

# ASSEMBLY GUIDE 13 for the Mr Circuit STEM Electronics Learning Lab 1

## Experiment 13: “Build an Automatic Night Light Circuit”

### Step E13-1. Find all the parts needed for Experiment #13:

- one Solderless Circuit Board in Bag #15
- one 9-Volt Battery Snap in Bag #1
- two LEDs (Light Emitting Diodes) in Bag #9
- one 47 Ohm resistor (yellow, violet, black, gold) in Bag #3
- two 16k Ohm resistors (brown, blue, orange, gold) in Bag #3
- one Photocell in Bag #5
- one NPN 3904 Transistor in Bag #11
- one Potentiometer in Bag #4
- three Jumper Wires in Bag #16



### Step E13-2: Now, using the Pictorial Diagram on Page 24, install the parts on the Solderless Circuit Board in this order.

- Install an LED with the Short Lead in hole 9j and the Long Lead in hole 7j
- Install an LED with the Short Lead in hole 7i and the Long Lead in hole 5i
- Install the 47 Ohm resistor (yellow, violet, black, gold) in holes 17h to 19h
- Install the 16k Ohm resistor (brown, blue, orange, gold) in holes 1h to 5h
- Install the Photocell in holes 10b to 12b
- Install the NPN 3904 Transistor - Emitter in 13d, Base in 12d, Collector in 11d
- Install the Potentiometer, edge lead in hole 12c, middle lead in hole 6f
- Install Jumper Wire #1 in holes 1a to 10c
- Install Jumper Wire #2 in holes 9g to 11e
- Install Jumper Wire #3 in holes 10a to 13a
- Install the Battery Snap, Black lead in hole 1e and Red Lead in hole 1f

**Step E13-3: Connect the battery to the Battery Snap. With the battery connected,** adjust the Potentiometer until the LEDs light up and then back off on the Potentiometer until they just turn off. Now, put your finger over the Photocell and the LEDs should light up. When you remove your finger from the top of the Photocell, the LEDs should turn off. This is how it should operate. The LEDs should come on when it starts getting dark in the room.

**Step E13-4: Conclusion:** You should have observed in this simple experiment that we can use a Photocell to make a circuit that will turn on the light when it gets dark.