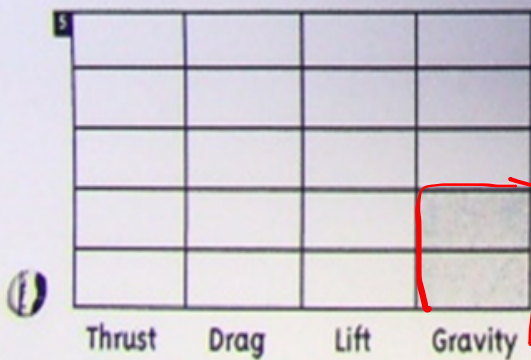
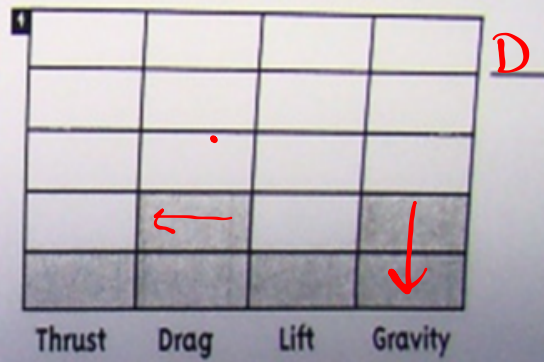
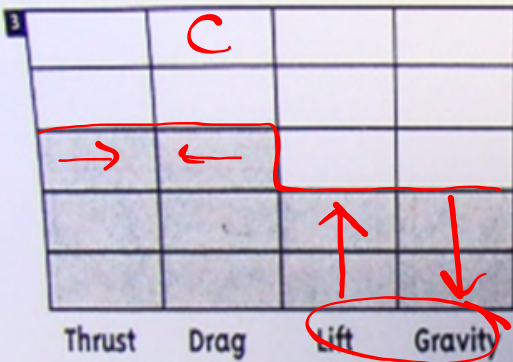
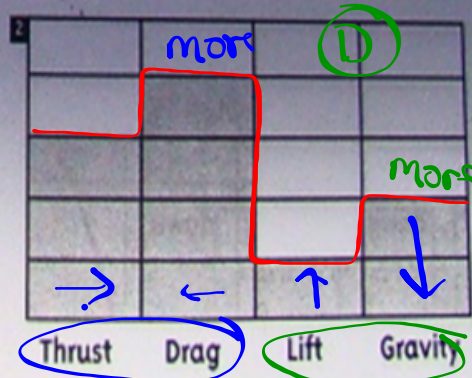
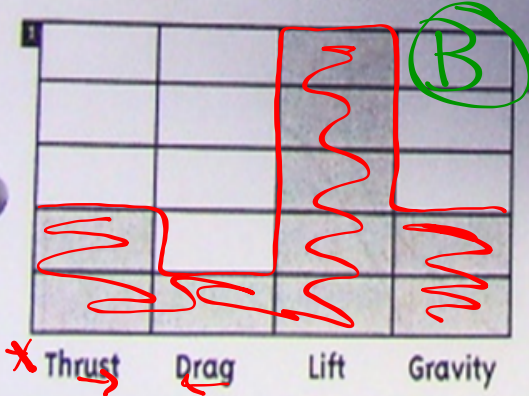
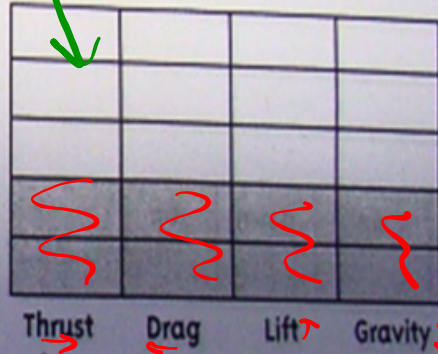


What's Happening Sheet

These graphs show how the four forces relate to each other in different flight situations: stopped on the ground, going up, flying level, and going down. You know, for example, that when a plane is flying level, the four forces are balanced. That means that lift is exerting the same amount of force as gravity is, and thrust is as strong as drag. The graph on the right shows those relationships.

