

**CAREER
PATHS**

Civil Aviation

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Express Publishing

**CAREER
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Book

1

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1 Parts of an airplane 1



13

Getting to Know Aircraft:

Fixed Wing

This chapter focuses on the basic parts of **fixed wing** aircraft like jets and airplanes. The **wings** on the **fuselage** create lift. The **pilot** sits in the cockpit towards the **nose**. Important stabilizers on the **tail** keep the aircraft steady.

Below the fuselage is the **landing gear**. This part usually has **wheels** so the pilot can

drive the aircraft along the ground. An aircraft needs strong **tires** to support its weight.

Most fixed wing aircraft get their power from **turbine engines**. Small planes requiring moderate speed have **turboprops**. Bigger, faster jets, on the other hand, usually need more powerful gas turbines.



landing gear

Get ready!

1 Before you read the passage, talk about these questions.

- 1 What are some of the parts of a fixed wing aircraft?
- 2 What part of an airplane is involved in landing?

Reading

2 Read the textbook chapter on parts of an aircraft. Then, mark the following statements as true (T) or false (F).

- 1 ___ A plane's wings attach to the fuselage.
- 2 ___ The nose has stabilizers to keep an aircraft steady.
- 3 ___ Turboprops are less appropriate for large, fast jets.

Vocabulary

3 Match the words (1-7) with the definitions (A-G).

- | | |
|----------------------|--------------------|
| 1 ___ tail | 5 ___ fuselage |
| 2 ___ tire | 6 ___ turboprop |
| 3 ___ nose | 7 ___ landing gear |
| 4 ___ turbine engine | |

- A the central part of an aircraft's body
- B an engine that uses a propeller for thrust
- C the front part of an aircraft
- D the rear part of an aircraft
- E a rubber part around a wheel
- F an engine that uses exhaust for propulsion
- G a structure supporting aircraft while not in flight

4 Choose the sentence that uses the underlined part correctly.

- 1 A The plane needs wheels to land safely.
B The damaged tire caused the pilot to lose control during flight.
- 2 A Airplanes and jets are examples of fixed wing aircraft.
B A jet gets its propulsion from the fuselage.
- 3 A The cockpit is usually located at the tail of an aircraft.
B Wings provide the lift needed for a plane to fly.

5 Listen and read the textbook chapter on parts of an aircraft again. Why does an aircraft need strong tires?

Listening

6 Listen to a conversation between a pilot and a co-pilot. Choose the correct answers.

- 1 What is the purpose of the conversation?
A to explain an accident on the runway
B to discuss damage to an aircraft
C to give instructions for repairing a wheel
D to reprimand the crew for a poor landing
- 2 What will the pilot likely do next?
A get ready for takeoff C practice landing
B examine the wheels D order new tires

7 Listen again and complete the conversation.

Pilot: Jamie, are we ready for 1 _____?

Co-pilot: Almost, Glen. But I'm concerned about 2 _____.

Pilot: Really? What's 3 _____?

Co-pilot: It looks a little crooked. I think we damaged it 4 _____ yesterday.

Pilot: Oh, I remember. That was 5 _____.

Co-pilot: I don't think our tires were 6 _____ to handle that.

Pilot: Hmm. We'd better take a look at it before we get started.

Speaking

8 With a partner, act out the roles below based on Task 7. Then switch roles.

USE LANGUAGE SUCH AS:

I'm concerned about ...

I think we damaged it when ...

We'd better ... before we ...

Student A: You are a pilot. Talk to Student B about:

- damage to an aircraft part
- the cause of the damage
- action required

Student B: You are a co-pilot. Talk to Student A about damage to an aircraft part.

Writing

9 Use the conversation from Task 8 to complete the pilot's damage report.

Pilot's Damage Report

Aircraft: JetWing 579

Part damaged: _____

Cause of damage: _____

Replace damaged part? Y / N



2 Parts of an airplane 2



Understanding Aircraft Movement

Before flying, you must understand how to control an aircraft's movement. **Elevators** guide an aircraft during takeoff and landing. **Ailerons** turn an aircraft left and right and roll it. A **rudder** keeps turns smooth.

Pilots adjust **flaps** to change the force produced during flight. Increased air resistance on a **spoiler** helps reduce speed. During landing, **slats** along the wings and **outboard slats** at the wing tips also slow an aircraft.

Stabilizers keep the pilot in control during flight. The **horizontal stabilizer** maintains up-and-down steadiness. Unwanted side-to-side movement is minimized with the **vertical stabilizer**.

Winglets at the tip of the wings also keep an aircraft steady.

Get ready!

1 Before you read the passage, talk about these questions.

- 1 What are some parts of an aircraft's wing?
- 2 Which parts guide an aircraft during takeoff and landing?

Reading

2 Read the training manual on aircraft parts. Then, mark the following statements as true (T) or false (F).

- 1 Ailerons guide an aircraft during takeoff.
- 2 A spoiler helps a pilot fly faster.
- 3 Pilots need stabilizers to prevent unwanted movement.

Vocabulary

3 Read the sentence and choose the correct word.

- 1 The **spoiler** / **horizontal stabilizer** prevents unwanted up-and-down movement.
- 2 The pilot used the **rudder** / **elevator** to bring the plane down to the runway.
- 3 **Flaps** / **Winglets** allow the pilot to increase the amount of force produced.
- 4 Slow down during landing by adjusting the **vertical stabilizers** / **slats**.

4 Place the correct words and phrases from the word bank under the correct headings.

word BANK

winglet vertical stabilizer spoiler
 rudder outboard slat aileron

Steering	Speed	Steadiness

5 Listen and read the training manual on aircraft parts again. What do an aileron and a rudder do?

Listening

6 Listen to a conversation between a flight instructor and a student. Check (✓) the aircraft parts that are defined in the lesson.

- 1 aileron
- 2 spoiler
- 3 winglet
- 4 rudder
- 5 elevator

7 Listen again and complete the conversation.

Instructor: Okay, Henry. Tell me what parts are important for 1 _____.

Student: Well, you 2 _____ to move up and down.

Instructor: Good. What else?

Student: Um, let's see. The 3 _____ allows the aircraft to roll from side to side.

Instructor: You're close, but that's 4 _____ . Try again.

Student: Oh, of course. It's the 5 _____ that controls rolling movements.

Instructor: 6 _____. And what does the rudder do?

Student: The rudder helps the pilot turn the aircraft smoothly.

Speaking

8 With a partner, act out the roles below based on Task 7. Then switch roles.

USE LANGUAGE SUCH AS:

You use the ... to move ...
 You're close, but ...
 What does the ... do?

Student A: You are a flight instructor. Talk to Student B about:

- parts for steering an aircraft
- types of aircraft movement
- an error he or she makes

Student B: You are a student. Talk to Student A about parts for steering an aircraft.

Writing

9 Use the conversation from Task 8 to complete the student's lesson notes.



Student's
Lesson notes

Name: _____

Aircraft part: Movement controlled:

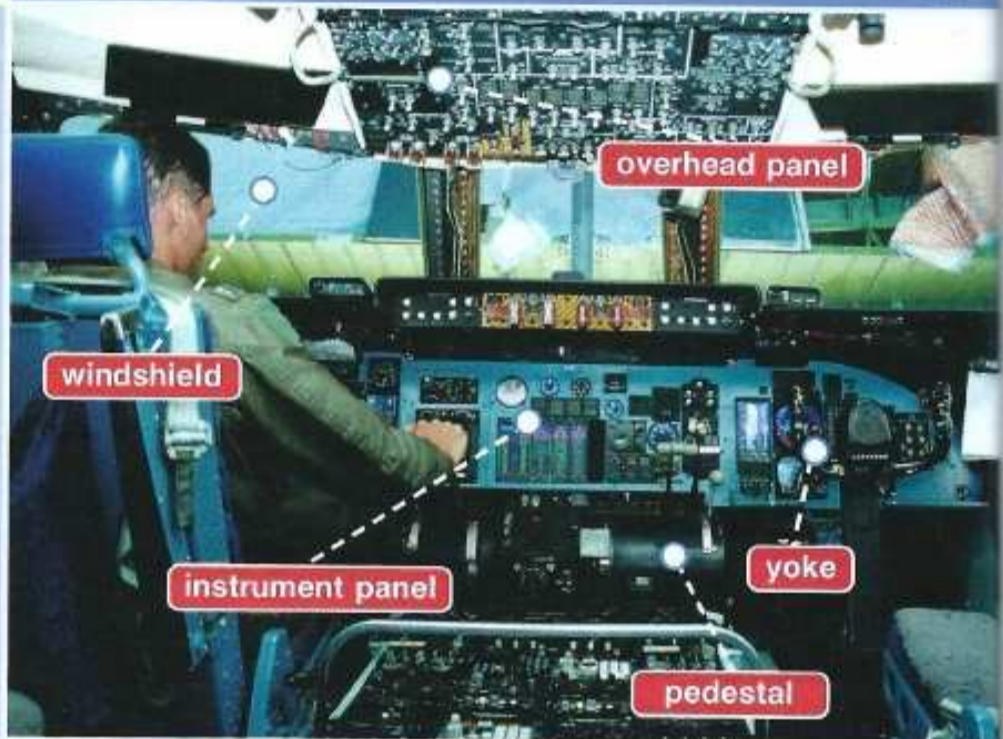
- 1 _____
- 2 _____
- 3 _____

Cockpit Basics

A cockpit contains the controls needed for flying the aircraft. Here, you will find **rudder pedals** for steering. Always check whether to control movement with a **side stick**, **center stick**, or traditional **yoke**. Power controls like the **throttle** are typically between the pilot and **co-pilot** on the **pedestal**.

Learn about your **instrument panel**. This will let you easily check your flight status. Most aircraft have an **overhead panel** above the **windshield**. This area often includes the cabin's climate controls.

As a pilot, you must be comfortable in your aircraft's **cockpit**, or **flight deck**. This guide will help you identify the standard features of a cockpit.



Get ready!

1 Before you read the passage, talk about these questions.

- 1 What are the two main panels in a cockpit?
- 2 What is the yoke used for?

Reading

2 Read the training manual entry on cockpits. Then, choose the correct answers.

- 1 What is the purpose of the passage?
 - A to outline a checklist for cockpit inspections
 - B to compare types of cockpit controls
 - C to give instructions for flying an aircraft
 - D to introduce features of a cockpit
- 2 Which feature does NOT control flight movement?

A center stick	C overhead panel
B rudder pedals	D throttle
- 3 What can you infer about a yoke?
 - A It is a feature of some aircraft, but not all.
 - B It is superior to a center stick.
 - C It is typically located to the side of the pilot.
 - D It is an alternative to a throttle.

Vocabulary

3 Write a word that is similar in meaning to the underlined part.

- 1 Large, commercial jets often have a W-shaped control for adjusting pitch.
_ _ k e
- 2 To turn the nose to the right, press the right control for turning the aircraft.
_ u d _ _ _ p _ _ a l
- 3 We inspected all the controls in the section of an aircraft where the pilot sits.
_ o _ k _ i t
- 4 Speed up by adjusting the part that controls fuel to the engine.
t _ _ o t _ _ e
- 5 Pilots of smaller aircraft often prefer a pitch control located to the side of the pilot.
s _ _ e _ t _ c k

craft's
to you

4 Choose the correct word for each blank.

1 flight deck / instrument panel

- A Check the _____ to verify our heading.
- B The co-pilot left the _____ to inform the crew of the route change.

2 pedestal / center stick

- A Both the pilot and co-pilot can reach controls on the _____.
- B This aircraft has a _____ to control its movement.

3 overhead panel / windshield

- A The de-icing control is located on the _____.
- B We couldn't see anything through the _____ because of the heavy clouds.

5 Listen and read the training manual entry on cockpits again. What is another name for the cockpit?

Listening

6 Listen to a conversation between a flight instructor and a student. Mark the following statements as true (T) or false (F).

- 1 ___ The woman misunderstands the purpose of a yoke.
- 2 ___ Lighter aircraft often have side sticks.
- 3 ___ A yoke is better for small cockpits.

7 Listen again and complete the conversation.

Instructor: Does anyone have questions about 1 _____?

Student: Yes, Sir. You said the 2 _____ controls pitch. Doesn't the yoke do that?

Instructor: Yes, but some aircraft models use a side stick instead of a 3 _____.

Student: What's 4 _____?

Instructor: A side stick makes more efficient use of space. It's used in 5 _____.

Student: Oh, I see. So a side stick is better for 6 _____?

Instructor: Right. On the other hand, a yoke allows two-handed control. This makes it better for steering large, heavy aircraft.

Speaking

8 With a partner, act out the roles below based on Task 7. Then switch roles.

USE LANGUAGE SUCH AS:

Doesn't the ... control ...
Some models use ...
On the other hand ...

Student A: You are a flight instructor. Talk to Student B about:

- cockpit controls
- differences between certain parts
- reasons for using each part

Student B: You are a student. Talk to Student A about cockpit controls.

Writing

9 Use the conversation from Task 8 to complete the student's lesson notes.

Student's Lesson notes

Topic:

Controlling pitch

Part: _____

Cockpit location: _____

Aircraft type: _____

Part: _____

Cockpit location: _____

Aircraft type: _____

4 Flight instruments

1.5 FLIGHT INSTRUMENTS

The layout of the **Basic Six** follows the **T Arrangement**.

ATTITUDE INDICATOR - This unit is reliable through 60 degrees of climb and dive.

HEADING INDICATOR - This unit is reliable through 55 degrees of climb and dive.

AIRSPEED INDICATOR - Speeds appear in knots per hour.

ALTIMETER - The short needle indicates thousands of feet. The long needle indicates hundreds of feet.

VERTICAL SPEED INDICATOR - This unit indicates rate of climb or descent up to 2000 feet per minute.

COURSE DEVIATION INDICATOR - The programmed sensitivity is 5 nautical miles.

TURN COORDINATOR - Model V-56C uses a 2-minute turn rate instrument.

SINGLE-NEEDLE RADIO MAGNETIC INDICATOR - Model V-56C uses a single-needle instrument to indicate direction.

MAGNETIC COMPASS

**AIRCRAFT
MANUAL
MODEL
V-56C**



1.5.1 Illustration "Cockpit Front View: Location of Flight Instruments"

Get ready!

1 Before you read the passage, talk about these questions.

- 1 What is the name for the primary flight instruments?
- 2 What are some important primary flight instruments?

Reading

2 Read the manual on flight instruments. Then, choose the correct answers.

- 1 What is the purpose of the manual?
A to specify when to replace flight instruments
B to describe common flight instrument errors
C to list technical details of flight instruments
D to show where flight instruments are located
- 2 Which of the following statements is NOT true?
A The aircraft has a single-needle radio magnetic indicator.
B The heading indicator is reliable through a set degree of climb.
C The course deviation indicator has a programmed sensitivity.
D The plane does not have a magnetic compass.
- 3 Which instrument indicates a plane's direction?
A airspeed indicator
B radio magnetic indicator
C course deviation indicator
D attitude indicator

Vocabulary

3 Match the words (1-8) with the definitions (A-H).

- 1 ___ altimeter
 - 2 ___ Basic Six
 - 3 ___ turn coordinator
 - 4 ___ airspeed indicator
 - 5 ___ heading indicator
 - 6 ___ magnetic compass
 - 7 ___ radio magnetic indicator
 - 8 ___ course deviation indicator
- A a flight instrument that shows a plane's speed
B a flight instrument that shows a plane's position relative to its course
C a flight instrument that shows a plane's direction relative to magnetic north
D a flight instrument that shows a plane's altitude
E a flight instrument that uses radio and magnetic information to show a plane's direction
F flight instruments that make up the standard flight panel
G a flight instrument that shows how fast and in what direction a plane is turning
H a flight instrument that shows a plane's direction relative to magnetic north during level flight

4 Read the sentence pair. Choose where the words best fit the blanks.

- 1 vertical speed indicator / T arrangement
- A In the _____, the altimeter is below the airspeed indicator.
- B According to the _____, the plane was climbing very fast.
- 2 flight instruments / attitude indicator
- A During bad weather, pilots navigate using _____.
- B The pilot kept the aircraft level with the horizon by keeping his eye on the _____.

5 Listen and read the manual on flight instruments again. How does the altimeter display altitude?

Listening

6 Listen to a conversation between a flight instructor and her student. Mark the following statements as true (T) or false (F).

- 1 ___ The attitude indicator is next to the airspeed indicator.
- 2 ___ The man cannot identify the airspeed indicator.
- 3 ___ The altimeter shows how fast the plane is moving.

7 Listen again and complete the conversation.

Instructor: Let's start the exam. Where is the 1 _____ on this plane?

Student: It's in the center of the 2 _____ on the instrument panel.

Instructor: Well done. Now, can you identify the instruments 3 _____ it?

Student: 4 _____ is the airspeed indicator, I believe.

Instructor: Excellent. And what does it do?

Student: It tells the pilot 5 _____ the plane is moving.

Instructor: Correct. And what's below that?

Student: Below that is the altimeter. It shows the 6 _____.

Speaking

8 With a partner, act out the roles below based on Task 7. Then switch roles.

USE LANGUAGE SUCH AS:

Where is the ... on this plane?
Can you identify the ...
It is to the ...

Student A: You are a flight instructor. Ask Student B about:

- the location of flight instruments on a plane
- the purpose of those flight instruments

Student B: You are a student pilot. Talk to Student A about flight instruments.

Writing

9 Use the conversation from Task 8 and the manual to complete the flying exam checklist.



Flying Exam I

Checklist

Aircraft: _____

Please identify flight instruments on this aircraft:

Please describe the layout of the instrument panel:

Are all instruments in good condition? _____

5 Radio equipment



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Audio Switch Panel GA 100

Radio Communication Management

One button switches between **headphones** and the cabin **speaker**. The panel includes two **transceivers** (Com 1, Com 2). The pilot and co-pilot can tune into different **frequencies**. **Squelch control** can be manual or automatic. A single knob adjusts **break squelch**.

The panel connects **PTT handheld mikes** and/or headphones. Press the PTT switch to **key** any selected device.

Transponders

We supply mode A, C, and S **transponders**.

[CLICK HERE FOR DETAILS](#)

Headphones and Microphones

Our headphones reduce white noise and increase comfort.

We provide both handheld mikes and **boom mikes**.

[CLICK HERE FOR DETAILS](#)



Vocabulary

3 Match the words (1-7) with the definitions (A-G).

- | | |
|---------------------|-------------------|
| 1 _ boom mike | 5 _ break squelch |
| 2 _ transponder | 6 _ handheld mike |
| 3 _ transceiver | 7 _ headphones |
| 4 _ squelch control | |

- A a pair of small speakers worn close to a person's ears
 B a setting that controls the level of background noise
 C a device that communicates an aircraft's location using radio-frequency signals
 D a microphone that one holds by hand
 E a radio device that includes both a transmitter and a receiver
 F a microphone attached to a pole that one does not have to hold
 G a set threshold at which noise becomes audible

4 Fill in the blanks with the words and phrases from the word bank.

Word BANK

audio switch panel speaker
 PTT frequency radio key

- Pilots communicate with air traffic controllers using a specific _____.
- Before you _____ your mike, make sure you know what to say.
- A cabin _____ is much louder than a headphone.
- Flying safely would be impossible without _____ communication.
- A modern _____ displays frequencies and channels digitally.
- A(n) _____ mike requires pilots to press a button before speaking.

Get ready!

1 Before you read the passage, talk about these questions.

- What are some types of equipment that pilots use to communicate?
- What is one important feature on an audio switch panel?

Reading

2 Read the radio equipment webpage. Then, mark the following statements as true (T) or false (F).

- _ The audio switch panel connects headphones and transponders.
- _ Break squelch on the GA 100 cannot be adjusted manually.
- _ The company sells multiple types of mike.

- 5 Listen and read the radio equipment webpage again. What do pilots use headphones for besides listening to air traffic controllers?

Listening

- 6 Listen to a conversation between a representative and a customer. Choose the correct answers.

- Why is the man calling Grays Aviation?
 - to ask how to use a product
 - to ask how to install a product
 - to ask about product capabilities
 - to ask about product prices
- What does the woman recommend?
 - repairing the audio switch
 - installing a larger speaker
 - purchasing a certain headphone model
 - speaking to an audio equipment specialist

- 7 Listen again and complete the conversation.

Sales representative: Good morning, Grays Aviation.

Customer: Hi. I'm 1 _____ your Audio Switch Panel GA 100.

Sales representative: Great. What can I tell you about it?

Customer: Is its squelch control 2 _____?

Sales representative: Actually, 3 _____. It's automatic. But you can adjust it manually too.

Customer: Oh, okay. 4 _____. And do you sell noise canceling headphones?

Sales representative: We do. 5 _____ the 800 model. They reduce a lot of noise. And they're very comfortable.

Customer: Sounds good. I guess I'll 6 _____.

Speaking

- 8 With a partner, act out the roles below based on Task 7. Then switch roles.

USE LANGUAGE SUCH AS:

I'm calling about ...

Do you sell ...

I recommend ...

Student A: You are a radio equipment sales representative. Talk to Student B about:

- radio equipment capabilities
- different products you sell
- your recommendation

Student B: You are a customer. Talk to Student A about product details and what products to buy.

Writing

- 9 Use the conversation from Task 8 to complete the order form.

Aviation Radio Equipment

Product Order Form

Product name: _____

Number of items: _____

Product features: _____

Did you get help from an employee?
Y / N

Was he or she helpful? Please explain.

Aviation Phonetic Alphabet

Letter	Word	Spoken
A	Alfa	Al fah
B	Bravo	Brah voh
C	Charlie	Char lee
D	Delta	Dell tah
E	Echo	Eck oh
F	Foxtrot	Foks trot
G	Golf	Golf
H	Hotel	Ho tell
I	India	In dee ah
J	Juliett	Jew lee ett
K	Kilo	Key loh
L	Lima	Lee mah
M	Mike	Mike
N	November	No vem ber
O	Oscar	Oss cah
P	Papa	Pah pah
Q	Quebec	Keh beck
R	Romeo	Row me oh
S	Sierra	See air rah
T	Tango	Tang go
U	Uniform	You nee form
V	Victor	Vik tah
W	Whiskey	Wiss key
X	Xray	Ecks ray
Y	Yankee	Yang key
Z	Zulu	Zoo loo

Good Communicators Make Safe Aviators

Follow these ICAO guidelines when communicating by radio:

- Always use established **ICAO** prowords such as "**roger**" and "**wilco**" for consistency of communication.
- Don't say "yes" and "no" in radio communications. "**Affirmative**" and "**negative**" are much clearer. Also, "can't" sounds very similar to "can." Use "**unable**" instead to avoid confusion.
- Remember to spell **callsigns** using the **aviation phonetic alphabet**. Similar-sounding letters like "B" and "D" are easily confused. Use "Bravo" and "Delta" instead.
- Quick communication is especially important in emergencies. Use "**pan**" for urgent situations and reserve "**mayday**" for true emergencies. This saves time and prevents false alarms.

Get ready!

- 1 Before you read the passage, talk about these questions.

- 1 How is talking on an airplane's radio different from usual communication?
- 2 How would a pilot say O W using the phonetic alphabet?

Reading

- 2 Read the poster on radio communication. Then, mark the following statements as true (T) or false (F).

- 1 The guidelines recommend that pilots use "yes" instead of "affirmative" because it is shorter.
- 2 The poster encourages aviators to create new prowords.
- 3 Using the proper words for emergencies prevents false alarms.

Vocabulary

- 3 Match the words (1-6) with the definitions (A-F).

- | | |
|-------------------------------------|--|
| 1 <input type="checkbox"/> pan | 4 <input type="checkbox"/> unable |
| 2 <input type="checkbox"/> wilco | 5 <input type="checkbox"/> negative |
| 3 <input type="checkbox"/> callsign | 6 <input type="checkbox"/> affirmative |

- A a proword meaning "no"
- B a code that identifies an aircraft
- C a proword indicating urgency
- D a proword meaning the speaker will comply
- E a proword meaning "yes"
- F not having the ability to comply with instructions

4 Read the sentence pair. Choose where the words best fit the blanks.

1 **mayday / roger**

A The pilot said "_____" to indicate that he received the message.

B Prepare to send help when you hear the call "_____".

2 **ICAO / phonetic alphabet**

A The _____ creates guidelines for communicating by radio.

B New pilots must learn to use the _____ when speaking.

5 Listen and read the poster on radio communication again. What is a danger of poor radio communication?

Listening

6 Listen to a conversation between a pilot and an air traffic controller. Check (✓) the instructions that the woman gives the man.

1 say again

4 stand by

2 go ahead

5 clear runway

3 request permission

7 Listen again and complete the conversation.

Pilot: Norwick Approach, Freedom Air 812.

Controller: This is Norwick Approach. 1 _____.

Pilot: I say again, Norwick Approach, Freedom Air 812.

Controller: Freedom Air 812. 2 _____.

Pilot: Norwick Approach, Freedom Air 812, 3 _____ landing clearance.

Controller: Freedom Air 812. Unable. Stand by for AirTech 579 to 4 _____.

Pilot: Norwick Approach. Roger. 5 _____.

Controller: Freedom Air 812, AirTech 579 needs more time. Do you have fuel to hold?

Pilot: 6 _____, Approach.

Speaking

8 With a partner, act out the roles below based on Task 7. Then switch roles.

USE LANGUAGE SUCH AS:

Say again ...

Stand by for ...

Roger. Standing by ...

Student A: You are a pilot. Talk to Student B about:

- your identification
- a request
- receiving instructions

Student B: You are an air traffic controller. Talk to Student A about his or her request.

Writing

9 Use the conversation from Task 8 to complete the air traffic controller's radio log.

Norwick radio log

Contacted by: _____

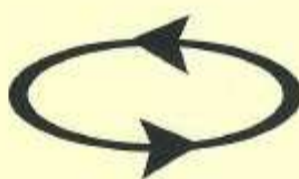
Aircraft's request: _____

Request: Approved / Denied

Instructions given: _____



transmit



hold

As a pilot, you must maintain consistent communication with air traffic control. Remember these conventions when you **transmit** messages:

ALWAYS ...

- **identify** yourself by your callsign.
- **stand by** until you receive instructions. For example, always **hold** your position until you are **cleared** to proceed.
- repeat a transmission exactly when you hear "**read back**."

NEVER ...

- use **plain English** when you can use a callsign or proword instead.
- say "**degrees**." Describe your heading with numbers only. For example, say "two three zero" instead of "two hundred thirty degrees."
- **step on** another transmission. Wait until other speakers are finished.
 - risk miscommunication. Use "**say again**" if you are not sure of a transmission.

Get ready!

1 Before you read the passage, talk about these questions.

- 1 What must a pilot always do when communicating by radio?
- 2 How do pilots send and receive radio messages?

Reading

2 Read the training manual on radio communication. Then, complete the table.

Instead of ...	Pilots should ...
using plain English	1 _____
saying degrees	2 _____
stepping on transmissions	3 _____

Vocabulary

3 Match the words (1-5) with the definitions (A-E).

- | | |
|----------------|-----------------|
| 1 ___ degree | 4 ___ identify |
| 2 ___ step on | 5 ___ read back |
| 3 ___ stand by | |

- A to announce one's name or callsign
 B to repeat information exactly
 C to wait for further information
 D to interrupt someone
 E a unit that measures direction

- 4 Fill in the blanks with the words and phrases from the word bank.

Word BANK

hold say again transmit
cleared to plain English

- The message was unclear, so the pilot asked the controller to _____.
- Remember to use prowords instead of _____.
- Air Global 592, you are _____ land.
- Use your callsign whenever you _____ a radio communication.
- ProJet 62, _____ your position until the runway is clear.

- 5 Listen and read the training manual on radio communication again. How should a pilot express his or her heading?

Listening

- 6 Listen to a conversation between a pilot and an air traffic controller. Mark the following statements as true (T) or false (F).

- ___ Another pilot stepped on the woman's transmission.
- ___ The man is unable to provide a traffic advisory.
- ___ The woman is cleared to take off on runway 817.

- 7 Listen again and complete the conversation.

Pilot: Rockford Approach, JetFlyer 56.

Controller: JetFlyer 56, Rockford Approach. Stand by, 1 _____ another transmission.

Pilot: 2 _____, _____ JetFlyer 56.

Controller: JetFlyer 56. 3 _____.

Pilot: Rockford Approach, JetFlyer 56. Requesting 4 _____.

Controller: JetFlyer 56. No traffic on runway 17. You are 5 _____.

Pilot: Rockford Approach. JetFLyer 56. 6 _____.

Controller: JetFlyer 56, Rockford Approach. Cleared to land on runway 17.

Speaking

- 8 With a partner, act out the roles below based on Task 7. Then switch roles.

USE LANGUAGE SUCH AS:

Stand by, you stepped on ...
Request ... advisory ...
You are cleared to ...

Student A: You are a pilot. Talk to Student B about:

- a radio transmission
- an advisory request
- current conditions

Student B: You are an air traffic controller. Talk to Student A about an advisory request.

Writing

- 9 Use the conversation from Task 8 to complete the pilot's flight status log.



Pilot's Flight Status Log

Aircraft: _____

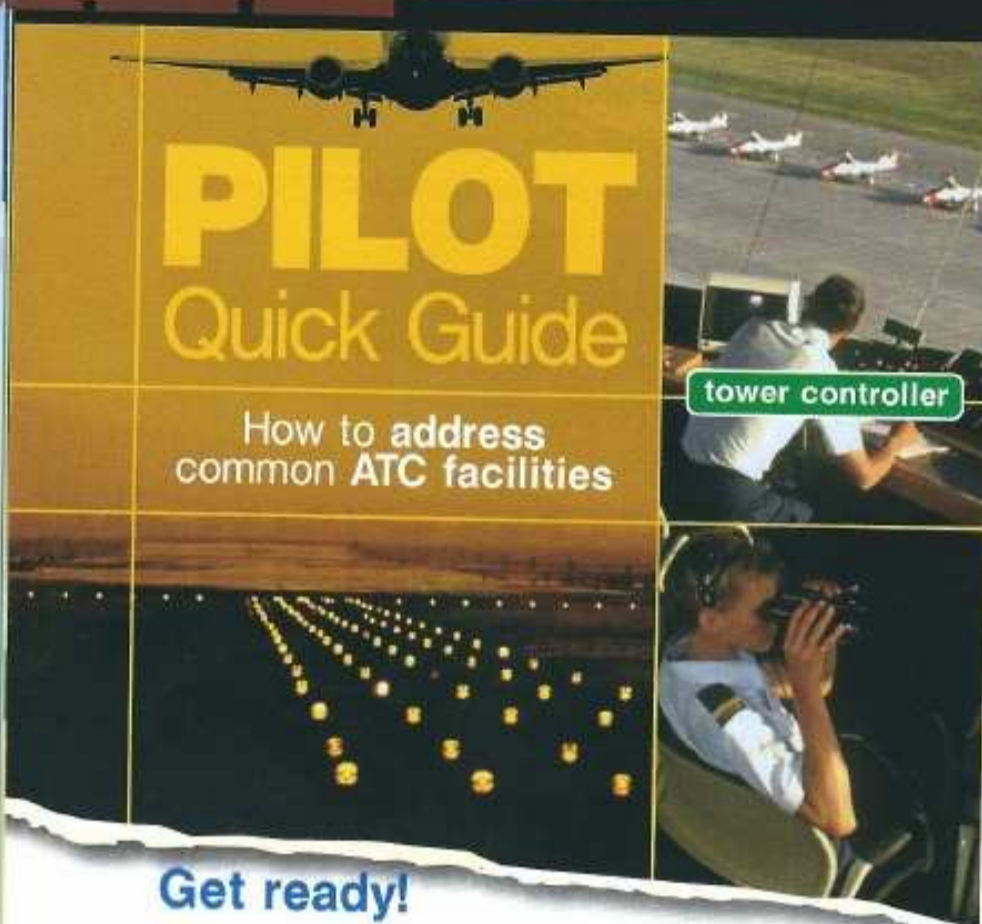
Flight status at 0700 hours

Requested _____

advisory from _____

Received advisory that _____

8 Radio basics 3



When addressing a **tower controller**, use *Tower*.

Example: "Greenfield Tower, SkyBus 124 preparing for takeoff."

When addressing **Ground** control, use *Ground*.

Example: "Greenfield Ground, SkyBus 124 taxiing on runway 7."

When addressing an **approach facility** or a **departure facility**, use *Approach* or *Departure*.

Example: "Delton Approach, SkyBus 124 approaching at 1,800 feet."

When addressing a **Flight Service Station**, use *Radio*.

Example: "Harborville Radio, SkyBus 124, 30 miles east. Requesting weather advisory."

When addressing **Center** control, use *Center*.

Example: "Delton Center, SkyBus 124 requesting traffic advisory."

Address **UNICOM** and **MULTICOM** as such.

Get ready!

1 Before you read the passage, talk about these questions.

- 1 Who works in an air traffic control tower?
- 2 Which air traffic control station controls the airplane during mid-flight?

Reading

2 Read the manual for pilots. Then, choose the correct answers.

- 1 What is the main purpose of the manual?
A to correct common mistakes
B to define the different ATC facilities
C to provide communication instructions
D to compare different types of pilots
- 2 Which of the following is a correct way for a pilot to address a controller?
A SkyBus 112, Greenfield Ground.
B Greenfield Ground, SkyBus 112.
C Pilot Rogers, Greenfield Ground.
D Ground Approach, SkyBus 112.
- 3 Which of the following is NOT explained in the manual?
A how to address a Flight Service Station
B how to address UNICOM
C how to address a tower controller
D how to address another pilot

Vocabulary

3 Match the words (1-8) with the definitions (A-H).

- | | | | |
|---|--------------------|---|--------------------------|
| 1 | — tower controller | 5 | — UNICOM |
| 2 | — MULTICOM | 6 | — approach facility |
| 3 | — ATC facility | 7 | — departure facility |
| 4 | — Center | 8 | — Flight Service Station |

- A a location from which air traffic controllers give pilots instructions and clearance
- B a communication frequency used by pilots to communicate their flight intentions when no air traffic control facility or base operator is available
- C an air traffic communications system that provides air traffic advisories at airports that do not have air traffic control
- D a facility that provides pilots with air traffic information before, during, and after flights
- E a location that controls air traffic leaving from an airport
- F a location that controls air traffic arriving at an airport
- G a person who manages traffic in and around an airport from the airport's tower
- H a part of air traffic control that manages traffic en route between departure and arrival

4 Read the sentence pair. Choose where the words best fit the blanks.

1 ATC facility / Flight Service Station

A Pilots receive instructions from a(n) _____.

B Pilots receive traffic information from a(n) _____.

2 ground / center

A _____ controls planes in mid-flight.

B _____ controls planes that are taxiing at an airport.

5 Listen and read the manual for pilots again. How should a pilot address a Flight Service Station?

Listening

6 Listen to a pilot contacting air traffic control by radio. Mark the following statements as true (T) or false (F).

1 ___ The woman contacts Approach first.

2 ___ The man tells the woman to contact Greenfield Ground.

3 ___ The woman requests landing clearance.

7 Listen again and complete the conversation.

Pilot: Greenfield 1 _____, SkyBus 112 approaching from Delton.

Controller 1: SkyBus 112, Greenfield Tower. What is your distance and estimated 2 _____?

Pilot: Distance, 27 miles 3 _____. Time of arrival estimated at 1:17 pm.

Controller 1: SkyBus 112, contact Greenfield 4 _____ on 117.22.

Pilot: 5 _____. SkyBus 112 contacting Greenfield Approach. Greenfield Approach, SkyBus 112 approaching at 1,600 feet.

Controller 2: SkyBus 112, Greenfield Approach, roger. Please 6 _____ estimated arrival time.

Pilot: Greenfield Approach, SkyBus 112 estimated arrival time at 1:17. Requesting clearance to land.

Speaking

8 With a partner, act out the roles below based on Task 7. Then switch roles.

USE LANGUAGE SUCH AS:

Requesting ...

What is your ...

Contact ...

Student A: You are a pilot. Talk to Student B about:

- your distance
- your time of arrival
- what you are requesting

Student B: You are an air traffic controller. Talk to Student A about contacting other ATC facilities.

Writing

9 Use the conversation from Task 8 to complete the flight arrival report.



Flight Arrival Report

Airline and flight number: _____

Approaching from: _____

Expected arrival time: _____

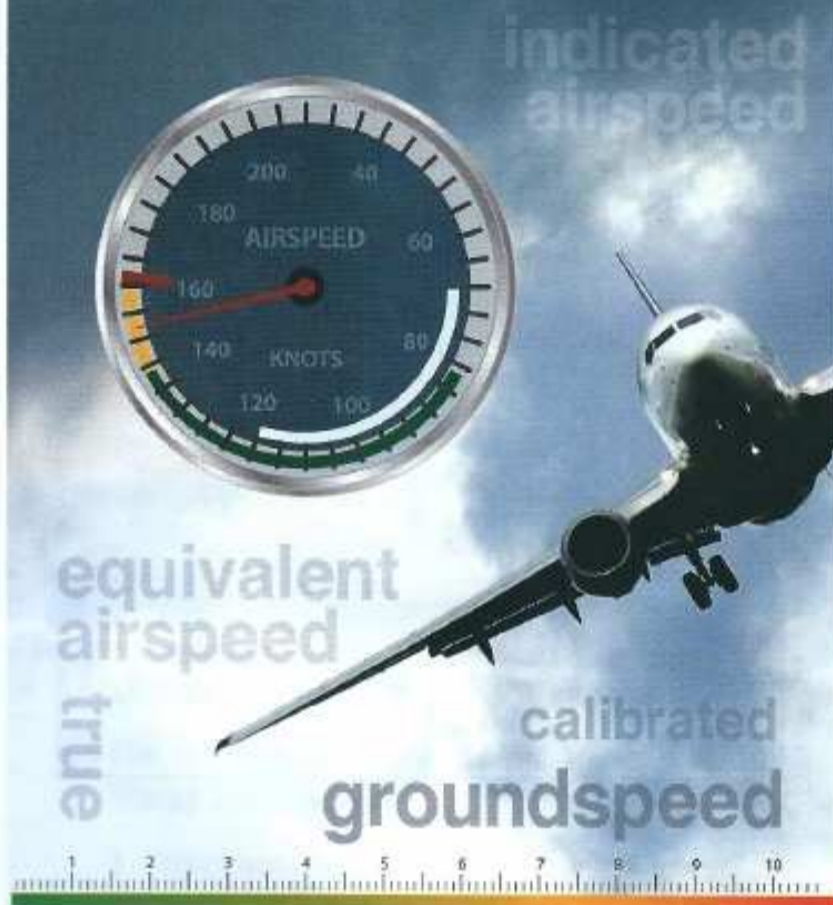
First ATC facility contacted: _____

Pilot directed to contact: _____

9 Distance and speed

CHAPTER III

TYPES OF AIRSPEED



There are many types of **airspeed**. Remember that **indicated airspeed** is what your instrument reads. **Calibrated airspeed** is corrected for errors and is more accurate. **True airspeed** and **equivalent airspeed** are also different. True airspeed refers to the air around the aircraft. Equivalent airspeed refers to the air at sea level. **Groundspeed** is speed relative to the ground. Always know which type of airspeed you are using.

Be aware of different units of measurement. A **knot** measures speed. A **nautical mile** measures distance. Some places use **mph** (miles per hour) and others use **kph** (kilometers per hour). Always indicate your units of measurement.



Get ready!

1 Before you read the passage, talk about these questions.

- 1 What are some measures of speed?
- 2 What unit is air distance measured in?

Reading

2 Read the chapter on airspeed. Then, choose the correct answers.

- 1 What is the main purpose of this chapter?
A to explain how pilots measure airspeed
B to describe different types of airspeed
C to help a pilot calculate airspeed
D to compare different airspeed instruments
- 2 Which of the following is often inaccurate because it is not corrected for errors?
A calibrated airspeed C true airspeed
B groundspeed D indicated airspeed
- 3 Which of these is NOT explained in the chapter?
A different types of airspeed
B different instruments for reading airspeed
C the difference between indicated airspeed and calibrated airspeed
D different units used to measure airspeed

Vocabulary

3 Fill in the blanks with the words and phrases from the word bank.

word BANK

airspeed groundspeed knot
nautical mile true airspeed
equivalent airspeed

- 1 The pilot measured his aircraft's speed based on one nautical mile per hour, or one _____.
- 2 The pilot had to decide which type of _____ to measure.
- 3 1,852 meters is the same as one _____.
- 4 The co-pilot measured _____ to see how fast the plane was moving in relation to the ground.
- 5 Pilot Rogers used _____ to see how fast his craft would be flying at sea level.
- 6 Pilot Stevens measured _____ based on the air immediately around his aircraft.

