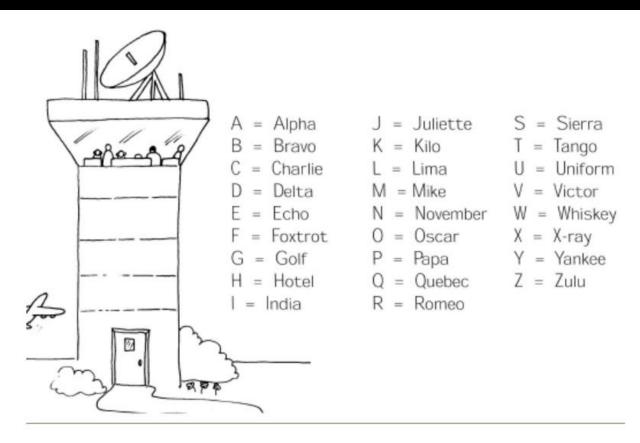


01

General View

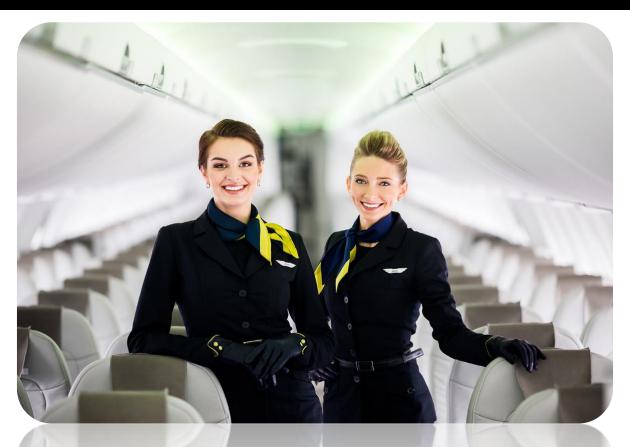
Aviation Alphabet



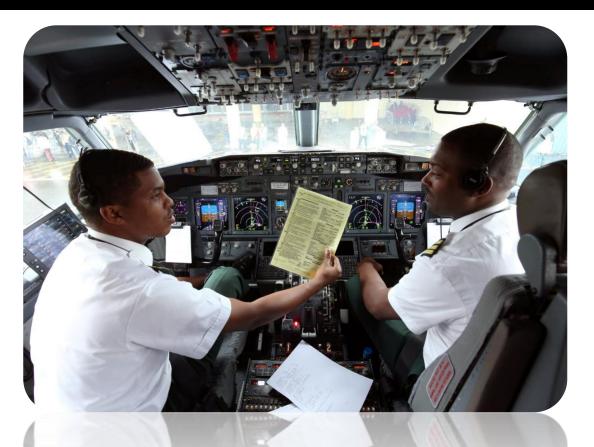
Captain and first oficer (pilot and copilot)



Flight attendant



Cockpit Crew



Cabin Crew

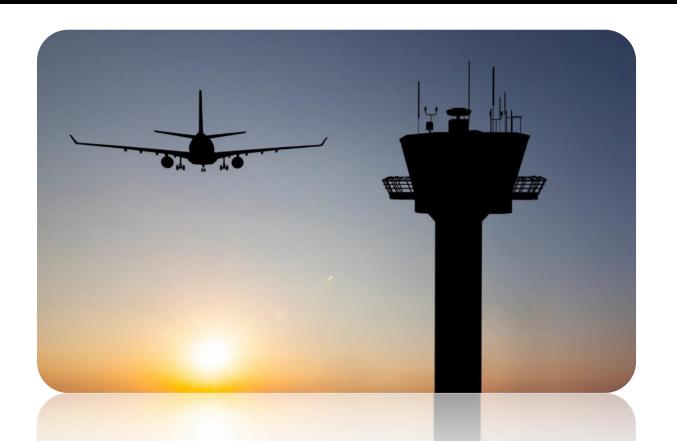


Seat belt and Harness

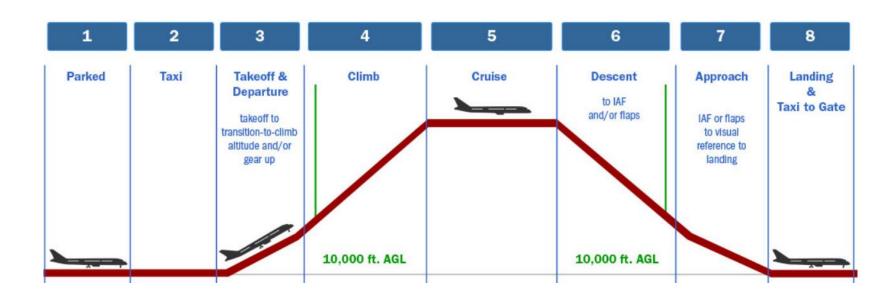




Air traffic Controll



Phases of Flight



Aerodrome Definitions

- Departure Aerodrome
- Destination Aerodrome
- Alternate Aerodrome
- What is Diversion?

Aircraft or Airplane

• Aircraft:

Any machine that can derive support in the atmosphere from the reactions of the air other than the reactions of the air against the earth's surface.

• Aeroplane:

A power-driven heavier-than-air aircraft, deriving its lift in flight chiefly from aerodynamic reactions on surfaces which remain fixed under given conditions of flight.

