

Circuit Types Lab

Name _____ Date _____ Group _____

Objective: In this lab you'll be working with two types of electric circuits, a series and a parallel circuit. You'll discover:

1. Which type of circuit will still work even after you remove some of the bulbs from it.
2. Which type of circuit requires more effort from you to light all of the bulbs.

Materials: Hand generator, lamp board

Procedures:

In between each step, make sure that all connector knobs are tightened.

1-Loosen but do not remove, the Red and Black knobs on the lamp board. You should now be able to move the conductor strips, numbered one through eight in the diagram, so that they are angled outward as shown. Depending on the type of circuit you'll be asked to make, you'll need to position some of the conductor strips at an outward angle. (see diagram for example)

2- The first type of circuit you'll make is a series circuit. To make this type of circuit you need to angle outward the following conductor strips only: numbers 3, 4, 5, and 6. (see diagram)

3-Once your hand generator is properly set up, connect one of its alligator clips onto conductor strip #5 and the other onto conductor strip #6 next to the knob.

4-Begin turning the handle about three rotations per second. Observe how **bright** the light bulbs appear and the amount of **effort** it takes to turn the handle. Record below how many bulbs light up.

5-Reconnect just the alligator clip from strip #6 onto strip #4. Repeat step 4 again. How many bulbs are lit this time?

Is there any difference in the brightness of the bulbs this time as compared to step 4 ?(they're: dimmer,brighter,or the same)

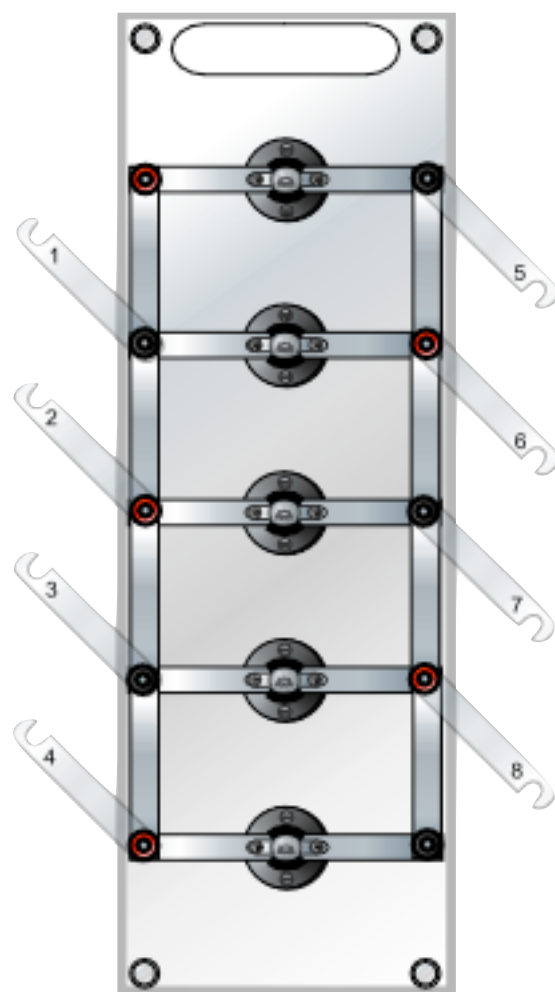
6-Disconnect the alligator clips, and reposition the conductor strips so that just numbers 2,4,5 & 7 are angled out. Reconnect the alligator clips to conductor strips #4 and #5. Now turn the handle again at the same rate of three turns a second.

How many bulbs light up now ? _____

How does the brightness of the bulbs **this** time, compare to the brightness for the **previous two** trials? _____

7-With the connections as they were in step 6, while you're turning the handle of the generator, have your partner unscrew the bulb in the middle of the board (between strips 2 and 7) two turns and remove it. Screw the bulb back when done.

Question 1 What happens to the rest of the bulbs when the middle bulb was removed ?



This next type of circuit you'll make is a parallel circuit.

8-Reposition the conductor strips so **all** of the strips **except** for # 1 and # 5 are angled outward. Reconnect the alligator clips onto conductor strips 1 and 5.

Begin turning the handle about three rotations per second. Observe how bright the light bulbs appear and the amount of effort it takes to turn the handle. Remember this information !

How many bulbs are lit and about how bright are they?

9- Now swing **just** conductor strips #'s 2 and 6 back to their vertical positions and gently tighten the knobs. Repeat step 8 above.

How many bulbs light this time **and** how does their brightness compare to step 8 ?

Is it easier or harder to turn the handle **this time** compared to the previous step?

10- Now swing conductor strips 3 and 7 back into a vertical position and tighten, and turn the handle as you did previously. How many bulbs light up, what is their brightness and effort required to turn the handle, compared to the previous parallel set ups?(answer all three parts of this question)

11- Now swing conductor strips 4 and 8 back into a vertical position, and turn the handle as you did previously. How many bulbs light up, what is their brightness and effort required to turn the handle,**compared to previous parallel set ups?**

Question 2 What happens to **the amount of effort** required to turn the handle in a parallel circuit as **more of the bulbs light up?**

Question 3-Which type of circuit requires more turning effort to light the bulbs, series or parallel?

12-With the connections as they were in step 11, while you're turning the handle of the generator, have your partner unscrew the bulb in the middle of the board (between strips 2 and 7) two turns and remove it from its socket. Screw the bulb back in when done so it's just snug. Do not over tighten!

Question 4- What happens to the rest of the bulbs when the middle bulb was removed?

13- Remove the three bulbs in the middle and continue turning the handle.

Question 5- Which type of circuit (series **or** parallel) will still continue to work even if one of the devices in the circuit fails?

(Compare your answers to steps 7 and 12)_____