

Flying Start Challenge



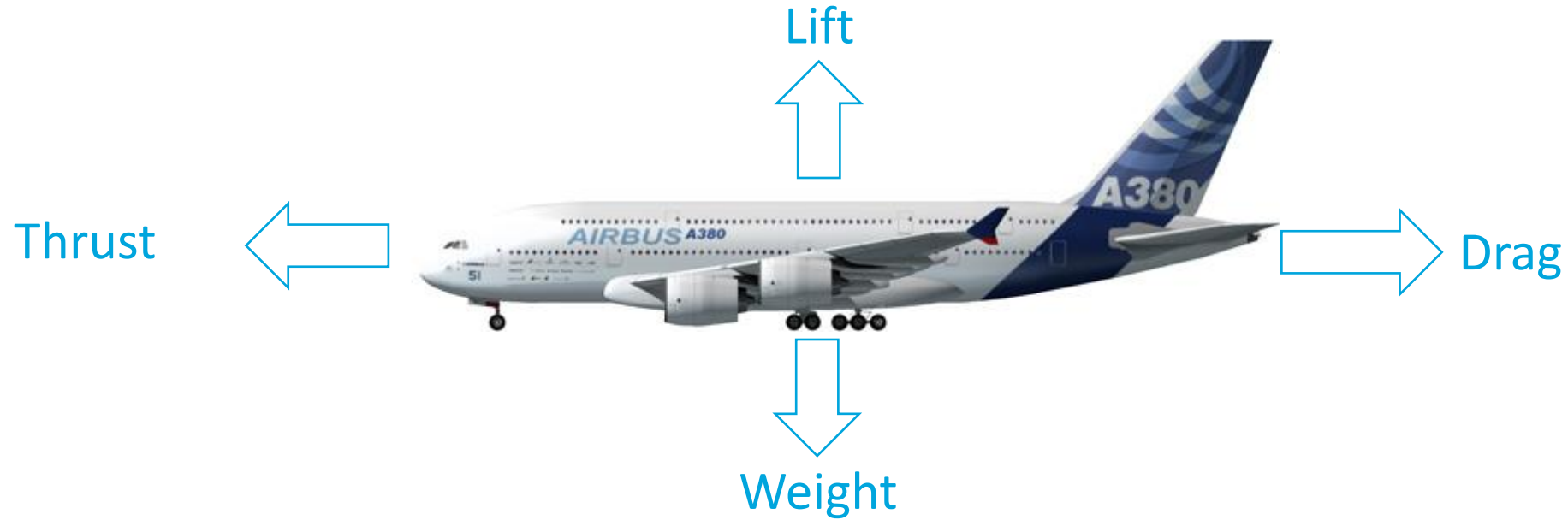
Basics of Flight

Lesson 2

Learning Objectives

- Forces on an Aircraft
 - Understand what forces act on an aircraft in flight
- Balance Activity
 - To understand how centre of gravity affects an aircraft
- Parts of a Glider
 - Learn the key components of a glider
- Aircraft Mobility
 - Understand how aircraft move
- Different Aircraft Types
 - Learn the different types of aircraft and their individual characteristics

Forces on an Aircraft



Your gliders will be unpowered so there will only be a thrust force when you throw them!

