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step by step

Electronic Series, KIT-1

Experiment 45:
Automatic Night Lamp

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DIY
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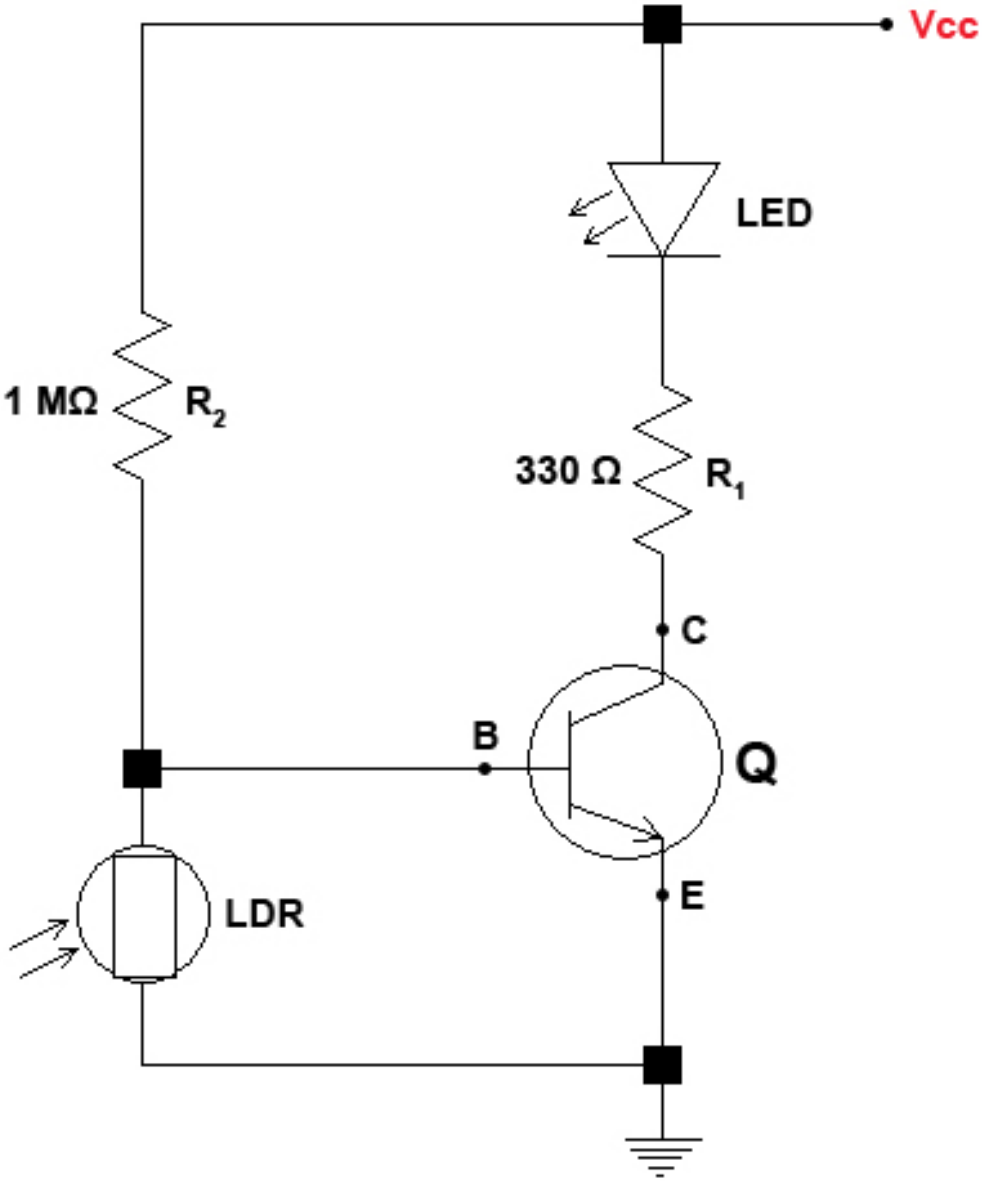
Circuit Diagram



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Materials Required

i. Breadboard - 1
ii. Transistor: BC547 - 1
iii. LDR - 1
iv. LED - 1
v. Resistor: 330 Ω - 1, 1 MΩ - 1
Colour Code: 330 Ω - Orange Orange Brown Gold
1 MΩ - Brown Black Green Gold
vi. 9 V Battery - 1
vii. Connecting Wire Pieces