Beside each graph below, put the letter of the indicated flight situation:

- (a) on the ground
- (b) going up
- (c) flying level
- (d) going down



How Living Things Fly

- Characteristics of flying birds

- Wings to produce lift ↑

- Powerful flight muscles to generate forward motion

- Aerodynamic body reduces drag

- Very light bones with air sacs reduces weight

- Gliding and Parachuting

- Other flying animals



thrust

X

X

push

(thrust)

(honeycomb)



Powerful flight muscles to generate thrust

- When a bird flaps its wings, it sends air down and behind to produce thrust
- To accomplish this, a bird must twist its wings to create the right angle
- Birds accomplish this with very strong flying muscles



How Do Birds Fly?

Bird flight is one of the most remarkable phenomena in the animal kingdom. The following animations show how main physical forces such as thrust, lift, and gravity affect bird flight.

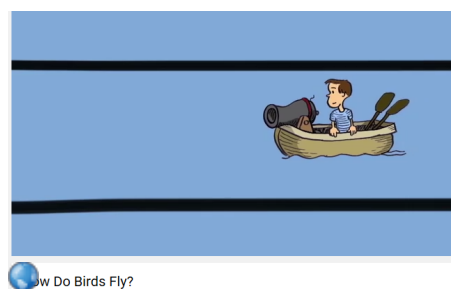


Take Off Flapping Gliding

0:08 / 2:10

How Birds Fly

This video player interface shows a title 'How Do Birds Fly?' and an introductory paragraph. Below the text are three sequential images of a white bird in flight, labeled 'Take Off', 'Flapping', and 'Gliding'. The video progress bar indicates the video is at 0:08 of a 2:10 duration. The channel name 'How Birds Fly' is visible at the bottom left of the player.

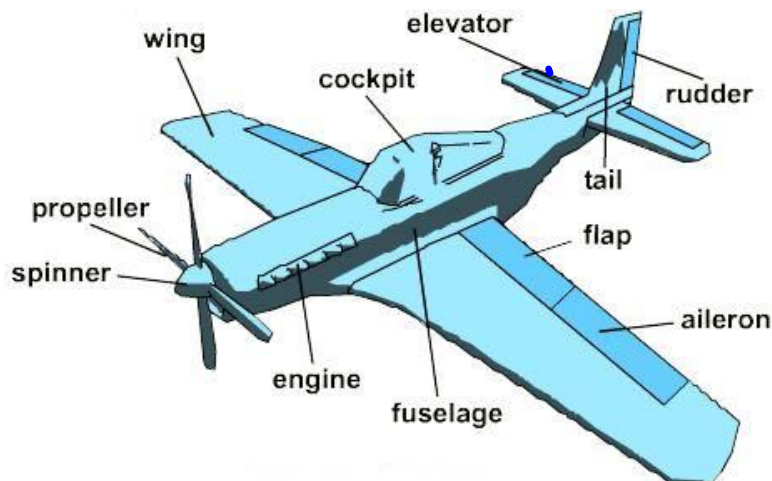


Wingsuit

- _____
- They allow you to glide from one place to another while falling at a reduced speed
- Most people wearing a wingsuit will also need to use a parachute to land



Parts of a Plane



Credit - NASA

Study

Ailerons - These are the small surfaces located at the ends of the wings. If they are angled in opposite directions to each other (ie. the left aileron is lowered and the right aileron is raised), the plane will roll in the direction of the aileron.

Elevator - The elevator can be controlled in an up and down motion. When angled up, the nose of the plane rises and when the elevator is lowered, the nose drops.