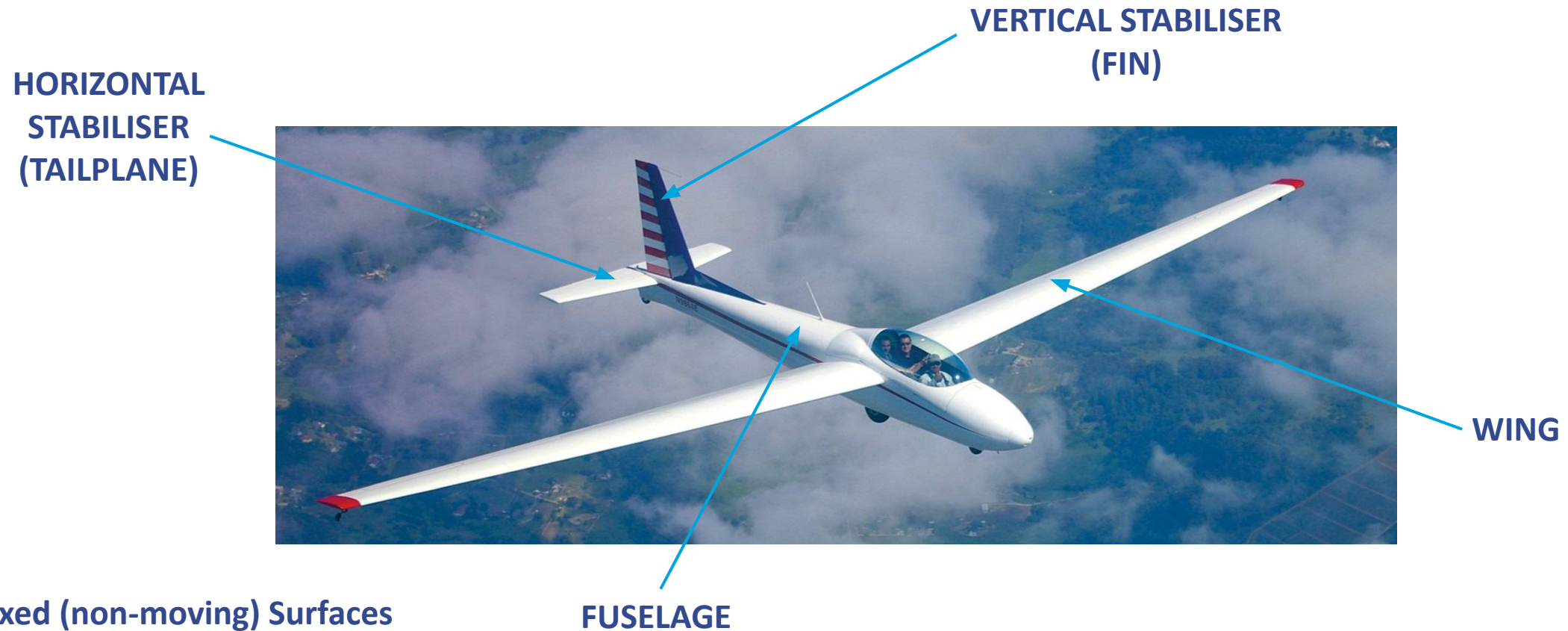
Remember $\text{Weight} = \text{Mass} \times \text{Gravity!}$

Balance Activity



Use Blu Tack to adjust the centre of gravity of your paper plane to find the best position

Parts of a Glider – Fixed (non-moving) Surfaces



Parts of a Glider – Control Surfaces



Match up the “Terms” with their “Descriptions”

FUSELAGE

Keeps nose of glider level

WINGS

Separates the “tailplane” from the wing and centre of gravity

NOSE

Provides the lift which counteracts the weight of the glider

**HORIZONTAL
STABILISER**

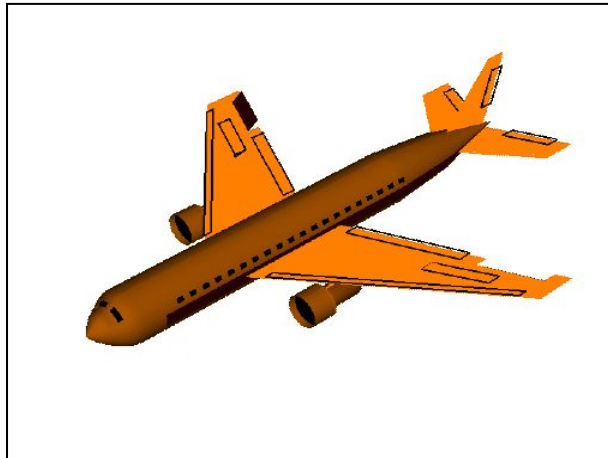
Keeps glider from turning left and right

**VERTICAL
STABILISER**

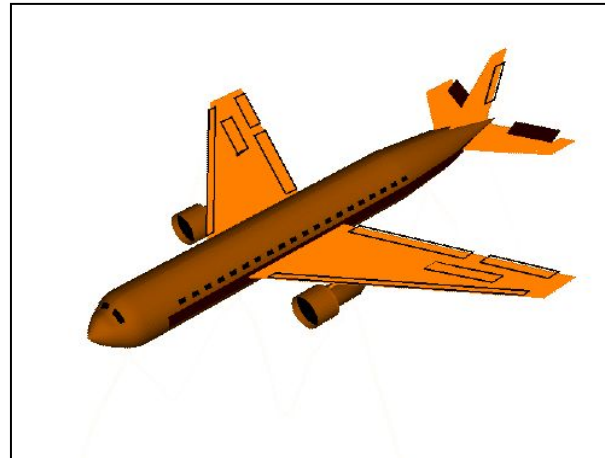
Provides weight for stability and is the first part of the glider to come into contact with ‘new’ air

How can an Aircraft Move?

