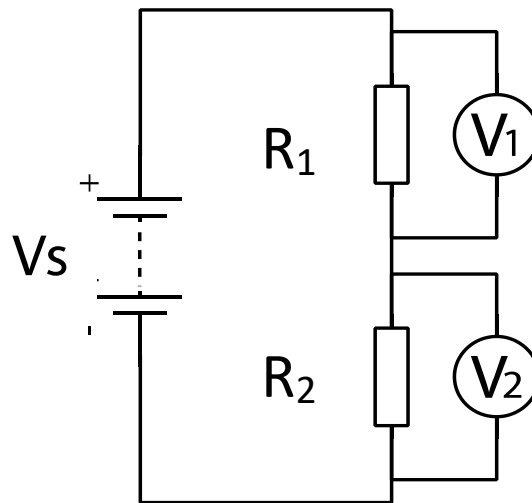


N5

Potential Dividers

A potential divider circuit is made up with resistors or other components connected across a supply.

For example:



Drawn as above, the potential divider circuit is simply a series circuit following all the same rules; the current is the same at all points and the supply voltage splits up across each component to give them a share of the voltage (or potential difference).

Through experimentation the following relationships can be derived:

$$\frac{V_1}{V_2} = \frac{R_1}{R_2}$$

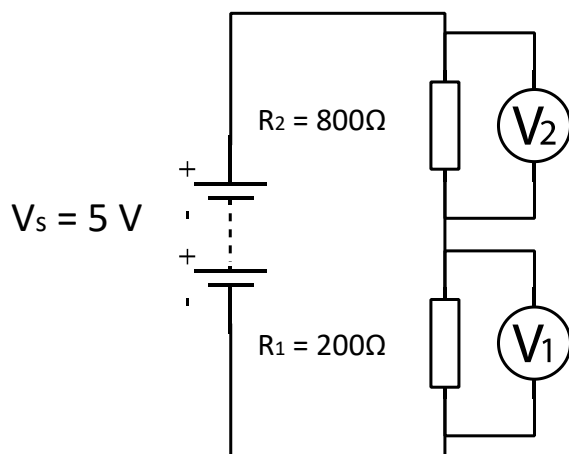
$$V_1 = \frac{R_1}{R_1 + R_2} \times V_{\text{supply}}$$

and

$$V_2 = \frac{R_2}{R_1 + R_2} \times V_{\text{supply}}$$

Example 1

Calculate the potential difference V_1 .



$$V_1 = \frac{R_1}{R_1 + R_2} \times V_{\text{supply}}$$

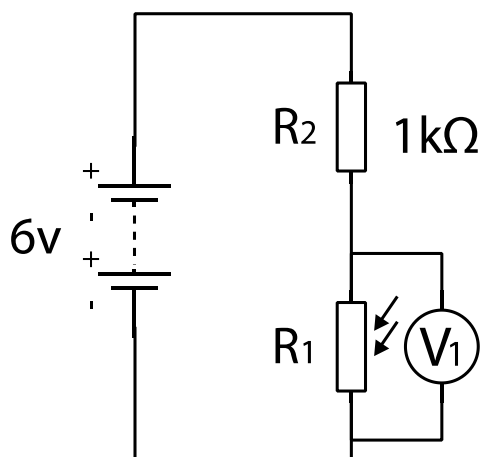
$$V_1 = \frac{200}{800+200} \times 5$$

$$\underline{V_1 = 1\text{ V}}$$

Example 2

The resistance of the LDR, R_1 in the dark is $10\text{ k}\Omega$ and when in the light its resistance is $1\text{ k}\Omega$.

Calculate the value of V_1 when the LDR is in the dark.



$$V_1 = \frac{R_1}{R_1 + R_2} \times V_{\text{supply}}$$

$$V_1 = \frac{10\,000}{11\,000} \times 6$$

$$\underline{V_1 = 5.45\text{ V}}$$