

Refrigeration

You put a fresh lemonade in the refrigerator. Later in the day, it is refreshingly chilled. But how does the inside of the refrigerator get cold? Where does the cool air pouring out of the air conditioner come from?

When something gets cooler, the energy isn't lost. Instead, when something loses energy and gets cold, something else gains it. In a refrigerator, liquid coolant travels through a pipe towards the freezer. The coolant passes through an expansion valve into the evaporator coil and turns into a low pressure gas. The particles of coolant need energy to spread out and form a gas. Evaporation is endothermic. The kinetic energy of the coolant's particles is converted to potential energy when the particles spread out. As a result, the temperature of the gas drops. The cold gas moves through the pipes toward the compressor and absorbs energy from inside the refrigerator, making it cold. In the compressor, the coolant is compressed to become a hot, high pressure gas. The hot gas goes into the condenser coil where it loses thermal energy to its surroundings and liquefies. The cycle repeats.



Answer the questions below based on your reading above and on your knowledge of physics.

1. How is conservation of energy demonstrated when the refrigerator's coolant evaporates and becomes colder?

2. Based on the description of how a refrigerator works, describe how an air conditioner works.

3. Why does the fan on the outside unit of central air conditioning blow hot air?

4. How does sweating make you cooler?

