	<h1>Technology and Digitalization</h1> <p>PAI Task 1 → Ohm's Law (Criteria A and B) PAI Task 2 – Simulating – Breadboard – Multimeter (Criteria C and D)</p>		Criterion A: FormAsses
	Criterion A: Inquiring and Analysing Criterion B: Developing Ideas Criterion C: Creating the solution Criterion D: Evaluating	Name:	
	Date:		Criterion C: SumAsses
<ul style="list-style-type: none"> Answers must be appropriately written and fully reasoned. REVIEW at the end of each exercise. The MYP spelling criteria will be applied in the correction. 			Criterion D: SumAsses

OHM'S LAW – Simulating circuits – Breadboard Operation

Goals:

Correctly apply Ohm's law, checking its veracity in simple circuits with resistors.

Analyse and identify the relationships between the fundamental magnitudes in circuits.

Identify different connections in circuits such as series, parallel and mixed circuits.

Use of simulators such as tinkercad in electrical circuits.

Breadboard Operation and measurements with the multimeter.

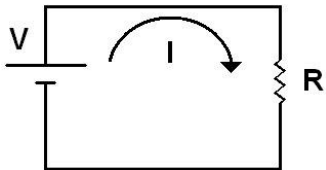
Assessment Criteria:

Formative assessment of Criteria A and B → through the activities proposed in this document.

Summative assessment of Criteria A and B → through an exam-type written exercise and workbook.

Formative and summative assessment of Criteria C and D → directly through the activities proposed in this document.

- 1- Analyse the following circuit identifying V, I and R. Then fill in the gaps in the following table, applying the relationship between the three previous magnitudes through Ohm's law (A).

Ohm's Law	$R = 5\Omega$ and $I = 2A$.	$V = 12V$ and $R = 3\Omega$.	$V = 6V$ and $I = 2A$.
			

- 2- Three resistors with values $R_1 = 5\Omega$, $R_2 = 4\Omega$, $R_3 = 3\Omega$ are connected in series to a 24V power supply. Answer the next questions:

- Prepare or elaborate diagrams or drawings that fit the circuit under study (B).
- Calculate and analyse the total resistance, the total intensity, the partial voltages, the total power delivered by the source and the partials absorbed in each resistance (A).
- Simulate the circuit and justify the results obtained theoretically with those measured with the multimeter. Take a screenshot and paste it here to check how you did it. (C-D).

Totals	Partials	Partials
$R_T =$	$V_1 =$	$P_1 =$
$V_T =$	$V_2 =$	$P_2 =$
$I_T =$	$V_3 =$	$P_3 =$
$P_T =$	$V_T = V_1 + V_2 + V_3$	$P_T = P_1 + P_2 + P_3$

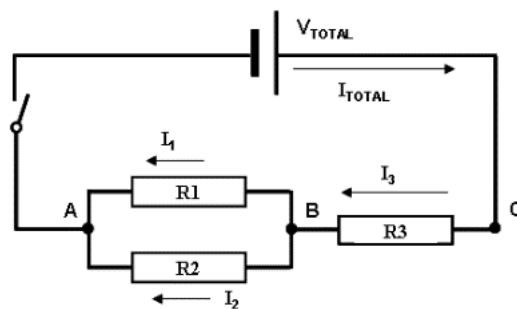
- 3- Three resistors with values $R_1 = 6\Omega$, $R_2 = 4\Omega$, $R_3 = 12\Omega$ are connected in parallel to a 12V power supply. Answer the next questions:
- Prepare or elaborate diagrams or drawings that fit the circuit under study (B).
 - Calculate and analyse the total resistance, the total intensity, the partial intensities, the total power delivered by the source and the partials absorbed in each resistance (A).
 - Simulate the circuit and justify the results obtained theoretically with those measured with the multimeter. Take a screenshot and paste it here to check how you did it. (C-D).

Totals	Partials	Partials
$R_T =$	$V_1 =$	$P_1 =$
$V_T =$	$V_2 =$	$P_2 =$
$I_T =$	$V_3 =$	$P_3 =$
$P_T =$	$V_T = V_1 + V_2 + V_3$	$P_T = P_1 + P_2 + P_3$

- 4- Three resistors are connected as shown in the figure.
- Calculate and analyse the total resistance, the total intensity, the partial voltages, the partial intensities (A).
 - Simulate the circuit and justify the results obtained theoretically with those measured with the multimeter. Take a screenshot and paste it here to check how you did it. (C-D).

