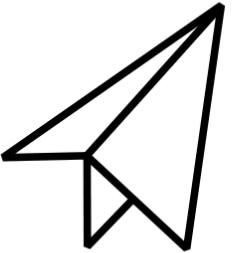
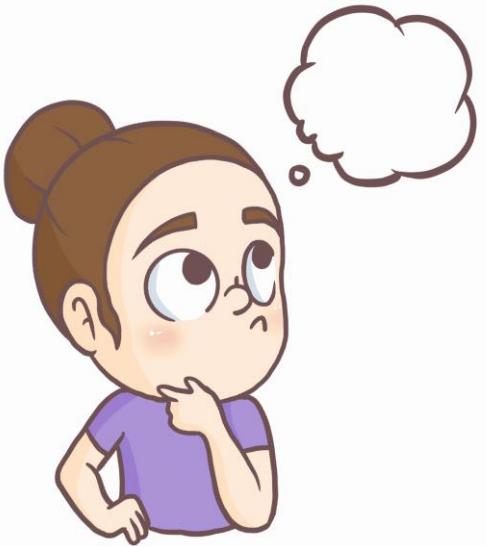


How does an Aeroplane fly?

Content Delivery:
Thejas K V
Aakansha





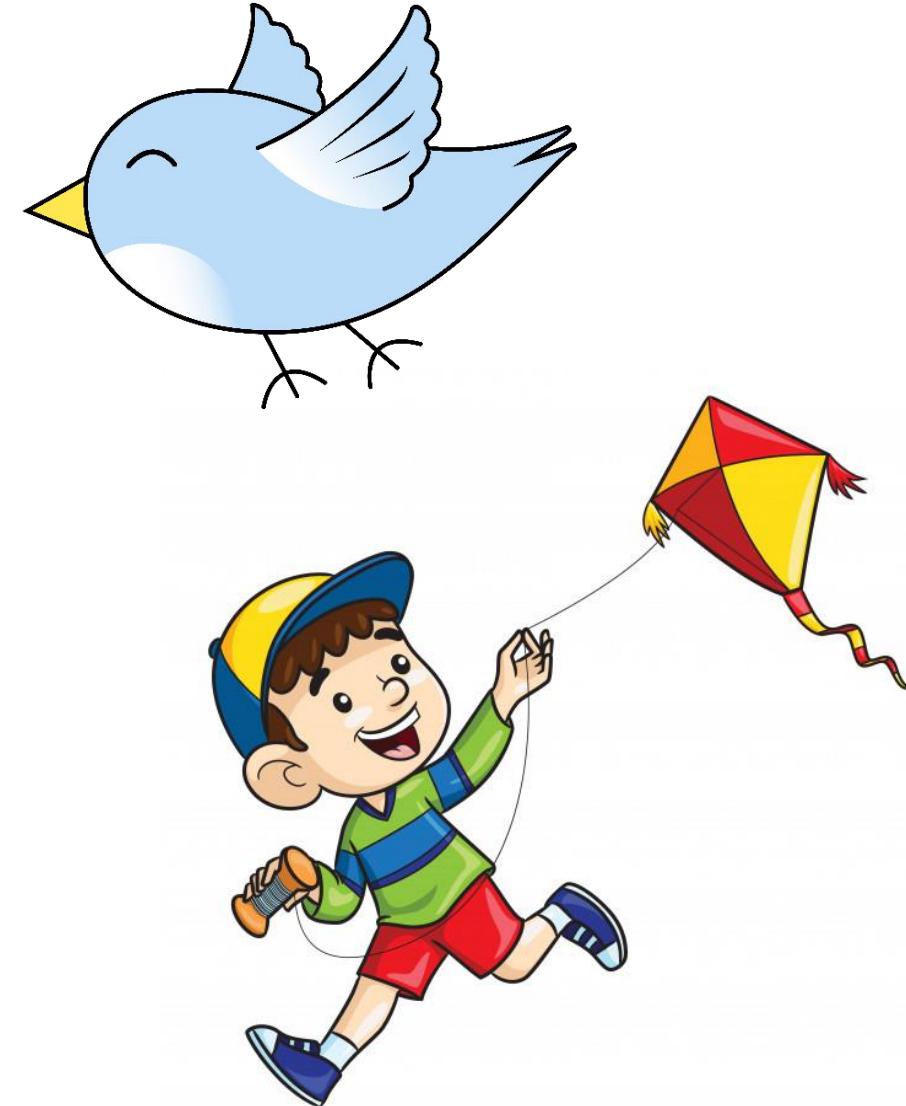
How does an Aeroplane fly?



What do they all have in common?



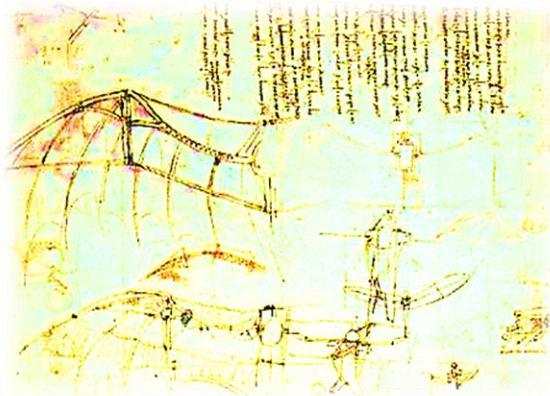
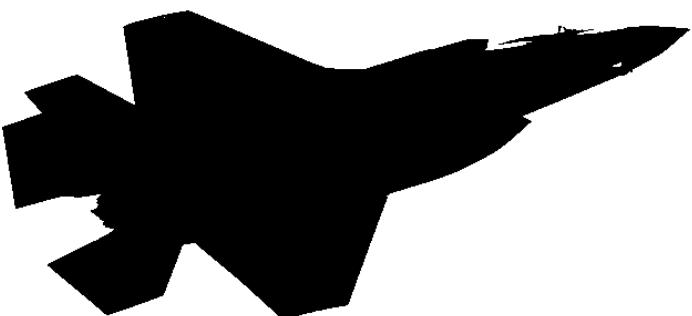
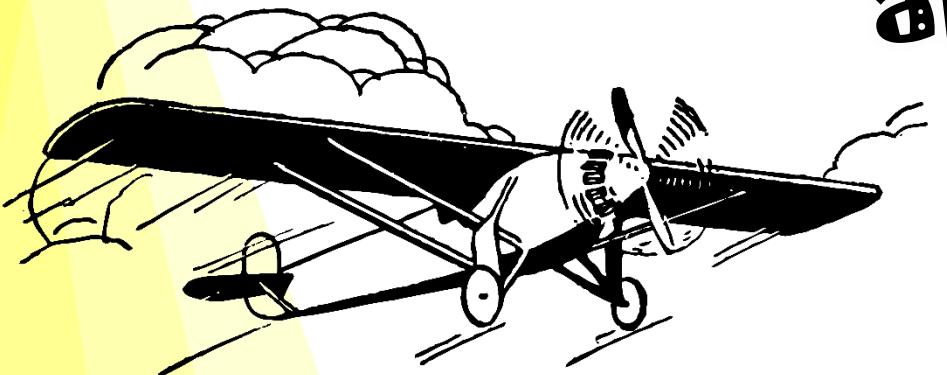
They all can fly!!!