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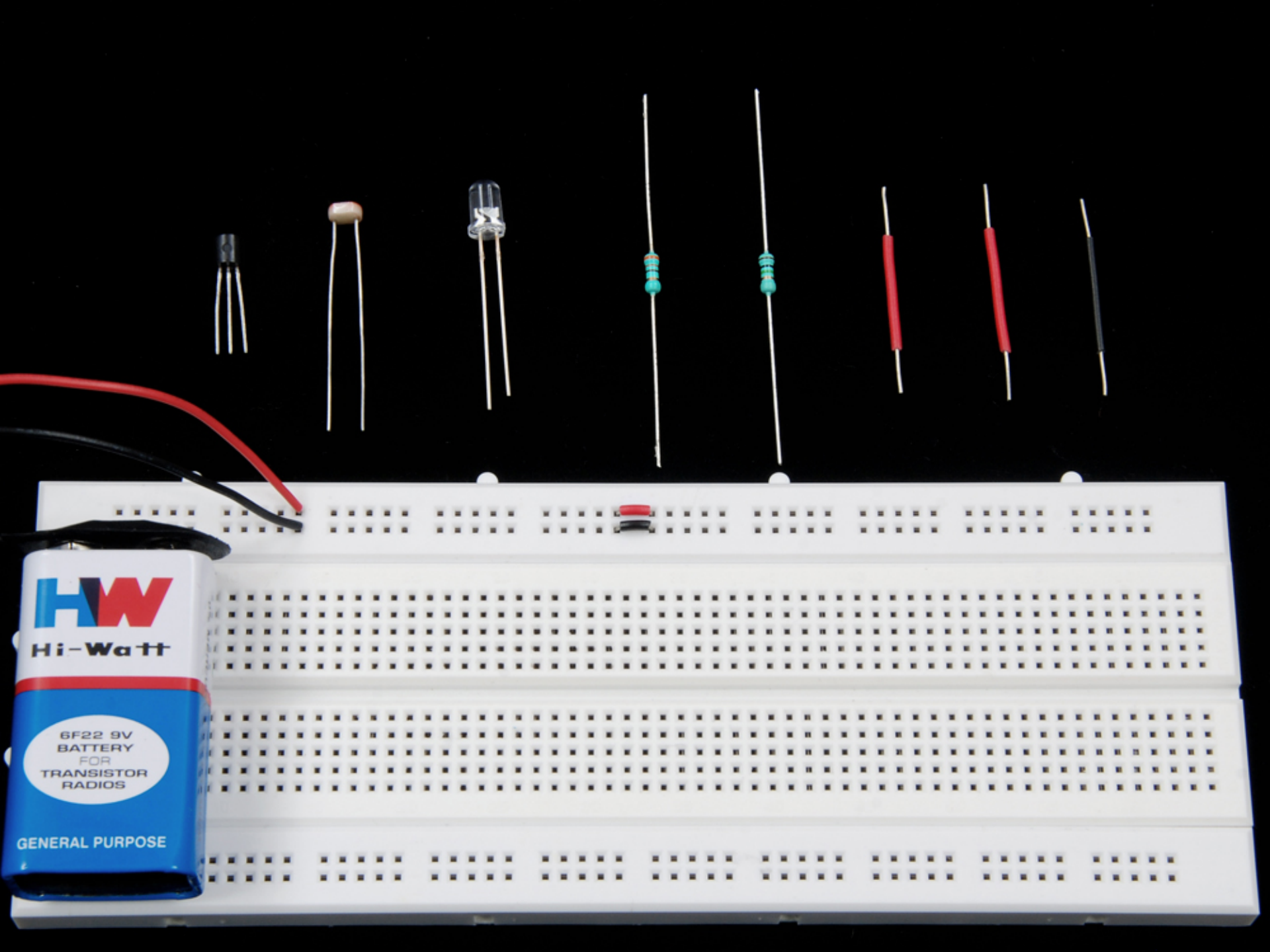
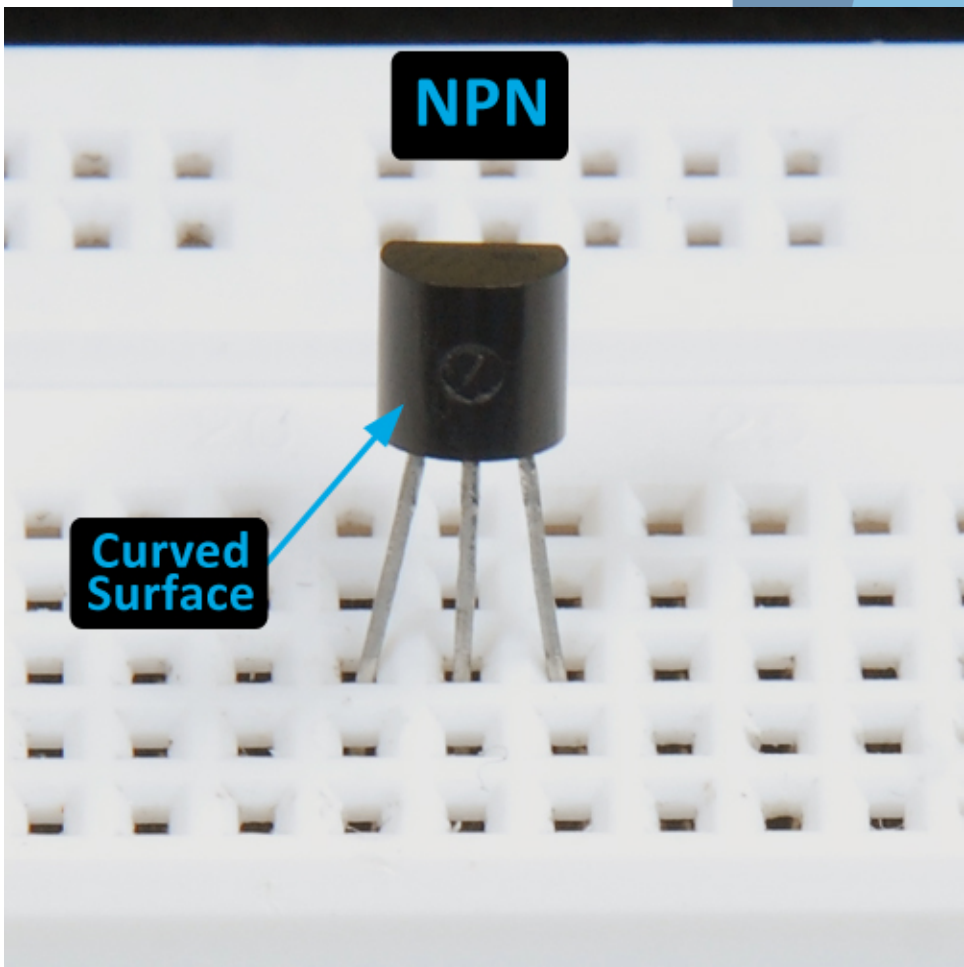

HW
Hi-Watt
6F22 9V
BATTERY
FOR
TRANSISTOR
RADIOS
GENERAL PURPOSE

Points to Remember

An NPN transistor has three legs, namely, Emitter (E), Base(B) and Collector (C). 547-B is an NPN transistor.

