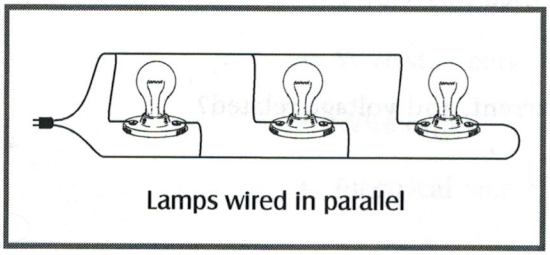
The total voltage across the circuit is divided among the individual devices, so the sum of the total voltage drops in the resistors equals the total voltage. The voltage drop across each device is proportional to its resistance.

What this means for the string of lights is that the longer the length of the string of lights wired in series, if the voltage cannot be increased (say, from a battery providing additional power), the total resistance of the lights has to be taken into account by the voltage, and this will cause the lights to glow rather dimly.



Lamps wired in parallel

In a parallel circuit, on the other hand, each device is wired separately to the energy source. The voltage is the same across each device. The total current, however, divides among the parallel branches. Because the voltage across each branch is the same, the amount of current in each branch is inversely proportional to the resistance of the branch. The total current in the circuit equals the sum of the currents in its parallel branches. Resistance, however, is decreased for each additional branch.

If your holiday lights are wired in parallel, each light will shine brightly. However, there is a danger of overloading a circuit wired in parallel. This isn't an issue when the circuit is wired in series. For this reason, most parallel circuits are fitted with fuses, which blow if the circuit begins to overload.