4 Read the sentence pair. Choose where the words best fit the blanks.

1 indicated / calibrated

A _____ airspeed is usually accurate because it is corrected for errors.

B _____ airspeed is not always accurate because it is not corrected for errors.

2 mph / kph

A A measurement that is based on miles is _____.

B A measurement that uses kilometers is _____.

5 Listen and read the chapter on airspeed again. What does equivalent airspeed refer to?

Listening

6 Listen to a conversation between a student and an instructor. Mark the statements true (T) or false (F).

1 ___ The woman is confused about indicated and calibrated airspeeds.

2 ___ Indicated airspeed is more accurate than calibrated airspeed.

3 ___ Changes in air pressure create calibrated airspeed errors.

7 Listen again and complete the conversation.

Student: Mr. Henry, I have a few questions about 1 _____.

Instructor: Of course, Linda. What do you 2 _____?

Student: Indicated airspeed and calibrated airspeed 3 _____ a little.

Instructor: Well, do you know which one is more 4 _____?

Student: 5 _____ airspeed, because it's corrected for errors.

Instructor: 6 _____. So what are you confused about?



Speaking

8 With a partner, act out the roles below based on Task 7. Then switch roles.

USE LANGUAGE SUCH AS:

I have a few questions about ...

I'm confused about ...

Do you know ...

Student A: You are a student. Talk to Student B about:

- indicated airspeed
- calibrated airspeed
- why you feel confused

Student B: You are an instructor. Talk to Student A about errors that might occur in indicated airspeed.

Writing

9 Use the conversation from Task 8 to complete the exam questions.

Part III

Indicated VS calibrated airspeed

Indicated airspeed is: _____

Calibrated airspeed is: _____

Which one is more accurate? _____



Get ready!

1 Before you read the passage, talk about these questions.

- 1 What are the three different axes of rotation of an airplane?
- 2 What is movement along the lateral axis?

Reading

2 Read the chapter on axes of rotation. Then, choose the correct answers.

- 1 What is the purpose of the chapter?
 - A to explain how to use instruments to maneuver an aircraft
 - B to criticize a certain maneuvering method
 - C to define the parts of an aircraft
 - D to define different ways to maneuver an aircraft
- 2 Which of the following is NOT an axis of rotation in an aircraft?

A lateral axis	C vertical axis
B horizontal axis	D longitudinal axis
- 3 What is the direction of a longitudinal axis?
 - A from nose to tail
 - B from top to bottom
 - C from the pilot's left to right
 - D from wingtip to wingtip

CHAPTER IV

AXES OF ROTATION

There are three axes of rotation in aircraft. The **lateral axis** (or pitch axis) extends from wingtip to wingtip. The **longitudinal axis** (or roll axis) runs from the aircraft's nose to its tail. The **vertical axis** (or yaw axis) runs perpendicular to the wings.

Accordingly, **pitch** is rotation along the lateral axis. **Roll** or **bank** is rotation along the longitudinal axis. **Yaw** is rotation along the vertical axis. These different types of rotation are called **torques**. When you **maneuver** an aircraft, you rotate on one of the axes.

Vocabulary

3 Match the words (1-6) with the definitions (A-F).

- | | |
|--------------|-----------|
| 1 — maneuver | 4 — yaw |
| 2 — torque | 5 — pitch |
| 3 — wingtip | 6 — roll |

- A the lengthwise end of an aircraft's wing
- B to cause an aircraft to rotate or move
- C rotation along the longitudinal axis of an aircraft
- D a twisting force that causes rotation
- E rotation along the lateral axis of an aircraft
- F rotation along the vertical axis of an aircraft

4 Read the sentence pair. Choose where the words best fit the blanks.

1 lateral axis / longitudinal axis

- A The _____ runs front to back.
 B The _____ runs from side to side.

2 vertical axis / bank

- A Movement on the _____ goes straight up and down.
 B The pilot entered a _____ to start the turn.

5 Listen and read the chapter on axes of rotation again. How can a pilot cause an aircraft to climb?

Listening

6 Listen to a conversation between a flight instructor and a student. Mark the following statements as true (T) or false (F).

- 1 ___ The woman wants her aircraft to descend.
 2 ___ The man tells the woman to adjust her pitch.
 3 ___ The speakers will practice yaw after they have reached the right altitude.

7 Listen again and complete the conversation.

Instructor: Carol, turn to a heading of 060 degrees. Be sure to use the rudder to control yaw as you roll. Then start the 1 _____ exercise.

Student: Got it. What's the appropriate 2 _____?

Instructor: We'll start with a climb above 7000. 3 _____ and start to ascend.

Student: Okay, we're climbing.

Instructor: Do you feel that pressure on the stick? You should 4 _____ . You're climbing too fast.

Student: Sorry. 5 _____?

Instructor: Perfect. 6 _____ this course until we level at 7000.

vertical axis-yaw
 lateral axis-pitch
 longitudinal axis-roll

Speaking

8 With a partner, act out the roles below based on Task 7. Then switch roles.

USE LANGUAGE SUCH AS:

We'll start with ...
You should ...
Is that better?

Student A: You are an instructor. Talk to Student B about:

- controlling yaw
- climbing
- adjusting rotation

Student B: You are a student. Talk to Student A about pitching correctly.

Writing

9 Use the conversation from Task 8 to complete the student practice report.

Flight Class 104

Student Practice Report

Student: _____

Primary purposes of practice: _____

Types of rotation practiced: _____

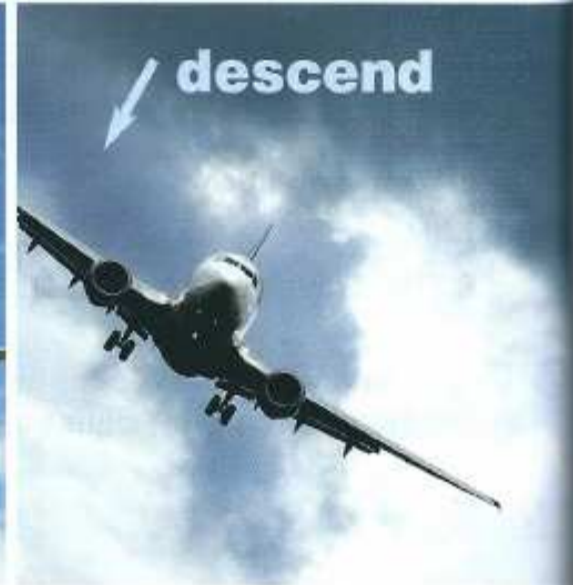
Altitude reached: _____

11 Describing flight 2



Pilot Flight Manual

Sample post takeoff flight script



Get ready!

1 Before you read the passage, talk about these questions.

- 1 What does a plane do to rise higher after takeoff?
- 2 What are some words to describe going faster? Going slower?

Reading

2 Read the script from a pilot's flight manual. Then, mark the following statements as true (T) or false (F).

- 1 The flight will cruise at 18,000 feet.
- 2 Flying below 25,000 feet will avoid turbulence.
- 3 The pilot will increase speed to provide a smoother ride.

Vocabulary

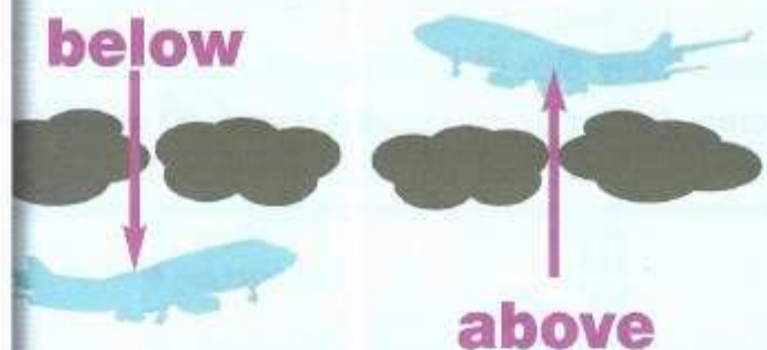
3 Match the words (1-5) with the definitions (A-E).

- | | |
|--------------------------------------|------------------------------------|
| 1 <input type="checkbox"/> slow down | 4 <input type="checkbox"/> descend |
| 2 <input type="checkbox"/> cruise | 5 <input type="checkbox"/> climb |
| 3 <input type="checkbox"/> increase | |

- A to lower speed
- B to lower altitude
- C to maintain a constant speed
- D to raise altitude
- E to raise the amount of something

This is your captain speaking. As we **climb** to 18,000 feet we will **rise** through some thick clouds. You may experience some turbulence until the clouds are **below** us. When we are **above** the clouds, we will continue to **increase** our altitude to 25,000 feet. At that point we can **speed up** to our cruising speed. We'll **cruise** to our destination of Santiago, Chile, in about three hours. We'll **descend** around 4:00. But if we encounter any more bad weather, we'll have to **slow down**. **Decreasing** speed should result in a smoother ride.

Enjoy your flight and thank you for flying Andean Airlines.



3 Write a word that is similar in meaning to the underlined part.

- The pilot will raise her speed after she reaches 20,000.
_ p _ _ d _ u _
- The plane is currently flying over the ocean. _ _ o _ e
- The clouds are under the airliner. _ e _ _ w
- The change in air pressure caused the airliner to gain altitude.
_ i _ e
- The pilot will lower her speed before she lands the plane.
_ l _ _ d o _ _

4 Listen and read the script from a pilot's flight manual again. When will the pilot increase speed?

Listening

5 Listen to a conversation between a pilot and a controller. Choose the correct answers.

- What does the pilot want to do?
 - A land the aircraft
 - B fly at a higher altitude
 - C enter the airspace
 - D receive traffic information
- What does the controller tell the pilot to do?
 - A increase altitude
 - B decrease speed
 - C stay above 120 feet
 - D leave the airspace

6 Listen again and complete the conversation.

Controller: Skylark 210, this is Cortland Tower. 1 _____

Pilot: Cortland Tower, Skylark 210 on approach for landing.

Controller: Skylark 210, 2 _____ speed to 120 knots.
3 _____ to runway 05.

Pilot: Cortland Tower. 4 _____ speed to 120. But I missed that 5 _____. Say again.

Controller: Skylark 210, runway 05, 05.

Pilot: Cortland Tower, runway 05.

Controller: 6 _____, Skylark 210. You are cleared to land on runway 05.

Pilot: Cleared to land runway 05 Skylark 210.

Speaking

8 With a partner, act out the roles below based on Task 7. Then switch roles.

USE LANGUAGE SUCH AS:

Decrease speed to ...
But I missed ...
You are free to ...

Student A: You are a pilot. Talk to Student B about:

- reducing speed
- descending to a runway
- landing the plane

Student B: You are a controller. Talk to Student A about landing an airplane.

Writing

9 Use the conversation from Task 8 to complete the approach log.

Jet Air Airlines

Approach log

Date: _____ Time: _____

Flight # _____

Controller: _____

Runway # _____

Instructions from controller:



12 Types of airliners



Airliners Big and Small

AVIATION
Today

If you plan to fly for an airline, you'll probably pilot one of two types of **civil aircraft**. One type is a **narrow-body airliner**. These planes have a cabin width of three to four meters and one passenger aisle. They are **regional airliners**, also known as **feederliners**. **Regional jets** are similar. The only difference is that they have jet engines instead of turboprops. The smallest narrow-body airliners, **commuterliners**, seat fewer than twenty passengers.

The other major type of civil aircraft is the **wide-body airliner**. Multiple **turbofan** engines power these large planes. They have a cabin width of five to seven meters and twin passenger aisles. The seats in wide-body airliners are often separated into multiple **cabin classes**.

Get ready!

1 Before you read the passage, talk about these questions.

- 1 What are some types of airliners?
- 2 What are some different engines that power a plane?

Reading

2 Read the magazine article on types of airliners. Then, mark the following statements as true (T) or false (F).

- 1 Feederliners seat fewer passengers than commuterliners.
- 2 Commuterliners have a single aisle for passengers.
- 3 A wide-body airliner has multiple aisles, classes, and turbofan engines.

Vocabulary

3 Match the words (1-6) with the definitions (A-F).

- | | |
|--|---|
| 1 <input type="checkbox"/> turboprop | 4 <input type="checkbox"/> wide-body airliner |
| 2 <input type="checkbox"/> turbofan | 5 <input type="checkbox"/> narrow-body airliner |
| 3 <input type="checkbox"/> cabin class | 6 <input type="checkbox"/> civil aircraft |

- A a turbine engine that propels an aircraft by driving a fan
- B a category of aircraft seats based on price and services
- C a passenger aircraft with two passenger aisles and a cabin width of 5 to 7 meters
- D an aircraft intended for non-military uses
- E a passenger aircraft with one passenger aisle and a cabin width of 3 to 4 meters
- F a turbine engine that propels an aircraft by driving a propeller

4 Read the sentence pair. Choose where the words best fit the blanks.

1 commuterliners / feederliners

- A _____ can carry twenty passengers or less.
B _____ vary in size, but none carry more than 100 passengers.

2 regional jet / regional airliner

- A The turboprop on the _____ failed.
B A _____ has a turbofan, not propellers.

5 Listen and read the magazine article on types of airlines again. What are the traits of a wide-body airliner?

Listening

6 Listen to a conversation between an interviewer and a pilot. Choose the correct answers.

- 1 What is the conversation mainly about?
A the aircraft the man has flown
B how the man trained to become a pilot
C why the man prefers flying turboprop engines
D the differences between narrow-body airliner types
- 2 What does the man say of wide-body planes?
A He does not fly them anymore.
B They use two turboprop engines.
C They require more training to fly.
D He thinks they fly just like narrow-body airliners.

7 Listen again and complete the conversation.

Interviewer: Captain Michaels, thanks for speaking with me. So, during your career have you flown different types of aircraft?

Pilot: I have. I 1 _____ fly narrow-body airliners. But now I fly wide-body planes.

Interviewer: I see. Is flying the 2 _____ different?

Pilot: It is. The smaller planes only have two turboprop engines. There's 3 _____ wing.

Interviewer: And how about the larger planes?

Pilot: Most of those 4 _____ four turbofans.

Interviewer: Okay, 5 _____ power. Does that make them more difficult to fly than narrow-body airliners?

Pilot: Somewhat, yes. It just requires 6 _____ training.

Speaking

8 With a partner, act out the roles based on Task 7. Then switch roles.

USE LANGUAGE SUCH AS:

Now I fly ...

The smaller planes have ...

Does that make them more difficult to fly?

Student A: You are an interviewer. Talk to Student B about:

- types of aircraft he or she has flown
- engine differences
- difficulty flying

Student B: You are a pilot. Talk to Student A about aircraft types you have flown.

Writing

9 Use the conversation from Task 8 to complete the interviewer's notes.

Interviewer's Notes

Pilot Name: _____

Types of aircraft flown: _____

Currently flying: _____

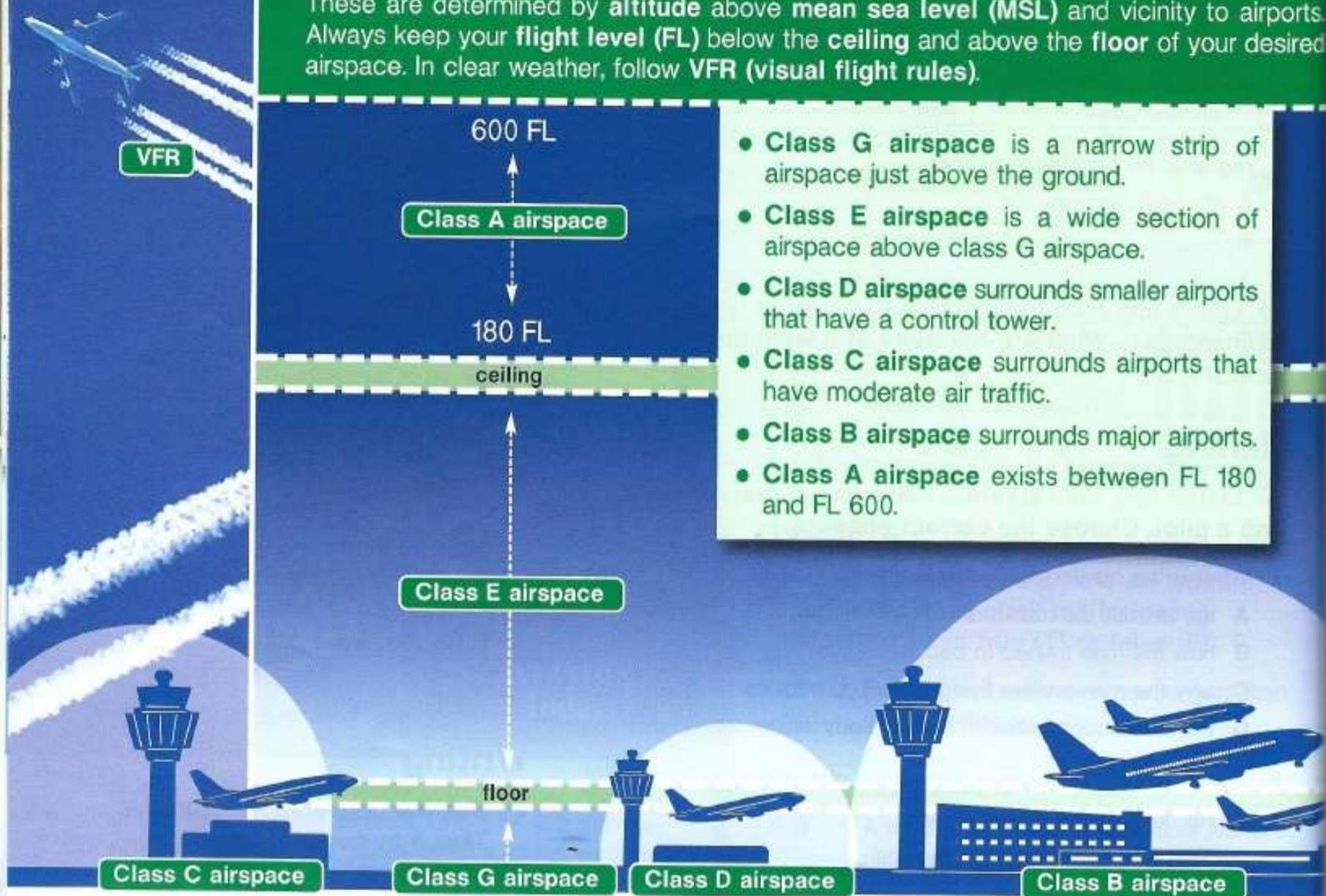
Engine types currently used: _____

Other comments: _____

13 Types of airspace

KNOW YOUR AIRSPACE

You must know where you are in the sky at all times. Air space is classified in sections. These are determined by **altitude** above **mean sea level (MSL)** and vicinity to airports. Always keep your **flight level (FL)** below the **ceiling** and above the **floor** of your desired airspace. In clear weather, follow **VFR (visual flight rules)**.



- **Class G airspace** is a narrow strip of airspace just above the ground.
- **Class E airspace** is a wide section of airspace above class G airspace.
- **Class D airspace** surrounds smaller airports that have a control tower.
- **Class C airspace** surrounds airports that have moderate air traffic.
- **Class B airspace** surrounds major airports.
- **Class A airspace** exists between FL 180 and FL 600.

Get ready!

- 1 Before you read the passage, talk about these questions.
 - 1 What are some different classes of airspace?
 - 2 What is the highest level in a defined airspace?

Reading

- 2 Read the section in a pilot's guide. Then, mark the following statements as true (T) or false (F).
 - 1 FL should remain lower than the floor of a given airspace.
 - 2 Class G airspace is lower than Class E airspace.
 - 3 Class B and Class D airspace exist above airports.

Vocabulary

- 3 Match the words (1-6) with the definitions (A-F).

- | | |
|------------------------------------|------------------------------------|
| 1 <input type="checkbox"/> Class A | 4 <input type="checkbox"/> Class D |
| 2 <input type="checkbox"/> Class B | 5 <input type="checkbox"/> Class E |
| 3 <input type="checkbox"/> Class C | 6 <input type="checkbox"/> Class G |

- A airspace around and above major airports
- B airspace around smaller airports that have a control tower
- C a small layer of uncontrolled airspace near the ground
- D airspace located above Class G airspace
- E airspace between 18,000 feet and 60,000 feet
- F airspace around airports with a moderate level of air traffic

7 Read the sentence pair. Choose where the words best fit the blanks.

1 floor / ceiling

- A The highest point of an airspace is the _____.
 B Never fly below the _____ without permission from ATC.

2 altitude / MSL

- A What _____ will the airplane cruise at?
 B The airplane will cruise at 20,000 feet above _____.

3 VFR / FL

- A _____ indicates an aircraft's altitude.
 B _____ should not be used in thick clouds or severe storms.

8 Listen and read the section in a pilot's guide again. What can a pilot do in clear weather?

Listening

9 Listen to a conversation between a pilot and an approach controller. Choose the correct answers.

- 1 What is the purpose of the conversation?
 A to get clearance to enter an airspace
 B to determine what airspace the pilot is in
 C to inform a controller of an airspace violation
 D to instruct an aircraft to leave restricted airspace
- 2 What information does the controller repeat?
 A the airspace
 B the tower frequency
 C the approach heading
 D the clearance approval

10 Listen again and complete the conversation.

Pilot: Westland approach, Sparrow 17 entering
 1 _____.

Approach: Sparrow 17, Westland approach. What is your
 2 _____?

Pilot: Westland approach, 3 _____ through
 Bravo airspace.

Approach: Sparrow 17, 4 _____ the class Bravo
 airspace. Contact Westland tower on 120.30.

Pilot: Westland approach, 5 _____ 123?

Approach: Negative, Sparrow 17. Contact tower on 120.30.

Pilot: 6 _____ . Westland tower on 120.30.

Speaking

8 With a partner, act out the roles below based on Task 7. Then switch roles.

USE LANGUAGE SUCH AS:

Entering ...
 Cleared through ...
 Contact ... Tower on ...

Student A: You are a pilot. Talk to Student B about:

- entering an airspace
- obtaining clearance
- contacting a tower

Student B: You are an approach controller. Talk to Student A about entering an airspace.

Writing

9 Use the conversation from Task 8 to complete the approach control log.



Approach Control Log Entry 918

Date: _____

Aircraft callsign: _____

Aircraft intent: _____

Actions taken: _____

Directions given: _____

14 Parts of an airport



Welcome to Brighton International Airport!

Employees must read and adhere to the following rules:

- 1 Use employee hallways to reach **terminals** and **gates**.
- 2 Employees need ID badges to enter **customs**.
- 3 Show ID badges to pass **security checkpoints**.
- 4 Employees must have Level-M security clearance to enter the **control tower**.
- 5 Remember, the **runway** and **taxiway** are **restricted** areas. (This doesn't apply to ground controllers and mechanics).
- 6 All employees must sign in when entering the **hangar**.
- 7 No smoking or open flames near the **fuel depot**.
- 8 Keep **concourses** clean by disposing of all trash.

Brighton International thanks you for your co-operation. Your compliance ensures a safer work environment for all!

Get ready!

- 1 Before you read the passage, talk about these questions.

- 1 Which part of an airport does the airplane land on?
- 2 Where do passengers wait to board their flight?



Reading

- 2 Read the employee sign. Then, choose the correct answers.

- 1 What is the purpose of the sign?
 - A to inform employees of emergency procedures
 - B to direct passengers to their flights
 - C to inform employees of airport policies
 - D to prevent passengers from entering secured areas
- 2 Which of the following is NOT stated on the poster?
 - A Show ID badge to pass security.
 - B Keep flames away from fuel depot.
 - C Keeps concourses clean.
 - D Employees need security clearance to enter customs.
- 3 Which area requires employees to sign in?

A the hangar	C customs
B the fuel depot	D the control tower

Vocabulary

- 3 Match the words (1-6) with the definitions (A-F).

- | | |
|--------------------|-----------------|
| 1 __ concourse | 4 __ restricted |
| 2 __ customs | 5 __ taxiway |
| 3 __ control tower | 6 __ terminal |

- A an area where luggage from foreign destinations is checked
- B a part of a terminal that contains gates
- C a road that connects part of a runway
- D not open to the general public
- E a place where passengers get off or on a plane
- F a building in which employees direct air traffic

4 Fill in the blanks with the correct words and phrases from the word bank.

Word BANK

security checkpoint gate
hangar fuel depot

- 1 Passengers have to go through the _____ before boarding the plane.
- 2 The plane is stopping at the _____ to get more gas.
- 3 The people are waiting at their _____ to board their plane.
- 4 The airline moved the damaged airplane to the _____.

5 Listen and read the employee sign again. What areas are restricted?

Listening

6 Listen to a conversation between an air traffic controller and a pilot. Then, mark the following statements as true (T) or false (F).

- 1 Another plane is at the man's original gate.
- 2 The woman asks the man to take off from another runway.
- 3 The man is told to contact ground control.

7 Listen again and complete the conversation.

Controller: JetFlight 117, Hartford Tower, 1 _____.

Pilot: JetFlight 117, go ahead.

Controller: JetFlight 117, your 2 _____ is unavailable. That was Terminal A, Gate 18. GoAir Flight 87 is there and unable to taxi out.

Pilot: Roger, JetFlight117. Request gate 3 _____.

Controller: JetFlight 117, taxi to Terminal B, Gate 22. Use 4 _____ C7.

Pilot: Wilco, 5 _____ to Terminal B, Gate 22 on taxiway C7.

Controller: Affirmative, JetFlight 117. 6 _____ ground control on 121.9.

Speaking

8 With a partner, act out the roles below based on Task 7. Then switch roles.

USE LANGUAGE SUCH AS:

- Request gate reassignment ...
- Taxi to Terminal ...
- Contact ground control ...

Student A: You are a controller. Talk to Student B about:

- a problem at a gate
- taxiing to a new terminal
- who to contact next

Student B: You are a pilot. Talk to Student A about your gate assignment.

Writing

9 Use the conversation from Task 8 to complete the entry in a pilot's log.

Pilot's Log

Date: _____

Name: _____

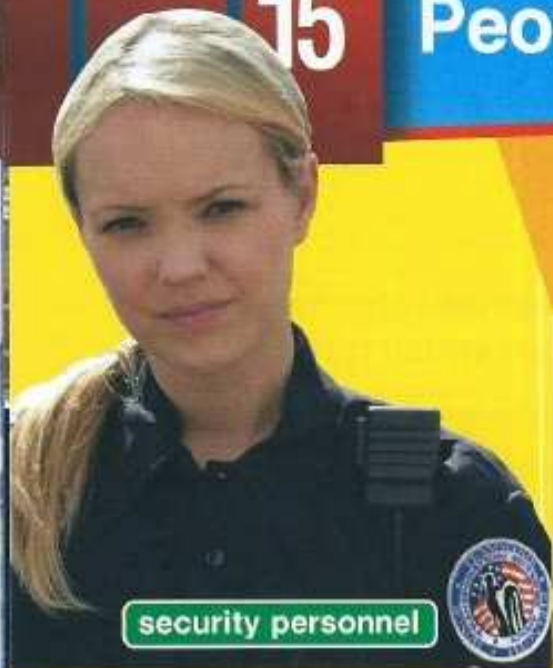
Flight number: _____

Notes/Changes

We were supposed to unload passengers at Gate _____ in _____.

That _____ was unavailable upon landing. Another aircraft could not taxi out. Tower reassigned us to _____ in _____ and directed us to contact _____.

15 People in an airport



security personnel



screener

Employment Opportunities

Thank you for your interest! We are looking to fill the following positions:

Glendale Airport Positions:

- **Airplane mechanic:** Mechanics' responsibilities include checking and solving maintenance issues in planes.
- **Ground controller:** This employee controls air traffic on the taxiways.
- **Customs agent:** Customs agents check goods entering or leaving the country.
- **Security Personnel:** Employee is responsible for monitoring flight passengers and their luggage. (Security screens passengers separately from **pilots, co-pilots, and flight attendants**). This person also works as a **screener** when needed.

GlobalAir Positions:

- **Ticket agent:** Ticket agents are responsible for helping customers schedule flights. Ticket agents also greet customers and solve booking issues.
- **Cargo handler:** Cargo handlers load passengers' luggage onto the plane. Candidates must be able to lift fifty pounds.

Send a resume and cover letter to hrrecruiters@globalair.net.



cargo handler



mechanic



ticket agent

Get ready!

- 1 Before you read the passage, talk about these questions.

- 1 Who assists passengers during a flight?
- 2 Who handles passengers' luggage?

Reading

- 2 Read the employment opportunities section. Then, mark the following statements as true (T) or false (F).

- 1 Ground controllers schedule aircraft maintenance.
- 2 Security personnel screens employees with passengers.
- 3 Cargo handlers take care of people's luggage.

Vocabulary

- 3 Write a word that is similar in meaning to the underlined part.

- 1 The employee who booked my flight charged me the wrong amount.
t _ c k _ _ _ g _ n t
- 2 Because the pilot got sick, the pilot who is second-in-command had to take over.
_ _ - p _ l o _
- 3 The person who loads the luggage onto the plane accidentally tore the bag.
c a _ _ o _ a n _ l _ r
- 4 The woman asked the employee who is assisting the passengers to bring her a pillow.
f l _ _ h _ a _ _ e n d _ _ t
- 5 The person who directs flights for take-off and landing sent the plane to the other side of the runway. g _ o u _ _ c o _ t _ _ l l _ r
- 6 The person who is trained to fly an aircraft was fifteen minutes late. _ i l _ _

4 Match the words (1-4) with the definitions (A-D).

- 1 — screener 3 — customs agent
2 — mechanic 4 — security personnel

- A a person who ensures that planes run properly
B a person who checks goods leaving/entering a country
C a person who checks passengers' luggage
D a person who ensures airports/airplanes are safe

5 Listen and read the employment opportunities section again. What are the responsibilities of mechanics and security personnel?

Listening

6 Listen to a conversation between a manager and a supervisor. Then, mark the following statements as true (T) or false (F).

- 1 — The woman needs to hire a flight attendant.
2 — The woman interviewed a mechanic.
3 — The woman has an open security personnel position.

7 Listen again and complete the conversation.

Manager: Hi Mr. Jones. Do you have a minute to discuss the open 1 _____?

Supervisor: Sure. How's the recruiting going?

Manager: It's going well. I just hired a new 2 _____.

Supervisor: Great. What positions do we still need to fill?

Manager: We still need to fill the mechanic and 3 _____ personnel positions.

Supervisor: Have you met any qualified 4 _____?

Manager: We haven't started 5 _____ people yet. But a couple of applicants look promising.

Supervisor: Well, keep me 6 _____.

Speaking

8 With a partner, act out the roles below based on Task 7. Then switch roles.

USE LANGUAGE SUCH AS:

- How's the recruiting going?*
We still need ...
We haven't started ...

Student A: You are a hiring manager. Talk to Student B about:

- positions you have filled
- positions you need to fill
- the interview process

Student B: You are a supervisor. Talk to Student A about the hiring process.

Writing

9 Use the conversation from Task 8 to complete the email.

From: _____
To: _____
Subject: _____

Hello Mr. Smith,

I hired a new _____ today. He has experience as a _____. So he has _____ before.

I'm interviewing someone for the _____ position tomorrow. I'll let you know _____.

Best,
Sharon Taylor

flight attendant



Glossary

- above** [PREP-U11] If something is **above** something else, it is over or higher than it.
- address** [V-T-U8] To **address** a person is to initiate a conversation with him or her.
- affirmative** [ADJ-U6] **Affirmative** is a radio proword meaning "yes."
- aileron** [N-COUNT-U2] An **aileron** is a hinged part of a wing that rolls an aircraft from side to side.
- airspeed** [N-UNCOUNT-U9] **Airspeed** is the measure of how fast an aircraft is moving relative to the air.
- airspeed indicator** [N-COUNT-U4] An **airspeed** indicator is a flight instrument that shows an aircraft's speed relative to the outside air.
- altimeter** [N-COUNT-U4] An **altimeter** is a flight instrument that shows an aircraft's altitude above sea-level.
- altitude** [N-UNCOUNT-U13] **Altitude** is a measurement of distance above a given point such as sea level or the level of the ground directly below an aircraft.
- approach facility** [N-COUNT-U8] An **approach facility** is a location that controls air traffic arriving at an airport.
- attitude indicator** [N-COUNT-U4] An **attitude indicator** is a flight instrument that shows an aircraft's relationship to the horizon.
- audio switch panel** [N-COUNT-U5] An **audio switch panel** is a panel that manages the audio communication between the pilot, co-pilot, the cabin, and air traffic control.
- aviation phonetic alphabet** [N-COUNT-U6] The **aviation phonetic alphabet** is a system for ensuring clear communication over radio by replacing letters with words.
- bank** [N-UNCOUNT-U10] **Bank** is rotation along the longitudinal axis of an aircraft, also called roll.
- Basic Six** [N-COUNT-U4] The **Basic Six** are the six primary flight instruments that make up the standard flight panel: altimeter, attitude indicator, airspeed indicator, heading indicator, turn coordinator, and vertical speed indicator.
- below** [PREP-U11] If something is **below** something else, it is beneath or lower than it.
- boom mike** [N-COUNT-U5] A **boom mike** is a microphone attached to a flexible pole that one can position as needed but does not have to hold.
- break squelch** [N-UNCOUNT-U5] **Break squelch** is a set threshold at which noise becomes audible.
- cabin class** [N-COUNT-U12] A **cabin class** is a way of categorizing airline tickets and their corresponding seats according to their price and relative levels of comfort and service.
- calibrated airspeed** [N-UNCOUNT-U9] **Calibrated airspeed** is the indicated airspeed corrected for errors brought about by instruments, position, or other factors.
- callsign** [N-COUNT-U6] A **callsign** is a sequence of numbers and letters that identifies an aircraft.
- cargo handler** [N-COUNT-U15] A **cargo handler** transfers passengers' luggage from the airport to the plane.
- ceiling** [N-UNCOUNT-U13] The **ceiling** is the highest altitude within a given airspace.
- Center** [N-COUNT-U8] **Center** is a part of air traffic control that manages traffic en route between departure and arrival.
- center stick** [N-COUNT-U3] A **center stick** is a part that controls the pitch of an aircraft and is located on the floor in front of a pilot.
- civil aircraft** [N-COUNT-U12] A **civil aircraft** is an aircraft intended for non-military uses.
- Class A airspace** [PHRASE-U13] **Class A airspace** is any airspace between 18,000 feet and 60,000 feet.
- Class B airspace** [PHRASE-U13] **Class B airspace** is a three dimensional volume of airspace around and above major airports.
- Class C airspace** [PHRASE-U13] **Class C airspace** is airspace located around airports with a moderate level of air traffic.
- Class D airspace** [PHRASE-U13] **Class D airspace** is airspace located around smaller airports that have a control tower.

Class E airspace [PHRASE-U13] **Class E airspace** is a large section of lower airspace located above Class G airspace.

Class G airspace [PHRASE-U13] **Class G airspace** is a small layer of uncontrolled airspace near the ground.

cleared to [V-T-U7] If someone is **cleared to** do something, he or she can do something safely or with permission from an authority.

climb [V-I-U11] To **climb** is to raise the altitude of an aircraft.

cockpit [N-COUNT-U3] A **cockpit** is the section of an aircraft in which a pilot sits and controls the movement of the aircraft, also called a flight deck.

commuterliner [N-COUNT-U12] A **commuterliner** is a short-haul aircraft that carries fewer than twenty passengers.

concourse [N-COUNT-U14] A **concourse** is the part of the terminal, usually identified with a letter, that contains a number of gates.

control tower [N-COUNT-U14] A **control tower** is a building where air traffic controllers work.

co-pilot [N-COUNT-U3] A **co-pilot** is a person who is trained to fly an aircraft and is the head pilot's second-in-command.

course deviation indicator [N-COUNT-U4] A **course deviation indicator** is a flight instrument that shows an aircraft's position relative to its course.

cruise [V-I-U11] To **cruise** is to fly at a constant speed.

customs [N-UNCOUNT-U14] **Customs** is an agency that monitors goods that come in and go out of a country.

customs agent [N-COUNT-U15] A **customs agent** enforces importing and exporting laws by checking goods that leave or enter a country.

decrease [V-T-U11] To **decrease** something is to lower its amount.

degree [N-COUNT-U7] A **degree** is a unit that measures the direction an aircraft is headed.

departure facility [N-COUNT-U8] A **departure facility** is a location that controls air traffic leaving an airport.

descend [V-I-U11] To **descend** is to go to a lower altitude.

elevator [N-COUNT-U2] An **elevator** is the hinged part of a horizontal stabilizer that guides an aircraft up and down.

equivalent airspeed [N-UNCOUNT-U9] **Equivalent airspeed** is the speed that the aircraft would have to fly at sea level to produce the same dynamic pressure that the aircraft produces when flying at an elevation.

feederliner [N-COUNT-U12] A **feederliner** is a small short-haul aircraft designed to transport fewer than 100 passengers.

fixed wing [ADJ-U1] If an aircraft is **fixed wing**, it relies on two wings attached to the fuselage to create lift.

flap [N-COUNT-U2] A **flap** is a hinged part of a wing that changes the amount of force produced.

flight attendant [N-COUNT-U15] A **flight attendant** assists and serves airplane passengers.

flight deck [N-COUNT-U3] The **flight deck** is the section of an aircraft in which a pilot sits and controls the movement of the aircraft, also called the cockpit.

flight instrument [N-COUNT-U4] A **flight instrument** is a tool that provides pilots with information necessary to navigate during times of low visibility.

flight level (FL) [N-COUNT-U13] **Flight level (FL)** is a number that indicates an aircraft's altitude. It is acquired by dividing the indicated pressure altitude by one hundred.

Flight Service Station [N-COUNT-U8] A **Flight Service Station** is a facility that provides pilots with air traffic information before, during, and after flights.

floor [N-UNCOUNT-U13] The **floor** is the lowest altitude within a given airspace.

frequency [N-COUNT-U5] A **frequency** is a specific rate of oscillation of radio waves assigned to a specific radio station to carry radio signals.

fuel depot [N-COUNT-U14] A **fuel depot** is a storage facility at an airport that provides gas for aircraft.

Glossary

- fuselage** [N-COUNT-U1] The **fuselage** is the central part of an aircraft's body.
- gate** [N-COUNT-U14] A **gate** is the location where passengers assemble to board their plane.
- Ground** [N-UNCOUNT-U8] **Ground** is a part of air traffic control that manages taxiing traffic at an airport.
- ground controller** [N-COUNT-U15] A **ground controller** directs planes before takeoff and after landing to prevent accidents on the runway.
- groundspeed** [N-UNCOUNT-U9] **Groundspeed** is the measure of how fast an aircraft is moving relative to the ground.
- handheld mike** [N-COUNT-U5] A **handheld mike** is a microphone that one holds by hand.
- hangar** [N-COUNT-U14] A **hangar** is a structure in which aircraft are stored and protected from the outside elements.
- heading indicator** [N-COUNT-U4] A **heading indicator** is a flight instrument that shows in which direction an aircraft is heading relative to magnetic north.
- headphones** [N-PL-U5] **Headphones** are a pair of small speakers worn close to a person's ears.
- hold** [V-T-U7] To **hold** something is to keep something in a particular state or position.
- horizontal stabilizer** [N-COUNT-U2] A **horizontal stabilizer** is the part of an aircraft's tail that prevents the nose from moving up and down.
- ICAO** [U6] The **ICAO** (*International Civil Aviation Organization*) is an agency that regulates the practices and standards of aviation worldwide.
- identify** [V-T-U7] To **identify** is to announce one's name or callsign.
- increase** [V-T-U11] To **increase** something is to raise its amount.
- indicated airspeed** [N-UNCOUNT-U9] **Indicated airspeed** is the measure of airspeed by an indicator, without taking position, instrument, or other errors into account.
- instrument panel** [N-COUNT-U3] The **instrument panel** is the area in a cockpit where information is displayed about the progress and status of an airplane flight.
- key** [V-T-U5] To **key** a device is to activate it by pressing a specific key.
- knot** [N-COUNT-U9] A **knot** is a unit of speed that measures one nautical mile per hour.
- kph** [U9] The **kph** (*kilometres per hour*) of an aircraft is the measure of how many kilometers the aircraft travels per hour.
- landing gear** [N-UNCOUNT-U1] **Landing gear** is the structure that supports an aircraft while it is on the ground and which allows it to take off and land.
- lateral axis** [N-COUNT-U10] The **lateral axis** of an aircraft extends from wingtip to wingtip.
- longitudinal axis** [N-COUNT-U10] The **longitudinal axis** of an aircraft is the axis running from nose to tail.
- magnetic compass** [N-COUNT-U4] A **magnetic compass** is a flight instrument that shows in which direction an aircraft is heading relative to magnetic north during steady and level flight.
- maneuver** [V-T-U10] To **maneuver** an aircraft is to cause it to rotate or move.
- mayday** [INT-U6] **Mayday** is a radio proword meaning that the speaker's aircraft is in immediate danger.
- mean sea level (MSL)** [N-UNCOUNT-U13] **Mean sea level (MSL)** is a measure of the average height of the ocean's surface.
- mechanic** [N-COUNT-U15] A **mechanic** checks and repairs a plane to ensure that everything is running properly.
- mph** [N-UNCOUNT-U9] The **mph** (*miles per hour*) of an aircraft is the measure of how many miles the aircraft travels per hour.
- MULTICOM** [U8] **MULTICOM** is a communication frequency used by pilots to communicate their flight intentions when no air traffic control facility or base operator is available.
- narrow-body airliner** [N-COUNT-U12] A **narrow-body airliner** is a passenger aircraft with one passenger aisle and a cabin width of three to four meters (10-13ft).

nautical mile [N-COUNT-U9] A **nautical mile** is a unit of distance that measure 1,852 meters.

negative [ADJ-U6] **Negative** is a radio proword meaning "no."

nose [N-COUNT-U1] A **nose** is the front part of an aircraft.

outboard slat [N-COUNT-U2] An **outboard slat** is a surface on the tip of an aircraft wing that is used to adjust velocity.

overhead panel [N-COUNT-U3] An **overhead panel** is the area in a cockpit above a pilot's head that contains controls.

pan [INT-U6] **Pan** is a radio proword, usually spoken two or three times in a row, meaning that there is an urgent situation on the speaker's aircraft but that immediate assistance is not needed.

pedestal [N-COUNT-U3] A **pedestal** is the area in a cockpit beside the pilot where the throttle and other controls are located.

pilot [N-COUNT-U1] A **pilot** is a person who is trained to fly an aircraft.

pitch [N-UNCOUNT-U10] **Pitch** is rotation along the lateral axis of an aircraft.

plain English [N-UNCOUNT-U7] **Plain English** is normal, everyday speech that is usually not used in radio transmissions.