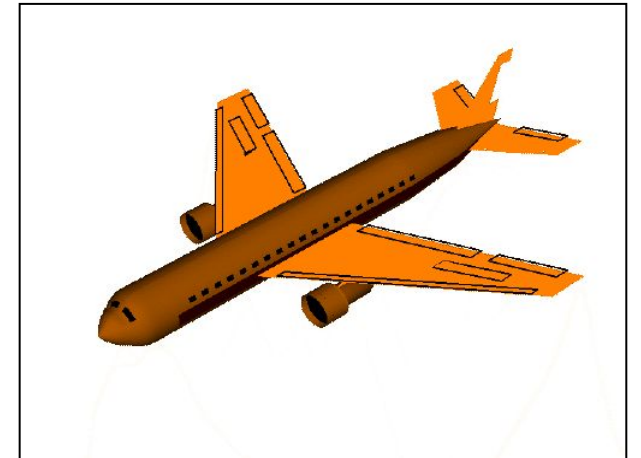
Roll



Pitch



Yaw



Maintaining Straight & Level Flight



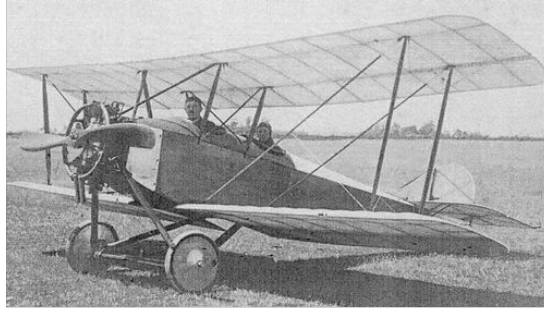
To prevent **Roll** - You need **balanced, symmetrical wings**

To stop **Yaw** - You need a **vertical stabiliser (the fin)**

To help control **Pitch** - You need two things:

- ✈ a horizontal stabiliser (the tailplane)
- ✈ a good weight balance

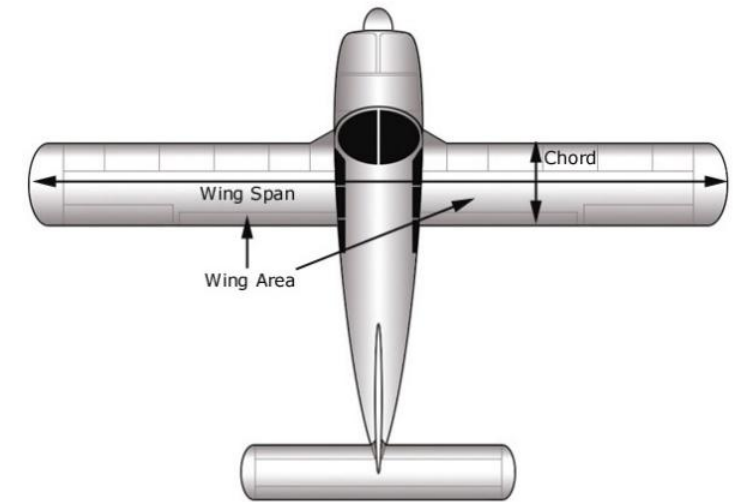
What is the difference?



Why are the wings different shapes?



Aircraft	Wing Span	Wing Chord	Wing Area	Speed
Jet Fighter	Short	Thick	Small	Fast Supersonic
Airliner	Long	Medium	Large	Medium Transonic
Glider	Long	Very Thin	Large	Slow Subsonic



TIP for your Glider:
Keep the wings thin but make the area as large as possible!

Learning Highlights

- Forces on an Aircraft
 - Thrust, Drag, Lift, Weight
- Balance Activity
 - Centre of Gravity
- Parts of a Glider
 - Fuselage, Wing, Tailplane, Fin, Ailerons, Rudder, Elevator
- Aircraft Mobility
 - Rolls, Pitch, Yaw
- Different Aircraft Types
 - Jet Fighter, Airliner, Glider