Aerodrome Aprone



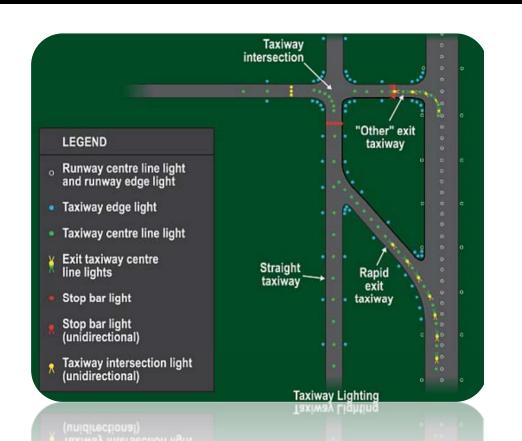
Aerodrome Taxiway



Aerodrome Runway



Aerodrome Lighting



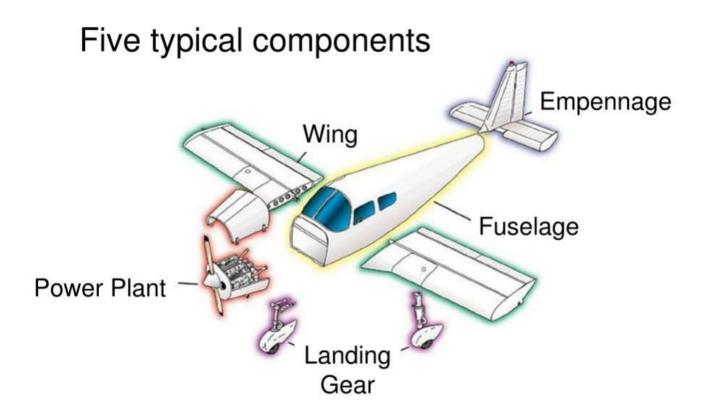
Aerodrome Stand



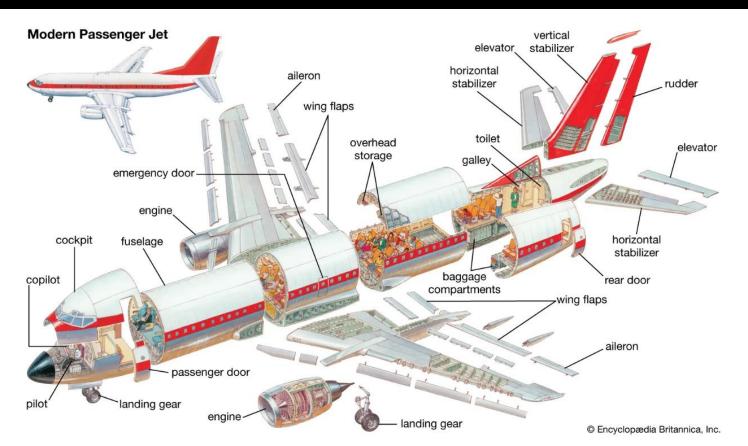
02

Principles of Flight

Aircraft Components



Aircraft Components



Aircraft Components

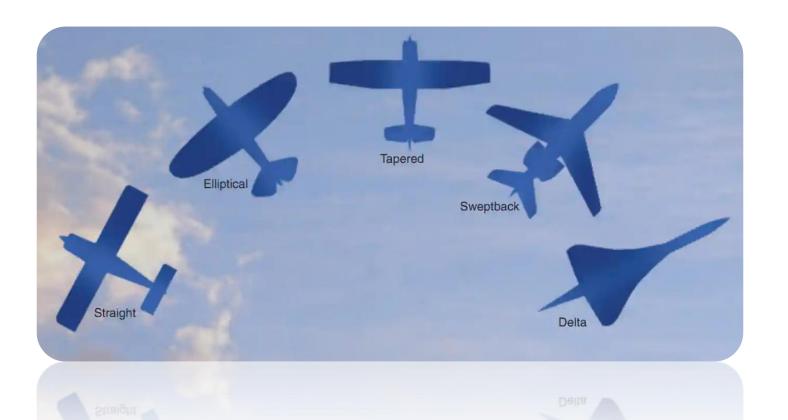
• Fuselage:

The fuselage is the central body of an airplane and is designed to accommodate the crew, passengers, and cargo. It also provides the structural connection for the wings and tail assembly.

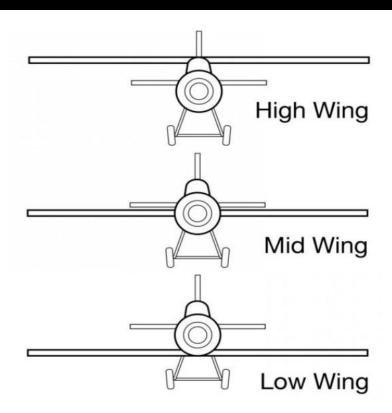
• Wing:

The wings are attached to each side of the fuselage, support the airplane in flight.

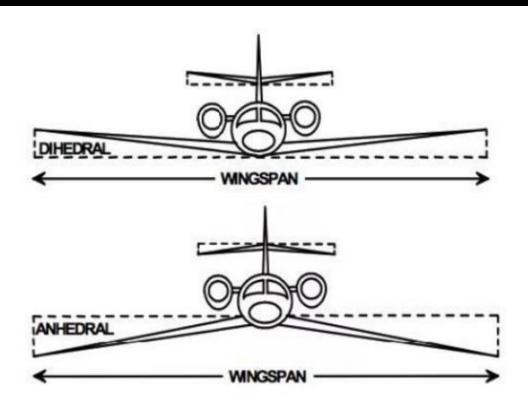
Aircraft Wing



Aircraft Wing

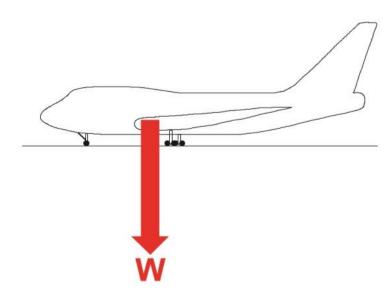


Aircraft Wing



• Weight:

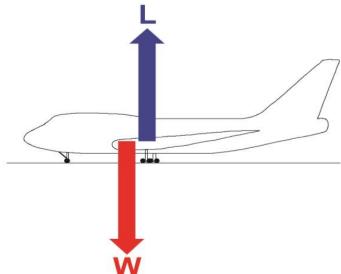
With the aircraft stationary on the ground it has only the force due to the acceleration of gravity acting upon it. This force, its WEIGHT, acts vertically downward at all times.



• Lift:

Before an aeroplane can leave the ground and fly, the force of weight must be balanced by a force which acts upwards. This force is called LIFT. The lift force must be increased until it is the same as

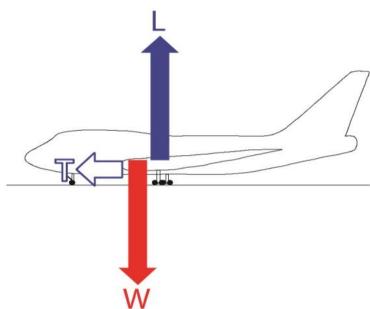
the aeroplane's weight.



• Thrust:

To generate a lift force, the aeroplane must be propelled forward through the air by a force called

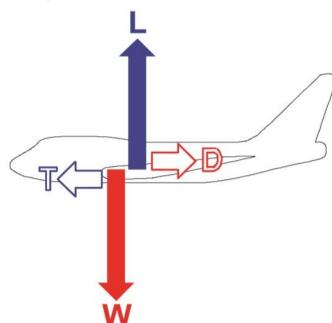
THRUST, provided by the engine(s).



• Drag:

From the very moment the aeroplane begins to move, air resists its forward motion with a force

called DRAG.

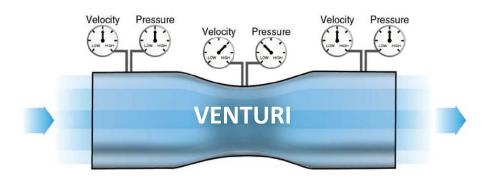


HOW DOES LIFT PRODUCE?

• BERNOULLI'S PRINCIPLE:

states that:

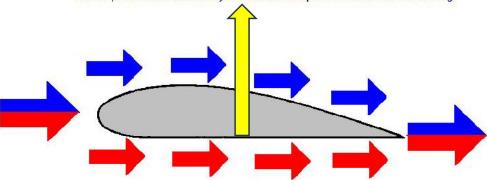
as the velocity of a moving fluid (liquid or gas) increases increases, the pressure within the fluid decreases.



HOW DOES LIFT PRODUCE?

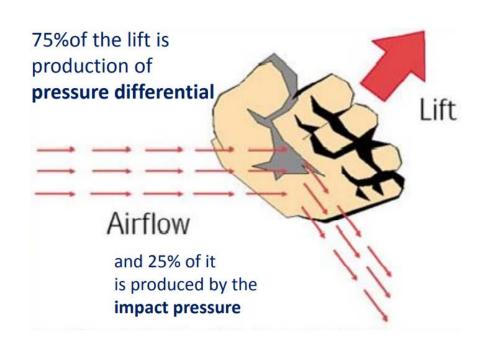
LIFT

Lower pressure is caused by the increased speed of the air over the wing.



Since the pressure is higher beneath the wing the wing is pushed upwards.

HOW DOES LIFT PRODUCE?