PTT [U5] If a mike is **PTT** (*push-to-talk*), a speaker must push a button to activate it each time he or she wants to speak.

radio [N-UNCOUNT-U5] **Radio** is the transmission of signals using electromagnetic waves.

radio magnetic indicator [N-COUNT-U4] A **radio magnetic indicator** is a flight instrument that combines radio and magnetic information to indicate in which direction an aircraft is heading.

read back [PHRASAL V-T-U7] To **read back** is to repeat information exactly as previously transmitted during a radio transmission.

regional airliner [N-COUNT-U12] A **regional airliner** is a small short-haul aircraft that transports fewer than 100 passengers.

regional jet [N-COUNT-U12] A **regional jet** is short- to medium-haul regional airliner powered by a turbofan engine.

restricted [ADJ-U14] If an area is **restricted**, it is not open to the general public.

rise [V-I-U11] To **rise** is to move upward.

roger [INT-U6] **Roger** is a radio proword meaning the speaker received a message.

roll [N-UNCOUNT-U10] **Roll** is rotation along the longitudinal axis of an aircraft, also called bank.

rudder [N-COUNT-U2] A **rudder** is a hinged part of a vertical stabilizer that guides an aircraft left and right.

rudder pedal [N-COUNT-U3] A **rudder pedal** is a control in a cockpit that changes the position of an aircraft's rudder.

runway [N-COUNT-U14] A **runway** is a special roadway that planes use when taking off and landing.

say again [PHRASE-U7] To **say again** is to send information again during a radio transmission.

screeener [N-COUNT-U15] A **screeener** is an airport employee who checks passengers' luggage to ensure that it doesn't contain unsafe or illegal items.

security checkpoint [N-COUNT-U14] A **security checkpoint** is an area of the airport where passengers and their luggage are checked for dangerous objects.

security personnel [N-UNCOUNT-15] **Security personnel** are airport employees who ensure that the airport and aircraft are safe by watching for and investigating potential threats.

side stick [N-COUNT-U3] A **side stick** is a part that controls the pitch of an aircraft and is located to the side of a pilot's seat.

slat [N-COUNT-U2] A **slat** is a surface on the leading edge of an aircraft wing that is used to adjust velocity, particularly when landing.

slow down [PHRASAL V-I-U11] To **slow down** is to reduce speed.

speaker [N-COUNT-U5] A **speaker** is a device that converts electrical audio signals into sound.

Glossary

- speed up** [PHRASAL V- I-U11] To **speed up** is to increase speed.
- spoiler** [N-COUNT-U2] A **spoiler** is a hinged part on the top of an aircraft that increases resistance.
- squelch control** [N-UNCOUNT-U5] **Squelch control** is a setting that controls the level of background noise.
- stand by** [PHRASAL V-I-U7] To **stand by** is to wait for further information or instructions.
- step on** [PHRASAL V-T-U7] To **step on** something is to interrupt another person's communication with ATC.
- T arrangement** [N-COUNT-U4] A **T arrangement** is a standard pattern in which the primary flight instruments are arranged on an instrument panel.
- tail** [N-COUNT-U1] A **tail** is the rear part of an aircraft where stabilizers are located.
- taxiway** [N-COUNT-U14] A **taxiway** is a path that connects the different areas of a runway together.
- terminal** [N-COUNT-U14] A **terminal** is a building where passengers transfer on or off planes.
- throttle** [N-COUNT-U3] A **throttle** is a part that controls the supply of fuel to an engine.
- ticket agent** [N-COUNT-U15] A **ticket agent** is an airline employee who helps customers book flights, assigns seats to customers, and assists customers with any flight problems they may have.
- tire** [N-COUNT-U1] A **tire** is a rubber part that fits around a wheel.
- torque** [N-UNCOUNT-U10] **Torque** is a twisting force that causes rotation.
- tower controller** [N-COUNT-U8] A **tower controller** is a person who manages traffic in and around an airport from the airport's tower.
- transceiver** [N-COUNT-U5] A **transceiver** is a radio device that includes both a transmitter and a receiver.
- transmit** [V-T-U7] To **transmit** something is to send information through electrical signals.
- transponder** [N-COUNT-U5] A **transponder** is a device that responds to radio frequency signals from air traffic controllers in order to communicate an aircraft's location.
- true airspeed** [N-UNCOUNT-U9] **True airspeed** is the measure of how fast an aircraft is moving relative to the air immediately surrounding the aircraft.
- turbine engine** [N-COUNT-U1] A **turbine engine** is an engine that uses exhaust to provide propulsion.
- turbofan** [N-COUNT-U12] A **turbofan** is a turbine engine that propels an aircraft by driving a fan.
- turboprop** [N-COUNT-U1] A **turboprop** is an engine that uses a turbine engine to turn a propeller and create thrust.
- turn coordinator** [N-COUNT-U4] A **turn coordinator** is a flight instrument that shows at what rate and in which direction an aircraft is turning.
- unable** [ADJ-U6] If someone is **unable**, he or she cannot comply with instructions.
- UNICOM** [U8] **UNICOM** (*Universal Communications*), is an air traffic communications system that provides air traffic advisories at airports that do not have air traffic control.
- vertical axis** [N-COUNT-U10] The **vertical axis** of an aircraft is the axis running perpendicular to its wings, from the center of gravity to the bottom of the aircraft.
- vertical speed indicator** [N-COUNT-U4] A **vertical speed indicator** is a flight instrument that shows how fast an aircraft is climbing or descending.
- vertical stabilizer** [N-COUNT-U2] A **vertical stabilizer** is the part of an aircraft's tail that prevents the nose from moving side to side.
- VFR** [U13] **VFR** (*Visual Flight Rules*) are a set of regulations that allow a pilot to operate an aircraft under weather conditions that are clear enough for the pilot to see where the aircraft is going.
- wheel** [N-COUNT-U1] A **wheel** is a rolling part that allows a vehicle, such as an airplane, to move smoothly along the ground.

wide-body airliner [N-COUNT-U12] A **wide-body airliner** is a passenger aircraft with two passenger aisles and a cabin width of five to seven meters (16-20ft).

wilco [INT-U6] **Wilco** is a radio proword meaning the speaker will follow instructions.

windshield [N-COUNT-U3] A **windshield** is a window in the front of an aircraft that protects the occupants.

wing [N-COUNT-U1] A **wing** is one of two structures attached to the fuselage of an aircraft that create the lift needed to fly.

winglet [N-COUNT-U2] A **winglet** is a vertical part on the end of a wing that increases an aircraft's stability.

wingtip [N-COUNT-U10] A **wingtip** is the lengthwise end of an aircraft's wing.

yaw [N-UNCOUNT-U10] **Yaw** is rotation along the vertical axis of an aircraft.

yoke [N-COUNT-U3] A **yoke** is a W-shaped part that controls the pitch of an aircraft and is located directly in front of the pilot.

**CAREER
PATHS**

Civil Aviation

Book
2

Virginia Evans
Jenny Dooley
Jacob Esparza



Express Publishing

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1 Air traffic control



Attn: Glenview Airport seeks ATC controller

Glenview Airport air traffic control facility seeks a new controller. This individual will work in the local control office. Applicants must have significant experience in piloting and/or air traffic control, though some training will be provided. Position will start as soon as the selected applicant passes a qualifying exam.

Responsibilities include:

- directing aircraft in landing and takeoff
- providing clearance delivery and maintaining minimum separation on runways
- studying radar to stay up-to-date with local air traffic
- noting aircraft positions and directing pilots to maintain minimum vertical separation, lateral separation, and longitudinal separation
- drafting NOTAMs to provide local pilots with informational advisories
- maintaining airport and airspace safety at all times
- preventing collisions and other aircraft accidents

To apply, send a resume and three references to adams4@glenviewair.com.

Get ready!

1 Before you read the passage, talk about these questions.

- 1 Who is responsible for air traffic control?
- 2 What are two different types of separation?

Reading

2 Read the job description. Then, choose the correct answers.

- 1 What must an applicant do before starting the position?
 - A take a training course
 - B read a radar display
 - C draft a NOTAM
 - D pass an exam
- 2 What is the purpose of a NOTAM?
 - A to provide radar updates
 - B to prevent collisions
 - C to pass on information
 - D to ensure lateral separation
- 3 Which of the following is NOT a responsibility of the listed position?
 - A advising controllers
 - B directing aircraft
 - C maintaining separation
 - D drafting NOTAMs

Vocabulary

3 Write a word that is similar in meaning to the underlined part.

- 1 Having a lot of aircraft flying in a region can keep an air traffic controller very busy.
_ _ r _ _ a _ f _ _
- 2 The local controller wrote an advisory about the closed runway. _ _ T _ _
- 3 ATC must always ensure that the smallest acceptable separation exists between two planes. _ i _ _ m _ _
- 4 The new controller wasn't sure how to give instructions to a plane that needed to land.
_ _ r _ _ _
- 5 Make sure that the aircraft maintain different elevations.
_ _ _ t _ _ _ l _ _ e _ _ _ _ t _ _ n



4 Read the sentence pair. Choose where the words best fit the blanks.

- 1 longitudinal / lateral
 - A _____ separation means that two planes flying parallel routes maintain horizontal distance.
 - B _____ separation is used when two planes are flying the same route without any other type of separation.
- 2 controller / air traffic control
 - A The new _____ starts work on Monday.
 - B Working in _____ can be extremely stressful.
- 3 radar / local control
 - A _____ controls planes that are landing, taking off, and taxiing.
 - B _____ tracks the positions of aircraft.
- 4 clearance delivery / collisions
 - A Controllers work to prevent _____ at airports.
 - B A controller always has to provide _____ before a plane can land.

5 Listen and read the job description again. How is separation between aircraft maintained?

Listening

6 Listen to a conversation between an ATC supervisor and a controller. Mark the following statements as true (T) or false (F).

- 1 ___ The runway was closed because of icy conditions.
- 2 ___ The man entered incorrect information on a NOTAM.
- 3 ___ The woman will report the man's mistake.

7 Listen again and complete the conversation.

Supervisor: It's about one of the NOTAMs from yesterday. Do you know which one I'm talking about?

Controller: I don't think so. We sent out 1 _____.

Supervisor: Well, one of them included information about runway four.

Controller: Yes, it was closed 2 _____.

Supervisor: It was. But the NOTAM informing pilots wasn't sent out until 12:30. We 3 _____ a collision.

Controller: I 4 _____ . What happened?

Supervisor: At 12:15, a pilot tried to taxi onto runway four. When he saw the maintenance crew, he tried to reverse out. He almost 5 _____ another plane on the taxiway.

Controller: Everyone is okay, though?

Supervisor: Yes, but a loss of minimum separation is 6 _____.

Speaking

8 With a partner, act out the roles below based on Task 7. Then switch roles.

USE LANGUAGE SUCH AS:

It's about one of the NOTAMs from yesterday.
We nearly had ...
A pilot tried to ...

Student A: You are a supervisor. Talk to Student B about:

- a NOTAM
- a runway closure
- a possible accident

Student B: You are a controller. Talk to Student A about a NOTAM.

Writing

9 Use the conversation from Task 8 to fill out a report on the runway incident.

Glenview airport

Incident Report

Controller: _____

Supervisor: _____

Description of incident: _____

Actions taken: _____

2 Flight plans



Get ready!

- 1 Before you read the passage, talk about these questions.
- 1 What is the time an airplane spends at the airport called?
 - 2 What does an airplane need to take onboard between flights?

Reading

- 2 Read the flight plan. Then, mark the following statements as true (T) or false (F).
- 1 The pilot has not selected a route yet.
 - 2 The pilot wants to limit luggage on the aircraft due to space concerns.
 - 3 The flight may be delayed by weather.

Vocabulary

- 3 Match the words (1-7) with the definitions (A-G).

- | | |
|--|--|
| 1 <input type="checkbox"/> burn-off | 5 <input type="checkbox"/> payload |
| 2 <input type="checkbox"/> block time | 6 <input type="checkbox"/> pounds per minute |
| 3 <input type="checkbox"/> flight plan | 7 <input type="checkbox"/> fuel |
| 4 <input type="checkbox"/> airways routing | |

- A an aircraft's carrying capacity
- B a route that includes travel on pre-determined aircraft paths
- C a detailed account of where a flight should go and how long it should take
- D the substance engines burn to provide thrust
- E the measure of how many pounds of fuel an aircraft will burn off in sixty seconds
- F the time from the moment an aircraft begins taxiing until it parks after landing
- G the process of using fuel

Farwell Airport

Flight Plan #783
 Flight ID _____
 Flight Identification: SkyBus Flight #345
 Pilot: Jack Addison Co-pilot: Abigail Rogers

Departure point and time:
 Farwell Airport, 3:17 pm December 1

Arrival point and time:
 Silver Springs Airport, 5:32 pm December 1

Route: Primarily **airways routing**; international airway 573, international airway 842

FLIGHT TIME

Ground time: 30 minutes
 Time en route: 2 hrs 15 min
 Block time: 2 hrs 35 min

FUEL DETAILS

Burn-off in pounds per minute: 200
 Burn-off in pounds per hour: 12,000

Pilot's notes: **Payload** restraints necessitate limit of two luggage items per passenger, maximum. In case of weather concerns, **off-to-on time** increases to 2 hrs 47 minutes.

Also note:

See **center-stored flight plan system** for more detailed, universal flight plan based on aircraft model.

- 4 Read the sentence pair. Choose where the words best fit the blanks.

- 1 **center-stored flight plan system / route**
 A The _____ is a computer database that pilots use often.
 B Every flight must have a predetermined _____.
- 2 **time en route / pounds per hour**
 A _____ is one way to measure fuel burn-off.
 B _____ starts at takeoff and ends at landing.
- 3 **ground time / off-to-on time**
 A _____ measures how long an aircraft is actually in the air.
 B The time for maintenance checks is included in _____.

- 5 Listen and read the flight plan again. How many items of luggage may passengers take on board?

Listening

- 6 Listen to a conversation between a pilot and a co-pilot. Choose the correct answers.

- What is the conversation mainly about?
 - A correcting a flight plan error
 - B changing the route of a flight
 - C estimating fuel burn-off
 - D reviewing a flight plan
- What is the woman worried about?
 - A extra passengers
 - B the flight path
 - C fuel burn-off
 - D weather delays

- 7 Listen again and complete the conversation.

Pilot: The first thing is 1 _____.

Co-pilot: Right. I saw your note about the luggage. We're limiting passengers to two items each?

Pilot: Exactly. It's a long flight. We'll be 2 _____ with fuel.

Co-pilot: That's true. But won't we 3 _____ with burn-off?

Pilot: Yes. But with this weather, I want to be 4 _____ on takeoff.

Co-pilot: I was worried about the weather, too.

Pilot: Hopefully we'll be 5 _____ before the snow gets too bad.

Co-pilot: Still, we should plan on some kind of delay, right?

Pilot: Yeah, that's 6 _____.

Our block time will increase by at least thirty minutes if there's a lot of snow.

Speaking

- 8 With a partner, act out the roles below based on Task 7. Then switch roles.

USE LANGUAGE SUCH AS:

I saw your note about the ...
I was worried about the ..., too.
That's a good idea.

Student A: You are a pilot. Talk to Student B about:

- a flight plan
- the weather
- the payload

Student B: You are a co-pilot. Talk to Student A about an upcoming flight.

Writing

- 9 Use the conversation from Task 8 to write a passenger notice about payload.



Farwell Airport

Passenger Notice

Airline and flight number: _____

Date: _____

Expected time en route: _____

Luggage restrictions: _____

HOME

ABOUT US

SERVICES

CONTACT

temperature

weather front

Weather Watcher

Who We Are - John K. Reynolds founded Weather Watcher in 1983. He started the company to update small airports on weather conditions. The company has grown and now serves airports and pilots around the globe. We make flying safer by providing the most up-to-date information possible.

What We Do - Weather Watcher specializes in **meteorology** and provides weather updates for aviation. Our website constantly updates the daily **weather forecasts** and **temperatures**. Our meteorologists also **predict** possibilities for storms and **precipitation** up to ten days in advance.

Weather Watcher keeps track of **visibility** conditions, **wind speeds**, and **weather fronts**. We post current **Visual Meteorological Conditions (VMC)** and **Instrument Meteorological Conditions (IMC)**. Pilots can also check the **atmospheric pressure** in the region they are flying to.

We also provide airports and pilots with personalized weather reports. Pilots select their starting and destination locations. Weather Watcher will then generate a report for that region. The report states the average temperature, precipitation levels, and visibility.

Reading

2 Read the website. Then, choose the correct answers.

- What is the main purpose of the section?
 - to describe meteorological terms
 - to describe the company's structure
 - to explain what the company does
 - to help pilots fly better
- Which of the following is NOT available on the website?
 - current temperatures
 - visibility conditions
 - regional atmospheric pressure
 - 10 day IMC predictions
- What is true of Weather Watcher?
 - It was founded a year ago.
 - It employs former pilots.
 - It flies aircraft to collect weather data.
 - It provides global weather information.

Vocabulary

3 Match the words (1-7) with the definitions (A-G).

- | | |
|-----------------|-------------------|
| 1 — meteorology | 5 — precipitation |
| 2 — wind speed | 6 — VMC |
| 3 — forecast | 7 — temperature |
| 4 — visibility | |

- measurement of how far a person can see
- weather in which a pilot can see to fly
- any form of moisture
- the study of the atmosphere and its weather
- a prediction of the weather
- degree of hot and cold in the air
- the velocity at which the wind is traveling

Get ready!

1 Before you read the passage, talk about these questions.

- What is the area between two different types of weather called?
- How could heavy rain affect an airplane?

wind speeds

4 Write a word that is similar in meaning to the underlined part.

- The meteorologist guesses, based on the information he has, that it will rain today.
p _ e d _ _ t s
- The force applied by air decreases as one goes higher up.
a t _ _ s p h _ r _ c _ _ r e _ _ u r _
- We're expecting weather conditions that require instruments on today's flight due to the storm.
_ M _

5 Listen and read the website again. How far in advance does the site predict weather?

Listening

6 Listen to a conversation between a pilot and a co-pilot. Mark the following statements as true (T) or false (F).

- The woman checked the weather report recently.
- The flight will encounter a weather front.
- The man expects the flight to be delayed.

7 Listen again and complete the conversation.

Pilot: I'd appreciate it if you could check the weather forecast 1 _____.

Co-pilot: I just did. We're expecting low wind speeds and zero precipitation. It's a perfect day for flying.

Pilot: I'm relieved to hear that. We 2 _____ a nasty storm yesterday.

Co-pilot: Really? Was everything okay?

Pilot: Everything was fine, but it wasn't a pleasant flight. We hit the 3 _____ early on, and it was rough the whole way.

Co-pilot: That's never any fun. How was 4 _____?

Pilot: Oh, terrible. We were 5 _____ the whole time.

Co-pilot: Well, at least today looks better. We should get in 6 _____.

Speaking

8 With a partner, act out the roles below based on Task 7. Then switch roles.

USE LANGUAGE SUCH AS:

Can you check the weather ...
We're expecting ...
We ran into a ...

Student A: You are a pilot. Talk to Student B about:

- a weather report
- expected conditions
- the weather for a previous flight

Student B: You are a co-pilot. Talk to Student A about the weather.

Writing

9 Use the conversation from Task 8 to fill out the pilot's log.



visibility

WEATHER WATCHER
Pilot's log

Pilot: _____
Date: _____
Flight number: _____

Weather notes

Wind speed: _____
Visibility: _____
Precipitation: _____
Possible delays? _____

4 Pre-flight check



Pre-flight check notes

Pilot: Andrea Graham Co-pilot: Henry McMullen

Flight: SkyBus 357, departing Charlesville 3:17 pm Monday, October 29, arriving Glenview at 6:09 pm Monday, October 29

Pre-flight check completed (time): 1:45 pm Monday, October 29

Types of checks completed: **cockpit check**, **emergency equipment check**, **walk-around**, **tire check**

Additional notes by pilot: Aircraft interior is in good condition, including all emergency safety devices and cockpit instruments. However, several **external** problems became clear during the walk-around. General **wear** is notable, such as scratches and minor dents on the aircraft's surface. More serious examples of **surface damage** were also visible. One **fan blade** on the turbojet is slightly bent. This problem was not noted in the aircraft's **log book** and is probably recent. The bent fan blade could become dangerous if the bend grows more **excessive**. Immediate **maintenance** is suggested to avoid future problems.

Get ready!

1 Before you read the passage, talk about these questions.

- 1 What are some checks that an aircraft's crew must perform before takeoff?
- 2 Where does the pilot keep a record of flight checks, repairs, and maintenance?

Reading

2 Read the pre-flight check notes. Then, choose the correct answers.

- 1 What is the purpose of the notes?
 - A to assess the aircraft's condition
 - B to examine recent repairs
 - C to report an equipment failure
 - D to explain the cause of an incident
- 2 Which of the following is NOT in good condition?
 - A the cockpit instruments
 - B the emergency equipment
 - C the log book
 - D the turbojet
- 3 What does the pilot recommend?
 - A updating the log book
 - B replacing the tires
 - C repairing the fan blade
 - D examining the surface again

Vocabulary

3 Write a word that is similar in meaning to the underlined part.

- 1 The damage to the plane's wingtip was more than what is acceptable. _ _ c _ s _ _ _ e
- 2 Many checks must be performed before the aircraft takes off. _ r _ - f _ _ _ _ t
- 3 It is very important to perform consistent upkeep on an aircraft to avoid future problems. m _ _ n _ _ _ a _ _ _
- 4 The damage was mostly on the outside of the aircraft. _ x _ _ _ _ _ l
- 5 The propeller showed signs of damage due to age. _ _ a _
- 6 The co-pilot forgot to write down the maintenance in the aircraft record. _ o _ b _ _ _

8 Read the sentence pair. Choose where the words best fit the blanks.

1 surface damage / fan blade

- A The _____ is part of a plane's propeller.
 B Scratching is an example of _____.

2 tire check / cockpit check

- A Perform a _____ on the front landing gear.
 B A _____ includes checking the flight instruments.

3 emergency equipment check / walk-around

- A The co-pilot completed a(n) _____ to assess damage to the wings.
 B Crew members entered the cabin to complete their _____.

9 Listen and read the pre-flight check notes again. What problems did the pilot describe in her notes?

Listening

9 Listen to a conversation between a pilot and a co-pilot. Mark the following statements as true (T) or false (F).

- ___ The man noticed more external problems than the woman.
- ___ The nose wheel passed the tire check.
- ___ The man said there is too much grime on the windshield.

10 Listen again and complete the conversation.

- Co-pilot: Captain, can we discuss some 1 _____ during my pre-flight check?
 Pilot: Of course. Go 2 _____.
 Co-pilot: Great. In your notes you talked about the 3 _____, which I also noticed. But there were a few other things.
 Pilot: Are these 4 _____?
 Co-pilot: Yes. For one thing, the tire on the nose wheel seems a little 5 _____.
 Pilot: So you did a 6 _____ during your walk-around? That's good.
 Co-pilot: Thanks. We should get someone to deal with this tire before takeoff.
 Pilot: I agree. I'll talk to the maintenance crew. Was there something else?
 Co-pilot: Yeah. I'm concerned about the primary vent near the engine. There's a lot of grime on the inside.

Speaking

8 With a partner, act out the roles below based on Task 7. Then switch roles.

USE LANGUAGE SUCH AS:

- Can we discuss ...*
I agree ...
I'm concerned about ...

Student A: You are a co-pilot. Talk to Student B about:

- a pre-flight check
- problems you noticed
- the severity of the problems

Student B: You are a pilot. Talk to Student A about the pre-flight check.

Writing

9 Use the conversation from Task 8 to fill out the maintenance request.

Charlesville Airport

Aircraft maintenance request

Pilot making request: _____

Date/time: _____

Gate: _____

Problems noted during pre-flight check:

1 _____

2 _____

3 _____

Maintenance requested:

1 _____

2 _____

3 _____

5 Weather reports



Weather data for GoAir Flight 901 from Dallas, TX, US to Santiago, Chile

Current weather report for DTX (DALLAS, TX, US)
observed 0700 Zulu 11 April

Wind information

Wind direction: SSW (200°). Winds at 20 kts, with **gusts** of up to 40 kts

Cloud cover: Overcast at 3,700'

Visibility: 12-15 miles

Temperature: 22.7° Celsius

Conditions: Thunderstorms with heavy **rain** and occasional **hail**. Severe **storm** watch in effect.

Forecast for CHL (SANTIAGO, CHILE)

Forecast period: 1700 CLT – 1900 Zulu 11 April

Wind information

Wind direction: SW (230°). Winds at 5 kts

Cloud cover: Broken at 5000'

Visibility: 10-12 miles

Temperature: 6° Celsius

Conditions: **Runway contamination** expected due to possible **ice, snow, slush**, or standing water. Increased potential for tires to **hydroplane** due to wet conditions. Patchy **fog** will reduce visibility on the ground.

Get ready!

1 Before you read the passage, talk about these questions.

- 1 What weather conditions might make it very difficult to fly?
- 2 Why is it important for a pilot to know what weather to expect?



Reading

2 Read the weather reports. Then, mark the following statements as true (T) or false (F).

- 1 ___ There will be higher-speed winds on takeoff than on arrival.
- 2 ___ There is rain and hail at Dallas.
- 3 ___ The runway at Santiago is closed due to ice and snow.

Vocabulary

3 Match the words (1-6) with the definitions (A-F).

- | | |
|------------------|----------------------------|
| 1 ___ gust | 4 ___ runway contamination |
| 2 ___ storm | 5 ___ weather report |
| 3 ___ hydroplane | 6 ___ wind direction |

- A to skim or slide over a wet surface
 B a sudden, strong increase in the speed of wind
 C any material that negatively affects the takeoff or landing of an airplane
 D a serious disturbance of the atmosphere
 E the angle that wind comes from
 F a statement of climate conditions

4 Read the sentence pair. Choose where the words best fit the blanks.

- 1 **hail / rain**
 - A Because it is made of ice, _____ can do more damage than other types of precipitation.
 - B The passengers' luggage was soaked after it was left out in the _____.
- 2 **cloud / fog**
 - A The plane climbed through the _____ to reach 20,000 feet.
 - B The _____ was so thick that pilots relied on control for directions while taxiing.
- 3 **snow / slush**
 - A The storm dropped two feet of _____ on the airport.
 - B The temperature dropped and rose quickly so the ice and rain turned into _____.

- 8 Listen and read the weather reports again. What conditions will the aircraft encounter on takeoff?

Listening

- 8 Listen to a conversation between a pilot and a controller. Choose the correct answers.

- What is the purpose of the conversation?
 - to report a change in weather conditions
 - to request an update on weather conditions
 - to warn of an error in a weather report
 - to suggest a course around poor weather conditions
- What is true of the airport?
 - It is experiencing a thunderstorm.
 - It has snow on the runways.
 - It has heavy fog limiting visibility.
 - It is experiencing severe wind gusts.

- 8 Listen again and complete the conversation.

Pilot: Santiago Center, Andes Air 190, inbound to Santiago Airport. Request 1 _____.

Controller: Andes Air 190, Santiago Center, weather observation at Santiago Airport, time 0112 Zulu. Wind is 270 at ten. Visibility is nine miles. 2 _____ is ten degrees Celsius. Be advised, we have a thunderstorm with hail. It starts at about fifteen miles southwest.

Pilot: Santiago Center, Andes Air 190, say again 3 _____.

Controller: Andes Air 190, Santiago Center, wind 270 at ten knots. Andes Air 190, Santiago Center. 4 _____ winds?

Pilot: Affirmative. Wind 270 at ten knots. Any delays 5 _____ the storm?

Controller: Negative, Andes Air 190. All flights 6 _____.

Speaking

- 8 With a partner, act out the roles below based on Task 7. Then switch roles.

USE LANGUAGE SUCH AS:

Request ...

Temperature is ...

Any delays?

Student A: You are a pilot. Talk to Student B about:

- weather conditions
- winds
- flight delays

Student B: You are a controller. Talk to Student A about weather conditions and delays.

Writing

- 9 Use the conversation from Task 8 and the weather report to fill out the weather reports.



HAYFIELD AIRPORT
Weather Report

Time: _____

Temperature: _____

Wind speed: _____

Wind direction: _____

Precipitation: Snow Rain Hail

Runway conditions: _____

6 Taxiing

Get ready!

1 Before you read the passage, talk about these questions.

- 1 What helps a pilot navigate on the ground after the airplane has landed?
- 2 What is one way an airplane is moved into position without the help of a pilot?



Reading

2 Read the chapter from a pilot's guide. Then, choose the correct answers.

- 1 What is the main idea of this chapter?
A the dangers of collisions while taxiing
B the importance of following ATC instructions
C the responsibilities of pilots while taxiing
D the steps of pushing-back and taxiing
- 2 Which of the following is NOT a way for external power to move an aircraft?
A towing C using a tug
B thrust D push-back
- 3 When should a pilot perform a brake check?
A when the aircraft is attached to a tug
B when the controller gives clearance
C every time the pilot uses reverse thrust
D when the aircraft moves under its own power

THE PILOT'S GUIDE

Chapter 9

Taxiing

Pilots often assume that taxiing is the easiest part of their journey. Actually, learning to **taxi** requires extreme care. The pilot must **steer** the aircraft and follow **airport markings**, but there are other responsibilities as well.

Always be aware of an aircraft's speed and how the aircraft is moving. Is the aircraft moving due to its own power or external power? In the case of **push-back**, a **tug** pushes the aircraft. In other cases, an airport vehicle might **tow** the aircraft. When the aircraft is moving on its own, the pilot must consider **thrust**. Thrust causes forward movement. Note that fuel **efficiency** is lower when thrust is used on the ground. Therefore, use it sparingly while taxiing. Perform checks immediately once the aircraft begins taxiing on its own power. Complete a **brake check** first. Then check that the **tiller wheel** and the **nosewheel** are working properly.

Vocabulary

3 Fill in the blanks with the correct words from the word bank.

word BANK

efficiency steer taxi
thrust tow nosewheel

- 1 The pilot didn't _____ very carefully and almost caused a collision.
- 2 Learning to _____ can be complicated because there are many checks to perform.
- 3 The aircraft burned off fuel fast; it had low fuel _____.
- 4 One part of an aircraft that a pilot uses to steer is the _____.
- 5 Find someone to _____ the aircraft over to maintenance.
- 6 The pilot used _____ to make the aircraft move more quickly.

4 Read the sentence pair. Choose where the words best fit the blanks.

1 tiller wheel / brake check

A It's important to complete a _____ while taxiing before takeoff.

B The _____ is used for steering.

2 airport marking / tug

A We need a _____ to move this aircraft!

B The _____ was unclear because of ice on the runway.

3 thrust / push-back

A _____ can be used on the ground or in the air.

B _____ is a way to move an aircraft away from its gate using external power.

5 Listen and read the chapter from a pilot's guide again. Why should pilots always follow airport markings?

Listening

6 Listen to a conversation between a pilot and a controller. Mark the following statements as true (T) or false (F).

- ___ The woman wants clearance for takeoff.
- ___ Another aircraft needs the woman's tug for push back.
- ___ The taxiway clears sooner than expected.

7 Listen again and complete the conversation.

Controller: Okay. Got it on the computer. It's going to be 1 _____.

Pilot: Understood. Roseville Ground, we'll also need our 2 _____.

Controller: Sky Bus 26, your runway assignment will be runway 17.

Pilot: Thanks, Roseville Ground. Our tug is here, but Sky Bus 330 needs it for push-back, too. Can we get 3 _____ push-back time?

Controller: Sky Bus 26, we'll have you 4 _____ - _____ in three minutes.

Pilot: Okay, Roseville Ground. We'll keep him here.

Controller: Sky Bus 26, the taxiway 5 _____ early. You are 6 _____ push-back. Contact Roseville Tower when you reach runway 17.

Speaking

8 With a partner, act out the roles below based on Task 7. Then switch roles.

USE LANGUAGE SUCH AS:

It's going to be ...

We'll also need ...

Can we get an estimate on ...

Student A: You are a pilot. Talk to Student B about:

- pushing back
- a runway assignment
- what to do with a tug

Student B: You are a controller. Talk to Student A about taxiing and runway information.

Writing

9 Use the conversation from Task 8 to fill out the runway assignment form.



BRIGHTON INTERNATIONAL AIRPORT

Runway assignment confirmation

Flight: _____

Departure time: _____

Gate assigned: _____

Runway assigned: _____

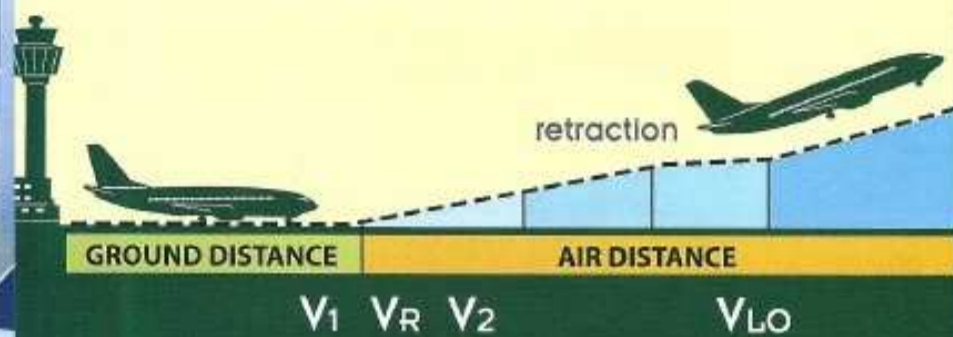
Method of leaving gate: _____

Instructions to pilot: _____

7 Takeoff

NTOFP

TYPICAL NET TAKEOFF FLIGHT PATH



THE PILOT'S GUIDE

1.2.1

TAKEOFF
SUMMARY

Takeoff is your last opportunity to identify problems that might affect flight. Pilots must make final critical decisions before an aircraft reaches certain speeds.

Before you fly, study the **net takeoff flight path** (NTOFP) in your flight manual. This profile will outline ideal speeds and heights during each phase of takeoff. A **rolling takeoff** is the smoothest way to get off the ground since you don't need to stop on the runway. However, always follow instructions from ATC if you are directed to remain at a **holding point** instead.

Remember that you must follow through with takeoff once you reach V_1 . At V_2 , you are prepared for complete liftoff. After leaving the ground at V_r in **Segment 1**, you must remember to complete landing gear **retraction** before you exceed V_{LO} . Then you must reach a safe height in **Segment 2**, for flap retraction in **Segment 3**. In **Segment 4**, make sure you achieve a sufficient height to clear all obstacles.

Get ready!

1 Before you read the passage, talk about these questions.

- 1 What must be retracted during takeoff?
- 2 When does flap retraction take place?

Reading

2 Read the training manual entry on takeoff. Then, choose the correct answers.

- 1 What is the purpose of the passage?
A to recommend particular takeoff methods
B to give an overview of takeoff procedures
C to compare different takeoff speeds
D to identify possible problems affecting takeoff
- 2 Which of the following is NOT instructed in the passage?
A commit to takeoff at V_1
B retract landing gear before V_{LO}
C complete flap retraction in Segment 2
D clear obstacles in Segment 4
- 3 Why should a pilot study the net takeoff flight path?
A It outlines how to complete a rolling takeoff.
B It provides ideal speeds for takeoff.
C It lists tips for a smooth landing.
D It includes instructions from ATC.

Vocabulary

3 Read the sentence pair. Choose where the words best fit the blanks.

- 1 **Segment 1 / Segment 4**
A In _____, you must be high enough to avoid obstacles.
B Landing gear should be retracted in _____.
- 2 **Segment 2 / Segment 3**
A After retracting landing gear, you will enter _____.
B Retract the flaps at the proper height during _____.
- 3 **rolling takeoff / net takeoff flight path**
A You do not have to stop on the runway during a _____.
B Review the _____ before flying a particular aircraft.

4 Fill in the blanks with the correct words and phrases from the word bank.

word BANK

V1 V2 Vr Vlo
 holding point takeoff retraction

- The pilot must remain at the _____ until instructed to proceed.
- We left the ground when we reached _____.
- Flap _____ should always be conducted at safe speeds.
- At _____, the pilot must commit to takeoff or abort.
- The aircraft must pull in the landing gear before exceeding _____.
- You are not safe for liftoff until _____.
- The aircraft must taxi to the runway before _____.

5 Listen and read the training manual entry on takeoff again. What happens at V1 and Vr?

Listening

6 Listen to a conversation between a pilot and a co-pilot. Number the commands and updates in the order they are given.

- A _ set takeoff power
- B _ V2 reached
- C _ stand by for liftoff
- D _ set pitch to 10
- E _ approaching V1

7 Listen again and complete the conversation.

Pilot: V1 reached. Increase throttle to approach 1 _____.

Co-pilot: Increasing throttle. All 2 _____ normal.

Pilot: Approaching Vr. Vr reached.

Co-pilot: 3 _____ for liftoff.

Pilot: Commencing liftoff. 4 _____ to 10.

Co-pilot: Pitch set to 10, 5 _____.

Pilot: 6 _____. Increase pitch to 15.

Speaking

8 With a partner, act out the roles below based on Task 7. Then switch roles.

USE LANGUAGE SUCH AS:

Increase throttle.
Approaching ...
Pitch set to ...

Student A: You are a pilot. Talk to Student B about:

- takeoff
- speeds reached

Student B: You are a co-pilot. Talk to Student A about takeoff.

