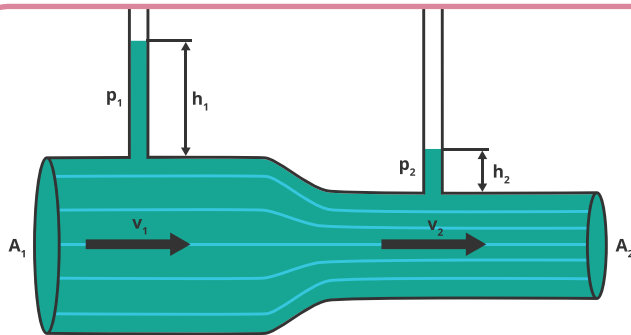# BERNOULLI'S PRINCIPLE

CONCEPT Bernoulli's Principle is found commonly with the flow of fluids in different types of pumps and systems such as hydraulics. It also explains the basic principles of flight and how to design aircraft to best use air pressure.

FORMULA

Bernoulli's Principle is simply, when speed of fluid or air increases, the pressure decreases and when the speed of fluid or air decreases, pressure is increased.

$$P_1 + \frac{1}{2}\rho v_1^2 + \rho g h_1 = P_2 + \frac{1}{2}\rho v_2^2 + \rho g h_2$$

p = fluid density
g = acceleration due to gravity
P_1 = pressure at elevation 1

v_1 = velocity at elevation 1
h_1 = height of elevation 1
P_2 = pressure at elevation 2

v_2 = velocity at elevation 2
h_2 = height at elevation 2

BACKGROUND

Daniel Bernoulli was a Swiss math professor in St. Petersburg in the 1730s. Bernoulli's Principle is the principle used to describe the laws of motion of fluids and the pressure of moving air.

Final position

Blowing air

Origin position
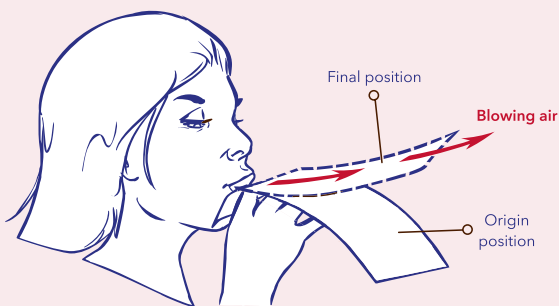
REAL WORLD CONNECTIONS

Bernoulli's Principle is used in many areas today, the hydraulics systems in machines, the shape and design of wings or fins of aircraft, the design and shape of the sails of sailboats, and even the pitch of a baseball.

Lift

Air flow

Faster air (lower pressure)

airfoil

Slower air (higher pressure)

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