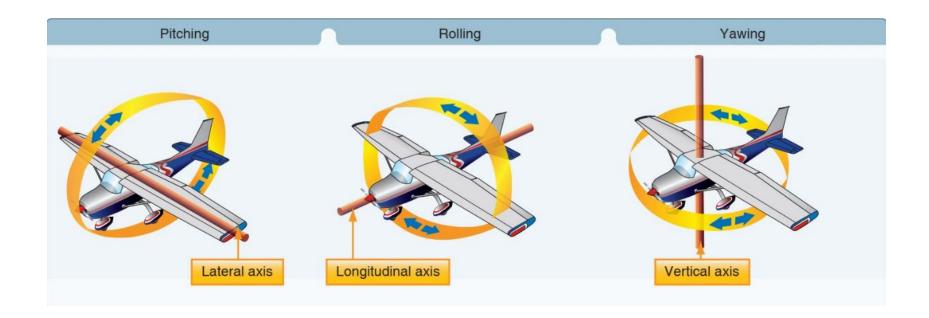


WAKE TURBULENCE

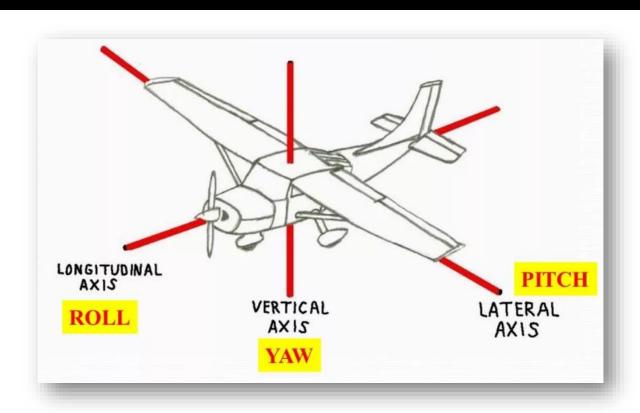
- Trailing wing tip vortices extend behind aircraft for a considerable distance and can present an extreme hazard to any aircraft unfortunate enough to encounter them.
- Wake turbulence cannot be detected, so it is important for pilots to be aware of the potential distribution and duration of trailing vortices.



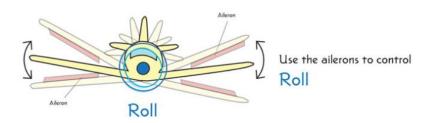
Aircraft Axis

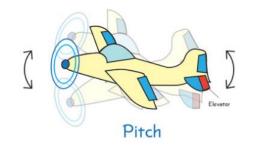


Aircraft Axis

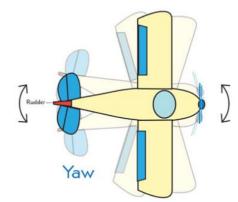


Aircraft Motion Around Axis



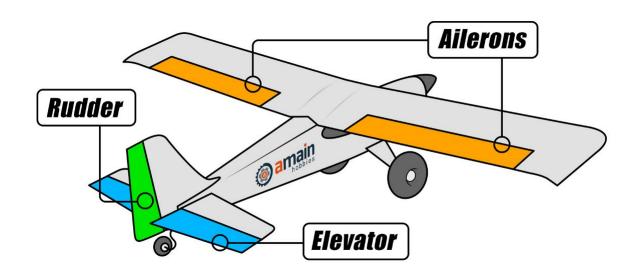


Use the elevators to control Pitch

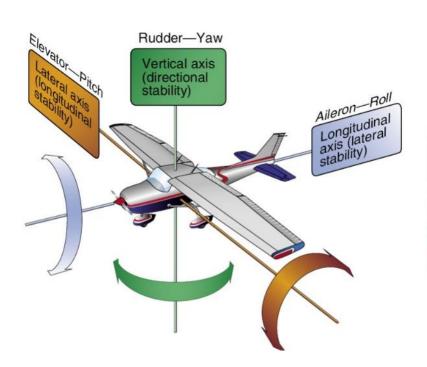


Use the rudder to control Yaw

Aircraft Control Surfaces



Aircraft Control Surfaces



Primary Control Surface	Airplane Movement	Axes of Rotation
Aileron	Roll	Longitudinal
Elevator/ Stabilator	Pitch	Lateral
Rudder	Yaw	Vertical

High Lift Devices

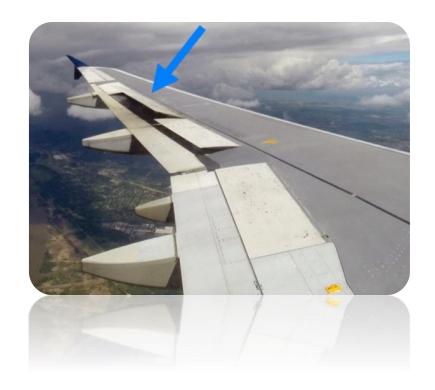
- Aircraft are fitted with high lift devices to reduce the take-off and landing distances.
- High lift devices are flaps and slats.





