Thermal Processes are Awesome!

Isothermal	
Temperature is constant.	
Internal energy (U) does not change based on an equal balance between heat flow (Q) and work (W).	
* Therefore Q = -W	
* The line on the graph marks the isotherm.	
Compression	Expansion
+W is balanced by equal cooling (-Q) to keep temperature constant despite compression.	-W is balanced by equal heating (+Q) to keep temperature constant despite expansion.

Adiabatic	
Heat flow is zero.	
Internal energy (U) changes based solely on work (W) since there is no heat flow (Q).	
* Therefore $\Delta U = W$, and temperature change is not mitigated by heat flow. Work causes temperature to change MORE than in an isothermal situation.	
* The line on the graph is more extreme than the isotherm.	
Compression	Expansion
+W is NOT balanced by cooling (-Q). Pressure and temperature will therefore be higher than the isotherm.	-W is NOT balanced by equal heating (+Q). Pressure and temperature will therefore be lower than the isotherm.

Thermal Processes are Awesome!

Isobaric	
Pressure is constant.	
Internal energy (U) changes based on the unequal balance between heat flow (Q) and work (W).	
* Therefore temperature (T) changes to keep pressure constant at different volumes.	
* The line on the PV graph crosses the isotherm horizontally.	
Compression	Expansion
+W is balanced by cooling (-Q) to keep pressure from increasing.	-W is balanced by heating (+Q) to keep pressure from decreasing.

Isochoric	
Volume is constant.	
Internal energy (U) changes based solely on heat flow (Q), since no work (W) is done to change volume.	
* Therefore temperature (T) changes as pressure changes at a constant volume.	
* The line on the graph crosses the isotherm vertically.	
Decreased Pressure	Increased Pressure
Cooling causes pressure to decrease in the same size container.	Heating causes pressure to increase in the same size container.