Circuit Setup:

- Configuration: Resistors 1 (R_1) and 2 (R_2) are in series, and the combination of R_1 and R_2 is in parallel with Resistor 3 (R_3).
- Note: Since R_1 and R_2 are in series, they share the same current.

Question 1: Predict whether the current through Resistor 2 is greater than, less than, or equal to the current through Resistor 1. Explain your answer.

Answer:
The current through Resistor 2 is equal to the current through Resistor 1.

Explanation:
Resistors R_1 and R_2 are connected in series. In a series configuration, the same current flows through all components because there is only one path for the current. Therefore, the current through R_2 must be equal to the current through R_1 .

Question 2: Predict whether the voltage across Resistor 2 is greater than, less than, or equal to the voltage across Resistor 1. Explain your answer.

Answer:
The voltage across Resistor 2 can be either greater than, less than, or equal to the voltage across Resistor 1, depending on their resistances.

Explanation:
In a series circuit, the voltage drop across each resistor depends on its resistance, following Ohm's law: $V = IR$. Since R_1 and R_2 share the same current, the voltage drop across each resistor is proportional to its resistance. If $R_2 > R_1$, then the voltage drop across R_2 will be greater than that across R_1 . Conversely, if $R_2 < R_1$, then the voltage drop across R_2 will be less than that across R_1 . If $R_1 = R_2$, then the voltage drops will be equal.