

# Student Worksheet for Ep. 15: Burglar Alarms

**Overview:** Burglar alarms not only protect your stuff, they put the intruder into a panic while they attempt to disarm the triggered noisemaker. This experiment teaches students how to make simple burglar alarms, which are really clever switches, out of their basic circuit equipment.

**What to Learn:** This particular burglar alarm is an NC (Normally Closed) switch, and kids will learn how to wire it up in a circuit and pull the trigger.



**Lab Time:** To arm the trip wire, insert a small scrap of paper between the jaws, and connect the other end of the paper to a thin piece of thread or fishing line that is spread across a doorway about an inch from the floor. When someone trips on the thread, the paper gets yanked out, the jaws touch and... *GOTCHA!!!*

## Materials:

- AA battery case (Radio Shack #270-408)
- LED (Radio Shack #276-012)
- 3 alligator clip wires (Radio Shack #278-1157)
- 2 AA batteries (cheap, "dollar store" type work great)
- wood clothespin
- aluminum foil
- scrap of paper

## Experiment:

1. Make the NC trip wire switch:
  - a. Open the clothespin all the way, and cover each jaw securely with foil.
  - b. Open up your paperclip and grab a scrap of a sheet of paper. When you release the clothespin, the metal jaws should be on either side of the paper.
2. Make the Trip Wire Circuit:
  - a. Use your batteries, wires, and LED to make the LED light up. (No clothespin yet.)
  - b. Remove one of the alligator wires from the LED and replace it with a third alligator wire.
  - c. Attach one of the free alligator wire ends to the foil on one of the jaws of the clothespin.
  - d. Attach the remaining alligator wire to the other foil jaw.
  - e. Yank the paper away – did the LED light up? (It should!)
  - f. Attach string to the paper. The length of string you need is going to depend on where you install the trip wire alarm. Installation Tip: Hide this switch down low by the door frame and use fishing line instead of string to make this burglar alarm virtually invisible. Use a tack in the frame or tie the line to the door hinge to secure and wait for the action...

**Exercises :** Answer the questions below:

1. How does this work?
2. What type of switch is the trip wire?
3. Name three places you can install this alarm.