



SNS COLLEGE OF TECHNOLOGY

**An Autonomous Institution
Coimbatore - 35**

Accredited by NBA – AICTE and Accredited by NACC – UGC with 'A++ Grade
Approved by AICTE , New Delhi and Affiliated to Anna University , Chennai.

DEPARTMENT OF AEROSPACE ENGINEERING

19ASO301 BASICS OF AERONAUTICAL ENGINEERING

UNIT 2 – AERODYNAMICS



UNIT 2 – AERODYNAMICS



- *Aerodynamic forces on Aircraft*
- *Drag*
- *Mach Number*
- *NACA & NASA*
- *Airfoil*
- *Components of Airplane*



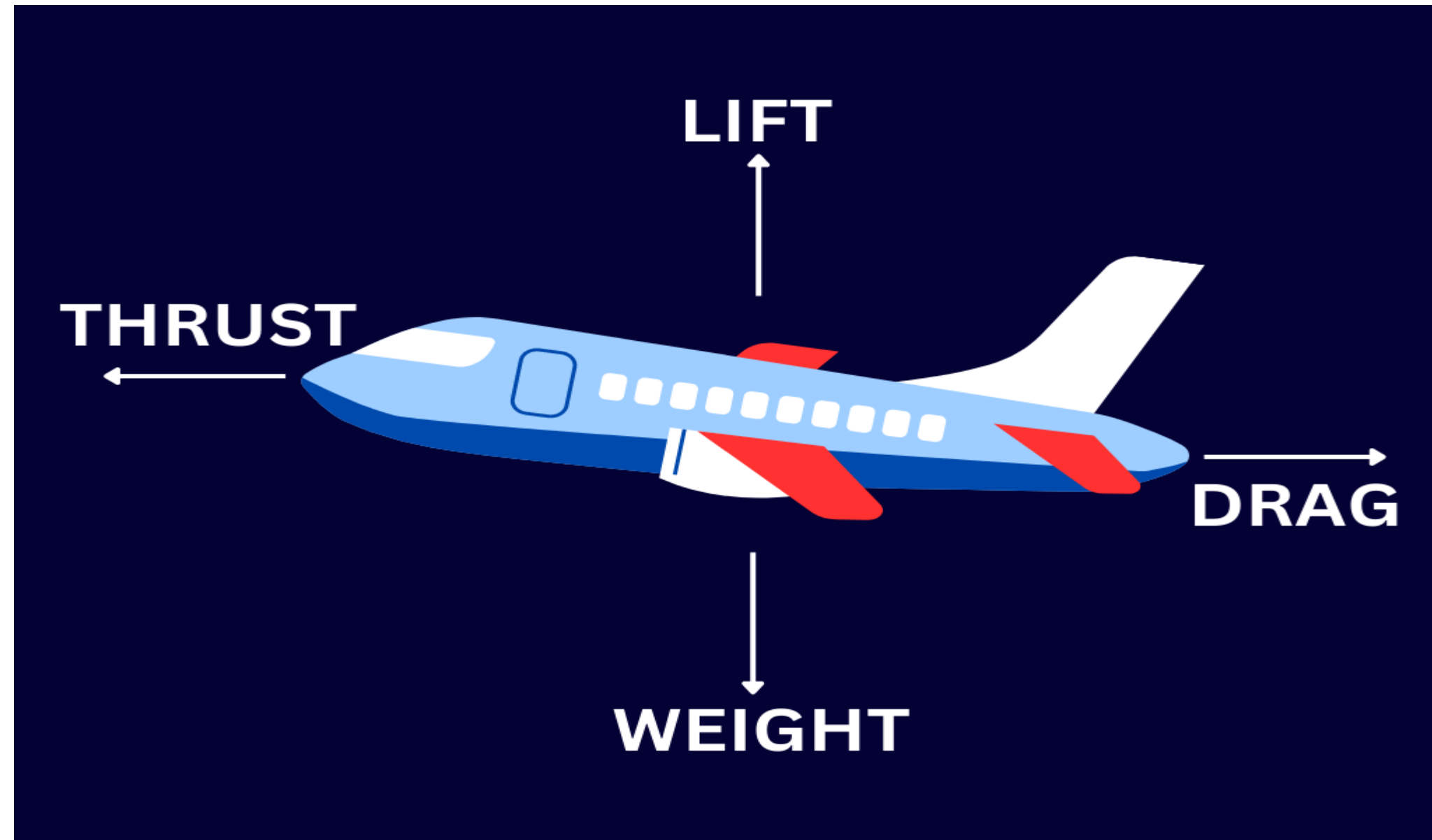
TEXT BOOK



- *Anderson. J D, “Introduction to Flight”, McGraw-Hill, 1995*
- *Richard S. Shevel, “Fundamentals of Flight”, Prentice Hall, 2010*