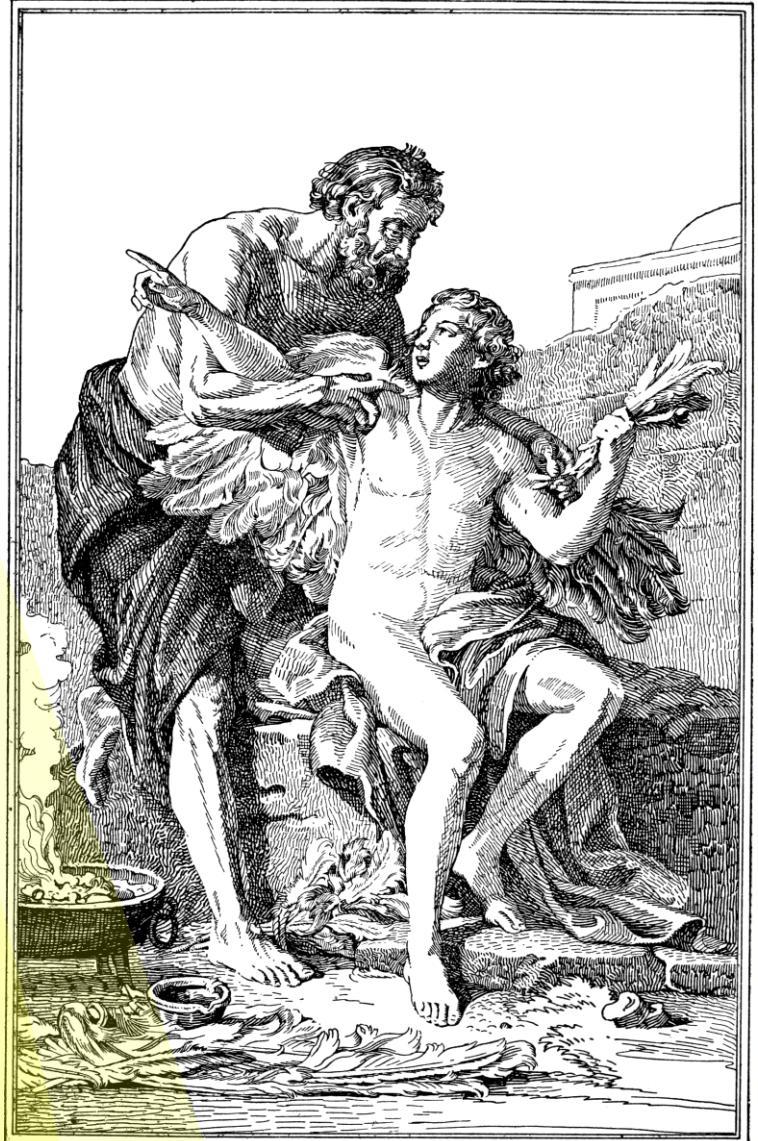


Awe and Aves

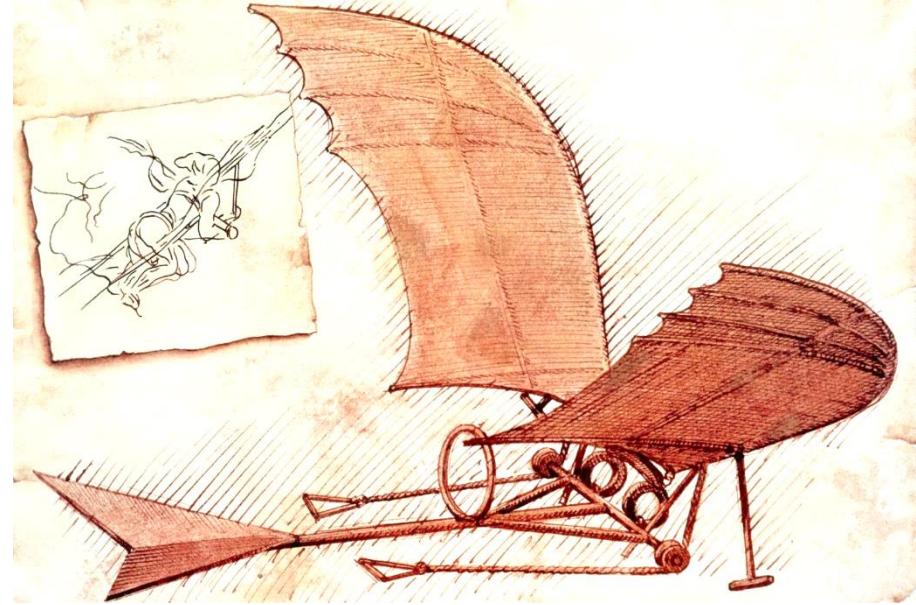
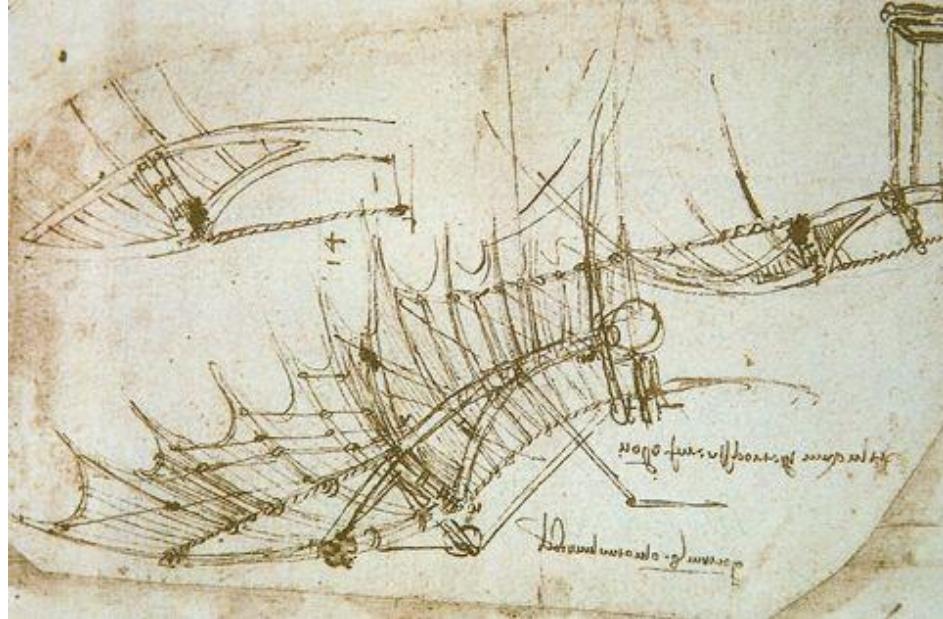
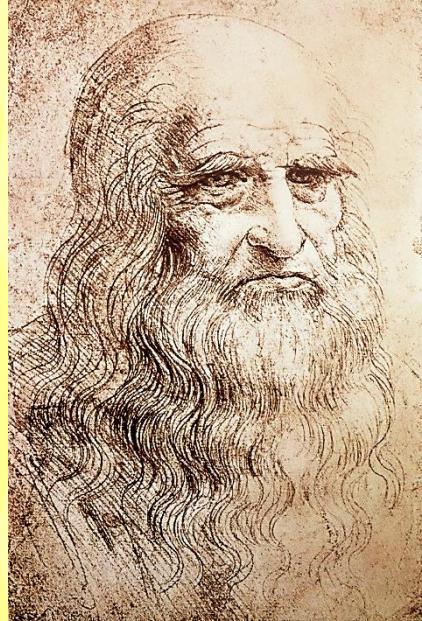
Through the legends
and pages of history...



The legend of Daedalus



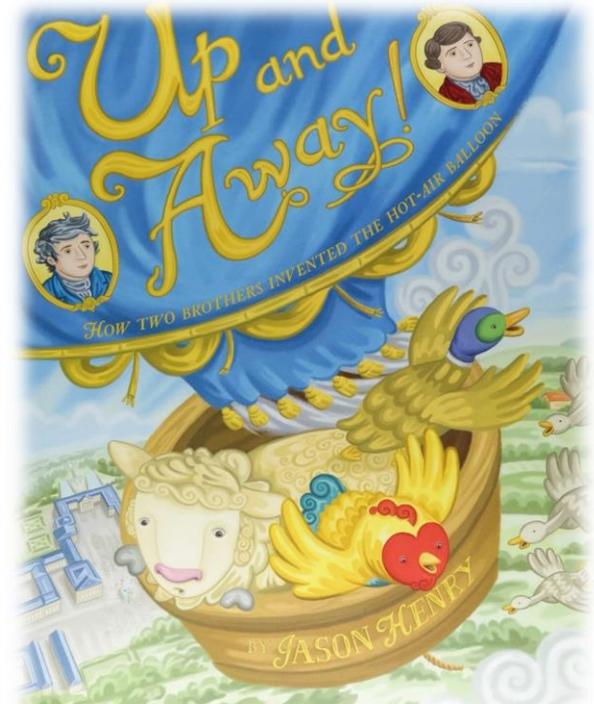
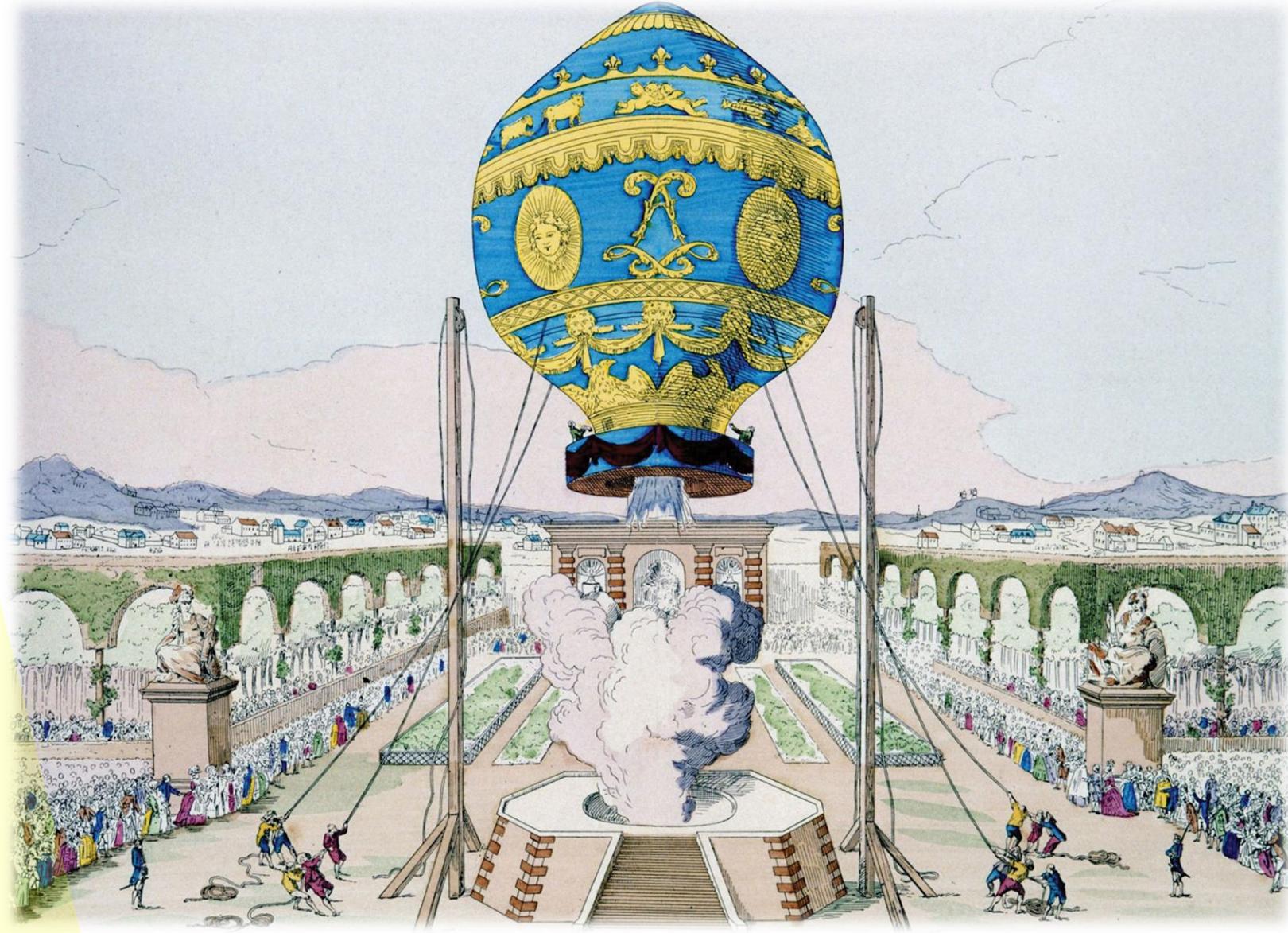
Da Vinci's Flying Machine



