Parallel Circuit Using Circuit Bug

by _kamini

Circuit bugs are a simple and fun way to learn electricity. This STEM activity is the next step to Open and Closed-circuit. If you have an understanding of open and closed circuits, you can understand Series and Parallel circuits. This Instructable uses a parallel circuit. You can also explain the series circuit with this activity too.

Step 1: Materials You Need

1) 2 LED Lights.

2) Insulated PVC coated wire.

3) Batteries – CR2032 3V

4) Electrical Tape

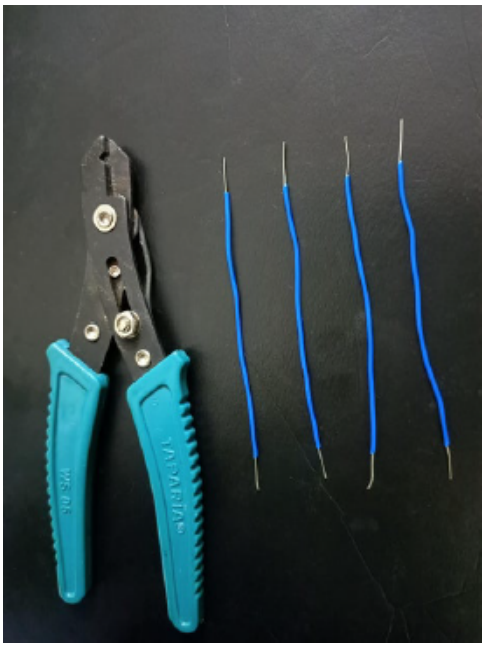
5) Clothespins

6) Pipecleaners

7) Wirestripper

8) Plier

Step 2: Cut and Remove End to End Coating



Measure the length of the wire equal to the length of the clothespin.

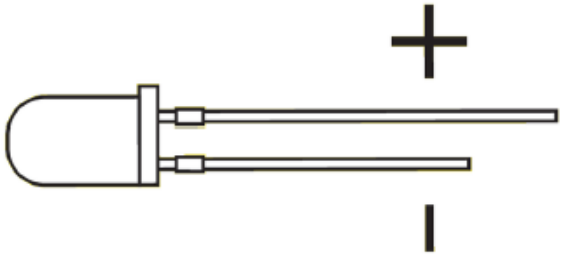
Cut 4 pieces of wire, each equal to the length of the clothepin. It is recommended to cut it a bit long and trim it later to the nal length. You want enough length for a good connection but not too much that you raise your risk of circuit interruption.

Remove the blue PVC coating off the ends of the wires with the wire stripper. Strip both ends of the wire by about 1.5 cm in length. BE CAREFUL!

Step 3: Terminals of LED

LED stands for Light Emitting Diode. It has two terminals, which is how it receives electricity and lights up. You will notice one leg is longer than the other. The longer one is the positive pin (Anode), and the shorter one is the negative pin (Cathode).

Place one side of the LED on each side of the battery. Does it light up? If not, switch sides. The long "leg" (anode) and the short leg (cathode) only work one way on the battery. Experiment to find out which way works.

