Resistance of wire **Grade- 11th -12th**

Brief Concepts:

- Electrical resistance of a conductor depends upon its material and geometry whereas resistivity depends upon material only.

- Resistance of conductor is given as:

$$R = \rho \frac{L}{A}$$

Explore:

1. Change length of the wire, how does its resistance change?
   What can be the reason for your observation?

2. Change area of the wire, how does its resistance change?
   Can you explain the reason for your observation?

3. Change the resistivity of wire, how does its resistance change?
   Why does this happen?

Think:

1. Does resistivity depend upon geometric factors (length and area) of a wire?

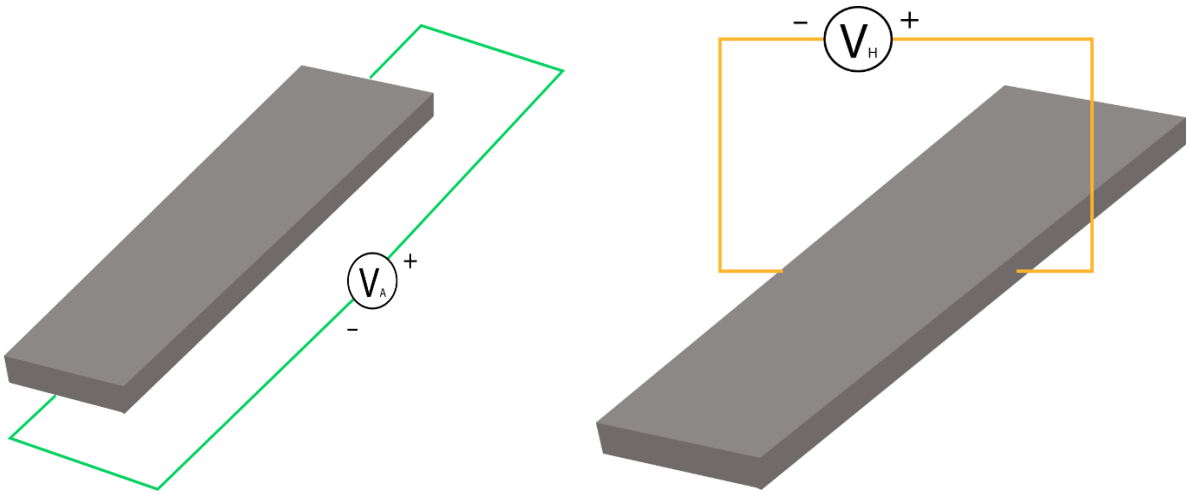
2. If you cut an aluminum wire into half, how will its resistivity and resistance change?

3. Take a copper wire. Wrap polythene over this multiple times. This will make Cu wire thicker and increase its area. Do you think, wire now has lesser resistance?

4. If you apply same potential across a thin and a thick Cu wire of same lengths, which one will get more heated? Give reasons for your answer.

5. Silver has lower resistivity as compared to copper. If same potential is applied across a silver wire and a copper wire of same length and area, in which case more current will flow?

6. If you connect battery to a conductor (of rectangular cross-section) across its length and then across width (as shown in fig), how will it change resistivity and resistance?



Contributions:

Author: SK Gupta (MS, Indian Institute of Technology Madras)
Editor: Chaithra Navada (Integrated MA, Indian Institute of Technology Madras)
Illustration: Sanjana Acharya (Integrated MA, Indian Institute of Technology Madras)

Contact Information: For any corrections/suggestions, please mail us at athenescience@gmail.com

Website: www.athenescience.org (This write-up can be accessed on our website for free)