

## # Second Law of Thermodynamics

↳ For a spontaneous process, the entropy of the universe is continuously increasing.

### • Entropy

$$\Delta S_{\text{total}} = \Delta S_{\text{sys}} + \Delta S_{\text{surroundings}}$$

For a irreversible process  $\Delta S_{\text{total}} > 0$

For a reversible process  $\Delta S_{\text{total}} = 0$

$$\Delta S_{\text{surroundings}} = -\frac{Q_{\text{sys}}}{T_{\text{surroundings}}}$$

Also.  $\Delta S_{\text{surroundings}} = -\frac{\Delta U_{\text{sys}}}{T_{\text{surroundings}}}$  (For isochoric process)

$\Delta S_{\text{surroundings}} = -\frac{\Delta H_{\text{sys}}}{T_{\text{surroundings}}}$  (For isobaric process)