

## **ELECTRONIC TIMER**

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You're gonna build an electronic timer. In this circuit the capacitor has all the fun because it gets filled up and then slowly releases electricity, turning the LED on and off. Slightly more complicated circuits like this are used in timers for the Olympics. There are a lot of wires and connections on this one and some pretty cool stuff to do once you're finished.

**Start by connecting #3 to #19**

**Connect #4 to #16**

**Connect #16 to #17**

**Connect #17 to #24**

**Connect #13 to #15**

**Connect #15 to #21**

**Connect #21 to #33**

**Stick one long yellow wire in spring #33 and let it just hang there.**

**Connect #18 to #26**

**Connect #7 to #22**

**Connect #22 to #23**

**Connect #8 to #27**

**Connect #27 to #29**

**Connect #20 to #25**

**Connect #25 to #28**

**Connect #28 to #34**

**And the last connection is #14 to #30**

Whew- You did it. We got the whole circuit connected. Now comes the fun part - actually using your timer. Hook up the battery and then touch and release the yellow wire to spring #19. The red LED should light up. If it doesn't, check your connections. If it does, we have a timer! Hey, you're pretty good at this! Check it against a clock with a second hand to see exactly how many seconds the LED stays lit. You can run a race against the LED. See how far you can run before the LED goes off.

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### Here's how the circuit works:

The capacitor sets the pace with this timer. It fills up with electrons, and when it's full, it turns off the LED.

From the battery, the current squeezes through the 5.1 kilo ohm and 10 kilo ohm resistors to open up the valve at transistor "B", turning the LED on. At the same time, current through the 470 kilohm resistor fills up the 47 micro farad capacitor.

Once the capacitor is full, the current goes on to open up the valve at transistor "A", and the LED goes off. When the yellow wire touches spring 19 at the 100 kilo ohm resistor, transistor "B" turns on again, and transistor "A" turns off, and the timer starts again.

Because the timer depends on the size of the capacitor and how long it takes to fill up, try connecting different sized capacitors and see what happens....