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North Vancouver**

**Science 10  
Electricity and Magnetism**

**CIRCUIT LAB**



## Physics 10 –Circuit Lab

Name:

Lab Partner:

Work Habits: /5

### Purpose:

- To figure out the circuitry of a typical flashlight
- To construct circuits according to schematic drawings
- To determine resistance and voltage of constructed circuits
- To draw a schematic circuit of an actual circuit (series and parallel)
- To differentiate between a series and parallel circuit
- To determine the resistance of actual resistors
- To disentangle a circuit

### Materials:

- Flashlight
- 1.5 volt cells
- 6 volt cells
- lamps
- battery connectors
- resistors
- wires with alligator clips
- switches

### Procedure:

#### Part A: Flashlight dissection

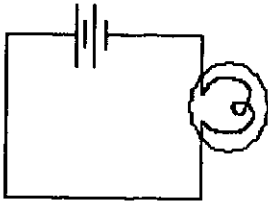
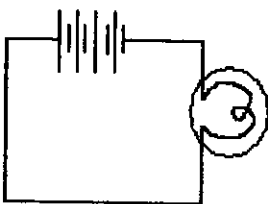
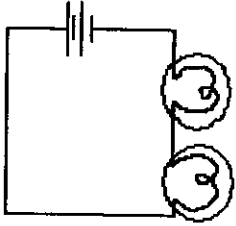
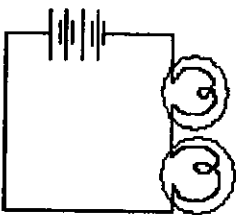
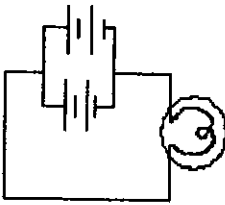
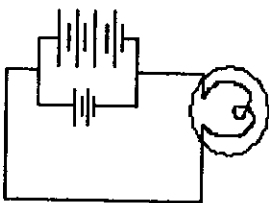
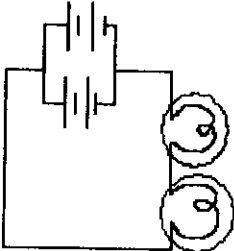
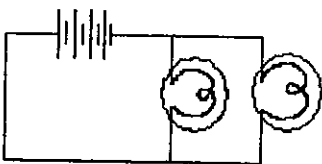
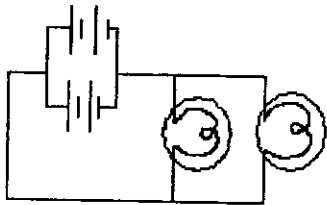
Take apart your flashlight by unscrewing the top, removing the bulb and batteries. Look inside and notice the springs, wires, and extras that compose your flashlight. In the first box draw the circuit in diagrammatic form and label the parts. Ensure that you indicate how the entire circuit is completed by the components. In the second box draw the circuit in schematic form. Be clear and neat!

#### **Diagrammatic:**

#### **Schematic:**

**Part B: Circuit Construction**

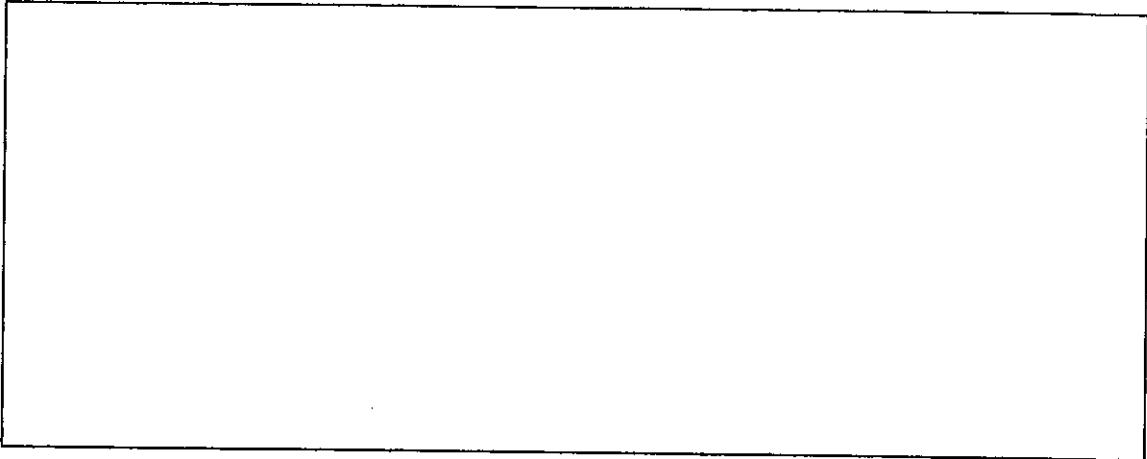
1. Construct each of the following circuits and determine the brightness of the bulb on the scale from 1-5
2. Your teacher must initial circuits 6, 7, and 9.
3. Determine the total resistance and voltage for each circuit and write it in the space provided..

