

Name: _____

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CORE SUBJECTS: AERODYNAMICS, MECHANICS, ENGINEERING

FLIGHT CONTROLS OF AN AIRPLANE

are surprisingly simple and, although the systems may get more complex on larger airplanes, the basic principles are the same for anything from a trainer aircraft to the largest of airliners.

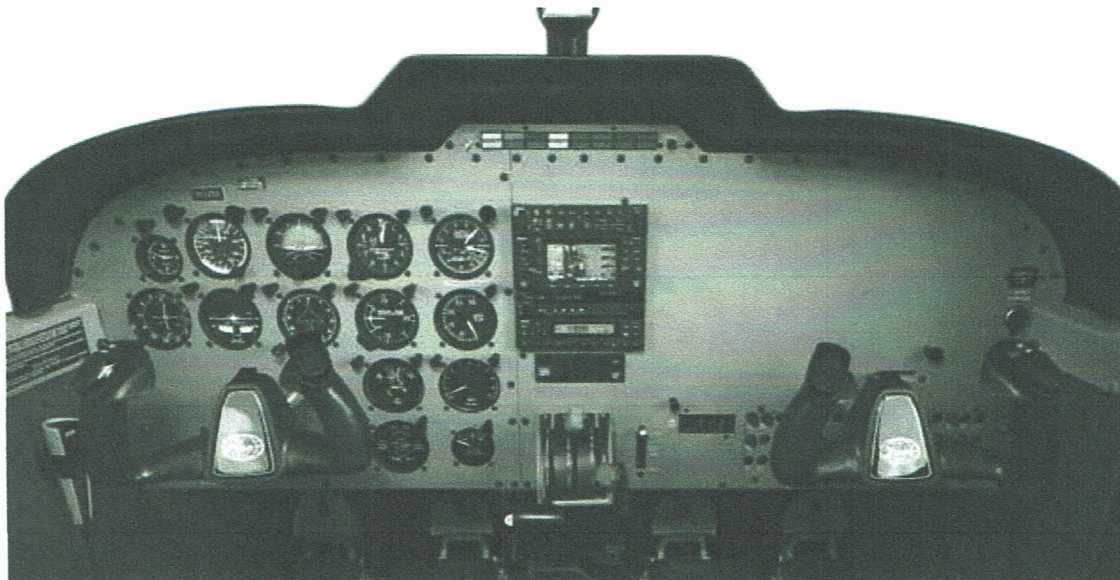
You may have wondered why airplanes bank (lean to one side) as they turn. The reason is that airplanes turn by directing the lift of their wings more to one side or the other. This is done by moving control surfaces on the wings known as ailerons. When you turn the control wheel (also known as the yoke), the aileron on one wing deflects upward, while the aileron on the other wing goes down. This increases and decreases lift on the wings.

Climbing and descending is directed through use of movable control surfaces on the horizontal portion of the tail. Appropriately enough, they are called eleva-

tors and are activated by pushing the control wheel forward or pulling it back.

The third basic control for flying an airplane is the rudder. Contrary to what you might expect, the rudder alone does not steer the airplane but rather serves the purpose of properly aligning the airplane in flight. The pilot controls the rudder's movement with rudder pedals on the floor of the airplane and also uses them to steer the airplane's nosewheel or tailwheel when on the ground.

Note: adapted from "You Can Fly!" by Gregory N. Brown and Laurel Lippert



A typical cockpit in a single-engine aircraft.

FLIGHT CONTROLS OF AN AIRPLANE

YOKE CONTROLS



When you turn the yoke left, the left aileron goes up, the right aileron goes down (black arrows), the left wing goes down (white arrow), and the airplane banks left.



When you turn the yoke right, the right aileron goes up, the left aileron goes down (black arrows), the right wing goes down (white arrow), and the airplane banks right.

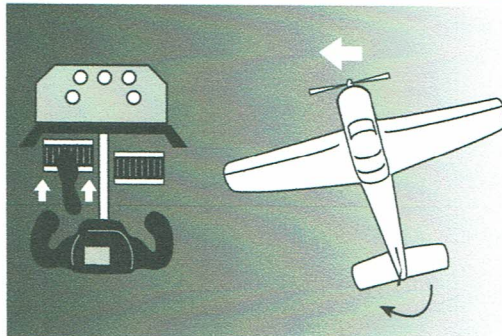


When you push the yoke forward, the elevator goes down (black arrow), forcing the tail up, and the nose goes down (white arrow).

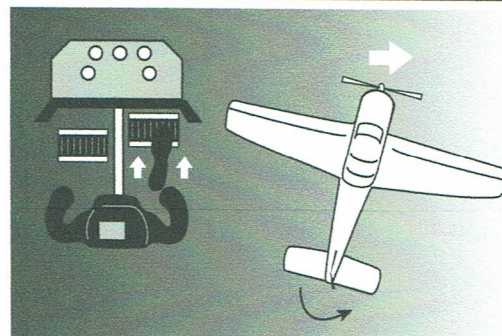


When you pull the yoke back, the elevator goes up (black arrow), forcing the tail down, and the nose goes up (white arrow).

RUDDER PEDAL CONTROLS



Push the left rudder pedal and the rudder on the tail moves left (black arrow), forcing the tail to the right and the nose moves left (white arrow).



Push the right rudder pedal and the rudder on the tail moves right (black arrow), forcing the tail to the left and the nose moves right (white arrow).

ACTIVITY: Flight Controls**CIRCLE ONE OR FILL IN THE BLANKS:**

1. To turn the plane, the pilot turns the control wheel **LEFT / RIGHT** to start a left turn.
2. Turning the control wheel makes the wings tilt or "B _ _ _ _."
3. To start a turn to the right, the pilot would turn the control wheel to the **LEFT / RIGHT**.
4. To help coordinate the turn, the pilot uses the R _ _ _ _ R.

CIRCLE ONE:

1. To facilitate a left turn, the pilot pushes the **LEFT / RIGHT** rudder pedal.
2. To start a climb, the pilot **PUSHES FORWARD / PULLS BACK** on the control wheel.
3. To start a descent, the pilot **PUSHES FORWARD / PULLS BACK** on the control wheel.

