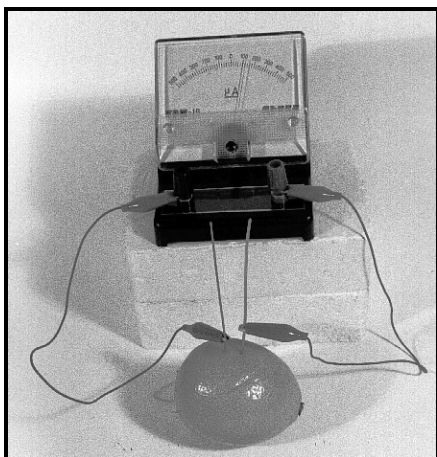


## *Homemade 'Batteries'\**

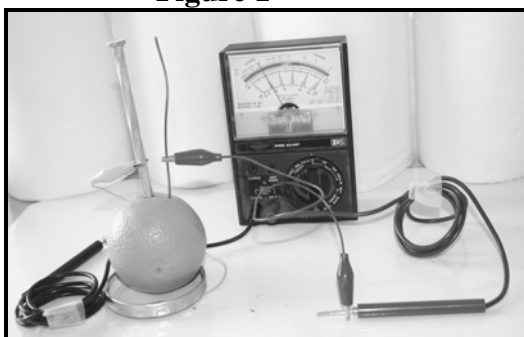
An **electric cell** is a device that produces a steady supply of electric current. The ingredients of an electric cell are simple: any two different metals separated by a conducting solution. Of course, some combinations of metals and conducting solutions work better than others. You can make simple electric cells at home using readily available materials.



**Figure 1**

In **Figure 1**, a simple cell has been created using  
(a) a 10 cm length of thick, bare copper wire,  
(b) a 10 cm length of iron wire (a straightened steel paper clip will work) , and  
(c) a lemon.

A very sensitive current meter is used to indicate that there is electric current coming from the lemon 'battery'\*. (This instrument, a galvanometer, has a scale in microamperes ( $\mu\text{A}$ ). A microampere is one millionth of an ampere.)



**Figure 2**

In **Figure 2**, a large galvanvanized (zinc coated) nail and a length of bare copper wire are inserted in an orange. A multimeter is connected to the nail and to the copper wire. The multimeter reads approximately 1 volt. The voltage is a measure of the energy supplied to each unit of electric charge delivered by the 'battery'\*.



**Figure 3**

In **Figure 3** a digital multimeter indicates a voltage of just less than 1 V for the same cell as Figure 2.

### **What to Do**

Why not experiment for yourself with different combinations of metals and different safe conducting solutions (e.g. juices, pop). Find out which combinations provide the highest voltage.

\*Strictly speaking, a **battery** is a combination of two or more electric cells in series or parallel.