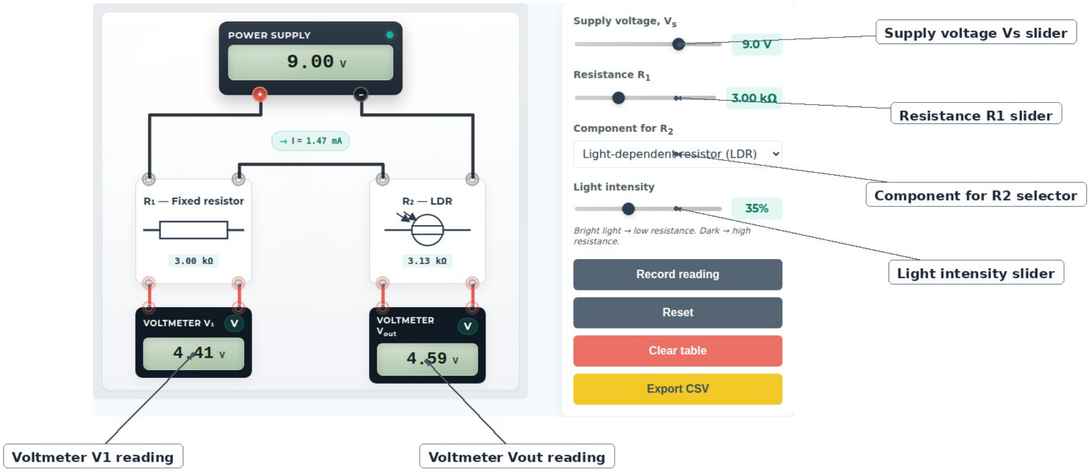
Investigating Potential Dividers

Resistance Ratio, LDR and Thermistor Circuits

Aim:

You are investigating how a potential divider splits voltage between two resistors.



Prediction:

Set R1 = R2 = 1000 Ω. Before you read the voltmeters, predict what V1 and Vout will each read if Vs = 6.0 V.

V1: V   Vout: V

Test it in the sim.

Method:

1. Set the Supply voltage, Vs to 6.0 V. Leave the Component for R2 as Fixed resistor, and set Resistance R1 and Resistance R2 both to 1000 Ω.
2. Click Record reading. Note V1, Vout and the current shown above the resistors.
3. Increase R1 to 5000 Ω while keeping R2 at 1000 Ω, then click Record reading again.
4. Set R1 back to 1000 Ω and increase R2 to 5000 Ω instead, then click Record reading again.
5. Choose two more R1/R2 combinations of your own, spread across the slider range, and record a reading for each.
6. Change the Component for R2 to Light-dependent resistor (LDR). Set the Light intensity slider close to 100% (bright) and record a reading, then close to 0% (dark) and record another.
7. Change the Component for R2 to Thermistor (NTC). Record a reading at a low temperature (close to 0 °C) and another at a high temperature (close to 80 °C).

Results:

Vs (V)	R1 (Ω)	R2 (Ω)	V1 (V)	Vout (V)	I (mA)

Analysis:

Look down your table: how does the ratio R1 : R2 compare with the ratio V1 : Vout for your fixed-resistor rows? Check whether V1 + Vout always adds up to Vs.

Compare your two LDR readings. Explain why Vout changes the way it does as the light dims, linking your answer to how the LDR's resistance responds to light.

Compare your two thermistor readings. Explain why Vout changes the way it does as the temperature rises, linking your answer to how the thermistor's resistance responds to temperature.