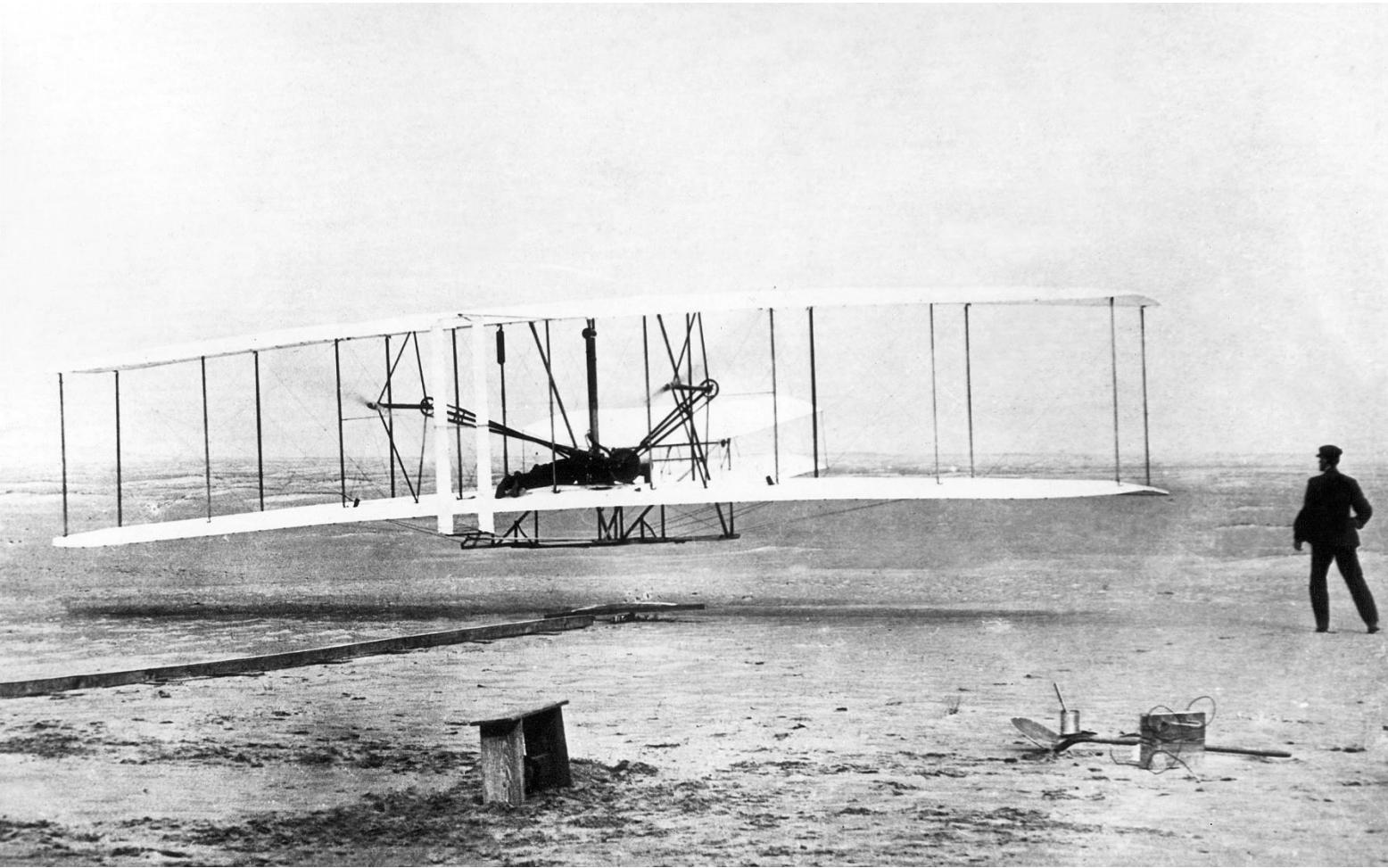
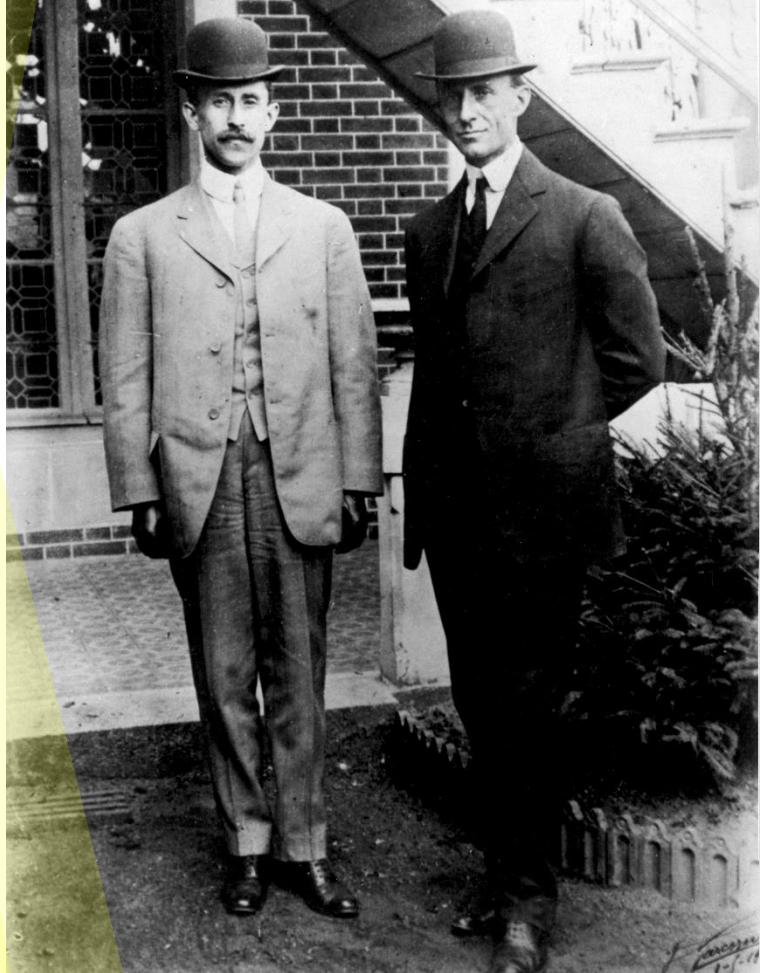
In 15th century, Leonardo da Vinci came up with a design using flapping wing mechanism called Ornithopter. The wings were designed to be powered by human muscles.

Many such designs were developed in the later centuries but were not able to achieve successful flights.

Montgolfier brothers and hot air balloons



Wright Brothers and the first powered flight



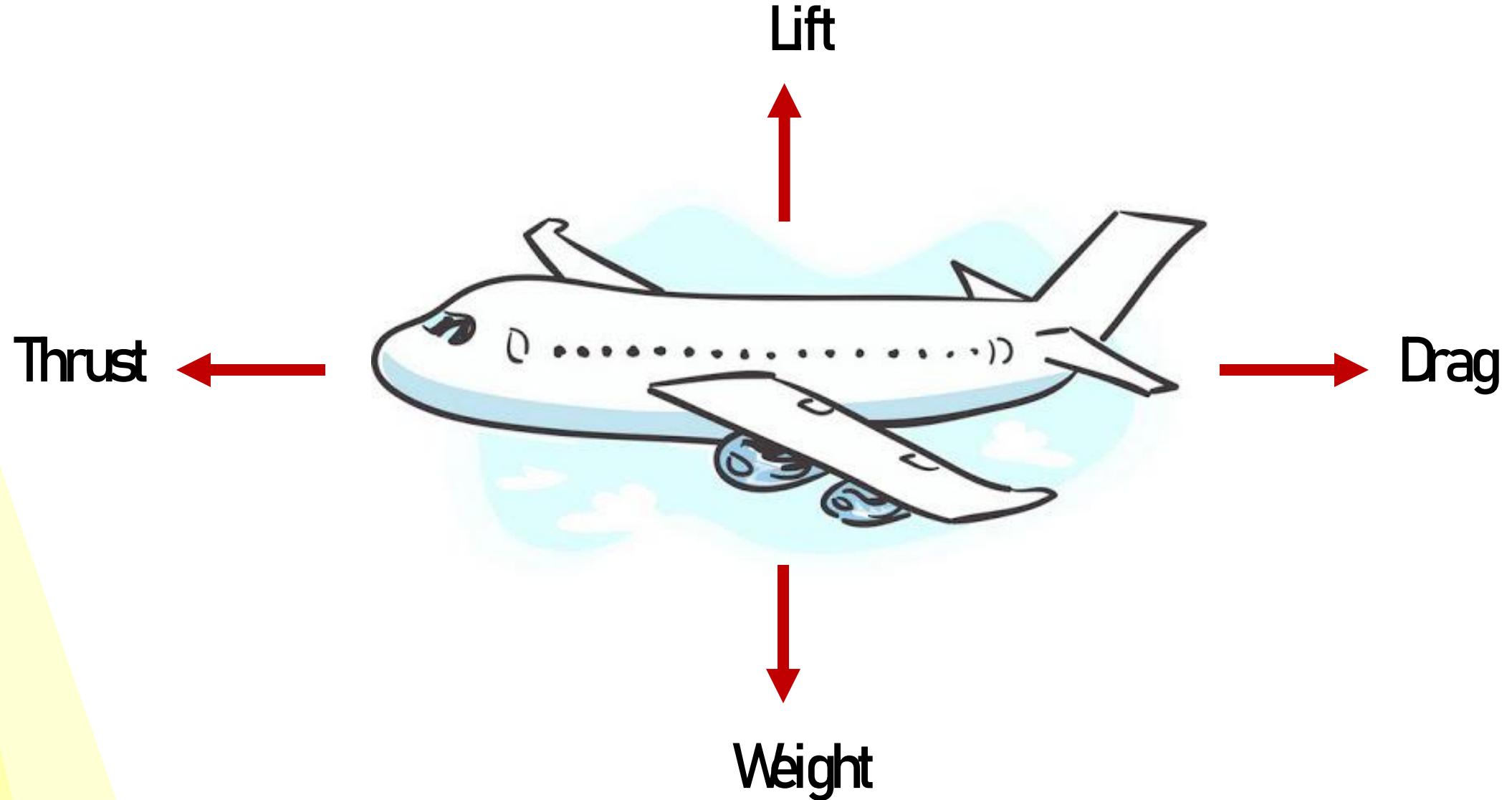
Old Movie Collector

Wright Brothers
First Flight
1903

Wright Brothers First Flight, 1903 – Old Movie Collector

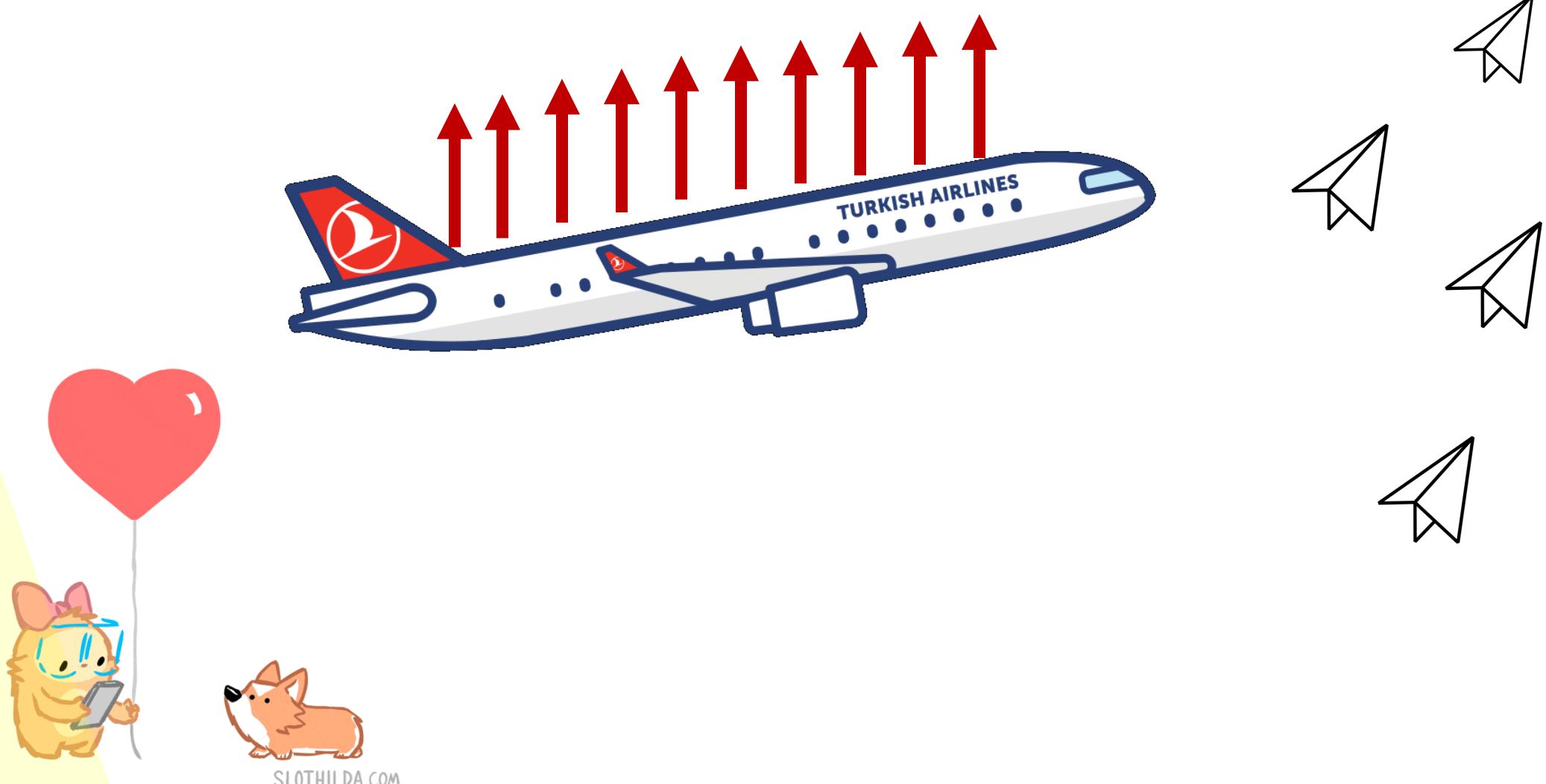
Source: <https://www.youtube.com/watch?v=kjRL-Q-KBc>

