

Unit Exam
Study Guide

Name and define the four forces of flight:

Thrust- is a force that moves an aircraft in a forward direction. It is created with a propeller, jet engine, or rocket. Air is pulled in and then pushed out in an opposite direction.

Lift- is the force that holds and airplane in the air. The wings create most of the lift used by airplanes.

Drag- is the force that acts opposite to the direction of motion. It slows down an object. Drag is caused by friction and differences in air pressure.

Gravity- it acts in a downward direction- towards the centre of the Earth.

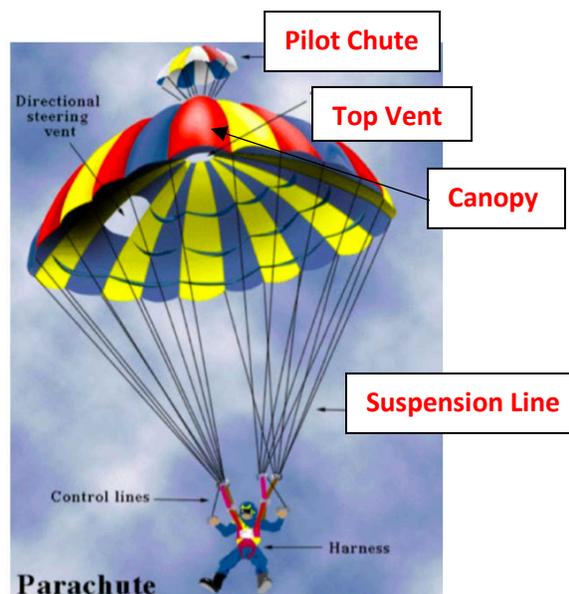
Define Air Resistance:

Air resistance is the frictional force air exerts against a moving object. As an object moves, air resistance slows it down. The faster the object's motion, the greater the air resistance exerted against it. An object's shape and surface area can increase or decrease the degree of air resistance it encounters.

Give examples of each:

- **Floaters:** Balloon, bubbles, seeds, hot- air balloon
- **Gliders:** Flying squirrel, paper air plane, parachute, hot-air balloon
- **Powered Flyers:** Air plane, helicopter, jet, birds, insects

Label the Parachute



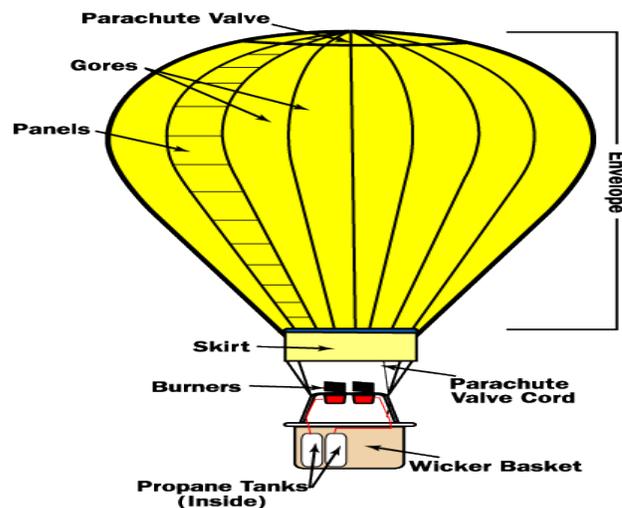
What is the purpose of the hole in the top of a parachute (top vent)?

The hole in the top of a parachute increases stability as it descends. This prevents the air from spilling out one side and causing the parachute to wobble.

What is the canopy shape of a parachute?

Concave shape (meaning curved)

Label the Hot Air Balloon



How do hot-air balloons go up and float? How does a hot air balloon descend (go down)?

Hot-air balloons create lift because the burner fills the envelope with hot, less dense air, so it begins to rise in the cool, more dense air surrounding it. To keep a hot-air balloon ascending (going up) you need to keep putting hot air into the envelope using the burners. To make the hot-air balloon descend (go down) you must release the hot air through the valve at the top of the balloon.

Define the following airplane movements

1) Pitch

The up and down movement of the airplane. Elevators control the pitch of a plane by moving it up or down. When the elevators are placed up the lift of the tail decreases making the plane move up. When the elevators are placed down the lift of the tail increases making the plane move down.

2) Roll

ALSO KNOWN AS BANK, IS THE ROTATION OF THE FUSELAGE LEFT OR RIGHT BY THE change in the ailerons. To achieve the roll the aileron on One wing is raised and the other wing's aileron is lowered.

3) YAW

The side to side movement of the nose of the airplane. The rudder controls the left or right movement of the nose of the plane.

Define the parts of a plane

1) Wings

The wing of the aircraft is responsible for making lift and is the reason we are able to fly.

