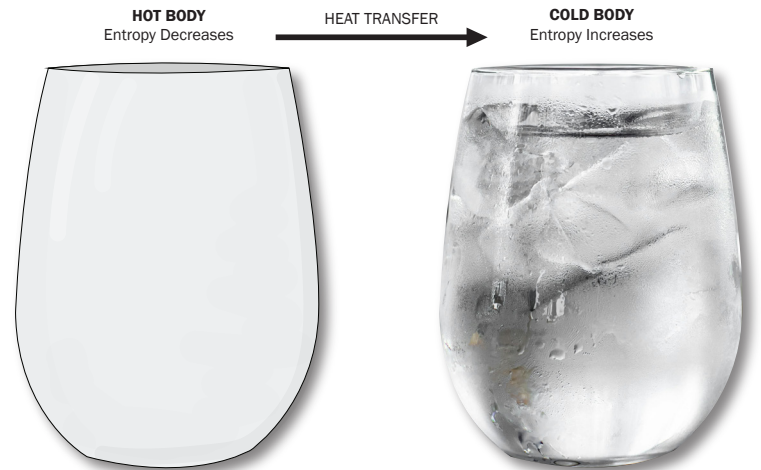


CONCEPT Entropy is a measure of the disorder of a system. Entropy also describes how much energy is not available to do work. The more disordered a system and higher the entropy, the less of a system's energy is available to do work.



The ice in the drink is slowly melting. Eventually, all of the components will reach thermal equilibrium. Heat transfers energy from the warmer liquid to the colder ice.

BACKGROUND

Nicolas Léonard Sadi Carnot was a French physicist, considered the “father of thermodynamics,” for he is responsible for the origins of the Second Law of Thermodynamics, as well as various other concepts. The current form of the second law uses entropy rather than caloric, which is what Sadi Carnot used to describe the law. Caloric relates to heat and Sadi Carnot realized that some caloric is always lost in the motion cycle. Thus, the thermodynamic reversibility concept was proven wrong, proving that irreversibility is the result of every system involving work.

REAL WORLD CONNECTIONS

Why is it that when you leave an ice cube at room temperature, it begins to melt? Why do we get older and never younger? And, why is it whenever rooms are cleaned, they become messy again in the future? Certain things happen in one direction and not the other. This is called the “arrow of time” and it encompasses every area of science.

EXAMPLE

The second law of thermodynamics is about the quality of energy. It states that as energy is transferred or transformed, more and more of it is wasted. The Second Law also states that there is a natural tendency of any isolated system to degenerate into a more disordered state.