

Lesson Plan: Electricity (age 14 – 16) – Ohm's Law.

Objectives:

The aim of the lesson and experiment is to help the student investigate how the voltage affects the current through a piece of wire and understand Ohm's Law.

Lesson introduction (15 min):

Recap on previous learning on electric current. Introduce subject area and refer students to the Ohm's Law Student Revision Notes in the 'Education' section of www.twothirtyvolts.org. Allow time for students to review these. Explain experiment and learning objectives.

Lesson activity (25 min):

Group students in pairs and task them to:

- Perform the experiment detailed in the Student Sheet to measure current for various voltages across a fixed piece of wire.
- Calculate V/I for each set of readings and insert in the table on the Worksheet.

Extension activity: plot voltage against current.

Lesson demonstration (10 min):

Select some of the students to inform the rest of the class about their findings.

Lesson review (10 min):

Recap on learning regarding the relationship between voltage and current from the experiment, the consequent Ohm's Law, and get students to complete the Ohm's Law Student Quiz at www.twothirtyvolts.org to establish levels of understanding.

Resources required:

For each student pair: 1 metre of constantan wire (28SWG) fixed to a metre rule, a variable voltage dc power supply (0 - 6v), a dc ammeter (0 - 1A), a dc voltmeter (0 - 6V), two crocodile clips and 5 leads.

Access to internet for www.twothirtyvolts.org

Expected Outcomes:

By the end of the session students will understand the relationship between voltage and current and the associated Ohm's Law.

Student sheet: Electricity – Ohm’s Law.

Objectives:

By the end of the session students will understand the relationship between voltage and current and the associated Ohm’s Law.

Resources required:

1 metre of constantan wire (28SWG) fixed to a metre rule, a variable voltage dc power supply (0 - 6v), a dc ammeter (0 - 1A), a dc voltmeter (0 - 6V), two crocodile clips and 5 leads. Access to internet for www.twothirtyvolts.org

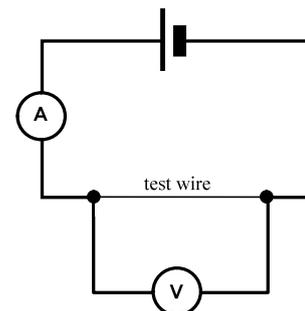
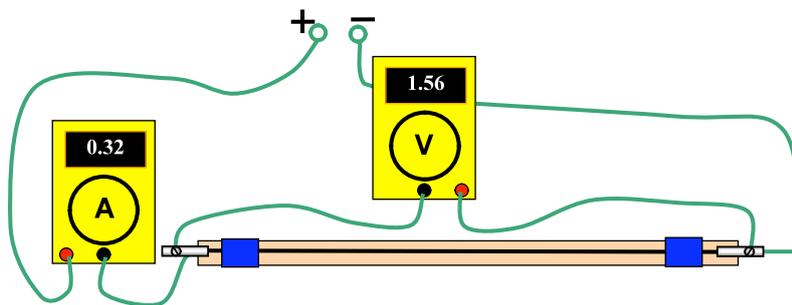
Introduction:

Access and review the Ohm’s Law Student Revision Notes at www.twothirtyvolts.org .

Activity:

Working in pairs undertake the following tasks:

Set up the circuit shown in the diagram, switch on and adjust the power supply so that the ammeter reads 0.1 A. Record the voltage reading. Repeat this for SIX other values of current and voltage. Do not use currents of more than 0.5A.



Record your results in the Worksheet table. In the third column in the table insert the calculation of the voltage readings divided by the current readings (V/I) for each result. This ratio is called the RESISTANCE of the wire.

Further work:

- Write up your experiment and plot a graph of voltage on the y axis against current on the x axis.
- Answer Worksheet questions.
- Complete Ohm’s Law Student Quiz at www.twothirtyvolts.org .

Linked Resources

www.twothirtyvolts.org:

Electrical Appliance Information 14 -16 Student Revision Notes
 Ohm’s Law 14 -16 Student Revision Notes
 Ohm’s Law 14 -16 Revision Quiz

Worksheet: Electricity – Ohm's Law.**Voltage vs Current Experiment:**

Voltage	Current	Voltage/Current

Questions:

1. Did the resistance of your piece of wire stay the same throughout the experiment?
2. Why was the current kept to less than 0.5A?
3. What is the resistance of 50cm of the same wire?
4. Why would constantan not be a good material for making connecting leads?
5. How accurately can you read your voltmeter and ammeter?

Experiment Write-up: