

Grade 8 Science Fluids – **Pressure, Pascal's Law and Hydraulic Advantage**

Name: _____ Class: _____ Date: _____

What is pressure?

What is PSI?

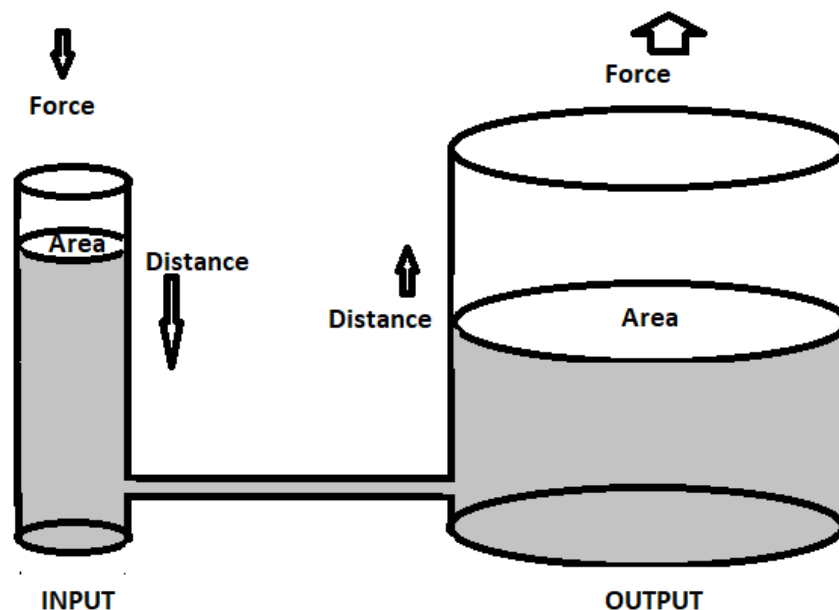
What is 1 Pascal equal to?

Why is liquid ideal for hydraulics?

Why are gases not good for hydraulics?

Why are solids not good for hydraulics?

How do we create Hydraulic Advantage in a closed system?



How do we calculate Hydraulic Advantage? What three ways can we calculate Hydraulic Advantage?

1 – SAR

$$(HA = \text{Output Area} \div \text{Input Area})$$

2 – SR

$$(HA = \text{Input Distance} \div \text{Output Distance})$$

3 – MA or HA

$$(HA = \text{Output Force} \div \text{Input Force})$$

Once you find one ratio or have the Hydraulic Advantage (also known as Mechanical Advantage), you can calculate the other part of each ratio:

$$\text{Hydraulic Advantage} = \text{Mechanical Advantage} = F_{\text{out}}:F_{\text{in}} = A_{\text{out}}:A_{\text{in}} = D_{\text{in}}:D_{\text{out}}$$

Use this information and the work on the board to answer the following questions.

1. What is the Hydraulic Advantage of a system with an input piston with an area of 3 cm^3 and an output piston of 27 cm^3 ?
2. What is the Hydraulic Advantage of a system that raises the output piston a distance of 2.5 cm when the input piston moves 50 cm?
3. If an input force of 40 N creates an output force of 960 N, what is the hydraulic Advantage?
4. If the Hydraulic Advantage is 7 and the input distance is 52.5 cm, what is the output distance?
5. If the area of the input piston is 1 cm^3 and you apply a force of 300N, what would be the output force if the area of the output piston is 12 cm^3 ?