2) Fuselage

The main body of the plane. This is where the passengers sit and cargo is stored.

3) Landing Gear

Landing gear on an aircraft is used to reduce the shock of landing and allows the aircraft to freely move around the airport on the ground. It is often able to retract into the aircraft after take off.

4) Rudder

The rudder is attached to the vertical stabilizer. The rudder is controlled by foot pedals inside the cockpit. When we push the left or right pedal the rudder moves left or right. This controls the YAW of the aircraft.

5) Propeller

The propeller is driven by the aircraft engine. When it spins it pushes air backwards, we call this thrust. Thrust is what moves the aircraft forward through the air.

6) Flaps

Flaps add camber to the wing, increasing the amount of lift the wing makes. We use them during take-off and landing because they allow the plane to fly slower due to the increase in lift.

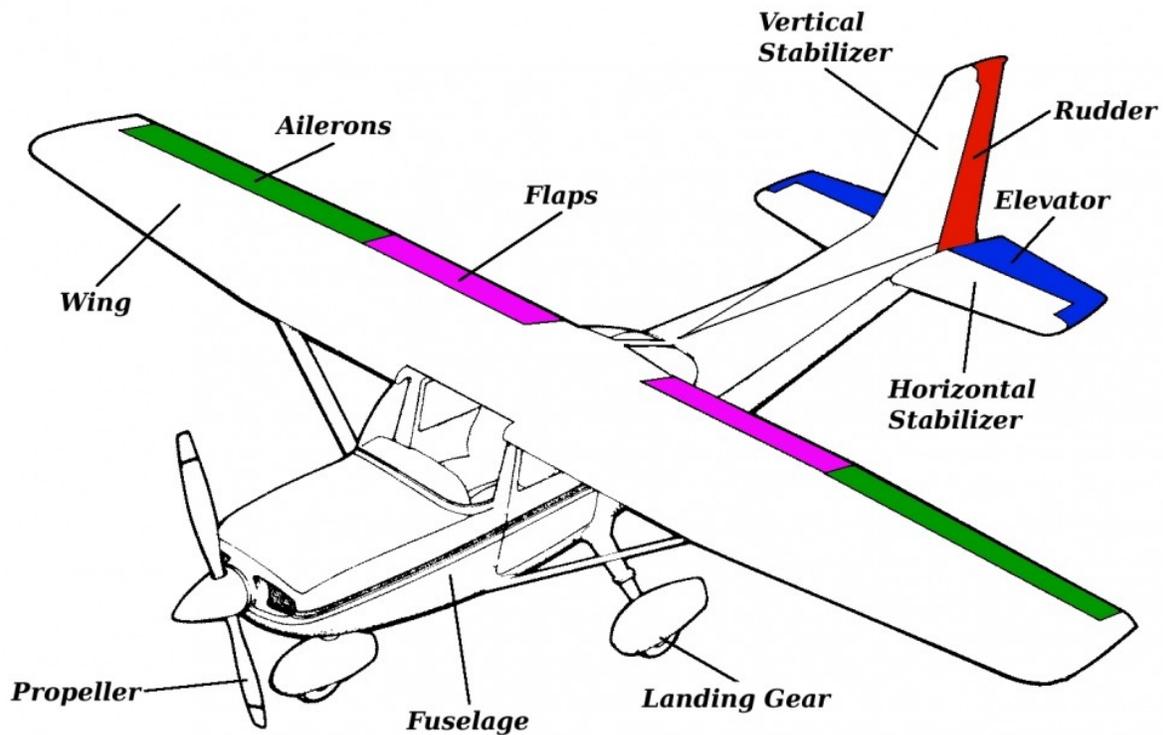
7) Cockpit

The cockpit is the area where the flight pilots work. Here are instruments showing the pilots information about the aircraft.

8) Elevator

The elevator is attached to the Horizontal Stabilizer. Moving the controls in the cockpit forward and backward will move the elevator up and down. This controls the PITCH of the aircraft

Label the parts of the plane



Discuss specific design features of a spacecraft

A spacecraft has fins for stability.

Thrust is created by the jet engines overcome drag and gravity.

A spacecraft carries fuel and oxygen because there is no oxygen in space.

It has a streamlined shape.

Discuss similarities and differences between an aircraft and a spacecraft

- Aircrafts get lift once the plane is moving forward. Spacecrafts get lift using rocket boosters and powerful engines that propel them UP not forward.
- Aircrafts and spacecrafts achieve thrust the same way: using jet engines. However, because there is no air in space spacecrafts have to carry their own supply of fuel AND OXYGEN.
- Spacecrafts have thrusters on them to move forward and side to side in space.