Writing

9 Use the conversation from Task 8 to fill out the pilot's flight log.

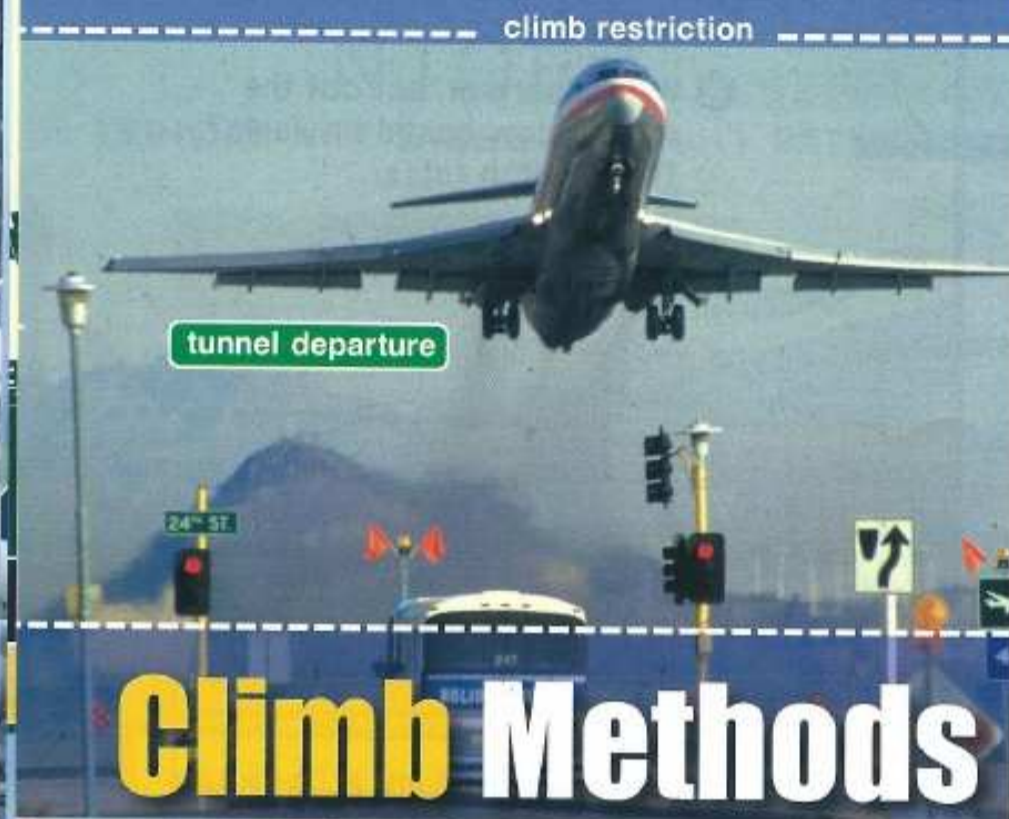


FLIGHT: JetLark 459

Action

- Cleared for takeoff, set takeoff power
- _____
- _____
- _____

8 Climbing



Climb Methods

inbound flight



mach number

$$M = \frac{V}{a}$$

M = Mach number
V = velocity
a = speed of sound

**AIRSPD
KNOTS**



Vb speed

Pilots use several different climb methods when they are flying. Each procedure has different advantages and purposes. A pilot's choice depends on the time, place, and purpose.

Pilots often use a **tunnel departure** in busy airports. The **climb restriction** prevents outgoing flights from colliding with **inbound** flights.

Some flights need to reach a high altitude fairly quickly. In those cases, pilots choose the **best rate of climb**. This method is also known as **time to altitude**. Other pilots are more concerned about high efficiency. These pilots might choose the **long-range climb** or best **fuel to altitude**.

Other flights need to cover more distance during the climb. In such circumstances, pilots use a **normal high-speed climb** or best **distance to altitude**.

Pilots also have to consider the smaller details of climbing. They must monitor the plane's **Vb speed**, **climb thrust**, and **mach number**. Pilots must have good control over these factors to ensure a safe flight.

Get ready!

1 Before you read the passage, talk about these questions.

- 1 What is the name for a departure where planes keep low to the ground?
- 2 What is an inbound plane getting ready for?

Reading

2 Read the article. Then, choose the correct answers.

- 1 What is the main purpose of the article?
A to describe the risks of climbing improperly
B to recommend a climb method
C to describe different climb methods
D to explain how planes are able to ascend
- 2 Which of the following is NOT a climb method?
A fuel to altitude C time to altitude
B tunnel departure D climb thrust
- 3 Which of the following methods adheres to a climb restriction?
A a tunnel departure
B a long-range climb
C a best rate of climb
D a best distance to altitude

Vocabulary

3 Choose the sentence that uses the underlined part correctly.

- 1 A The pilot used the fuel to altitude method to cover more distance during the climb.
B The pilot had to use a more powerful climb thrust while flying the bigger plane.
- 2 A The pilot used the best rate of climb method to reach the desired altitude quickly.
B The pilot used the normal high-speed climb method to save fuel.
- 3 A The long-range climb allows the plane to get a good mixture of climb, fuel efficiency and distance.
B The pilot covered a long distance during the climb by using the time to altitude method.

- 4 Fill in the blanks with the correct words and phrases from the word bank.

Word BANK

climb restriction Vb speed
 mach number distance to altitude
 inbound tunnel departure

- Ms. Jackson will arrive on the next _____ flight.
- Because the winds were strong, the pilot used a lower _____ than normal.
- The pilot wanted to cover more distance, so he used the _____ method.
- The airport set a(n) _____ to prevent air traffic accidents.
- The pilot figured the plane's _____ by dividing its velocity by the speed of sound.
- The pilot made a(n) _____ to avoid incoming planes.

- 5 Listen and read the article again. What is the purpose of a tunnel departure?

Listening

- 6 Listen to a conversation between a pilot and a co-pilot. Mark the following statements as true (T) or false (F).

- ___ The woman suggests a long-range climb.
- ___ The airport enforces climb restrictions.
- ___ The woman will change the flight log.

- 7 Listen again and complete the conversation.

Pilot: Ms. Samuels, we're almost ready for 1 _____. Did you see the log for today's flight?
Co-pilot: I didn't. Is there anything in particular that I should know?
Pilot: Not really. Everything will be standard today, except we'll be making a 2 _____.
Co-pilot: Wouldn't it be better to use a 3 _____ - _____ climb?
Pilot: Yes, when it's possible. But this airport uses tunnel departures.
Co-pilot: I see. I didn't know there were 4 _____.
Pilot: Yeah, it's the 5 _____ in the area. So they control traffic pretty closely.
Co-pilot: Do you know 6 _____ we'll need to go before the climb restriction is lifted?

Speaking

- 8 With a partner, act out the roles below based on Task 7. Then switch roles.

USE LANGUAGE SUCH AS:

Did you see ...
Is there anything ...
We'll need to be ...

Student A: You are a pilot. Talk to Student B about:

- checking the log
- climb methods
- climb restrictions

Student B: You are a co-pilot. Talk to Student A about climb methods.

Writing

- 9 Use the conversation from Task 8 to fill out the pilot's log.

PILOT'S LOG

Date: June 15

Name: Tom Nickels

Flight number: JetFlight332

Type of climb: _____

Reason: _____

Restrictions? Y / N

If so, explain: _____

9 Control systems

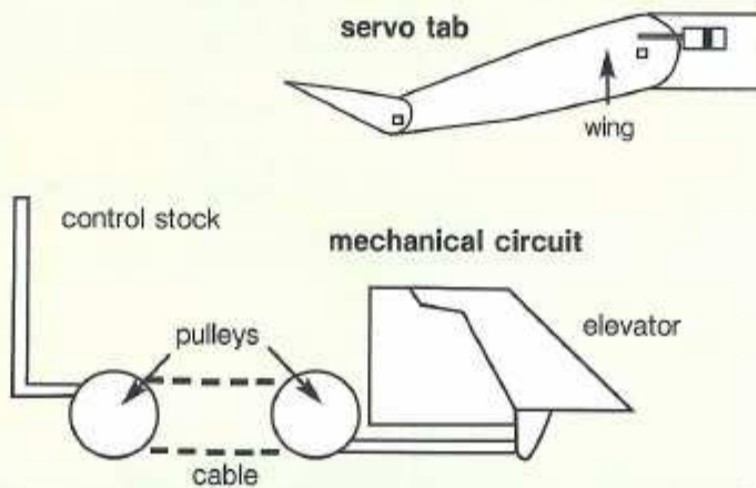


FLIGHT CONTROL SYSTEMS

Which system is Right for your fleet?

1 HYDRO-MECHANICAL CONTROL SYSTEMS

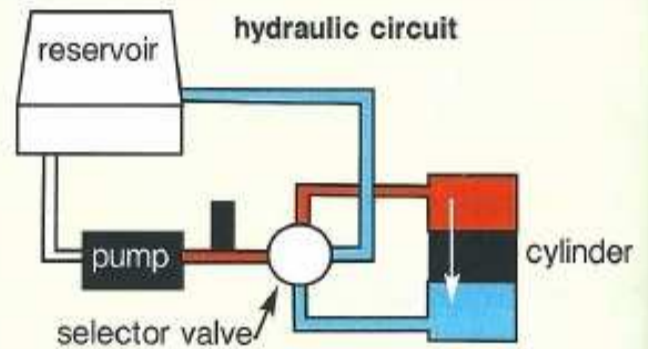
Our **hydro-mechanical control systems** are ideal for most commercial aircraft. Combining a traditional **mechanical circuit** with a more advanced **hydraulic circuit**, these systems maximize power. The latest **electro-hydraulic servo valves** provide smooth transfer of hydraulic fluid, giving you precise control over your system's **actuators**.



Watling manufactures state-of-the-art systems for all types of aircraft.

2 FLY-BY-WIRE CONTROL SYSTEMS

For lighter aircraft, consider one of our innovative **fly-by-wire control systems**. These electrical systems eliminate the need for bulky pumps and other heavy hydraulic equipment.



3 MECHANICAL CONTROL SYSTEMS

While Watling no longer makes basic **mechanical control systems**, we still use our expertise from years of mechanical production. Even the most advanced hydraulic systems still rely on basic mechanical features like **servo tabs**. Features from older mechanical systems are still used to ensure **redundancy** in newer systems. You never know when an automatic function might fail, and you have to operate it **manually**.

Each system comes with a detailed **flight envelope** and optional **flight envelope protection** to prevent reckless flying. Of course, all systems allow pilots to **override** set limits in case of emergency.

Get ready!

1 Before you read the passage, talk about these questions.

- 1 What are some different types of flight control systems?
- 2 Which control system uses fluid?

Reading

2 Read the brochure on control systems. Then, complete the table.

System	Advantages
Hydro-mechanical	_____
Fly-by-Wire	_____
Mechanical	_____

Vocabulary

3 Match the words (1-7) with the definitions (A-G).

- 1 _ actuator
- 2 _ override
- 3 _ manually
- 4 _ hydro-mechanical control system
- 5 _ fly-by-wire control system
- 6 _ mechanical control system
- 7 _ flight envelope

- A a set of specifications for safe flight
- B a high-pressure fluid control system
- C operated directly by a person
- D a part that converts energy into movement
- E to stop an automatic function
- F a system that relies on electrical signals
- G a system in which force is applied directly from the cockpit to controls

4 Read the sentence pair. Choose where the words best fit the blanks.

1 **flight envelope protection / redundancy**

A Pilots rely on _____ to prevent them from flying dangerously.

B _____ ensures that the aircraft continues to function after mechanical failure.

2 **mechanical circuit / hydraulic circuit**

A A _____ uses a series of basic manual controls.

B A _____ is a high pressure system using pumps and valves.

3 **servo tabs / electro-hydraulic servo valves**

A _____ control the flow of fluid into the actuators.

B Mechanical systems use _____ to facilitate movement of aircraft parts.

5 Listen and read the brochure on control systems again. Why can a pilot override automatic protection?

Listening

6 Listen to a conversation between a flight instructor and a student. Mark the following statements as true (T) or false (F).

- ___ The woman does not know what kind of control system the aircraft uses.
- ___ The woman understands the purpose of the protection system.
- ___ The man corrects the woman's assumption about the protection system.

7 Listen again and complete the conversation.

Instructor: Okay, Fiona, next question. What 1 _____ does the Hauerbach 190 have?

Student: The 190 uses a 2 _____ - _____ control system with flight envelope protection.

Instructor: Good. And 3 _____ of that protection system?

Student: It stops the pilot from 4 _____ that might cause the aircraft to fail or become damaged.

Instructor: That's right. So what happens if the pilot needs to make a dangerous maneuver 5 _____?

Student: I'm not sure. I guess the system would prevent the pilot from making 6 _____.

Instructor: In normal circumstances, yes. But if there's an unusual situation, the pilot can override the flight envelope protection.

Speaking

8 With a partner, act out the roles below based on Task 7. Then switch roles.

USE LANGUAGE SUCH AS:

What features does ... have?

What is the point of ...

It stops the ... from ...

Student A: You are a flight instructor. Talk to Student B about:

- a flight control system
- purpose of a flight control feature
- how the feature functions in unusual situations

Student B: You are a student. Talk to Student A about a flight control system.

Writing

9 Use the conversation from Task 8 to fill out the student's notes.

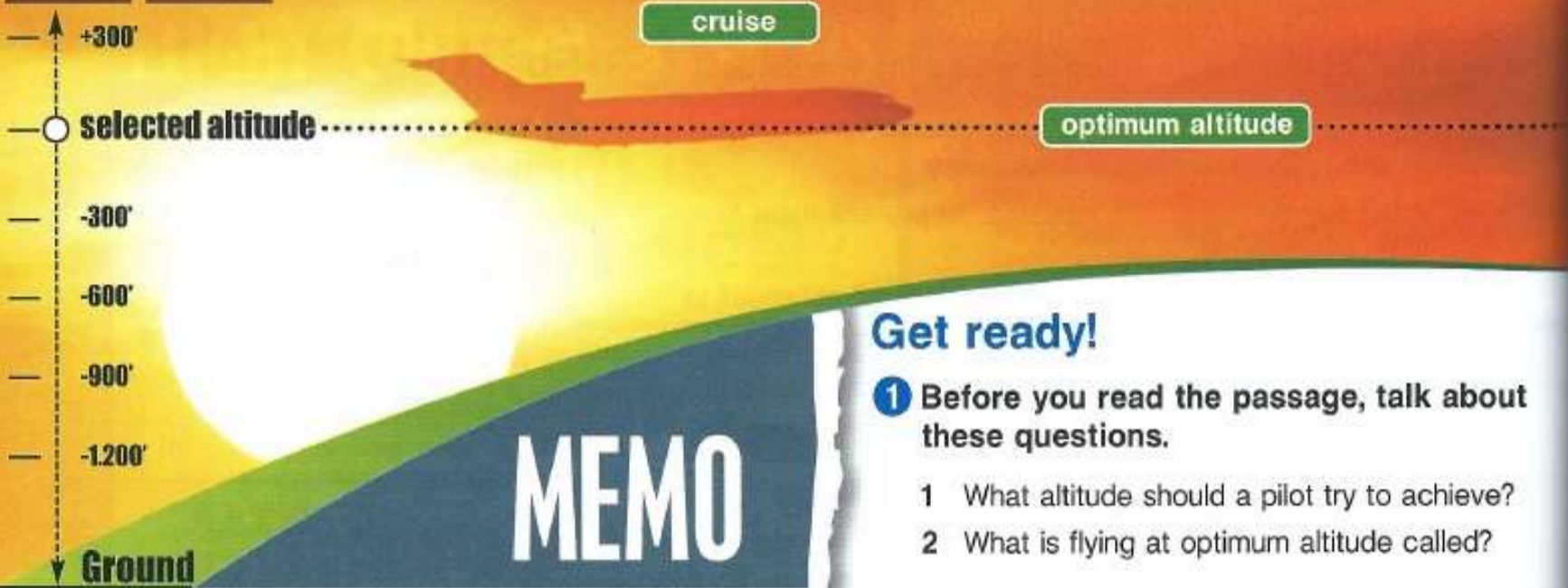


Aircraft: Hauerbach 111

Flight control system: _____

Additional features and functions: _____

10 Cruising



MEMO

Spotlight on Cruising Procedure



New Pilots,

Before you start flying for Graywing, please familiarize yourself with our practices for **cruise**. The type of **cruise regime** you choose affects your passengers and company costs.

Each Graywing cockpit is equipped with important information about the aircraft's **recommended cruise**. There, you will find details about **fuel consumption**. This includes the aircraft's typical **fuel flow** and **range constant**. You will also find your aircraft's **optimum altitude** so you can avoid flying too low or too high.

While you should stick to recommended cruise in most situations, there are some exceptions. Long flights may require **long-range cruise** to preserve fuel. This extends flight time, but prevents costly overuse of fuel. If you experience delays, you should use **high-speed cruise** to make up time. It's less **efficient**, but it may be necessary to arrive on time. Be careful, however, not to exceed your aircraft's **buffet boundary**. Pay attention to **overspeed clacker warnings** so you know when you're flying too fast to maintain stability.

Get ready!

1 Before you read the passage, talk about these questions.

- 1 What altitude should a pilot try to achieve?
- 2 What is flying at optimum altitude called?

Reading

2 Read the memo on cruising. Then, complete the table.

Cruise Regime	When to use
Recommended cruise	_____
Long-range cruise	_____
High-speed cruise	_____

Vocabulary

3 Write a word that is similar in meaning to the underlined part.

- 1 We should use air travel with maximum fuel efficiency for this 16-hour flight.
_ o n _ - _ _ n _ e _ c _ _ i s _
- 2 Did you figure out the pounds of fuel consumed per hour of the new aircraft?
_ _ _ l _ f _ _ w
- 3 Make sure you choose the appropriate type of cruise for each flight.
_ r _ _ s _ _ e g _ m _
- 4 If you don't fly at the height with the best fuel efficiency, you will waste fuel.
o _ _ i _ _ m _ l t _ t _ d _
- 5 It's okay to use air travel with lower fuel efficiency if you are in a hurry.
h _ _ h _ _ p _ e _ _ r u _ _ e
- 6 The Redstar 799 has the most efficient rate of fuel usage in its class.
_ u _ _ _ o n _ u m _ _ _ o n

- 4 Fill in the blanks with the correct words and phrases from the word bank.

word BANK

efficient range constant cruise
recommended cruise buffet boundary
overspeed clacker warning

- Exceeding the _____ can lead to aircraft instability.
- Most of the time, the pilot flies at _____.
- The new commercial jet has more _____ fuel usage than the old one.
- The co-pilot calculated the _____ to measure fuel efficiency.
- Aircraft maintain a steady speed and altitude during any type of _____.
- The pilot reduced her speed when she saw the _____.

- 5 Listen and read the memo on cruising again. What are the advantages and disadvantages of high-speed cruising?

Listening

- 6 Listen to a conversation between a pilot and a co-pilot. Mark the following statements as true (T) or false (F).

- ___ The man is concerned about running out of fuel.
- ___ The aircraft has already reached the buffet boundary.
- ___ The flight may arrive late.

- 7 Listen again and complete the conversation.

Pilot: Hey, Don. That delay on the runway put us way 1 _____.

Co-pilot: Yeah, I know. Do you think we should try to 2 _____ time?

Pilot: I don't know. We got that memo last week encouraging us to 3 _____.

Co-pilot: That's true. But 4 _____, we'd get our passengers there on time.

Pilot: That would certainly make them happy. And it would prevent 5 _____.

Co-pilot: On the other hand, our recommended cruise is already approaching the 6 _____.

Pilot: Hmm, you're right. It might be risky to travel much faster.

Speaking

- 8 With a partner, act out the roles below based on Task 7. Then switch roles.

USE LANGUAGE SUCH AS:

Do you think ...
On the plus side ...
On the other hand ...

Student A: You are a pilot. Talk to Student B about:

- a delay
- pros and cons of changing cruise
- your decision

Student B: You are a co-pilot. Talk to Student A about pros and cons of changing cruise.

Writing

- 9 Use the conversation from Task 8 to fill out the pilot's flight report.

GRAYWING AIRLINES

Flight: Graywing 691

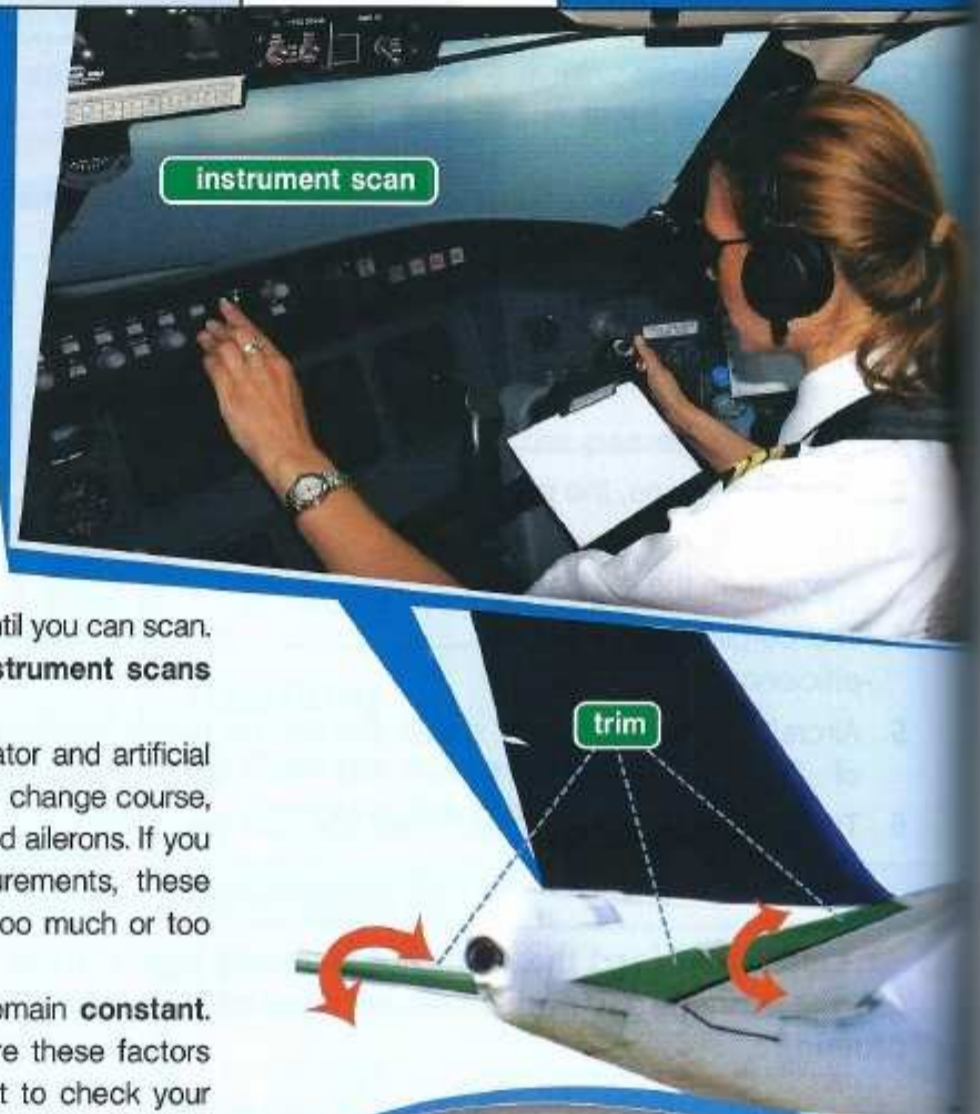
Delays? Y / N

Effect on flight: _____

Action taken and why: _____

WingTip of the Week:

Know your instruments

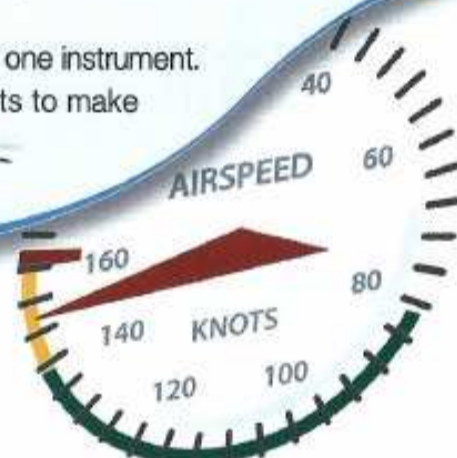


Any experienced pilot will tell you that you can't fly until you can scan. To stay on course, you must perform accurate **instrument scans** before, during, and after every maneuver.

If you are banking, for example, your heading indicator and artificial horizon tell you your heading and bank angle. As you change course, you must precisely **adjust** the **trim** of your rudder and ailerons. If you don't properly **interpret** your instruments' measurements, these adjustments could be inaccurate. You might bank too much or too little and struggle to stay on course.

During a maneuver, one or two factors typically remain **constant**. **Read** your **primary instruments** carefully to ensure these factors don't change during the maneuver. But don't forget to check your **secondary instruments** too. These will give you an **indication** of how your maneuver is progressing.

Finally, remember not to rely too much on any one instrument. **Cross-check** your data with other instruments to make sure you have accurate information.



Get ready!

1 Before you read the passage, talk about these questions.

- 1 How do pilots check that all instruments are working correctly?
- 2 How can a pilot ensure his or her data is correct?

Reading

2 Read the article on instrument scans. Then, mark the following statements as true (T) or false (F).

- 1 Instrument scans help a pilot determine what trim adjustments are needed.
- 2 Pilots can measure a change in position using primary instruments.
- 3 The article recommends using multiple instruments to verify particular data.

Vocabulary

3 Match the words (1-7) with the definitions (A-G).

- | | | |
|---|--------------------------|--|
| 1 | <input type="checkbox"/> | read |
| 2 | <input type="checkbox"/> | trim |
| 3 | <input type="checkbox"/> | constant |
| 4 | <input type="checkbox"/> | secondary instrument |
| 5 | <input type="checkbox"/> | interpret |
| 6 | <input type="checkbox"/> | instrument scan |
| 7 | <input type="checkbox"/> | primary instrument |
| A | | the process of reading flight position indicators |
| B | | an instrument that measures a changing factor |
| C | | something that does not change |
| D | | an instrument that measures an unchanging factor |
| E | | the process of changing the position of an aircraft part |
| F | | to take information from something |
| G | | to determine the meaning of something |

6 Read the sentence and choose the correct word.

- 1 The pilot **interpreted** / **adjusted** the rudder trim after performing an instrument scan.
- 2 The compass gives you a(n) **constant** / **indication** of which direction you're flying.
- 3 You should **cross-check** / **read** your data with another instrument for verification.

6 Listen and read the article on instrument scans again. What might happen if a pilot does not perform frequent instrument scans?

Listening

6 Listen to a conversation between a flight student and an instructor. Choose the correct answers.

- 1 What is the purpose of the conversation?
A to adjust the aircraft's position
B to show how heading indicators work
C to determine the correct instruments to use
D to reprimand the man for an error
- 2 Why is the man off-course?
A he did not keep pressure on the tail surface
B he needed to adjust the rudder trim
C he was misinterpreting his instruments
D he did not maintain enough drag on the rudder

7 Listen again and complete the conversation.

Student: How's my flying so far, Ms. Reynolds?
Instructor: Not too bad, Carl. But you're getting a little 1 _____.

Student: Really? I thought I was doing all right.
Instructor: Take a look at your 2 _____ . Do you see how you've drifted to the northwest?
Student: Oh, I see. But I've been keeping steady pressure on the wing and tail surfaces.
Instructor: That's good. Keep holding the aileron steady, but then 3 _____ on the rudder.
Student: Okay. I'm giving it a try. How's that?
Instructor: Just 4 _____ . Okay, now trim it off right there.
Student: That feels better. There's less drag 5 _____ now.
Instructor: Good. Now just remember to watch your 6 _____ so you know when to make those adjustments.

Speaking

8 With a partner, act out the roles below based on Task 7. Then switch roles.

USE LANGUAGE SUCH AS:

How's my ...
You're a little ...
Adjust the ... on the ...

Student A: You are a flight student. Talk to Student B about:

- your performance
- your position
- making an adjustment

Student B: You are an instructor. Talk to Student A about making an adjustment.

Writing

9 Use the conversation from Task 8 to fill out the instructor's flight review.

Flight Review

Student: _____

Problems during flight: _____

How student can improve: _____

12 Encountering traffic

Section Three

Separation

wingtip vortices

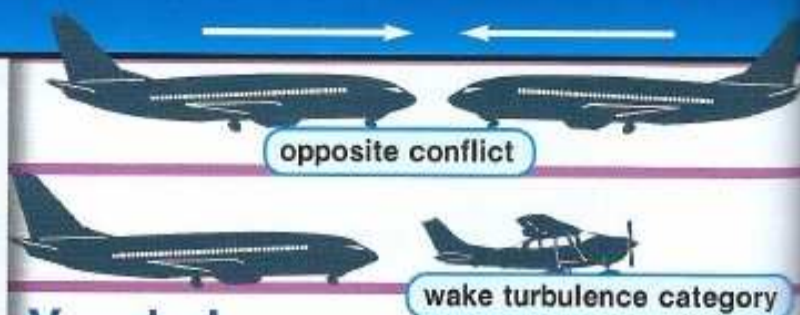


traffic

Separation is the minimum distance between two or more aircraft. It must be maintained to avoid **wake turbulence** and collisions. Although most aircraft have **traffic collision avoidance systems**, aircraft controllers are responsible for preventing a **loss of separation**. This requires different actions on the part of controllers depending on the stage of flight aircraft are in.

Separation during takeoff and landing is based on **wake turbulence category** and **MTOM (maximum takeoff mass)**. This ensures that smaller aircraft do not **encounter wingtip vortices** from larger aircraft on arrival or departure.

Conflicts occur when there is a loss of separation en route, though not all conflicts are the same. A **local conflict** occurs when **traffic** passes through limited airspace above a town or specific area. **Opposite conflict** happens as multiple aircraft reach a shared destination from opposing directions. Though traffic controllers manage airspace and runways, pilots also share the responsibility of maintaining separation.



Vocabulary

3 Match the words (1-7) with the definitions (A-G).

- 1 — wake turbulence category
- 2 — loss of separation
- 3 — wingtip vortex
- 4 — traffic collision avoidance system
- 5 — MTOM
- 6 — wake turbulence
- 7 — encounter

- A an event in which two aircraft come too close to one another
- B an air disturbance that an aircraft creates as it moves through air
- C the maximum weight a specific aircraft can weigh and continue to meet all safety requirements for take-off and flight
- D a spiraling wind disturbance created by wings at landing that remains stable in airspace for up to three minutes
- E to approach or go through something
- F a determination of how much distance should exist between aircraft based on weight
- G a program that notifies pilots of other aircraft that may be too close

Get ready!

1 Before you read the passage, talk about these questions.

- 1 What is an opposite conflict between planes?
- 2 How are planes' journeys monitored?

Reading

2 Read the section from an ATC guide. Then, mark the following statements as true (T) or false (F).

- 1 — Traffic collision avoidance systems are used by aircraft controllers.
- 2 — Wingtip vortices can be encountered on takeoff or landing.
- 3 — Two planes flying side by side cannot experience opposite conflict.



4 Read the sentence pair. Choose where the words best fit the blanks.

1 **opposite conflict / local conflict**

- A A southbound plane entered a(n) _____ with the northbound plane.
- B This airport has a lot of traffic in a small area and so there is frequent _____.

2 **conflict / traffic**

- A Norfolk Approach guides all incoming _____ through its airspace.
- B The _____ occurred when a pilot missed ATC directions and turned towards another flight.

- 5 Listen and read the section from the ATC guide again. What is a local conflict?

Listening

- 6 Listen to a conversation between two air traffic controllers. Choose the correct answers.

- What is the conversation mainly about?
 - a collision on a runway
 - a loss of separation on landing
 - a report on an opposite conflict
 - a wrong wake turbulence category assignment
- What error did the pilot make?
 - He landed too soon after a large aircraft.
 - He turned into the course of another aircraft.
 - He miscalculated his maximum takeoff mass.
 - He turned off his traffic collision avoidance system.

- 7 Listen again and complete the conversation.

- Controller 1: Was it a rough shift?
 Controller 2: You have no idea. I had a pretty 1 _____ a few hours ago.
 Controller 1: What happened? Is everything okay?
 Controller 2: Everything is fine, but a small feederliner almost lost control on landing earlier. My 2 _____ .
 Controller 1: But we have perfect weather today. How did that happen?
 Controller 2: He came in 3 _____ after a 747 landed. His plane was caught in the 4 _____ .
 Controller 1: Wow. He's lucky he didn't crash! But how did he lose 5 _____ ?
 Controller 2: It was just a miscommunication. I told him to hold 6 _____ clear him to land.
 Controller 1: That sounds pretty clear to me.
 Controller 2: Well, I guess all he heard me say was "clear to land".
 Controller 1: I see. That's why I ask pilots to read back instructions.

Speaking

- 8 With a partner, act out the roles below based on Task 7. Then switch roles.

USE LANGUAGE SUCH AS:

- I had a pretty ...*
A plane almost ...
All he heard me say was ...

Student A: You are a controller. Talk to Student B about:

- a previous shift
- a loss of separation
- how to avoid a loss of separation

Student B: You are a controller. Talk to Student A about a loss of separation during your shift.

Writing

- 9 Use the conversation from Task 8 to fill out a report on a loss of separation.



Haverton Airfield

Loss of Separation Report

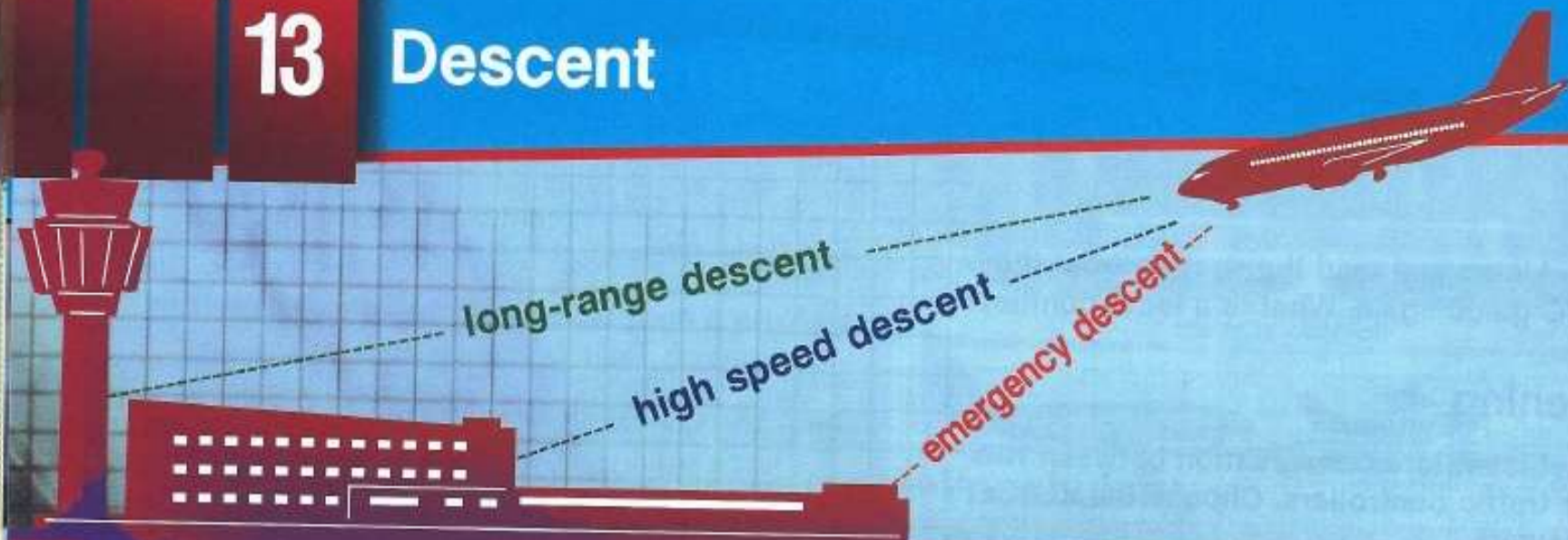
Controller: _____

Flight(s) involved: _____

Briefly describe the event: _____

How can this event be avoided in the future?

13 Descent



Get ready!

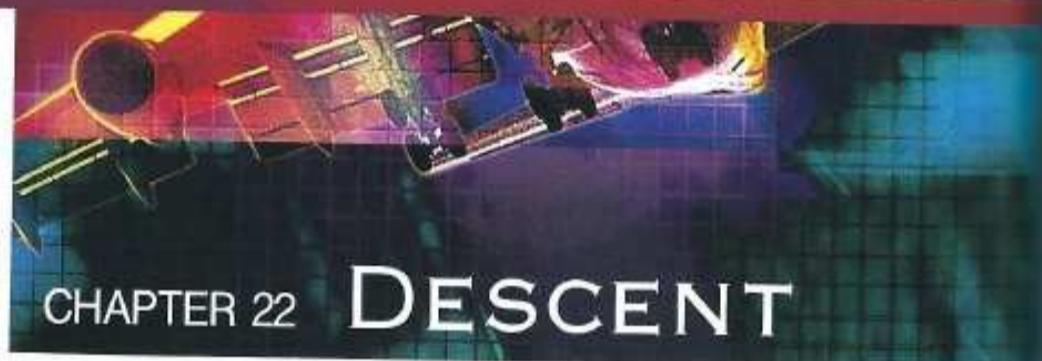
1 Before you read the passage, talk about these questions.

- 1 What type of descent involves a sudden drop in altitude?
- 2 What can cause an emergency situation in an airplane cabin?

Reading

2 Read the chapter on descending. Then, choose the correct answers.

- 1 What is the main idea of the chapter?
 - A the types of descents aircraft make
 - B how to execute an emergency descent
 - C when to use long-range descents
 - D ways to conserve fuel on descents
- 2 Which of the following is NOT a method of reaching a lower altitude?
 - A rate of descent
 - B long-range descent
 - C emergency descent
 - D high speed descent
- 3 Why is a high speed descent not advised in bad weather?
 - A It is not fuel efficient.
 - B It can damage the aircraft.
 - C It stresses the speed brake.
 - D It can lead to rapid depressurization.



CHAPTER 22 DESCENT

When landing an aircraft, the pilot must **descend** in a controlled manner. In level flight, four forces are in balance: weight, lift, thrust, and drag. In a descent, the pilot will decrease lift, which increases the force of weight. Applying the **speed brake** is one way to decrease lift by increasing drag. The **rate of descent** will be determined by this balance of forces.

There are two ways to descend in normal aircraft operations. The first is a **long-range descent**, which is the most fuel-efficient option. Even though **V_{mo}** is maintained, this descent takes more time.

The second option, **high speed descent**, should not be confused with an **emergency descent**. High speed descent occurs under normal conditions. (It should not be attempted in some situations, such as bad weather as it stresses the aircraft.) The second occurs when safety is compromised. **Rapid depressurization** will require an emergency descent. The timing of either descent depends on the **final approach fix**.

Vocabulary

3 Match the words (1-6) with the definitions (A-F).

- | | | | |
|---|----------------------|---|-------------------|
| 1 | — long-range descent | 4 | — descend |
| 2 | — high speed descent | 5 | — V _{mo} |
| 3 | — emergency descent | 6 | — rate of descent |

- A a descent in which the aircraft descends gradually
- B maximum operating limit speed
- C a rapid drop from high altitude to low altitude
- D a rapid drop from high altitude to low altitude due to safety concerns
- E to move down in altitude
- F the speed at which an aircraft descends

4 Fill in the blanks with the correct words and phrases from the word bank.

word BANK

descent speed brake
final approach fix rapid depressurization

- 1 Stay at cruising altitude until you reach the _____.
- 2 Pilots can use the _____ to decrease speeds even faster.
- 3 Should _____ occur, pilots drop to a safe altitude as soon as possible.
- 4 After cruising, pilots enter the _____ and then prepare for approach and landing.

5 Listen and read the chapter on descent again. What forces affect balance in level flight?

Listening

6 Listen to a conversation between a pilot and a co-pilot. Mark the following statements as true (T) or false (F).

- 1 The woman wants to descend faster to avoid turbulence.
- 2 The flight is low on fuel.
- 3 The pilots will use a long-range descent.

7 Listen again and complete the conversation.

Pilot: With a 1 _____ - _____ we'll arrive late, but our fuel is on the low side.

Co-pilot: Should we contact ATC and see if there's heavy traffic?

Pilot: Maybe. I wouldn't want to circle the airport 2 _____.

Co-pilot: Our only other option is a high speed descent.

Pilot: If we do that we can 3 _____.

Co-pilot: There's some pretty 4 _____ at 10,000 feet, though.

Pilot: What if we maintain our altitude until 100 miles out, and then try?

Co-pilot: I think the turbulence is pretty constant the whole way.

Pilot: Then to be 5 _____, we'd better go for the long-range descent.

Co-pilot: Yeah. It's better to be late than to 6 _____.

Speaking

8 With a partner, act out the roles below based on Task 7. Then switch roles.

USE LANGUAGE SUCH AS:

Maybe we shouldn't ... like we planned.

If we do that we can ...

It's better to ...

Student A: You are a pilot. Talk to Student B about:

- changing descent methods
- benefits of each option
- why you made your decision

Student B: You are a co-pilot. Talk to Student A about which type of descent to use.

