

# Simple Electric Circuits

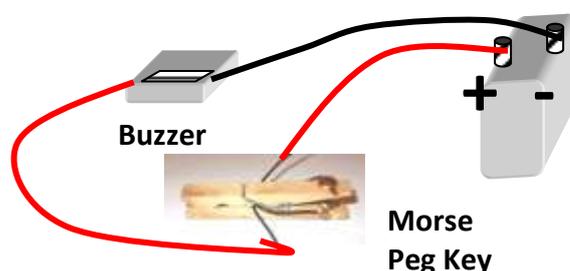
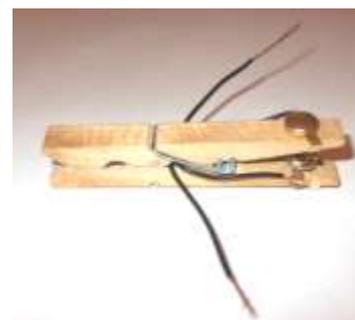
Experimenting with circuits is a great way to enter the world of electronics. In this technological age even a basic electrical knowledge is advantageous. There are a number of beginner kits available but with a few leads, batteries, LED lights, globes and even Alfoil is a good way to get started.



## Morse Code Sender

**Materials:** 2 split pin paper fasteners, 2 pieces of connecting wire with bare ends, 2 clip leads, 1 peg, 1 buzzer, 9V battery

- Connect each wire to a paper fastener (split pin)
- Wrap each paper fastener around each handle of the peg with the centre pieces facing upwards so that there is a wire on each side of the peg
- Make sure there is a small gap between the two split pins
- Pass the two wires through the hole in the peg
- Connect one wire to red buzzer wire and the other wire to the positive terminal of the battery using a clip lead
- Connect the black wire of the buzzer to the negative terminal of the battery with a clip lead
- Press the top handle of the peg down until the split pins connect (you may have to hold the peg down with your other hand or attach it to the table)
- The buzzer should sound. Send Morse code by tapping the peg handle

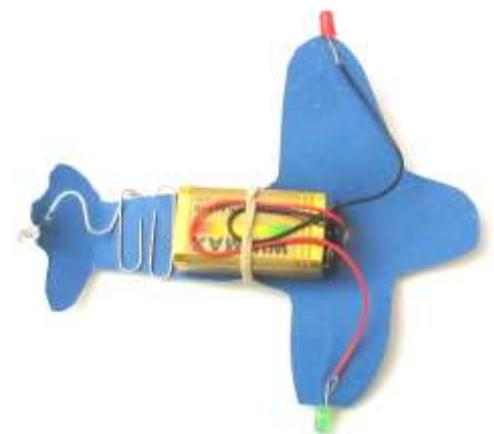
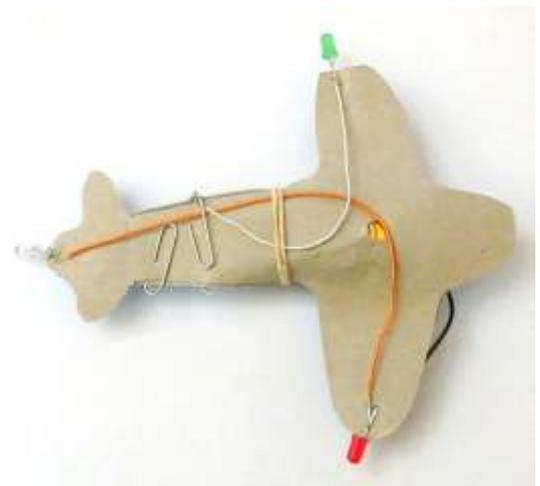
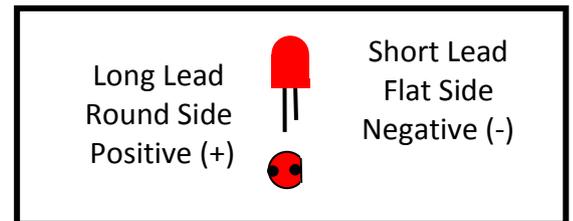


# Aircraft Navigation Lights

**Materials:** red LED, green LED, flashing red LED (clear LED), 9 Volt battery, 9 Volt battery clip, 2 paper clips, cardboard for aircraft, 3 pieces of covered wire with bared ends (length depends on aircraft size)



- Cut out an aircraft shape from the cardboard
- Using small pliers carefully make a small hook on the end of each LED.
- Hook together and tighten with pliers:
  - Positive lead of the Red LED to one piece of covered wire
  - The other end of this wire to the positive end of the Clear LED
  - The negative end to the Clear LED to a short piece of covered wire
  - The other end of this short wire to a paper clip
  - Negative lead of Green LED to another piece of covered wire
  - The other end of this wire to another paper clip.
- Place the Red LED over the LEFT wing tip
- Place the Green LED over the Right wing tip
- Place the Clear LED over the tip of the tail
- Place the 2 paper clips on the rear of the plane body keeping them separated
- Attach the Black battery clip lead to the Red LED
- Attach the Red battery clip lead to the Green LED
- Tighten all the connections with pliers
- Place the 9 Volt battery on the top of the plane body
- Secure with a rubber band
- Place the battery clip on the battery
- Check all connections
- Briefly touch the 2 paper clips together
- The Red and Green LEDs should glow and the Clear LED should flash
- Bend up the tail part carefully so that it is now vertical
- If the LEDs do not glow then check the connections
- Unfortunately if a LED is connected in the wrong way it may not work anymore!