<p>1.</p>  <p>Brightness: 1 2 3 4 5 Voltage: Resistance:</p>	<p>2.</p>  <p>Brightness: 1 2 3 4 5 Voltage: Resistance:</p>	<p>3.</p>  <p>Brightness: 1 2 3 4 5 Voltage: Resistance:</p>
<p>4.</p>  <p>Brightness: 1 2 3 4 5 Voltage: Resistance:</p>	<p>5.</p>  <p>Brightness: 1 2 3 4 5 Voltage: Resistance:</p>	<p>6.</p>  <p>Brightness: 1 2 3 4 5 Voltage: Resistance:</p>
<p>7.</p>  <p>Brightness: 1 2 3 4 5 Voltage: Resistance:</p>	<p>8.</p>  <p>Brightness: 1 2 3 4 5 Voltage: Resistance:</p>	<p>9.</p>  <p>Brightness: 1 2 3 4 5 Voltage: Resistance:</p>

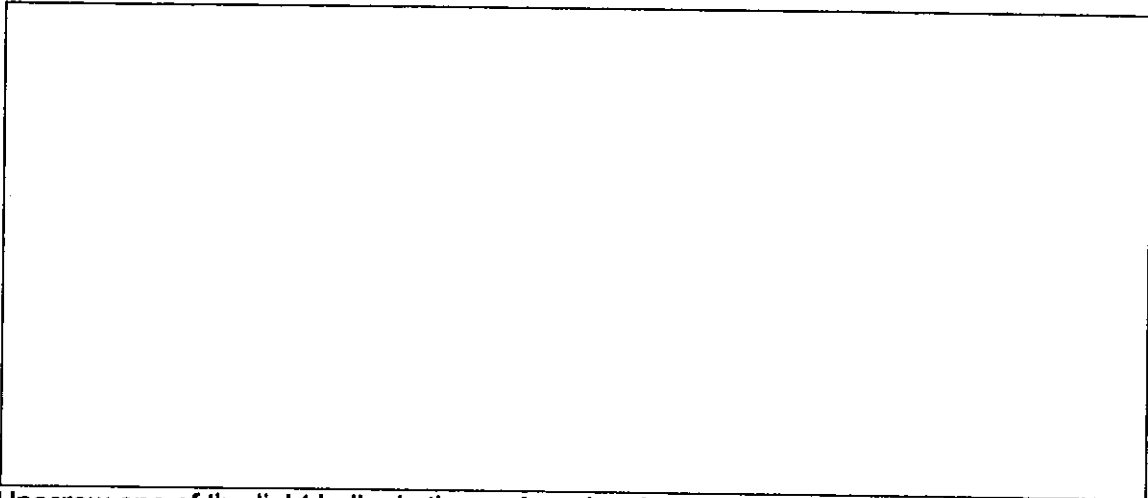
**Part C: Series vs. Parallel**

Look at the two circuits set up. The one labeled A is a series circuit. The one that is labeled B is a parallel circuit. In the boxes below, draw each in schematic form.