Writing

9 Use the conversation from Task 8 to fill out the pilot's log.

Pilot's Log

Pilot: _____

Flight: _____

Departure/Arrival cities: _____

Changes to flight plan? Y / N _____

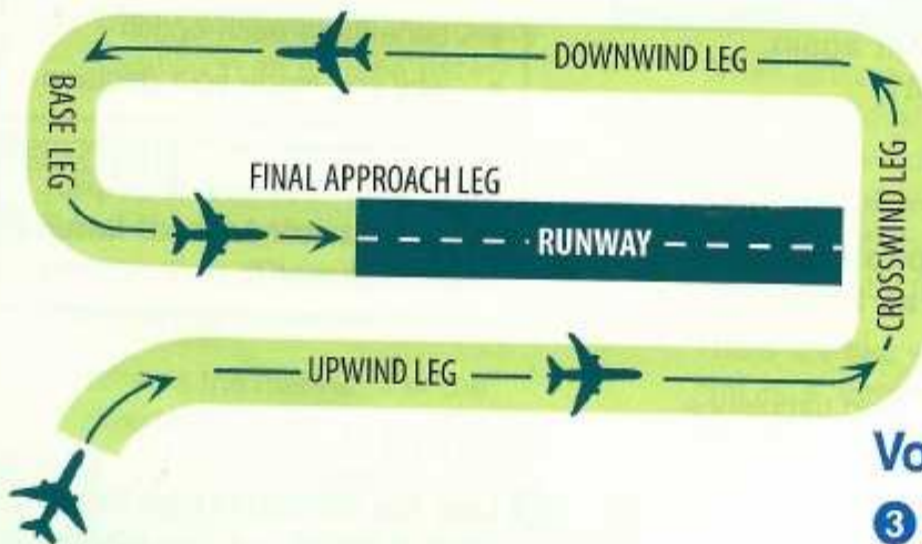
If yes, why did the flight change? _____

LANDING

A smooth **approach** to a runway depends on several factors. As a pilot, you must establish the correct **landing configuration** and **Vref**. These will depend on which part of the **landing pattern** you are in, and on the aircraft you are piloting. A standard rectangular landing pattern leads to good traffic control.

While cruising, your aircraft will be set to a **clean configuration**. On the **downwind leg**, you'll extend your flaps. This **extension** should be complete halfway through the downwind leg. By the time you reach the **base leg**, you should set **approach flap configuration**. Landing gear should be down, which will help **deceleration**.

In the **final approach leg**, the aircraft is aligned with the runway's centerline. Pitch and power adjustments may be necessary while landing. You should **flare** the plane right before touchdown. This final maneuver allows for a safer and smoother landing.



Get ready!

1 Before you read the passage, talk about these questions.

- 1 What is the last leg of landing pattern?
- 2 What are some other legs in a landing pattern?

Reading

2 Read the pilot's guide. Then, mark the following statements as true (T) or false (F).

- 1 Pilots should set a clean configuration for the downwind leg.
- 2 The landing gear will be down during the base leg.
- 3 Pilots should flare the aircraft at the start of the final approach leg.

Vocabulary

3 Match the words (1-8) with the definitions (A-H).

- | | |
|--|-------------------------------------|
| 1 <input type="checkbox"/> final approach leg | 5 <input type="checkbox"/> flare |
| 2 <input type="checkbox"/> landing configuration | 6 <input type="checkbox"/> Vref |
| 3 <input type="checkbox"/> upwind leg | 7 <input type="checkbox"/> approach |
| 4 <input type="checkbox"/> landing pattern | 8 <input type="checkbox"/> base leg |

- A the last part of a landing pattern
- B the second part of a landing pattern that approaches the end of a runway at a right angle
- C the arrangement of an aircraft's equipment where the flaps are fully extended, the landing gear is down, and the spoiler is retracted
- D the course followed when preparing to land an aircraft
- E the landing approach speed for an aircraft
- F a rectangular flight path which provides a way for aircraft to transition into an airport's space and land
- G the first part of a landing pattern
- H to switch to a landing altitude by increasing the angle of attack

4 Read the sentence pair. Choose where the words best fit the blanks.

1 approach flap configuration / clean configuration

- A All flaps are retracted in a(n) _____.
- B The _____ increases drag and slows planes.

2 extension / deceleration

- A Without proper _____, planes will be flying too fast upon landing.
- B Flap _____ helps planes reduce speed.

5 Listen and read the pilot's guide again. Why do pilots flare an airplane before touch down?

Listening

6 Listen to a conversation between an instructor and a student pilot. Choose the correct answers.

- 1 What is the conversation mainly about?
- A which landing configuration to use
- B the legs of the landing pattern
- C what speed to use on approach
- D when to lower the landing gear
- 2 What will the woman most likely do next?
- A lower the landing gear C extend flaps
- B turn ninety degrees D flare the plane

7 Listen again and complete the conversation.

Instructor: We're coming close to our approach, so let's review the 1 _____.

Student: Well, I remember that there are three legs: 2 _____, base, and final approach.

Instructor: That's right. Now, can you describe the downwind leg?

Student: That's when you fly 3 _____ at a 90 degree angle.

Instructor: Are 4 _____ that?

Student: Oh, wait. Is that the final approach leg?

Instructor: 5 _____. On the downwind leg, you're parallel to the runway. But you're going to turn 180 degrees before landing.

Student: 6 _____, _____. Then on the base leg you turn towards the runway.

Speaking

8 With a partner, act out the roles below based on Task 7. Then switch roles.

USE LANGUAGE SUCH AS:

Let's review the ...

On the downwind leg ...

It's where you ...

Student A: You are an instructor. Talk to Student B about:

- the landing pattern
- actions for each leg
- what happens before landing

Student B: You are a student pilot. Talk to Student A about the landing pattern.

Writing

9 Use the conversation from Task 8 and the pilot's guide to fill out the student's notes.



Landing Pattern

1st Leg: _____

Actions: _____

2nd Leg: _____

Actions: _____

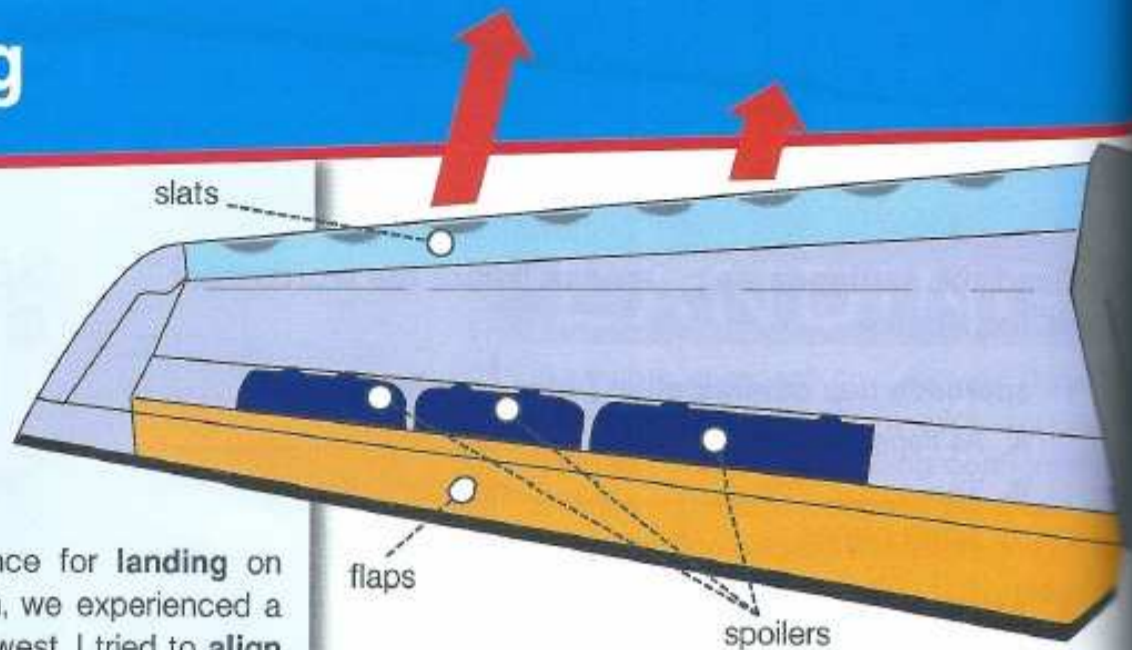
3rd Leg: _____

Actions: _____

Flight Log

Flight:	BlueSkies 907
Pilot:	Capt. Rachel Pierce
Flight Segment:	Landing

At 0810, we received ATC clearance for **landing** on Runway 1C. Just before **touchdown**, we experienced a sudden gust of wind from the southwest. I tried to **align** the **nosewheel** with the **centerline**, but the **crosswind** was too strong. We landed to the left of the centerline. I applied the **brakes** to avoid further **rollout**, but the runway surface was very wet and slick. I lost control and the aircraft entered a **skid**. I discontinued **reverse thrust** until the wheels were stable. I then regained control of the aircraft and extended the **spoilers** to assist slowdown. Fortunately, this aircraft requires a relatively short **stopping distance**, so we were able to stop well before the end of the runway. I slowed to an appropriate **taxiing speed** and proceeded to the terminal. The aircraft did not sustain any damage during landing.



Get ready!

1 Before you read the passage, talk about these questions.

- 1 What weather can make a landing dangerous?
- 2 What part of an plane's wing is extended during landing to slow the plane down?

Reading

2 Read the flight log on landing. Then, mark the following statements as true (T) or false (F).

- 1 The pilot encountered a problem right before touchdown.
- 2 The pilot had to retract the spoilers until she regained control.
- 3 The crosswind caused damage to the aircraft.

Vocabulary

3 Match the words (1-8) with the definitions (A-H).

- | | |
|--------------------------------------|--|
| 1 <input type="checkbox"/> align | 5 <input type="checkbox"/> nosewheel |
| 2 <input type="checkbox"/> spoiler | 6 <input type="checkbox"/> touchdown |
| 3 <input type="checkbox"/> landing | 7 <input type="checkbox"/> taxiing speed |
| 4 <input type="checkbox"/> crosswind | 8 <input type="checkbox"/> stopping distance |

- A the process of returning to the ground
- B a part of an aircraft wing that increases drag
- C length of runway needed for a total stop
- D the moment when an aircraft makes contact with the ground
- E to bring something into place
- F a wind blowing across the direction of travel
- G the front part of an aircraft that touches the ground last
- H the speed at which an aircraft travels on the ground

4 Place the words and phrases from the word bank under the correct headings.

Word BANK

centerline reverse thrust
rollout brakes skid

Speed Reducers	Landing Problems	Part of a Runway

5 Listen and read the flight log on landing again. What caused the airplane to enter a skid?

Listening

6 Listen to a conversation between a pilot and a co-pilot. Check (✓) the instructions that the man gives the woman.

- 1 Extend landing gear.
- 2 Prepare for touchdown.
- 3 Bring reverse thrust to 80%.
- 4 Ease up on brakes.
- 5 Approach taxiing speed.

7 Listen again and complete the conversation.

Co-pilot: Reducing speed. 1 _____ for touchdown.

Pilot: Okay, aligning nosewheel to centerline. Prepare 2 _____.

Co-pilot: All conditions are stable. Standing by for touchdown.

Pilot: Touchdown complete. Apply brakes and 3 _____ to eighty percent.

Co-pilot: Reverse thrust at eighty percent, approaching 4 _____. How are we doing?

Pilot: Hold on, I think we might enter a skid.

Co-pilot: 5 _____ the brakes. Is that better?

Pilot: Okay, I think we're 6 _____.

Speaking

8 With a partner, act out the roles below based on Task 7. Then switch roles.

USE LANGUAGE SUCH AS:

- Extend ...
- Standing by ...
- Ease up ...

Student A: You are a pilot. Talk to Student B about:

- landing
- your instructions
- correcting a problem

Student B: You are a co-pilot. Talk to Student A about landing.

Writing

9 Use the conversation from Task 8 and the flight log to fill out the pilot's flight log.

Pilot's Flight Log

Flight: BlueSkies 1029

Pilot: Capt. Arnold Reyes

Flight Segment: Landing

Before touchdown, _____

After touchdown _____

Glossary

- actuator** [N-COUNT-U9] An **actuator** is a device that converts energy into force or movement.
- adjust** [V-T-U11] To **adjust** something is to change something's setting or position.
- air traffic** [N-UNCOUNT-U1] **Air traffic** is all aircraft that are active in a particular area at a particular time.
- air traffic control (ATC)** [U1] **Air traffic control (ATC)** is a service through which controllers on the ground direct both taxiing and in-flight aircraft in the area.
- airport marking** [N-COUNT-U6] An **airport marking** is a sign painted on an airport's pavement that informs or directs pilots during takeoff, landing, and taxiing.
- airways routing** [N-UNCOUNT-U2] **Airways routing** is the use of pre-determined aircraft pathways, or airways.
- align** [V-T-U15] To **align** something is to bring something into place or in line with something else.
- approach** [N-COUNT-U14] An **approach** is the course followed when preparing to land an aircraft.
- approach flap configuration** [PHRASE-U14] An **approach flap configuration** is the arrangement of an aircraft's equipment where the flaps are not fully extended and the landing gear is down.
- atmospheric pressure** [N-UNCOUNT-U3] **Atmospheric pressure** is the amount of force exerted by the atmosphere's weight and decreases as altitude rises.
- base leg** [N-COUNT-U14] A **base leg** follows the downwind leg, and is a descending flight path that is short and approaches the end of a runway at a right angle.
- best rate of climb** [PHRASE-U8] A **best rate of climb** is the climbing method that gets a plane to altitude most quickly.
- block time** [N-UNCOUNT-U2] **Block time** is the time of an aircraft's journey from the moment it begins taxiing before takeoff until the moment it reaches its final parked position after landing.
- brake check** [N-PL-U6] A **brake check** is a procedure in which a pilot activates an aircraft's brakes immediately after the aircraft begins taxiing to ensure that the brakes are functioning correctly.
- brakes** [N-PL-U15] **Brakes** are devices on an aircraft or other vehicle used to reduce speed or stop.
- buffet boundary** [N-COUNT-U10] A **buffet boundary** is a speed at which an aircraft experiences instability due to a separation of airflow from the surface of the aircraft.
- burn-off** [N-UNCOUNT-U2] **Burn-off** is the process of using fuel, which reduces the weight of an aircraft.
- centerline** [N-COUNT-U15] A **centerline** is a marking down the middle of a runway to indicate the path that the nosewheel should travel along during landing.
- center-stored flight plan system** [PHRASE-U2] A **center-stored flight plan system** is a computer database from which pilots can obtain pre-made flight plans for any route and aircraft type.
- clean configuration** [N-COUNT-U14] A **clean configuration** is the arrangement of an aircraft's equipment in which the flaps, landing gear, and spoilers are all retracted.
- clearance delivery** [N-UNCOUNT-U1] **Clearance delivery** is permission by air traffic control for an aircraft to land or take off using a prescribed runway space.
- climb restriction** [N-COUNT-U8] A **climb restriction** is a limit for how high a plane can climb while taking off from an airport.
- climb thrust** [N-UNCOUNT-U8] **Climb thrust** is the amount of power that pushes the plane up when it is ascending.
- cloud** [N-COUNT-U5] A **cloud** is a collection of water or ice particles that are visible in the sky.
- cockpit check** [N-COUNT-U4] A **cockpit check** is a pre-flight check in which crew members examine cockpit equipment and instruments to ensure that they are functioning correctly.
- collision** [N-COUNT-U1] A **collision** is an incident in which two people or objects are too close together and strike one another.
- conflict** [N-COUNT-U12] A **conflict** is a loss of separation between two aircraft.
- constant** [ADJ-U11] If something is **constant**, it does not change.
- controller** [N-COUNT-U1] A **controller** is a person who works in air traffic control and directs aircraft.
- cross-check** [V-T-U11] To **cross-check** something is to verify information from one instrument with data from another instrument or method of measurement.
- crosswind** [N-COUNT-U15] A **crosswind** is a wind that blows sideways across an aircraft's direction of travel.

cruise [N-UNCOUNT-U10] **Cruise** is the phase of aircraft travel in which the aircraft is at a steady altitude and speed.

cruise regime [N-COUNT-U10] A **cruise regime** is a type or method of cruise, characterized by its typical speed and level of fuel consumption.

deceleration [N-UNCOUNT-U14] **Deceleration** is the act of decreasing speed.

descend [V-I-U13] To **descend** is to move down in altitude, from high to low.

descent [N-COUNT-U13] A **descent** is the act of moving from high altitude to low.

direct [V-T-U1] To **direct** someone is to tell that person what to do.

distance to altitude [PHRASE-U8] **Distance to altitude** is the preferred en route speed that can be used for any weight and temperature and covers the most distance while in climb.

downwind leg [N-COUNT-U14] A **downwind leg** is a level flight path that runs parallel to the landing runway, but in the opposite direction to how the aircraft will land.

efficiency [N-UNCOUNT-U6] **Efficiency** is a measure of how well something is used.

efficient [ADJ-U10] If something is **efficient**, it achieves the best result while using the least amount of material, such as fuel.

electro-hydraulic servo valve [N-COUNT-U9] An **electro-hydraulic servo valve** is a valve that controls the flow of hydraulic fluid into an actuator.

emergency descent [N-COUNT-U13] An **emergency descent** is a rapid drop from high altitude to low altitude due to safety concerns.

emergency equipment check [N-COUNT-U4] An **emergency equipment check** is a pre-flight check in which crew members examine all emergency safety devices on an aircraft to ensure that they are functioning correctly.

encounter [V-T-U12] To **encounter** something is to approach or go through it.

excessive [ADJ-U4] If something is **excessive**, it is more than is necessary or acceptable.

extension [N-COUNT-U14] An **extension** is the range or degree to which a flap can be opened.

external [ADJ-U4] If something is **external**, it is located on the outside of an object.

fan blade [N-COUNT-U4] A **fan blade** is a spinning piece on an aircraft's turbofan.

final approach fix [N-COUNT-U13] A **final approach fix** is the geographical point where the final segment of an approach to a runway begins.

final approach leg [N-COUNT-U14] A **final approach leg** is the last part of the landing pattern, and is a flight path that follows the direction of the runway, along the centerline.

flare [V-T-U14] To **flare** an aircraft is to swift to a landing altitude by increasing the angle of attack.

flight envelope [N-COUNT-U9] A **flight envelope** is a set of specifications for safe flight, including an aircraft's maximum speed and altitude, as well as limitations on maneuverability.

flight envelope protection [N-UNCOUNT-U9] **Flight envelope protection** is an aircraft system that prevents a pilot from violating flight envelope limitations.

flight plan [N-COUNT-U2] A **flight plan** is a detailed account of an aircraft's journey, including route and aircraft specifications, compiled before the flight takes place.

fly-by-wire control system [N-COUNT-U9] A **fly-by-wire control system** is a flight control system that uses electricity to control the movement of flight mechanisms.

fog [N-UNCOUNT-U5] **Fog** is condensed water vapor, similar to a cloud that is close to or on the ground.

fuel [N-UNCOUNT-U2] **Fuel** is the substance that supplies an aircraft's power.

fuel consumption [N-UNCOUNT-U10] **Fuel consumption** is the rate at which fuel is used.

fuel flow [N-UNCOUNT-U10] **Fuel flow** is a measurement of fuel consumption expressed in pounds per hour.

fuel to altitude [PHRASE-U8] **Fuel to altitude** is a certain speed that is the most efficient mixture of climb, fuel burn-off, and distance.

ground time [N-UNCOUNT-U2] **Ground time** is the time necessary for an aircraft to undergo a maintenance check and other pre-flight procedures on the ground before takeoff.

gust [N-COUNT-U5] A **gust** is a sudden, strong increase in the speed of wind.

Glossary

- hail** [N-UNCOUNT-U5] **Hail** is pellets of ice that fall from the sky.
- high-speed cruise** [N-UNCOUNT-U10] **High-speed cruise** is very fast aircraft travel, usually with less efficient fuel consumption.
- high-speed descent** [N-COUNT-U13] A **high-speed descent** is a rapid drop from high altitude to low altitude.
- holding point** [N-COUNT-U7] A **holding point** is a location where an aircraft is required to stay until it receives permission from air traffic control to proceed.
- hydraulic circuit** [N-COUNT-U9] A **hydraulic circuit** is a system of pumps, valves, actuators, and other parts that uses hydraulic pressure to transmit force to flight mechanisms.
- hydro-mechanical control system** [U9] A **hydro-mechanical control system** is a flight control system that uses mechanical parts as well as hydraulic pressure to apply force on flight mechanisms.
- hydroplane** [V-I-U5] To **hydroplane** is to lose control of a vehicle when it skims the surface of a wet road.
- ice** [N-UNCOUNT-U5] **Ice** is water that is frozen in a solid form.
- inbound** [ADJ-U8] If a flight is **inbound**, it is coming towards an airport to land.
- indication** [N-COUNT-U11] An **indication** is something that serves as a signal or alert.
- instrument meteorological conditions (IMC)** [U3] **Instrument Meteorological Conditions (IMC)** are weather conditions where a pilot must use instruments to guide the aircraft.
- instrument scan** [N-COUNT-U11] An **instrument scan** is the process of reading flight positioning instruments to determine appropriate control changes.
- interpret** [V-T-U11] To **interpret** something is to determine the meaning of something.
- landing** [N-UNCOUNT-U15] **Landing** is the process of coming to rest on the ground after being in flight.
- landing configuration** [N-COUNT-U14] A **landing configuration** is the arrangement of an aircraft's equipment in which the flaps are fully extended, the landing gear is down, and the spoiler is retracted.
- landing pattern** [N-COUNT-U14] A **landing pattern** is a rectangular flight path which provides a way for aircraft to transition into an airport's space and to land smoothly.
- lateral separation** [N-UNCOUNT-U1] **Lateral separation** is the distance between two aircraft in horizontal space when the two aircraft are following parallel courses.
- local conflict** [N-COUNT-U12] A **local conflict** is an event in which multiple aircraft pass over a specific area at the same time.
- local control** [N-UNCOUNT-U1] **Local control** is the division of air traffic control that clears aircraft for landing and takeoff and ensures that separation always exists on runway surfaces.
- log book** [N-COUNT-U4] A **log book** is a document that an aircraft's crew uses to keep an aircraft's records in order, including checks, repairs, and maintenance.
- long-range climb** [N-COUNT-U8] A **long-range climb** is a climb method that provides the most efficient mixture of climb, fuel burn-off, and distance.
- longitudinal separation** [N-UNCOUNT-U1] **Longitudinal separation** is the separation of two aircraft in horizontal space by time or distance if the aircraft are following the same route and are not laterally separated.
- long-range cruise** [N-UNCOUNT-U10] **Long-range cruise** is aircraft travel designed for maximum fuel efficiency, usually at slower speeds.
- long-range descent** [N-COUNT-U13] A **long-range descent** is a descent in which an aircraft stays at a higher altitude for a longer period of time and descends gradually.
- loss of separation** [N-COUNT-U12] A **loss of separation** is an event in which two aircraft come too close to one another.
- mach number** [N-COUNT-U8] The **mach number** is the proportion of the speed of sound to the speed at which an object is moving.
- maintenance** [N-UNCOUNT-U4] **Maintenance** is general upkeep of an aircraft or other device.
- manually** [ADV-U9] If something is done **manually**, it is operated by a person directly, without the aid of machines or electrical power.
- mechanical circuit** [N-COUNT-U9] A **mechanical circuit** is a system of cables, pulleys, counterweights, and other mechanical parts that transmits force from cockpit controls to flight mechanisms.

mechanical control system [N-COUNT-U9] A **mechanical control system** is a flight control system that uses a series of mechanical parts to apply force directly from cockpit controls to the flight mechanisms.

meteorology [N-UNCOUNT-U3] **Meteorology** is a science that deals with atmospheric phenomena and especially with weather and weather forecasting.

minimum [ADJ-U1] If something is the **minimum**, it is the smallest amount or distance allowed.

MTOM [U12] **MTOM** (*Maximum Takeoff Mass*) is the maximum weight a specific aircraft can weigh and continue to meet all safety requirements for takeoff and flight.

NTOPF [U7] A **NTOPF** (*Net Takeoff Flight Path*) is a vertical profile of the path an aircraft should take during takeoff, from the ground to its minimum height for safe flight.

normal high speed climb [PHRASE-U8] A **normal high speed climb** is the preferred en route speed that can be used for any weight and temperature and covers the most distance while in climb.

nosewheel [N-COUNT-U15] A **nosewheel** is a wheel on the front of an aircraft that touches the ground last during landing.

NOTAM [U1] A **NOTAM** (*Notice To Airmen*) is an informational (rather than instructional) advisory that air traffic control may provide to aircraft.

off-to-on time [PHRASE-U2] **Off-to-on time** is the time from the moment an aircraft lifts off to the time it touches down.

opposite conflict [N-COUNT-U12] An **opposite conflict** is an event in which an aircraft comes too close to another aircraft while heading towards the other aircraft.

optimum altitude [N-UNCOUNT-U10] **Optimum altitude** is the best height at which an aircraft should travel to maintain good fuel efficiency.

override [V-T-U9] To **override** something is to stop an automatic function.

overspeed clacker warning [N-COUNT-U10] An **overspeed clacker warning** is an alert that notifies a pilot when an aircraft exceeds a particular speed limit.

payload [N-COUNT-U2] A **payload** is an aircraft's carrying capacity including all cargo, passengers, fuel, instruments, etc.

pounds per hour [PHRASE-U2] **Pounds per hour** is the measure of how many pounds of fuel an aircraft will burn off within one hour.

pounds per minute [PHRASE-U2] **Pounds per minute** is the measure of how many pounds of fuel an aircraft will burn off within one minute.

precipitation [N-UNCOUNT-U3] **Precipitation** is any form of moisture falling to the ground.

predict [V-T-U3] To **predict** an event is to guess or assume what will happen based on given information.

pre-flight [ADJ-U4] If something occurs **pre-flight**, it occurs before an aircraft takes off.

primary instrument [N-COUNT-U11] A **primary instrument** is an instrument that measures a flight factor that will not change during the particular maneuver being performed.

push-back [N-UNCOUNT-U6] **Push-back** is a procedure in which an aircraft is pushed away from an airport gate by external power.

radar [N-UNCOUNT-U1] **Radar** is a sensory system that identifies the position, direction, and speed of an aircraft or other object.

rain [N-UNCOUNT-U5] **Rain** is drops of water that fall from clouds.

range constant [N-COUNT-U10] A **range constant** is a measurement of fuel efficiency expressed in miles per pound of fuel times the fuel weight.

rapid depressurization [N-UNCOUNT-U13] **Rapid depressurization** is the sudden reduction of air pressure in an aircraft.

rate of descent [N-COUNT-U13] A **rate of descent** is the speed at which an aircraft descends, usually measured in feet per minute.

read [V-T-U11] To **read** something is to take information, such as a measurement, from something.

recommended cruise [N-UNCOUNT-U10] **Recommended cruise** is aircraft travel at a speed that allows for more efficient fuel consumption than high-speed cruise.

Glossary

- redundancy** [N-UNCOUNT-U9] **Redundancy** is the state of having two or more parts that control the same function in case one part fails.
- retraction** [N-UNCOUNT-U7] **Retraction** is the process of pulling something, such as landing gear, back into an aircraft during flight.
- reverse thrust** [N-UNCOUNT-U15] **Reverse thrust** is a force produced in the opposite direction of an aircraft's travel, needed to slow the aircraft.
- rolling takeoff** [N-COUNT-U7] A **rolling takeoff** is a takeoff in which an aircraft's brakes are released right away and the aircraft taxis and takes off in a smooth, continuous movement.
- rollout** [N-UNCOUNT-U15] **Rollout** is an uncontrolled movement of an aircraft in which the aircraft rolls off the correct course on a runway.
- route** [N-COUNT-U2] A **route** is an established course of travel.
- runway contamination** [N-UNCOUNT-U5] **Runway contamination** is any material that negatively affects the takeoff or landing of an airplane.
- secondary instrument** [N-COUNT-U11] A **secondary instrument** is an instrument that measures a flight factor that will change during the particular maneuver being performed.
- segment 1** [PHRASE-U7] **Segment 1** is the phase in the NTOFP in which an aircraft leaves the ground, gathers speed, and retracts landing gear.
- segment 2** [PHRASE-U7] **Segment 2** is the phase in the NTOFP in which an aircraft climbs to a height safe for retracting the flaps.
- segment 3** [PHRASE-U7] *Segment 3 is the phase in the NTOFP in which an aircraft retracts its flaps and accelerates to safe climbing speed.*
- segment 4** [PHRASE-U7] **Segment 4** is the phase in the NTOFP in which an aircraft climbs to 1500 feet or higher.
- separation** [N-UNCOUNT-U12] **Separation** is the concept of keeping an aircraft outside a minimum distance from another aircraft, to reduce the risk of accidents.
- servo tab** [N-COUNT-U9] A **servo tab** is a hinged part of an aircraft surface that makes movement easier to control.
- skid** [N-COUNT-U15] A **skid** is an uncontrolled movement of an aircraft in which an aircraft slides along the ground instead of rolling.
- slush** [N-UNCOUNT-U5] **Slush** is ice or snow that is partly melted and watery.
- snow** [N-UNCOUNT-U5] **Snow** is water vapor frozen into ice crystals which often falls in flakes.
- speed brake** [N-COUNT-U13] A **speed brake** is a device that controls the speed of an aircraft when descending or landing.
- spoiler** [N-COUNT-U15] A **spoiler** is a part of an aircraft wing that can be extended to increase drag and slow the aircraft.
- steer** [V-T-U6] To **steer** an aircraft is to control its movements.
- stopping distance** [N-UNCOUNT-U15] **Stopping distance** is the length of runway needed for an aircraft to land and come to a complete stop.
- storm** [N-COUNT-U5] A **storm** is a serious disturbance of the atmosphere with high winds, thunder and lightning, and heavy rain, snow or hail.
- surface damage** [N-UNCOUNT-U4] **Surface damage** is damage that is clearly visible on an aircraft's exterior.
- takeoff** [N-UNCOUNT-U7] **Takeoff** is an aircraft's process of leaving the ground and beginning to fly.
- taxi** [V-I-U6] To **taxi** is to move on the ground, specifically for aircraft. An aircraft that is taxiing is moving using its own power.
- taxiing speed** [N-COUNT-U15] **Taxiing speed** is the speed at which an aircraft travels along the ground before coming to a stop.
- temperature** [N-UNCOUNT-U3] **Temperature** is a measurement of the amount of heat or cold in the air.
- thrust** [N-UNCOUNT-U6] **Thrust** is the force created by an aircraft engine's exhaust blasting backward, pushing the aircraft forward.

tiller wheel [N-COUNT-U6] The **tiller wheel** of an aircraft is the small steering wheel in the cockpit that is used to steer the nosewheel.

time en route [PHRASE-U2] **Time en route** is the time of an aircraft's journey from takeoff to landing.

time to altitude [PHRASE-U8] **Time to altitude** is the climbing method that gets a plane to altitude most quickly.

tire check [N-COUNT-U4] A **tire check** is a pre-flight check in which crew members examine the tires on an aircraft's wheels to ensure that they are safe and functional.

touchdown [N-UNCOUNT-U15] **Touchdown** is the moment during landing when an aircraft makes contact with the ground.

tow [V-T-U6] To **tow** an aircraft is to pull it along a runway.

traffic [N-UNCOUNT-U12] **Traffic** is the movement of aircraft which is managed by air traffic control communications.

traffic collision avoidance system [N-COUNT-U12] A **traffic collision avoidance system** is a warning system on aircraft that notifies pilots of other aircraft that may be too close or on a collision course.

trim [N-UNCOUNT-U11] **Trim** is the process of changing the position of an aircraft part to affect aircraft movement.

tug [N-COUNT-U6] A **tug** is an airport vehicle that performs push-back.

tunnel departure [N-COUNT-U8] A **tunnel departure** is a climb method that requires a pilot to fly the plane at a low altitude to avoid incoming air traffic flying at a higher altitude.

V1 [U7] **V1** is the speed at which a pilot must identify any critical engine failure so he or she can either commit to or abort takeoff.

V2 [U7] **V2** is the speed at which an aircraft can take off safely if one engine has become inoperative.

Vb speed [N-UNCOUNT-U8] The **Vb speed** is the turbulence penetration speed, the highest speed at which turbulence or a sudden burst of wind will not overwhelm the plane.

vertical separation [N-UNCOUNT-U1] **Vertical separation** is the distance between two aircraft in vertical space or the difference in altitude.

visibility [N-UNCOUNT-U3] **Visibility** is the measurement of the distance one can see in bad weather conditions.

visual meteorological conditions (VMC) [U3] **Visual Meteorological Conditions (VMC)** are the weather circumstances in which pilots can see adequately to fly a plane.

Vlo [U7] **Vlo** is the maximum speed at which an aircraft's landing gear can safely be operated.

Vmo [U13] **Vmo**, or maximum operating limit speed, is a speed that may not be exceeded during any part of a flight.

Vr [U7] **Vr** is the speed at which an aircraft leaves the ground.

Vref [U14] **Vref** is the landing approach speed for an aircraft.

wake turbulence [N-UNCOUNT-U12] **Wake turbulence** is an air disturbance that an aircraft creates as it moves through air.

wake turbulence category [N-COUNT-U12] A **wake turbulence category** is a determination of the minimum amount of distance that should exist between aircraft based on each aircraft's weight.

walk-around [N-COUNT-U4] A **walk-around** is a pre-flight check in which the pilot or co-pilot examines an aircraft's exterior from the ground.

wear [N-UNCOUNT-U4] **Wear** is the gradual deterioration of something due to use.

weather forecast [N-COUNT-U3] A **weather forecast** states what the weather will most likely do during the day or week.

weather front [N-COUNT-U3] A **weather front** is a border that divides two masses of air that have different densities.

weather report [N-COUNT-U5] A **weather report** is a statement of climate conditions for an area.

wind direction [N-UNCOUNT-U5] **Wind direction** is a description of the direction that wind comes from.

wind speed [N-UNCOUNT-U3] **Wind speed** is the velocity at which the wind is blowing.

wingtip vortices [N-PL-U12] **Wingtip vortices** are spiraling wind disturbances created by wingtips at landing that remain stable in airspace for up to three minutes.

**CAREER
PATHS**

Civil Aviation

Book
3

Virginia Evans
Jenny Dooley
Jacob Esparza



Express Publishing

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1 Aerodynamics



Aerodynamic Basics:

Introduction

If you're going to fly, you need to understand **aerodynamics**. Scientists began learning about these **forces** and how they work centuries ago. **Bernoulli's Theory** and **Newton's laws of motion** helped build the foundation for aerodynamics. Since then, we've continued learning how these forces positively and negatively impact flight.

Heavier-than-air aircraft must **overcome gravity** and **drag**. These are negative influences because they hinder an aircraft in flight. Gravity pulls the plane back towards the ground. And drag makes it harder for the plane to move forward.

Scientists have learned how to combat these two forces by counteracting them. **Thrust** and **lift** are the two components that offset gravity and drag. Lift keeps the aircraft up and thrust keeps the aircraft moving forward.

All aircraft are designed to utilize natural forces to their advantage. They also have special features that help create thrust and lift. One of these features are the specially designed **airfoils**. Airfoils are designed to take advantage of **pressure** differences to create more thrust. But they can also be designed to reduce drag. Also affecting lift is the wings' **angle-of-attack**. The larger the angle is, the more the lift increases. This is just a brief overview of aerodynamics and how they impact flight. We will be looking at this topic more thoroughly in the upcoming chapters.



Get ready!

1 Before you read the passage, talk about these questions.

- 1 What is a force that acts on an airplane?
- 2 What force is needed to raise an aircraft off the ground?

Reading

2 Read the textbook section. Then, choose the correct answers.

- 1 What is the main purpose of the article?
A to introduce aerodynamics
B to define lift and drag
C to explain Bernoulli's Theory
D to explain how pilots fly
- 2 Which of the following has a negative effect on flight?
A drag
B pressure
C airfoils
D lift
- 3 Which of the following pushes a plane forward?
A lift
B thrust
C angle-of-attack
D airfoils

Vocabulary

3 Match the words (1-8) with the definitions (A-H).

- | | |
|------------------------|----------------------|
| 1 — aerodynamics | 5 — airfoils |
| 2 — gravity | 6 — pressure |
| 3 — Bernoulli's Theory | 7 — heavier-than-air |
| 4 — thrust | 8 — overcome |

- A a rounded wing that helps thrust
- B having more weight than the atmosphere an object displaces
- C the amount of force applied to a certain area
- D the force that pushes a plane forward
- E to be stronger than something
- F natural laws that govern flight
- G the force that attracts a body towards the centre of the earth
- H an idea explaining the relationship between speed and energy

4 Write a word that is similar in meaning to the underlined part.

- 1 The phenomena that impact flight are more intense during bad weather. f _ r c _ s
- 2 The class studied the laws of motion and their effect on moving objects. N e _ _ o n ' _ l _ _ s
- 3 The plane is designed to reduce energy that opposes an aircraft's velocity. _ r _ g
- 4 Engines help generate the energy that overcomes an aircraft's weight. l _ f _
- 5 The wing's position in relation to its motion was not located in the right place to generate lift. a n _ l _ - o _ - a t _ _ c k

5 Listen and read the textbook section again. What are some factors that impact flight?

Listening

6 Listen to a conversation between two student pilots. Mark the following statements as true (T) or false (F).

- 1 _ The woman received a bad grade on a test.
- 2 _ The woman confuses the effects of lift and thrust.
- 3 _ The man describes the effects of gravity.

7 Listen again and complete the conversation.

Woman: Hey Max. Would you mind reviewing some material with me before we take our test?

Man: Sure. What are you reviewing?

Woman: It's the 1 _____. I keep mixing them up.

Man: Oh, no problem. 2 _____ this way, two forces make an aircraft move, and two forces resist movement.

Woman: Okay. So the forces that make an aircraft move are thrust and lift.

Man: Exactly.

Woman: But I get confused when I think of what each does. 3 _____ a plane forward, right?

Man: No, that's thrust. It's used to 4 _____.

Woman: Are you sure? I thought that 5 _____ counteracted gravity.

Man: 6 _____. Think of it this way. Gravity pulls things down, yeah?

Speaking

8 With a partner, act out the roles below based on Task 7. Then switch roles.

USE LANGUAGE SUCH AS:

Would you mind reviewing ...

I get confused when ...

Think about ...

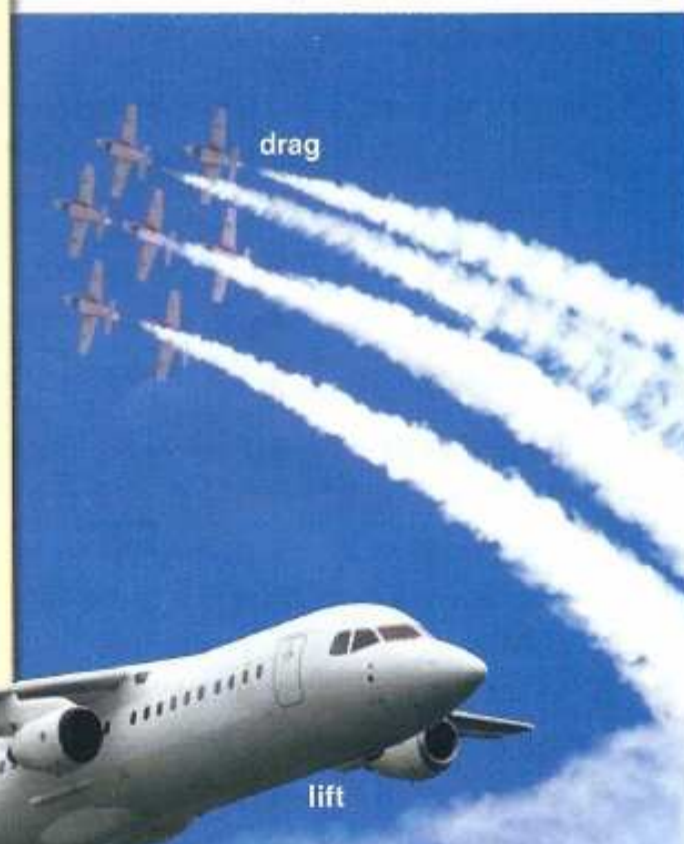
Student A: You are a student. Talk to Student B about:

- reviewing test material
- lift and thrust
- overcoming gravity or drag

Student B: You are a student. Talk to Student A about aerodynamic forces.

Writing

9 Use the conversation from Task 8 and the textbook passage to explain basic aerodynamic forces. Include: negative forces and how they are overcome to achieve flight.



2

Weight and balance



1.4 AN INTRODUCTION TO

WEIGHT and BALANCE

Get ready!

1 Before you read the passage, talk about these questions.

- 1 Apart from passengers what adds weight to a plane?
- 2 What measures the distance between a plane's reference datum and another part of the plane?

Reading

2 Read the training manual entry on weight and balance. Then, mark the following statements as true (T) or false (F).

- 1 Empty weight plus cargo, passengers, and fuel should not exceed maximum weight.
- 2 Reference datum is determined by adding the moments together.
- 3 Ballast should be added if an aircraft exceeds maximum weight.

Vocabulary

3 Match the words (1-8) with the definitions (A-H).

- | | |
|-----------------------------------|--|
| 1 <input type="checkbox"/> arm | 5 <input type="checkbox"/> CG limit |
| 2 <input type="checkbox"/> load | 6 <input type="checkbox"/> distribution |
| 3 <input type="checkbox"/> excess | 7 <input type="checkbox"/> empty weight |
| 4 <input type="checkbox"/> moment | 8 <input type="checkbox"/> center of gravity |

- A the weight of an aircraft itself
- B the point where all weight is balanced
- C the division or spread of something
- D the distance from an object to the reference datum
- E to put items or materials into something
- F the force produced by an object
- G an amount of something that is too much
- H a restriction on the amount and location of weight

Every pilot must understand how the weight of an aircraft affects flight. This chapter will give you an overview of key concepts that will keep you flying smoothly.

When you **load** an aircraft, you must be careful. The **total gross weight** can't be in **excess** of the aircraft's **maximum weight**. This means that you must know the aircraft's **empty weight** first. Then you can calculate the total by adding the weight of **cargo**, passengers, and fuel.

The amount of weight is not the only consideration when you load an aircraft. You must also pay attention to the **distribution** of weight. An aircraft without proper **balance** can be dangerously unstable in the air, or might not get off the ground at all.

To ensure balance, you must know the aircraft's **center of gravity**. To calculate this, find the **reference datum** in the aircraft manual. Use it to measure the **arms** of every object in the aircraft. Then, multiply each object's arm by its weight to determine **moment**. Add all the moments together. Then divide the total moment by the weight of the aircraft.

If your resulting number is greater than the **CG limit** provided in your aircraft manual, you must remove or redistribute weight before flight. You might need to add **ballast** if the weight is below maximum but is unevenly distributed.

4 Fill in the blanks with the correct words and phrases from the word bank.

Word BANK

reference datum cargo
maximum weight ballast
balance total gross weight

- 1 Some passengers must take the next flight because we've already reached _____.
- 2 The pilot forgot to include the weight of fuel when calculating _____.
- 3 This flight's _____ includes passenger luggage and some large crates.
- 4 If the aircraft is off _____, it might not take off properly.
- 5 The invisible line down the middle of the aircraft is known as the _____.
- 6 We need to add _____ at the rear to even out the extra weight at the front.

- 5 Listen and read the training manual entry on weight and balance again. What is the danger of an aircraft not being properly balanced?

Listening

- 6 Listen to a conversation between a pilot and a co-pilot. Choose the correct answers.

- 1 What weight did the woman forget to include in her calculations?
- A passengers C empty weight
B cargo D fuel
- 2 What will the woman likely do next?
- A recalculate the total gross weight
B remove cargo from the aircraft
C ask the passengers to take another flight
D add 2000 pounds of ballast to the aircraft

- 7 Listen again and complete the conversation.

Pilot: Hey, Danielle. I think we have a problem with 1 _____ on this flight.

Co-pilot: Are you sure? I thought I calculated everything pretty carefully.

Pilot: You were close, but you forgot to include the weight 2 _____.

Co-pilot: Oh, you're right. I'm sorry, that was careless. Have you recalculated?

Pilot: Yes, and it doesn't look good. It brings our 3 _____ to 327,000 pounds.

Co-pilot: Let me see ... So that means our 4 _____ is 90 inches behind the reference datum.

Pilot: Right. And that exceeds the CG limit. But even if we adjust distribution, 327,000 is still over our maximum weight.

Co-pilot: Can any of the passengers take 5 _____?

Pilot: I 6 _____, but they're all part of the same group.

Speaking

- 8 With a partner, act out the roles below based on Task 7. Then switch roles.

USE LANGUAGE SUCH AS:

I thought I ...

You forgot to ...

I wish we could, but ...

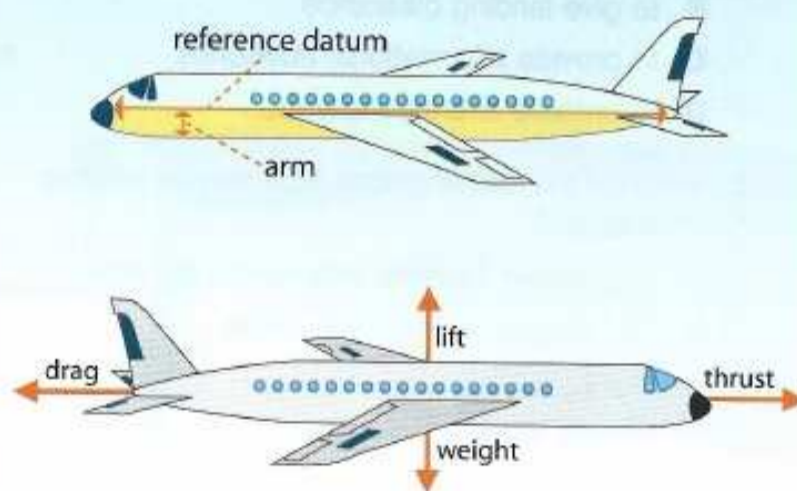
Student A: You are a pilot. Talk to Student B about:

- an aircraft's weight and balance
- a miscalculation
- how to reduce aircraft weight

Student B: You are a co-pilot. Talk to Student A about an aircraft's weight and balance.

Writing

- 9 Use the conversation from task 8 and the training manual to fill out the pilot's flight adjustment report. Include a description of a problem with weight distribution and how the problem was solved.



3 Broadcasts

COMMON AVIATION BROADCASTS AND SERVICES



Get ready!

- 1 Before you read the passage, talk about these questions.
 - 1 What are some services providing information to pilots?
 - 2 What type of station monitors the weather?

Reading

- 2 Read the list of flight broadcasts and services. Then, choose the correct answers.
 - 1 What is the purpose of a Flight Service Station?
 - A to give instructions to pilots
 - B to give landing clearance
 - C to provide informational advisories
 - D to enforce aircraft separation
 - 2 Which of the following does NOT provide weather information?
 - A Automated Terminal Information Service
 - B Air Navigation Service Provider
 - C Flight Watch
 - D Limited Weather Information System
 - 3 Why might a pilot need to use a remote communication device?
 - A to report a mechanical failure
 - B to receive landing clearance from Air Traffic Control
 - C to fill out an aircraft's log book
 - D to contact distant Flight Service Stations

General information services

ATIS: An Automated Terminal Information Service is a continuous broadcast providing non-control information in busy areas. This information may include weather and runway advisories.

FSS: A Flight Service Station is a facility that provides flight information to pilots. Note that a Flight Service Station cannot provide instructions or clearance.

AFSS: An Automated Flight Service Station serves the same function as an FSS. The information in this broadcast is automated.

Weather services

AWOS: An Automated Weather Observation System is a weather station providing complete weather data.

LWIS: A Limited Weather Information System is a weather station providing limited weather data like temperature and dew point.

Flight Watch: Provides pilots with in-flight weather updates, and collects weather reports from pilots.

Separation services

TRSA: A Terminal Radar Service Area is an area where pilots can access Air Traffic Control services. This is usually a major airport area.

ANSP: An Air Navigation Service Provider is an organization that maintains aircraft separation in a specific area. These organizations represent state governments.

Remote communication devices

RCO: A Remote Communication Outlet allows pilots to communicate with remote Flight Service Stations while in flight.

GCO: A Ground Communication Outlet allows pilots to communicate with remote Flight Service Stations while on the ground.

Vocabulary

- 3 Match the words (1-4) with the definitions (A-D).

- | | | | |
|---|----------------|---|--------|
| 1 | — ATIS | 3 | — LWIS |
| 2 | — Flight Watch | 4 | — GCO |

- A a service that provides pilots with en route weather updates and collects weather reports from pilots
- B an automated sensor station on the ground that collects and disseminates basic weather data such as temperature and wind
- C a device that allows pilots on the ground to contact remote air traffic control facilities or Flight Service Stations
- D an ongoing broadcast of non-control information in busy airport areas, such as weather and active runway information

4 Read the sentence pair. Choose where the words best fit the blanks.

1 AWOS / ANSP

- A An _____ must enforce aircraft separation.
B An _____ provides complete weather data.

2 FSS / TRSA

- A A(n) _____ provides information, but never instructions.
B It's important for pilots to know which _____ they are flying in.

3 RCO / AFSS

- A Captain Rogers asked his co-pilot to contact a(n) _____ for flight information.
B The co-pilot needed to use a(n) _____ because the aircraft was flying in a remote area.

5 Listen and read the list of flight broadcasts and services again. What is the difference between AWOS and LWIS?

Listening

6 Listen to a conversation between a flight student and instructor. Mark the following statements as true (T) or false (F).

- ___ The woman can't remember what AWOS stands for.
- ___ The woman doesn't understand the difference between an FSS and air traffic control.
- ___ Flight Watch and AWOS perform the same function.

7 Listen again and complete the conversation.

Student: Mr. Jennings, can I ask you 1 _____ questions?

Instructor: Of course, Kate. Is something 2 _____?

Student: I'm not sure about the differences between some of these 3 _____.

Instructor: Okay. Which ones 4 _____?

Student: First of all, what's the difference between a 5 _____ and air traffic control?

Instructor: Air traffic control has to give instructions and clearance. A Flight Service Station only provides information, but no instructions.

Student: Oh, okay. 6 _____.

Speaking

8 With a partner, act out the roles below based on Task 7. Then switch roles.

USE LANGUAGE SUCH AS:

Can I ask ...

I'm not sure about ...

What's the difference between ...

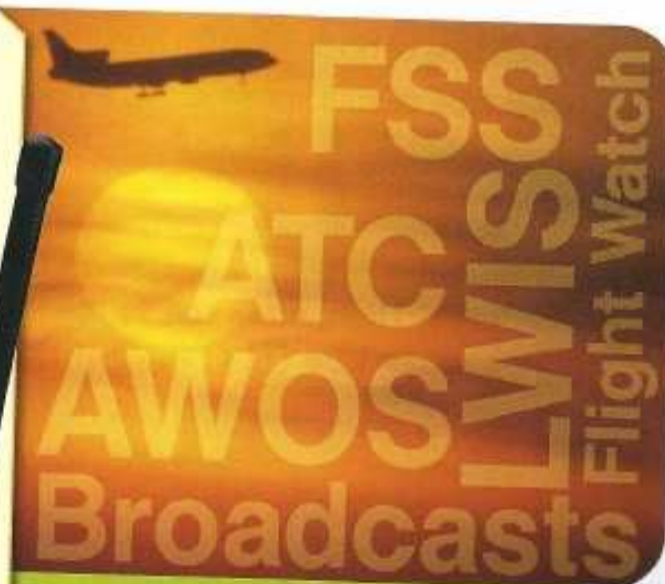
Student A: You are a student. Talk to Student B about:

- Flight Service Stations
- Air Traffic Control

Student B: You are an instructor. Talk to Student A about the differences between broadcast types.

Writing

9 Use the conversation from task 8 and the flight broadcast list to describe the function of different broadcasts and flight services. Include: FSS and ATC, Flight Watch, AWOS and LWIS.



RCO

HOLDING PROCEDURES

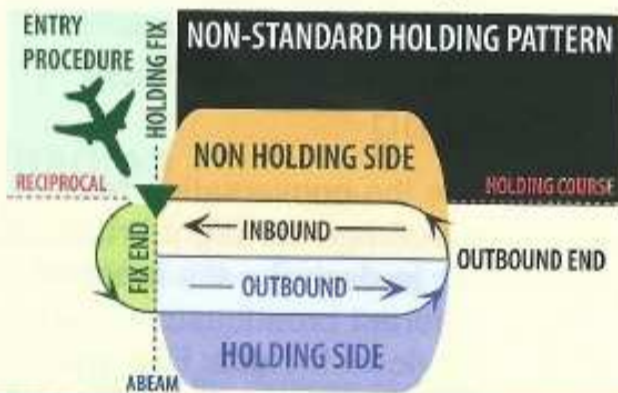
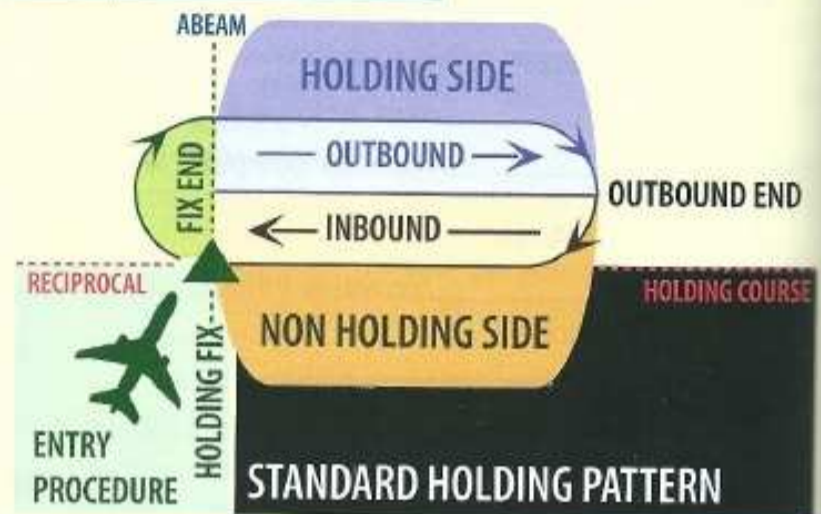
ATC Clearances - ATC issued clearances provide the information necessary for a specific hold. This includes information about the **holding fix**, **inbound course**, and holding pattern. ATC may give holding speeds in special circumstances to maintain separation.

Holding Fix - The holding fix is usually a **VOR**, **homing beacon**, **outer marker/compass locator**, a **DME** fix, or a **GPS** waypoint.

Maximum Holding Speed - Always cross the holding fix at or below maximum holding speed. Begin reducing airspeed to meet holding speed three minutes before entering the hold. Notify ATC immediately if you are unable to operate according to speed restrictions.

Holding Patterns - The most common holding pattern is referred to as the **racetrack pattern**. A **standard pattern** is shown in Figure 11.1. After entering the holding pattern, the pilot executes a 180° right turn onto the **outbound track**. Continue on this for one minute if at or below 14 000 ft ASL. Turn right onto the **inbound track**. If a **DME** leg is used instead of the standard one minute leg, **leg length** is defined in nautical miles. The ATC clearance always identifies **nonstandard patterns** as "non-standard" or "left-turns."

Entry Procedures - The proper entry procedure should always be determined upon arrival at the holding fix.



Vocabulary

3 Match the words (1-11) with the definitions (A-J).

- | | |
|-------------------------|----------------------|
| 1 ___ VOR | 8 ___ nonstandard |
| 2 ___ holding fix | 9 ___ outer marker/ |
| 3 ___ homing beacon | 10 ___ inbound track |
| 4 ___ entry procedure | 11 ___ GPS |
| 5 ___ racetrack pattern | |
| 6 ___ DME | |
| 7 ___ inbound course | |

- A the most common holding pattern
- B the direction of a holding pattern
- C a leg of a holding pattern that is flown towards the holding fix
- D a holding pattern that uses left turns
- E a radio navigation system that uses a composite signal and can be used as a holding fix
- F a sequence of steps by which an aircraft enters an existing holding pattern
- G a specified fix used as a reference point to mark the first turn and entrance to a holding pattern
- H a radio beacon used as a navigation tool and a holding fix
- I a radio navigation system that measures distance and can be used as a holding fix
- J a low-power radio beacon installed at the site of the outer marker of an instrument landing system
- K a system that can pinpoint receiver locations with satellites

Get ready!

1 Before you read the passage, talk about these questions.

- Which type of holding pattern features left turns?
- What type of station can act as a holding fix?

Reading

2 Read the pilot manual chapter on holding procedures. Then, mark the following statements as true (T) or false (F).

- ___ Holding clearances must include holding speeds.
- ___ DME holding fixes define leg lengths with distance instead of time.
- ___ Nonstandard patterns consist of left and right turns.

4 Read the sentence pair. Choose where the words best fit the blanks.

1 clearance / leg length

- A The _____ included information about maximum holding speed.
 B The _____ can be measured in either minutes or nautical miles.

2 standard pattern / hold

- A ATC issued a _____ for all incoming flights until the runways cleared.
 B A _____ always requires right-hand turns.

5 Listen and read the pilot manual chapter on holding procedures again. What kind of information does an ATC holding clearance contain?

Listening

6 Listen to a conversation between a pilot and an approach controller. Then, choose the correct answers.

- 1 What is the conversation mainly about?
 A correcting an error in a hold
 B providing hold instructions
 C clearing a pilot to exit a hold
 D discussing holding fix options
- 2 What will the woman most likely do next?
 A wait for further clearance
 B refresh her GPS system
 C lower her speed to conserve fuel
 D contact Tower for landing clearance

7 Listen again and complete the conversation.

Pilot: Portland Approach, request approach clearance.

Controller: Resson 612, unable. We have 1 _____ and delays on the ground.

Pilot: Portland Approach, Resson 612, understood. Request further 2 _____.

Controller: Resson 612, could be 3 _____ . How much fuel do you have remaining?

Pilot: 4 _____ three hours, Resson 612.

Controller: Resson 612, 5 _____ of the PTL VOR on the 360 radial, left turns, 12 800'.

Pilot: Resson 612 Hold north of the PTL VOR on the 360 radial 12,800.

Controller: Resson 612, expect 6 _____ 19:00.

Speaking

8 With a partner, act out the roles below based on Task 7. Then switch roles.

USE LANGUAGE SUCH AS:

Request ...

How much fuel ...

Hold north of the ... at ...

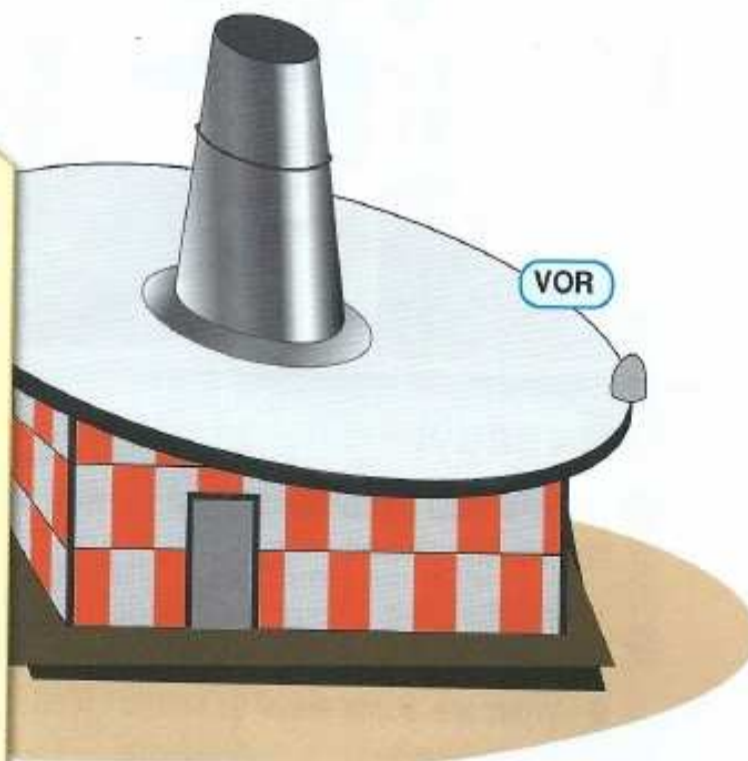
Student A: You are a pilot. Talk to Student B about:

- approach clearance
- fuel levels
- holding

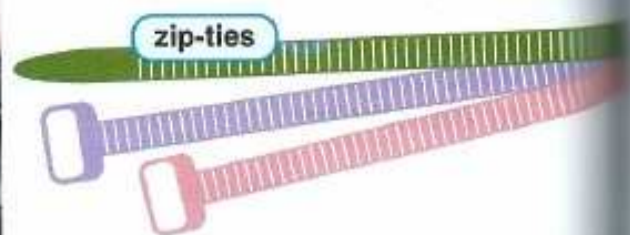
Student B: You are an approach controller. Talk to Student A about holding.

Writing

9 Use the conversation from Task 8 and the pilot manual to write a summary of holding procedures. Include: holding clearances, the information they contain, and types of fixes.



Global Airwaves Newsletter



Security Updates

In the last two months, Global Airwaves has experienced three separate security-related **incidents**. Thanks to the actions of our staff, each incident was resolved before more serious action was needed.

May 15 – A passenger boarded Flight 447 while **drunk** and caused a great deal of turmoil after takeoff.

May 29 – Flight 229 was **diverted** while en route to New York. This occurred because a passenger was **in possession of** a knife.

June 27 – An **air marshal arrested** a passenger who attempted to **assault** another passenger.

Global Airlines is increasing security and will request that additional air marshals be placed on more flights. We will also implement an awareness class for flight attendants and pilots. Until then, we ask that all employees stay alert to people behaving in a **suspicious** manner.

Immediately notify the air marshal of an **agitated** passenger. If a passenger acts **aggressively** towards employees or passengers, alert the pilot immediately. If a passenger becomes **abusive**, **handcuff** the person with a **zip-tie**. **Restrain** the passenger until security personnel are available.

We hope that our employees will not encounter any hazardous situations. But simply being aware could prevent a potentially life-threatening situation.



Get ready!

1 Before you read the passage, talk about these questions.

- 1 Whose job it is to prevent illegal actions on airplanes?
- 2 What are some ways to restrain a passenger on a plane?

Reading

2 Read the newsletter. Then, choose the correct answers.

- 1 What is the purpose of the article?
 - A to revise the company's security policy
 - B to explain mistakes made in security incidents
 - C to review security incidents and policies
 - D to explain the content of a security class
- 2 Which of the following incidents did NOT happen?
 - A An air marshal arrested a passenger.
 - B An airplane was diverted.
 - C A drunk passenger boarded a plane.
 - D A passenger physically harmed another passenger.
- 3 Which passengers should Global Airlines personnel restrain?
 - A passengers that are drunk
 - B passengers that are abusive
 - C passengers that are rude to flight staff
 - D passengers that are acting suspiciously

Vocabulary

3 Match the words (1-8) with the definitions (A-H).

- | | |
|-----------------|------------------|
| 1 __ incident | 5 __ restrain |
| 2 __ suspicious | 6 __ zip-tie |
| 3 __ divert | 7 __ air marshal |
| 4 __ agitated | 8 __ drunk |

- A to send in a different direction
- B to physically hold back
- C a state of mind caused by alcohol
- D nervous or upset
- E a person who provides security on a flight
- F a situation in which something bad or negative occurs
- G a plastic cable with ends that tie together
- H mistrustful or mysterious

4 Write a word that is similar in meaning to the underlined part.

- 1 Flight crews also provide safety from danger for all passengers. s _ c _ _ i t y
- 2 The provoking and antagonizing man attempted to hit the officer. a g _ r _ _ s _ v e
- 3 The air marshal found that the man was holding a weapon. i _ p o _ _ e s s _ o n _ f
- 4 The man physically harmed another person. _ s s _ u l _ _ d
- 5 The passenger was seized for breaking the law. a _ r e _ _ e d
- 6 The air marshal tied the hands of a drunk passenger. h _ n _ c u _ _ _ d

5 Listen and read the newsletter again. What will Global Airways do to try to prevent security incidents?

Listening

6 Listen to a conversation between a flight attendant and a pilot. Mark the following statements as true (T) or false (F).

- 1 ___ The unruly passenger hurt someone.
- 2 ___ The passenger was drunk before boarding the plane.
- 3 ___ The pilot plans to divert the flight because of the passenger.

7 Listen again and complete the conversation.

Flight Attendant: He's being very aggressive. Mike, Vicki, and I have tried to calm him, but it's only making him 1 _____.

Pilot: Has he been 2 _____ anyone?

Flight Attendant: Not physically, but he's been yelling and making threats. It's getting 3 _____.

Pilot: Well he can't stay on this flight if he won't 4 _____.

Flight Attendant: We've tried everything to 5 _____ . Nothing has worked. I think he was drunk before even he got on the plane.

Pilot: Get 6 _____ out of the storage area. Be ready to restrain him if he gets worse. I'll talk to ATC about diverting.

Speaking

8 With a partner, act out the roles below based on Task 7. Then switch roles.

USE LANGUAGE SUCH AS:

- Has he been ...*
- What should we do ...*
- Go get some ...*

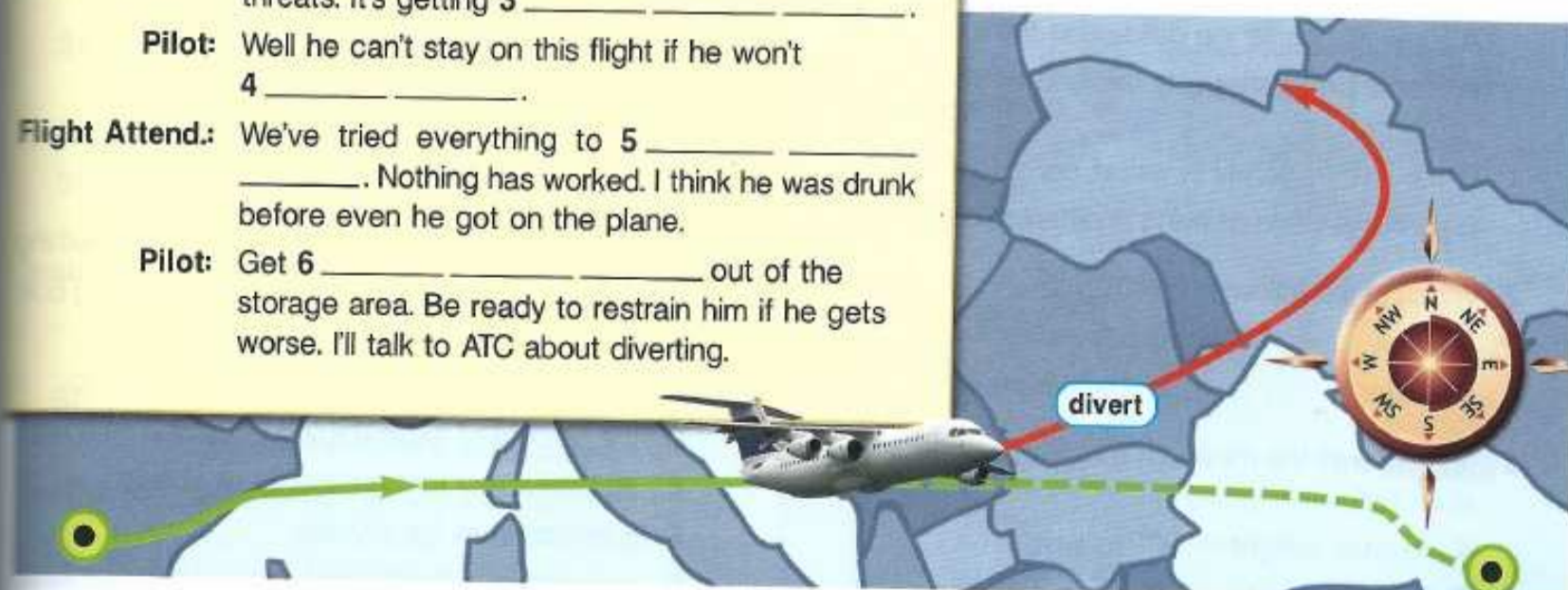
Student A: You are a flight attendant. Talk to Student B about:

- an unruly passenger
- how to deal with the passenger
- what to do after dealing with the passenger

Student B: You are a pilot. Talk to Student A about dealing with an unruly passenger.

Writing

9 Use the conversation from Task 8 and the newsletter to write a pilot's log entry about an unruly passenger. Include: the passenger's behavior, the flight crew's response, and how you resolved the problem.



6 Winter operations

Aviator Magazine

November edition

BY MIKE JOHNSON

Be Ready de-ice for the Cold

As a private pilot, you already know how lucky you are. You make your own schedule and avoid the pitfalls of commercial travel. Still, you need to be as careful in **winter operations** as any airline pilot. Here are some important tips for flying safely:



Will you start your flight in winter conditions? In a heated hangar, of course, **ice**, **frost** and snow won't **accumulate**. But if your plane is outside be sure to **de-ice** it with heat, water, or a **glycol**-based fluid. Glycol leaves a **slippery** film on the wing, so avoid walking on it after spraying. Be sure the **pitot tube** and **static port** are clear of ice, but don't allow any glycol to enter them. And don't forget to check the plane's **underside** for ice.

But you should be prepared for winter weather after takeoff, too. Turn on **wing anti-icing** before you enter the **icing range**.

Winter operations lead to reduced fuel efficiency. You might be tempted to **freight** low-cost fuel instead of purchasing more expensive fuel at a destination. But this isn't a good idea. Compute only the minimum **fuel load** necessary for your flight. Any extra weight could be a disadvantage if you have to land on an icy runway.

Get ready!

1 Before you read the passage, talk about these questions.

- 1 What are some winter weather conditions that can affect a plane?
- 2 What can be done to make a plane safe for flying in winter conditions?

Reading

2 Read the article on flying in winter conditions. Then, choose the correct answers.

- 1 What is the main idea of the article?
A how to handle ice build up in flight
B common errors pilots make in winter operations
C how to fly safely in winter conditions
D a comparison of flying in different conditions
- 2 Which of the following is NOT a de-icing method?
A heat C glycol
B water D hangar storage
- 3 Why should the minimum fuel load be carried in winter?
A to save weight C to save time
B to save money D to save space

Vocabulary

3 Match the words (1-7) with the definitions (A-G).

- | | | | |
|---|--------------|---|---------------------|
| 1 | — underside | 5 | — frost |
| 2 | — fuel load | 6 | — glycol |
| 3 | — freight | 7 | — winter operations |
| 4 | — pitot tube | | |

- A the side beneath, or on the bottom of something
B the procedures used to fly an aircraft during cold weather
C to carry something on an aircraft as cargo
D the amount of expendable fuel carried on a flight
E an instrument that measures air speed
F a thin layer of ice crystals
G a chemical in fluids used to de-ice an airplane

4 Read the sentence pair. Choose where the words best fit the blanks.

1 de-ice / wing anti-icing

A If a plane enters icing range, turn on the _____.

B Glycol is used to _____ an airplane.

2 accumulate / freight

A In a hangar, snow will not _____ on an aircraft.

B The pilot decided not to _____ extra fuel.

5 Listen and read the article on flying in winter conditions again. What methods can be used to de-ice a plane before take-off?

Listening

6 Listen to a conversation between a flight instructor and a student. Mark the following statements as true (T) or false (F).

- 1 ___ The woman has experience in winter operations.
- 2 ___ Heat from the engine prevents ice from forming in flight.
- 3 ___ During the flight, the aircraft will encounter icing conditions.

7 Listen again and complete the conversation.

Instructor: So, Michelle, is this your first 1 _____?

Student: Yup, and I'm a little anxious. 2 _____ everything again?

Instructor: Absolutely. What have we done so far?

Student: We've done the pre-flight checklist, and 3 _____ with that.

Instructor: What about the pre-heating and de-icing? 4 _____ how that was done?

Student: I did, but 5 _____ prevent ice from forming again?

Instructor: We'll turn on an anti-icing system 6 _____ enter the icing range.

Speaking

8 With a partner, act out the roles below based on Task 7. Then switch roles.

USE LANGUAGE SUCH AS:

Are you ready for your first ...

Did you see how ...

How do you prevent ...

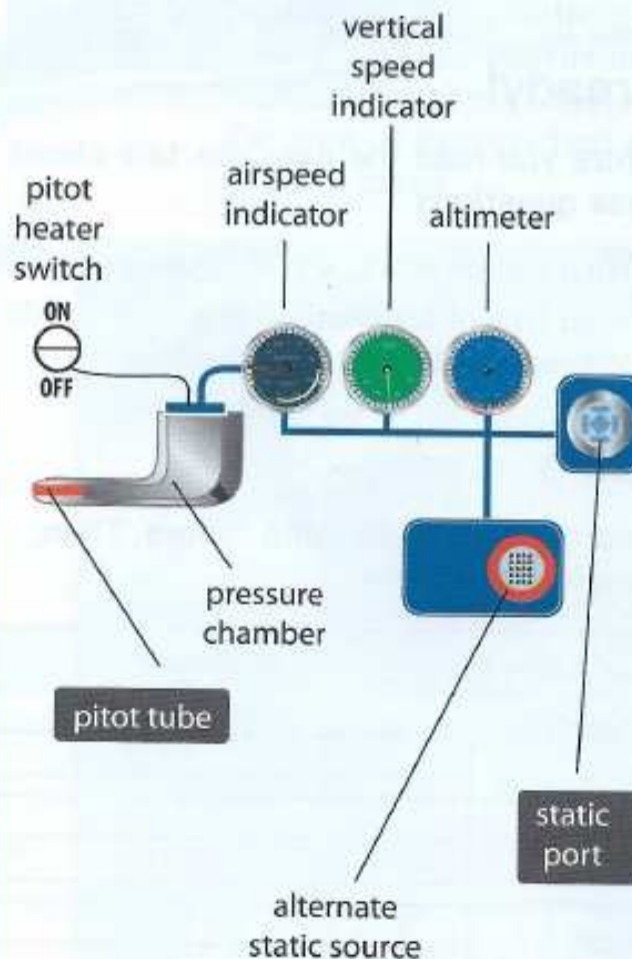
Student A: You are a flight instructor. Talk to Student B about:

- preparing for winter operations
- de-icing and wing anti-icing

Student B: You are taking flying lessons. Talk to Student A about winter operations.

Writing

9 Use the conversation from Task 8 and the article to write an article on winter operations. Include: pre-flight checks, de-icing methods, and fuel considerations.

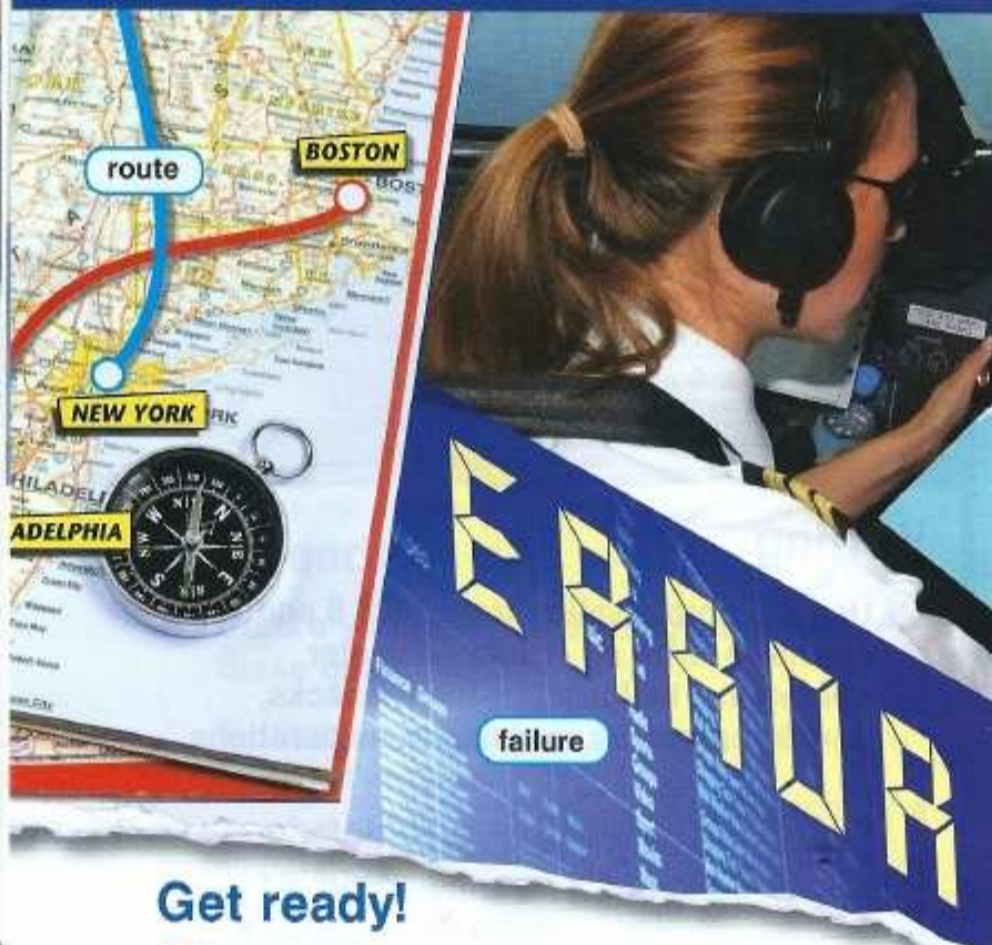


7 Radio failure

MODERN AVIATOR

How to handle radio failures

As a pilot, you know how important your radio is. So what would you do without it? Here are some tips and conventions for dealing with radio failures.



If you experience a **malfunction** with your **navigational radio**, use alternate navigational instruments to track your location using a **primary fix**. **Notify** air traffic control (ATC) of your location and provide frequent updates so they can keep track of where you are.

Problems with **two-way** radios can be trickier because you don't have direct **air-to-ground** communication. If you still have functioning navigational signals, such as **ADF**, proceed normally. ATC will still know where you are and provide **protection** for your flight. You can also continue to use signals from the **ILS receiver** to land safely, even when visibility is poor.

If you have lost all radio signals, you will need to fly very carefully. Follow any instructions from your last contact with ATC, and stick to your predetermined **route** and landing schedule. ATC will assume you are maintaining this route and will prevent other aircraft from crossing your path or interfering with landing.

Get ready!

1 Before you read the passage, talk about these questions.

- 1 What can go wrong with an airplane's radio?
- 2 What type of communication is used by ATC to keep in radio contact with planes?

Reading

2 Read the article on radio failure. Then, complete the table.

Type of Failure	Actions
Navigational Radio	
Two-Way Radio	
All Radio Signals	

Vocabulary

3 Choose the sentence that uses the underlined part correctly.

- 1 A The radio malfunction prevented all contact with ATC.
B There's a problem with the air-to-ground contact between the two aircraft.
- 2 A We should use the ILS receiver to notify ATC of our location.
B If the ADF still works, ATC can track where we are.
- 3 A I used the navigational radio to talk to the pilot.
B ATC is giving us flight protection by keeping other aircraft out of our way.

4 Match the words (1-8) with the definitions (A-H).

- | | |
|---------------|--------------------------|
| 1 ___ route | 5 ___ primary fix |
| 2 ___ notify | 6 ___ ILS receiver |
| 3 ___ failure | 7 ___ air-to-ground |
| 4 ___ two-way | 8 ___ navigational radio |

- A capable of sending and receiving messages
B to communicate something official
C a radio that transmits aircraft location
D a radio device that guides aircraft during landing
E the path that something travels along
F a situation in which something does not function correctly
G relating to communication between an aircraft and ATC
H a radio setting that communicates location with a signal from one station

5 Listen and read the article on radio failure again. What should a pilot do in case of two-way radio failure?

Listening

6 Listen to a conversation between a pilot and co-pilot. Mark the following statements as true (T) or false (F).

- ___ The man recommends holding until radio contact is re-established.
- ___ The cause of the radio failure is unknown.
- ___ The woman wants to begin descent on schedule.

7 Listen again and complete the conversation.

Pilot: Hey, Leo. I'm not 1 _____ from ATC.

Co-pilot: Hmm, it looks like we're not getting any 2 _____ - _____ at all on the two-way radio. Was there some kind of malfunction?

Pilot: I don't know, but we need to 3 _____ .

Co-pilot: This is really bad. What are we going to do?

Pilot: Relax, Leo. There's a procedure for this. Are we still 4 _____ the ILS receiver?

Co-pilot: Let me see. Yes, the ILS seems to be 5 _____ .

Pilot: Good. We need to maintain the route from our last 6 _____ . We should proceed at our current altitude until our scheduled approach time, and then we'll begin our descent.

Speaking

8 With a partner, act out the roles below based on Task 7. Then switch roles.

USE LANGUAGE SUCH AS:

We're not getting ...
Are we still picking up ...
We'll proceed ...