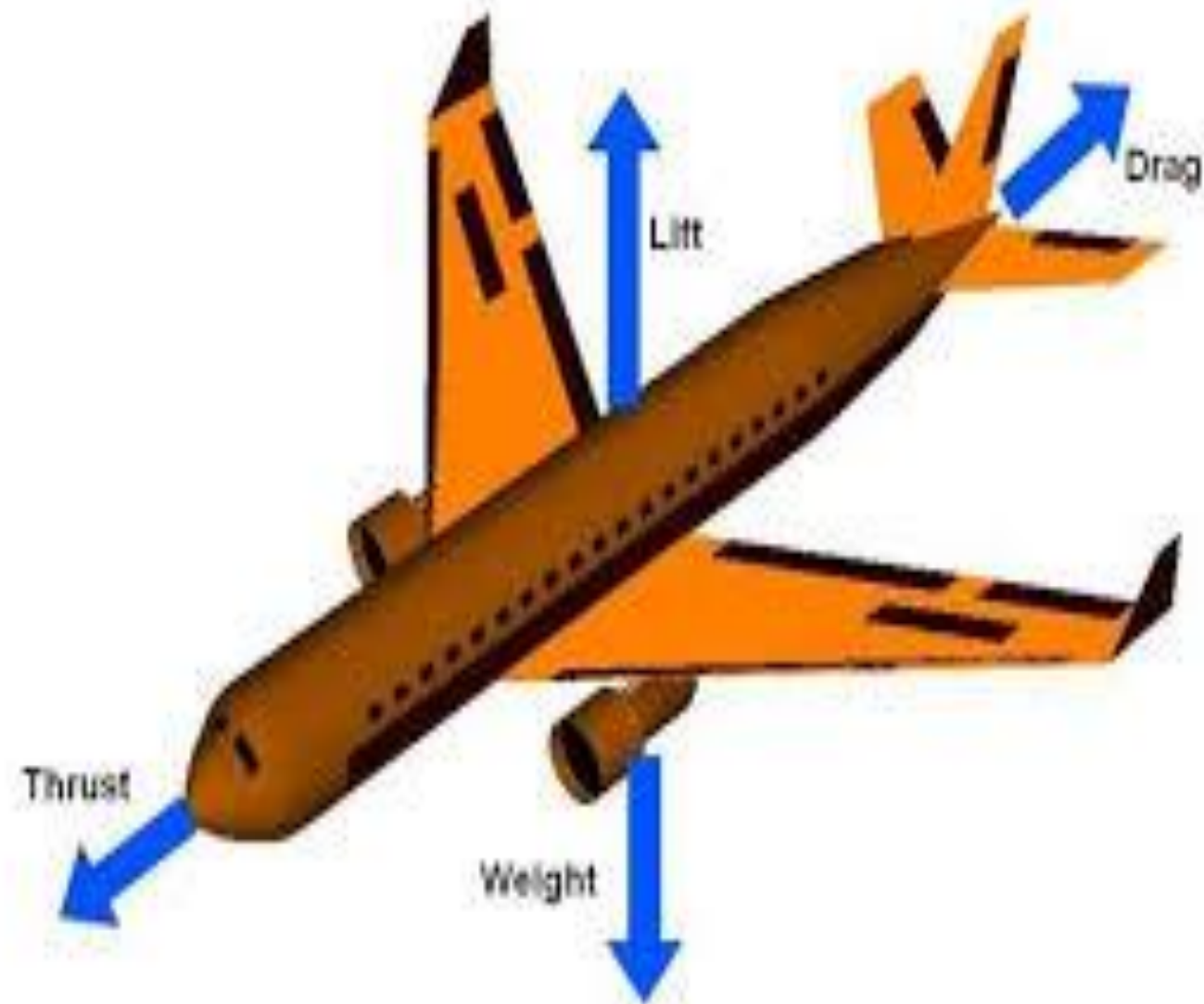


Aerodynamic Forces on Aircraft





Aerodynamic Forces on Aircraft



The four forces act on the aircraft in flight and they work against each other.