**Circuit A:**



**Circuit B:**



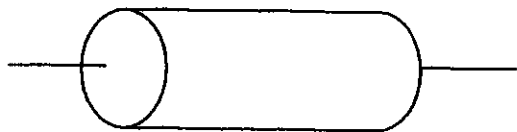
Unscrew one of the light bulbs in the **series circuit**. What happened to the other bulb?

Unscrew one of the light bulbs in the **parallel circuit**. What happened to the other bulb?

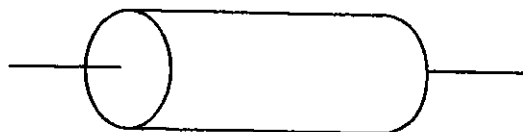
Explain why these two different results occurred.

**Part D: Reading Resistors**

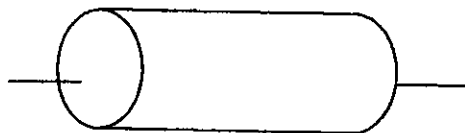
For each of the resistors provided, write the colours of the bands on the diagrams below and determine the resistance and tolerance.



Resistance \_\_\_\_\_



Resistance \_\_\_\_\_



Resistance \_\_\_\_\_



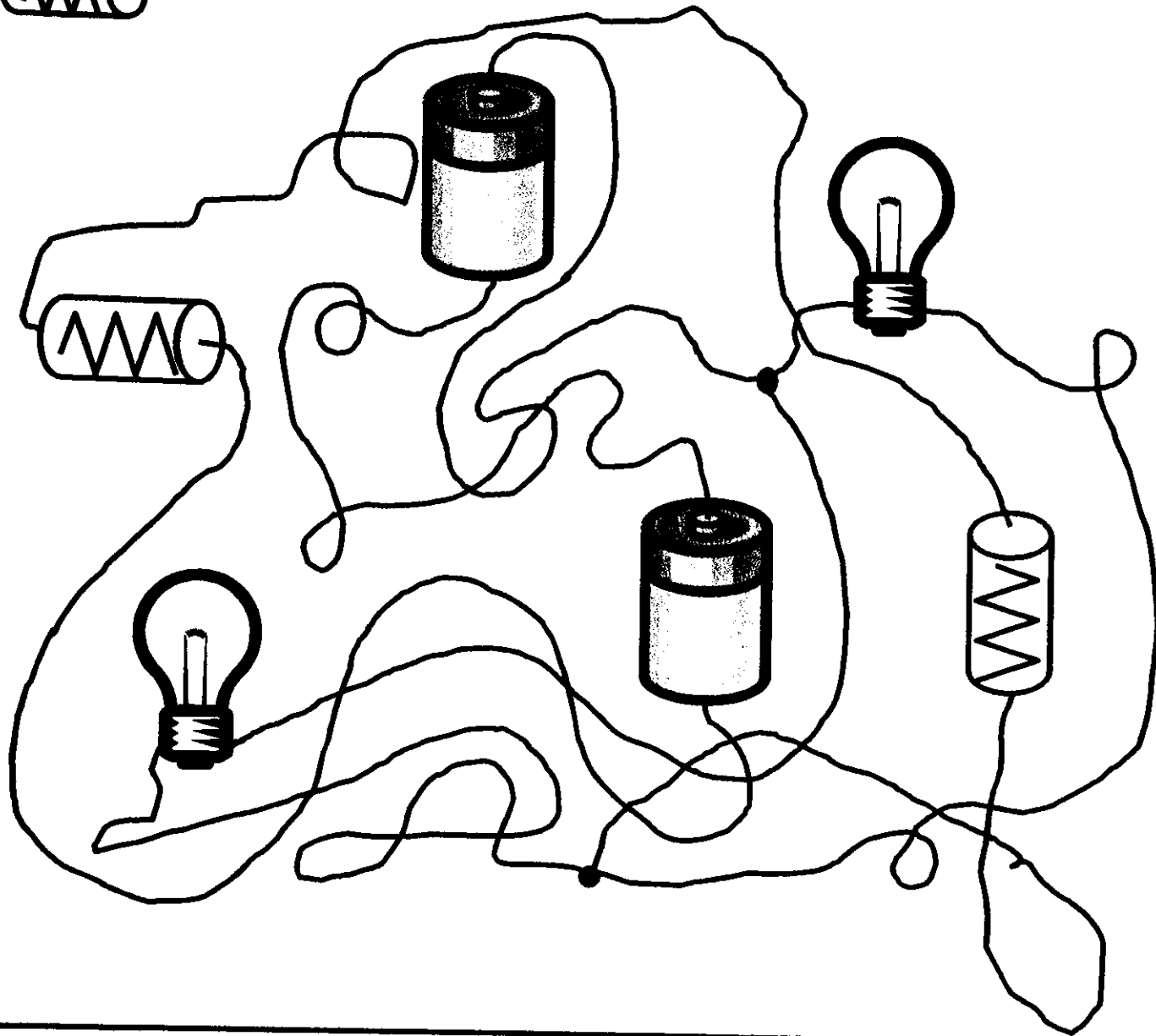
Resistance \_\_\_\_\_

**Discussion:**

**Circuit Scramble**

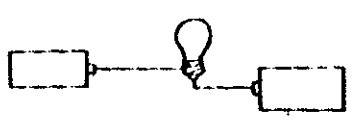

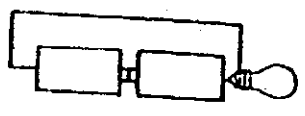
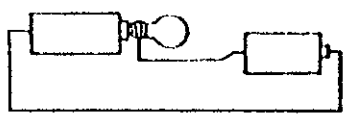
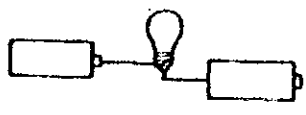
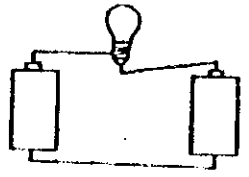
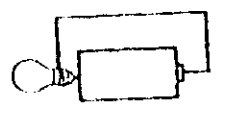
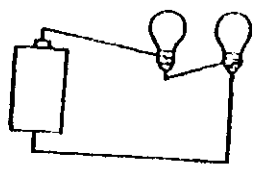
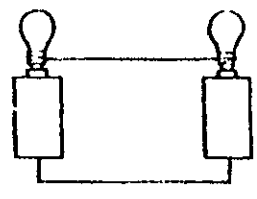
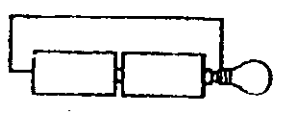
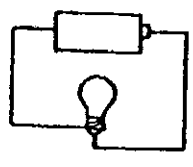