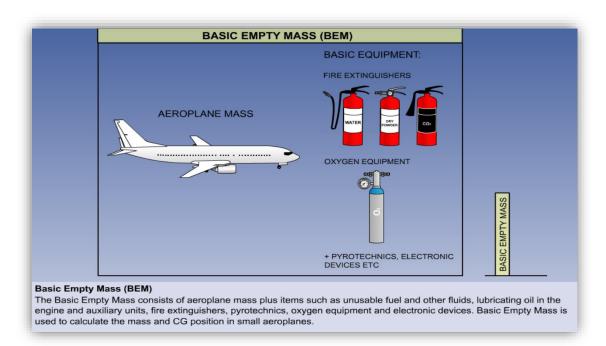
Air Brakes

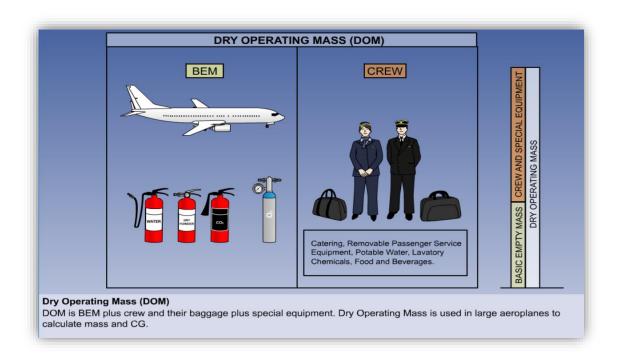


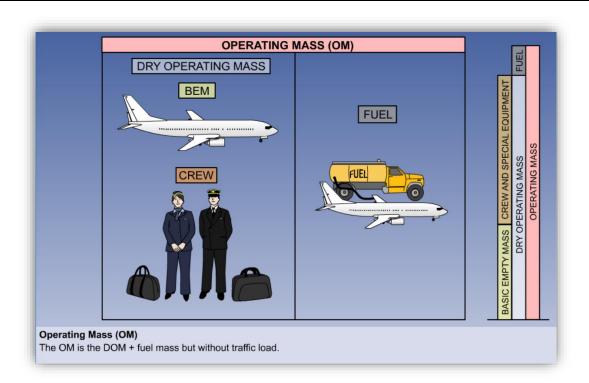


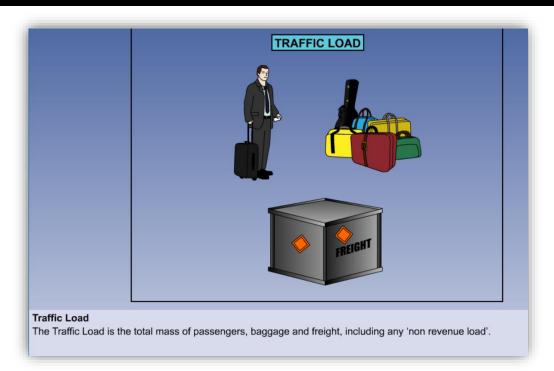
03

Weight & Balance

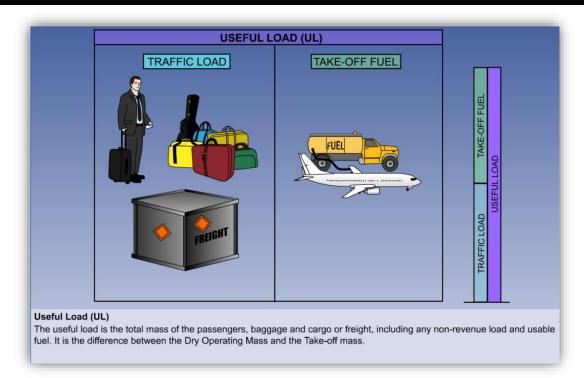


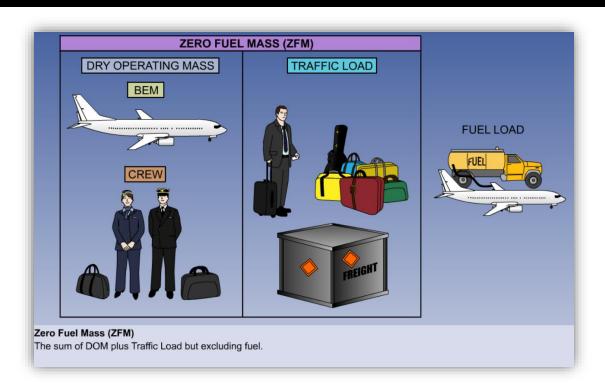


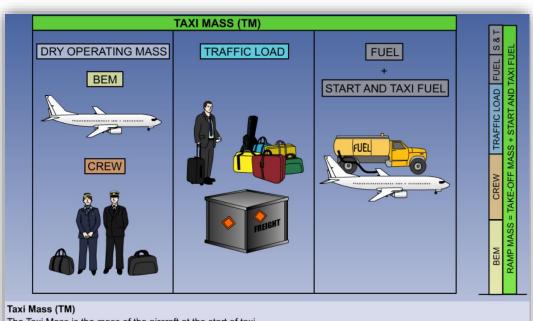




Difference between Traffic load and payload is non revenue load





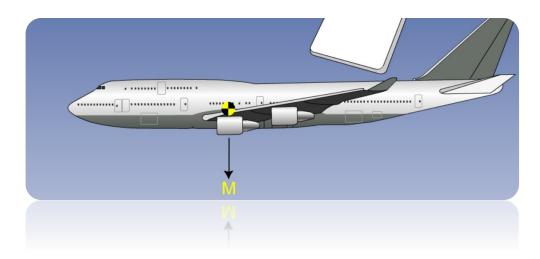


The Taxi Mass is the mass of the aircraft at the start of taxi. It may be referred to as Ramp Mass.



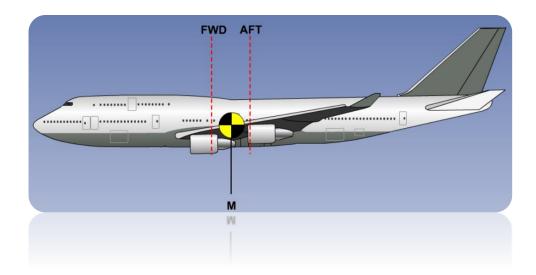
Center of Gravity

- Center of gravity (CG)
- The point through which the weight acts.
- > The point of aircraft balance.
- > The point which the aircraft maneuvers around it.



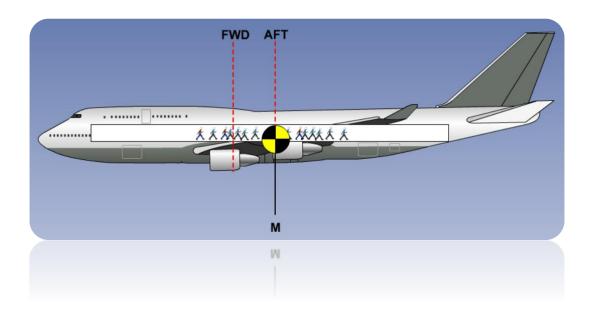
Center of Gravity Limits

- CG limits
- The point of CG must locate between forward and aft limits during all phases of flight.
- > The CG limits are constant points which determine by aircraft manufacture.
- > If the CG moves out side of limits the performance of the aircraft would be affected.



Centre of gravity movement

CG moves toward the heavier side.



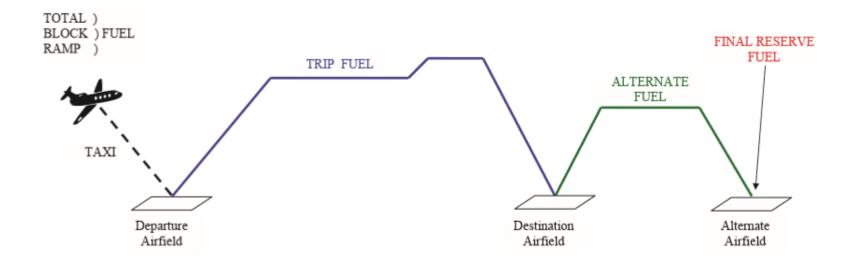
Centre of gravity movement

- Factors affecting CG position:
- Passenger and cargo distribution
- Fuel distribution

Aircraft Fuel Definitions

- Block fuel: total amount of fuel on bord of aircraft before starting taxi.
- Taxi fuel: amount of fuel required to taxi from apron to runway.
- Trip fuel: amount of fuel required to fly from departure to destination.
- Final reserve fuel: amount of fuel to allow aircraft to fly 30 minutes in holding.
- Alternate fuel: amount of fuel to allow aircraft to fly to alternate aerodrome if its Not possible to land in destination.

Aircraft Fuel Definitions



Holding

- As the name suggests, holding is the act of delaying an aircraft from proceeding on course.
- Holding becomes necessary when there is a need to keep air traffic within specified airspace that is reasonably protected.



04

Meteorology

Atmosphere 😕

The earth is surrounded by a mixture of gases which are held to it by gravity.

The mixture of gases is called air

and

the space it occupies is called the atmosphere.

Mass Below This Level 53,000 50% of Mass Below This Level 50% of Mass Below This Level 50% of Mass Below This Level

The Constituents of the Atmosphere (By Volume)

Nitrogen Oxygen 78.09% 20.95% Argon

Carbon Dioxide

0.93%

Plus traces of:

Neon Krypton Hydrogen Nitrous Oxide Carbon Monoxide

Ammonia

Helium Xenon Methane Nitrogen Dioxide Sulphur Dioxide Iodine and Ozone The atmosphere protects life on earth by shielding it from incoming ultraviolet (UV) radiation

S. S.

ures.

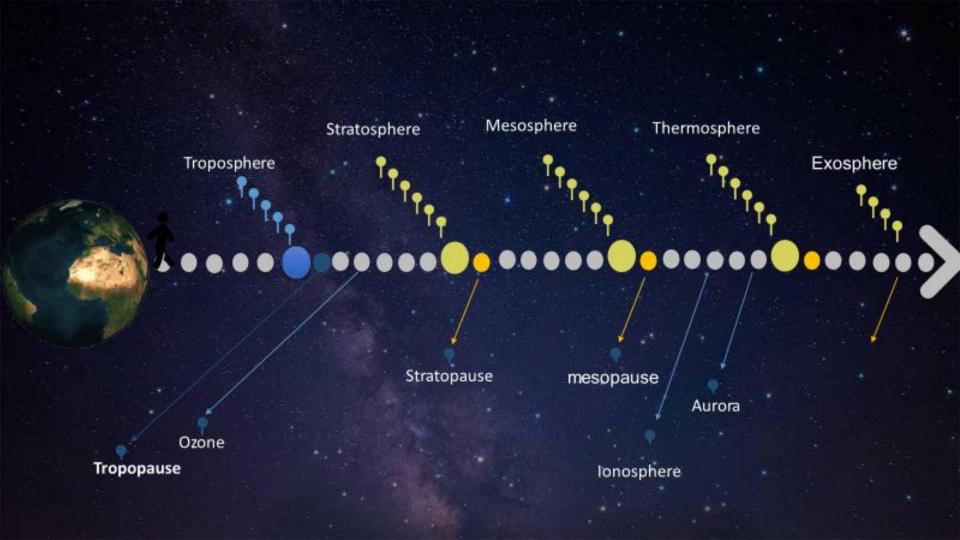
C

keeping the planet warm, and preventing extremes between day and night temperatures.

The sun heats layers of the atmosphere causing it to convect driving air movement and weather patterns around the world.

The Structure of the Atmosphere

Thermosphere Troposphere Stratosphere Mesosphere



Troposphere

contains almost all the weather.



consists of 3/4 of the total atmosphere in weight.



