

## Activity Instructions

The following items will be needed for this activity:

- soaked vegetables
- knife
- buret stand
- paper towels
- electrodes and plug
- safety gear
- flask clamp with rubber grips

### Step 1

After the vegetables have soaked for the required minimum of 24 hours, examine them for mould. If there is any mould, simply cut it off and discard it. The halide-soaked vegetables can be thrown away with regular garbage and do not require special disposal.

### Step 2

Set up a buret stand to hold the vegetable. Ensure that the prongs or the feet of the clamp are rubber-coated to prevent electricity from sparking into the fume hood bay. A three-pronged rubber-coated clamp works best (**Figure 1**).

### Step 3

With the cord unplugged, mount the first vegetable in the clamp and insert one electrode into each end. Place paper towels under the vegetable to absorb any liquids that may drip off the vegetable.

### Step 4

Pull down the cover for the fume hood, put on protective goggles and gloves, and turn off the lights.



Figure 1

### Step 5

Plug in the power cord and watch the vegetable glow the corresponding colour of the metal ion in the solution (see examples in **figures 2, 3** and **4** and the table in **figure 5**). At this point, the sudden application of current can cause small amounts of the vegetables to collect around the contacts. This accumulation can force the electrodes out of the vegetable. If this happens, simply unplug the cord, reposition the electrodes and try again. Be sure to keep the protective gloves on as the steel nails will be hot.

### Step 6

After approximately ten seconds, the glowing will stop as the metal ions are oxidized. Unplug the cord and wait several seconds before opening the fume hood. While the fumes are not toxic, they do smell horrible. Remove the vegetable from the clamp and place it in the garbage.

### Step 7

Repeat Steps 3-6 with the remaining vegetables, replacing the steel nails each time. As the current travels through the steel nails, they will form a non-toxic coating of ferrous chloride, which will interfere with each successive experiment. Thus, it is essential that each vegetable uses a different pair of nails.

### Step 8

When finished with the activity, dispose of the solutions and vegetables in the conventional manner. Alternatively, the solutions can be saved and used in the next two weeks. Put the solutions in the fridge until ready to use them again. When next used, add an additional 20% of the original amount of salt prior to putting in the vegetables. For example, the solution called for 100 g of lithium chloride for the original activity. When using it next, take the used solution out of the fridge, heat it and add 20 g of lithium chloride.



Cucumber soaked in Magnesium Chloride

Figure 2



Potato soaked in Sodium Chloride

Figure 3



Cucumber soaked in Copper (II) Chloride

Figure 4

metal ion	colour emitted
copper	blue
lithium	red
magnesium	pure white
sodium	yellow/orange
potassium	pale mauve

Figure 5