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GLIDING

Fly without power

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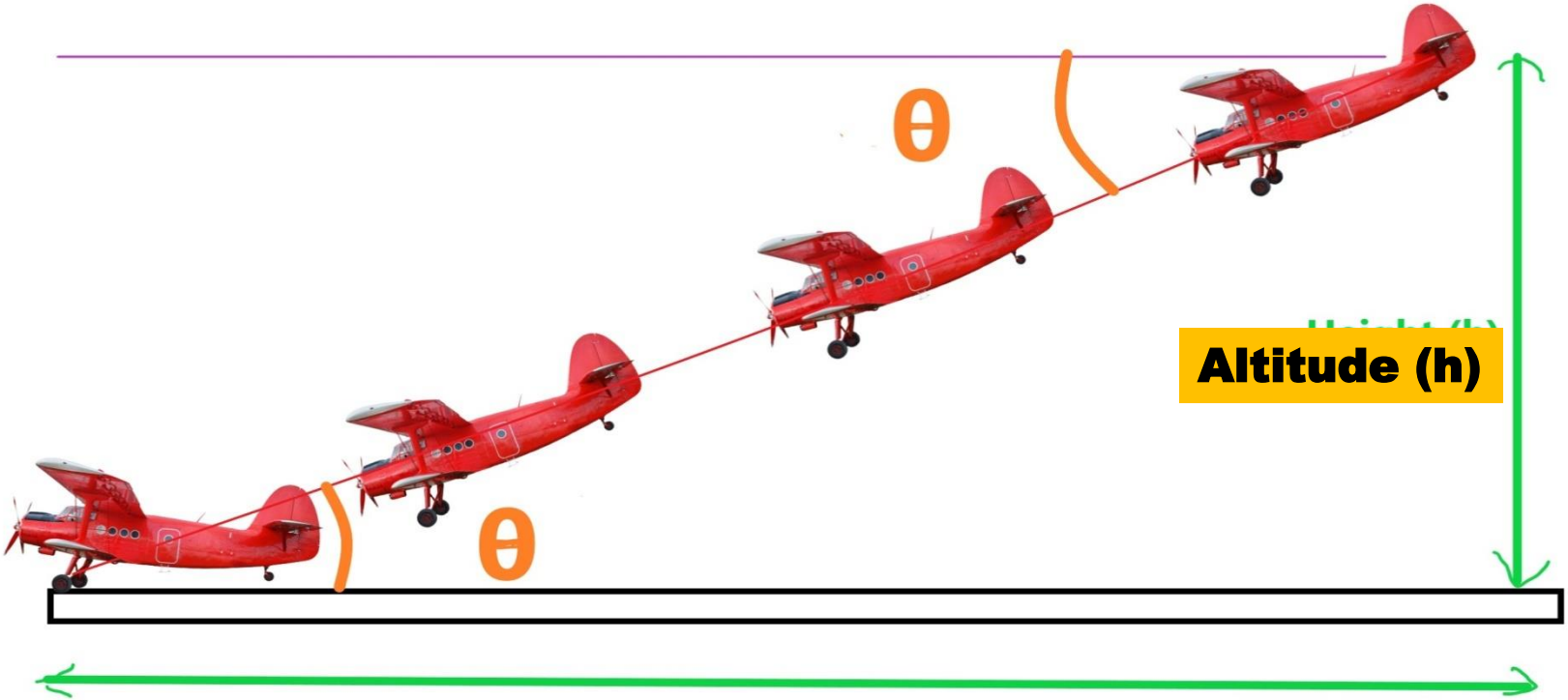
GLIDING

- **Gliding is the one of the performance of the aircraft in which Thrust force vector is absent and other Lift, Drag, Weight force vectors are present on aircraft.**

GLIDE RATIO

- It is the ratio of forward gliding distance of the aircraft to lose in altitude.
- $GR = \frac{R}{h}$



