, A345, and A346	
A388	Airbus 380	H	4/Jets	3000-3500	460+	Use the term "SUPER" when coordinating with a terminal facility, and when issuing traffic advisories. Note: ICAO does not have a super weight class.	

Continued on next page

APPENDIX A: AIRCRAFT CHARACTERISTICS STUDY CHART *(Continued)*

Aircraft		Data					Image
Designator	*Aircraft Model*	*Weight Class*	*Number & Type of Engines*	*Climb Rate (FPM)*	*Cruise Speed (KTAS)*	*Comment*	
B1	Rockwell INTL B1- Lancer	H	4/Jets	3000-3500	460+	Military Bomber	
B2	Northrop Grumman B2-Spirit	H	4/Jets	3000-3500	460+	Military Bomber	
B742	Boeing 747	H	4/Jets	3000-3500	460+	Similar aircraft: B741, B743, B74D, B744, B74R, B74S, and B748	
C5	Lockheed C-5 Galaxy	H	4/Jets	2000-3000	460+	Military Cargo	

Continued on next page

APPENDIX A: AIRCRAFT CHARACTERISTICS STUDY CHART *(Continued)*

Aircraft		Data					Image
Designator	*Aircraft Model*	*Weight Class*	*Number & Type of Engines*	*Climb Rate (FPM)*	*Cruise Speed (KTAS)*	*Comment*	
C17	Boeing C-17 Globemaster	H	4/Jets	2000-3000	430-450	Military Cargo	
K35R	Boeing KC-135 Stratotanker	H	4/Jets	4000-5000	430-450	Similar aircraft: K35E, Military Refueling Aircraft	
B52	Boeing B-52 Stratofortress	H	8/Jets	3000-3500	460+	Military Bomber	

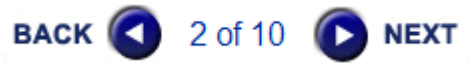
APPENDIX B: INSTRUCTOR KEY FOR ELEARNING INTRODUCTION AND ACTIVITY

Purpose

This document serves as a guide for facilitating the eLearning introduction and activities of the Aircraft Characteristics lesson and provides navigation support as well as an overview of the objectives and content of the eLearning.

Navigation

- To navigate within the eLearning activities, a Navigation Bar is positioned at the top right of the page and contains the following options:
  - MAIN MENU: Allows students to access a main menu listing all of the eLearning activities
  - RESOURCES: Allows students to access additional resources, including:
    - A **Glossary** link
    - A **References** link
    - A **Help** link
  - EXIT: Allows students to exit from the eLearning activity at any time



- To navigate within an activity, a navigation tab is also positioned near the top right of the screen, just below the navigation bar.
- The navigation tab contains the following buttons:
  - BACK: When active, returns students to the previous page
  - NEXT: When active, allows students to advance to the next page

NOTE: Inactive **BACK** and **NEXT** buttons indicate students are at the beginning or at the end of a lesson.

Navigation Tips

- To refresh a page or reset an activity, press **F5**.
- You can advance to a specific page in the activity without completing the activity. Click the **NEXT** or **BACK** buttons until the page is displayed.

Continued on next page

APPENDIX B: INSTRUCTOR KEY FOR ELEARNING INTRODUCTION AND ACTIVITY (*Continued)*

Lesson Title

Lesson 20, Aircraft Characteristics

eLearning Objective

The objective of this eLearning module is for students to learn the aircraft designators key characteristics of the common aircraft presented.

eLearning Activity

⊙ Lesson 20 contains the following eLearning activities:

- Aircraft Characteristics Lesson Introduction
- Aircraft Characteristics Activity

Lesson Introduction: Aircraft Characteristics

Lesson Introduction Description

In this eLearning, students are introduced to key characteristics of aircraft. Students click through seven pages that discuss each characteristic.

Lesson Introduction Content

⊙ Page 1 contains the lesson introduction.

⊙ Page 2 introduces aircraft designators.

⊙ Page 3 introduces climb rates and cruise speeds.

⊙ Page 4 introduces three weight classes of aircraft.

⊙ Page 5 introduces four engine group categories.

⊙ Page 6 introduces factors that affect an aircraft's performance.

⊙ Page 7 introduces ICAO – approved aircraft type information.

Continued on next page

APPENDIX B: INSTRUCTOR KEY FOR ELEARNING INTRODUCTION AND ACTIVITY *(Continued)*

Aircraft Characteristics Activity

Activity Description

In this eLearning activity, students check their immediate recall of aircraft characteristics.

Activity Content

- The activity contains the following areas.
  - Review flash cards
  - Recall flash cards
  - Match the aircraft designator to the correct engine group
  - Compare the cruise rates (KTAS) of different aircraft groups
  - Compare the climb rates (FPM) of different aircraft groups
  - Aircraft characteristics practice

Activity Specifics

- Flash Cards
  - On pages 2-9, students review the flash cards grouped by engine type until they have memorized the content. Then they recall the information related to the aircraft designator before clicking each card to verify
  - On page 10, students recall all the flash cards for all engine types.
- Matching Activity
  - On page 11, students have two attempts to drag the appropriate aircraft designator to the correct engine group
- Cruise and Climb Rate Comparisons
  - On pages 12-13, students click **Animate** to compare different groups of aircraft
- Aircraft Characteristics Practice
  - On page 14, students have one attempt to answer a series of multiple choice, true and false, and fill-in-the-blank questions before receiving feedback.