'To identify the legs, we will keep the transistor such that the curved surface faces us. Starting from the left side, the first leg is the emitter, the second is the base and the third is the collector.'



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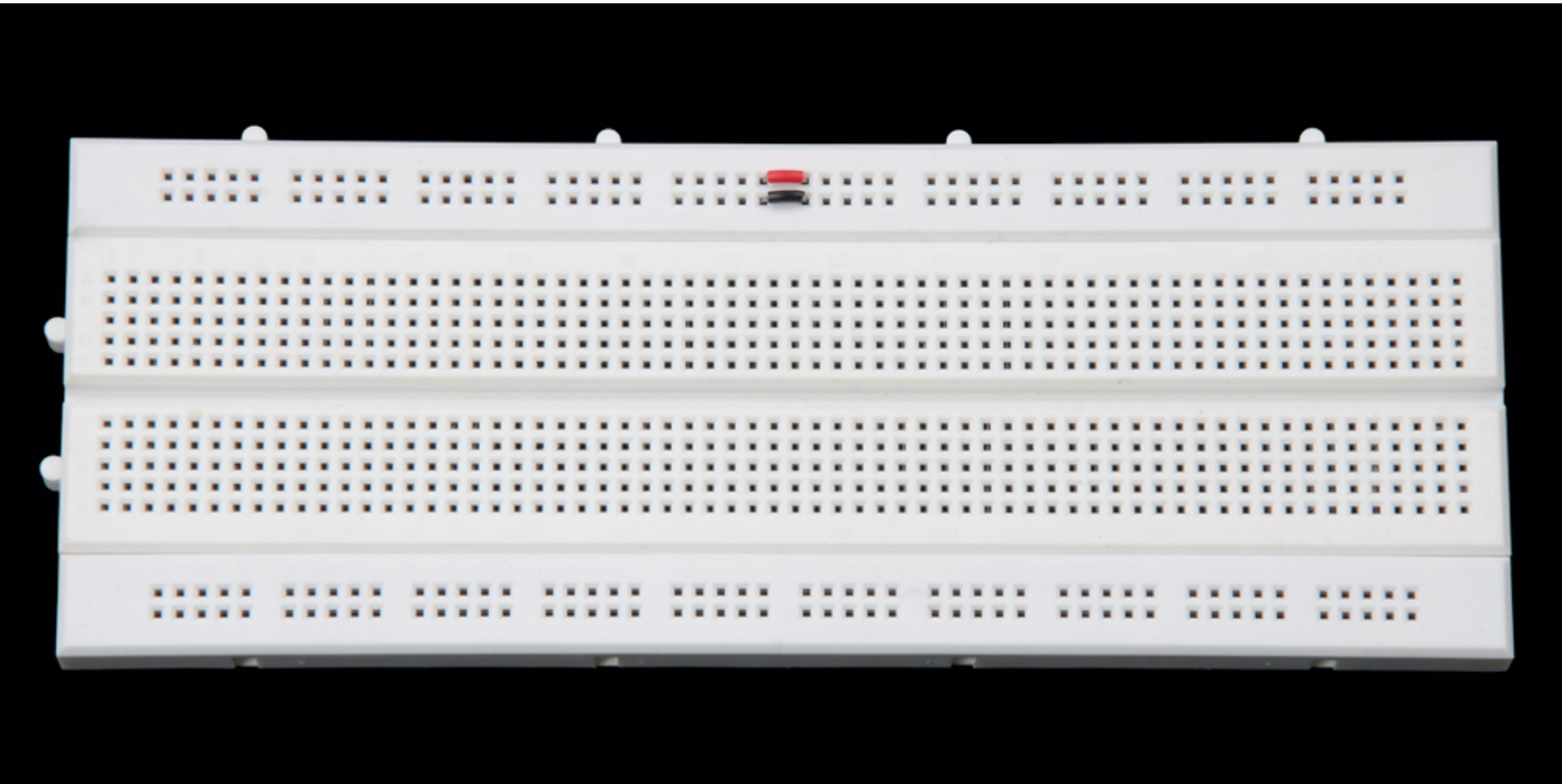
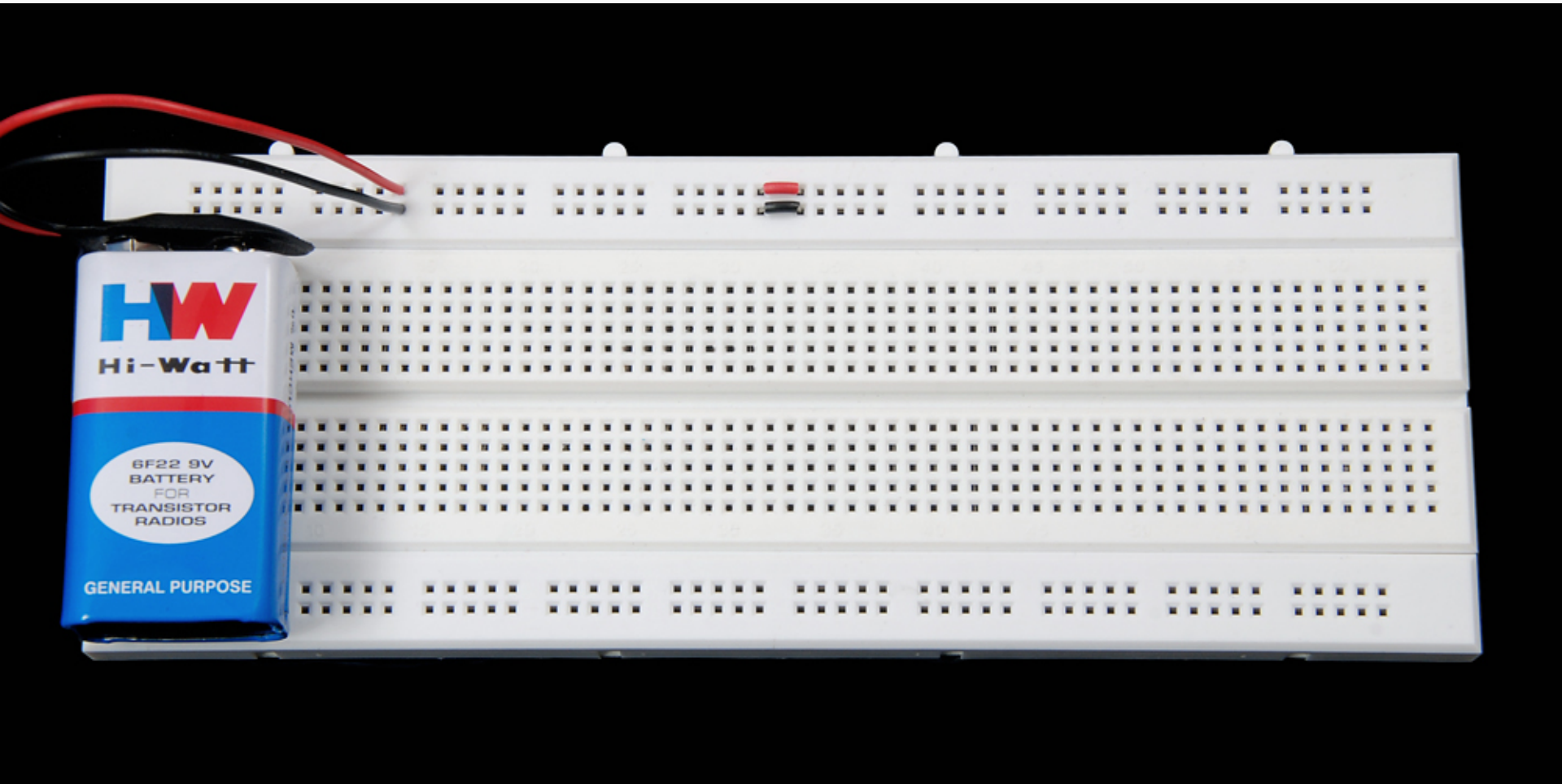
Step No. 1