There are four forces that act on an airplane



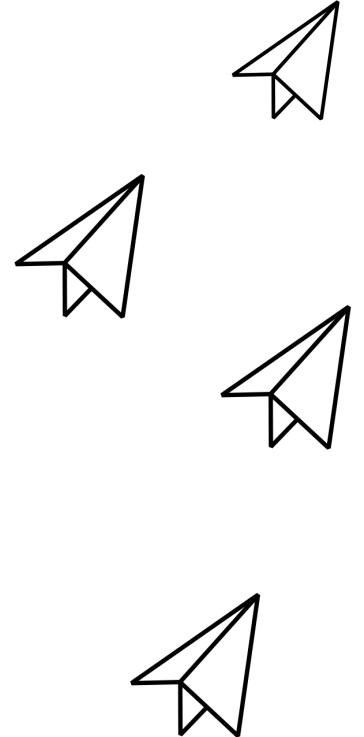
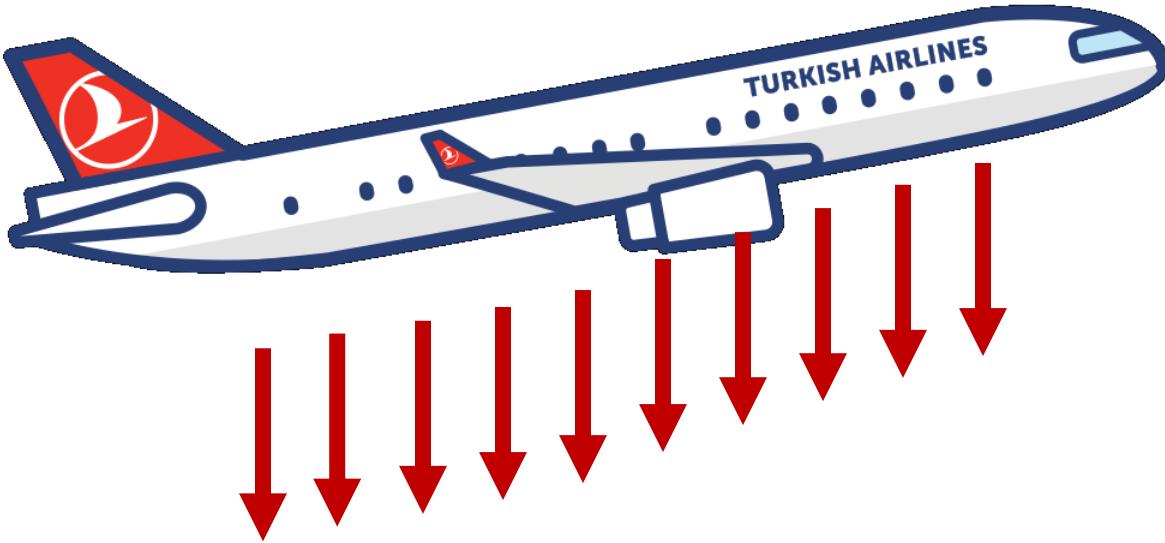
Lift

It is the force that lifts up the aircraft



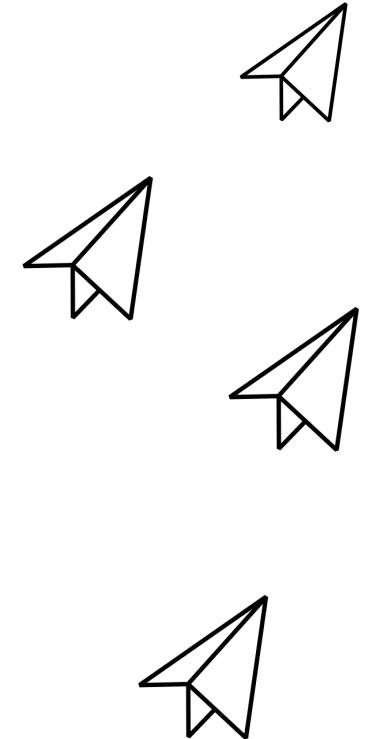
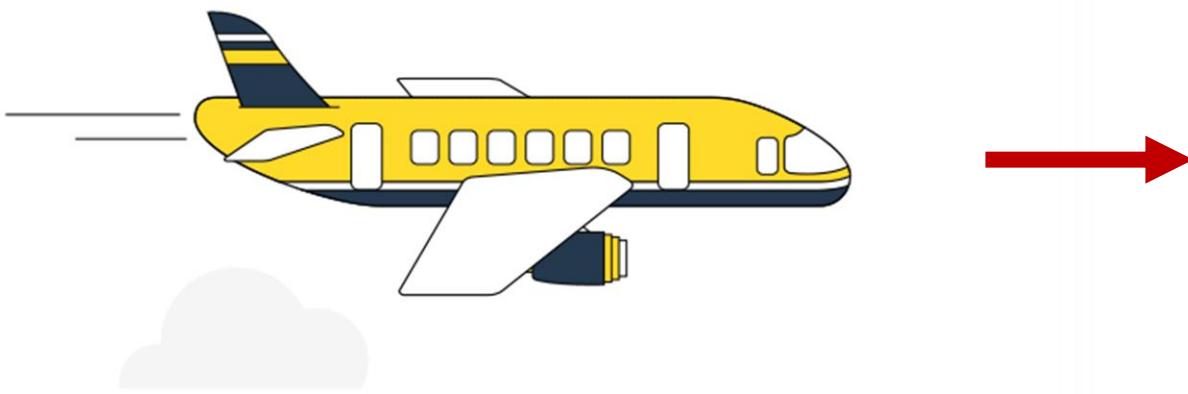
Weight

It is the force that pulls down the aircraft towards Earth due to gravity



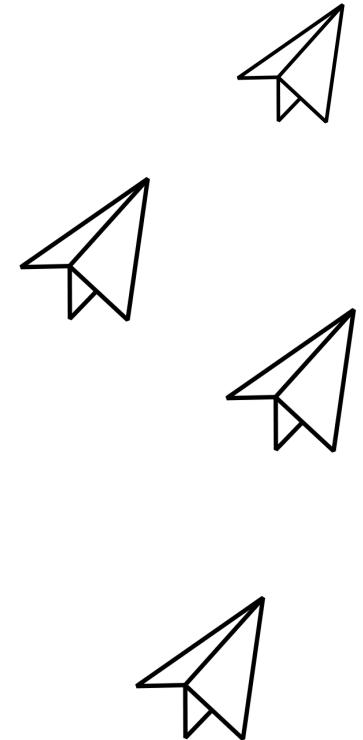
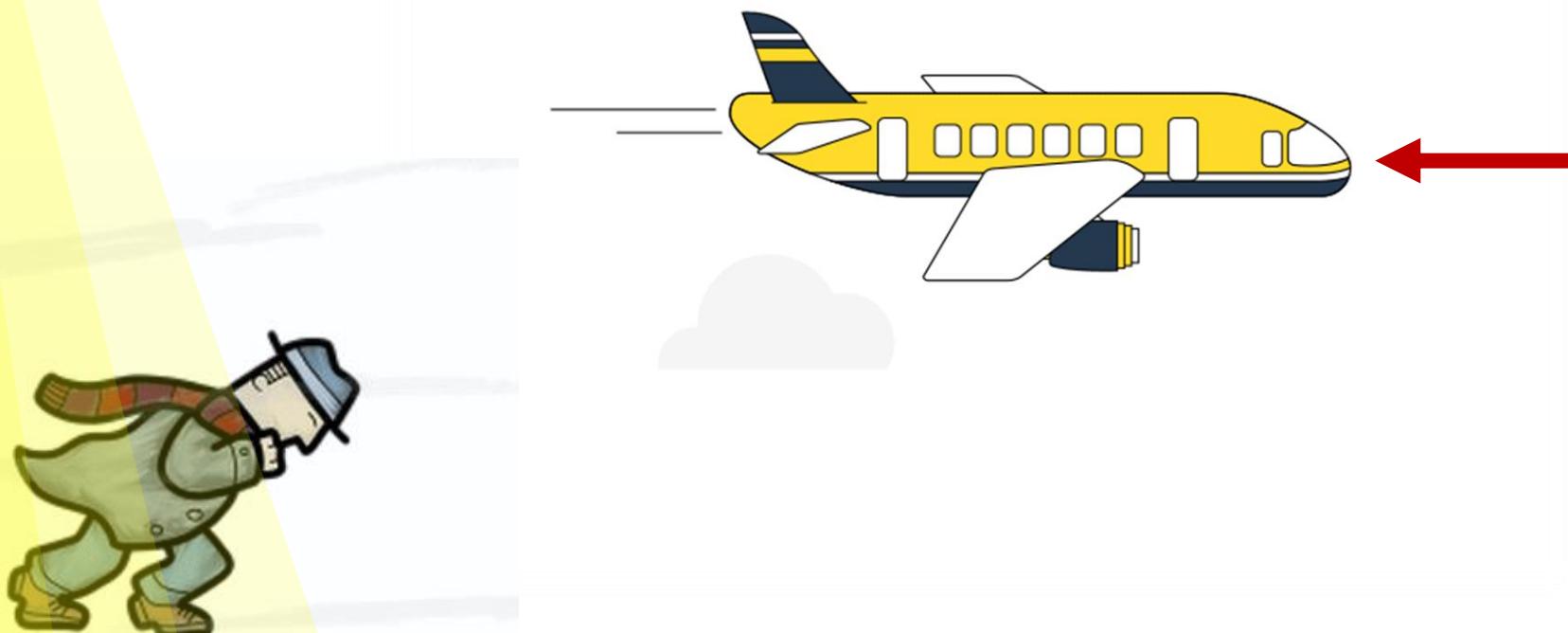
Thrust

It is the force that propels the aircraft forward.



