Resistance and Current flow

Ahmed Dallal

Resistance

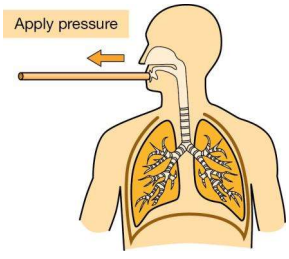
- Every object has a resistance to the flow of current
  - Conductors have small resistance
  - Insulators have large resistance

Drinking straws

What's inside a straw? What is it doing?

(Air. The molecules move randomly, but there is no net movement!)

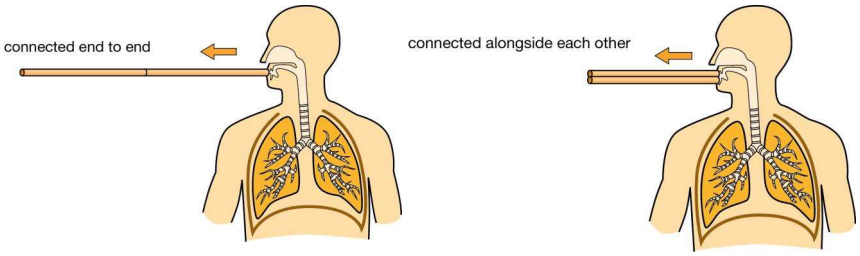
Can you make the air flow?



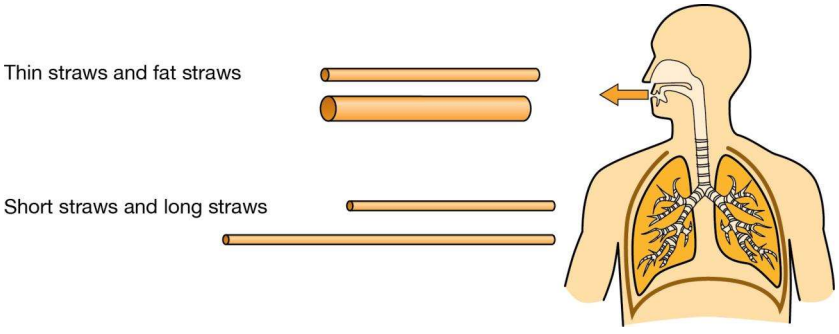
(A force is needed to make anything start moving and, if there are resistive forces, to keep it moving.)

What if the pressure is bigger?

What if there are two straws?



Straws of different shapes?



Current, voltage and resistance

Current in a simple circuit will be larger if

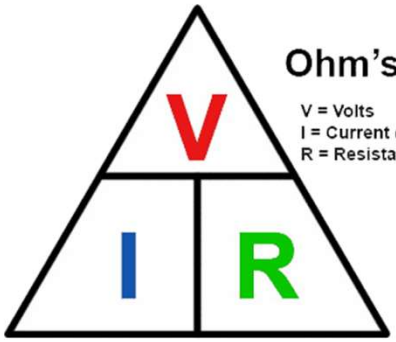
- voltage of the supply is larger
- resistance in the circuit is smaller

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

where R is resistance, ρ is resistivity of the material, l is its length and A is its cross-sectional area.

The same relationships apply in networks of identical resistors.

Ohm's Law



Ohm's Law

V = Volts
I = Current (in Amps)
R = Resistance (in Ohms)

V= I • R	$V = I \cdot R$	(volts = amps times ohms)
$\frac{V}{I = R}$	$I = \frac{V}{R}$	(amps = volts divided by ohms)
$\frac{V}{I = R}$	$R = \frac{V}{I}$	(ohms = volts divided by amps)