The invention of canning helped keep food fresh, but two other ways of preserving food are refrigeration and freezing.

In 1834, Jacob Perkins built the first **practical refrigerator**, but it was very large. In 1844, John Gorrie, a physicist, was the first to build a refrigerator based on the science of vaporization. When liquid vaporizes, or turns to steam or mist, it absorbs the heat around it. (When gas is compressed, it releases heat; when it expands, it cools.) Gorrie's idea was to compress gas, let it cool, and then lower its pressure to cool it again.

Refrigeration kept food from spoiling because bacteria do not grow well in cold temperatures. Refrigeration made a greater variety of food available since it allowed people to transport food all over the world.

In 1913, the Domestic Electric Refrigerator Company sold the first **household refrigerator**. In 1916, Nathaniel Wales sold the first Kelvinator, a more practical home refrigerator. Frigidaire refrigerators went on the market in 1917. A decade later, Thomas Midgley, a chemist, developed **Freon**. Freon, a nonflammable, nonpoisonous coolant, was safe to use in home refrigerators. Earlier coolants

temperature" refrigerator: One part was for frozen food, the other part for chilled food. This was the beginning of the refrigerator used today.

Inventor Clarence Birdseye (1886–1956) did the first large-scale, deep-freezing of food. He learned from Alaskan Inuits, who had discovered that if fresh food was frozen quickly, it kept its flavor. In 1924, Birdseye started a freezing company to deep-freeze food—550 tons of fruit and vegetables per year. In 1929, Birdseye invented a freezing machine made of two refrigerated plates that chilled food on both sides, and in 1935 he invented the freezer used today—a **multiple-plate freezer**.

Fred Jones (1893–1961) and Joe Numero (1897–1991) developed a cooling process that would refrigerate the inside of a tractor-trailer and called it the **Thermo King**. Thermo King changed the food industry because it allowed food to be shipped long distances without being in cans. People later used this process in trains, boats, and planes. During World War II, the United States military used the process to ship food and blood plasma to soldiers.

Exercise:

1. Why is refrigeration important? _____
   _____
   _____
2. How has refrigeration changed the way people eat? _____
   _____
3. What chemical is used in refrigerators? _____
4. How did Fred Jones and Joe Numero change the world? _____
   _____
   _____