

Cycle Analysis Activity

In this activity you will visualize a thermodynamic cycle on a PV and TS diagram and relate process paths to work transfer, heat transfer, and changes in internal energy (with particular emphasis on the sign of each quantity associated with each process as well as the overall cycle).

- a) Sketch the following processes that make up a thermodynamic cycle, using data in the table below. Show pressure-volume (P-V) and temperature-entropy (T-S) diagrams. Clearly label the starting and ending points for each process. Assume ideal gas behavior.

Process	W	Q	ΔU
1-2 isentropic compression			
2-3 isochoric heat addition			
3-4 isobaric heat addition			
4-5 reversible, adiabatic expansion			
5-1 isochoric heat rejection			
ENTIRE CYCLE (1-2-3-4-5-1)			

- b) Give the sign of the work, heat, and change in internal energy for each process as well as the entire cycle.

- c) Explain/demonstrate how to use cycle information from only the TS diagram in part (a) to obtain an estimate of cycle efficiency.