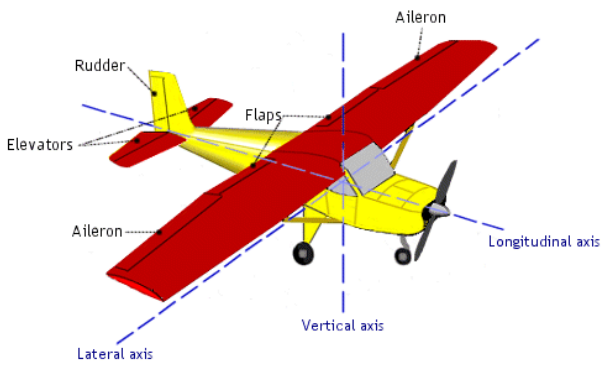
Flaps - Flaps are surfaces on the wings which can be raised or lowered to create additional lift or drag. They are used mainly during landing and takeoff.

Fuselage - The fuselage is the main body of the airplane. It can be used to carry cargo or passengers.

Propeller - The propeller creates the forward thrust to increase lift.

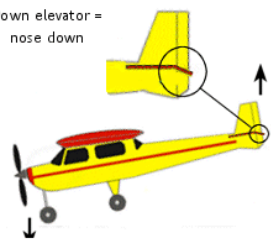
Rudder - The rudder is a flap which can be moved right or left. The nose of the plane will move in the direction of the turned rudder.

Wing - The wings permit lift to occur. This allows the plane to fly.

