Green STEM

Activity Setup

- This activity will teach kids the concepts behind a battery and basics of electrochemistry.
- Each student will get the following material:
  - A kit which includes Copper and Zinc Electrodes and LCD clock.
  - Two lemon halves
  - Two potato halves
  - Two lime halves
  - Two Styrofoam plates to hold the fruits and vegetable halves
  - Pre-printed note sheet to tabulate results
  - Pencil
  - Pictorial instruction card that shows how to put together the “battery”
- Each group of two students will get a galvanometer to measure the current generated by the battery. Co-leads may need to assist with the banana clip cords and the meters.

Green STEM Experiment Worksheet

Green STEM Experiment

Making a Battery from Lemons, Limes and Potatoes

Name: _____

	Fruit or Vegetable	**How Many?**	**Current Measured**
1.	Limes	2	
2.	Potatoes	2	
3.	Lemons	2	
4.			
5.			
6.			
7.			
8.			
9.			
10.			

Safety

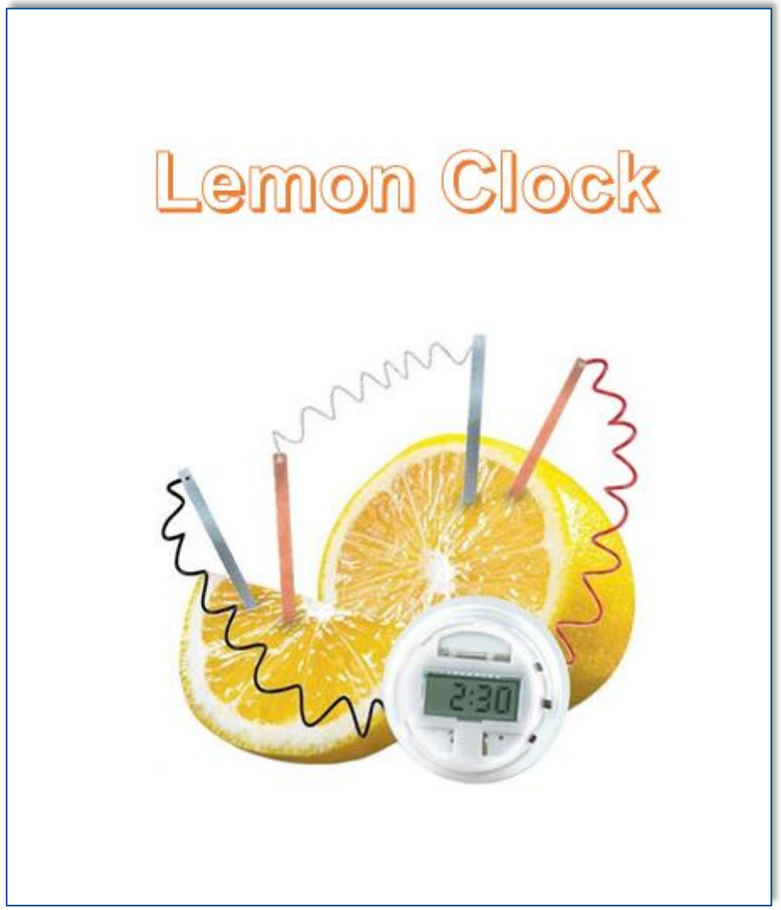
- Limes, Lemons and Potatoes will be pre-cut. If necessary, all cutting will be by the leads and co-leads **only**.
- Electrodes are not sharp but care should be taken when inserting into the fruits. If you see one of the kids struggling, please assist them.
- Be watching when the kids handle the test leads with the alligator clips. Assist when necessary.

Activity 1

- Engage kids:
  - Ask kids if they know what a battery is?
  - Examples where batteries are used? (flash light, wall clock, calculator, cell phone)
- YouTube video: First video explains atoms and electrons, Second video concept of lemon battery and current

- Ready to make the battery?
  - Ask the kids to put together the battery using a lemon. Red Wire: Copper (+), Black Wire: Zinc (-). Follow the instruction card.
  - They can adjust the clock to the current time. Assist if necessary using the instructions on the back of the KidzLab packaging material
  - Some of the older kids may get a galvanometer instead of a clock
- Engage kids again:
  - Ask how many fruit batteries are needed for an iPhone (3.8V), car battery (12V)?

Instruction Card 1

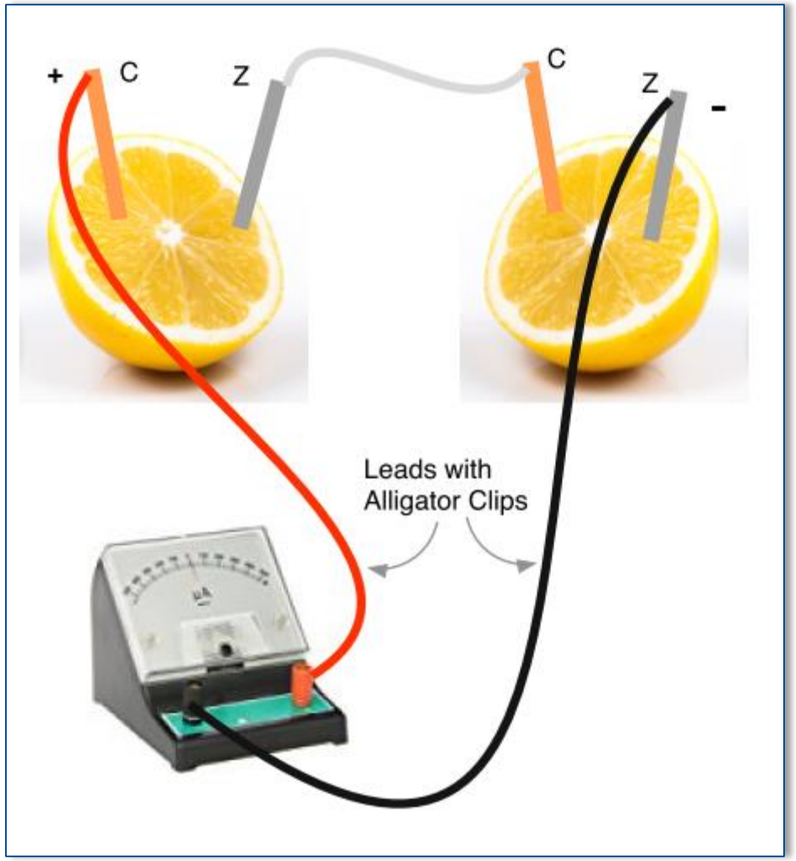


Activity 2

- Work in groups of 2
- Remove the clock and use the galvanometer to measure the current with the lemon. Note the value
- Remove the lemons and use the potato halves now. Measure the current and make a note of the value
- Remove the potato and use the limes now. Measure the current and make a note of the value

- Engage the kids again:
  - Ask why there is a difference between the lemon, potato and lime battery (Different electrolyte or “acidity” to make it simple)
  - Ask suggestions for other fruits or vegetables

Instruction Card 2



Finishing Up

- Ask the students to disassemble the fruit batteries.
- Pack the electrodes, clock, original packing material and LEDs in a sandwich bag for the students to take home.