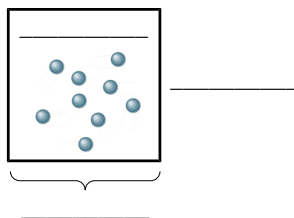


CONCEPT: FIRST LAW OF THERMODYNAMICS

- 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 °C. 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.

Heat & Work

Heat Application

- Transfers from _____ object to _____ object.

evolves
releases
gives off

absorbs
takes in

Work Application

- Force done by reacting molecules on a frictionless piston.

system does work
on surroundings

surroundings does
work on system

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) $q = +$, $w = -$