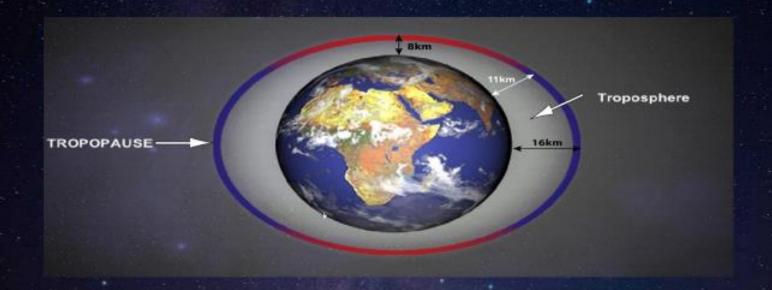
Temperature decreases with an increase in height.

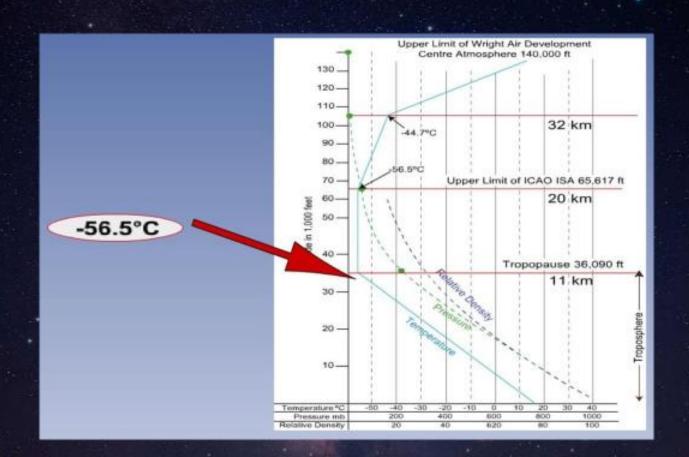


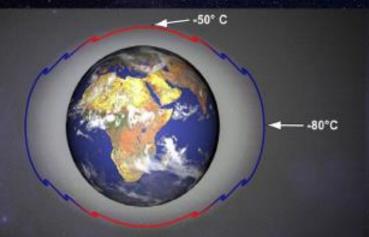
part of the atmosphere that most of the water vapor is contained



DISTANCE



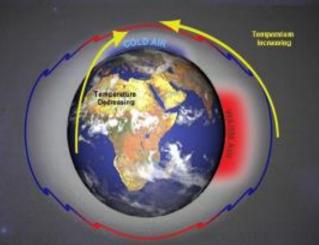


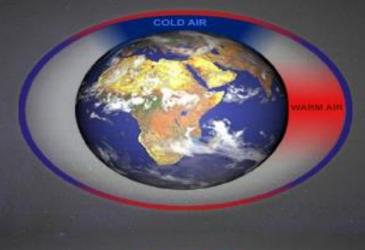


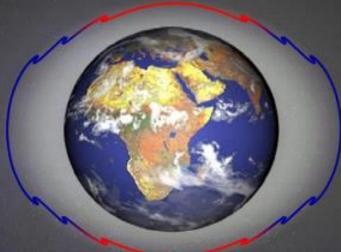




MARCH

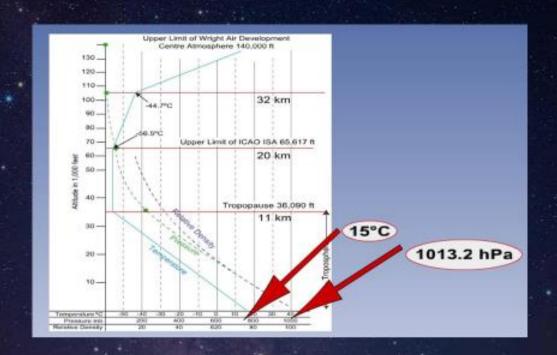




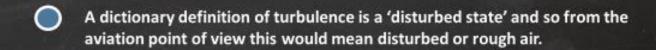


The ICAO International Standard Atmosphere (ISA) is:

- · a MSL temperature of +15° Celsius,
- a MSL pressure of 1013.25 hectopascals (hPa),
- · a MSL density of 1225 grams / cubic metre,
- a lapse rate of (2°C/1000 ft) up to 11 km (36 000 ft),
- a constant temperature of -56.5°C up to 20 km (65 617 ft),







Light Turbulence

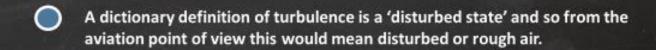
Turbulence that momentarily causes slight, erratic changes in altitude and/or attitude (pitch, roll, yaw).

Moderate Turbulence

Turbulence that is similar to light Turbulence but of greater intensity. Changes in altitude and/or attitude occur but the aircraft remains in positive control at all times.

Severe Turbulence

Turbulence that causes large, abrupt changes in altitude and/or attitude. Aircraft may be momentarily out of control.



Light Turbulence

Turbulence that momentarily causes slight, erratic changes in altitude and/or attitude (pitch, roll, yaw).

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Severe Turbulence

Turbulence that causes large, abrupt changes in altitude and/or attitude. Aircraft may be momentarily out of control.



- Wind shear
- Thermal Turbulence
- Mechanical Turbulence
- Cumulonimbus Clouds
- Jet streams

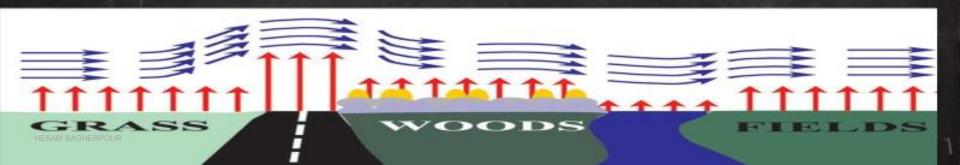
Wind shear

- Windshear is the sudden change in speed and/or direction of the wind including vertical currents.
- These changes affect the energy of the aircraft and that change in energy is felt inside the aircraft as turbulence

- Locations
- Turbulence occurs:
- In the friction layer.
- In douds.
- In clear air.

Thermal Turbulence

- Insolation gives rise to convection currents. The intensity of these currents
 depends on the heating of the surface. Surfaces like rock and concrete heat
 rapidly and give rise to strong vertical currents, whereas grass and wooded
 areas will only heat slowly and create weak convection currents. So flight
 within the friction layer on a sunny day will be affected by variable speed
 vertical currents and hence windshear giving turbulence.
- Thermal turbulence is greatest around 1500 hrs on clear sunny days.
- There is no thermal turbulence over the sea



Mechanical Turbulence

 This is caused by physical obstructions to the normal flow of air such as hills, mountains, coasts, trees and buildings.



Jet Streams

- Jetstreams are narrow fast moving currents of air which occur just below the tropopause.
- Generally the associated turbulence is found on the cold air side of the Jet Stream just below the core where the greatest windshear occurs, with a secondary area above the core extending into the stratosphere as the winds rapidly decrease in strength. The turbulence will be more severe with curved jets, developing and rapidly moving jets and in mountainous areas, particularly when mountain waves are present



INTRODUCTION

Clouds are collections of water droplets, ice crystals, or a mixture of both.

