DEVIL PHYSICS
BADDEST CLASS ON CAMPUS

GIANCOLI READING ACTIVITY
Section 19-3

1. Big Idea(s): Changes that occur as a result of interactions are constrained by conservation laws.

2. Enduring Understanding(s):

   a. The energy of a system is conserved.

   b. The electric charge of a system is conserved.

3. Essential Knowledge(s):

   a. Kirchhoff's loop rule describes conservation of energy in electrical circuits. The application of Kirchhoff's laws to circuits is introduced in Physics 1 and further developed in Physics 2 in the context of more complex circuits, including those with capacitors.

      i. Energy changes in simple electrical circuits are conveniently represented in terms of energy change per charge moving through a battery and a resistor.

      ii. Since electric potential difference times charge is energy, and energy is conserved, the sum of the potential differences about any closed loop must add to zero.

      iii. The electric potential difference across a resistor is given by the product of the current and the resistance.

      iv. The rate at which energy is transferred from a resistor is equal to the product of the electric potential difference across the resistor and the current through the resistor.

   b. Kirchhoff's junction rule describes the conservation of electric charge in electrical circuits. Since charge is conserved, current must be conserved at each junction in the circuit. Examples should include circuits that combine resistors in series and parallel. [Physics 1: covers circuits with resistors in series, with at most one parallel branch, one battery only.]

4. Learning Objective(s):

   a. The student is able to construct or interpret a graph of the energy changes within an electrical circuit with only a single battery and resistors in series and/or in, at most, one parallel branch as an application of the conservation of energy (Kirchhoff's loop rule).

   b. The student is able to apply conservation of energy concepts to the design of an experiment that will demonstrate the validity of Kirchhoff's loop rule ($\Sigma \Delta V = 0$) in a circuit with only a battery and resistors either in series or in, at most, one pair of parallel branches.

   c. The student is able to apply conservation of energy (Kirchhoff's loop rule) in calculations involving the total electric potential difference for complete circuit loops with only a single battery and resistors in series and/or in, at most, one parallel branch.

   d. The student is able to apply conservation of electric charge (Kirchhoff's junction rule) to the comparison of electric current in various segments of an electrical circuit with a single battery and resistors in series and in, at most, one parallel branch and predict how those values would change if configurations of the circuit are changed.

e. The student is able to design an investigation of an electrical circuit with one or more resistors in which evidence of conservation of electric charge can be collected and analyzed.

f. The student is able to use a description or schematic diagram of an electrical circuit to calculate unknown values of current in various segments or branches of the circuit.

5. Read section 19-3 in your textbook.

6. Use the Cornell Notes system to take notes on the lesson material. You have the following options:

a. You can print multiple copies of one of the forms on the following pages of this document and handwrite your notes.

b. You can use the MS Word form supplied below and type your notes.

   i. You can then print your work and submit a hardcopy, or

   ii. You can upload your work to Focus. If you choose this option, you must use a filename in the format, "LastnameFirstinitialPerXAsgnmtName". For example, "SmithKPer4ReadActT9-3.doc"

c. You can take notes on notebook paper using the Cornell Notes format and submit the hardcopy.

7. When using this form, remember the **Five R's of Notetaking**:

a. *Record* – the most important or emphasized information

b. *Reduce* – and synthesize information wherever possible, making it as concise as you can

c. *Recite* – read your notes out loud

d. *Reflect* – and consider how this information is connected to your personal experiences and what you already know

e. *Review* – look over your notes more than once

8. As a minimum, you must include notes on the following topics:

a. Kirchoff's first rule (junction rule)

b. Kirchoff's second rule (loop rule)

c. Problem Solving with Kirchoff's Rules

9. Answers may be typed or neatly printed. You do not need to include this page of instructions with your assignment.

10. *Note: The following computer skills should be practiced:*

a. *Use Microsoft Equation to type any equations.*

b. *Drawings may be freehand, but try to make use of the 'Shapes', 'Insert Picture' or 'Insert Clipart" functions of MS Word.*

c. *A reading assignment may contain drawings that would be useful in your notes. If you have scanning capability, you should practice scanning pictures and inserting them into documents. As you prepare for college, you should consider investing in a desktop printer-scanner-copier.*

d. *Just remember that for formal reports you have to cite any images that you insert into your document. You don't have to cite scanned images for this exercise unless you use a source other than the textbook.*

CORNELL NOTES and the 5 R's

Record – the most important or emphasized information
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    experiences and what you already know
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Name:

Date:

Topic:

Questions/Key Points	Notes

SUMMARY:

Name _____

Date _____

CORNELL NOTES

Topic _____

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Questions/key points	Notes

Summary