Drag

It is the force that resists the aircraft from going forward

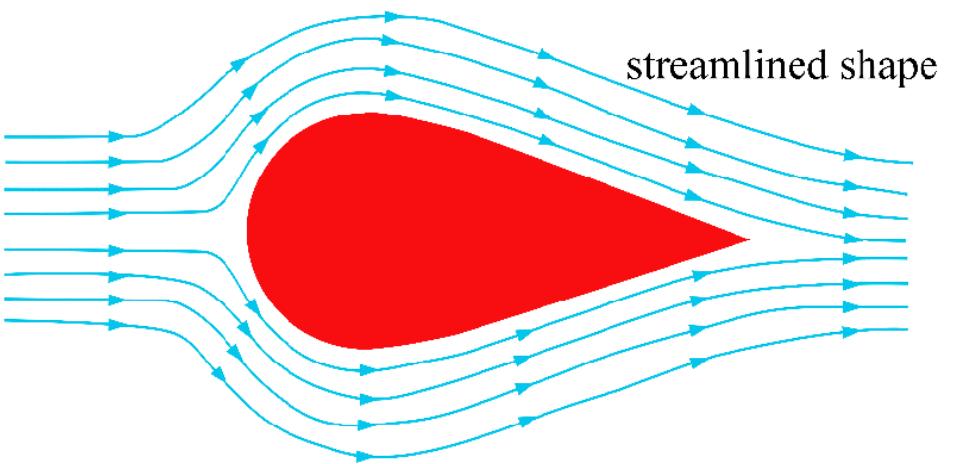
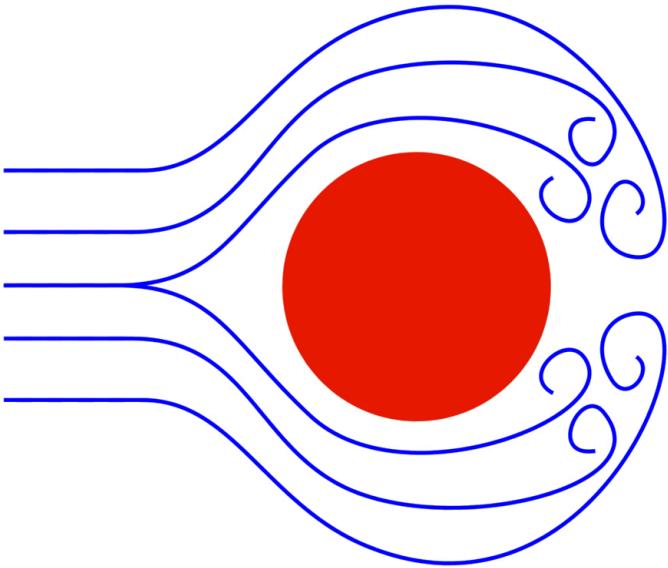
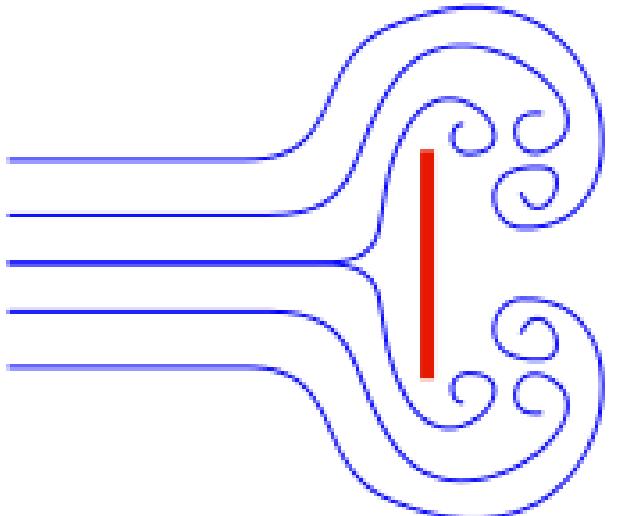




How Do Planes Fly? – Thinking Captain

Source: <https://www.youtube.com/watch?v=wFTHh-6jIT8>

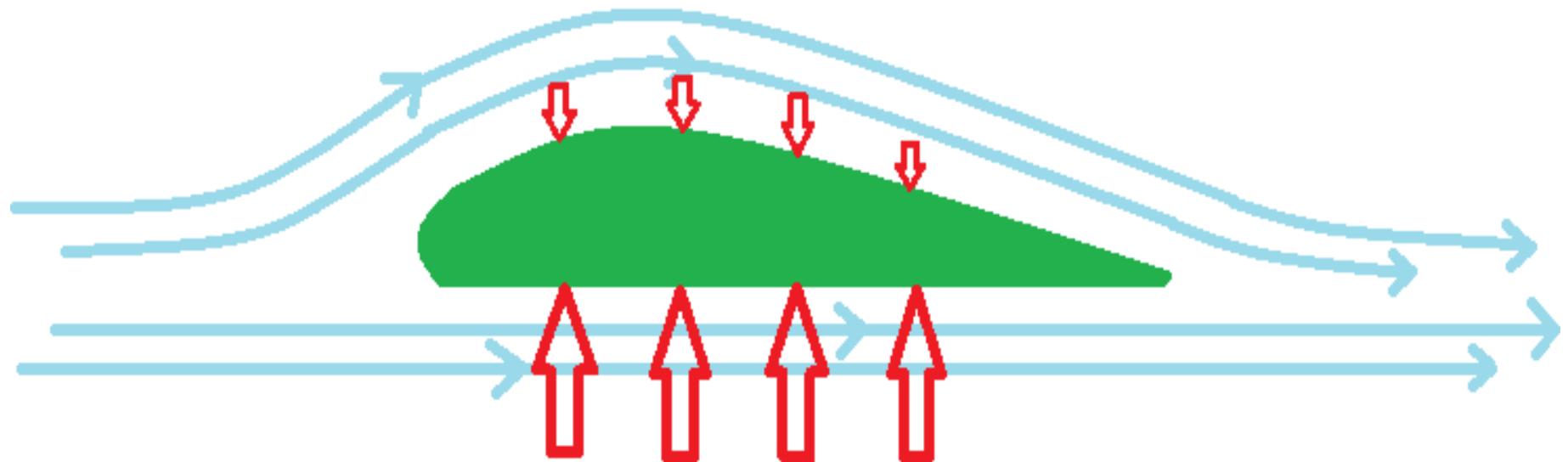
How do different shapes affect drag?



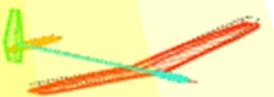
How do Wings produce lift?