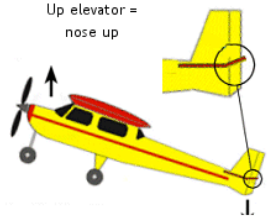


Elevators

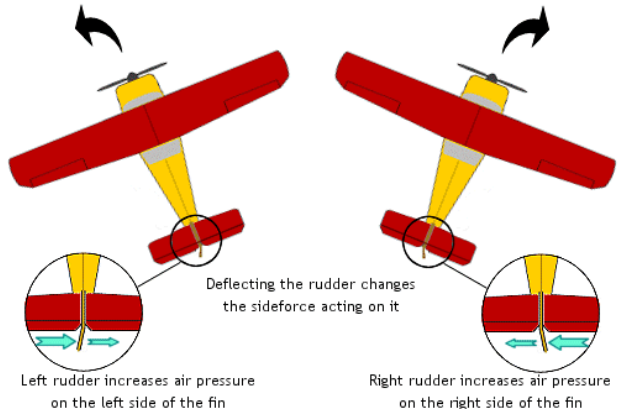
Down elevator = nose down



Up elevator = nose up

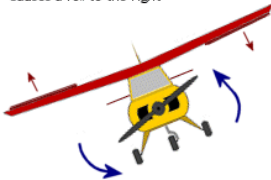


Rudder

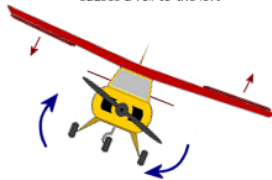


Ailerons

Left aileron down, right one up causes a roll to the right

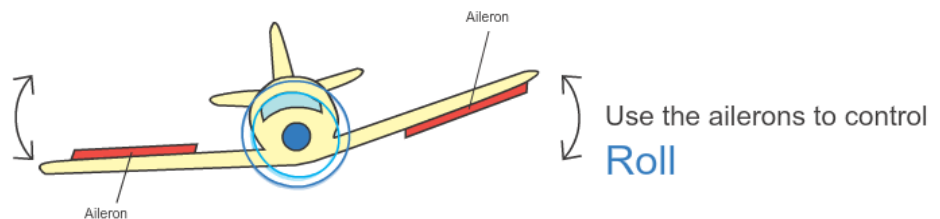


Left aileron up, right one down causes a roll to the left

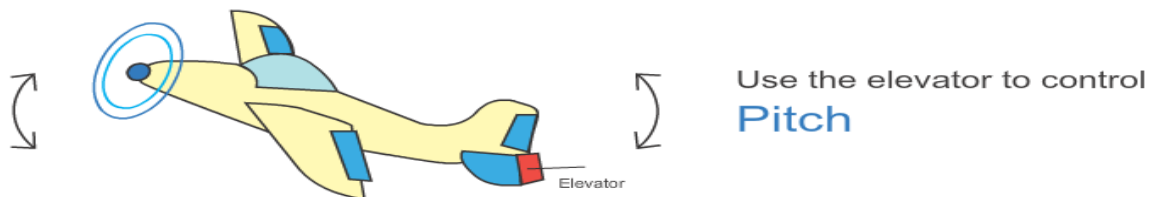




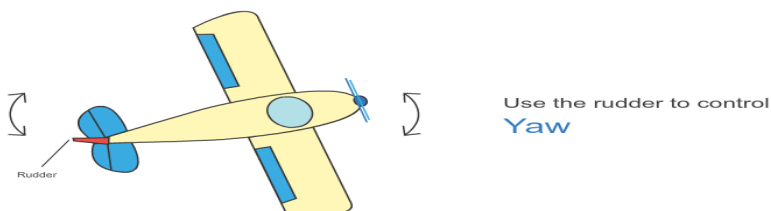
Turning the control column moves the ailerons and make the plane roll.



Pulling back and forward on the control column, make the plane pitch (point its nose up or down), so it climbs or dives.



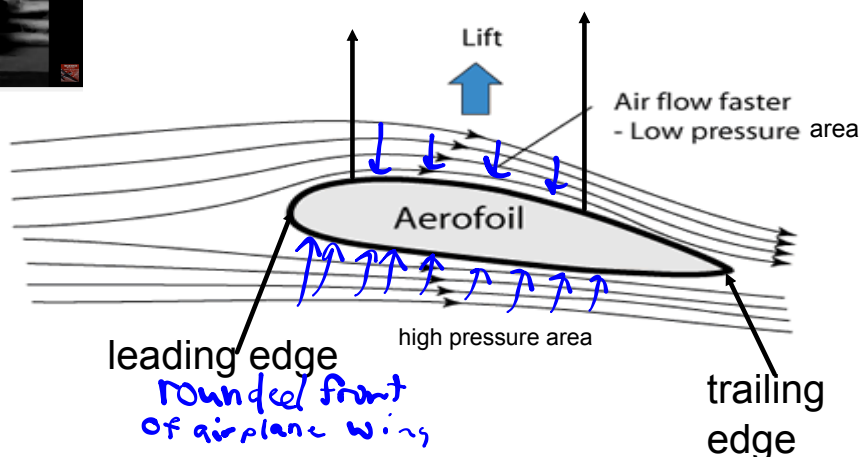
The rudder, worked by foot pedals, yaw or swivel (move right or left).



<http://howthingsfly.si.edu/flight-dynamics/roll-pitch-and-yaw>

- When given pictures on a test you must be able to tell what each pane is doing and why?

The Wing of a Plane



Definition

*** Airfoil - a streamlined shape with a curved top, a rounded leading edge, and a sharp trailing edge.**

When the airplane moves forward the air moves backwards remember over its wing.

1) When air hits the front of the wing (Leading edge) it splits up. Some goes on top and some goes under the wing.

2) The air flowing over the curved top of the wing has further to go than the air going under the flat bottom of the wing.

3) For the two streams of air to reach the back of the wing (trailing edge) at the same time, the top stream must travel faster than the bottom. (It has further to go)

4) This fast moving air creates a low pressure area on top of the wing and a high pressure area on the bottom of the wing. (Bernoulli's Law)

5) Since objects tend to go from high pressure to low pressure, lift is created, which is how birds and planes stay in the air. (Note that for the wing to have lift, it must be moving forward through the air)

Bernoulli's Principle

"If the speed of a fluid increases, the pressure it exerts decreases"

In other words

"Fast-moving fluids exerts less pressure than slow-moving fluids"