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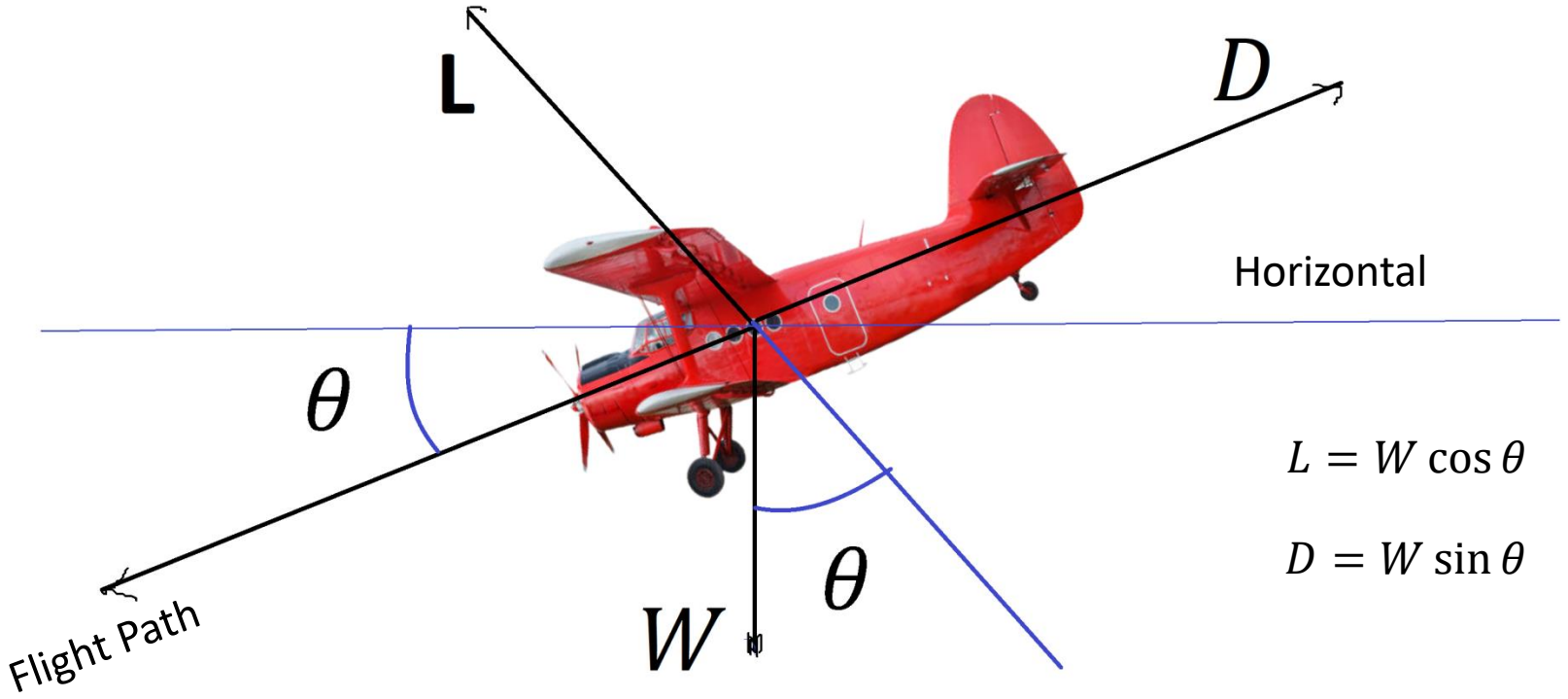


$$L = W \cos\theta$$

$$D = W \sin\theta$$

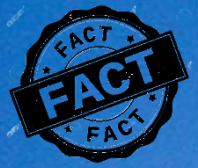
GLIDE ANGLE

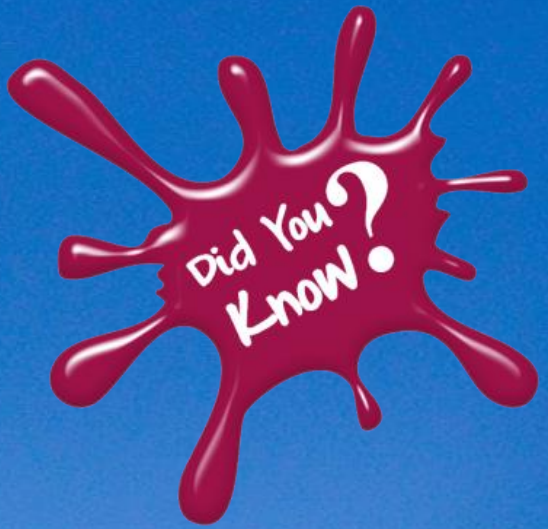
- Glide angle is the angle made between aircraft flight path and horizontal axis of plane or ground.
- $\tan\theta = \frac{h}{R}$ --------Eq (1)
- $tan\,\theta = \frac{1}{(L/D)}$ -------Eq (2)
- $\frac{h}{R} = \frac{1}{(L/D)} = \frac{D}{L}$
- $R(\text{Range}) = h \times (L/D)$ -------Eq(3)