Four Forces of Flight



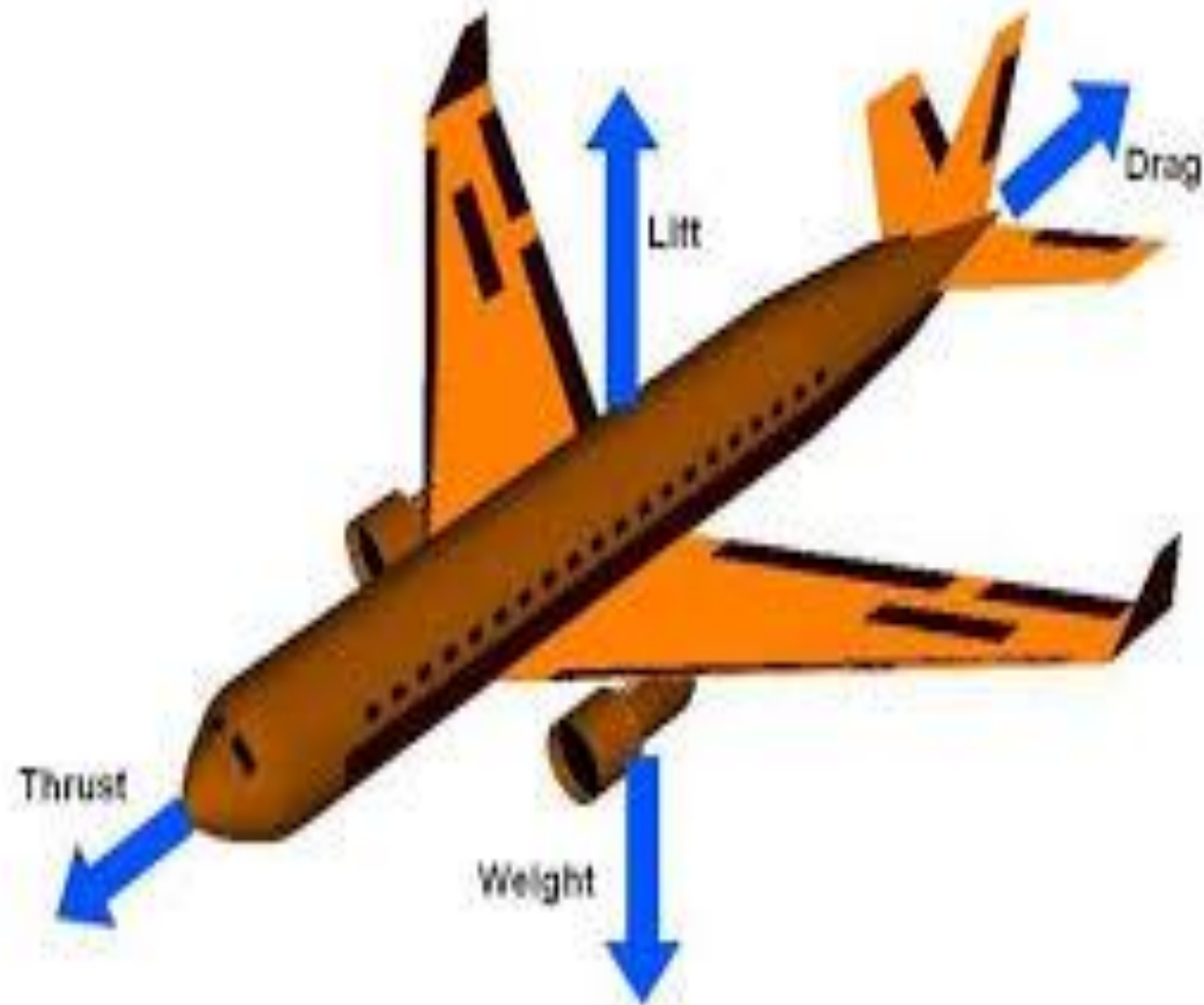
Gravity & Gravitational Pull

- *Gravity. Latin word 'Gravitas', Mutual attraction between objects which have mass.*
- *Gravitational Pull. Every particle is attracted towards each other and is represented as*

