Types of Circuits Activity

Today we will be playing with the Circuitry kits. You will need:

* Peg board
* Battery holder and 2 AA batteries
* 100 Ω resistor (R1)
* 2 resistor holders (?1)
* Connectors.
* 2 different resistors from the box up front (10Ω, 22Ω, 47Ω, 220Ω, 470Ω)

**Series Circuit.**

Set up a circuit (complete loop) so that one resistor comes after another one in the circuit. When drawing diagrams of circuits, we use symbols to represent different items.

Resistors: Voltage supplies (batteries):

With those symbols, draw your circuit diagram below, labeling the 3 resistors and the total voltage of the circuit:

Use the volt meter to measure the voltage drop across each resistor:

|  |  |  |
| --- | --- | --- |
| Resistor | Resistance (Ω) | Voltage (V) |
| 1 |  |  |
| 2 |  |  |
| 3 |  |  |

How do the voltages of the 3 resistors compare to the total voltage being provided by the battery?

What rule can you make about voltage drops in a series circuit compared to the total voltage drop?

Calculate the current passing through each resistor using Ohm’s Law. What do you notice about those currents?

|  |  |  |
| --- | --- | --- |
| Resistor | Resistance (Ω) | Current (A) |
| 1 |  |  |
| 2 |  |  |
| 3 |  |  |

Thinking about how current flows through the circuit, what claim can you make about the current through a series circuit?

**Parallel Circuit:**



Using the same resistors, construct a parallel circuit like the diagram on the side:

Using the volt meter and measure the voltages across each resistor.

|  |  |  |
| --- | --- | --- |
| Resistor | Resistance (Ω) | Voltage (V) |
| 1 |  |  |
| 2 |  |  |
| 3 |  |  |

What has changed about the voltages now compared to the voltages in the series circuit?

Use Ohm’s law to calculate the currents for each resistor:

|  |  |  |
| --- | --- | --- |
| Resistor | Resistance (Ω) | Current (A) |
| 1 |  |  |
| 2 |  |  |
| 3 |  |  |

Disconnect the connector from one end of the battery and hook up an Ammeter (measures current) so you can measure the total current. Record the total current and compare that value to the 3 currents in the resistors. What do you notice?

What claim can you make about the currents through a parallel circuit?

**Practice Problems:**

1. A 10 Ω, 20 Ω and 30 Ω are connected in series. The total current in the circuit is measured to be 0.5 A. What is the total voltage being supplied to this circuit? (**30 V**)
2. 1. A light bulb with resistance of 240 Ω, a blow dryer with a resistance of 150 Ω, and a stereo of resistance 280 Ω are all connected in parallel to a wall socket that puts out a voltage of 120 V. What is the total current that is being drawn from that socket? (**1.73 A**)
   2. How many electrons are leaving that socket above every minute? (**6.48\*1020**)