

Teacher: Bruce Tedrow

Subject: U.S. History Technology

Title: Ohms Law

Topic: The development of Ohms Law and the Scientific Method **Grade:** High School

Lesson Duration: Two 90 min. periods **School:** Florence High School

Education Designs Lesson/ Unit Plan

Lesson Summary: <i>(A short 3-5 sentence summary of the lesson and how it will be delivered)</i>	Electricity was first an amusement and a curiosity. Georg Ohm was one of the pioneers that determined that it could be measured mathematically. Through the development of this formula others followed, harnessing the electron to move mountains and communicate around the world. As a result of the completion of this lesson, each student should be able to define the meanings of key electrical terms, and what the scientific method is.	
National Standards for History Era: Link	Era 4 VIII Science, Technology, & Society identify and describe both current and historical examples of the development of technology and the interdependence of science, technology and society in a variety of cultural settings;	
Standard(s): <i>State, Local or National</i>	State: Colorado 4. Students understand how science, technology, and economic activity have developed, changed, and affected societies throughout history. <ul style="list-style-type: none"> • analyzing the major technological turning points in history • explaining how the scientific revolution affected how people lived in and viewed the world; 	
Themes/Concept:	Through the use of the scientific method Georg Ohm pioneered the harnessing of the electron. Both the scientific method and ohms law are worthy concepts to understand. Students may not remember ohms law specifically but hopefully will remember the three key terms and that they relate to each other mathematically.	
Essential questions (2-5 questions) <i>(What you want the students to know)</i>	What is the meaning of terms often referred to in relation to electricity? How do you calculate various values: ohms, voltage, amps? When was electricity harnessed? What is the scientific method?	
Elements <i>(What you want the students to understand)</i>	As a result of the completion of this lesson, each student should be able to define the meanings of key electrical terms, explain how electricity is measured, and what the scientific method is.	
Launch Activity (Hook)	When students enter the room various electronic gizmos are on display: flash light, batteries, old computer, telephone etc. Students are asked to list the last 25 items that they have used that use electricity.	
Knowledge & Skills <i>(People, Places, times and vocabulary-what the student should be able to do. What skills will they use?)</i>	Students will be able to explain the scientific method, who Georg Ohm the author of Ohms law was, and his significance related to the development of electricity and the scientific method, and define the terms that define electricity's use. Georg was rejected initially. The prevailing thought of 1827 was nature is random or explained through casual observation.	Skills Define Vocabulary and be able to identify the abbreviation related to each term. Volts=v, Current= I resistance= , Georg Ohm, direct current=DC, alternating current=AC, series, parallel circuits

Lesson Methodology *(How will you conduct the lesson; activities...?)*

1. Introduction or hook activity.
2. Introduce voltage Georg ohm and the scientific method
3. Use of water tower lecture to explain voltage amperage and resistance (ohms).
4. Have students fill in work sheet using Ohms Law $I \times R = V$ and describe an application of the scientific method.
5. Quiz / Test

Assessment Evidence: *What evidence will show that students met the learning goal?*

Traditional Assessment (*Quizzes, Test, Selected Responses*)

Students will be given an gizmo and be able to define the key electrical values that are listed, volts, amps, ohms and using ohms law and supply those values that are missing. $V=IR$ $I=V/R$ $R=V/I$ For example a fan using regular 110 wall voltage and listed at 11 amps can be calculated at 10 ohms. $110 / 11 = 10$

Note: Normally most electrical devices will only list two of the three values, and occasionally only one.

Differentiation Associated with this unit

Remedial; Students with varying abilities may have an abbreviated vocabulary list and on the final when asked to find key electrical values and calculate those missing the student may be asked to simply list what the item is and what it is for such as, motor—battery—or light bulb.

Gifted; Students with a background in electronics or of gifted intelligence may be asked to trace the development of electricity by use of a timeline, or be assigned to assist other students with the math portion of this assignment.

Resources and instructional tool

<http://bnrg.eecs.berkeley.edu/~randy/Courses/CS39C.S97/telegraph/electricity.html>

http://www.sciencebuddies.org/mentoring/project_scientific_method.shtml

http://en.wikipedia.org/wiki/Ohm's_law

<http://resources.schoolscience.co.uk/BritishEnergy/14-16/index.html>

Various items using electricity: telephone, motor, computer, light bulb, flash light etc.

This lesson may require some time spent on math.