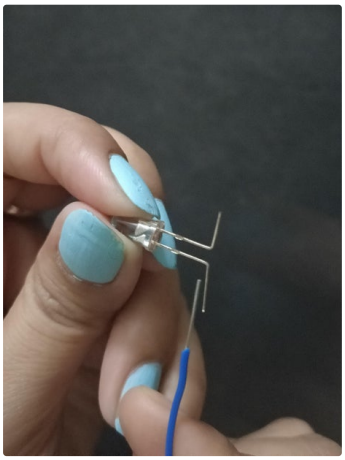


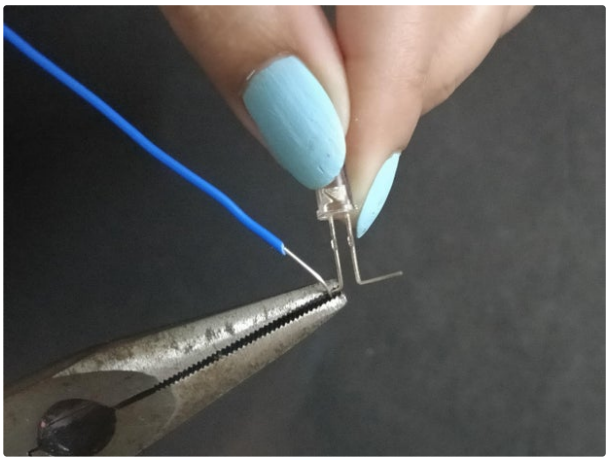
Step 4: Fold the Legs

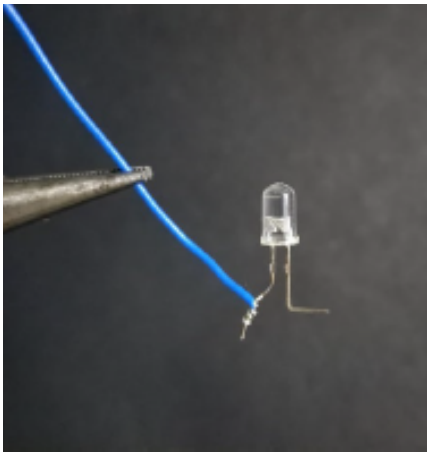
Take two LEDs. Using a plier fold both the legs of the LEDs. This step is to ensure the convenient connection of wires to the legs of LED.

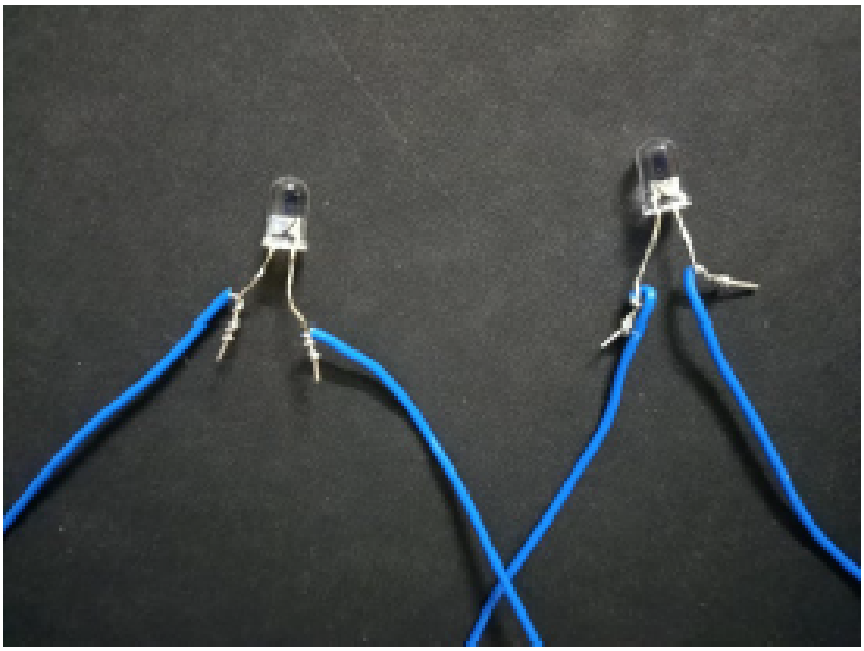
Step 5: Connect Wires

Twist the wires around the positive leg and negative leg of both the LEDs. Here, I am using a plier to twist the LED legs with wires. Make sure to have a sturdy twist so that there is no loose connection afterward.



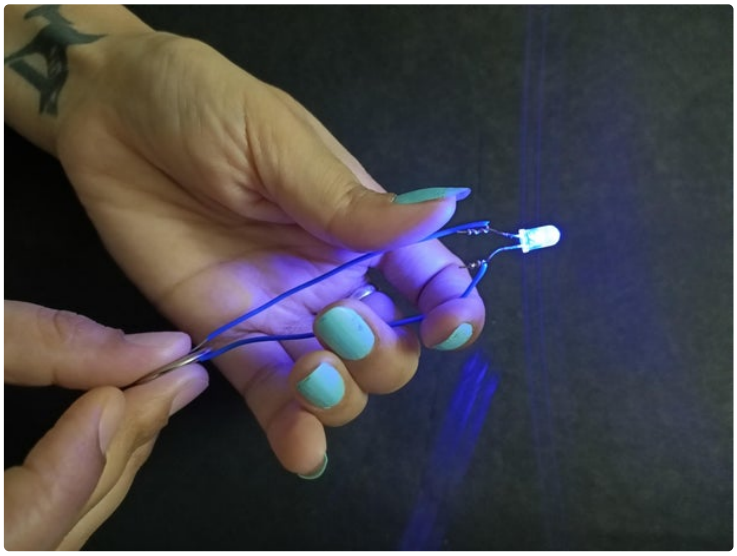






Step 6: Check the Terminals

Check LEDs with battery by touching the twisted positive wire to one side of the battery and twisted negative wire to the other side of the battery. If it doesn't work, turn the battery over. Repeat the same with another LED. Now, students knows which terminal is positive and which is negative.