$$F=(G*M_1*M_2)/R^2$$



Aerodynamic Forces on Aircraft



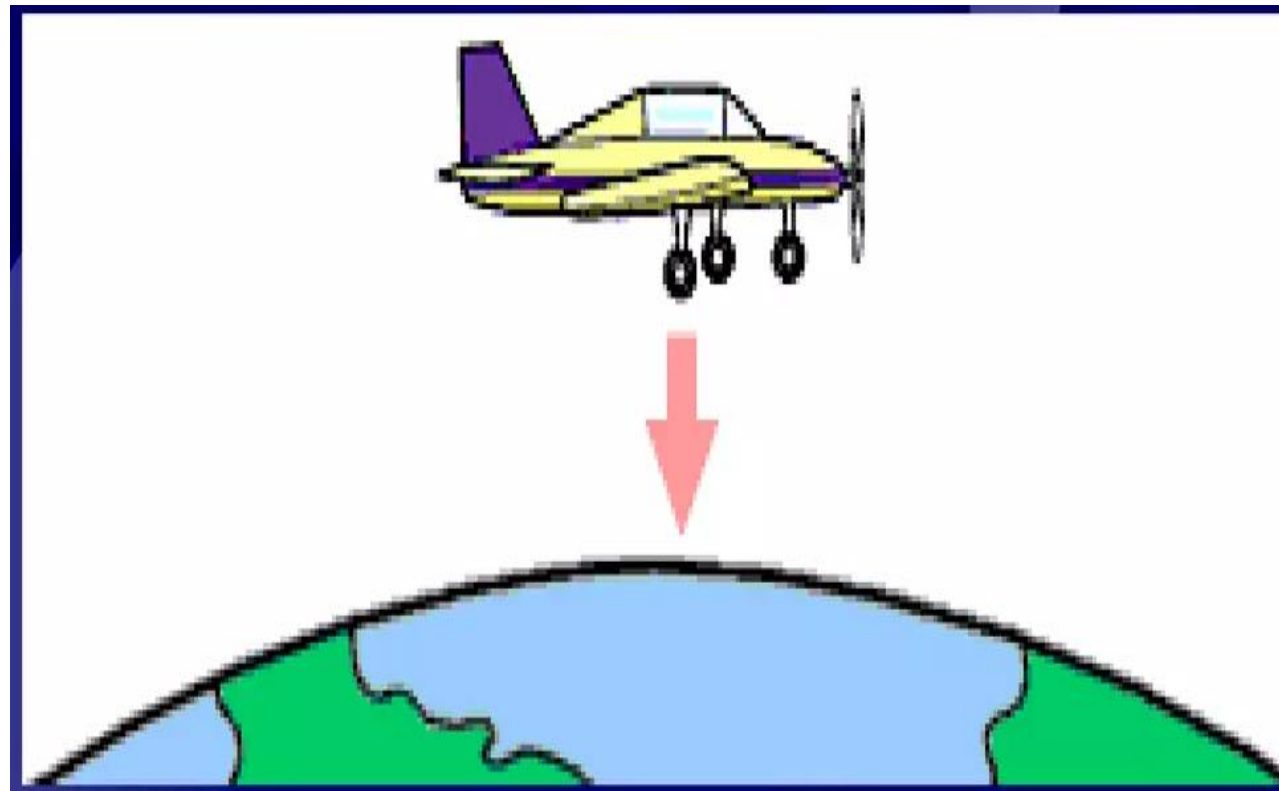
Weight is a force exerted on a body having a mass (denoted by 'm') by the gravitational pull (denoted by 'g') of the earth.