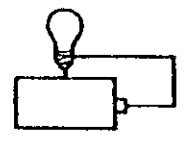
Circuits can get pretty messy. Unscramble the following circuit and redraw it in schematic form in the space below. The wires cross many times but the only time a branch occurs is when a ● is shown.

 = Resistor



**Circuit Knowledge:**

From your circuit knowledge, decide which of the following circuits will work. If you think it will put a check in the YES box. If not, put a check in the NO box.

					
Yes <input type="checkbox"/>	No <input type="checkbox"/>	Yes <input type="checkbox"/>	No <input type="checkbox"/>	Yes <input type="checkbox"/>	No <input type="checkbox"/>
					
Yes <input type="checkbox"/>	No <input type="checkbox"/>	Yes <input type="checkbox"/>	No <input type="checkbox"/>	Yes <input type="checkbox"/>	No <input type="checkbox"/>
					
Yes <input type="checkbox"/>	No <input type="checkbox"/>	Yes <input type="checkbox"/>	No <input type="checkbox"/>	Yes <input type="checkbox"/>	No <input type="checkbox"/>
					
Yes <input type="checkbox"/>	No <input type="checkbox"/>	Yes <input type="checkbox"/>	No <input type="checkbox"/>	Yes <input type="checkbox"/>	No <input type="checkbox"/>

**Conclusion:**