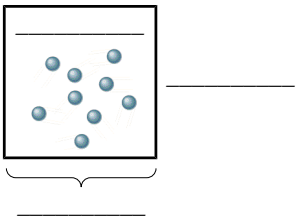
CONCEPT: FIRST LAW OF THERMODYNAMICS

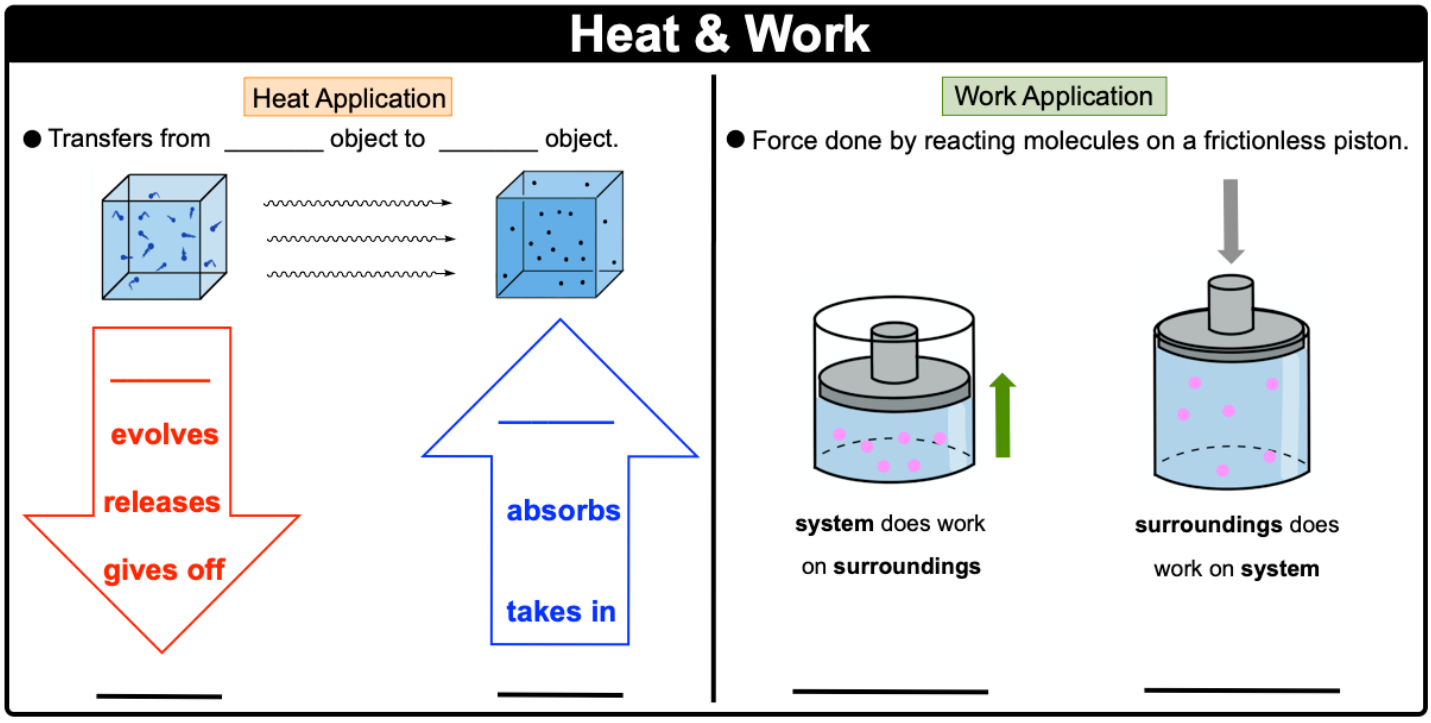
- The **1st Law** states that energy cannot be created nor destroyed, but transferred between *system* & *surroundings*.
  - **System**: Represents the _____ or substance that is being studied and analyzed.
  - **Surroundings**: Everything that is not found in the system.



EXAMPLE: A chemist wishing to determine the final temperature of 30.0 g of a metal ore places it into an insulated beaker containing 615.5 g of water at 42.18 ºC. It is determined that the metal gains 19.11 kJ of energy. From the information provided, determine the system and the surroundings.

Heat and Work

- The transferring of energy between the system and surroundings deals with first understanding *heat* and *work*.
  - **Heat** (___) : The _____ of thermal energy from a higher temperature object to a lower temperature object.
  - **Work** (___) : Movement of reacting molecules against gravity or an opposing force.



PRACTICE: What are the signs of q and w when a system loses heat while doing work on the surroundings?

a) q = – , w = – b) q = + , w = + c) q = – , w = + d) q = + , w = –