They provide indications of:

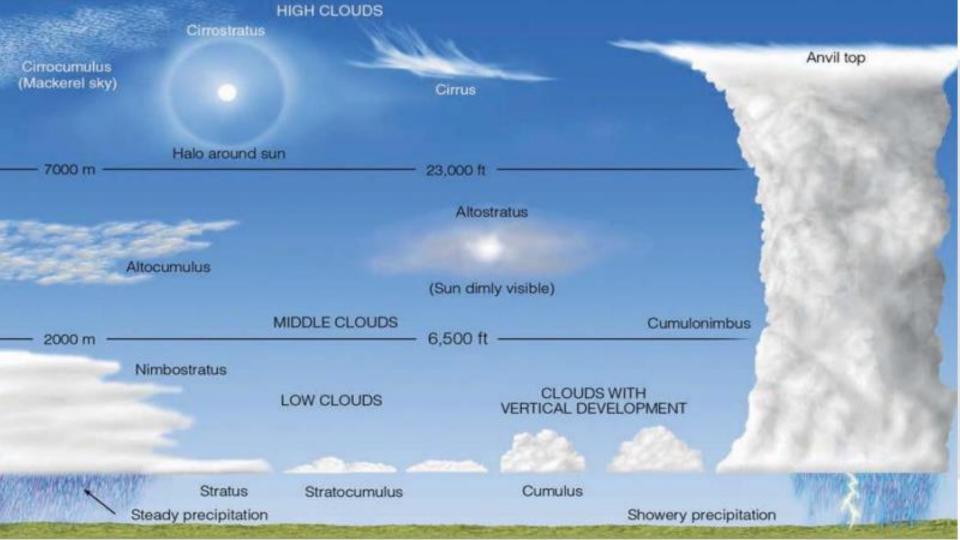
- 1. possible turbulence
- poor visibility
- 3. precipitation
- 4. icing











STRATUS, ST



Stratus (ST)

- Stratus (St) is a uniform grayish cloud
- is a layer cloud with large horizontal extent but little vertical development.
- It generally has a very low doud base (below 1000ft) and covers the whole sky.
- It is a turbulence doud, often found in the warm sector of polar front depressions.
- It can also be formed when low fog lifts.
- ST consists of water droplets that are sub-zero in winter but are not very dense, so light to moderate icing can be expected.

 Precipitation may occur as drizzle,



The nimbostratus (Ns)

- is a dark gray, "wet"-looking cloudy layer associated with more or less continuously falling rain or snow
- The intensity of this precipitation is usually light or moderate it is never of the heavy, showery variety, unless well-developed cumulus clouds are embedded within the nimbostratus cloud.
- The base of the nimbostratus cloud is normally impossible to identify clearly and its top may be over 3 km (10,000 ft) higher.

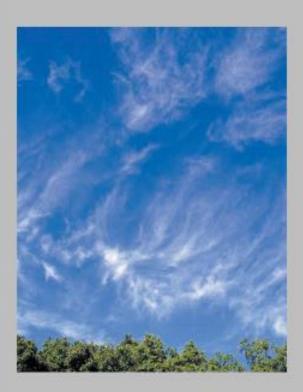
- Thin nimbostratus is usually darker gray than thick altostratus, and you normally cannot see the sun or moon through a layer of nimbostratus.
- Visibility below a nimbostratus cloud deck is usually quite poor because rain will evaporate and mix with the air in this region.
- If this air becomes saturated, a lower layer of clouds or fog may form beneath the original cloud base.

CIRRUS

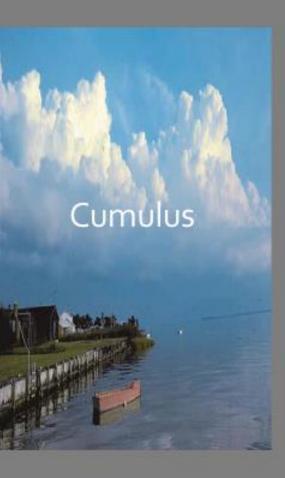
- Cirrus is a thin wispy cloud.
- It is associated with the approach of a warm front.
- It can also indicate the line of a jet stream.
- It consists of ice crystals and does not produce icing or precipitation. Likewise,
- 5. there is no turbulence.



CIRRUS (Ci)



The most common high clouds are the **cirrus** (Ci),



cumulus (Cu) cloud takes on a variety of shapes, but most often it looks like a piece of floating cotton

with sharp outlines and a flat base.

The base appears white to light gray and, on a humid day, may be only 1000m (3300 ft) above the ground and a kilometer or so wide. The top of the cloud — often in the form of rounded

Precipitation that falls from a cumulus is always showery.



a head of cauliflower, it becomes a cumulus congestus, or towering cumulus (Tcu). Most often, it is a single large cloud, but, occasionally several grow into each other, forming a line of towering clouds.

CUMULONIMBUS

Cumulonimbus is a towering cumulus cloud with a top that has turned into cirrus. This is called

the anvil and extends in the direction of the wind.

This cloud is very hazardous to aircraft. It is very dense and consists of water droplets of varying

sizes, so moderate to severe icing may be expected. Moderate to severe turbulence is also likely.

CB can give precipitation in the form of rain or snow showers and hail.

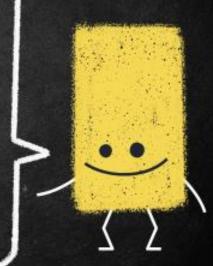


ICING

CONDITIONS

Ice forms on an airframe if the following three conditions are present:

- Water is present in a liquid state.
- 2. The ambient air temperature is below 0°C.
- 3. The airframe temperature is below 0°C.





EFFECTS OF ICING

















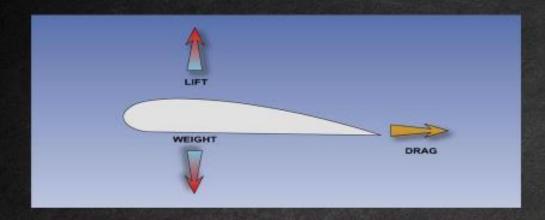


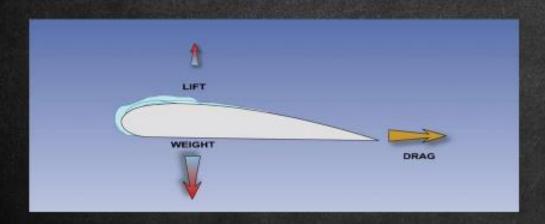


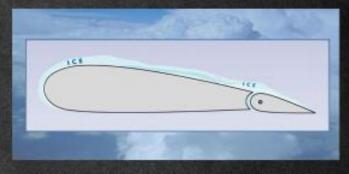
AERODYNAMIC

Ice forms mostly on the leading edges of the airframe and aerofoils. This spoils the aerodynamic shape of the airframe and leads to:







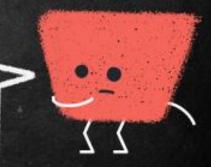


SIGNIFICANT ICING CAN JAM THE CONTROLS

INSTRUMENTS

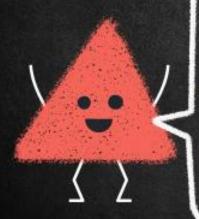
Ice may block the pitot and static inlets leading to gross instrument errors in the altimeter,

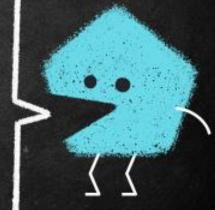
airspeed indicator, vertical speed indicator and Machmeter. The safety implications of this are far-reaching.



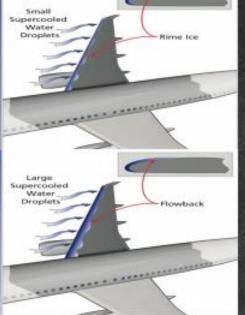
OTHER EFFECTS

- · Other miscellaneous effects include:
- ✓ Skin damage from chunks of ice breaking off propellers
- ✓ Obscuration of windscreens
- Increased skin friction and associated performance effects
- Radio interference due to ice build-up on aerials
- Landing gear deployment/retraction problems if ice forms in gear wells or freezes gear doors closed













Rime Ice: Granular and opaque in appearance caused by small supercooled water droplets

Clear Ice: smooth and transparent in appearance caused by large supercooled water droplets

Mixed ice: Rime and Clear ice characteristic

05

Operational Procedure

TAXI

• Movement of an aircraft along the ground under its own power excluding before take-off or after landing.