Faster Moving Air = Lower Pressure

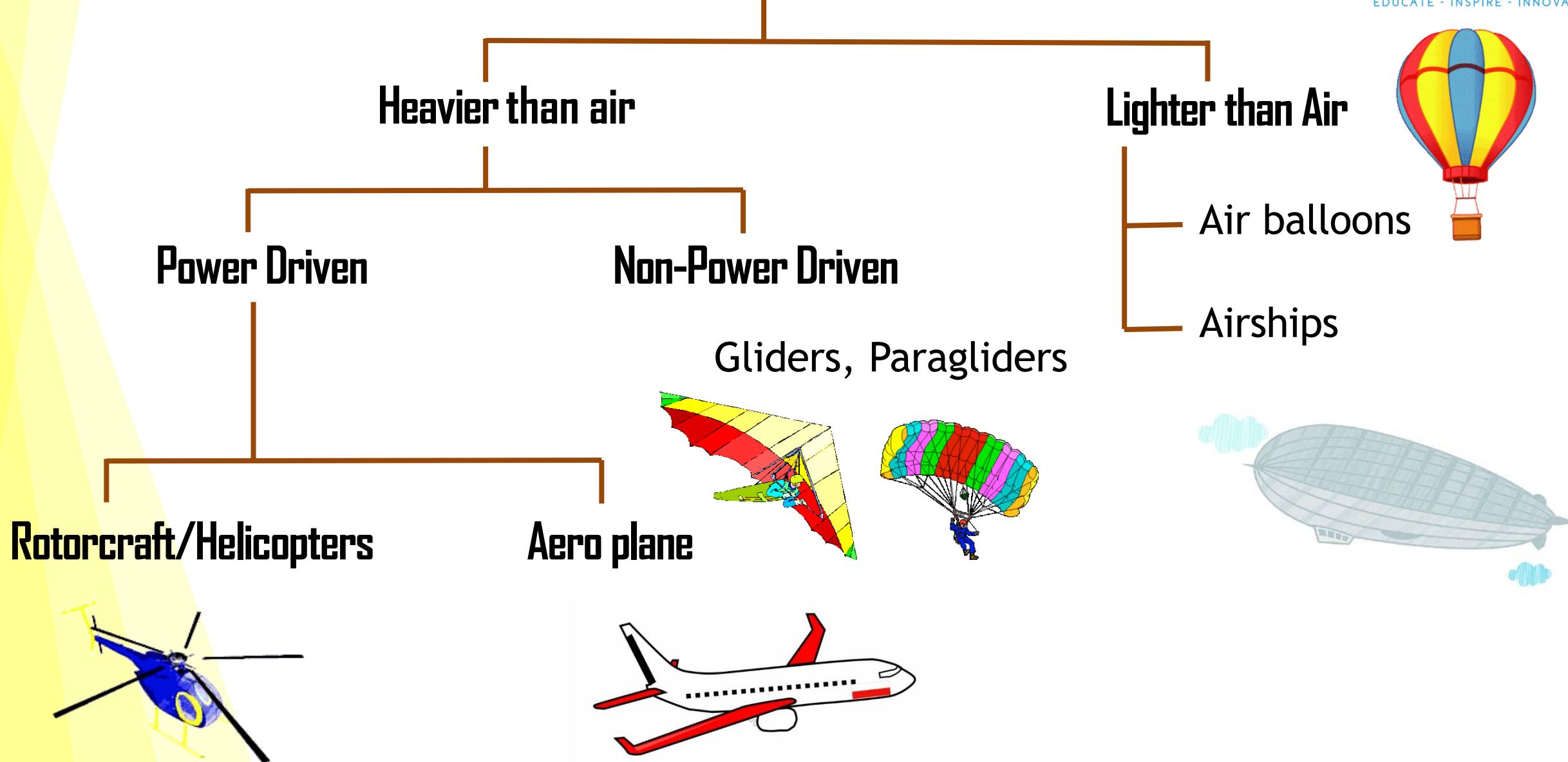


Slower Moving Air = Higher Pressure

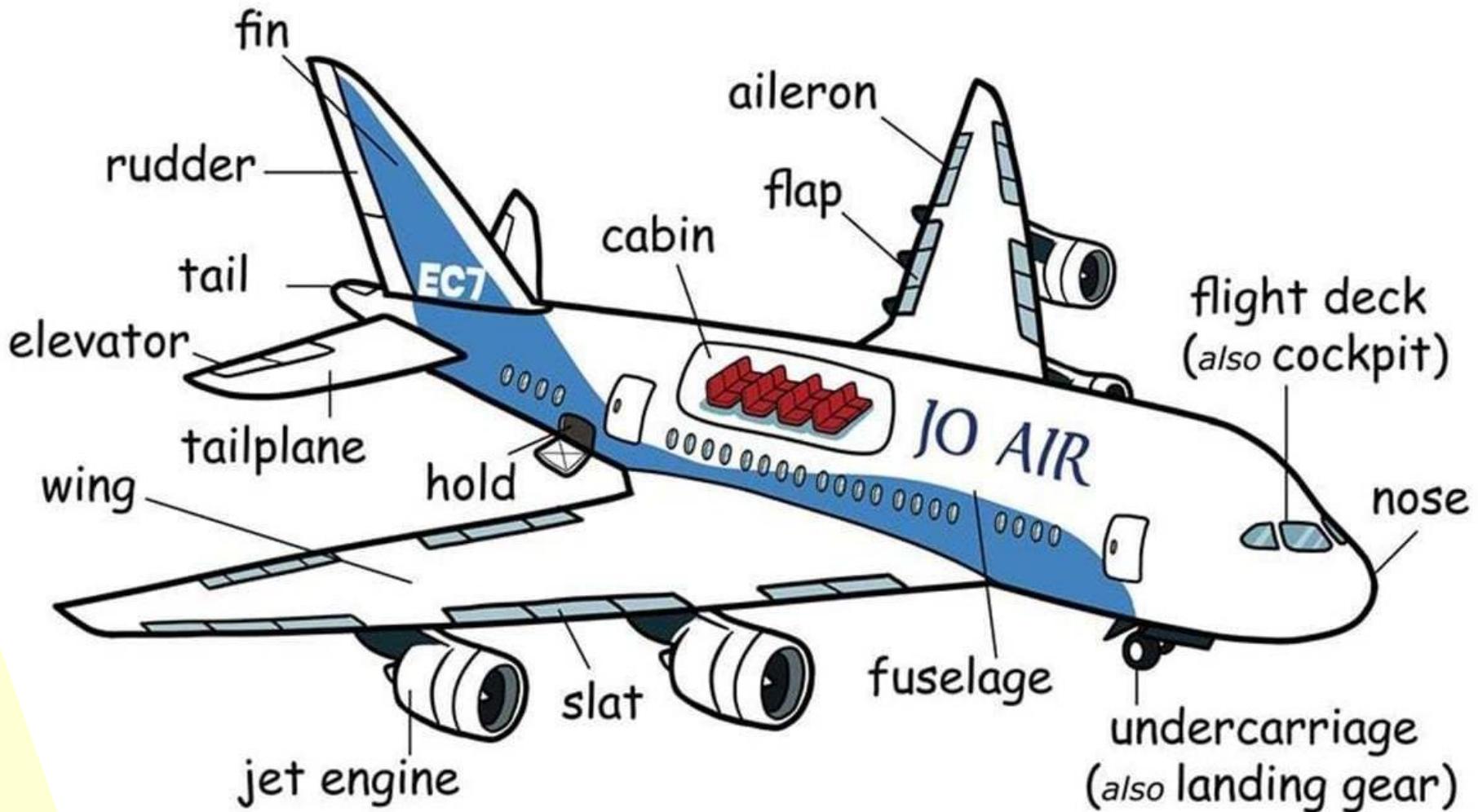


X = 0.00 m
Y = 0.00 m
Z = 0.00 m
t = 0.000 s Frame 1

Aircrafts



Parts of an Airplane



What is propulsion?

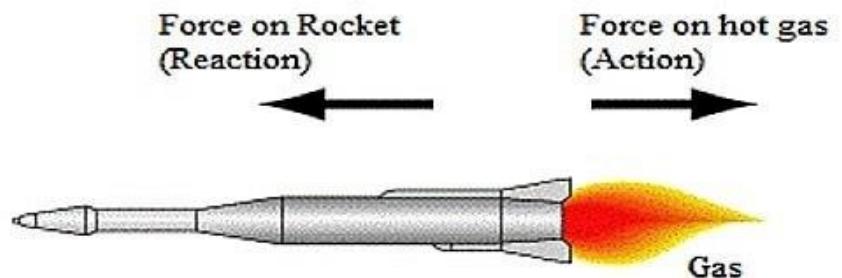
Propulsion is the act of moving or pushing an object forward.



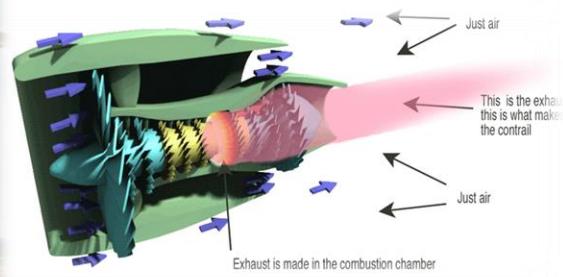
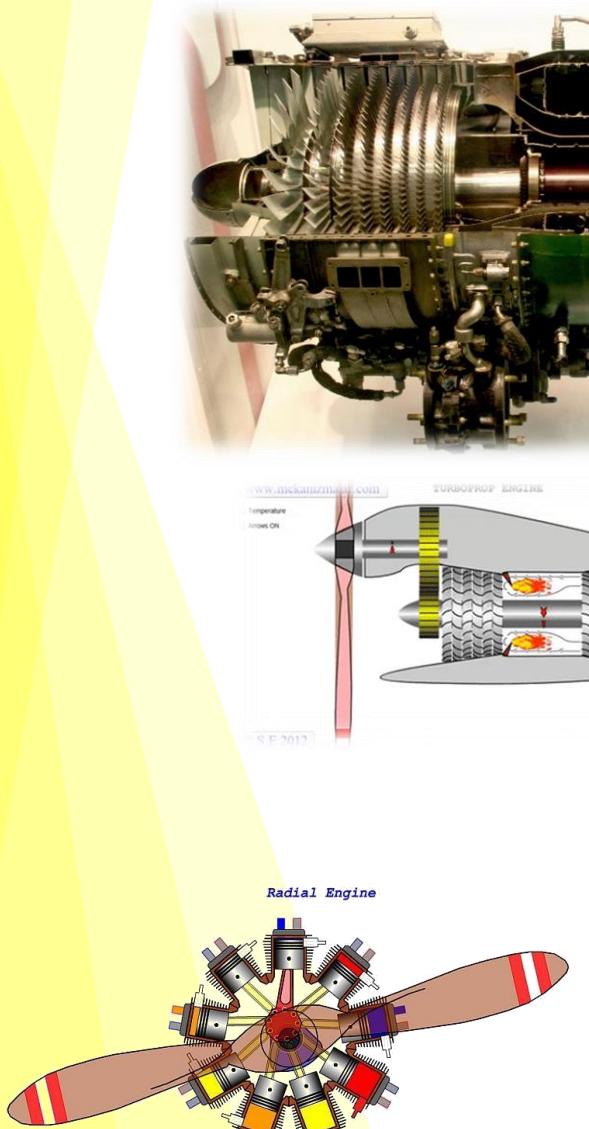
From rowing a boat to firing a rocket...



