Roll a piece of modeling clay into a cylinder and use an ohmmeter to measure its resistance.

Now roll it out until it's twice as long, and measure the resistance again. Compared with the initial resistance, the new resistance is

a) unchanged.
b) twice as much.
c) four times as much.
d) eight times as much.
e) actually less.

Defend your answer!

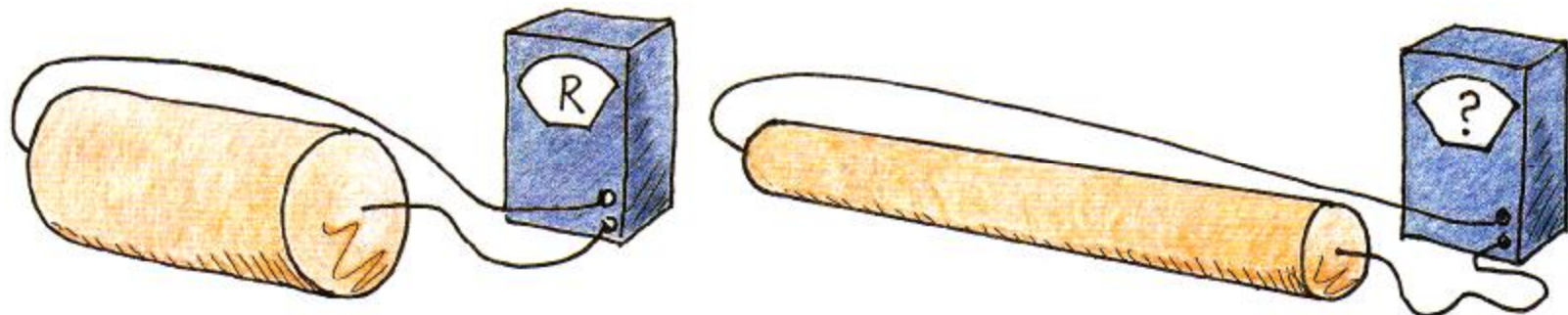thanx to Peter Hopkinson

ARBOR SCIENTIFIC
TOOLS THAT TEACH.

NEXT-TIME QUESTION

Roll a piece of modeling clay into a cylinder and use an ohmmeter to measure its resistance.

Now roll it out until it's twice as long, and measure the resistance again. Compared with the initial resistance, the new resistance is
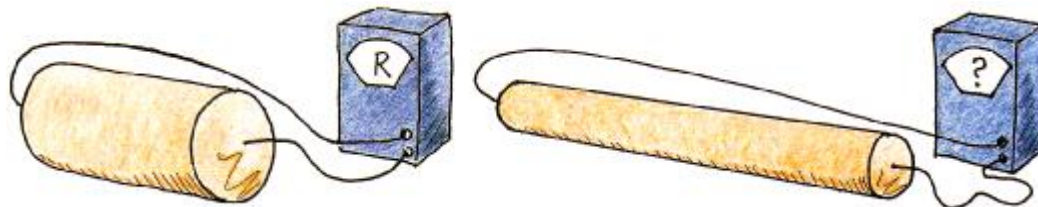
a) unchanged.
b) twice as much.
c) four times as much.
d) eight times as much.
e) actually less.

Defend your answer!

Answer: c, four times as much.

Resistance is greater due to the smaller cross section of the clay, and also greater due to its greater length. Its cross section is half (increasing resistance by 2), and length doubled (increasing resistance by another 2). So resistance is four times as much.

That's right; $R = \rho \frac{L}{A}$

so $\rho \frac{2L}{A/2} = 4R$

CONCEPTUAL Physics

Hewitt Dewitt!