Take a breadboard and connect its two halves as shown in figure below.



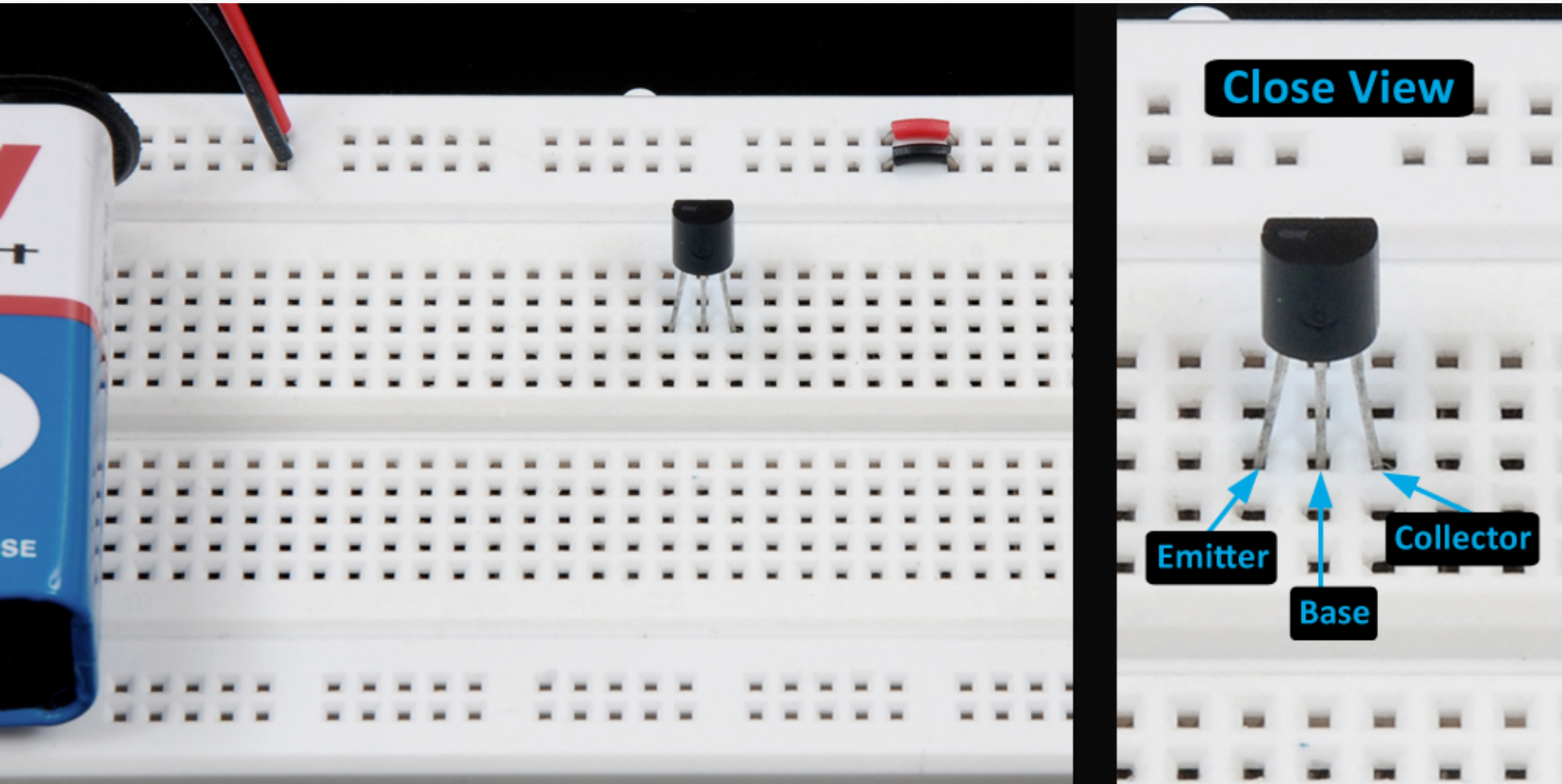
Step No. 2

Connect a 9 V battery on the breadboard.



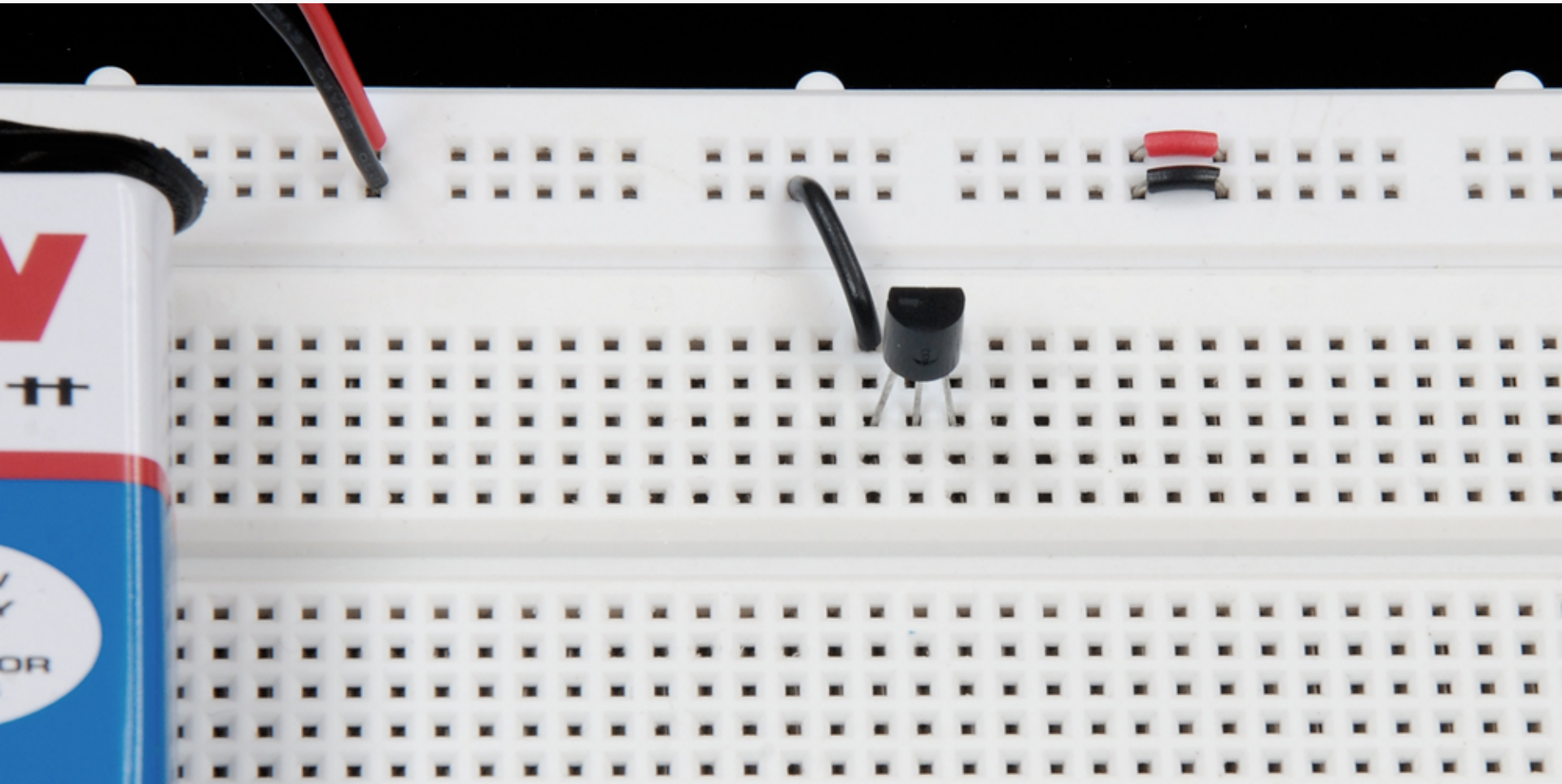
Step No. 3

Connect an NPN transistor on the breadboard with its three legs (Emitter, Base, Collector) inserted in three different columns of the breadboard. **Remember that the curved surface of the transistor should face you.**