IN GLIDING

- Gliding angle is only depend on the Lift to drag ratio of the aircraft, **NOT ON AIRCRAFT WEIGHT.**
- Aircraft gliding range is depend on Glider altitude and the Lift to drag ratio and **NOT ON WEIGHT OF AIRCRAFT.**

SAILPLANE CAN HAVE GLIDE RATIO UPTO 40 WHERE AS GENERAL AVIATION AIRCRAFT HAS UP TO 20





Effect of weight on Gliding

- If Aircraft weight increases then flight velocity increases and Endurance(Flight time) decreases.
- Endurance decreases means flying time decreases but there is no effect of weight on aircraft Range.
- If Aircraft weight decreases then flight velocity decreases and Endurance(Flight time) increases.
- Endurance increases means flying time increases but there is no effect of weight on aircraft Range.
- Two different weight aircraft with same L/D ratio then both aircraft will cover same distance but heavier aircraft will reach in short time and light aircraft will take longer time to reach same distance.

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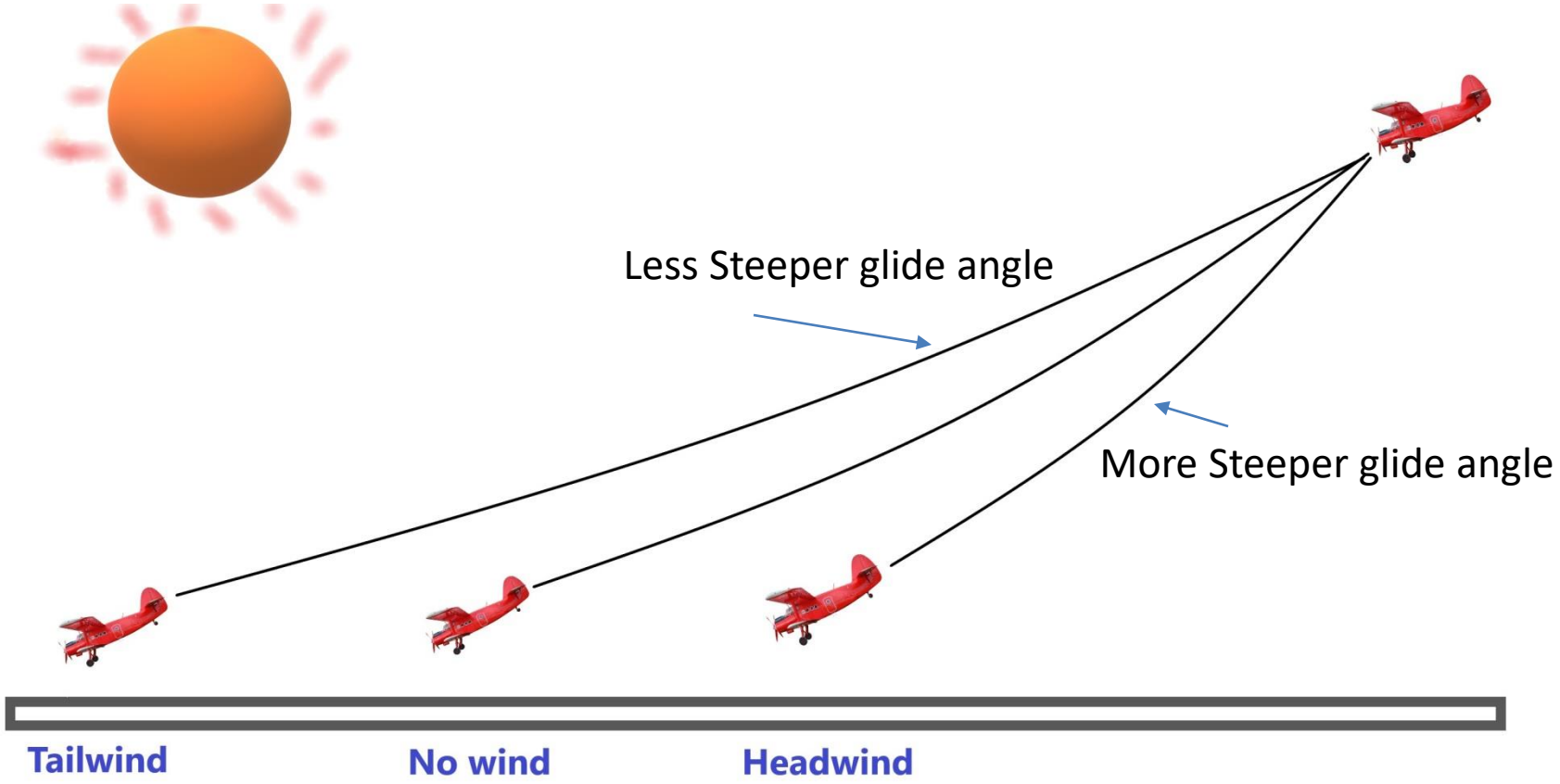
Effect of Wind on Gliding

