

**SECTION****2****Enrichment****Conservation of Energy  
in the Heart**

It is important to eat good food for energy and health. The human body changes some of the energy from food to electrical energy. Electrical energy is used by the nervous system, which includes the brain. The electrical signals in the body travel over the nerves to every muscle in the body, telling the muscles to move.

**The Heart**

One of the strongest muscles in the body is the heart. The heart is a muscle with four sections. Each section, or chamber, holds blood until the muscles around the opening contract, pumping the blood into the next chamber or out into the arteries to the rest of the body. The signal for the muscles to squeeze comes from the brain. The brain's signal to the heart is electrical.

**Conservation of Energy**

The brain is always sending signals to the heart. If it didn't, the heart would stop. But where does this electrical energy go after it signals the heart to pump? Conservation of energy says that the energy is not lost. Remember that the electrical energy makes the muscles around the chambers of the heart contract or squeeze together. When they do this, the electrical energy becomes mechanical energy.

1. What kind of energy does the heart receive from the brain?

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2. How is energy conserved in the process of a heartbeat?

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3. What is the source of the electrical energy in the brain?

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4. While you are alive, does your brain ever stop sending electricity to your heart? Explain your answer.

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**Heat**

Then, the energy is again transformed. This time it becomes heat. When the heart muscles contract, some of the energy they use becomes heat energy. Have you ever been cold and shivered? That is the muscles in your body using electricity to make heat.

**Mechanical Energy**

The heart is specially designed to use electrical energy. An area of the heart, called a node, gathers the impulses sent from the brain and sends it to the proper places in the heart. If a node is damaged or stops working, the heart might not be able to use the electrical impulses that the brain sends. Then a special battery operated device, called a pacemaker, can be placed in the person's body to make the electrical current that the heart needs to beat. This energy is used by the heart muscles in the same way as the electrical energy from the brain. It's transformed into mechanical energy and then into heat.