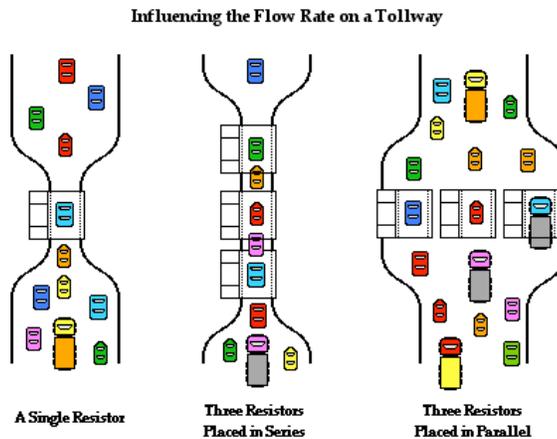


Series and Parallel Circuits

“And a wall which was outside ran parallel to the chambers, at the front of the chambers, toward the outer court; its length was fifty cubits.” Ezekiel 42:7



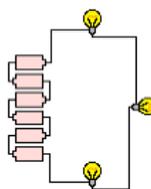
Tollbooth example

- How would adding tollbooths to a road affect the flow of cars?
- Adding tollbooths along the path would have the overall effect of increasing the total amount of traffic and decreasing the overall car flow rate
- Adding more tollbooths along one another creates less overall traffic; by allowing for more pathways by which cars can flow through the bottleneck areas, the flow rate can be increased

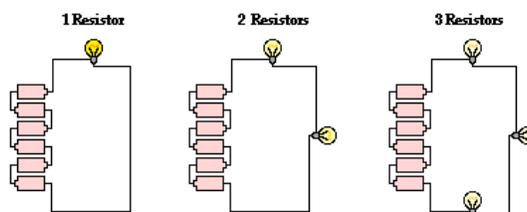
Series circuits

- When there are two or more electrical devices present in a circuit with an energy source, there are a couple of basic means by which to connect them.
- They can be connected in series: they are connected in such a way that an individual charge would pass through each one of the light bulbs in consecutive fashion or in order.
- When in series, charge passes through every light bulb (or device).

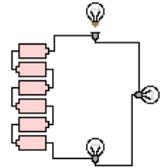
Series Connection



Series Connection of Light Bulbs



- So for series circuits, as more resistors are added the overall current within the circuit decreases. This decrease in current is consistent with the conclusion that the overall resistance increases.
- The effect of removing a bulb from a socket: in order for the devices in a series circuit to work, each device must work. If one goes out, they all go out. If current is *cut* from any one of them, it is cut from all of them.
- Question: Would the appliances in the kitchen be connected in series?

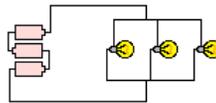


When one bulb is removed from its socket, the other bulbs in series "go out."

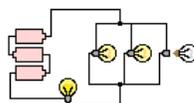
Parallel circuits

- If connected in parallel, a single charge passing through the external circuit would only pass through one of the light bulbs.
- The light bulbs are placed within a separate branch line, and a charge will pass through only one of the branches during its path back to the low potential terminal.

Parallel Connection



- For parallel circuits, as the number of light bulbs increases, the overall current also increases.
- The overall resistance is decreased when the number of light bulbs increases because the current has more paths it can travel.
- If an individual bulb in a parallel branch is unscrewed from its socket, then there is still current in the overall circuit and current in the other branches. The current in the remaining branches will increase.
- Question: Would the appliances in a home be wired with parallel connections?



When one bulb is removed from its socket, the other bulbs in the parallel branches remain lit.