FLUIDS!

Density = mass per unit volume. Density characterizes specific substances.

Pressure... the exerted pressure at a point is the magnitude of the applied force per unit area. Pressure is a scalar.

Pressure in a fluid:

\[
\frac{dp}{dy} = \rho g.
\]

If the density is constant,

\[
p(y) = p_0 + \rho gy.
\]

Barometer: \( \rho gh = p_a \).

Gauge pressure: \( p_g = p - p_a \).

Pascal Principle: Any pressure exerted on a fluid is exerted at each point within the fluid.

\[
p = F_1/A_1 = F_2/A_2.
\]
Archimedes’ Principle: The buoyant force exerted on an object in a fluid is precisely the supporting force that was originally exerted on the fluid the object has displaced: \( B = \rho_f g V \).

Equation of Continuity: \( A_1 v_1 = A_2 v_2 \).

Bernoulli Principle:

\[
p + \frac{1}{2} \rho v^2 + \rho g y \text{ is a constant.}
\]

For a gas not otherwise disturbed, \( pV = \text{constant} \).