

## Light Bulb “Blow Out”

### Introduction

Have you ever been in a room when you suddenly see a burst of light and then the room goes dark? This is because a light bulb has blown out. Light bulbs “blow out” because the current is too high for the filament inside; it gets too hot, and burns out. When Thomas Edison was trying to invent the electric light bulb he tested and tested and tested hundreds of different kinds of filaments (i.e. everything from string to cat hair to many different metals) under different kinds of atmospheres (i.e. exposed to the air or enclosed in a vacuum). Constantly, the filament he was using would simply burn out during experiment. Even now the filaments in our incandescent light bulbs blow out all the time. This typically happens when you turn on the lights; an old bulb will have more “wear and tear” and thus be more susceptible to the variation in power when the lights are flicked on. The spike in power will simply provide too much current to the filament, and make it burn out.

Today, we’ll try to do just that. We need to know what makes bulbs burn out, what kinds of circuits have properties that would tend to make the bulbs burn out quicker, and which properties to change in the circuit to make the bulb burn out.

### Equipment List

2.2Ω, 10Ω, 22Ω, and 100Ω resistors

Battery

Light bulb

Connecting wires

### Experimental Procedure

1. Answer the “Hints” below to get on the right track towards designing a circuit that will blow out the bulb.
2. Design a circuit (series or parallel) that will make the light bulb burn out.
  - a. If necessary you may join with another group for this part.
3. Explain the underlying concept you used to blow out the bulb in the space provided below.
4. Draw a schematic diagram of your circuit in the space provided below.
5. Measure and write down the circuit properties as indicated in the last question of this lab.

## Hints:

- a) What makes a light bulb burn out?
- b) How does the total resistance of a circuit compare to each resistor in
  - i. a series circuit
  - ii. a parallel circuit
- c) Where does current always want to flow?

## **Provide a Summary of the Concept For Blowing Out the Bulb:**

Draw a Schematic Diagram of Your Circuit:

Calculate the voltage and current at each connection in your circuit and indicate where they are in the circuit: