Basic Resistor Experiment 基本电阻实验概述

Initial Observations 初步观察:

In the ***"Simple LED Circuit"*** experiment a 330Ω resistor was used to protect a 3V LED light bulb from burning out when a 9V battery was used to power the circuit.

在"简单LED电路"实验中，当使用9V电池为电路供电时，则用330Ω电阻器来防止3V LED灯泡烧坏。

From this one observation we may be able to ask several questions:
通过这一观察，我们可能会问几个问题:

1. *What is the purpose of a resistor?*
   电阻器的用途是什么?
2. *How does a resistor work, and how are they rated?*
   电阻器是如何工作的，它们的额定值是多少?
3. *How do you select the correct resistor value for your circuit?*
   如何为电路选择正确的电阻值?
4. *Why was the resistor used in a series configuration in this circuit?*
   为什么在该电路中使用串联电阻器?
5. *Is there, and what is the difference between using a resistor in an either series or parallel configuration?*
   在串联或并联电路中使用电阻器有什么区别?

Although there a many more questions that could be investigated relating to this one ***"Simple LED Circuit"*** experiment, the preceding 5 questions are the foundation of our current experiment. In particular question #5 is the basis for the development of the hypothesis for our next experiment.

虽然这一"简单LED电路"实验有更多的问题可以研究，但目前先集中这5个问题，尤其问题5是下一个实验假设提出的基础。

Assignment Details 任务明细:

You will be required to build the **"Basic Resistor"** experiment circuit board in class. Then for homework you will need to complete the first half of your report using the **"Scientific Method"** and proper formatting conventions. An outline of the project schedule is provided below:

制作"基本电阻"实验电路板，按照"科学方法"和适当的格式完成报告的前半部分作为家庭作业。项目进度大致如下:

Class Activity #1 - 课堂活动1:
Complete the construction of the **"Basic Resistor"** experiment circuit board.

完成"基本电阻"实验电路板的搭建。

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Homework Assignment #1 - 家庭作业1:
You are only required to complete the following sections of your report for homework, but it must be done and submitted online before the next class.

你只需要完成报告的以下部分作为家庭作业，但必须在下节课之前完成并在线提交。

1. Introduction 介绍
2. Hypothesis 假设
3. Experiment Design 实验设计
4. Materials and method 材料和方法

You will also need to prepare your data table so you know what information you will need to record when completing the experiment in the next class.

准备数据表，以便在下节课完成实验时知道需要记录哪些信息。

Class Activity #2 - 课堂活动2:
Complete the experiment, record your data, and share your results with a minimum of two other students.

完成实验，记录数据，并与至少两名其他学生分享结果。

Homework Assignment #2 - 家庭作业2:
Complete your report and submit it digitally before the deadline.

完成报告并在截止日期前提交电子版。

Note*: Do not conduct any online research related to the topic. Use only the evidence from your experiment to formulate your conclusion.*

注意：不要进行任何与该主题相关的在线搜索，只需使用实验中的证据来得出结论。

Experiment Design 实验设计:

This experiment will focus on determining how resistors work and will try to determine if there is any mathematical relationships that can be observed for resistors when being used in either a series or parallel circuit design.

本实验将重点确定电阻器的工作原理，并尝试确定在串联或并联电路设计中使用电阻器时是否存在任何可以观察到的数学关系。

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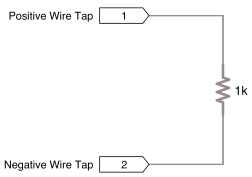
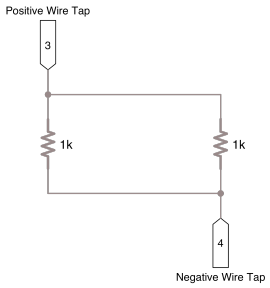
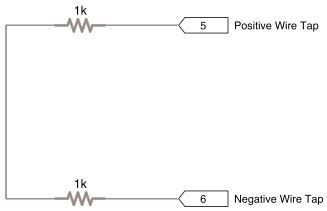
Electrical Schematics 电子原理图	Experiment 实验
	**<u>Experiment A:</u> *Control Circuit* 实验*A*：控制电路** This experiment is designed to establish a baseline of what we should expect from the components and the equipment being used. 本实验旨在建立我们对所使用的组件和设备的基本框架。 ***NOTE:*** *Resistance is measured in Ohms* 注：电阻的测量单位为欧姆 **Ohm (Ω):** *The SI unit used for electrical resistance. See Ohm's law.* 欧姆（Ω）：用于测量电阻的国际单位制单位。见欧姆定律。
	**<u>Experiment B:</u> *Parallel Circuit* 实验B：并联电路** This experiment is designed to determine what will happen to the resistance (being measured in Ohms) when two resistors of the same value are used in parallel to one another. 本实验旨在确定当两个相同值的电阻器并联使用时，电阻（以欧姆为单位）会发生什么变化。 **Parallel circuit: A** *closed electrical circuit in which the current is divided into two or more paths and then returns via a common path to complete the circuit.* 并联电路：一种闭合电路，其中电流分为两条或多条支路，然后通过干路返回以完成电路。
	**<u>Experiment C:</u> *Series Circuit* 实验*C*：串联电路** This experiment is designed to determine what will happen to the resistance (being measured in Ohms) when two resistors of the same value are used in series. 本实验旨在确定当串联使用两个相同值的电阻器时，电阻（以欧姆为单位）会发生什么变化。 **Series circuits:***An electric circuit connected so that current passes through each circuit element in turn without branching.* 串联电路：使电流依次通过每个电路元件而不发生分支的电路。