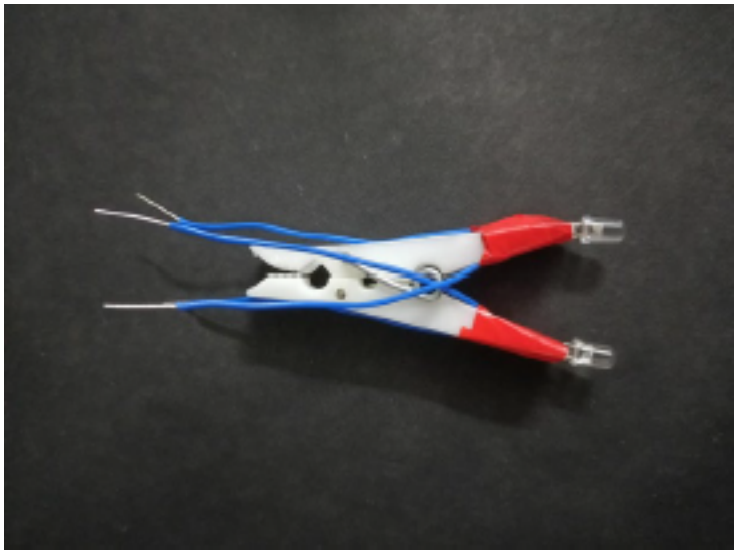


Step 7: Place LEDs on Clothspin

Put both the LEDs on both of the ends of the clothespin. Place the LED in such a way that the positive terminal of both the LEDs goes inside the Clothespin ends while the negative terminal of both the LEDs goes outside the ends of the clothespin. The LEDs place on the ends should be tight enough to be held at the ends.

Step 8: Secure LEDs

Secure LEDs and wires to clothespin with electrical tape. Wrap around the clothespin end 4-5 times to fix LEDs and wires in place.



Step 9: Concept Behind Parallel Circuit

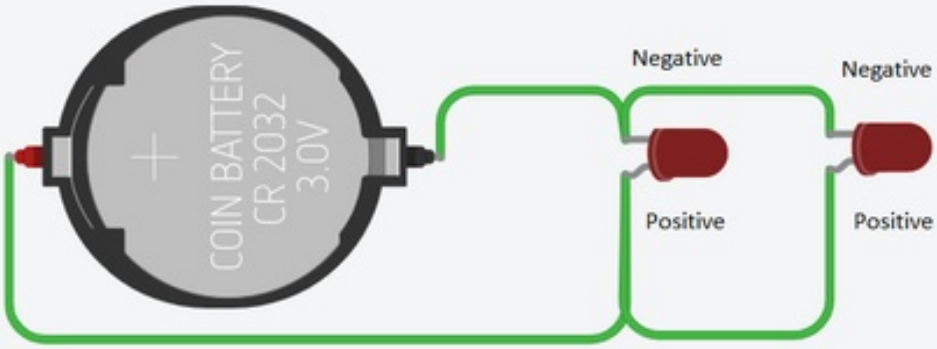
A simple electrical circuit has a power source (Battery), a complete path for electrons to flow (Wires), and a resistive load. Here the load is represented by LEDs. If there is more than one load (LED in this case) in a circuit, there are two **ways in which the load (LEDs) is connected:**

