

Course and Section \_\_\_\_\_

Names \_\_\_\_\_

Date \_\_\_\_\_

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## ***SIMPLE CIRCUITS – LIGHT BULBS***

### **Short description:**

In this experiment you will explore various types of circuits. Your goal is to try to understand what controls the current in circuits. The circuit elements will be batteries and light bulbs. The bulbs, of course, will glow more brightly the more current flows through them.

### **Equipment:**

- Three bulbs with bulb sockets
- Two batteries with holders
- Six wires
- Simple generator (Genecon)
- Simple engine (electric ‘solar’ motor)

### **Preliminary questions:**

Describe the analogy between fluid flow and electric circuits. What is the electrical analog to the following:

1. Pipes
2. Water current
3. Pressure
4. The pump
5. The “line” or “load”

## Procedure:

Now we'll use the battery holders and sockets. The battery is actually made by a series combination of two D cell batteries. In each of the following parts, construct the circuit and explore the features of the circuit by answering the questions.

### USE TWO BATTERIES IN SERIES: 3V

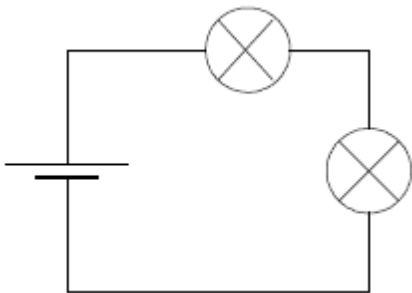
#### 1. One bulb.



Note the bulb's brightness for later comparison to the other circuits.

What happens if you unscrew the bulb?

#### 2. Two bulbs in series.

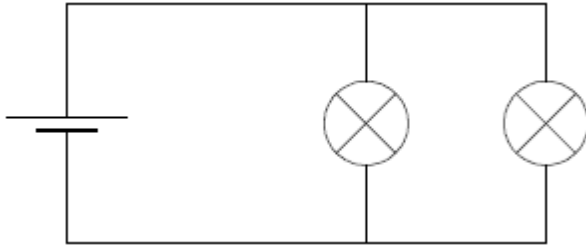


a) What happens if you unscrew one bulb?

b) Do all bulbs glow with the same brightness?

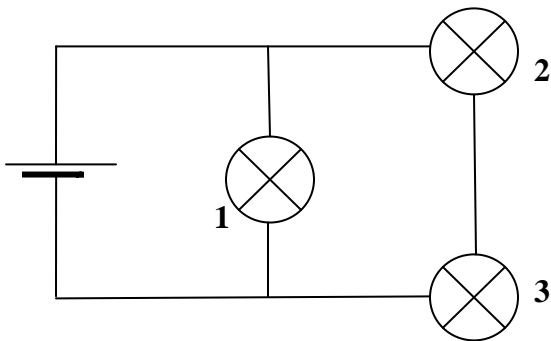
c) Do the bulbs glow as brightly as in part 1?

3. Two bulbs in parallel.



- What happens if you unscrew one bulb?
- Do all bulbs glow with the same brightness?
- How does the brightness of this circuit compare to the second circuit?
- If you keep the bulbs connected to the battery, the battery eventually will die. Will the battery die quicker in the second or third circuit? Why?

4. Series/parallel combination



- Do all bulbs glow with the same brightness?
- What happens if you unscrew bulb  
#1?  
#2?  
#3?
- How do the bulbs in this circuit compare in brightness to the other circuits?  
Can you explain this?

## 5. Electric Motor

Connect the battery with the 'solar motor' (as show in the first circuit with the solar motor instead of the light bulb)

a) What happen to the propeller of the motor?

b) What happen if you reverse the connections?

Conservation of energy states that energy is never lost in a physical process, but it might transform to a different form of energy.

a) In which forms of energy does the electrical energy of the battery transform in the case of the light bulb?

b) In the case of the solar motor?

## 6. The Genecon

The Genecon is hand-operated generator that can substitute for a battery. Hook the Genecon up to the electric motor and see if you can make it work.

a) Can you vary the motor's speed?

It is important that each person try the Genecon to see and feel the difference.

b) While using the Genecon, which form of energy does make the propeller spin?