LESSON SCENARIO

Topic: Modelling in Physics – Calculating electrical resistance

Objective: To examine the relation between voltage and electric current in electrical network

Successful student will be able to :

- construct network to calculate electric resistance
- measure voltage and amperage in electrical network
- draw a diagram showing relation between electric current and applied voltage
- formulate Ohm's law
- define relation between electric current and voltage in joining receivers

Materials: computer with calculating application – spreadsheet, electrical wires, bulbs, batteries, voltmeter and ammeter.

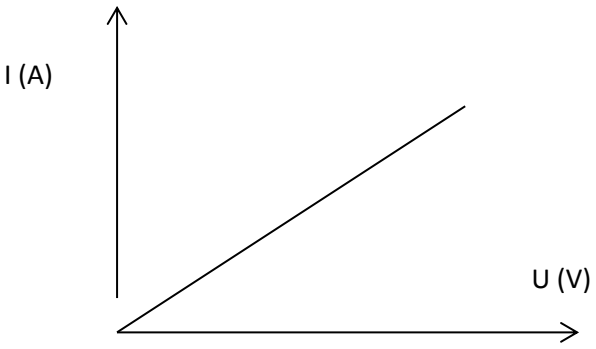
Procedure:

1. Students form 3 groups.
2. Each group should have a set to construct electrical network: wires, bulbs, batteries, switches and meters.
3. Each group constructs a simple electrical network, measures voltage and electric current in the network, then changes the source of power and repeats the measurement (three networks are to be examined). The results should be entered into a chart and finally resistance must be calculated.

	1.	2.	3.	R = U/I
U (V)				
I (A)				

Mathematical Modelling

4. Students open a spreadsheet, e.g. Excel and enter the results they received
5. According to the results they draw a line graph with the best fit curve.



6. On the basis of the graph, students draw a conclusion how current in the network depends on electric source voltage (linearly or in direct proportion).

7. Students note mathematical relation showing relation between voltage U and electric current I
   I~U
8. According to mathematical properties of proportionality, students come to the conclusion that U/I = const
9. They compare the conclusion under point 8 with calculated resistance R (point 3) and ponder over what happens with the value of electric resistance of the receiver. They come to the conclusion that for a given network R = const
10. All students note down the so called Ohm's law: *the current through a conductor between two points is directly proportional to the voltage across the two points*.
11. Class discussion and summing up.

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