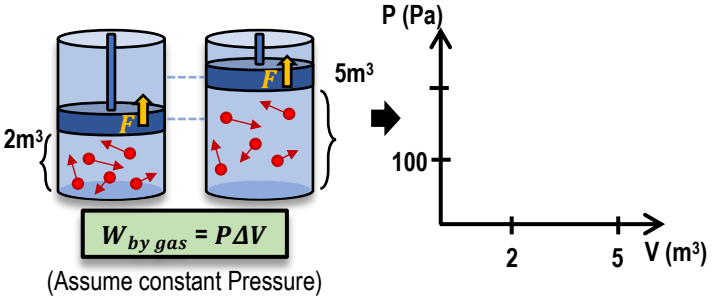
CONCEPT: INTRO TO PV DIAGRAMS & WORK

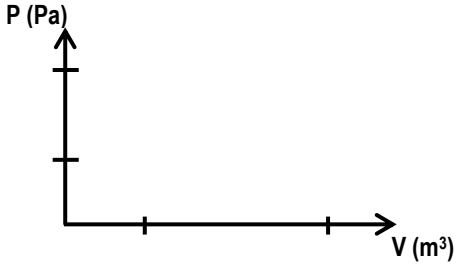
- PV Diagrams plot **P**_____ vs. **V**_____.
  - They graph *thermodynamic processes*, which is when any system/gas _____ between states.
- Work done in any thermodynamic process = _____ under the PV curve
- Unlike other diagrams which *only* went left-to-right, thermodynamic processes can go in *any* direction on PV diagrams.
  - If the "path" of the process goes from *left-to-right*, W_{BY} = **Area = [+ | –]**
  - If the "path" of the process goes from *right-to-left*, W_{BY} = **Area = [+ | –]**

EXAMPLE: A gas expands from a volume of $2m^3$ to $5m^3$ at a constant pressure of 100 Pa. **a)** Draw this process on the PV diagram. **b)** Calculate the work done by the gas. **c)** Calculate the area under the "path" of the process.

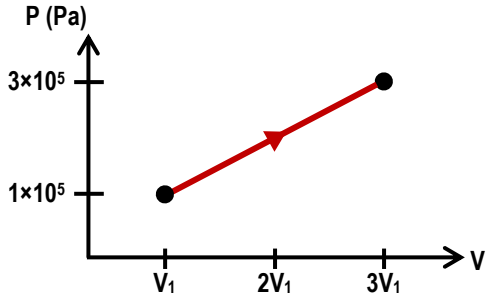


(Assume constant Pressure)

EXAMPLE: A gas compresses from $5m^3$ to $2m^3$ while the pressure rises steadily from 100 to 220 Pa. Draw the process on the PV diagram and calculate the work done BY the gas.



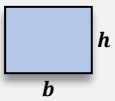
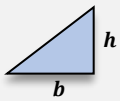
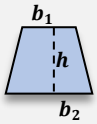
PROBLEM: The work done by the gas in the process shown below is 2×10^5 J. What is the value V_1 indicated on the axis?



THERMO EQs & CONSTANTS

$W_{BY} = P\Delta V$

$R = 8.314 \frac{J}{mol \cdot K}$

Rectangle	Triangle	Trapezoid
		
$A = b \cdot h$	$A = \frac{1}{2} b \cdot h$	$A = \frac{1}{2}(b_1 + b_2) \cdot h$