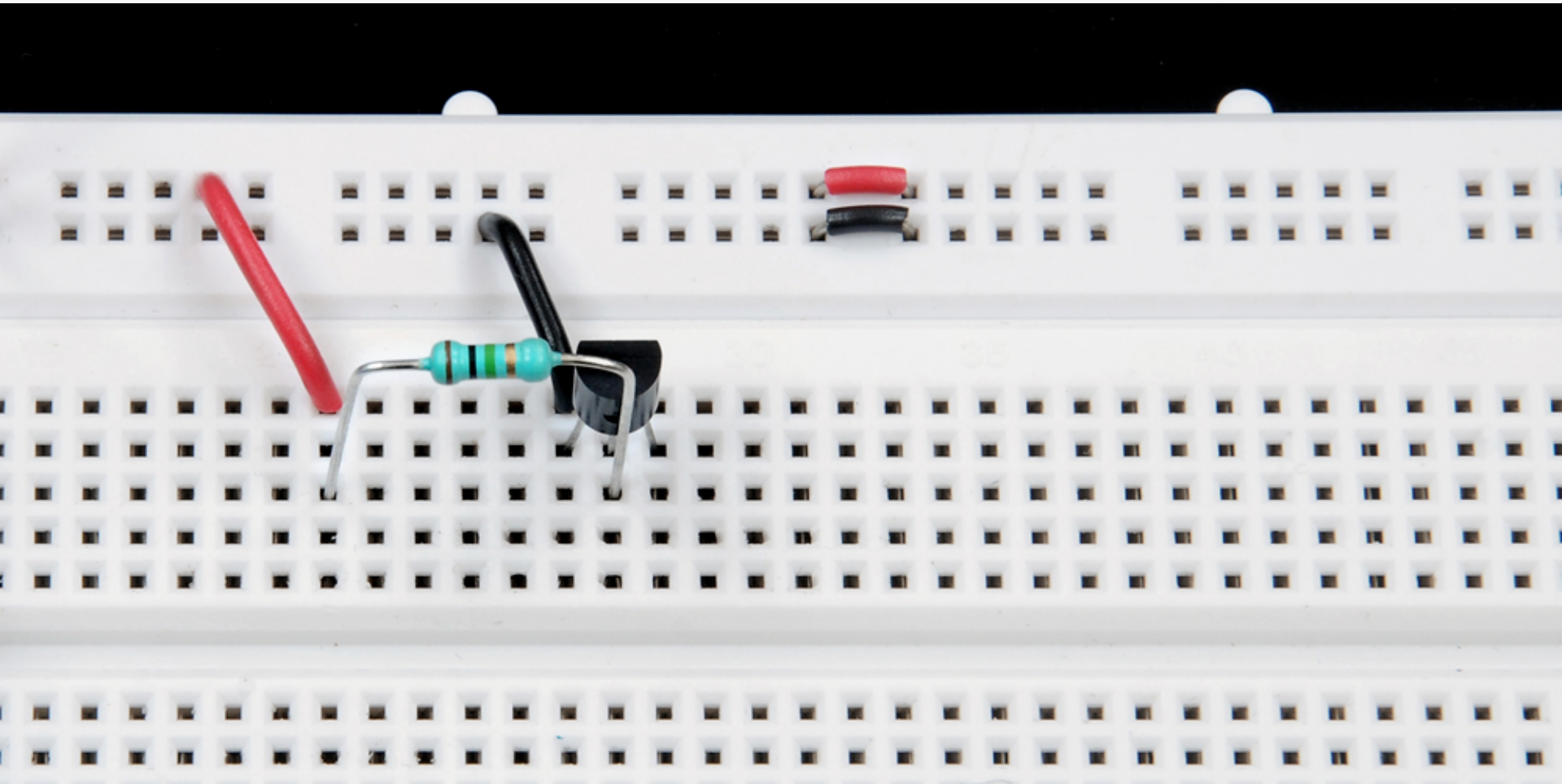
Step No. 4

Connect the emitter of the transistor to ground.