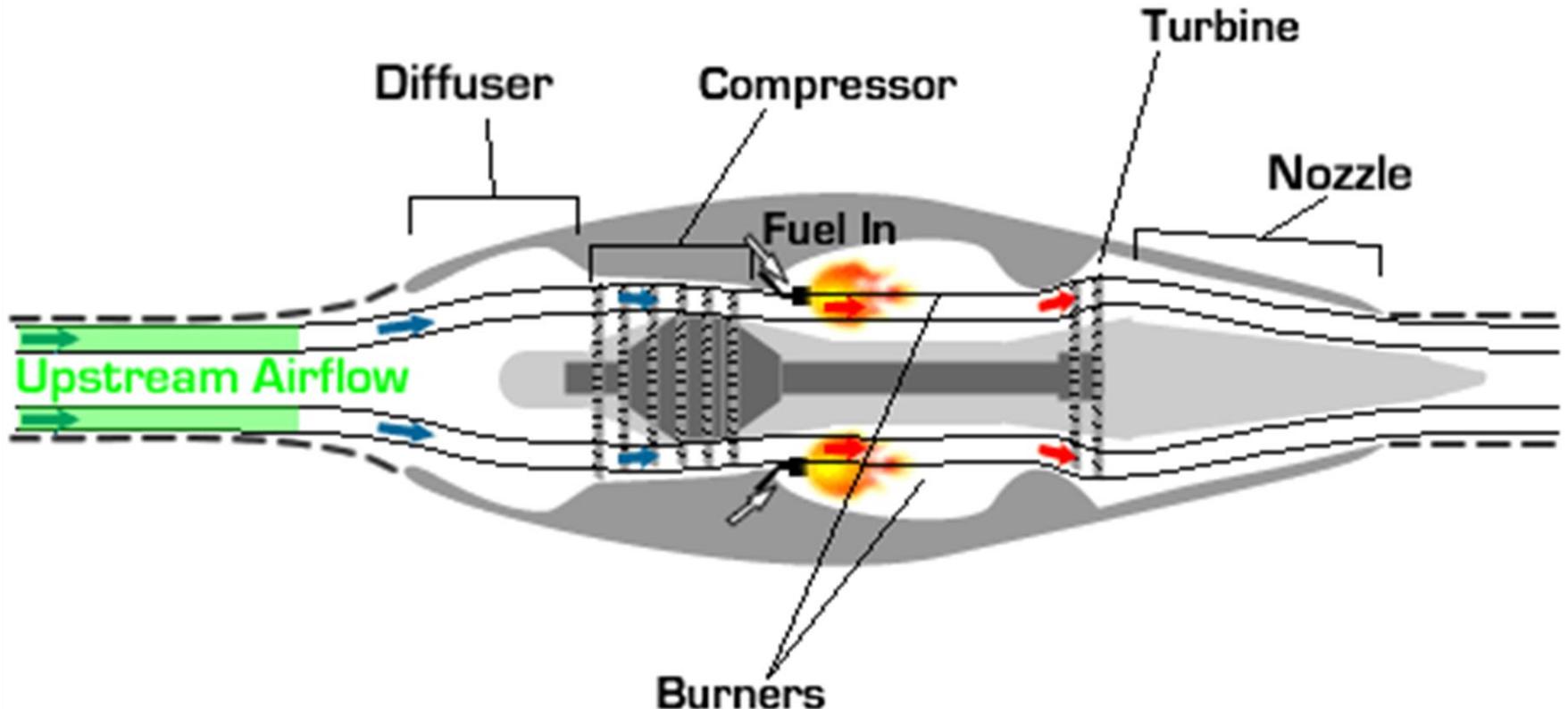
Newton's Third Law of Motion



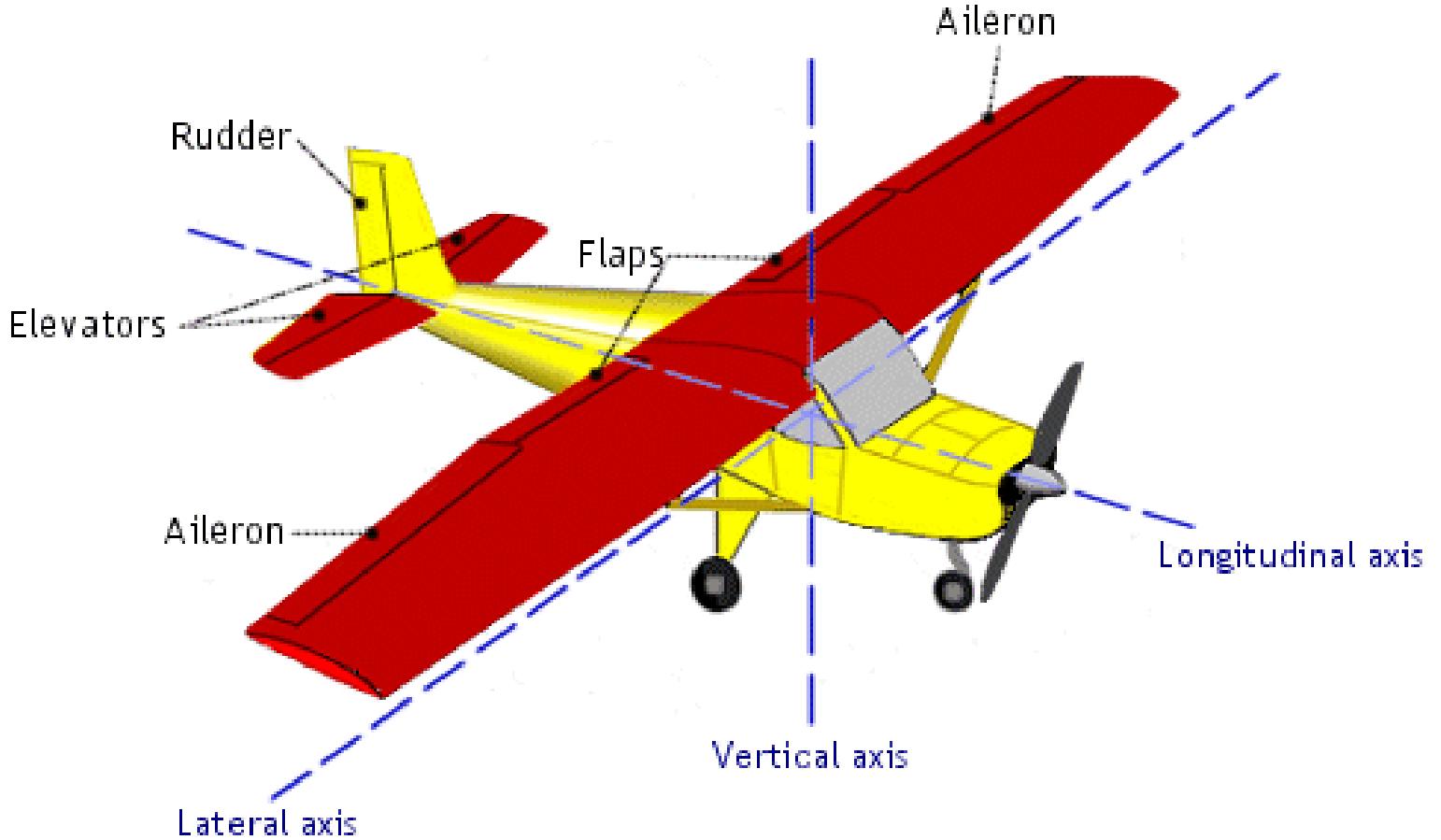
Aircraft Engines

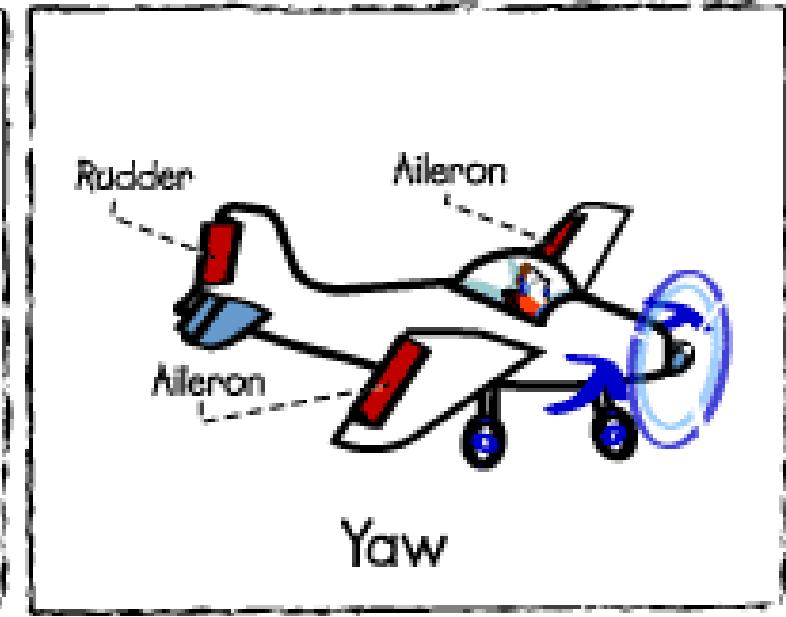
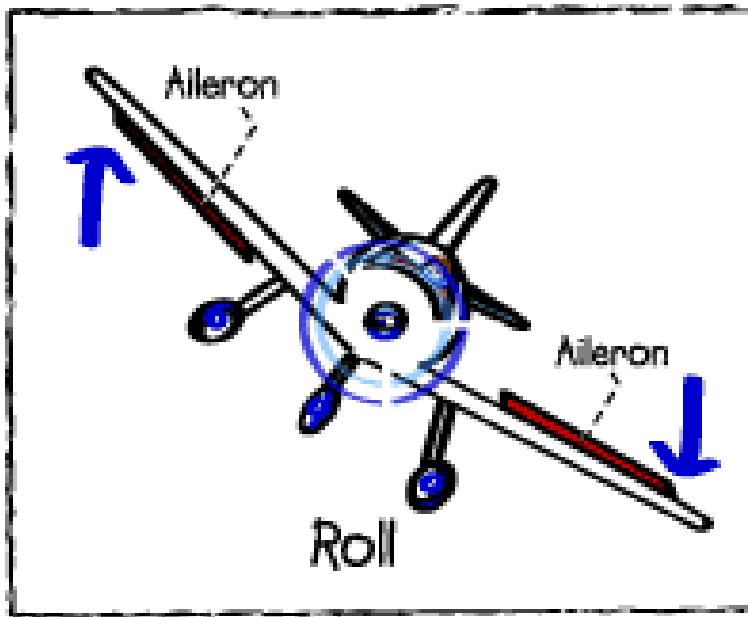
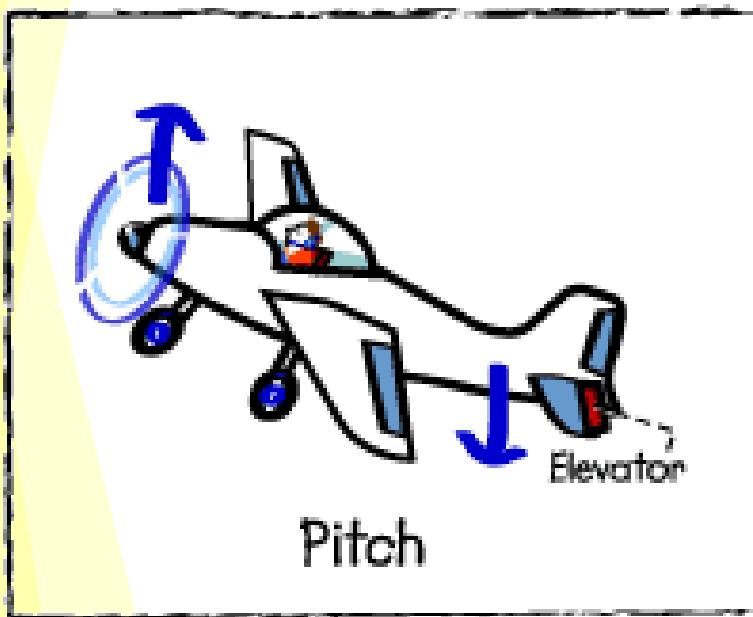


