Answer on Question #50149, Physics, Mechanics | Kinematics | Dynamics

Lift on an aeroplane wing results from:

1. locally reaching the speed of sound in the boundary layer of the upper face of the aerofoil

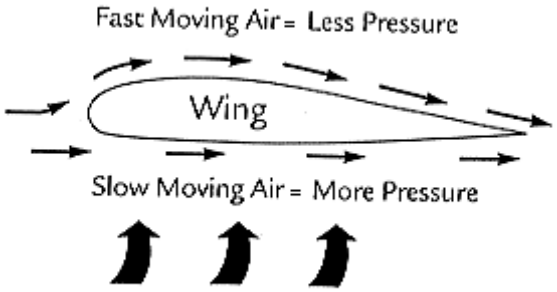
2. a pressure difference between the faces of the aerofoil

3. a local increase in density at the upper face of the aerofoil

4. creating micro-vortices on the upper face which decrease the viscosity of the fluid

Solution:

A cross section of a typical airplane wing will show the top surface to be more curved than the bottom surface. This shaped profile is called an 'airfoil' (or 'aerofoil') and the shape exists because it's long been proven (since the dawn of flight) that an airfoil generates significantly more lift than opposing drag i.e. it's very efficient at generating lift.



During flight air naturally flows over and beneath the wing and is deflected upwards over the top surface and downwards beneath the lower surface. Any difference in deflection causes a difference in air pressure ('pressure gradient') and because of the airfoil shape the pressure of the deflected air is lower above the airfoil than below it. As a result the wing is 'pushed' upwards by the higher pressure beneath or, you can argue, it is 'sucked' upwards by the lower pressure above.

Answer: 2. a pressure difference between the faces of the aerofoil.