- Parallel

- Series

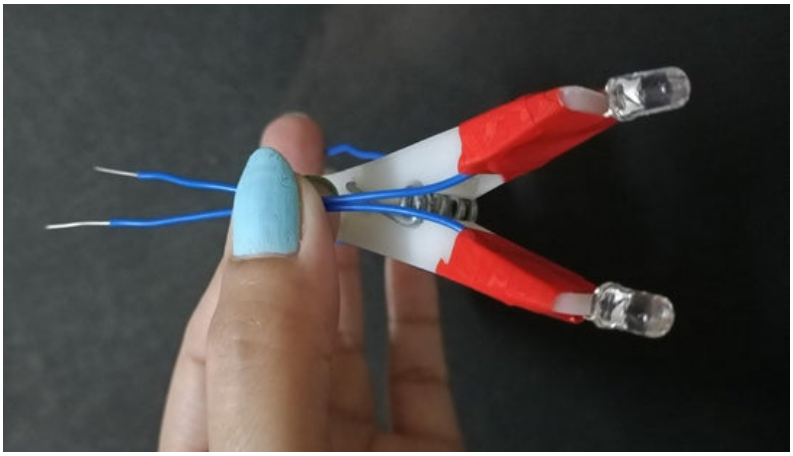
LED has to be connected either in a serial or a parallel connection. With a parallel connection, the starting points (+) and end points (-) of the different components are connected to each other. The parallel circuit receives the same voltage to each LED. LED is a very sensitive component, it can breakdown at high voltage. So, after this circuit, you can introduce "Resistor" to the students so they can understand the importance and need of a resistor in a circuit. Use 220 ohm or 330 ohm resister with the terminal of LEDs.

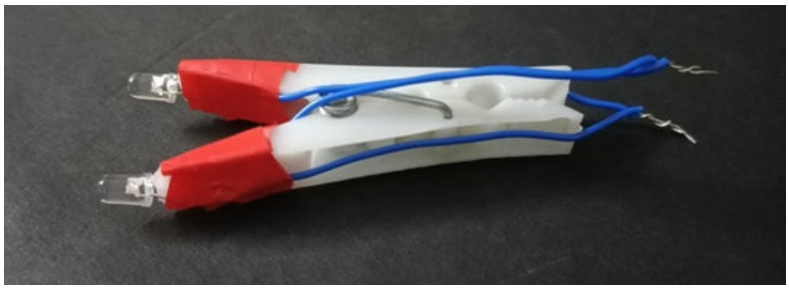
With a series connection there is only one flow. The current enters the first spot through the + and then leaves through the - to move to the next spot and do the same with the third spot.

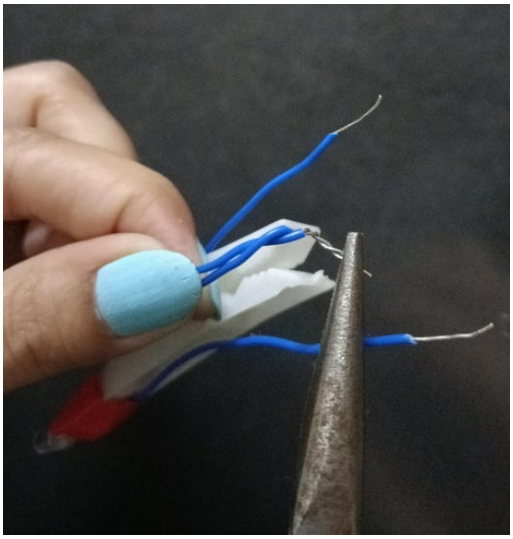


Step 10: Connect Positives and Negatives

Using the concept of Parallel circuit, connect both the positives of LED and both the negatives of LED and twist them together using a plier.