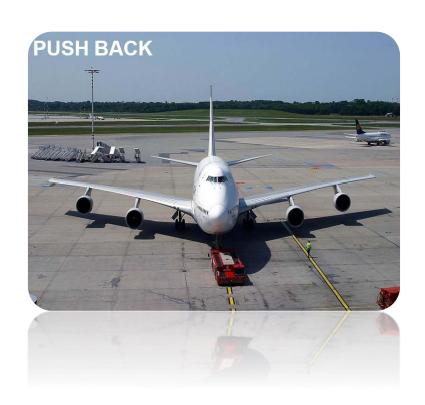


TOW

• pull an aircraft or vehicle using a bar, rope, etc. attached to another aircraft or vehicle.



Push Back



Contrail



AIRPORT BEACON



Whoa!

Here you could give a brief description of the topic you want to talk about. For example, if you want to talk about Mercury, you could say that it's the smallest planet in the Solar System and the closest one to the Sun



Table of contents

1

2

3

4

Did you know?

Here you could explain the topic of this section

Multiple choice

Is that true?

What you learnt

Here you could explain the topic of this section

GO!

Here you could explain the topic of this section

Here you could explain the topic of this section





GO!



Before starting

Venus has a beautiful name and is the second planet from the Sun. It's terribly hot—even hotter than Mercury—and its atmosphere is extremely poisonous. It's the second-brightest natural object

Tips on how to play

01

Be quick!

Here you could give a brief description of the topic you want to talk about. If you want to talk about Mercury, you could say that it's the closest planet to the Sun and the smallest one

02

Be right!

It's only a bit larger than the Moon, and its name has nothing to do with the liquid metal, since it was named after the Roman messenger god, Mercury

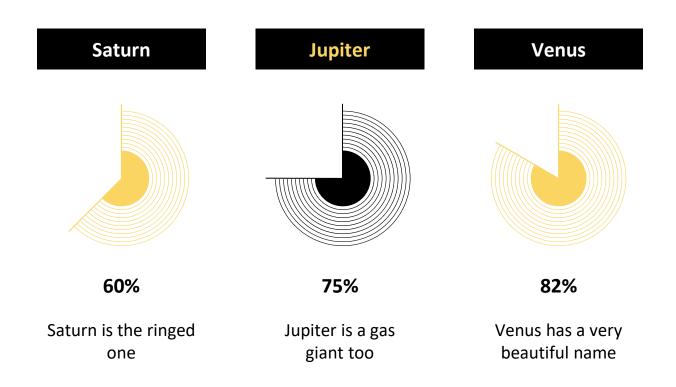


Did you know that Mercury is cold?

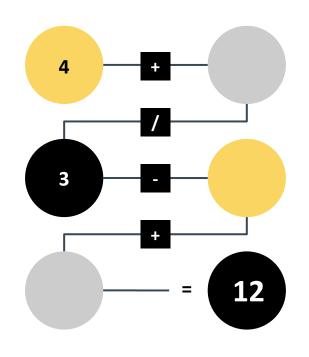
Here you could give a brief description of the topic you want to talk about. For example, if you want to talk about Mercury, you could say that it's the closest planet to the Sun and the smallest one in the Solar System. It's only a bit larger than the Moon

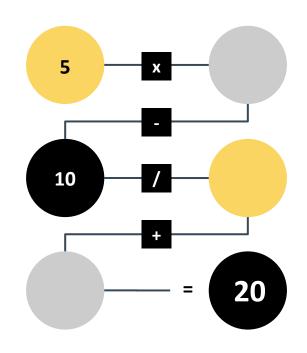


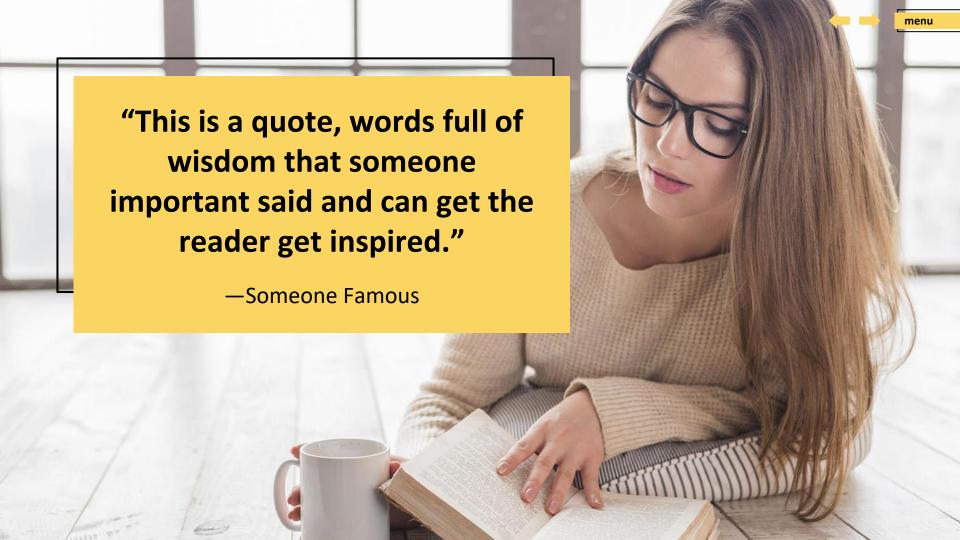
Memorize these percentages



Guess the missing numbers of the following diagrams











02

Multiple choice







Activity 1: The title goes here

24h 37m 23s

Jupiter's rotation period

386,000 km

Between Earth and the Moon

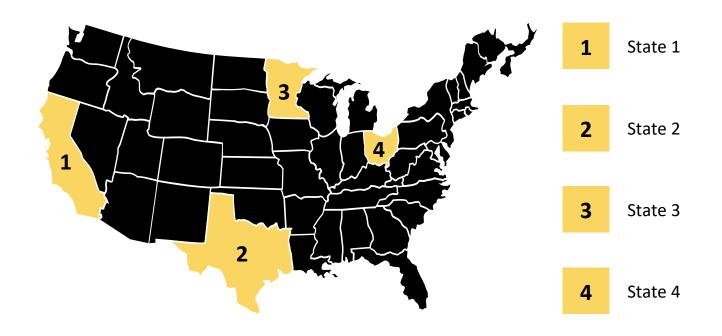
333,000.000

Earth is the Sun's mass





Activity 2: Locate the state





Four columns of text









Venus

Jupiter

Yes, this is the ringed one. It's a gas giant

Saturn

Venus is the second planet from the Sun

Jupiter is a gas
giant and the
biggest planet

Neptune

Neptune is the

farthest planet

from the Sun



03

Is that true?



These are six columns

Mercury

Mercury is the closest planet to the Sun

Saturn

Yes, this is the ringed one. It's a gas giant

Jupiter

Jupiter is a gas giant and the biggest planet

Venus

Venus is the second planet from the Sun

Mars

Despite being red, Mars is actually a cold place

Neptune

Neptune is the farthest planet from the Sun



Activity 3: Choose the correct answer

Here goes the question





Mercury

Mercury is the closest planet to the Sun

Jupiter

Jupiter is a gas giant and the biggest planet



Activity 3: Choose the correct answer

And the correct answer was...