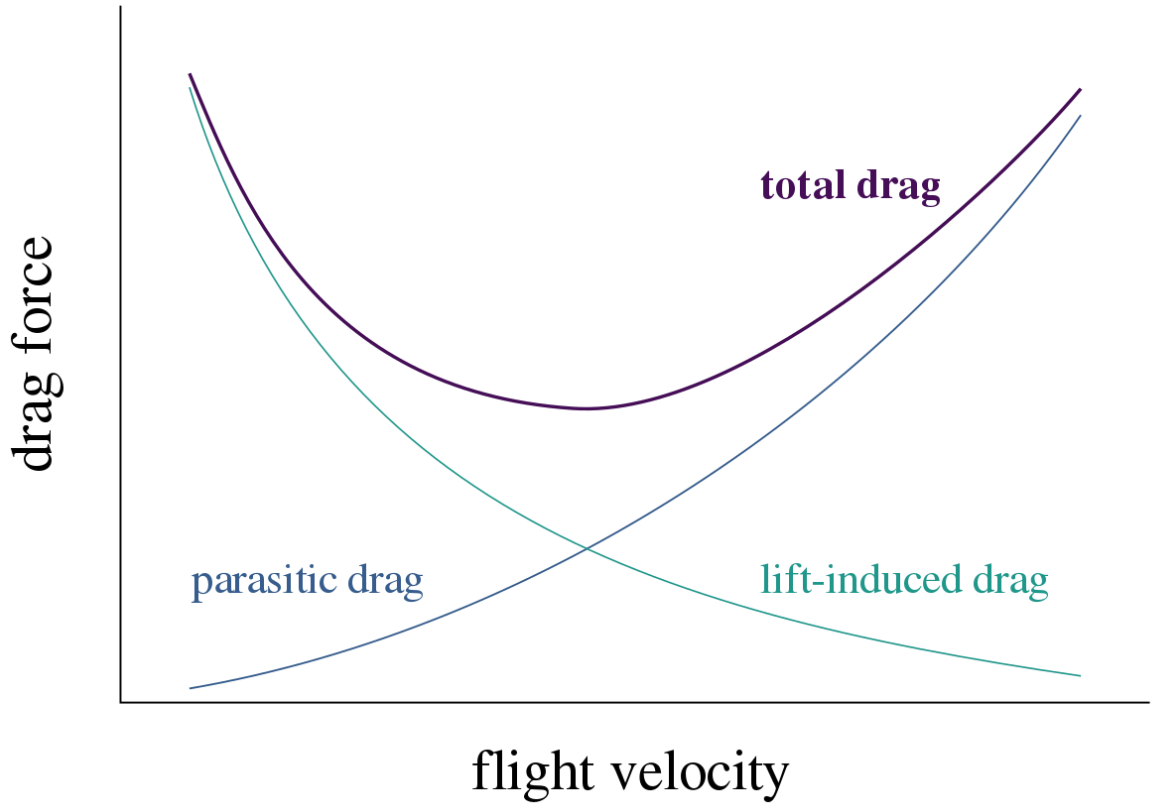
- **In Head wind:**
  - Aircraft will cover less distance than regular distance.
  - Aircraft range reduces
- **In Tail wind:**
  - Aircraft will cover more distance than regular distance.
  - Aircraft range increases.