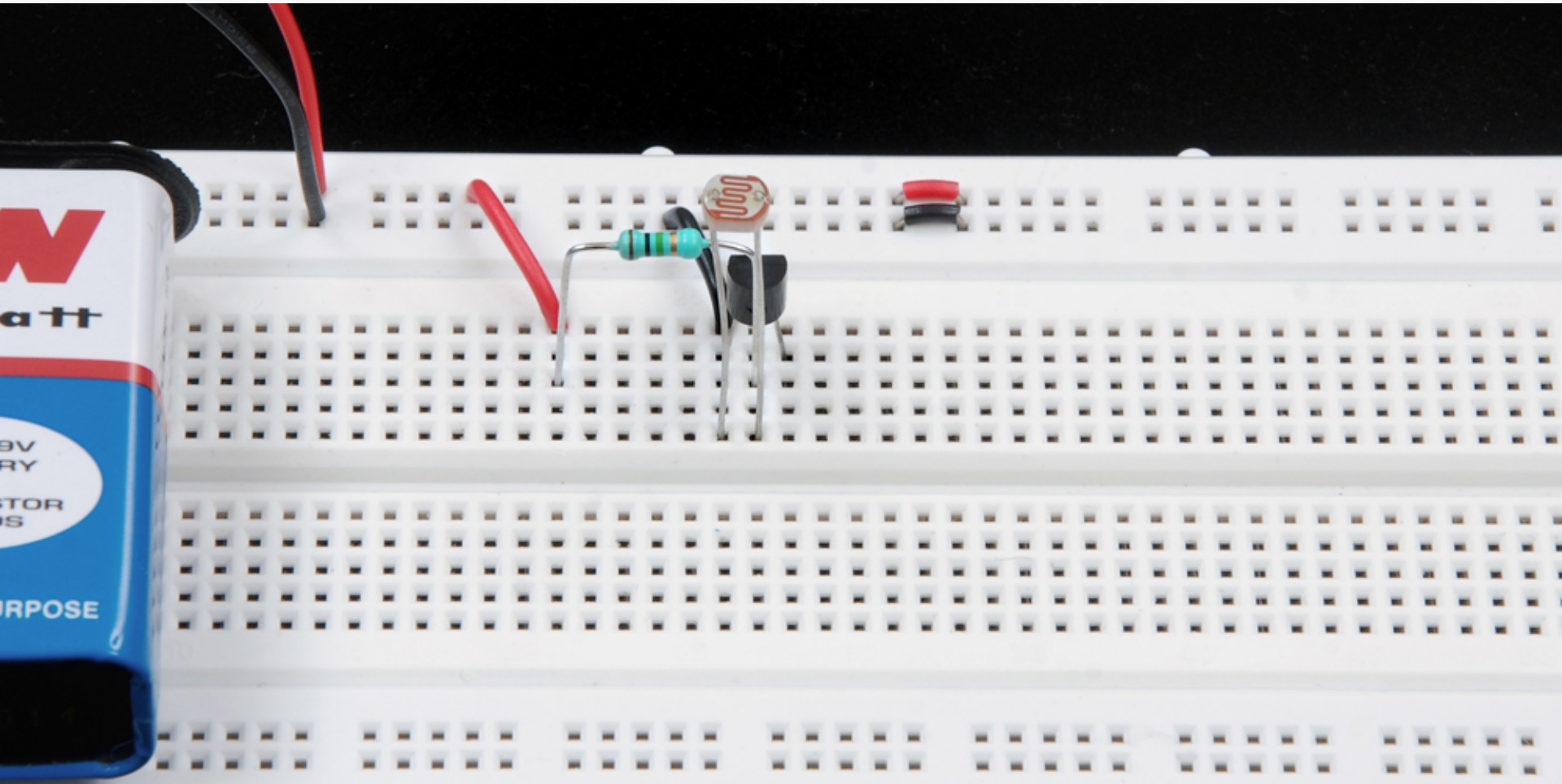
Step No. 5

Connect one leg of a 1 MΩ resistor to the base of the transistor, and its other leg to any different column of the breadboard. Connect the corresponding column to Vcc.



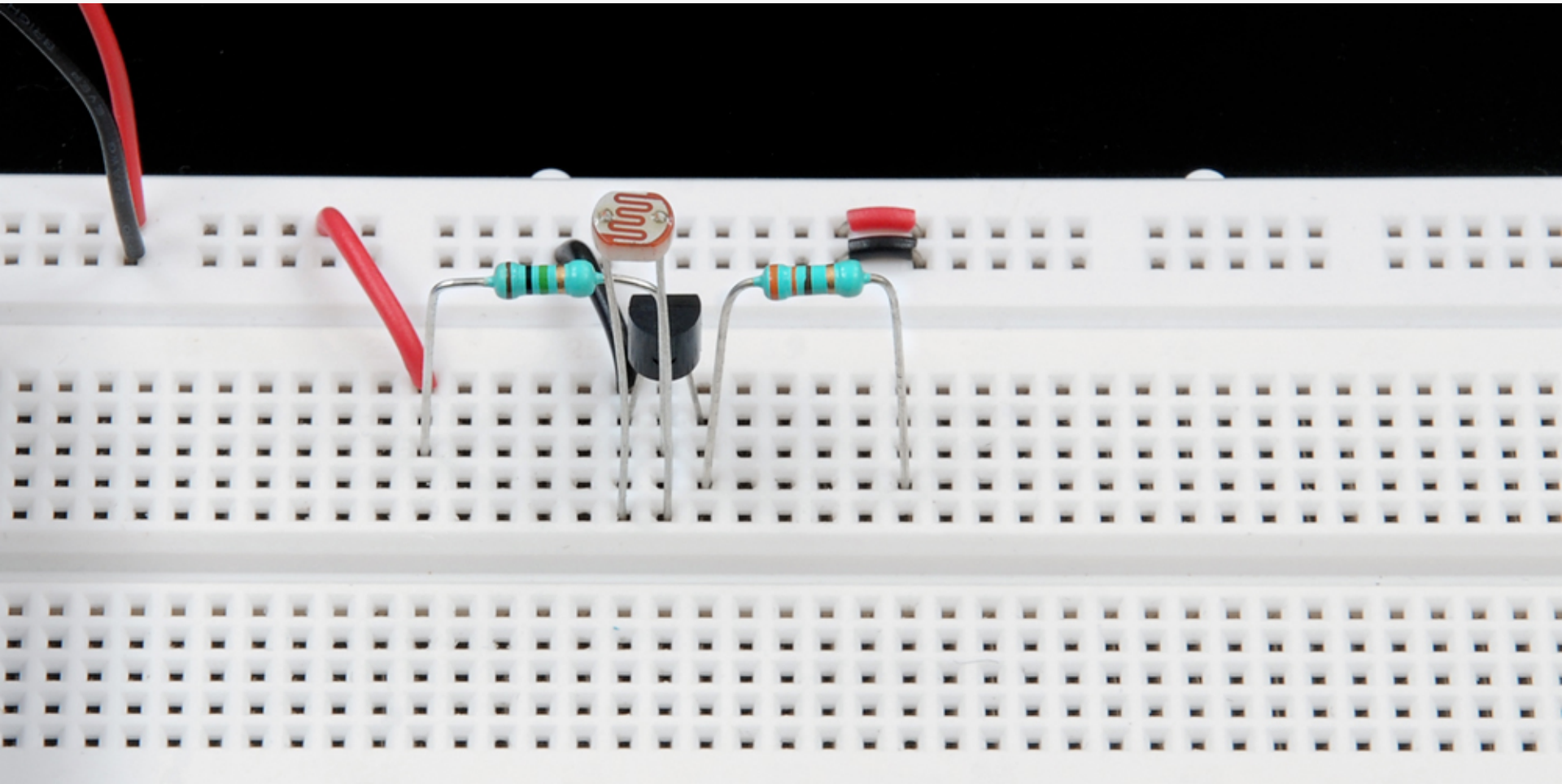
Step No. 6

Connect an LDR between the base and emitter of the transistor.



