***Lesson Plans for the Week of: 2/13/17 Teacher: Hough Course: Physics Period: 3***

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| Elements of  a Lesson | **Monday** | **Tuesday** | **Wednesday** | **Thursday** | **Friday** |
| Objective/  Focus/  Essential  Question | PH.5d,e;10a  understand the relationship between distance and force (and later, other things) in the Inverse Square Law (ISL) | PH.11a,b,d  a) correctly describe what current is and recognize its SI unit  b) calculate current from charge and time  c) Identify the symbols for battery, resistor, and switch on a circuit diagram | PH.11a,b  a) understand that potential difference is the same as voltage and is related to the energy of the charges; recognize its SI unit  b) understand what resistance is, recognize its SI units, and identify the factors which affect resistance  c) recognize Ohm’s Law and solve problems using it  d) draw a closed circuit using circuit symbols | PH.11b,c; 12i  a) understand that electrical power is the rate at which electrical energy is converted  b) solve problems using electrical power  c) identify the cause of superconductivity and the main condition under which it occurs  d) describe the significance of Tc in the process of superconductivity | PH.11b  a) finish lesson from previous day  b) understand how the factors in a series circuit are impacted by changes in voltage and/or current  c) calculate equivalent resistance for a series circuit |
| Lesson/Act.  Type of Presentation | Whole group:  a)review equation for the law of universal gravitation (LUG)  b)scaffold concept that if the mass of one item is M, then a separate item that has 3x the mass is 3M; likewise, if the distance between objects is R, then the distance between the objects is 3R—use parentheses  Individual:  c) students do supplemental worksheet Chapter 7 Section 3 #1-2 to practice manipulating symbols and drawing conclusions about how the gravitational force is affected by various types of changes  Whole group:  d)Afterward, go over the responses, and Lead students to the idea of the Inverse Square Law, including the fact that increasing 3x distance yields 1/9 the force; and tripling any one mass triples the force  differentiation: be prepared to scaffold to aid students who are having difficulty processing the use of variables instead of numbers in the equations | Individual:  a)bellwork: ask students to write a sentence or two describing the difference between static electricity and current  Whole group:  b) discuss and clarify the general trend of student descriptions  c) Clearly state that static electricity typically refers to groups of charges that “jump” from one object to another: eg doorknob to your hand; also, conservation of charge—emphasize and give examples using integers; use Phet simulations like John Travoltage  d)Clearly describe current the rate of moving charge with SI units and basic tool for measuring it ; contrast the difference between static electricity and current as being like the difference between seeing the occasional ant in a room and seeing an entire line of ants  e) alternating vs direct current  f) general equation for current, and sample problem p. 595 #3,esp. to emphasize the idea that more charge carriers increases the current  g) identify circuit symbols from p. 629 and show students which symbols they are responsible for knowing | Whole group:  a) Define (electric) Potential difference (or voltage); measured by a voltmeter; differentiate from potential energy  b) Define Resistance and explain that is it the natural ability of a substance to slow down electrical current; SI unit; basic tool for measuring it  c) material factors that affect resistance (show Figure 3.5 on p. 599 in book)  d) Explain Ohm’s Law  equation and model sample problem p. 601 #1  e) review from 8th grade the concept of the closed circuit  Individual:  f) Complete Schematic Diagram and Circuit worksheet to use circuit symbols | Whole group:  a) define electrical power and give physical consequences of elec. power:  b) Give equations for electrical power and model sample problem: p. 607 #1; note that issues may arise on final exam because equations for electrical power are different from equations for “moving objects power”  c) Define superconductivity and explain when it occurs;  d) define critical temperature; utilize Tc table to demonstrate that superconductivity is not a new phenomena; what is new is the alloys which have higher Tc and make superconductivity an achieveable effect ;  e)describe the Meissner effect, status in applications today  f) Show YouTube video demonstrating the Meissner effect | Whole group:  a)Finish any material leftover from previous lesson  b) Clarify the factors which make a series circuit; also, how current and voltage are affected in a series circuit  c) Define Req for any circuit  d) Model how to calculate Req for series circuit  Individual:  e) Students will answer question 1 (all parts) about current, voltage, and voltage (individual and equivalent) for a series circuit |
| Evaluation | One question to confirm student understanding |  | --quality of homework assignment  --Results of completed worksheet | quality of homework assignment  Formative assessment p. 633#1-3 | Results of completed worksheet |
| Extension/  Homework | No homework  . | Homework: p. 595 #1,4,5a; p. 617 #32-33 (Hint about charge on an electron for 33b)  Knowledge of current is a prerequisite to understanding the next day’s lesson | p. 601 #2-5  Resistance and voltage are phenomena which affect the main topic for tomorrow | p. 607 #2-4; p. 618 #55-56  exit pass: define superconductor and Tc | p. 638#2,3,4,6 (show work) |

Materials:

Monday: worksheet from textbook: Chapter 7 Section 3 supplemental worksheet #1-2

Tuesday: simulation about static charge: <https://phet.colorado.edu/en/simulation/balloons-and-static-electricity> or Phet’s John Travoltage simulation; simulation about current: https://phet.colorado.edu/en/simulation/legacy/circuit-construction-kit-dc

Wednesday: <https://phet.colorado.edu/en/simulation/legacy/circuit-construction-kit-dc> ; voltmeter; --textbook p. 629, 633; <https://phet.colorado.edu/en/simulation/legacy/circuit-construction-kit-dc> ; worksheet about circuits; battery, wire, light bulbs, ammeter, voltmeter;

Thursday: --Tc table from last year’s textbook;-- <http://www.youtube.com/watch?v=JIjzJKnpahA> and/ or http://www.youtube.com/watch?v=VyOtIsnG71U

Friday: circuit worksheet; battery, wire, light bulbs, ammeter, voltmeter