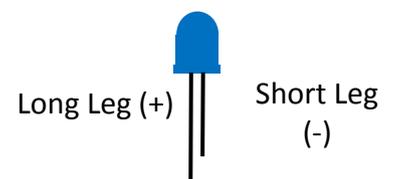
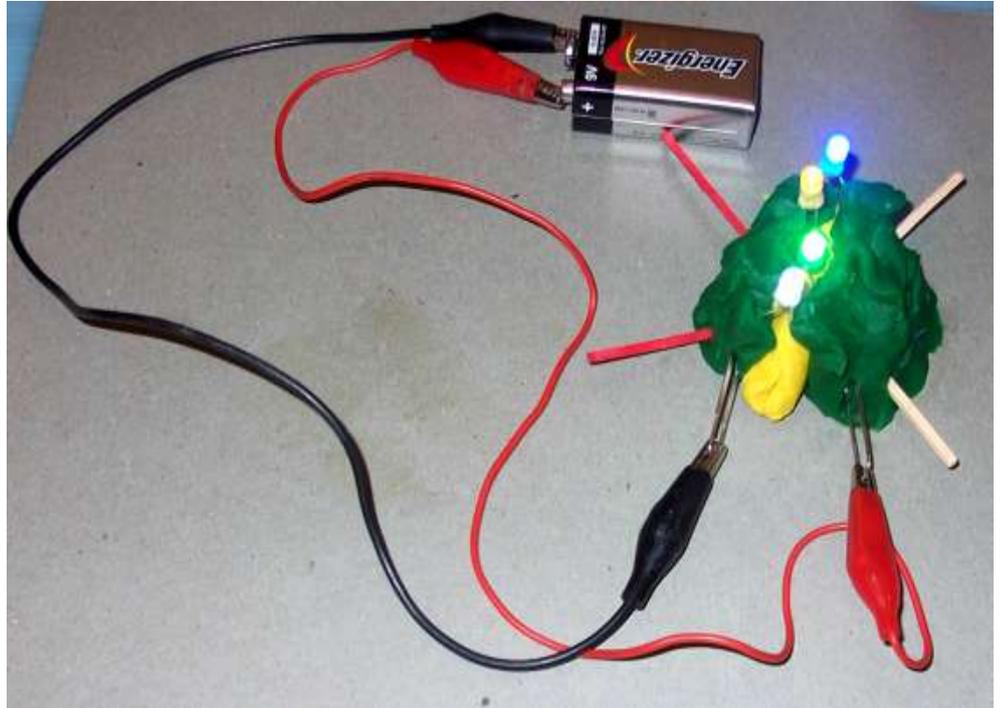
## Play Dough Campfire

Did you know that play dough conducts electricity and that modelling clay is an insulator. Some exciting sculptures can be made using these facts.

**Materials:** modelling clay, play dough, 2 clip leads, LED lights, match stick sized pieces of wood, 2 paper clips, 9V battery, cardboard for a base board

**WARNING: DO NOT connect the LED lights directly to the battery**

- Take a stick of modelling clay and lay it down
- Make 2 mounds of play dough
- Attach them on either side of the modelling clay
- Push a metal paper clip into the base of each play dough mound
- Attach clip leads to each paper clip
- Join the clip leads to the battery
- Note which lead is connected to the positive (+) terminal and which one connects to the negative (-) terminal of the battery
- Choose a LED light and note the positive (+) leg which is the long one
- Very carefully bend the legs of the LED light out slightly
- Push the long leg into the mound which is connected to the positive terminal of the battery
- Push the other leg into the play dough mound on the other side
- Make sure that the LED legs do not touch each other or the opposite play dough mound
- The LED should light up
- If it does not then check that the connections are correct
- Now add further LED lights in the same way
- Add small wooden pieces to make it look like a camp fire



Other sculptures can now be made provided that the play dough connected to the positive battery terminal does not touch the play dough connected to the negative terminal. Keep the two sides of play dough separated with modelling clay strips. Add LED lights to connect across the two play dough sectors. LED legs can be extended by winding thin strips of Alfoil around them and securing with sticky tape. Make sure that the LED legs extensions do not touch each other and that the correct positive and negative connections are maintained.