Parts of a Jet Engine

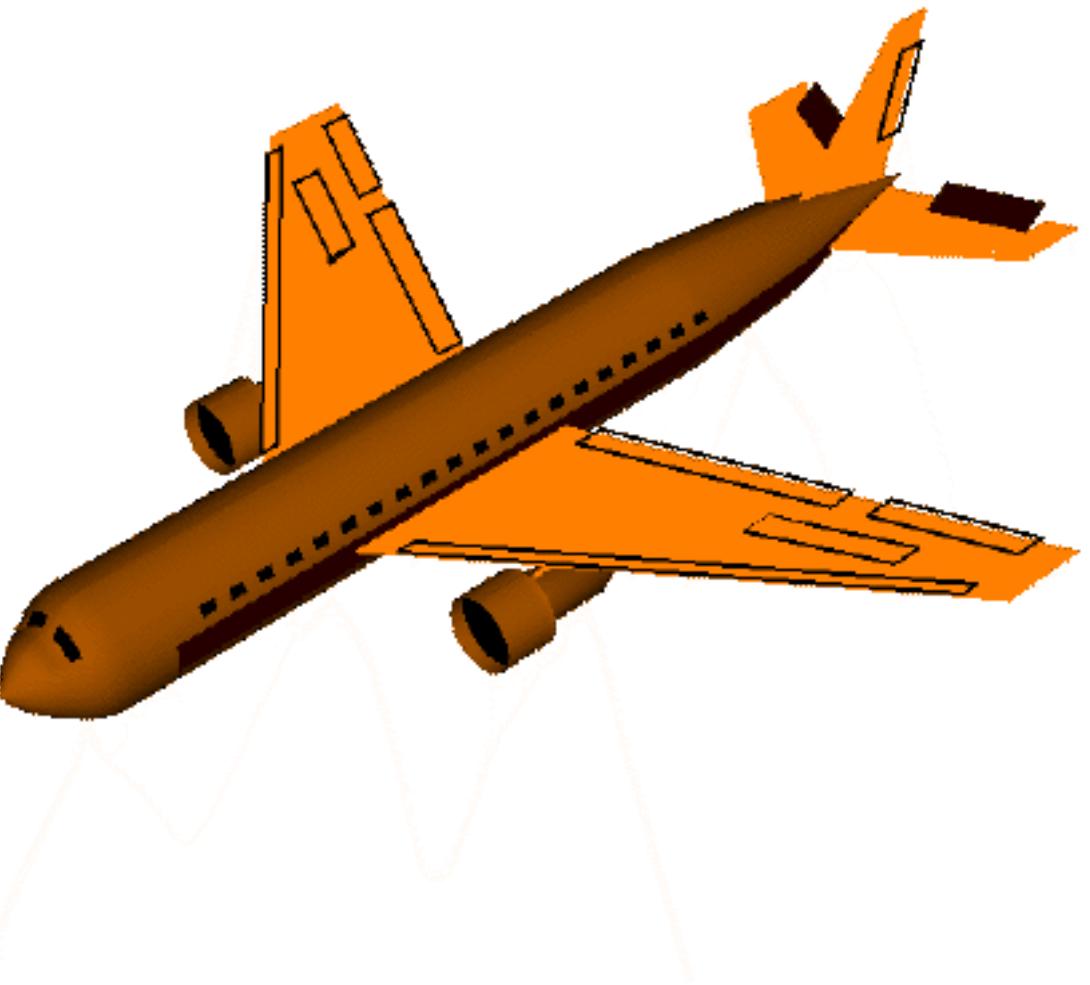


Control Surfaces on an Airplane

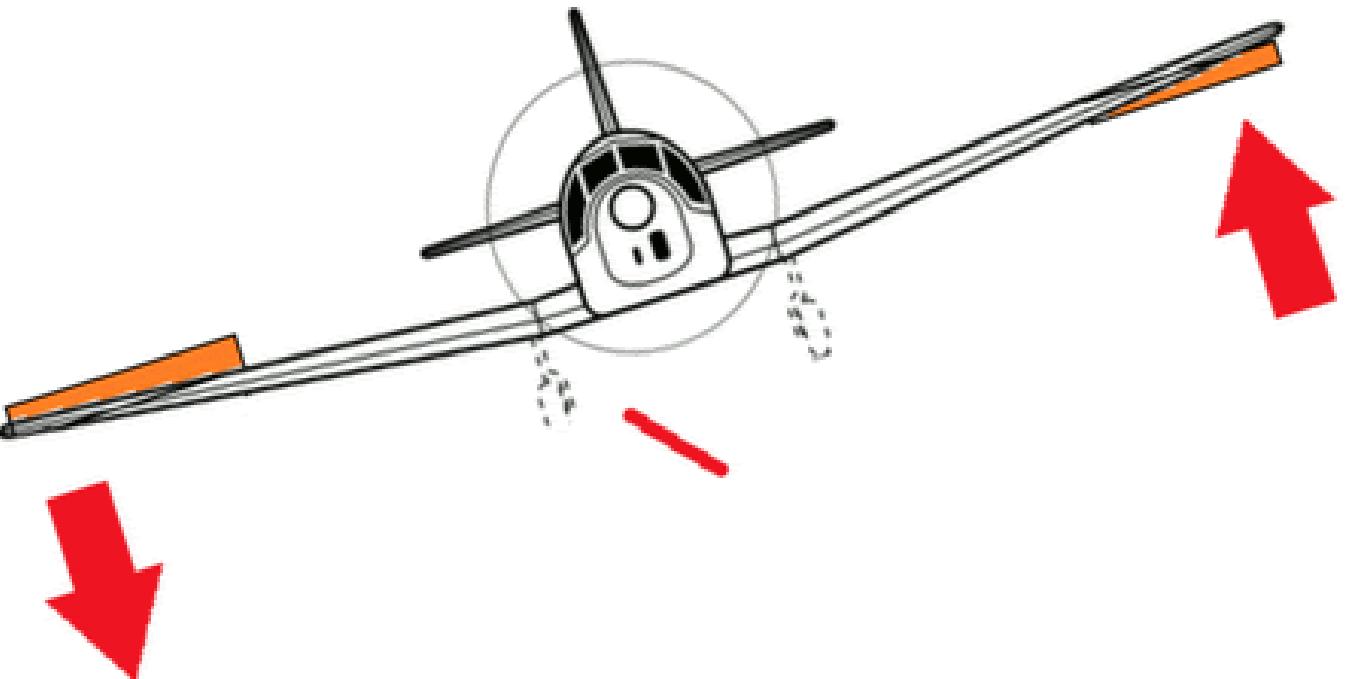




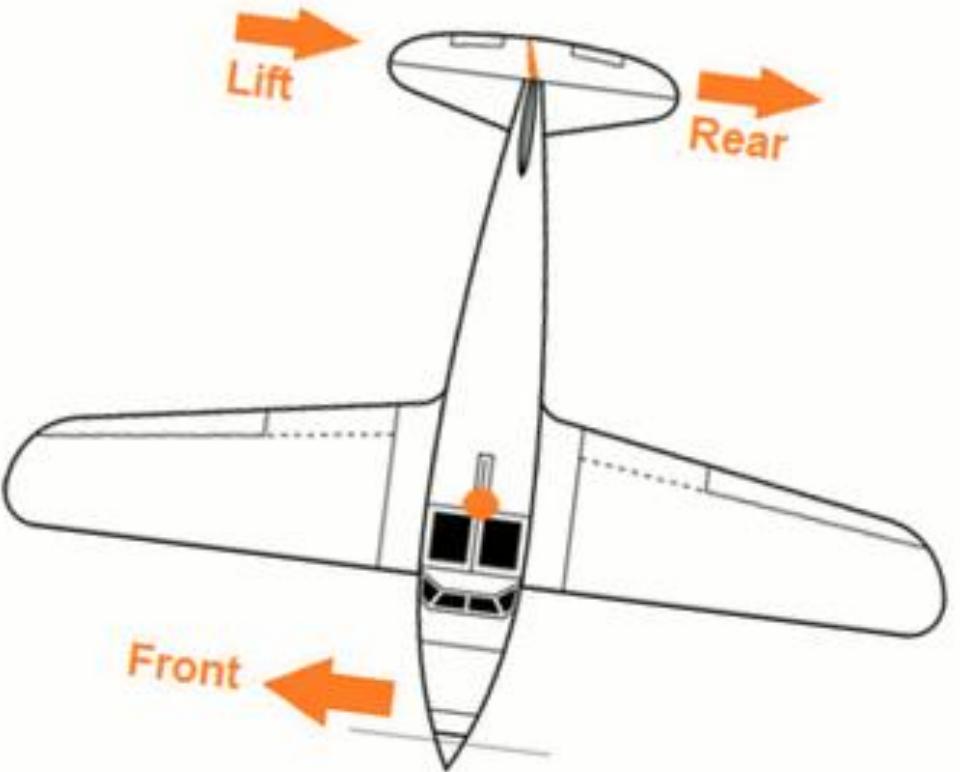
Pitch Control (Elevators)



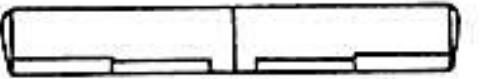
Roll Control (Ailerons + Rudders)



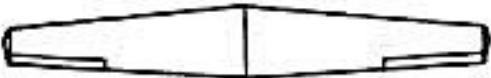
Yaw Control (Rudders + Ailerons)



Types of wings (based on planform shape)



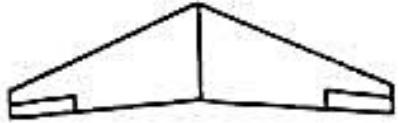
Rectangular
straight wing



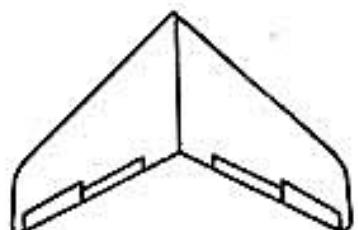
Tapered straight wing



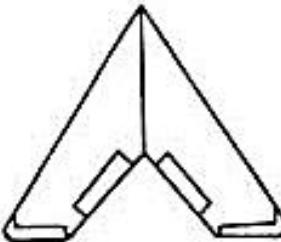
Rounded or elliptical
straight wing



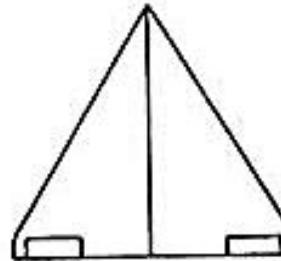
Slightly swept wing



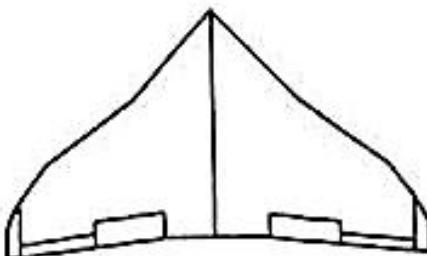
Moderately swept wing



Highly swept wing



Simple delta wing

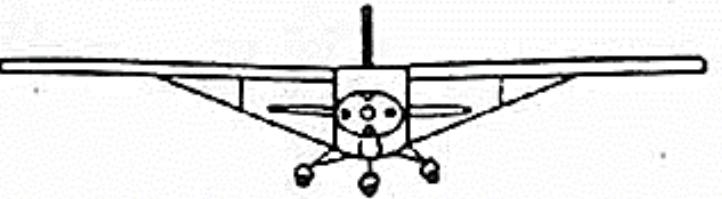


Complex delta wing

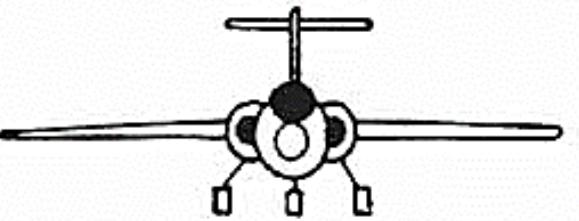
Learning from Nature



Types of wings (based on wing position)



High-wing



Mid-wing



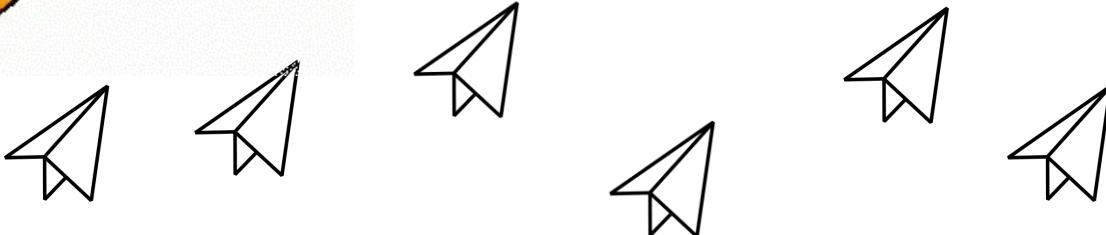
Low-wing

Pause-Point

How does the shape and position of wings affect aircraft performance?



Its time to explore through
an activity!



Refer to the following site for more Paper Plane Designs

<http://www.paperairplanes.co.uk/planes.php>

Roles and applications of Aircrafts in modern world



Private Jets



Types of Commercial Airplanes



Jumbo Passenger Airplanes
Boeing 747



Mid-Size Passenger Airplanes
Airbus A-350



Light Passenger Airplanes
Embraer E-175



Cargo Airplanes
Airbus A300-600ST Beluga

Military Aircrafts



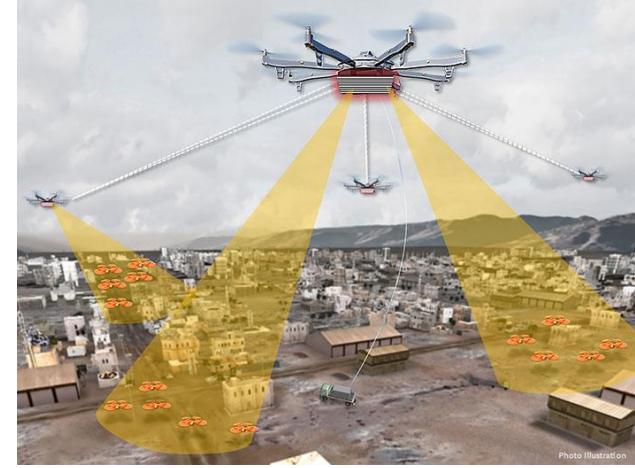
Unmanned Aerial Vehicles (UAV)



Agriculture



Photography



Surveillance



Remote tracking



Air strikes

Solar Impulse-2 : Solar Powered Aircraft



Few unusual Aircrafts



Few unusual Aircrafts



Thank You!

Images used in this presentation are obtained from various sources on the internet with a non-profit intent to educate students. Due credits are to be attributed to the appropriate content creators and copyright holders

