Experimenting with a Lemon Battery
Background Reading

In the 21st century, billions of people rely on electrical energy in one form or another. Today, even in some of the most remote regions, electricity powers lights, radios, televisions, and many other devices that help people to be more productive, comfortable, and informed.

In some places, electricity is generated by sources such as hydro-electric dams or coal-fired power plants. In others it comes from self-contained units called "dry cells," also known as batteries. Regardless of its source, the resulting electrical current is the same — it is the flow of electrons through a substance.

In order for electrical current to flow, three conditions must be met. One is presence of a substance that allows electrons to move, or flow, easily through it. Such substances, called conductors, are made up of atoms that hold their electrons loosely, allowing them to flow freely to other nearby atoms.

The second requirement is the presence of a power source. Whatever its form, a source of electrical current creates what is called a voltage difference, which pushes electrons through the circuit. The chemical reactions inside batteries produce voltage differences between one end of the cell and the other that result in electrical current.

Lastly, electrical current requires a closed circuit, a length of conducting material connected at each end to a power source that also passes through the "load," the object that makes use of the current. A closed circuit allows a direct, uninterrupted flow of electrons out from the power source and back again in a complete circular connection with no beginning or end.