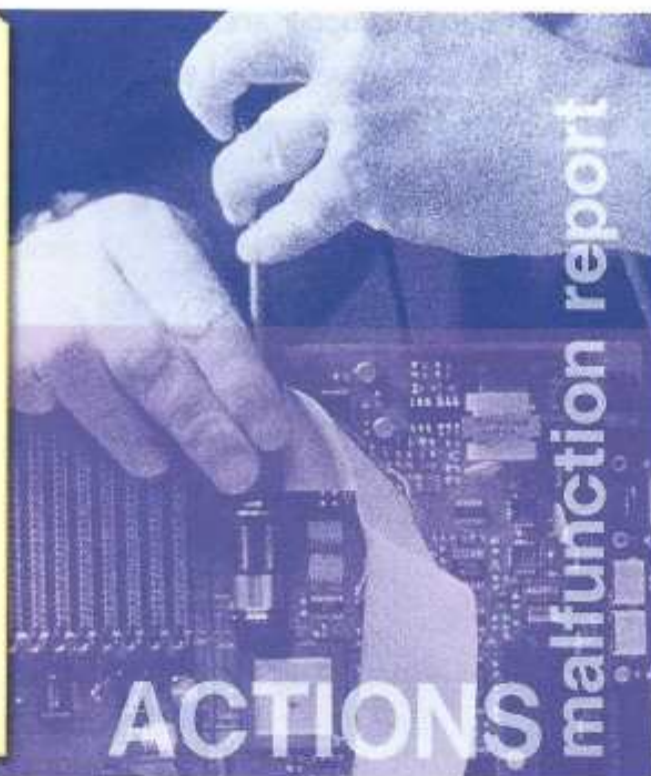
Student A: You are a pilot. Talk to Student B about:

- a radio malfunction
- which instruments are still working
- the proper procedure

Student B: You are a co-pilot. Talk to Student A about a radio malfunction.

Writing

9 Use the conversation from Task 8 and the article to create a pilot's instrument malfunction report. Include: the type of malfunction and actions taken.



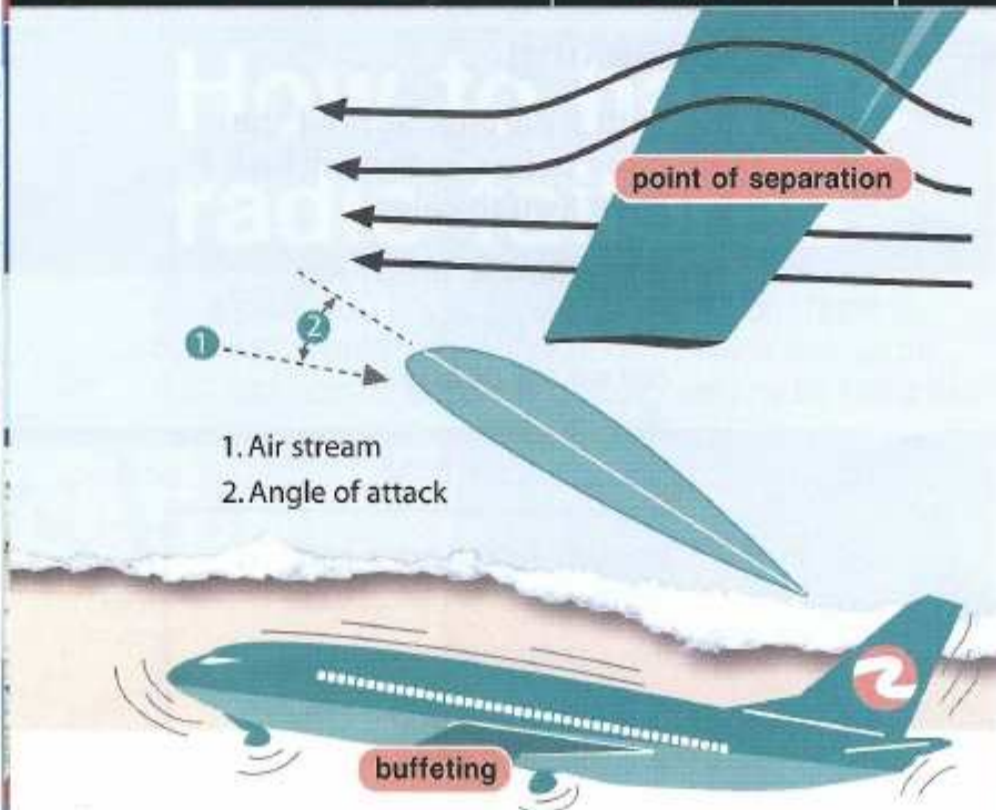
Aircraft Stalls

A **stall** is a dangerous condition for any aircraft. It is important to know how to recognize types of stalls, how to avoid them, and how to correct them. Most flight tests will require you to practice an **approach to a stall** so you know just what it feels like.

A stall occurs when air stops moving smoothly over a wing. The **point of separation** reaches the front of an aircraft's wings, which destroys the aircraft's lift. A **full stall** occurs when a critical angle of attack is reached. An **accelerated stall** occurs when the pilot suddenly increases the angle of attack. Any type of stall will cause **buffeting** of an aircraft.

Pilots must practice approaching stalls during flight school to learn proper **recovery** methods. It often starts by reaching **stall speed**. This usually involves decreasing pressure on the elevator and allowing the aircraft's nose to **pitch over**. At the same time, a pilot should increase power. Then the pilot must **attain** a safe airspeed and angle of attack.

Safer than recovering from a stall, however, is avoiding a stall in the first place. Most experienced pilots know when they are in danger of stalling. Aircraft also have devices that warn pilots when a stall is possible. These include **stall warning** alarms and **stick shakers**.



Get ready!

1 Before you read the passage, talk about these questions.

- 1 What is a warning device a plane has to prevent a stall?
- 2 What is another name for an airplane shaking and vibrating in flight?

Reading

2 Read the textbook chapter. Then, choose the correct answers.

- 1 What is the main idea of the passage?
 - A how stalls occur and how to recover
 - B the consequences of stalling
 - C the stress stalls put on aircraft
 - D how stalls affect pilots
- 2 What is true of the point of separation during an approach to a stall?
 - A It no longer exists.
 - B It eliminates buffeting.
 - C It is approaching the front of the wing.
 - D It has reached the leading edge of the wings.
- 3 What is the function of a stick shaker?
 - A to notify pilots of an approaching stall
 - B to force an aircraft to pitch over
 - C to increase stall recovery time
 - D to decrease the angle of attack

Vocabulary

3 Match the words (1-6) with the definitions (A-F).

- | | |
|----------------|-------------------------|
| 1 — full stall | 4 — approach to a stall |
| 2 — pitch over | 5 — accelerated stall |
| 3 — recovery | 6 — stick shaker |

- A the process of correcting a stall and restoring the aircraft to normal lift
- B to drop an aircraft's nose suddenly from an upward angle to a downward angle
- C a device that causes an aircraft's control yoke to rattle when a stall is about to occur
- D the condition of an aircraft when the point of separation is moving forward on the wings and a stall becomes imminent
- E a type of stall that occurs when an aircraft's angle of attack is suddenly increased to an excessive degree
- F a type of stall that occurs when an aircraft's angle of attack reaches too high a level

4 Read the sentence pair. Choose where the words best fit the blanks.

1 attain / stall

- A It's important to _____ a safe airspeed to avoid complications.
B A _____ is possible when air begins to separate itself from the wings.

2 buffeting / stall warning

- A The pilot heard the _____ and knew that a stall was imminent.
B The passenger felt the aircraft _____ and wondered what was happening.

3 point of separation / stall speed

- A The pilot decreased thrust because he was approaching _____.
B The _____ neared the front of the wings and caused buffeting.

5 Listen and read the textbook chapter again. How can a pilot prepare for a stall when they are training?

Listening

6 Listen to a conversation between a flight instructor and a student. Mark the following statements as true (T) or false (F).

- ___ The man accidentally approached a stall.
- ___ Pitching over could cause a full stall.
- ___ The man starts to increase the angle of attack.

7 Listen again and complete the conversation.

- Instructor:** Okay Tom, 1 _____ you're ready to practice an approach to a stall?
Student: I think so. That might be 2 _____.
Instructor: Yes, but it's an 3 _____ that we really should practice.
Student: Okay. I guess I'm ready, then.
Instructor: Great. So tell me, 4 _____ an approach to a stall?
Student: That's when the 5 _____ starts moving forward, right?
Instructor: Right. How are you going to make that happen?
Student: By increasing the angle of attack. It needs to be an 6 _____.

Speaking

8 With a partner, act out the roles below based on Task 7. Then switch roles.

USE LANGUAGE SUCH AS:

- Do you think ...*
What causes ...
As soon as ...

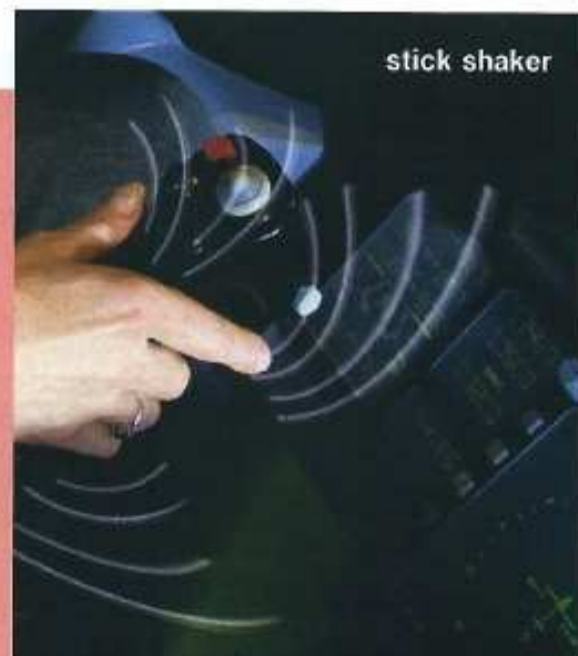
Student A: You are an instructor. Talk to Student B about:

- an approach to a stall
- when to begin recovery
- how to start the procedure

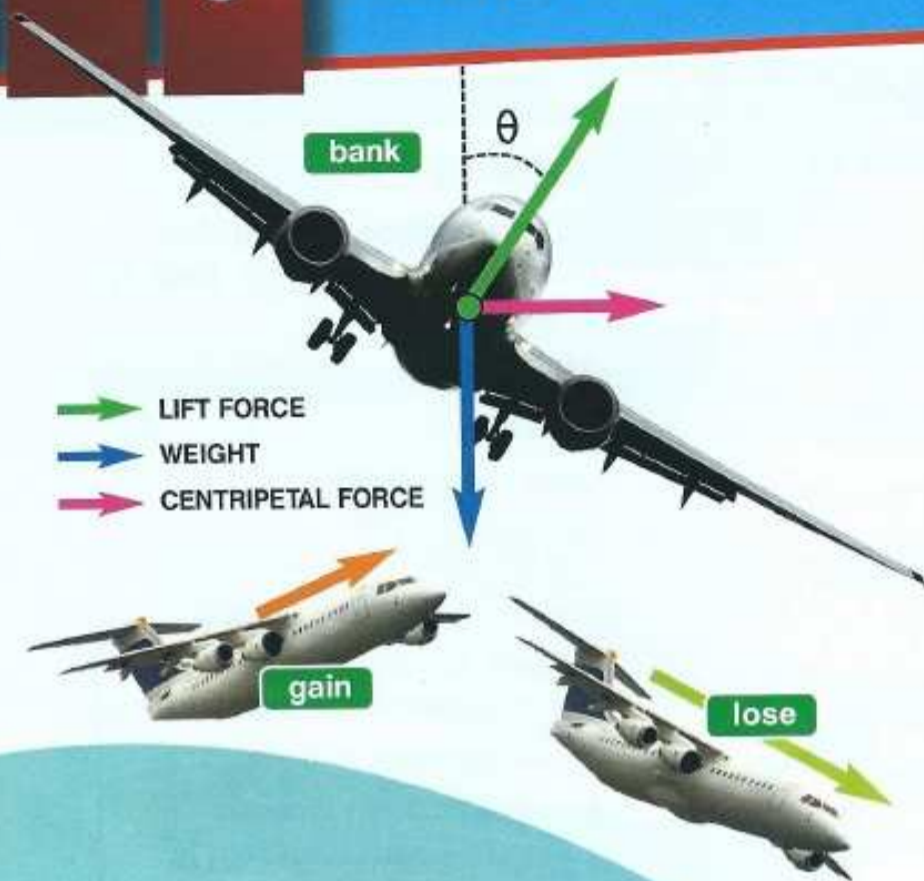
Student B: You are a student. Talk to Student A about how you will complete this exercise.

Writing

9 Use the conversation from Task 8 and the chapter to write a report on a student's lesson on stalls. Include: the exercise completed, how a stall was approached, and how the student recovered.



9 Steep turns



Check Ride Report

Student:	Ellen Gomez
Maneuvers Tested:	Turns

Achievements: Overall, the student did well on her first **check ride**. She handled several **steep turns** at a **bank** of 45° with precision and confidence while maintaining a safe speed at or below **VA**. She used a steady **rate of roll** to achieve the appropriate **bank angle**. The student then maintained her gradual rate as she came out of the bank. The return to **level flight** was smooth and well timed.

Problem areas: The student had some trouble staying within her altitude **tolerance parameters**. As she entered each turn, she habitually turned the nose upward and **gained** altitude. This caused her to **lose** speed and forced her to make corrections mid-turn. She was able to recover, but her execution could have been much smoother and should have required less effort.

Improvements: The student should focus on improving her **altitude control** so that she does not unnecessarily **vary** her speed and altitude during difficult turns. If she maintains her altitude next time, she will find it much easier to return to her correct course as she completes a turn.

Get ready!

1 Before you read the passage, talk about these questions.

- 1 What is the opposite of losing altitude?
- 2 What is another name for a roll?

Reading

2 Read the flight instructor's report on steep turns. Then, mark the following statements as true (T) or false (F).

- 1 The student had difficulty maintaining consistent altitude.
- 2 The student's rate of roll during the turn was too high.
- 3 The instructor recommends slowing down during steep turns.

Vocabulary

3 Write a word that is similar in meaning to the underlined part.

- 1 Today, we're going to practice turns with high bank angles. s _ _ e p _ u _ _ s
- 2 The student pilot needs to work on her speed entering a bank. _ a t _ _ f _ _ l _
- 3 Jill is nervous about her test to receive her pilot certification. _ h e _ k _ r _ _ _
- 4 I don't know why I always decrease speed during turns. _ o s _

4 Read the sentence pair. Choose where the words best fit the blanks.

1 vary / gain

- A You should try not to _____ your speed. Instead, keep it steady.
- B You will likely slow down if you suddenly _____ altitude.

2 tolerance parameters / level flight

- A I must check the _____ for this aircraft before I attempt a turn.
- B Return to _____ after you achieve the desired heading.

3 VA / altitude control

- A Hold your elevators steady to maintain _____.
- B Exceeding _____ during a steep turn can be dangerous.

4 bank / bank angle

- A I need to practice entering a _____ more smoothly.
- B This is considered a steep turn because the _____ is more than 30 degrees.

- 5 Listen and read the flight instructor's report on steep turns again. What happens if a pilot does not maintain altitude control?

Listening

- 6 Listen to a conversation between a flight instructor and a student. Choose the correct answers.
- What is the purpose of the conversation?
 - to reprimand the woman for careless flying
 - to prepare the woman for a check ride
 - to quiz the woman on speed and altitude
 - to review the woman's performance
 - What did the woman do well?
 - hold a steady rate of roll
 - turn the nose up during the bank
 - gain speed while entering the turn
 - maintain consistent altitude control

- 7 Listen again and complete the conversation.

Instructor: In general, you did very well. You 1 _____ mistakes that new pilots often make.

Student: That's a relief. Like what?

Instructor: Well, new pilots have a tendency to enter a bank too quickly. You maintained a nice, 2 _____ in and out of the bank.

Student: I guess that's good, but I felt like it was 3 _____.

Instructor: I'm glad you noticed. While your rate of roll was fine, you had some trouble with 4 _____.

Student: Speed was the problem?

Instructor: Well, sort of. You turned the nose up each time you entered a turn, so you 5 _____ and lost speed.

Student: Oh, I see. So that's why I felt like I had to keep 6 _____ to the right speed.

Instructor: That's right. Next time, concentrate on maintaining your altitude and the speed will naturally remain steady, too.

Speaking

- 8 With a partner, act out the roles below based on Task 7. Then switch roles.

USE LANGUAGE SUCH AS:

New pilots tend to ...

I still felt like ...

While ... was fine, you had trouble with ...

Student A: You are a flight instructor. Talk to Student B about:

- his or her check ride
- what he or she did well
- how he or she can improve

Student B: You are a flight student. Talk to Student A about your check ride.

Writing

- 9 Use the conversation from Task 8 and the report to fill out an instructor's check ride report. Include: the student's achievements, problem areas, and ways to improve.



10 Unusual attitudes

Recovering from Unusual Attitudes

Unusual attitudes can present extremely dangerous flying situations, so you must know how to handle these to avoid disaster. This chapter is an overview of what to do when an **aircraft upset** puts you in unusual attitudes.

Inverts Extreme winds can put aircraft in an **inverted position**. In these cases, you must return to an upright position immediately. Some pilots use a **split S**, but this method requires a dramatic decrease in altitude. A safer method is to **wrap in** the aileron so that you enter a sharp roll. You may lose some altitude, but not as much as you will during a split S.

Dives As with an inverted position, rapid recovery is vital when you enter a dive. In a downward **spin** or **vertical dive**, turn your rudder to recover your heading and then **break** the stall so your aircraft regains aerodynamic lift. For a **graveyard spiral**, adjust bank to get level wing attitude.

Climbs A **vertical climb** might cause you to fall backwards into a **tail slide** or nose-first into a **whipstall**. The recovery will be similar to that of a dive. Roll to one side in a **rolling wingover** until you return to level flight.



Get ready!

1 Before you read the passage, talk about these questions.

- 1 An aircraft flying upside down is flying in what position?
- 2 What happens during a spin?

Reading

2 Read the training manual entry on unusual attitudes. Then, complete the table.

Type of Upset	Recovery Methods
Invert	_____
Dive	_____
Climb	_____

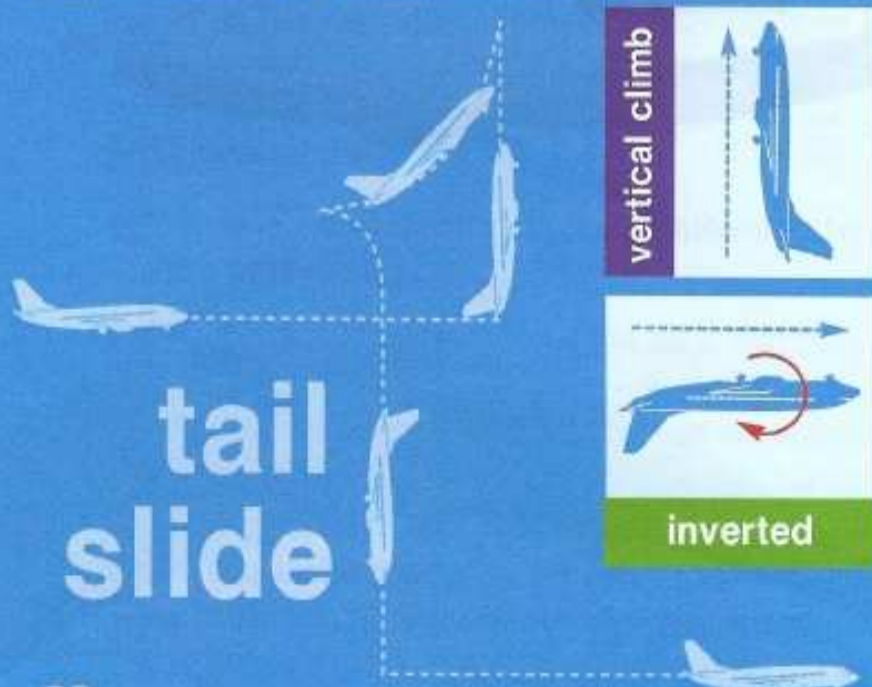
Vocabulary

3 Place the words and phrases from the word bank under the correct headings.

Word BANK

whipstall spin graveyard spiral
split S tail slide rolling wingover

Dive	Climb	Recovery
_____	_____	_____
_____	_____	_____



4 Match the words (1-7) with the definitions (A-G).

- | | |
|----------------------|-------------------------|
| 1 ___ break | 5 ___ vertical climb |
| 2 ___ wrap in | 6 ___ inverted position |
| 3 ___ vertical dive | 7 ___ unusual attitude |
| 4 ___ aircraft upset | |

- A a situation in which a pilot loses control
B a situation in which an aircraft's upward pitch is very steep
C a situation in which pitch or bank is outside normal flight parameters
D to stop or interrupt something
E an upset in which an aircraft moves downward nose first
F to switch something to a maximum setting
G an upset in which an aircraft flies upside-down

5 **Listen and read the training manual entry on unusual attitudes again. What can happen during a vertical climb?**

Listening

6 **Listen to a conversation between a flight instructor and a student. Mark the following statements as true (T) or false (F).**

- ___ The man understands the difference between a spin and a graveyard spiral.
- ___ The man does not know how a whipstall starts.
- ___ Whipstalls occur most frequently when flying on instruments.

7 **Listen again and complete the conversation.**

Instructor: Ralph, can you tell me how to recover from a spin?

Student: Hmm, I suppose you'd want to 1 _____
_____ sharply in the direction of the spin. Then the nose would level off.

Instructor: Very good. Now how about a 2 _____?

Student: That requires gentler corrections. You can 3 _____
_____ to get level attitude.

Instructor: Right again. Let's try something harder. 4 _____
_____.

Student: A whipstall? That's similar to a 5 _____,
isn't it?

Instructor: Yes, but it starts in a particular way.

Student: I guess I don't remember. How 6 _____
_____?

Instructor: A whipstall starts with a vertical climb.

Speaking

8 **With a partner, act out the roles below based on Task 7. Then switch roles.**

USE LANGUAGE SUCH AS:

Describe a ...

That's similar to ...

A(n) ... occurs when ...

Student A: You are a flight instructor. Talk to Student B about:

- unusual attitudes
- how to recover from aircraft upsets
- differences between attitudes

Student B: You are a flight student. Talk to Student A about unusual attitudes.

Writing

9 **Use the conversation from Task 8 and the training manual to make some student notes. Include: two particular aircraft upsets, how they occur, and how to recover from them.**





Thunderstorms

tornado

thunderstorm

lightning

Get ready!

1 Before you read the passage, talk about these questions.

- 1 What are some hazardous weather phenomena?
- 2 What are the two opposing forces that operate within a storm?

Reading

2 Read the pilot's guide chapter. Then, choose the correct answers.

- 1 What is the main idea of the passage?
 - A where thunderstorms are most likely
 - B how dangerous storms form
 - C the importance of studying weather forecasts
 - D ways to handle the dangers of thunderstorms
- 2 What is the best course of action when facing updrafts and downdrafts?
 - A increase altitude
 - B decrease altitude
 - C ride the waves
 - D fly at a slower speed
- 3 What is the best way to avoid tornadic tubes?
 - A flying in the anvil
 - B following the updrafts
 - C checking radar frequently
 - D fly along squall lines

Thunderstorms are examples of severe weather that represent significant dangers for any aircraft. These storms may include **lightning**, severe turbulence, heavy rain or hail, and **tornadic tubes**. While the best method is to **avoid** thunderstorms altogether, this is not always possible. For this reason pilots must train extensively to react appropriately in storms.

Pilots should always be prepared for the **wind shear** around a storm. Often, one will encounter an extremely turbulent **roll cloud** at the head of the storm. Once inside a storm, a pilot will meet with many **updrafts** and **downdrafts**. Usually it is impossible to avoid all such drafts. The best course of action is to **ride the waves**, reducing **stress** on the aircraft.

Any **squall line** or storm **cell** may hide a tornadic tube. These tornadic tubes may be **tornadoes** extending to the ground. Sometimes, however, they are hidden within the cloud and are not visible from the ground. Any tornadic tube can be disastrous for an aircraft. The **anvil** of a storm is often clear, but it is filled with turbulence and is the second worst place to be. The best way to avoid tornadic tubes and other dangers of thunderstorms is to be aware. Monitor your radar, and keep out of their way.

Vocabulary

3 Write a word that is similar in meaning to the underlined part.

- 1 The vortex of rotating wind was hidden in the cloud. _ o _ _ _ d _ c _ u _ _
- 2 The pilot did his best to stay away from the turbulence. _ _ o _ _
- 3 To reduce stress on an aircraft, follow the currents inside a storm. _ i _ _ _ e w _ _ e _
- 4 One hazard of thunderstorms is electric discharge from the clouds to the ground. _ _ g _ t _ _ _ _
- 5 The aircraft hit a strong vertical wind moving upward. _ p _ _ _ f _
- 6 Air Traffic Control warned the pilot she was approaching a string of thunderstorms. _ q _ _ _ l _ _ _

squall line

4 Read the sentence pair. Choose where the words best fit the blanks.

1 **thunderstorm / roll cloud**

- A Be sure to avoid the _____ at the leading edge of the storm.
B Lightning, tornadoes, and heavy rain are hazards of a _____.

2 **wind shear / cell**

- A The radar showed a small storm _____.
B _____ happens on the outside edge of a storm.

3 **downdraft / tornado**

- A The _____ was strong, but the pilot decided to ride the waves.
B A _____ is visible from the ground.

4 **stress / anvil**

- A The co-pilot suggesting flying in the _____ to try to avoid tornadic tubes.
B The aircraft experienced a lot of _____ due to strong air currents in the storm.

5 Listen and read the pilot's guide chapter again. Why are tornadic tubes so dangerous?

Listening

6 Listen to a conversation between pilot and co-pilot. Mark the following statements as true (T) or false (F).

- The man detects a large storm in the flight path.
- The woman suggests flying through the storm.
- The man thinks a course around the storm would be too far.

7 Listen again and complete the conversation.

Co-pilot: Too bad. I saw the forecast and they predicted 1 _____. But I thought that was for later tonight.

Pilot: Looks like it's happening now.

Co-pilot: Do you think we should try to fly through it? If there are any strong updrafts or downdrafts we can just 2 _____.

Pilot: No way. It's 3 _____. Let's talk to ATC and plot a course around it.

Co-pilot: Are you sure? We'll have to go over 100 miles 4 _____.

Pilot: I'm certain. I'm not going to 5 _____ of hitting a tornadic tube.

Co-pilot: Okay, 6 _____. I'll get in touch with ATC.

Speaking

8 With a partner, act out the roles below based on Task 7. Then switch roles.

USE LANGUAGE SUCH AS:

*Looks like ... / I'm concerned about ... /
Do you think we should ...*

Student A: You are a pilot. Talk to Student B about:

- an upcoming storm
- a course of action
- potential threats

Student B: You are a co-pilot. Talk to Student A about how you will deal with the storm.

Writing

9 Use the conversation from Task 8 and the pilot's guide to write a log book entry. Include: a storm encounter, the pilot's concerns, and the course of action to be taken.



12 In-Flight hazards 2

MODERN AVIATOR

Flight Hazards: What You Should Know

If you're an experienced pilot, you've probably had a few **close calls**. The key to avoiding flight hazards is knowing what to look for.

Other Aircraft Always keep an eye out for aircraft in your path. ATC can advise you of nearby flights. They'll let you know when to clear the area for another aircraft's **fuel dumping** or of any **air shows** in the area. However, individual small craft like **hot air balloons** and **hang gliders** do not always notify ATC when they will take off.

Cultural Events When you fly on holidays, be aware that people may let off **fireworks**. Individuals playing with **laser pointers** can impair visibility. Steer clear of any scheduled **military operations**, which ATC should advise you about.

Industrial Equipment You should check if local meteorologists are floating **weather balloons**. Keep a lookout for **warning lights** on radio towers to avoid collisions when flying low.

Natural Hazards Even with the most updated details from ATC, you'll still encounter trouble from natural events. **Bird strikes** can cause severe engine damage. **Volcanic ash** can cause engine damage as well, and usually creates visibility problems. And be prepared to navigate through bumpy **mountain wave turbulence** when you travel over mountain ranges.



Get ready!

1 Before you read the passage, talk about these questions.

- 1 What are some natural events that pose flight hazards?
- 2 What are some flight hazards caused by people?

Reading

2 Read the article on flight hazards. Then, choose the correct answers.

- 1 What is the main idea of the article?
A methods for avoiding natural hazards
B ways to notify other aircraft of your presence
C reasons not to fly at certain times
D dangers that might be encountered in flight
- 2 Which of the following is NOT a hazard mentioned in the article?
A non-commercial aircraft
B severe weather
C shows with bright lights
D bumpy conditions over mountain ranges
- 3 What hazards might ATC not know about?
A fuel dumping C commercial aircraft
B hang gliders D military operations

Vocabulary

3 Match the words (1-6) with the definitions (A-F).

- | | |
|--------------------|-----------------------|
| 1 ___ air show | 4 ___ warning light |
| 2 ___ close call | 5 ___ fuel dumping |
| 3 ___ volcanic ash | 6 ___ weather balloon |

- A a substance composed of rock particles
- B releasing fuel from an aircraft midair
- C a device that carries measuring instruments
- D an event in which pilots show off their abilities
- E a flashing light on top of a radio tower
- F a situation in which disaster is barely avoided

- 4 Place the words and phrases from the word bank under the correct headings.

Word BANK

bird strike hot air balloon fireworks
 laser pointer military operation
 mountain wave turbulence hang glider

Aircraft	Cultural Hazards	Natural Hazards
_____	_____	_____
_____	_____	_____
_____	_____	_____

- 5 Listen and read the article on flight hazards again. What might happen during a bird strike?

Listening

- 6 Listen to a conversation between a flight instructor and a student. Mark the following statements as true (T) or false (F).

- ___ The man is worried about encountering flight hazards.
- ___ The bird strike caused severe engine damage.
- ___ The woman once collided with a hot air balloon.

- 7 Listen again and complete the conversation.

Instructor: You are likely to come across many hazards as a pilot. The trick is paying close attention so you know when there's something you 1 _____

Student: Gosh, that makes me a little nervous. Have you ever encountered any of these hazards?

Instructor: Oh, yes. Many times. On my first commercial flight, we had a bird strike and had to make an 2 _____

Student: Really? How did that happen?

Instructor: The birds flew into one of the engines and 3 _____ it.

Student: Wow. What else has happened to you?

Instructor: Well, one time I 4 _____ with a hot air balloon during landing.

Student: That must have been scary. What 5 _____ ?

Instructor: I pulled my pitch back sharply and increased altitude just in time to avoid the balloon. But it was a 6 _____

Speaking

- 8 With a partner, act out the roles below based on Task 7. Then switch roles.

USE LANGUAGE SUCH AS:

Have you ever encountered ...
On my first ... we had to ...
That must have been ...

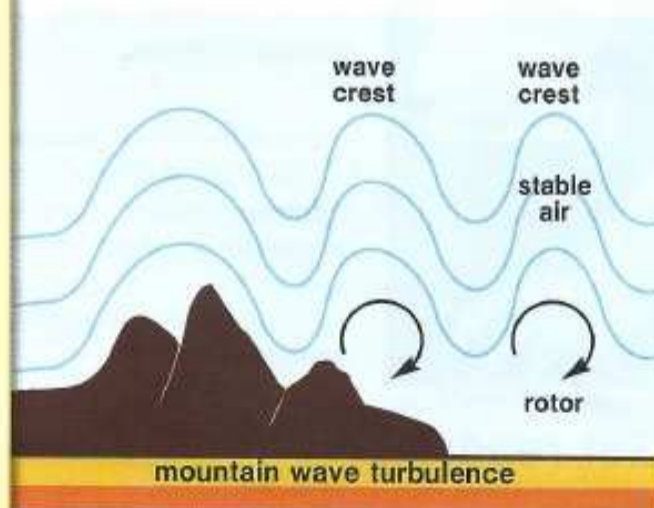
Student A: You are a flight instructor. Talk to Student B about:

- flight hazards
- your experiences
- how you avoided a hazard

Student B: You are a flight student. Talk to Student A about flight hazards.

Writing

- 9 Use the conversation from Task 8 and the article to write some student notes. Include: examples of natural and man-made flight hazards, and how to avoid them.



13 Medical emergencies

FIRST AID KIT

Always be prepared for a **medical emergency**. Administering first aid can save a life.



Contents of this kit:



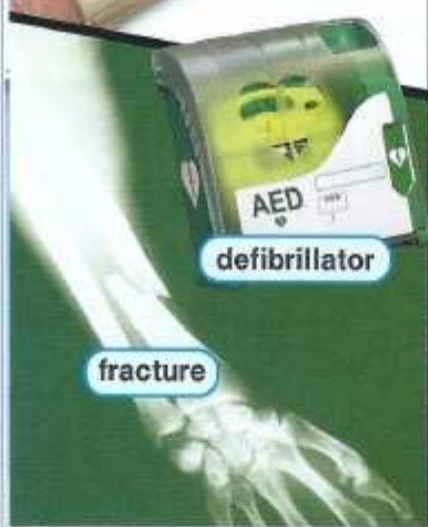
laceration



syringe



splint



defibrillator

fracture

Aspirin

Give two capsules every 6 hours for pain or to reduce fever. Give the passenger two capsules immediately if you suspect he or she is having a heart attack. Symptoms of a **heart attack** include chest tightness and **shortness of breath**.

Bandage

Clean all **lacerations** with soap and water prior to applying bandage.

Splint

Suspected **fractures** should be immobilized to prevent further injury and reduce pain. When tightening the bandage around the splint, do not block the circulation. Check sensation and **pulse** below the splint once an hour. If there is numbness or tingling, loosen the bandage.

Syringes

Do not re-use a needle or syringe.

EpiPen

Only use the EpiPen when a passenger is experiencing or is likely to experience a serious **allergic reaction**. If not treated, allergic reactions can be life-threatening. They can lead to shock, loss of **consciousness**, and death. To use the injection device, first remove the activation cap. Jab the device firmly into the passenger's thigh and hold in place for 10 seconds. Notify ATC of the emergency immediately.

Automated External Defibrillator

In case of abnormal irregular heart rhythm or sudden heart failure, apply defibrillator to chest immediately. The device turns on automatically and provides voice instructions. Follow the prompts carefully.

Get ready!

1 Before you read the passage, talk about these questions.

- 1 What are some items you find in a first aid kit?
- 2 What can be used when a passenger suffers a heart attack?

Reading

2 Read the first aid kit contents descriptions. Then, choose the correct answers.

- 1 What is the purpose of the document?
A to explain the proper use of first aid supplies
B to train flight personnel to identify symptoms of medical emergencies
C to stress the importance of first aid training
D to provide instructions on putting together a first aid kit
- 2 Which of the following is NOT a reason to take an aspirin?
A chest tightness and shortness of breath
B abnormal irregular heart rhythm
C pain due to a fractured bone
D the presence of a fever
- 3 What is true of splints?
A They cannot be reused.
B They are used to support mobility.
C They are used to treat lacerations.
D They must be examined regularly.

Vocabulary

3 Match the words (1-8) with the definitions (A-H).

- | | |
|-----------------------|-------------------|
| 1 — EpiPen | 5 — first aid kit |
| 2 — allergic reaction | 6 — aspirin |
| 3 — defibrillator | 7 — first aid |
| 4 — syringe | 8 — fracture |

- A a collection of medical supplies needed to treat patients in case of a medical emergency
- B a break in a bone
- C an instrument used to withdraw and inject fluids into the body
- D a common medication used to reduce pain and fever
- E an injection device used to prevent shock from a severe allergic reaction
- F emergency treatment for an injury or illness before full medical care can be given
- G the immune system's overreaction to a substance
- H a device used to restart the heart or restore its normal rhythm

- 4** Fill in the blanks with the correct words and phrases: *pulse, heart attack, splint, consciousness, bandage, laceration, shortness of breath, medical emergency.*

- In a _____, blood cannot flow through the heart properly.
- She lost _____ and fell to the ground.
- The flight attendant washed the wound and placed a _____ on it.
- _____ is among the first signs of a severe allergic reaction.
- Check the patient's _____ regularly and monitor her heart rhythm.
- A passenger suffering a heart attack during a flight is considered a _____.
- The man tightened the _____ along the passenger's fractured arm.
- Cover the _____ only after you've cleaned it thoroughly.

- 5** Listen and read the first aid kit contents description again. When should flight staff loosen a splint?

Listening

- 6** Listen to a conversation between a pilot and a flight attendant. Mark the following statements as true (T) or false (F).

- The passenger suffered an allergic reaction.
- The woman used equipment from the first aid kit to treat the passenger.
- The man must land immediately to get the passenger to a doctor.

- 7** Listen again and complete the conversation.

Flight Attend.: A passenger had a severe 1 _____ to something he ate.

Pilot: When did this happen?

Flight Attend.: A couple of minutes ago, right after we served lunch. His throat 2 _____ and he had difficulty breathing.

Pilot: Were you able to 3 _____?

Flight Attend.: He treated himself. Fortunately, he had an 4 _____ on him. He injected the medicine in his thigh.

Pilot: Did it work?

Flight Attend.: It worked immediately. He 5 _____ and could breathe normally.

Pilot: How is he now?

Flight Attend.: He's in a 6 _____. His pulse is regular and he's breathing normally.

Speaking

- 8** With a partner, act out the roles below based on Task 7. Then switch roles.

USE LANGUAGE SUCH AS:

When did ...
Were you able to ...
His pulse is ...

Student A: You are a flight attendant. Talk to Student B about:

- a medical emergency on the plane
- the passenger's current condition
- treatments

Student B: You are a pilot. Talk to Student A about a medical emergency.

Writing

- 9** Use the conversation from Task 8 and the descriptions to create a medical emergency report. Include: the type of emergency, how it was treated, the patient's condition, and if the plane had to land or not.

14 Rejected takeoffs

PILOT'S GUIDE



Rejected Takeoffs

Get ready!

1 Before you read the passage, talk about these questions.

- 1 What are some distances a pilot must consider before takeoff?
- 2 What happens when an airplane cannot safely take off?

Reading

2 Read the guide on takeoffs. Then, mark the following statements as true (T) or false (F).

- 1 The minimum runway length is roughly the same length for most aircraft.
- 2 The balanced field length equalizes two different takeoff length calculations.
- 3 Pilots must choose whether or not to abort a flight before reaching the all-engine takeoff length.

Vocabulary

3 Fill in the blanks with the correct words and phrases from the word bank.

Word BANK

rejected takeoff decision speed
minimum runway length mandatory

- 1 The _____ was not long enough for the aircraft to successfully take off.
- 2 The pilot declared a _____ when the engines failed.
- 3 At the _____, a pilot must choose whether to complete a takeoff or abort it.
- 4 Students must take a _____ test before getting a pilot's license.

Pilots must consider many details while they are preparing for takeoff. First, a pilot should consider his location, including the temperature and altitude. Both these factors can greatly affect a takeoff's success. Other factors include distance. The pilot should determine the **minimum runway length**, which varies depending on the aircraft. The minimum runway length also covers the **takeoff distance with an engine failure**. Pilots need a certain distance in which they can address problems before takeoff. This distance includes the **all-engine takeoff length** and the **accelerate/stop distance**. One of the more important distances is the **balanced field length**. This distance equalizes the accelerate/stop distance and the takeoff distance with an engine failure.

Another crucial aspect of the takeoff process is the **decision speed**. The decision speed is the speed at which a pilot must decide to **abort** a takeoff or not. Once decision speed is passed, a takeoff is **mandatory**. Before decision speed, an **aborted** or **rejected takeoff** can occur for several reasons. An engine could **malfunction** or the plane may not reach the necessary speed. But knowing the right distances and speeds can help a pilot make that difficult choice.

4 Match the words (1-7) with the definitions (A-G).

- 1 accelerate/stop distance
- 2 aborted takeoff
- 3 balanced field length
- 4 abort
- 5 malfunction
- 6 all engine takeoff field length
- 7 takeoff distance with engine failure

- A an event that occurs when an object does not work properly
- B a flight ascension that is stopped before completion
- C the act of stopping a procedure
- D the distance needed to reach full speed, then come to a complete stop
- E the equalization of all-engine takeoff length and the accelerate/stop distance
- F the distance needed to get to takeoff speed from a standstill position
- G the distance needed to reach the decision speed, experience engine failure, and still reach VR

- 5 Listen and read the guide on takeoffs again. What things could go wrong during a takeoff?

Listening

- 6 Listen to a conversation between a supervisor and a pilot. Choose the correct answers.

- What is the conversation mainly about?
 - how to avoid a rejected takeoff
 - the cause of a rejected takeoff
 - when pilots should abort takeoffs
 - the importance of maintenance before takeoff
- What malfunction did the aircraft experience?
 - an engine failed
 - a tire blew out
 - the flaps did not respond
 - radio communication with ATC was lost

- 7 Listen again and complete the conversation.

Pilot: I looked everything over several times. I even took the elevation 1 _____.

Supervisor: Okay. I'm just making sure. Then what happened?

Pilot: Next, I checked all the engines to make sure that they were working properly.

Supervisor: And they all 2 _____?

Pilot: They did. Then I got clearance from ATC and positioned the plane for takeoff.

Supervisor: And you didn't notice whether anything was working differently?