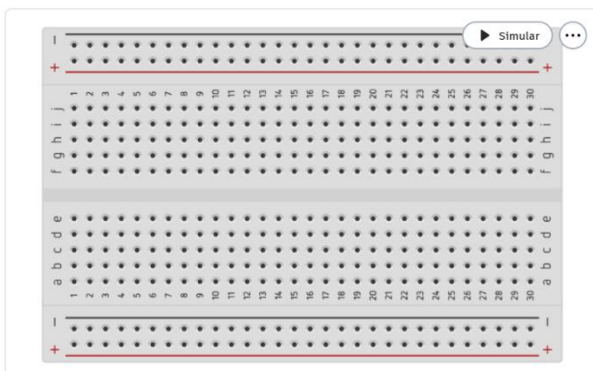
$$R_1 = 6\Omega, R_2 = 4\Omega, R_3 = 12\Omega.$$

$$V_T = 18V.$$



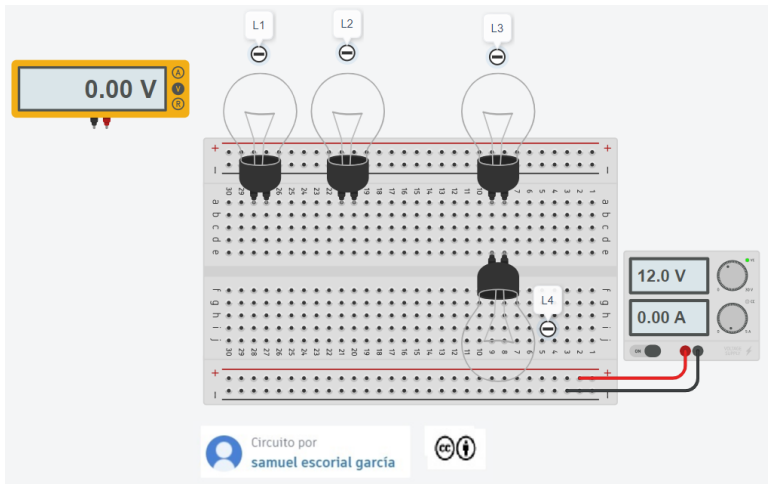
Totals	Partials	Partials
$R_T =$	$V_{R1} = V_{BA}$	$I_1 =$
$V_T =$	$V_{R2} = V_{BA}$	$I_2 =$
$I_T =$	$V_{R3} = V_{CB}$	$I_3 =$
$P_T =$	$V_T = V_{R12} + V_{R3}$	$I_T = I_1 + I_2 = I_3$

- 5- Explain and evaluate how a breadboard works, clearly indicating the internal connections in it. (D)



6- Experiment with the following circuit in tinkercad, demonstrating excellent technical skills with the use of simulators and multimeters. A critical evaluation must also be made of the success of the simulators in testing electrical circuits. (C-D).

Each light bulb has an internal resistance of 48Ω and the power supply is 12V.



- Measures the internal resistance of a light bulb (L1).
Take a screenshot and paste it here to see how you did it.
- Connect L1 and L2 in series and measure the equivalent resistance.
Take a screenshot and paste it here to see how you did it.
- Measure the equivalent resistance of L3 and L4, which are already in parallel.
Take a screenshot and paste it here to see how you did it.
- Finally, connect the four light bulbs in a mixed circuit and measure the equivalent resistance.
Take a screenshot and paste it here to see how you did it.
- Measure the partial voltages of the previous mixed circuit with the multimeter.
Take a screenshot and paste it here to see how you did it.

$V_1 =$	$V_2 =$	$V_{34} =$	$V_T = V_1 + V_2 + V_{34} =$
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- Measure the partial intensities of the previous mixed circuit with the multimeter.
Take a screenshot and paste it here to see how you did it.

$I_{12} =$	$I_3 =$	$I_4 =$	$I_T = I_{12} = I_3 + I_4 =$
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