**![C:\Documents and Settings\dogrady-cunniff\Local Settings\Temporary Internet Files\Content.IE5\2HSMJBNZ\MC900391164[1].wmf]()Taking apart a flashlight**

Take apart a flashlight, draw the separate components below and label them

1. There are usually no wires in the flashlight. Why not?
2. Put the flashlight back together. Does it matter which way you put the battery into the case?
3. How does the circuit work? Describe what is happening in complete sentences.

# resistor simulationAnalyzing circuits

### Create a circuit with a battery, light bulb and resistor in series.

Right click on the components of the circuit to change their values and explore the relationship between voltage, current and resistance. Fill in the missing values in the table. Use the ammeter to measure current.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Voltage** | **Resistance of LightBulb** | **Resistance of resistor** | **Total Resistance** | **Current** | **Results** |
| 9 V | 10 Ohms | 10 Ohms |   |   | Add the resistances in a series circuit to get the total resistance |
| 9 V | 5 Ohms | 0 Ohms |   |   | When the total resistance goes down the current goes \_\_\_\_  |
| 12 V | 10 Ohms | **60** Ohms | 70 Ohms |   | When the total resistance goes up the current goes \_\_\_\_  |
|   | 10 Ohms | 10 Ohms | 20 Ohms | 1.00 Amp | You need \_\_\_ volts with 20 ohms of resistance for 1 Amp of current |
|   | 10 Ohms | 10 Ohms | 20 Ohms | 2.00 Amps | You need \_\_\_ volts with 20 ohms of resistance for 2 Amps of currentDescribe the relationship between volts, ohms and Amps |

### Create a parallel and series circuit

|  |  |
| --- | --- |
| **Parallel** | **Series** |
| parallel simulationEach lightbulb should have a resistance of 10 Ohms to start with | series simulationEach lightbulb should have a resistance of 10 Ohms to start with |
| With a 9 V battery, how many volts are passing through each lightbulb in the parallel circuit? |   | With a 9 V battery, how many volts are passing through each lightbulb in the series circuit? |  |
| If you disconnect one lightbulb, what happens to the other lightbulb in the parallel circuit? |   | If you disconnect one lightbulb, what happens to the other lightbulb in the series circuit? |  |
| What is the current in the parallel circuit with a 9 V battery? |  | What is the current in the series circuit with a 9 V battery? |  |
| Is the current the same on every wire? |  | Is the current the same on every wire? |   |
| Change the battery to 10V, did the current change by much? |  | Change the battery to 10V, did the current change by much? |  |
| Change 1 lightbulb to 30 Ohms resistance. Are the bulbs equally bright? |  | Change 1 lightbulb to 30 Ohms resistance. Are the bulbs equally bright? |  |
| Label the diagrams of the circuits above with how much voltage there is across each lightbulb and how much current is in each wire with a 10V battery, one 10 Ohm bulb and one 30 Ohm bulb. |

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| --- | --- | --- |
| resistor simulation | Replace the resistor, with an item from the grab bag. Find out if it's possible to light the light bulb without causing a fire and if so, how many volts will be needed. Test at least 4 items from the grab bag. Describe your results below. | grab bag |
|  |
| Which item in the grab bag has the most resistance?\_\_\_\_\_\_\_\_\_\_\_\_\_\_How do you know? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ |