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Unit 5G
Series Circuits
Note-Taking Guide TEACHER

Main Ideas, Key Points, Questions:

After watching the video segment, write down key points, main ideas, and big questions.

Objective(s):

- *Based on provided examples, construct a series electrical circuit.*
- *Understand how voltage and current behave in a series circuit.*

Notes:

During the video segment, use words, phrases, or drawings to take notes.

Summary:

After watching the video segment, write at least three sentences explaining what you learned.
You may ask yourself: "If I was going to explain this to someone else, what would I say?"

Answer the following.

1. Which of the following circuits are series circuits? Circle all that apply.
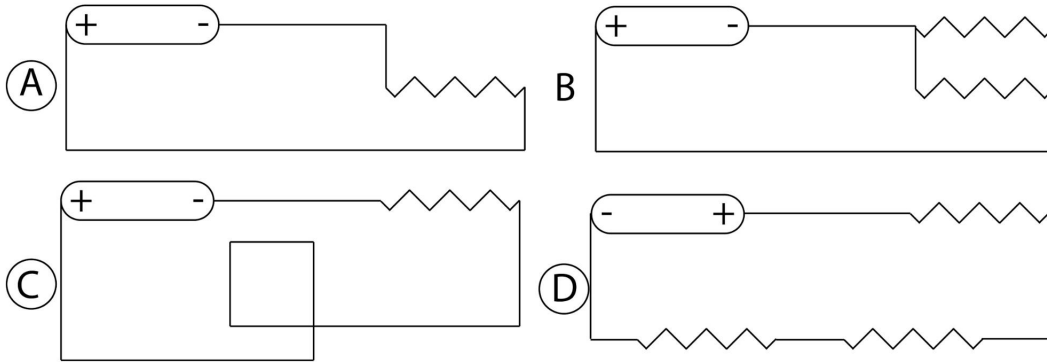
2. Is current the same throughout a series circuit? Why or why not?

   Yes, the current is constant throughout a series circuit because it has nowhere to divide or diminish.

3. Is voltage the same throughout a series circuit? Why or why not?

   *No, voltage is not constant throughout a series circuit because it*

   drops across each resistive element, eventually reaching zero by the end.

4. Imagine you have a battery, five identical light bulbs, and some wire. You wire up a series circuit with one of the light bulbs, then add each of the remaining four bulbs one by one. If I is the current in the circuit with one bulb, write the current in the circuit (in terms of I) as each additional bulb is added. If R is the resistance of each bulb, write the resistance of the total circuit (in terms of R) as each bulb is added.

Number of Light Bulbs	Total Circuit Current	Total Circuit Resistance
1	I	R
2	I/2	2R
3	I/3	3R
4	I/4	4R
5	I/5	5R

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Questions to Consider TEACHER

Answer the following.

5. For the following series circuit, write how much voltage remains at each black dot along the circuit. Assume that 1) the resistors are all the same, and 2) the wires do not use any voltage.
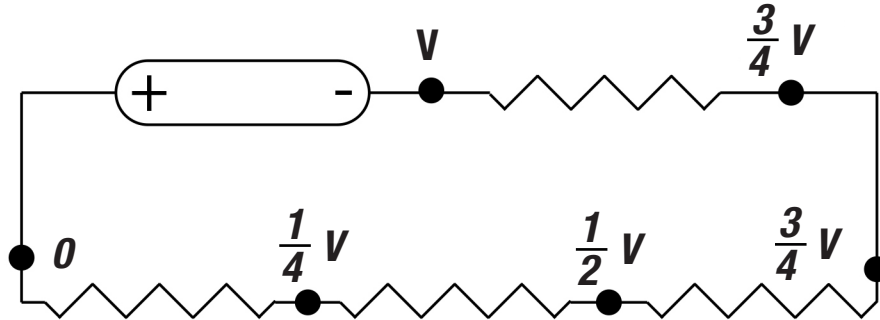
6. Circle the correct answers to each question.

    As the number of resistors in a series circuit increases, the overall resistance:
    a. *increases*
    b. decreases
    c. stays the same

    The current in the circuit:
    a. increases
    b. *decreases*
    c. stays the same

7. Three identical light bulbs are connected in series. Which of the following statements are true? (Circle all that apply.)

    a. *The total circuit resistance equals the sum of the individual resistors.*
    b. The current decreases the same amount as it passes through each bulb.
    c. *The voltage drop across each bulb is the same.*
    d. The first bulb shines more brightly than the last one.

8. Mathematically, in a series circuit, how do you find the total resistance of the circuit as it relates to the other resistors? How about the total current? Total voltage?

$$R_{total} = R_1 + R_2 + R_3 + \ldots$$
$$I_{total} = I_1 = I_2 = I_3 = \ldots$$
$$V_{total} = V_1 + V_2 + V_3 + \ldots$$