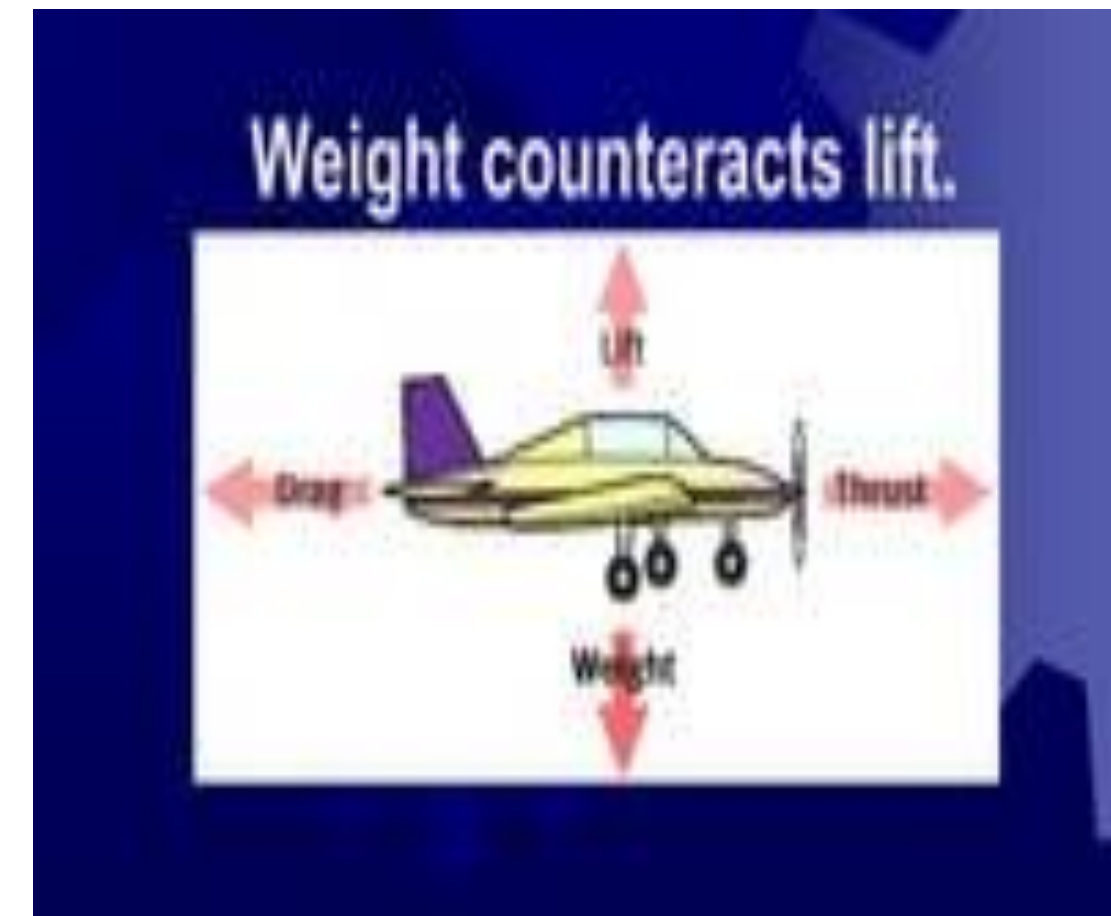
Aerodynamic Forces on Aircraft



What is Weight?



The earth's gravity pulls down the object and gives them weight.





