

ENERGY CONVERSIONS

THERMODYNAMIC CONSIDERATIONS

FIRST LAW OF THERMODYNAMICS:

Energy is conserved. In all physical changes, energy is neither created nor destroyed. Energy can be converted from one form to another.

WHAT DOES IT MEAN?

Chemical energy can be converted to heat or to light; light can be converted to chemical energy; nuclear energy can be converted to light or to heat; chemical energy can be converted to mechanical energy, and so on. All forms of energy can be converted back and forth.

SECOND LAW OF THERMODYNAMICS:

When energy is changed from one form to another, some of the energy is degraded to a more dispersed, random form with increased entropy (Entropy: The tendency of the universe towards disordered systems). Often energy is lost in the form of heat (thermal) or light (radiant). Energy is not 100% converted to work.

WHAT DOES IT MEAN?

No system is fully efficient in transforming energy. This includes the human body. Our food (chemical energy) can be transformed to provide energy for movement (mechanical energy), however a significant amount of the energy is lost in the form of heat. You can place your hand on your arm and feel the energy in the form of heat that you are losing from your last meal.

- ✓ Coal (chemical energy) to electricity (electrical energy)...only 33% efficiency
- ✓ Gasoline (chemical energy) to movement (mechanical energy)...only 15 to 35% efficiency
- ✓ Electricity (electrical energy) to radiant energy (incandescent light bulb)...only 10% efficiency