

# Auxiliary Concept: Fluid Mechanics

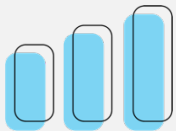
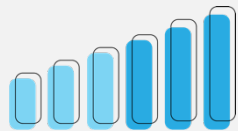
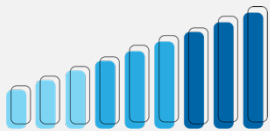
**Engineering Literacy Dimension:** Engineering Knowledge

**Domain:** Engineering Sciences

**Overview:** *Fluid Mechanics* concerns how the laws of force and motion apply to liquids and gases. This concept is important to Engineering Literacy, as it is the knowledge that informs how engineering professionals understand, design, create, and analyze systems involving fluids such as heating and cooling equipment, pump systems, fans, turbines, pneumatic equipment, and hydraulic equipment. For example, one may use Bernoulli's equation and the conservation of mass to determine flow rates, pressure changes, minor and major head losses for viscous flows through pipes and ducts, and the effects of pumps, fans, and blowers in such system.

## Performance Goal for High School Learners

I can, when appropriate, draw upon the knowledge of Fluid Mechanics content, such as (a) *fluid properties*, (b) *lift, drag, and fluid resistance*, (c) *pumps, turbines, and compressors*, (d) *fluid statics and motion (Bernoulli's Equation)*, and (e) *pneumatics and hydraulics*, to analyze how fluids behave and measure/control their flow to solve problems in a manner that is analytical, predictive, repeatable, and practical.

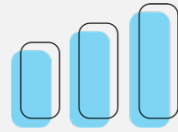
	 Basic	 Proficient	 Advanced
<b>FLUID PROPERTIES</b>	I can describe the basic properties of fluid (e.g. density, viscosity, pressure, temperature, and surface tension).	I can explain how various variables (volume, weight, mass, etc.) determine fluid properties, using mathematical descriptions.	I can analyze the properties of a fluid, using mathematical equations and correct units.
<b>PUMPS, TURBINES, &amp; COMPRESSORS</b>	I can define and distinguish between pumps, turbines, and compressors.	I can explain the basic features and applications of pumps, turbines, and compressors.	I can determine and justify which types of devices to increase the pressure of fluid for a given design problem.
<b>LIFT, DRAG, &amp; FLUID RESISTANCE</b>	I can describe the basic laws of fluid forces in terms of lift, drag, and resistance.	I can explain lift, drag, resistance forces, using mathematical descriptions.	I can analyze the force of a fluid, using mathematical equations and correct units.
<b>FLUID STATICS &amp; MOTION (Bernoulli's Equation)</b>	I can define Bernoulli's principles.	I can explain how Bernoulli's principles apply to a fluid system.	I can verify the conservation of energy for a flowing fluid, using Bernoulli's equation and correct units.

## Auxiliary Concept: Fluid Mechanics Cont.

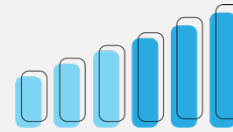
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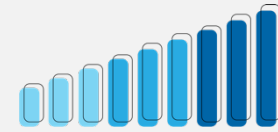
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Basic



Proficient



Advanced

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### PNEUMATICS & HYDRAULICS

I can distinguish between fluid power and others.

I can explain the differences between pneumatics and hydraulics.

I can evaluate a fluid power system, using mathematical equations and correct units.