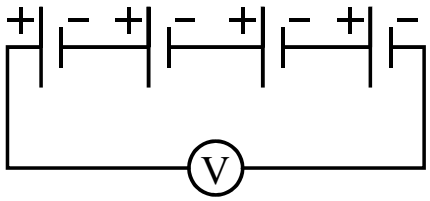
Name _____Period_____ Date_____

Lab 12:1 DC Electric Circuits – EMF Series

Purpose: The goal of this lab is to become familiar with the basic laws of electricity and to then apply those laws to simple DC circuits. If you do not understand what you are doing on a fundamental level in each part of the lab, then you have not accomplished what is expected of you!

A. How is the potential difference generated by an electrochemical cell related to the number of cells connected in series? Why?



1. Connect a single flashlight cell to a voltmeter [Always verify that your meter is properly zeroed. Turning the thumbscrew on the front of the meter can be used to adjust the zero point.] and record the potential difference produced in volts. [Don't forget to record the estimated error!] [Note! Any time you use a meter be sure to record the meter's number and make sure that the meter is calibrated to zero before you use it!]
2. Increase the number of cells in series [positive to negative!] one cell at a time until you can determine the relationship between the number of cells in series and the potential difference produced. Support your conclusion with concrete evidence!
3. With four cells in the battery holder, reverse one of the cells and measure the resulting potential difference. Reverse a second cell and again record the potential difference. Determine the relationship between the potential difference produced and the number of cells reversed.

4. Conclusion [What and Why!]

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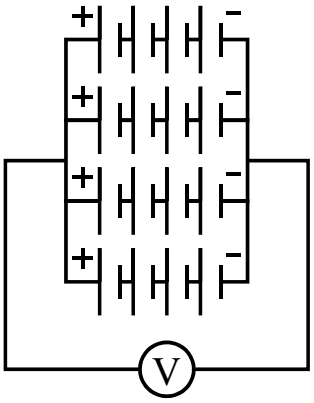
Name _____Period_____ Date_____

Lab 12:1 DC Electric Circuits – EMF Parallel

B. How is the potential difference generated by a battery [or cell] related to the number of batteries [or cells] connected in parallel? Why?



1. Connect a voltmeter to a 6.0 Volt battery and record the potential difference.
2. Connect a second 6.0 Volt battery in parallel with the first battery and again record the potential difference.
3. Increase the number of batteries in parallel until you can determine the relationship between the number of batteries and the resulting potential difference. Explain!

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4. Conclusion [What and Why!]

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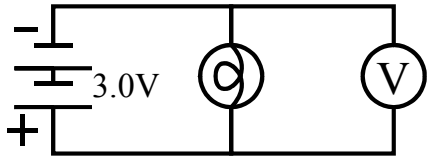
Name _____Period_____ Date_____

Lab 12:1 DC Electric Circuits – Voltmeters

C. How should a voltmeter be connected in an electrical circuit? Why?

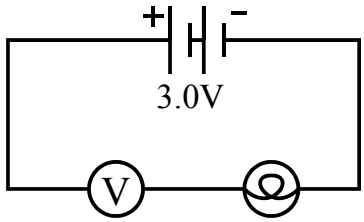
1. Connect a 3.0 Volt battery to a light bulb [Make sure the light bulb lights!]. Add a voltmeter in parallel with the battery. Record the reading on the voltmeter and note if the light bulb still lights.

$\mathbf{V_1}$ = _____



2. Connect a 3.0 Volt battery in series with a light bulb and a voltmeter. Record the reading on the voltmeter and note if the light bulb lights.

$\mathbf{V_2}$ = _____



3. Which of the above configurations is the correct way to use a voltmeter? What is it about voltmeter design that accounts for the above results? Explain!

4. Conclusion [What and Why!]

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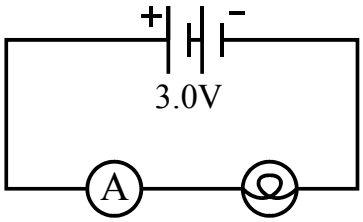
Name _____Period_____ Date_____

Lab 12:1 DC Electric Circuits – Ammeters

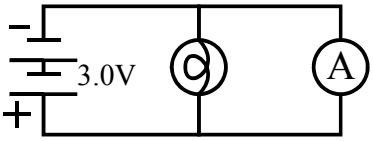
D. How should an ammeter be used in an electrical circuit? Why?

1. Connect a 3.0 Volt battery in series with a light bulb and an ammeter. Record the reading on the ammeter and note if the light bulb lights.



I_1 = _____

2. Connect a 3.0 Volt battery to a light bulb and note that light bulb lights. Carefully, connect an ammeter in parallel with the light bulb using the maximum current terminal only. If the meter "pegs" disconnect immediately! Determine if the light bulb lights with the ammeter connected in parallel with it.



I_2 = _____

3. Which of the above configurations is the correct way to use an ammeter?

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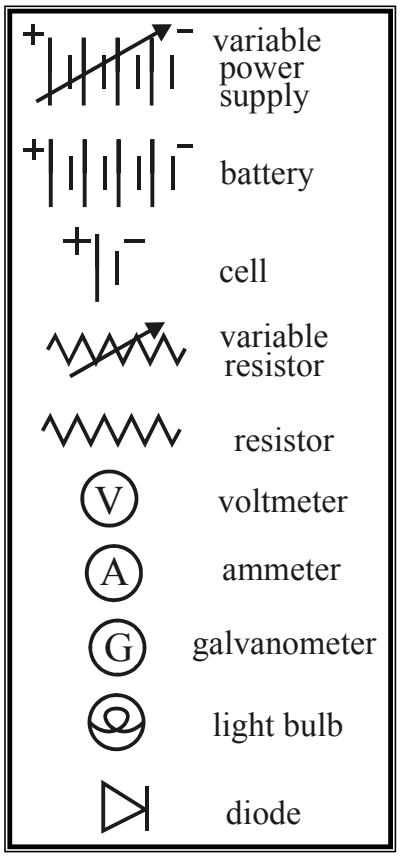

4. What is it about ammeter design that accounts for the above results? Explain and support with specific evidence!

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5. Conclusion [What and Why!]

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