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| Name | **Unit 1 Factors Affecting Resistance (Practice Lab)** | | Date | | | | |
| [**https://phet.colorado.edu/sims/html/resistance-in-a-wire/latest/resistance-in-a-wire\_en.html**](https://phet.colorado.edu/sims/html/resistance-in-a-wire/latest/resistance-in-a-wire_en.html) | | | | | | |  |
| **Part A: Effect of Resistivity on Resistance** | | | | | | |  |
| **Problem:** What effect will the resistivity of a wire conductor have on the resistance of the wire conductor? | | | | | | | **/C00** |
| **Hypothesis:** (a mathematical relationship; control – 1K, variables – 1C; math relationship – 1T; variable order – 1T) | | | | | | | **/K01**  **/T02**  **/C01** |
| **Table 1 – Effect of Resistivity on Resistance** (Constants – 1K; ~~Headings – T;~~ Values – 1C)  **Constant *\_L (length)\_\_* = \_\_\_\_\_\_\_\_\_\_; Constant \_*A (cross-sectional area)*\_\_ = \_\_\_\_\_\_\_\_\_\_**   |  |  |  |  |  | | --- | --- | --- | --- | --- | | **Trial** | **Repetition** | **Resistivity (Ωcm)** | **Resistance**  **(Ω)** |  | | **1** | **1** |  |  |  | | **2** | **1** |  |  |  | | **3** | **1** |  |  |  | | **4** | **1** |  |  |  | | **5** | **1** |  |  |  | | | | | | | | **/K01**  **/T00**  **/C01** |
| **Graph 1 – Resistance vs. Resistivity**  (~~Correct variables selected, correct title – T~~; Table of values (headings, data) correct – K;  Axes scale, points plotted correctly, – K; Axes labels - in correct location, error circles around data points – C; Axes labels – English and math, SI units – C; Best fit line or curve selected, drawn properly – T)   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | | | | | |  |  | | --- | --- | |  |  | |  |  | |  |  | |  |  | |  |  | |  |  | |  |  | | | | **/K02**  **/T01**  **/C02** |
| **Conclusion:**  (a mathematical relationship; graph referred to – 1K, control – 1K, variables – 1C; math relationship – 1T; variable order – 1T) | | | | | | | **/K02**  **/T02**  **/C01** |
| **Totals** | | **K/18** | | | **T/15** | **C/15** | **A/08­­­** |
| **Page Totals** | | **K/06** | | | **T/05** | **C/05** | **A/00** |
| **Part B: Effect of Length on Resistance** | | | | | | |  |
| **Problem:** What effect will the length of a wire conductor have on the resistance of the wire conductor? | | | | | | | **/C00** |
| **Hypothesis:** (a mathematical relationship; control – 1K, variables – 1C; math relationship – 1T; variable order – 1T) | | | | | | | **/K01**  **/T02**  **/C01** |
| **Table 2 – Effect of Length on Resistance** (Constants – 1K; ~~Headings – T;~~ Values – 1C)  **Constant *\_ρ (Resistivity)\_\_* = \_\_\_\_\_\_\_\_\_\_; Constant \_*A (cross-sectional area)*\_\_ = \_\_\_\_\_\_\_\_\_\_**   |  |  |  |  |  | | --- | --- | --- | --- | --- | | **Trial** | **Repetition** | **Length**  **(cm)** | **Resistance**  **(Ω)** |  | | **1** | **1** |  |  |  | | **2** | **1** |  |  |  | | **3** | **1** |  |  |  | | **4** | **1** |  |  |  | | **5** | **1** |  |  |  | | | | | | | | **/K01**  **/T00**  **/C01** |
| **Graph 2 – Resistance vs. Length**  (~~Correct variables selected, correct title – T~~; Table of values (headings, data) correct – K;  Axes scale, points plotted correctly, – K; Axes labels - in correct location, error circles around data points – C; Axes labels – English and math, SI units – C; Best fit line or curve selected, drawn properly – T)   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | | | | | |  |  | | --- | --- | |  |  | |  |  | |  |  | |  |  | |  |  | |  |  | |  |  | | | | **/K02**  **/T01**  **/C02** |
| **Conclusion:**  (a mathematical relationship; graph referred to – 1K, control – 1K, variables – 1C; math relationship – 1T; variable order – 1T) | | | | | | | **/K02**  **/T02**  **/C01** |
| **Page Totals** | | **K/06** | | | **T/05** | **C/05** | **A/00** |

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| **Part C: Effect of Cross-Sectional Area on Resistance** | | | | |  |
| **Problem:** What effect will the cross-sectional area of a wire conductor have on the resistance of the wire conductor? | | | | | **/C00** |
| **Hypothesis:** (a mathematical relationship; control – 1K, variables – 1C; math relationship – 1T; variable order – 1T) | | | | | **/K01**  **/T02**  **/C01** |
| **Table 3 – Effect of Cross-Sectional Area on Resistance** (Constants – 1K; ~~Headings – T;~~ Values – 1C)  **Constant *\_L (length)\_\_* = \_\_\_\_\_\_\_\_\_\_; Constant *\_ρ (resistivity)\_\_* = \_\_\_\_\_\_\_\_\_\_**   |  |  |  |  |  | | --- | --- | --- | --- | --- | | **Trial** | **Repetition** | **Cross-sectional Area**  **(cm2)** | **Resistance**  **(Ω)** |  | | **1** | **1** |  |  |  | | **2** | **1** |  |  |  | | **3** | **1** |  |  |  | | **4** | **1** |  |  |  | | **5** | **1** |  |  |  | | | | | | **/K01**  **/T00**  **/C01** |
| **Graph 3 – Resistance vs. Cross-sectional Area**  (~~Correct variables selected, correct title – T~~; Table of values (headings, data) correct – K;  Axes scale, points plotted correctly, – K; Axes labels - in correct location, error circles around data points – C; Axes labels – English and math, SI units – C; Best fit line or curve selected, drawn properly – T)   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | | | |  |  | | --- | --- | |  |  | |  |  | |  |  | |  |  | |  |  | |  |  | |  |  | | | | **/K02**  **/T01**  **/C02** |
| **Conclusion:**  (a mathematical relationship; graph referred to – 1K, control – 1K, variables – 1C; math relationship – 1T; variable order – 1T) | | | | | **/K02**  **/T02**  **/C01** |
| **Page Totals** | **K/06** | | **T/00** | **C/05** | **A/00** |

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| **Application:**  1.a) State two (2) random errors and explain how those errors could be reduced.  Random Error 1:  Reduced by:  Random Error 2:  Reduced by:    1.b) State two (2) systematic errors and explain how those errors could be reduced.  Systematic Error 1:  Reduced by:  Systematic Error 2:  Reduced by: | | | | | **/A04**  **/A04** | |
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| ***For future labs***  **Data Analysis:**  **Sample Calculation of Mean Average Period of Pendulum from Table 1, Trial 1**  (formula – 1K; substitution – 1T; answer – 1K; units in substitution and answer– 1C) | **/K02**  **/T01**  **/C01** |