Mercury

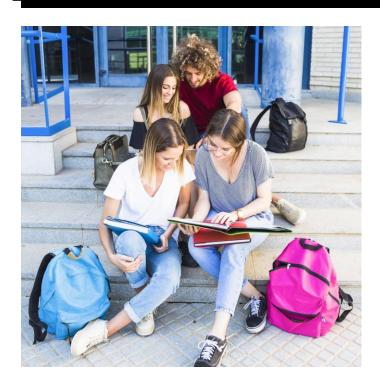
Mercury is the closest planet to the Sun



Jupiter is a gas giant and the biggest planet



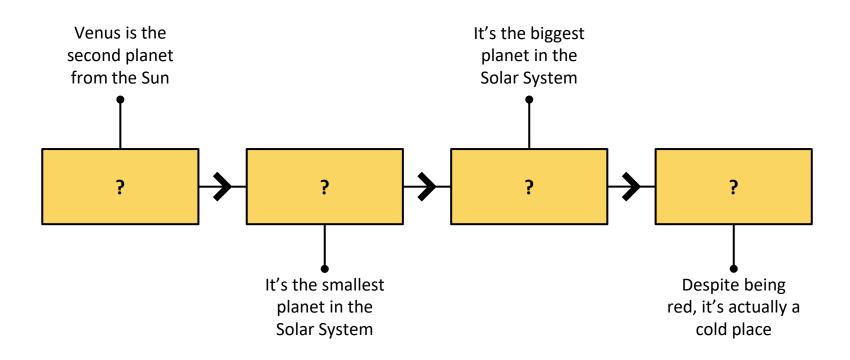
Activity 4: True or false



- ? Neptune is the fourth-largest planet
- ? Venus is the ringed one
- ? Mars the closest planet to the Sun
- ? Jupiter is the biggest planet in the Solar System



Activity 5: Complete the timeline

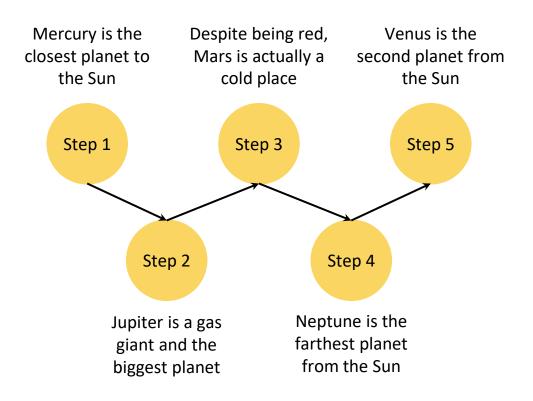








Learning process





Maybe you need to divide the content

Mars

Despite being red, Mars is actually a cold place

Mercury

Mercury is the closest planet to the Sun

Venus

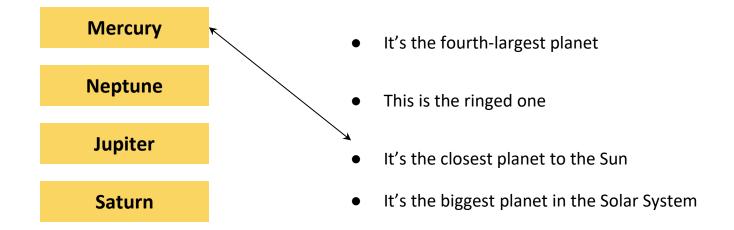
Venus is the second planet from the Sun

Neptune

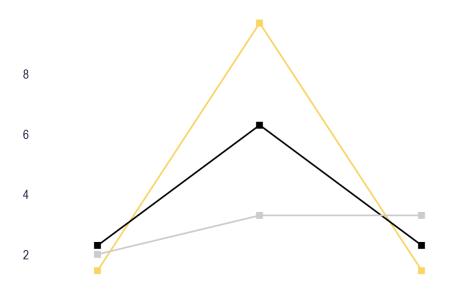
Neptune is the farthest planet from the Sun



Activity 6: Match each planet with its description



This is a graph



*To modify this graph, click on it, follow the link, change the data and paste the new graph here

Saturn
It's the ringed one

Jupiter
2 It's a big gas giant

3 Venus
It has a pretty name



Activity 7: Complete the table

	Mass (Earths)	Diameter (Earths)	Gravity (Earths)
Mars	100	355	?
Mercury	490		890
Venus	,	260	245

Our team







Christina Love

You can replace the image on the screen with your own one

Max Doe

You can replace the image on the screen with your own one

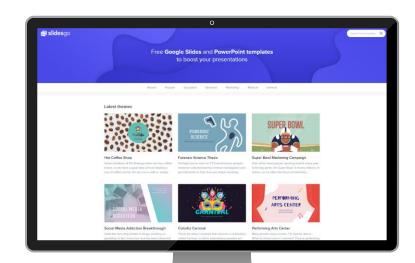
Gia Patterson

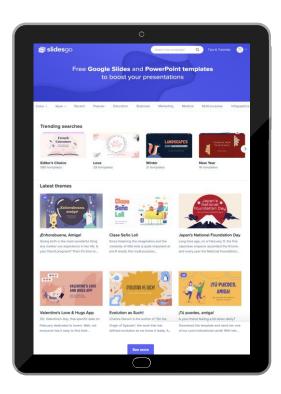
You can replace the image on the screen with your own one



Website

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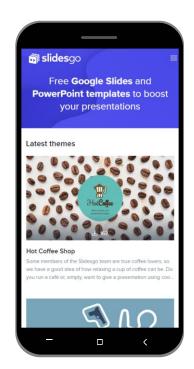
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Thanks!

Do you have any question?

youremail@freepik.com +91 620 421 838 yourcompany.com

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Alternative resources

- Low view of guy wearing a white shirt
- Teenage students walking with books and talking about lessons
- Group of university students hanging out together
- Young student reading a book at the library
- Students sitting and studying on steps
- Students happy to be back at university
- Portrait of student holding books at campus



Resources

- Student working with laptop
- Young college students walking together
- Content girl in class with students
- Blonde young woman lying on hardwood floor reading book
- College students in library
- Pretty girl on porch on university
- Pretty woman reading book in library
- Smart female student with book in library

- Charming young woman sitting in library and reading book
- Friends studying on steps of university building
- Students giving five
- Friends studying near university building
- Cute blonde girl taking a front view selfie
- Student sitting with books and pen in library
- Smiley girl with headphones wearing hoodie

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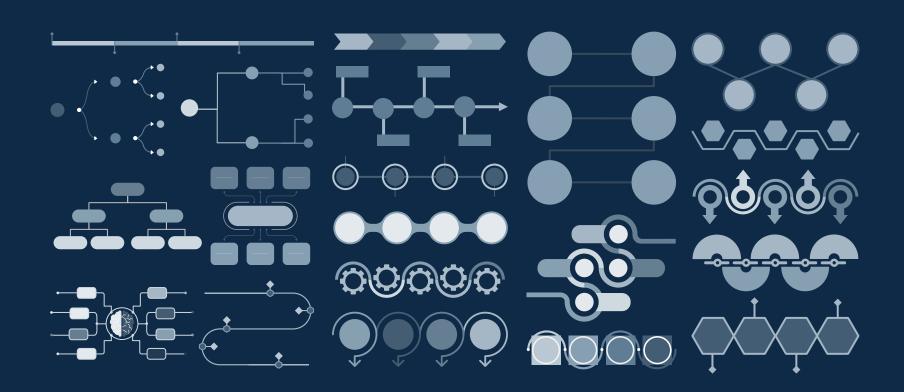
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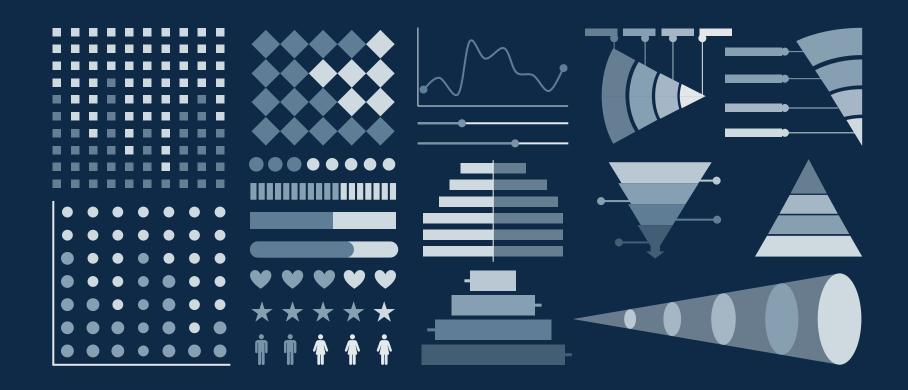












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