



WARNING: Beware of excess puns. They come fast and furious in one section.

This episode makes an analogy between the flow of electric charge and the flow of water. It's a reasonable analogy, wherein water takes on the role of charge, pipes replace wires, pressure replaces voltage, and mass flow rate replaces charge flow rate.

Electrical resistors are shown as cylinders with colored stripes because this is how they appear in actual circuits. The stripes represent the value of resistance given in a "secret" color code.

Most of the important information is in the text spoken during the presentation. So don't become entranced by the visual imagery; concentrate and stay focused on the words!

MATCHING SECTION (pertains to information given *throughout* the video)

- | | |
|--|--|
| 1. ___ Thomas Edison | <i>A. Musical instrument maker</i> |
| 2. ___ Gustav Kirchhoff
[pronounced <i>KER koff</i>] | <i>B. Used electric current to perfect the telegraph</i> |
| 3. ___ Georg Simon Ohm | <i>C. Charged ahead and invented the battery</i> |
| 4. ___ Alessandro Volta | <i>D. Obscure German professor</i> |
| 5. ___ Charles Wheatstone | <i>E. Developed two laws for current and energy in various points around a circuit</i> |

SEQUENTIAL QUESTION SECTION

6. Ohm's law

- A. is a fundamental law of nature like Newton's Second Law
- B. does not hold in all situations
- C. Both A and B
- D. Neither A nor B

7. The resistance of a circuit element can be calculated using the equation $R = \rho L/A$. In terms of this equation, what is the effect of wiring two resistors in series?

- | | |
|--------------------------|--------------------------|
| A. It increases ρ . | B. It decreases ρ . |
| C. It increases L. | D. It decreases L. |
| E. It increases A. | F. It decreases A. |

8. The resistance of a circuit element can be calculated using the equation $R = \rho L/A$. In terms of this equation, what is the effect of wiring two resistors in parallel?

- | | |
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9. Resistivity is like _____.

10. In a perfect crystalline metal, if a sample of it could be found,

A. mobile electrons would encounter no resistance.

B. mobile electrons would encounter more resistance than those in imperfect samples.

C. electrons would all be bound and unable to move within the sample.

D. the sample would have *negative* resistance.



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9. When a conductor is in electrostatic equilibrium,

A. its free electrons are at rest

B. its free electrons move randomly with no net flow

C. electrons are not free until current is passing through

10. Flowing electrons bounce off _____ in a conductor. This bouncing (starting and stopping) gives rise to resistance.