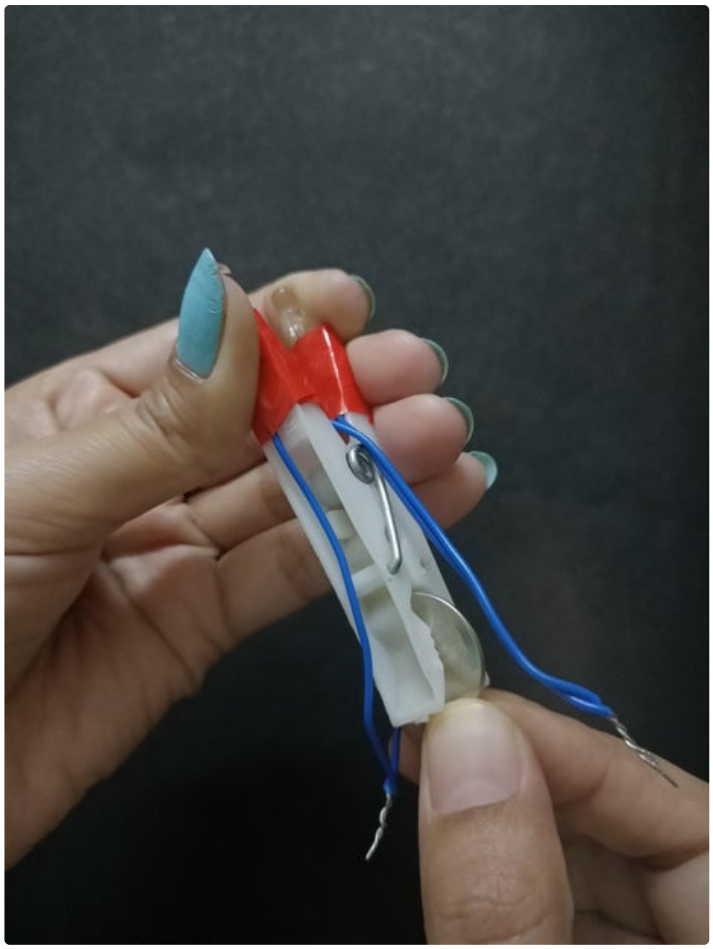


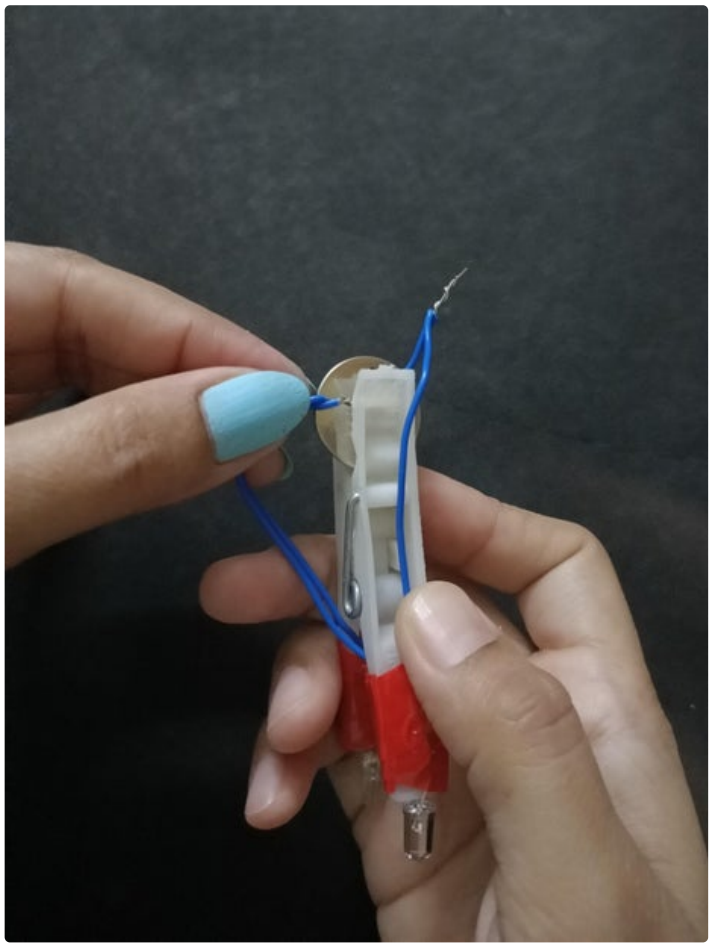


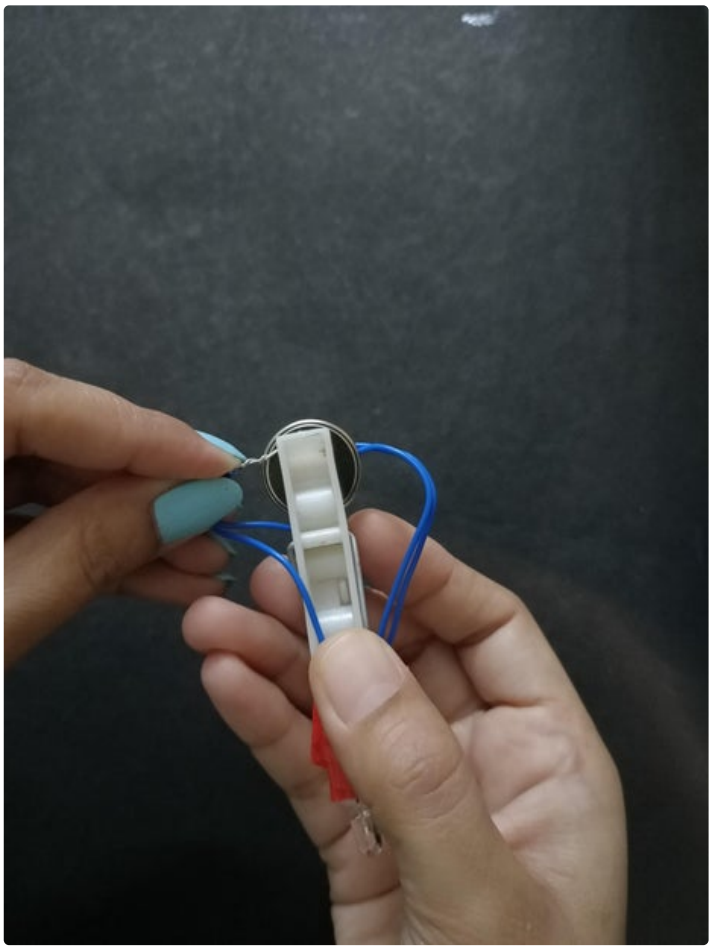
Step 11: Connect Battery

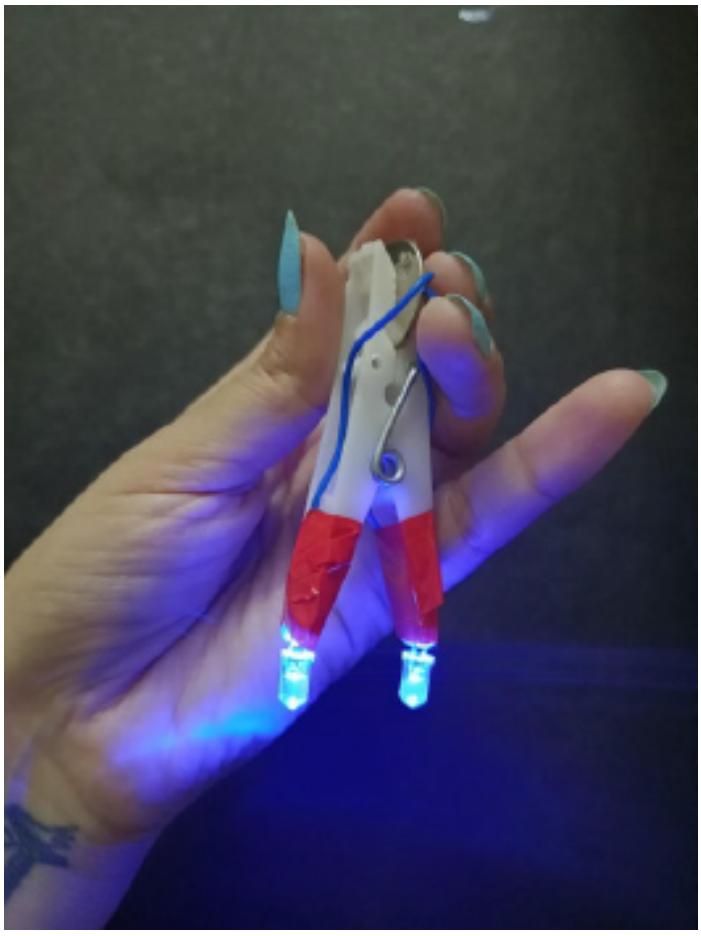
Place the coin cell battery at the grip of the clothespin. The grip will hold the battery tightly. Now place the twisted positive and negative ends of the LEDs inside the grip of the clothespin, connecting the positive of the battery with positive of LEDs and negative of battery with negative of LEDs.

See next page for pictures.









Step 12: Add Fun !

At last, add pipe cleaners to create something fun! Wrap the clothespin with your choice of pipe cleaners, and make legs. I made a bug. Be it bee, butterfly, or anything. Bee creative :)