

Name: _____

Period: _____ Date: _____

GIANCOLI READING ACTIVITY**Section(s) 19-1 to 19-2**

1. Big Idea(s):
 - a. 1: Objects and systems have properties such as mass and charge. Systems may have internal structure.
 - b. 3: The interactions of an object with other objects can be described by forces.
 - c. 5: Changes that occur as a result of interactions are constrained by conservation laws.
2. Enduring Understanding(s):
 - a. Electric charge is a property of an object or system that affects its interactions with other objects or systems containing charge.
 - b. Materials have many macroscopic properties that result from the arrangement and interactions of the atoms and molecules that make up the material.
 - c. At the macroscopic level, forces can be categorized as either long-range (action-at-a-distance) forces or contact forces.
 - d. Certain quantities are conserved, in the sense that the changes of those quantities in a given system are always equal to the transfer of that quantity to or from the system by all possible interactions with other systems.
 - e. The energy of a system is conserved.
3. Essential Knowledge(s):
 - a. Electric charge is conserved. The net charge of a system is equal to the sum of the charges of all the objects in the system.
 - i. An electrical current is a movement of charge through a conductor.
 - ii. A circuit is a closed loop of electrical current.
 - b. There are only two kinds of electric charge. Neutral objects or systems contain equal quantities of positive and negative charge, with the exception of some fundamental particles that have no electric charge.
 - i. Like-charged objects and systems repel, and unlikecharged objects and systems attract.
 - c. The smallest observed unit of charge that can be isolated is the electron charge, also known as the elementary charge.
 - i. The magnitude of the elementary charge is equal to 1.6×10^{-19} coulombs.
 - ii. Electrons have a negative elementary charge; protons have a positive elementary charge of equal magnitude, although the mass of a proton is much larger than the mass of an electron.
 - d. Matter has a property called resistivity.

- i. The resistivity of a material depends on its molecular and atomic structure.
 - ii. The resistivity depends on the temperature of the material.
- e. Electric force results from the interaction of one object that has an electric charge with another object that has an electric charge.
- i. Electric forces dominate the properties of the objects in our everyday experiences. However, the large number of particle interactions that occur make it more convenient to treat everyday forces in terms of nonfundamental forces called contact forces, such as normal force, friction, and tension.
 - ii. Electric forces may be attractive or repulsive, depending upon the charges on the objects involved.
- f. For all systems under all circumstances, energy, charge, linear momentum, and angular momentum are conserved. For an isolated or a closed system, conserved quantities are constant. An open system is one that exchanges any conserved quantity with its surroundings.
- g. A system with internal structure can have potential energy. Potential energy exists within a system if the objects within that system interact with conservative forces.
- i. The change in electric potential in a circuit is the change in potential energy per unit charge. [Physics 1: only in the context of circuits.]
4. Learning Objective(s):
- a. The student is able to make claims about natural phenomena based on conservation of electric charge.
 - b. The student is able to make predictions, using the conservation of electric charge, about the sign and relative quantity of net charge of objects or systems after various charging processes, including conservation of charge in simple circuits.
 - c. The student is able to construct an explanation of the two-charge model of electric charge based on evidence produced through scientific practices.
 - d. The student is able to challenge the claim that an electric charge smaller than the elementary charge has been isolated.
 - e. The student is able to choose and justify the selection of data needed to determine resistivity for a given material.
 - f. The student is able to use Coulomb's law qualitatively and quantitatively to make predictions about the interaction between two electric point charges.
 - g. The student is able to connect the concepts of gravitational force and electric force to compare similarities and differences between the forces.
 - h. The student is able to define open and closed systems for everyday situations and apply conservation concepts for energy, charge, and linear momentum to those situations.
 - i. The student is able to make quantitative calculations of the internal potential energy of a system from a description or diagram of that system.
 - j. The student is able to apply mathematical reasoning to create a description of the internal potential energy of a system from a description or diagram of the objects and interactions in that system.
5. Read section(s) 19-1 to 19-2 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, “LastnameFirstinitialPerXAsgmtName”. 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. electromotive force (emf)
 - b. potential difference
 - c. internal resistance
 - d. terminal voltage
 - e. resistors in series
 - f. current in series circuits
 - g. resistors in parallel
 - h. current in parallel circuits
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

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

Recite – read your notes out loud

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

Review – look over your notes more than once

Name:

Date:

Topic:

Questions/Key Points	Notes
SUMMARY:	