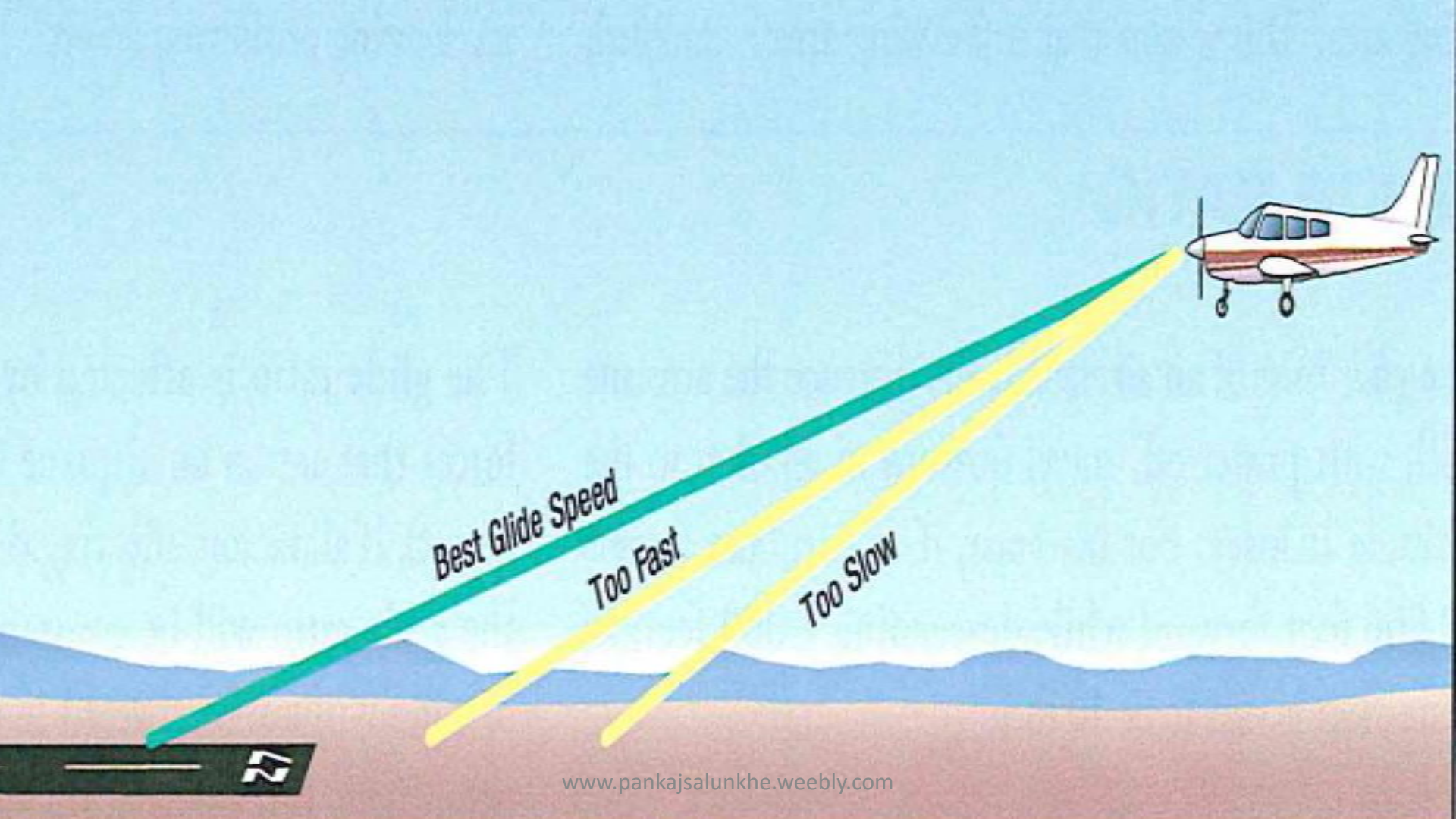

Less Steeper glide angle
More Steeper glide angle
Tailwind
No wind
Headwind

EFFECT OF GLIDING VELOCITY

- **Case 1: Gliding, In case aircraft velocity increases then parasite drag increases so Range of aircraft decreases.**
- **Case 2: In Gliding, In case aircraft velocity decreases then induced drag increases so Range of aircraft decreases. Lower speed of the aircraft will make more steeper glide angle so in this case aircraft will cover less distance than first case.**
- **Some times pilots try to increases range by reducing speed and increasing angle of attack but unfortunately this methods leads to stall.**

