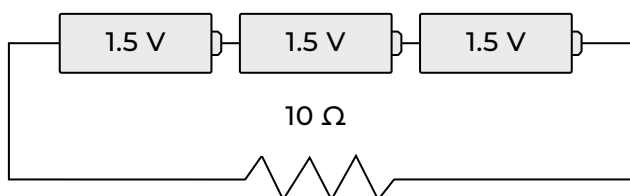


Activity sheet 5

5a.



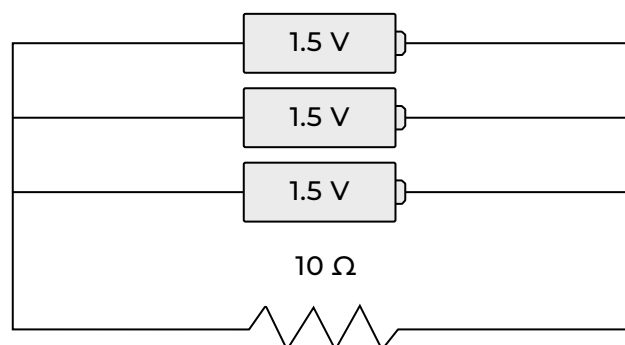
What is the total voltage across the three cells in series before they are connected to the resistor?

Using $V=IR$, what current would you expect to flow through the resistor?

When measured, the current through the resistor is 0.39 A. Using $V=IR$, what voltage would you expect to measure across the resistor?

What is the internal resistance within each cell?

5b.



What voltage would you now expect to measure across the three cells in parallel before they are connected to the resistor?

The total of resistors in parallel is given by

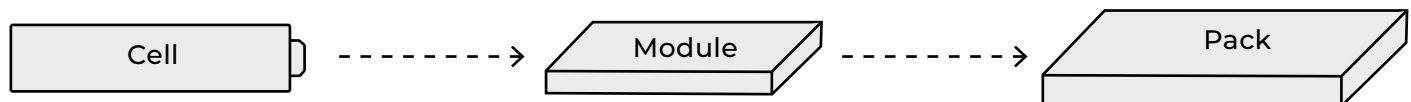
$$\frac{1}{R_T} = \frac{1}{R_1} + \frac{1}{R_2} + \frac{1}{R_3} + \dots$$

Using the value you calculated for each cell's internal resistance in **section 5a.**, calculate the expected current through the 10 Ω load resistor and the voltage across it.

Activity sheet 6

An electric vehicle (EV) battery pack is to be made using **18650 lithium-ion cells** with the following specifications:

- **Nominal voltage 3.7 V**
- **Capacity 3400 mAh**



What battery module will provide 22.2 V and 5.6 kWh capacity?

How many cells will this module require?

The battery pack must provide a minimum of 350 V.
How many battery packs should be arranged to meet this specification?

What is the capacity of the battery pack in kWh?

Each cell has a mass of 50 g. What mass of cells will the pack include, in kg?