Pilot: No, everything was fine. We finally started moving down the runway. We were just about to reach 3 _____ when the left tire blew out.

Supervisor: And that slowed you down 4 _____ you couldn't takeoff?

Pilot: Well, we could have finished the takeoff 5 _____ . But since we hadn't reached decision speed, I thought it best to 6 _____ and repair it here.

Speaking

- 8 With a partner, act out the roles below based on Task 7. Then switch roles.

USE LANGUAGE SUCH AS:

I want to hear about ...

Then I checked ...

I thought it best to ...

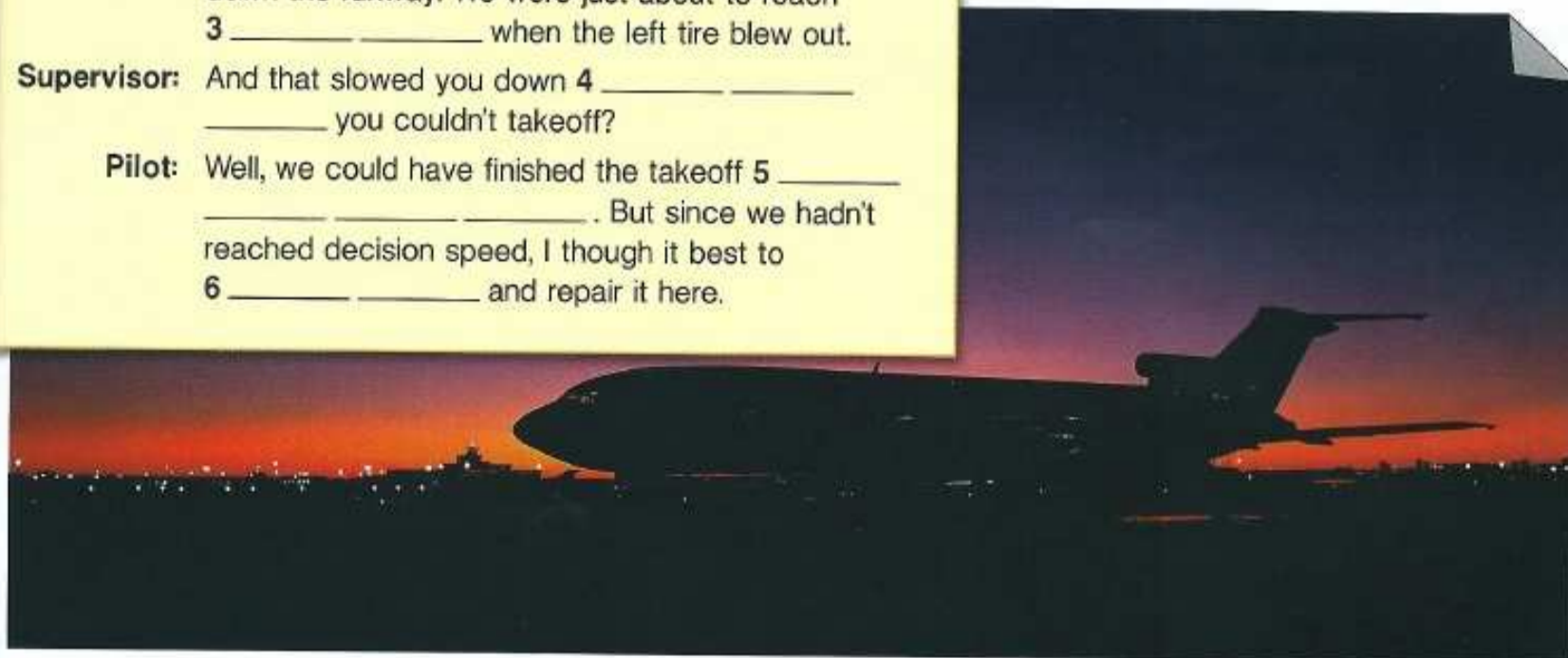
Student A: You are an airline supervisor. Talk to Student B about:

- a rejected takeoff
- actions leading up to takeoff
- the cause of the problem

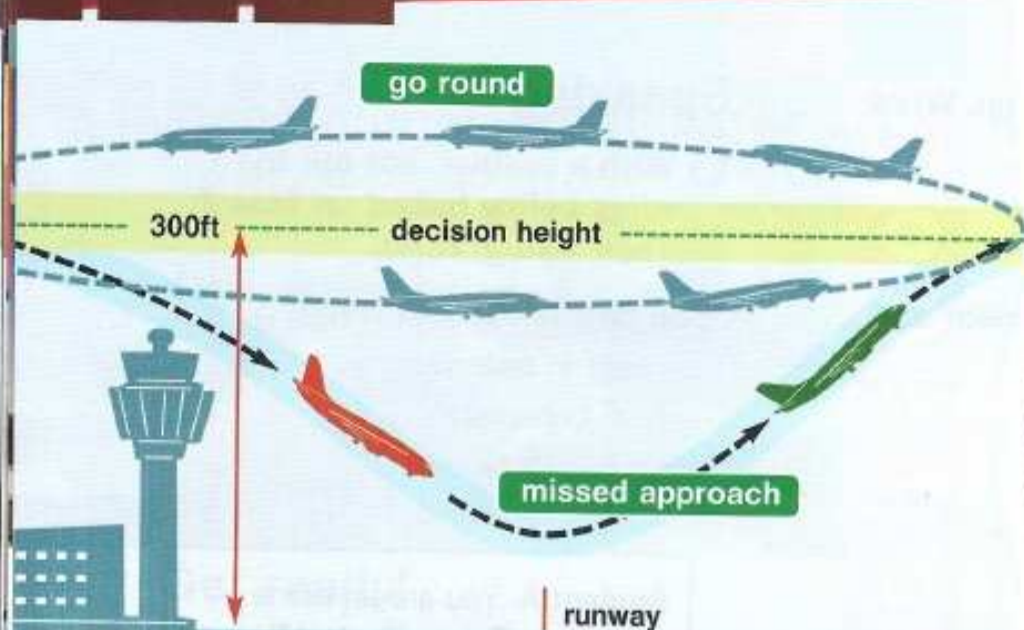
Student B: You are a pilot. Talk to Student A about why the takeoff failed.

Writing

- 9 Use the conversation from Task 8 and the guide to write a report on a rejected takeoff. Include: checks and calculations made before takeoff, what went wrong, and why you made the decision.



15 Rejected landings



SKYBUS Airlines

November 11 Report

Missed approaches:

SkyBus aircraft have completed six missed approach procedures in the past week. In each case, a **rejected landing** was declared at or before the **decision height**. In each case pilots activated the **go around** procedure. Five flights completed one go around and then landed successfully. One flight, SkyBus 601 Delton to Rock Forest (November 9), completed two go around passes. In this case the pilot declared two **aborted landings** due to excessive fog. After the third go around, the aircraft landed successfully. All six flights used **instrument approaches**. (Note to pilots: when aborting an instrument approach, always activate the **TO/GA switch** and return to **takeoff power**.)

Causes:

In two cases (SkyBus 55, 113) pilots activated missed approaches due to **obstructions** on the runway. SkyBus 55 noted a runway obstruction caused by a luggage vehicle. Ground Control notified SkyBus 113 that another aircraft was stalled on the runway in question.

In one case (SkyBus 884) the pilot aborted the landing due to an **unsafe gear warning**. The pilot had to **retract** all landing gear and complete a go around. Pilot was able to **execute** the second landing attempt successfully.

In three cases (SkyBus 601, 97, 200) pilots activated missed approaches due to fog that obscured their vision.

Get ready!

1 Before you read the passage, talk about these questions.

- 1 What happens in a missed approach?
- 2 What can cause a runway obstruction?

Reading

2 Read this report on missed approaches. Then, choose the correct answers.

- 1 What is the main purpose of this document?
 - A to explain why missed approaches occurred
 - B to prevent missed approaches in the future
 - C to explain how to execute a rejected landing
 - D to discuss landing mistakes made by pilots
- 2 What should a pilot always do when aborting an instrument approach?
 - A activate an unsafe gear warning
 - B activate the TO/GA switch
 - C notify passengers
 - D stay at decision height
- 3 Which of the following did NOT cause a missed approach?
 - A an unsafe gear warning
 - B an obstruction on a runway
 - C excessive snow
 - D excessive fog

Vocabulary

3 Fill in the blanks with the correct words and phrases from the word bank.

Word BANK

TO/GA switch retract
 rejected landing go around
 obstruction execute

- 1 The pilot could not land on his assigned runway due to a(n) _____.
- 2 Pilots must choose to _____ an abort before they reach decision height.
- 3 A(n) _____ is a necessary maneuver after declaring a missed approach.
- 4 The _____ is located in the cockpit, on the thrust lever.
- 5 Pilot Rogers declared a(n) _____ because the snow was limiting his vision.
- 6 In an aborted landing, the pilot must _____ his/her landing gear.

4 Read the sentence pair. Choose where the words best fit the blanks.

1 unsafe gear warning / missed approach

A A(n) _____ indicates that there is a problem with the aircraft's equipment.

B A rejected landing can also be called a(n) _____.

2 aborted landing / instrument approach

A An _____ is the standard for all modern aircraft.

B An _____ must be declared before decision height.

3 decision height / takeoff power

A Return to _____ after a missed approach.

B At _____, pilots must choose whether or not they will land.

5 Listen and read the report on missed approaches again. What did one pilot do when there was a problem with equipment?

Listening

6 Listen to a conversation between a pilot and a controller. Mark the following statements as true (T) or false (F).

- 1 ___ The runway is blocked by another aircraft.
- 2 ___ The man has already passed decision height.
- 3 ___ The man must land on a different runway.

7 Listen again and complete the conversation.

Controller: Air Transit 53, Rosedale Approach.
Pilot: Rosedale Approach, Air Transit 53. 1 _____
Controller: Be advised, there's a 2 _____ on runway seven.
Pilot: Air Transit 53, roger. I'm still 2,000 3 _____
Controller: Air Transit 53, 4 _____ runway seven.
Pilot: 5 _____, Air Transit 53 go around runway seven.
Controller: Air Transit 53, that disabled aircraft regained power. It's clearing the runway now. 6 _____ after go around.
Pilot: Understood. Will contact when go around is complete.

Speaking

8 With a partner, act out the roles below based on Task 7. Then switch roles.

USE LANGUAGE SUCH AS:

Be advised, there is ...

I'm still ...

Approach runway ...

Student A: You are a pilot. Talk to Student B about:

- a missed approach
- how to proceed

Student B: Student B: You are a controller. Talk to Student A about a missed approach.

Writing

9 Use the conversation from Task 8 and the report to create a missed approach report. Include: conditions before the missed approach, the reason for the event, and how the situation was resolved.



Glossary

- abort** [V-T-U14] To **abort** is the act of stopping a procedure due to an unexpected problem.
- aborted landing** [N-COUNT-U15] An **aborted landing** is a flight procedure in which the pilot decides to discontinue a planned landing.
- aborted takeoff** [N-COUNT-U14] An **aborted takeoff** is a flight that is stopped while preparing to lift off the ground.
- abusive** [ADJ-U5] If a person is being **abusive**, he or she is physically or emotionally harming another person.
- accelerate/stop distance** [N-COUNT-U14] The **accelerate/stop distance** is the distance needed to reach the decision speed with all engines running, identify an engine failure, and bring the plane to a complete stop.
- accelerated stall** [N-COUNT-U8] An **accelerated stall** is a type of stall that occurs when an aircraft's angle of attack is suddenly increased to an excessive degree.
- accumulate** [V-I-U6] To **accumulate** is to increase, or build up.
- ADF** [U7] An **ADF** (*Automatic Direction Finder*) is a navigational instrument that automatically keeps track of an aircraft's location during flight.
- aerodynamics** [N-UNCOUNT-U1] **Aerodynamics** are the natural laws that govern and affect flight.
- AFSS** [U3] An **AFSS** (*Automated Flight Service Station*) is an air traffic facility that provides pilots with automated flight information, but does not give instructions or clearance.
- aggressively** [ADV-U5] If a person is acting **aggressively**, he or she is acting in a provoking or antagonizing manner.
- agitated** [ADJ-U5] If a person is **agitated**, he or she is acting in a nervous or upset manner.
- air marshal** [N-COUNT-U5] An **air marshal** is a person whose job is to fly on an airplane so that he can handle any illegal or harmful activity that may occur.
- air show** [N-COUNT-U12] An **air show** is an event in which pilots demonstrate their flying abilities to a group of spectators.
- aircraft upset** [N-COUNT-U10] An **aircraft upset** is a dangerous situation in which a pilot loses control of an aircraft.
- airfoil** [N-COUNT-U1] An **airfoil** is a rounded wing.
- air-to-ground** [PHRASE-U7] If something is **air-to-ground**, it refers to communication between an aircraft and air traffic control on the ground.
- all-engine takeoff length** [PHRASE-U14] The **all-engine takeoff length** is the distance needed to reach the takeoff speed from a standstill position.
- allergic reaction** [N-COUNT-U13] An **allergic reaction** is the immune system's overreaction to a substance.
- altitude control** [N-UNCOUNT-U9] **Altitude control** is the act of maintaining a constant or desired altitude during an aircraft maneuver.
- angle of attack** [N-COUNT-U1] An **angle of attack** is the position of the wing in relation to its motion while in the air.
- ANSP** [U3] An **ANSP** (*Air Navigation Service Provider*) is an organization that enforces aircraft separation on the ground and in-flight in a designated area, on behalf of a state government.
- anvil** [N-COUNT-U11] An **anvil** is the upper part of a storm cloud, extending horizontally from the storm's center.
- approach to a stall** [PHRASE-U8] An **approach to a stall** is the condition of an aircraft when the point of separation is moving forward on the wings, and a stall becomes imminent.
- arm** [N-COUNT-U2] An **arm** is a distance from an aircraft's reference datum to another area or object in the aircraft.
- arrest** [V-T-U5] To **arrest** someone is to seize someone who has broken the law.
- aspirin** [N-COUNT-U13] **Aspirin** is a common medication used to reduce pain, fever, and inflammation.
- assault** [V-T-U5] To **assault** someone is to physically harm them.
- ATIS** [U3] An **ATIS** (*Automated Terminal Information Service*) is an ongoing broadcast of non-control information in busy airport areas, such as weather and active runway information.
- attain** [V-T-U8] To **attain** a safe airspeed is to successfully reach a safe airspeed.
- avoid** [V-T-U11] To **avoid** a storm is to keep away from or evade it.
- AWOS** [U3] An **AWOS** (*Automated Weather Observation System*) is an automated sensor station on the ground that collects and provides complete weather data.
- balance** [N-UNCOUNT-U2] **Balance** is the state of having weight distributed evenly.
- balanced field length** [PHRASE-U14] A **balanced field length** is a takeoff length that allows room for an aircraft to reach decision speed, experience an engine failure, and either complete takeoff or bring the plane to a full stop.

ballast [N-UNCOUNT-U2] **Ballast** is heavy material that is used to create balance by offsetting cargo weight.

bandage [N-COUNT-U13] A **bandage** is a piece of soft material used to cover and protect wounds.

bank [N-COUNT-U9] A **bank** is the process of rolling to one side during an aircraft maneuver.

bank angle [N-COUNT-U9] A **bank angle** is the angle between an aircraft wing and a horizontal plane.

Bernoulli's theory [PHRASE-U1] **Bernoulli's theory** says that an increase in a fluid's speed occurs at the same time as the decrease in the fluid's energy.

bird strike [N-COUNT-U12] A **bird strike** is a collision between an aircraft and a bird or group of birds.

break [V-T-U10] To **break** something is to stop or interrupt something.

buffeting [N-UNCOUNT-U8] **Buffeting** is the strong vibrating or jerking that occurs in an aircraft when it is stalling.

cargo [N-UNCOUNT-U2] **Cargo** is material being transported.

cell [N-COUNT-U11] A **cell** is an air mass containing updrafts and downdrafts moving and reacting together, the smallest unit of a storm.

center of gravity [PHRASE-U2] The **center of gravity** is the point in an aircraft where its entire weight is balanced.

CG limit [N-COUNT-U2] A **CG limit** is a restriction on the amount and location of weight that an aircraft can hold.

check ride [N-COUNT-U9] A **check ride** is a test flight required to become a certified pilot.

clearance [N-COUNT-U4] A **clearance** is permission to proceed according to a set of instructions issued by ATC for a pilot in a specific situation in order to ensure separation between aircraft.

close call [N-COUNT-U12] A **close call** is a situation in which an accident or disaster is barely avoided.

consciousness [N-UNCOUNT-U13] **Consciousness** is the state of being awake and aware of one's surroundings.

decision height [N-UNCOUNT-U15] **Decision height** is the point at which an aircraft's crew must decide whether to continue or abort a landing procedure.

decision speed [N-UNCOUNT-U14] The **decision speed** is the critical engine failure recognition speed and it is at this point that pilots must choose whether to execute a takeoff or not.

defibrillator [N-COUNT-U13] A **defibrillator** is a medical device that applies an electric current to the chest or heart in order to restart the heart or restore its normal rhythm.

de-ice [V-T-U6] To **de-ice** an aircraft is to remove ice that has formed on its surface.

distribution [N-UNCOUNT-U2] **Distribution** is the division or spread of something throughout a particular area.

divert [V-T-U5] To **divert** an airplane is to send it in a different direction than the path it is currently following.

DME [U4] A **DME** (*Distance Measuring Equipment*) is a radio navigation system that measures distance and can be used as a holding fix.

downdraft [N-COUNT-U11] A **downdraft** is the vertical movement of air in a downward direction.

drag [N-UNCOUNT-U1] **Drag** is the force that opposes thrust.

drunk [ADJ-U5] If a person is **drunk**, they have consumed an amount of alcohol that has impaired their senses and good judgment.

empty weight [N-COUNT-U2] An **empty weight** is the weight of an aircraft itself, without cargo, passengers, or fuel.

entry procedure [N-COUNT-U4] An **entry procedure** is a sequence of steps by which an aircraft enters an existing holding pattern.

EpiPen® [U13] An **EpiPen®** (*Epinephrine Auto-Injector*) is an injection device containing medicine that is administered to prevent shock from a severe allergic reaction.

excess [N-UNCOUNT-U2] An **excess** is an amount of something that is more than is appropriate or workable.

execute [V-T-U15] To **execute** a procedure is to complete it.

failure [N-COUNT-U7] A **failure** is a situation in which something does not function correctly.

fireworks [N-PL-U12] **Fireworks** are explosive devices that send out bright displays of light, often used for entertainment.

first aid [N-UNCOUNT-U13] **First aid** is emergency treatment for an injury or illness before full medical care can be given.

first aid kit [N-COUNT-U13] A **first aid kit** is a collection of medical supplies needed to treat patients in case of a medical emergency.

Flight Watch [PHRASE-U3] **Flight Watch** is a service that provides pilots with en route weather updates and collects weather reports from pilots.

Glossary

- force** [N-COUNT-U1] A **force** is an energy – either natural or man-made, that causes or resists movement.
- fracture** [N-COUNT-U13] A **fracture** is a crack or break in a bone.
- freight** [V-T-U6] To **freight** something is to load it onto an aircraft as cargo.
- frost** [N-UNCOUNT-U6] **Frost** is a thin layer of ice crystals that forms when condensed water freezes.
- FSS** [U3] An **FSS** (*Flight Service Station*) is an air traffic facility that provides pilots with flight information but does not give instructions or clearance.
- fuel dumping** [N-UNCOUNT-U12] **Fuel dumping** is the process of releasing fuel from an aircraft midair to lighten its weight before landing.
- fuel load** [N-COUNT-U6] A **fuel load** is the amount of expendable fuel carried on a flight, measured by weight.
- full stall** [N-COUNT-U8] A **full stall** is a type of stall that occurs when an aircraft's angle of attack is maintained at too high a level and the movement of air around the wings is diminished.
- gain** [V-T-U9] To **gain** something is to get more of something or increase something.
- GCO** [U3] A **GCO** (*Ground Communication Outlet*) is a device that allows pilots on the ground to contact remote Air Traffic Control facilities or Flight Service Stations.
- glycol** [N-UNCOUNT-U6] **Glycol** is a chemical in fluids used to de-ice an airplane.
- go around** [N-COUNT-U15] A **go around** is a flight procedure in which the pilot misses an approach and circles around the airport before attempting to land again.
- GPS** [N-UNCOUNT-U4] **GPS** (*Global Positioning System*) is a navigational system that uses radio signals from satellites to show the location of an object on or above the earth's surface.
- graveyard spiral** [N-COUNT-U10] A **graveyard spiral** is an aircraft upset in which the aircraft enters an extended bank and loses altitude, causing it to move downwards in a spiral movement.
- gravity** [N-UNCOUNT-U1] **Gravity** is the force that attracts a body towards the centre of the earth.
- handcuff** [V-T-U5] To **handcuff** someone is to tie a person's arms together at the wrists.
- hang glider** [N-COUNT-U12] A **hang glider** is a light aircraft made of a frame and strong cloth that is steered by a person hanging beneath it.
- heart attack** [N-COUNT-U13] A **heart attack** is a disruption in the blood supply to a part of the heart, which causes heart cells to die, and is usually caused by a blood clot in the artery.
- heavier-than-air** [ADJ-U1] If something is **heavier-than-air**, it has more weight than the air it displaces in the atmosphere.
- hold** [N-COUNT-U4] A **hold** is a predetermined course with a set entry point which is designed to delay aircraft already at their destination from landing while keeping them within a specified airspace.
- holding fix** [N-COUNT-U4] A **holding fix** is a specified fix identifiable to a pilot that is used as a reference point to mark the first turn and entrance to a holding pattern.
- homing beacon** [N-COUNT-U4] A **homing beacon** is a radio beacon that is used as a navigation tool and can be used as a holding fix.
- hot air balloon** [N-COUNT-U12] A **hot air balloon** is a type of flight vehicle that gets its lift from heated air inside a large, strong balloon.
- ice** [N-UNCOUNT-U6] **Ice** is water that is frozen in a solid form.
- icing range** [N-COUNT-U6] An **icing range** is the span of temperatures and conditions in which ice can form on an airplane.
- ILS receiver** [N-COUNT-U7] An **ILS** (*Instrument Landing System*) **receiver** is a device that uses radio signals to guide aircraft during landing, especially in low-visibility conditions.
- in possession of** [PHRASE-U5] To be **in possession of** is to have a certain object.
- inbound course** [N-COUNT-U4] An **inbound course** is the direction of a holding pattern.
- inbound track** [N-COUNT-U4] An **inbound track** is the leg of a holding pattern that is flown towards the holding fix.
- incident** [N-COUNT-U5] An **incident** is an event in which something bad or negative happens.
- instrument approach** [N-COUNT-U15] An **instrument approach** is a flight procedure in which an aircraft follows a predetermined sequence of maneuvers to complete a landing.
- inverted position** [N-COUNT-U10] An **inverted position** is an aircraft upset in which an aircraft is flying upside-down.
- laceration** [N-COUNT-U13] A **laceration** is a cut to the skin.

laser pointer [N-COUNT-U12] A **laser pointer** is a device that shines a bright, concentrated light, often used for astronomical or entertainment purposes.

leg length [N-UNCOUNT-U4] A **leg length** is the length of either the inbound or outbound tracks of a holding pattern as measured in minutes or nautical miles.

level flight [N-UNCOUNT-U9] **Level flight** is the act of flying straight ahead with a bank angle of zero degrees.

lift [N-UNCOUNT-U1] **Lift** is a force that pushes an aircraft upwards.

lightning [N-UNCOUNT-U11] **Lightning** is electrical discharge between storm clouds and the ground, causing a visual flashing phenomenon.

load [V-T-U2] To **load** something is to put items or materials into something.

lose [V-T-U9] To **lose** something is to get less of something or decrease something.

LWIS [U3] A **LWIS** (*Limited Weather Information System*) is an automated sensor station on the ground that collects and provides basic weather data such as temperature and wind.

malfunction [N-COUNT-U7] A **malfunction** is an electrical or mechanical problem that causes something not to work properly.

mandatory [ADJ-U14] If something is **mandatory**, it is necessary or required.

maximum weight [N-COUNT-U2] A **maximum weight** is a limit on the amount of weight a particular aircraft can carry.

medical emergency [N-COUNT-U13] A **medical emergency** is a sudden illness or injury that threatens a patient's life or long term health.

military operation [N-COUNT-U12] A **military operation** is a coordinated action or exercise that is conducted by a military organization.

minimum runway length [PHRASE-U14] The **minimum runway length** is the shortest length at which an aircraft can take off.

missed approach [N-COUNT-U15] A **missed approach** is a flight procedure in which the pilot discontinues an approach to a landing based on the absence of safe landing conditions.

moment [N-COUNT-U2] A **moment** is the force produced by an object.

mountain wave turbulence [PHRASE-U12] **Mountain wave turbulence** is forceful air movement in different directions caused by the flow of wind over a mountain range.

navigational radio [N-COUNT-U7] A **navigational radio** is a radio that communicates the location of an aircraft.

Newton's laws of motion [PHRASE-U1] **Newton's laws of motion** describe the relationship among natural forces and how they affect a body or mass in motion.

nonstandard pattern [N-COUNT-U4] A **nonstandard pattern** is a holding pattern that deviates from the standard pattern as it uses left instead of right turns.

notify [V-T-U7] To **notify** someone is to communicate something official or important to someone.

obstruction [N-COUNT-U15] An **obstruction** is an object that prevents progress.

outer marker/compass locator [N-COUNT-U4] An **outer marker/compass locator** is a low-power radio beacon installed at the site of the outer marker of an instrument landing system and used as a holding fix.

overcome [V-T-U1] To **overcome** something is to be stronger than it.

pitch over [V-I-U8] To **pitch over** is to drop the nose of an aircraft suddenly from an upward angle to a downward angle.

pitot tube [N-COUNT-U6] A **pitot tube** is an instrument that measures air speed, and is mounted on the leading edge of a wing.

point of separation [PHRASE-U8] A **point of separation** is the place on an aircraft's wing where air is no longer able to follow the curvature of the wing and separates itself from the wing.

pressure [N-UNCOUNT-U1] **Pressure** is the amount of force applied perpendicularly to a unit of area on a surface.

primary fix [N-COUNT-U7] A **primary fix** is a radio setting that transmits an aircraft's location with one signal instead of relying on signals from two or more stations.

protection [N-UNCOUNT-U7] **Protection** is the act of preventing something from being endangered or hurt.

pulse [N-COUNT-U13] A **pulse** is the physical manifestation of heartbeat in the contraction and expansion of an artery that can be felt by a finger.

Glossary

- racetrack pattern** [N-COUNT-U4] A **racetrack pattern** is the most common holding pattern for aircraft and is shaped like a race track, incorporating two straight legs and two 180 degree right turns.
- rate of roll** [PHRASE-U9] **Rate of roll** is how quickly a pilot rolls an aircraft to one side during a bank.
- RCO** [U3] An **RCO** (*Remote Communication Outlet*) is a radio transceiver that extends the communication abilities of Flight Service Stations to remote areas.
- recovery** [N-COUNT-U8] A **recovery** is the process of correcting a stall and restoring the aircraft to normal lift.
- reference datum** [N-COUNT-U2] A **reference datum** is a line through an aircraft that is used to measure distances and compare the locations of different objects. It is also used to calculate a plane's center of gravity.
- rejected landing** [N-COUNT-U15] A **rejected landing** is a flight procedure in which the pilot decides to discontinue a planned landing.
- rejected takeoff** [N-COUNT-U14] A **rejected takeoff** is a flight that is stopped while preparing to lift off the ground.
- restrain** [V-T-U5] To **restrain** someone is to physically hold him so that he cannot run away or make any sudden movements.
- retract** [V-T-U15] To **retract** an aircraft's landing gear is to reverse the gear from a landing position to a non-landing position.
- ride the waves** [PHRASE-U11] To **ride the waves** is to follow or passively go along with the air currents in a storm.
- roll cloud** [N-COUNT-U11] A **roll cloud** is the turbulent air current at the head of a storm, creating a visual rolling phenomenon.
- rolling wingover** [N-COUNT-U10] A **rolling wingover** is a method for recovering from a vertical stall in which the aircraft enters a steep turn to return to level flight.
- route** [N-COUNT-U7] A **route** is a particular path that something, such as an aircraft, travels along.
- security** [N-UNCOUNT-U5] **Security** is the things that are done to keep a person or place safe from danger or crime.
- shortness of breath** [PHRASE-U13] **Shortness of breath** is an inability to take whole, controlled breaths of air and is symptomatic of many serious medical conditions.
- slippery** [ADJ-U6] If a runway is **slippery**, it is likely to cause gliding or sliding, as on ice.
- spin** [N-COUNT-U10] A **spin** is an aircraft upset in which an aircraft stalls and rapidly spirals downwards, nose first.
- splint** [N-COUNT-U13] A **splint** is a rigid device used to restrict the motion of an injured body part, especially a fractured bone.
- split S** [PHRASE-U10] A **split S** is a method for recovering from an inverted position in which a pilot curves the nose of the aircraft downwards until the aircraft reaches level flight in the upright position.
- squall line** [N-COUNT-U11] A **squall line** is a string of active storms located close together.
- stall** [N-COUNT-U8] A **stall** is a condition of reduced lift in an aircraft when air cannot properly flow over the wings, caused by an excessive angle of attack.
- stall speed** [N-UNCOUNT-U8] **Stall speed** is the speed at which a stall occurs, based on an aircraft's structure, size, altitude, and most importantly, its angle of attack.
- stall warning** [N-COUNT-U8] A **stall warning** is an alarm activated by the flight system when the aircraft is approaching stall speed.
- standard pattern** [N-COUNT-U4] A **standard pattern** is a holding pattern during which a pilot takes right turns onto the inbound and outbound tracks and the leg length is one or one-and-a-half minutes long.
- static port** [N-COUNT-U6] A **static port** is a small hole in the skin of an aircraft which measures the pressure of calm air.
- steep turn** [N-COUNT-U9] A **steep turn** is a turn performed at a bank angle of 30 degrees or more.
- stick shaker** [N-COUNT-U8] A **stick shaker** is a device that causes an aircraft's control yoke (or stick) to shake, warning the pilot that a stall is about to occur.
- stress** [N-UNCOUNT-U11] **Stress** on an aircraft is pressure that could lead to damage.
- suspicious** [ADJ-U5] If a person is behaving in a **suspicious** manner, he or she is acting in a mistrustful or mysterious way.
- syringe** [N-COUNT-U13] A **syringe** is a medical instrument used to withdraw or inject fluids into the body.
- tail slide** [N-COUNT-U10] A **tail slide** is an aircraft upset in which an aircraft stalls during a vertical climb and falls downwards, tail first.

takeoff distance with an engine failure [PHRASE-U14] The **takeoff distance with an engine failure** is the distance needed to reach the decision speed with all engines running, experience engine failure and – with the remaining engines – reach rotation speed.

takeoff power [N-UNCOUNT-U15] **Takeoff power** is the energy or thrust required for an aircraft to take off from the ground.

thrust [N-UNCOUNT-U1] **Thrust** is the force that pushes an aircraft forward.

thunderstorm [N-COUNT-U11] A **thunderstorm** is a severe weather storm involving thunder, lightning, and generally heavy rain or hail.

TO/GA switch [N-COUNT-U15] The **TO/GA** (*takeoff/go around*) **switch** is a switch that a pilot can activate on the thrust lever to prepare the aircraft for takeoff (from the ground) or go around (in case of an aborted landing).

tolerance parameter [N-COUNT-U9] A **tolerance parameter** is a specification of ideal altitude or heading at which an aircraft can perform certain turns.

tornadic tube [N-COUNT-U11] A **tornadic tube** is a vortex or rotating air within the clouds of a storm, possibly but not necessarily extending to the ground.

tornado [N-COUNT-U11] A **tornado** is a vortex of strong, rotating winds within a storm, extending from cloud cover to the ground.

total gross weight [N-UNCOUNT-U2] **Total gross weight** is the entire weight of an aircraft, including the cargo, passengers, a full fuel tank, and the aircraft itself.

TRSA [U3] A **TRSA** (*Terminal Radar Service Area*) is a specified airspace in which pilots can utilize Air Traffic Control and radar services to maintain separation, usually surrounding a busy airport.

two-way [ADJ-U7] If a radio is **two-way**, it sends and receives messages.

underside [N-COUNT-U6] The **underside** of a surface is the side beneath, or on the bottom.

unsafe gear warning [N-COUNT-U15] An **unsafe gear warning** is an indicator that is activated by an aircraft's flight system when any piece of aircraft gear is not functioning properly.

unusual attitude [N-COUNT-U10] An **unusual attitude** is a situation in which an aircraft's attitude is outside the parameters of normal flight, usually defined as a pitch of more than 15 degrees or a bank of more than 30 degrees.

updraft [N-COUNT-U11] An **updraft** is the vertical movement of air in an upward direction.

VA [U9] **VA** is the maximum speed at which a steep turn can be safely performed.

vary [V-T-U9] To **vary** something is to change something or cause something to fluctuate.

vertical climb [N-COUNT-U10] A **vertical climb** is an aircraft upset in which an aircraft's pitch is too great to support its forward movement.

vertical dive [N-COUNT-U10] A **vertical dive** is an aircraft upset in which the aircraft moves rapidly downwards nose first.

volcanic ash [N-UNCOUNT-U12] **Volcanic ash** is a substance composed of rock particles that is produced by an erupting volcano.

VOR [U4] **VOR** (*VHF Omnidirectional Range*) is a radio navigation system for aircraft that uses a composite signal that includes Morse code, voice, and navigation signal, and that can be used as a holding fix.

warning light [N-COUNT-U12] A **warning light** is a flashing light at the top of a radio tower to signal the location of the tower to passing aircraft.

weather balloon [N-COUNT-U12] A **weather balloon** is a device that carries instruments through the air for measuring weather information such as temperature and wind speed.

whipstall [N-COUNT-U10] A **whipstall** is an aircraft upset in which an aircraft stalls during a vertical climb and falls downwards, nose first.

wind shear [N-UNCOUNT-U11] **Wind shear** is a major difference in wind speed and direction within a short distance, causing turbulence.

wing anti-icing [PHRASE-U6] **Wing anti-icing** is a procedure that prevents ice from forming on an aircraft, using chemicals, heat, or inflatable rubber parts.

winter operations [N-COUNT-U6] **Winter operations** are the procedures needed to safely manage an aircraft in winter conditions.

wrap in [V-T-U10] To **wrap in** something is to pull or switch something to its limit or maximum setting.

zip tie [N-COUNT-U5] A **zip tie** is a plastic band with tiny holes that enable both ends to tightly tie together.

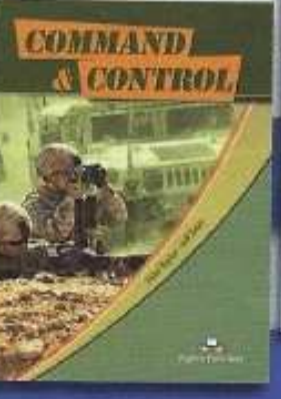
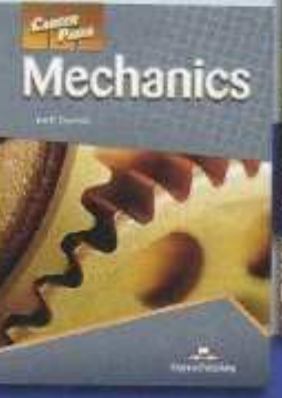
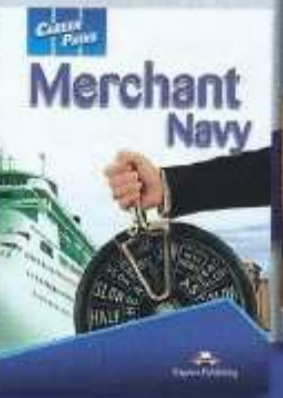
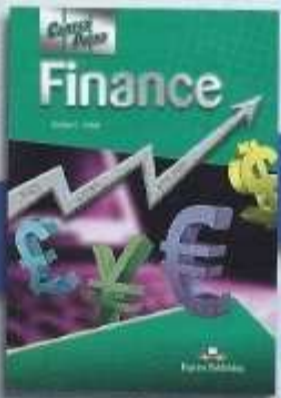
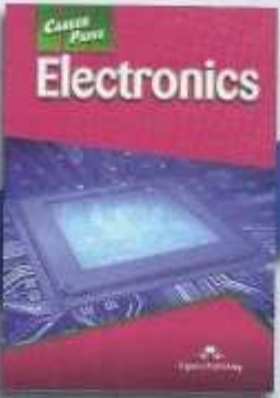
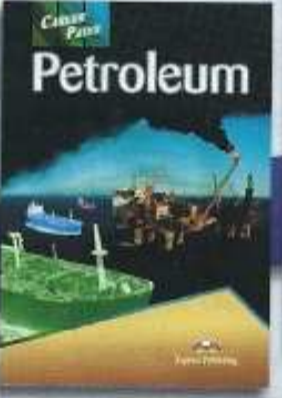
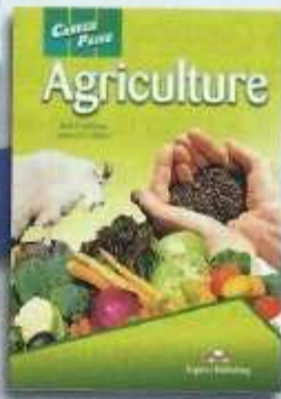
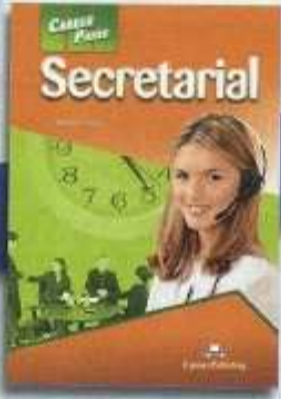
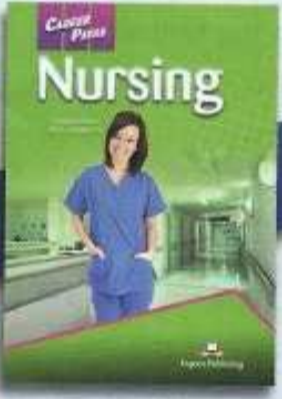
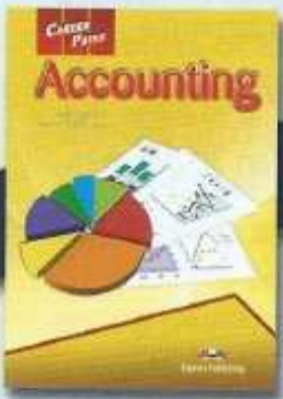
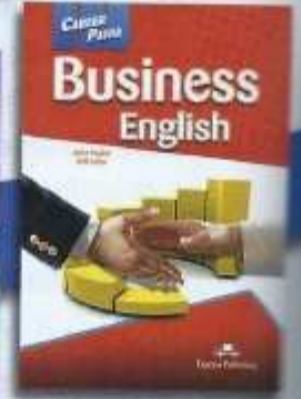
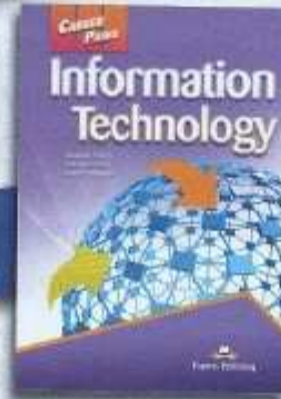
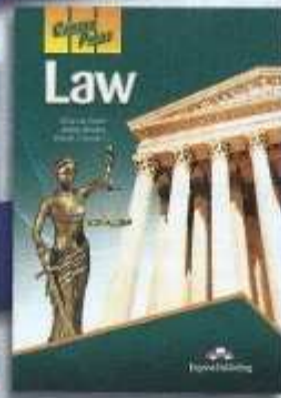
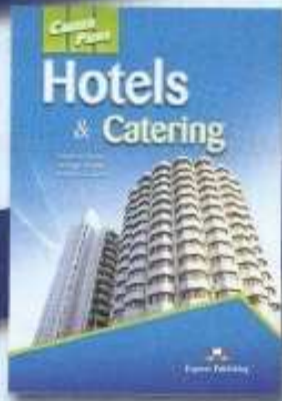
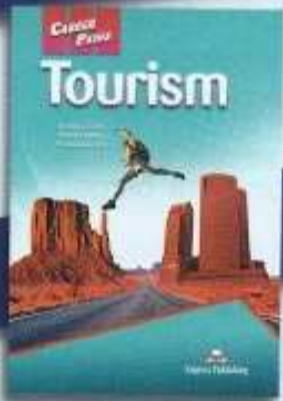


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