WARM A BOTTLE BY SHAKING

A. Question: *Does energy affect temperature?*

B. Materials Needed:

1. A medium size jar with lid.
2. Dry sand (beach sand).
3. A thermometer.

C: Procedure:

1. Fill the jar about two-thirds full with dry sand.
2. Push a thermometer in the sand and let one of the students read off the temperature.
3. Take the thermometer out or the jar, close the jar tightly and let the students take turns shaking the jar for 5 to 6 minutes in total (about ½ minute each for 10 to 12 students).
4. Open the jar after shaking, push the thermometer in the sand and let a student read off the temperature again.

D: Anticipated Results:

Students should observe a change (increase) in temperature after shaking the jar.

E: Thought Questions for Class Discussion:

1. What were the temperature readings before and after the shaking?
2. What is the cause for the temperature to rise?
3. What type of energy was turned into heat?
4. To what type of energy as the original source can this produced heat be traced back?

F: Explanation:

The shaking of the bottle or jar is mechanical energy, which was turned into heat. The mechanical shaking of the sand gave the sand particles kinetic energy, which caused friction between the sand particles, thus creating heat. The energy needed for the shaking of the jar was supplied by muscle power of the students. To give this energy, the students needed to eat (chemical energy), and the food the students ate came from plants and animals. The animals also needed to eat plants, and the plants in their turn, obtained the energy from the sun to grow. All forms of energy can thus be traced back to solar energy.