- Clausius was convinced of the significance of the ratio of heat delivered and the temp. at which is it delivered,

$$\frac{q}{T}$$

- this is most relevant when you are considering phase transitions (such as solid to liquid) where the temp. does not change with added head

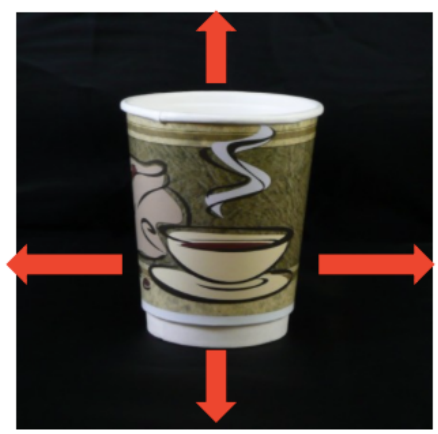
- entropy can be thought of as a measure of the randomness of a system
- it is related to the various modes of motion in molecules
- like total energy (E) and enthalpy (H), entropy is a state function
- therefore,

$$\Delta S = S_{final} - S_{initial}$$

- for a process occurring at constant temp. (as **isothermal** process), change in entropy is equal to the heat that would be transferred if the process were reversible, divided by the temp.

$$\Delta S = \frac{q_{rev}}{T}$$

- **ex.** heat energy from a cup of hot coffee spontaneously flows to its surroundings (the table top, the air around the cup, or your hand holding the cup)
    - overall, the entropy of the system (the cup of hot coffee) and its surroundings has increase



- **ex.** the rock rolling down the hill is a bit more complicated; as it rolls down, the rock's potential energy is converted to kinetic energy
    - as it collides with other rocks on the way down, it transfers energy to then
    - the entropy of the system (the rock) and its surroundings has increased
- **ex.** now, consider a gas in a flask connected to an equal-sized flask that is evacuated
    - when the valve is open, the gas will flow into the evacuated flask