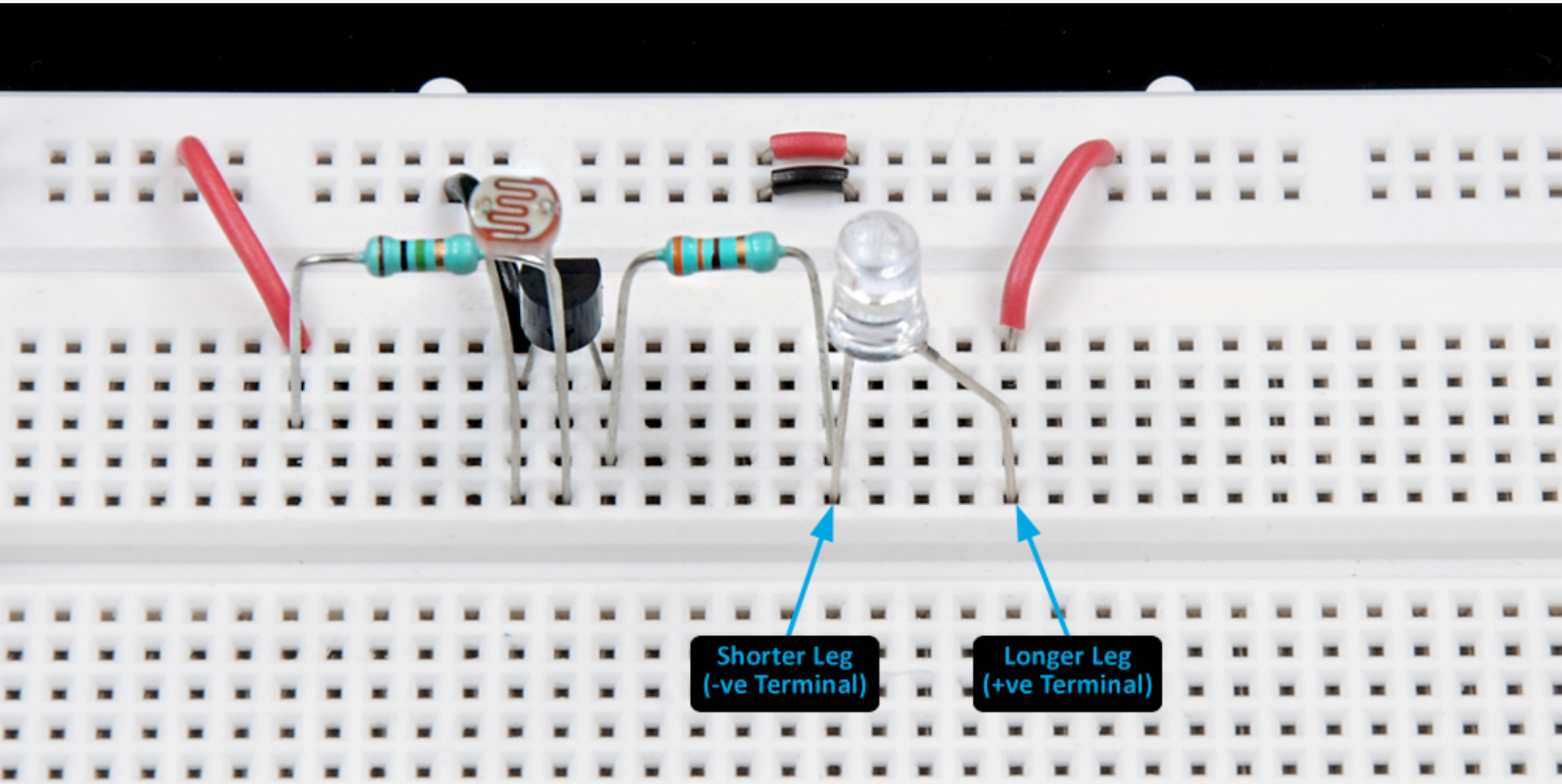
Step No. 7

Connect one leg of a 330 Ω resistor to the collector of the transistor, and its other leg to any different column of the breadboard.



Step No. 8

Take an LED. Connect its negative terminal to the right leg of 330 Ω resistor, and its positive terminal to Vcc.



Step No. 9

Now switch off the lights. We will observe that the LED glows.

Observation

When the circuit is exposed to light, the LED remains OFF. When the circuit is taken into dark, the LED glows.

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For:

- Activity
- Modification
- Reasoning
- Inference

Refer Book Set

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Troubleshooting Tips

- Ensure that the battery voltage is more than 6 volt.
- Ensure that the wires of the battery connector are properly inserted into the breadboard. The red wire should be inserted into the first row, and the black wire into the second row of the breadboard.
- Ensure that a 547-B transistor is chosen for the experiment.
- Ensure that the transistor is connected on the breadboard such that its curved surface faces you.
- Ensure that the transistor is connected properly on the breadboard without twisting its legs.

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Troubleshooting Tips

- Ensure that the stripped ends of the connecting wires should be long enough to fit inside the holes of the breadboard completely.
- Ensure that the lights in the room are switched off to observe the result. Note that the LED may also glow in low light.
- Ensure that there are no loose connections.

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