DRAG VS VELOCITY





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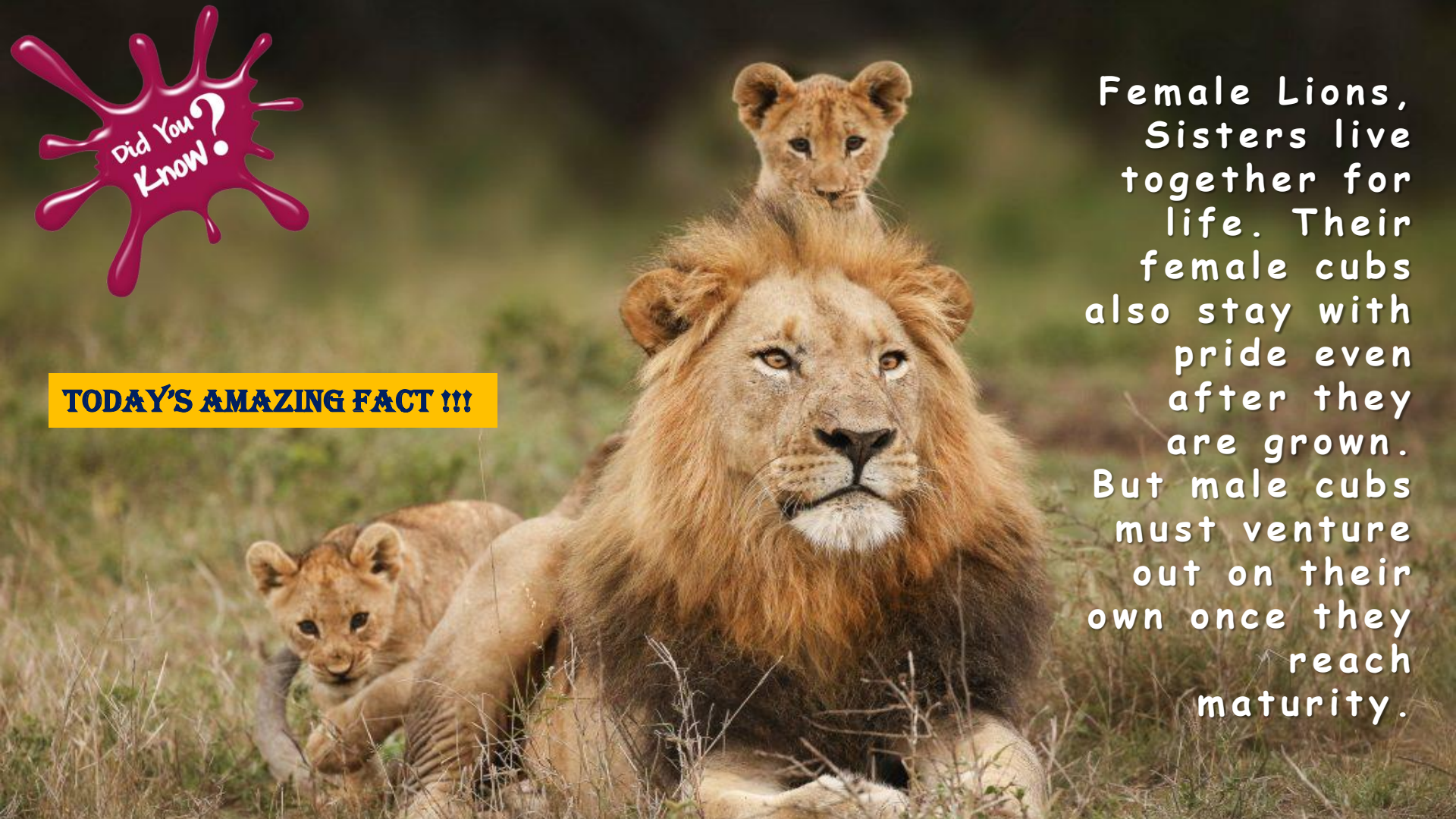
What is best gliding speed?

- The best gliding speed where aircraft cover more forward distance with less losing altitude.
- This is only possible when aircraft creates its highest lift and lowest drag.
- The aircraft velocity where lift to drag ratio is maximum.


Did You Know?
TODAY'S AMAZING FACT !!!
Female Lions, Sisters live together for life. Their female cubs also stay with pride even after they are grown. But male cubs must venture out on their own once they reach maturity.

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धन्यवाद

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