

Key Concepts

1. According to the **Second Law of Thermodynamics**, in all energy conversions some energy is “lost” (not recoverable) into the environment.
2. The ratio of input energy to output energy is a measure of the efficiency of the energy conversion system.
3. In mechanical systems (like the GENECON) much of the “lost” energy is in the form of heat due to friction.

Teaching Tips

1. Have the students calculate the apparent efficiency of the “motor” GENECON using data they collected. Express the result as a percentage.
2. Call attention to the fact that both generators and motors produce a lot of noise (a form of sound energy).
3. Make sure students realize that “lost” energy refers to energy which dissipates uselessly into our surroundings-not that we don’t know what happened to it or that it “disappeared”.

Materials

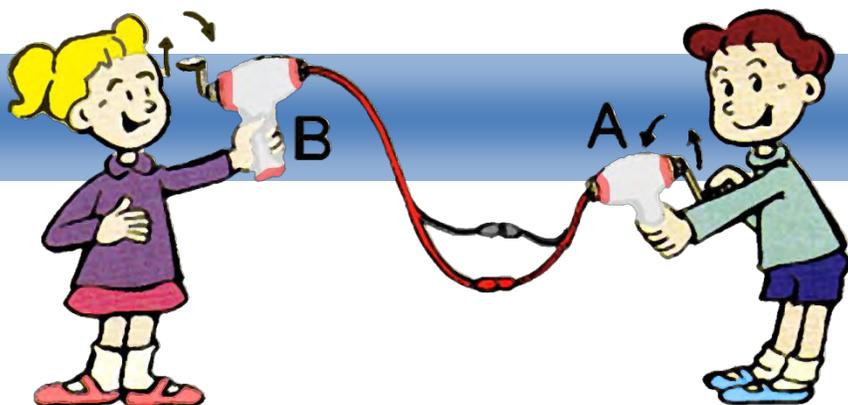
2 GENECONs with output cord

Procedure

1. Connect the leads of the two GENECONs together (as in Activity #4 and the illustration below)
2. Have one student turn the handle of one GENECON exactly 10 times, while the class counts the number of rotations of the “motor” GENECON. Repeat, using different numbers of rotations. Why does the “output” GENECON always rotate less than the “input” one? Where does the “missing” energy go?

Activity 4

Generator or Motor?



Key Concepts

1. A generator changes mechanical energy into electrical energy; a motor changes electrical energy into mechanical energy.
2. The GENECON can function as either a generator or a motor depending upon the form of energy supplied.
3. The polarity of the electricity supplied determines the direction of rotation of the “motor” GENECON.

Teaching Tips

1. Careful observation of the interior mechanisms of a GENECON will reveal the presence of a small DC motor!
2. Review the instructions on a polarity in Activity #2. Note that when the color-coded leads of the two GENECONs are connected, both handles will rotate in the same direction.
3. Do not allow the metal alligator clip connectors from the same GENECON to accidentally touch each other or both units will be shorted out.

Materials

2 GENECONs with output cords

Procedure

1. Label one GENECON “A” and the other “B”. Attach the leads of “A” directly to the leads of “B”. Have one student turn the handle of GENECON “A” while another student holds “B” by the grip only. Most students will be surprised by the result: the handle of “B” will begin to rotate just like a motor! Note the direction in which the handle of “B” is turning: Is it clockwise or counterclockwise?
2. What happens to “B” when the students operating GENECON “A” reverses its direction of rotation?
3. What happens when GENECON “B” is operated while “A” is held passively by the grip? Which one is the “motor” GENECON now?