

Physics 4B

PLC Activity #8: Current and Resistance

*To get credit for this activity, you must show your answers to a PLC tutor and have them initial the sign-out sheet **before 4:00 pm on Wednesday.***

Show all of your work for each question.

Part 1: DC Circuits Physlets

Go to **Chapter 30: DC Circuits**. Do the following Physlet Physics exercises and answer the questions listed.

1) Physlet Problem 30.5

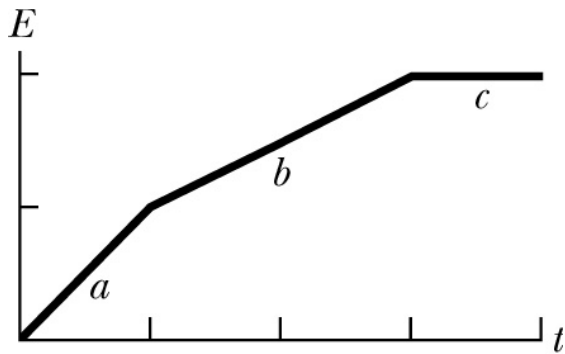
Assume an ideal battery. Vary the resistor and explain which of the graphs are correct and which are incorrect. Pay attention to the labels on the axes (electric potential is given in volts, current is given in amperes, resistance is given in ohms, and power is given in watts).

Part 2: Conceptual Questions

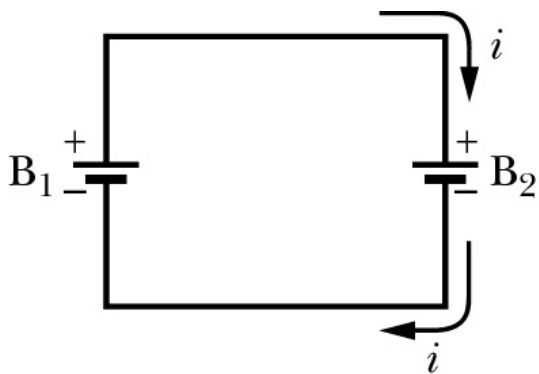
2) Go to the [HyperPhysics](#) website (click on the link or Google Hyperphysics – it is first result). HyperPhysics is an amazing site to use as a reference for the Physics 4 series.

Click on Electricity and Magnetism and then click DC Circuits and then Water Circuits. Read through the analogies and write a 2-3 sentence summary below.

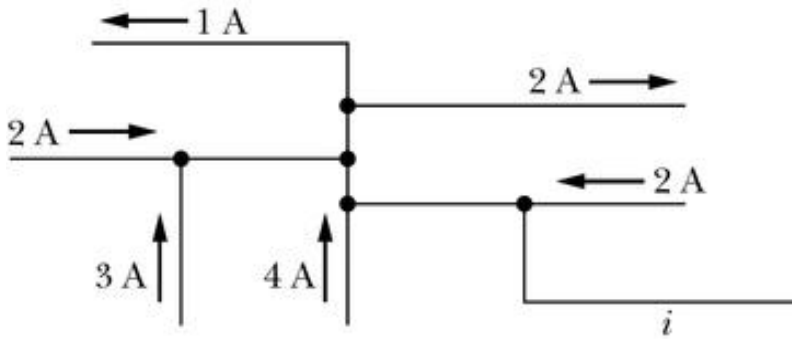
3) The figure below shows, as a function of time, the energy dissipated in a resistor. Rank the lettered time periods according to (a) the current through the resistor and (b) the rate of dissipation in the resistor, greatest first.



4) In the figure below, battery B_1 is recharging battery B_2 . The current through B_2 and the potential across B_2 may be (a) 3 A and 4 V, (b) 2 A and 5 V, or (c) 6 A and 2 V. Rank these pairs of values according to the rate at which electric energy is transferred from B_1 to B_2 , greatest first.



5) The figure below shows a portion of a circuit. What are the magnitude and direction of the current i in the lower right-hand wire?



6) The following list gives data for three situations in which a current is in a wire. For each situation, find the energy dissipated in the wire in 2 minutes.

Situation 1: potential difference = 12 V, resistance = 2.0 Ω

Situation 2: current = 4.0 A, resistance = 3.0 Ω

Situation 3: potential difference = 12 V, current = 4.0 A