Aerodynamic Forces on Aircraft



What does it take to create Lift?

- *Air & Motion.*
- *Newton's Laws of Motion.*
- *Daniel Bernoulli's Principle are used to explain the lift.*



Daniel Bernoulli



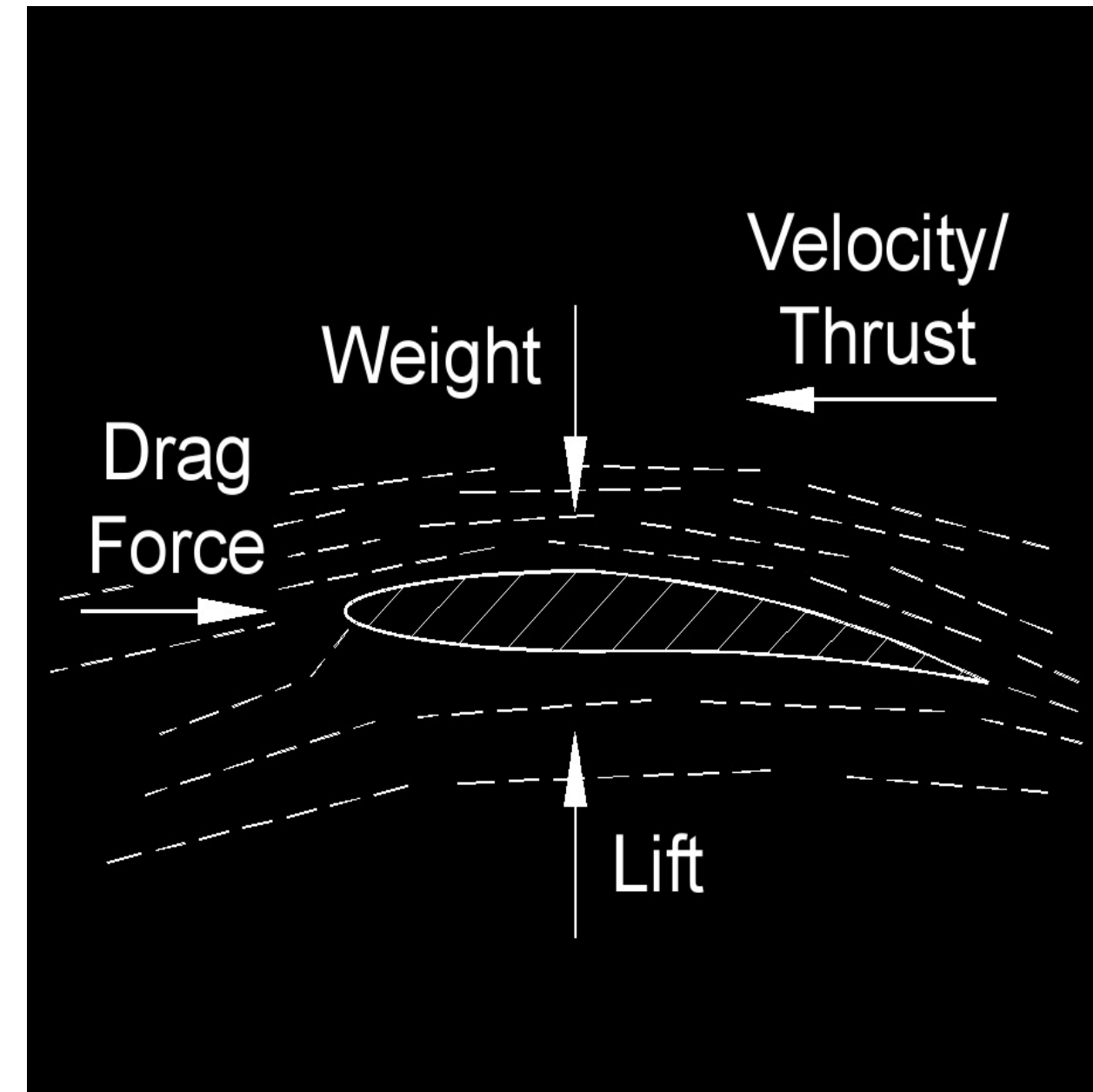
Aerodynamic Forces on Aircraft



Newton's laws

2nd Law: Rate of change of velocity (acceleration) is directly proportional to the Force acting on the body.

3rd Law: Every action has an 'Equal' and 'Opposite' reaction. The net flow of air is turned down resulting to an equal and opposite upward force.





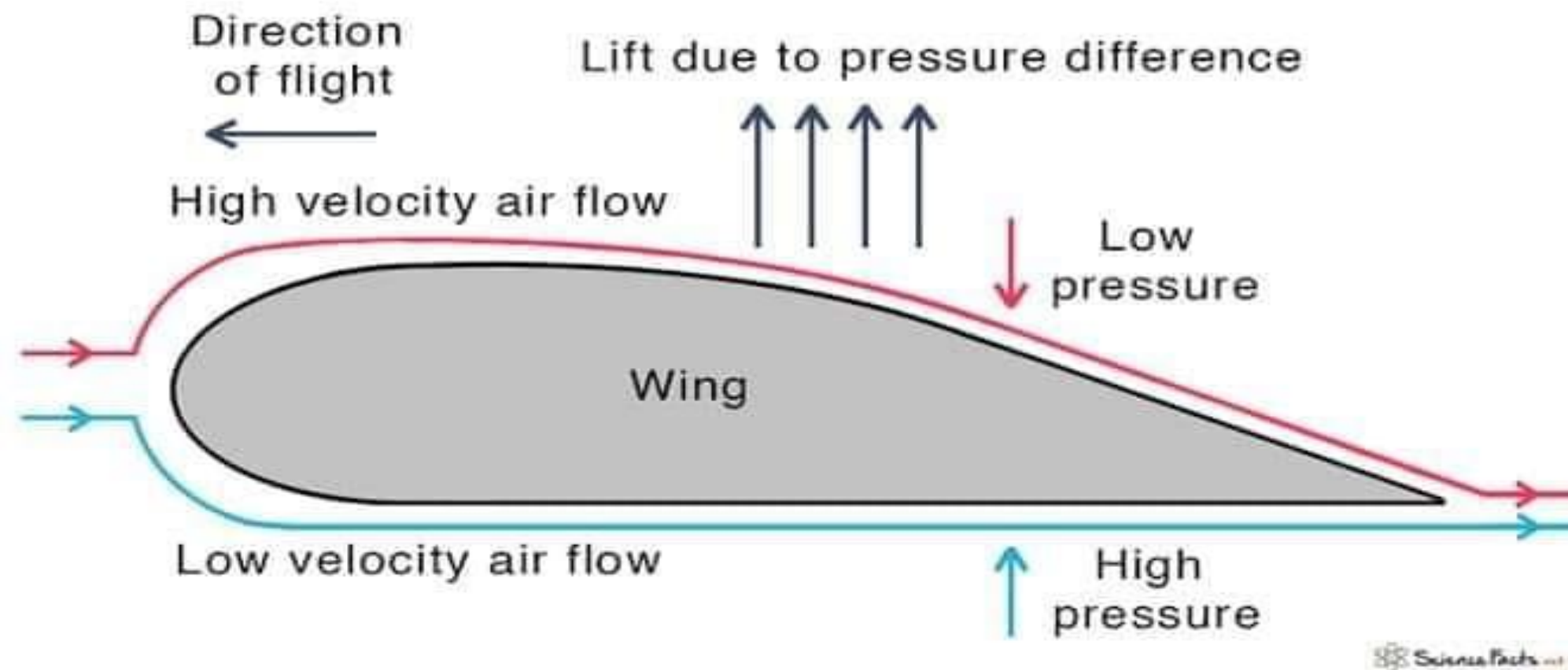
Aerodynamic Forces on Aircraft



Lift of an Aircraft

Bernoulli's Principle Example

Lift of an Aircraft





Aerodynamic Forces on Aircraft

