### LED Illluminator: Voltage Considerations

If at any time one of your components gets **hot**, immediately disconnect your battery, consider the probable cause, and then discuss the issues and corrective action with one of the student instructors.

To ensure the predictable behavior of your *battery-powered* 16-LED Illuminator, nothing is more important than considering the **voltage** requirement of your preferred arrangement. So, consider this.

1. *Kirchhoff’s Voltage Law* states that **all** the voltage in a working circuit is used up.

2. Each of the 16 warm white LEDs requires **3V** for optimum performance.

3. Individual alkaline batteries (AAA, AA, C, D) provide **1.5V** each.

**Task**. For each of the four arrangements of 16 LEDs that appear below, indicate the voltage drop between the **positive (*source*)** and **negative (*ground*)** supplies and suggest how many **1.5V** batteries (*in series*) would be required for optimum performance.

|  |  |  |
| --- | --- | --- |
| Scenario | Voltage Drop? | Required Number of 1.5V Batteries? |
| a |  |  |
| b |  |  |
| c |  |  |
| d |  |  |

