**Contextual Categories**
Instructor Name(s): John Barber, Joliet Township High School
**Develop:** Lesson Plan below

| Unit or Lesson Title | Unit 2 – Volts, Amps, Ohms |
|---|---|
| **Course and Grade Level** | Industrial Electricity Grades 9-12 |
| **Topic/Theme/Nature of Investigation** | o What is the unit of electromotive force called?<br>o What is the unit of Electrical Current?<br>o What is the unit of resistance? |
| **Assessment Activity, Experiment, Demo, etc.**<br>> Attach handouts | Flipped Classroom/Lab<br>o Students view PowerPoint the night before and come to class the following day with any questions.<br>o Class discussion.<br>o Students use PhET to build a virtual circuit and test it.<br>o Instructor will demonstrate how to wire and test the circuit.<br>o Once completed, students will complete Lab 2 to hard wire their virtual circuits and test them out with a multimeter.<br>o Students reflect on the entire process and discuss how this will relate to their lives/real world |
| **NGSS Performance Expectation(s) and Code** | o **HS-PS2-5**: Plan and conduct an investigation to provide evidence that an electric current can produce a magnetic field and that a changing magnetic field can produce an electric current. |
| **DIMENSION 1**<br>**Component: SEP** | o Plan and conduct an investigation individually and collaboratively to produce data to serve as the basis for evidence, and in the design: decide on types, how much, and accuracy of data needed to produce reliable measurements and consider limitations on the precision of the data (e.g., number of trials, cost, risk, time), and refine the design accordingly. (**HS-PS2-5**) |
| **DIMENSION 2**<br>**Component: CCC** | o Empirical evidence is required to differentiate between cause and correlation and make claims about specific causes and effects. (**HS-PS2-5**) |
| **DIMENSION 3**<br>**Component: DCI** | o Electrical energy may mean energy stored in a battery or energy transmitted by electric currents. (secondary to **HS-PS2-5**) |
| **CCSS and Code**<br>> When applicable to the investigation | HS-N-Q.A.1 – Use units as a way to understand problems and to guide the solution of multi-step problems; choose and interpret units consistently in formulas; choose and interpret the scale and the origin in graphs and data displays. (**HS-PS2-5**)<br>HS-N-Q.A.2 – Define appropriate quantities for the purpose of descriptive modeling. (**HS-PS2-5**)<br>HS-N-Q.A.3 – Choose a level of accuracy appropriate to limitations on measurement when reporting quantities. (**HS-PS2-5**) |
| **Other:** District correlation, etc. | Unit 2 during 1st Semester |

**Create Handouts:** attached (PowerPoint, Lab, and worksheet)

**Data Tables: N/A**

*Ohm's Law Worksheet*

Name _____

1.  The rate of electron flow is measured in (a) amperes (b) volts  (c) ohms.

2.  One amp is one _____ per second.  A coulomb is _____ electrons.

3.  A _____ is the electric pressure required to produce one ampere of current in a circuit having one _____ of resistance.

4.  Electric pressure (E) is measured in _____ (____): the rate of electron flow (____) is measured in amps (_____), the _____ (R) is measured in ohms (_____).

5.  In a circuit, voltage and current are (a) directly proportional,  (b) inversely proportional, or (c) not proportional.

6.  According to Ohm's Law, what effect will cutting the resistance have on the current?

7.  If the voltage stays the same and the resistance is ¼ of its original, what will happen to the current?

8.  Using your equation for Ohm's Law, answer the following. Current equals _____ divided by _____.

9.  If the power source is set at 6V and R is 2 ohms, the current = _____

10. V=5volts, R= 10 ohms, I= _____.

11. Voltage = _____ times _____.

12. If the current in the circuit is 7 amps and the resistance is 2 ohms the voltage = _____.

13. R = 30 ohms, I = 3A, V= _____.

14. Resistance = _____ divided by _____.

15. If the power source is 12 V and the flow of electrons is 3A, what is the resistance?

16. V= 6V, I= 18A, R= _____.