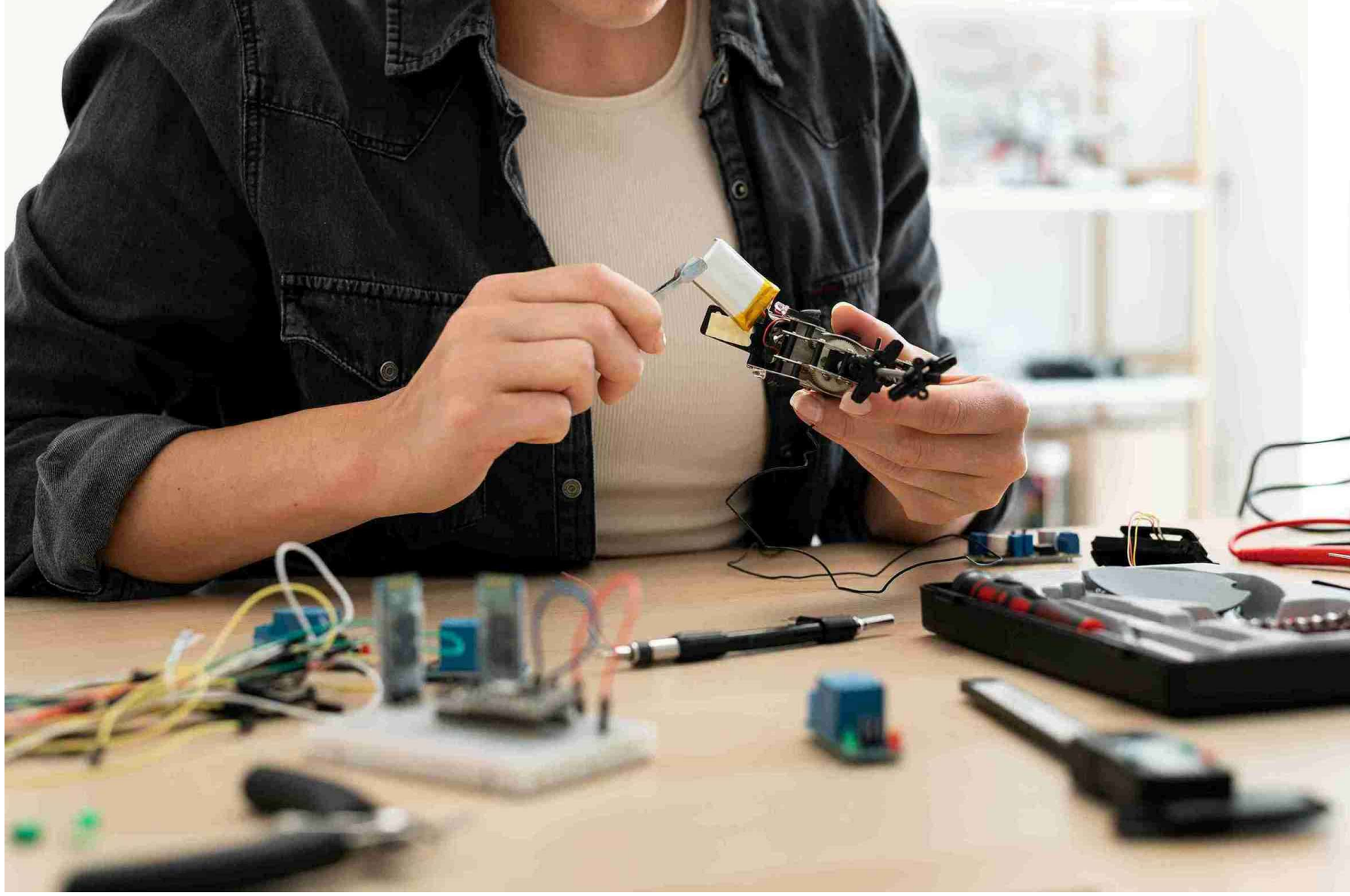


# Electronics Day 4



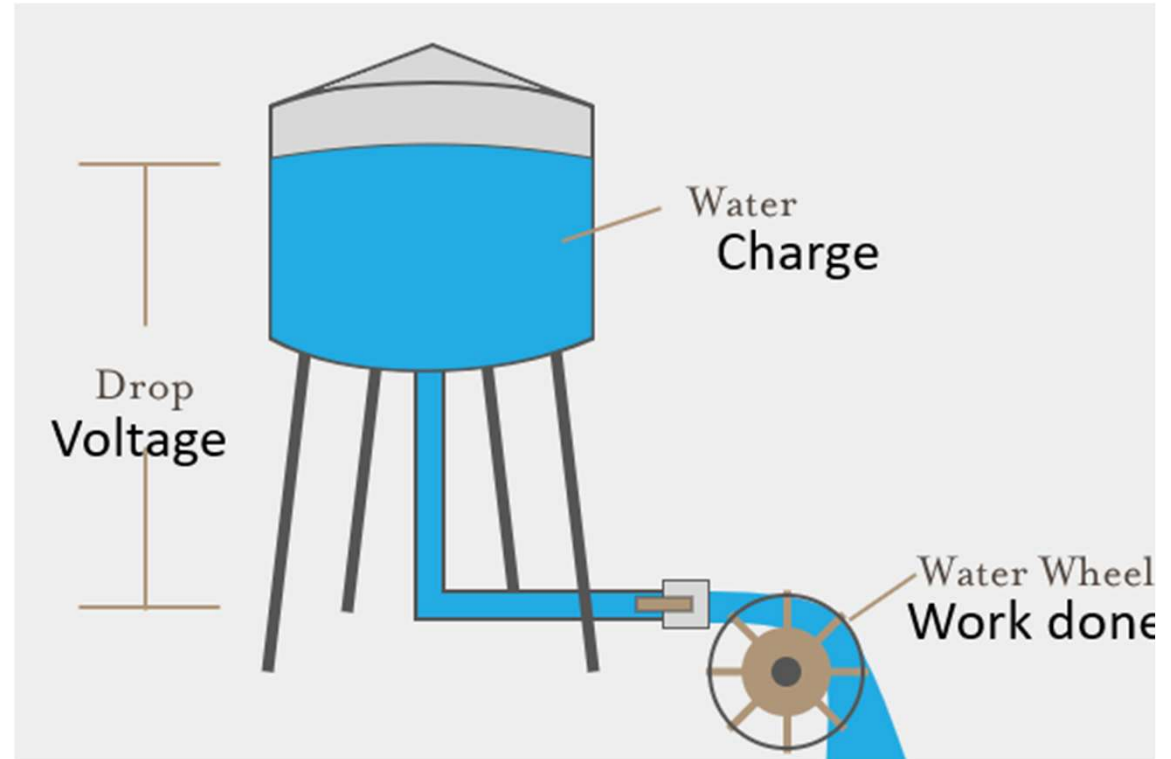
# Summary 1

## Quantities and Units

- ❑ Charge  $Q$  (Ah)
- ❑ Current  $I$  (A)
- ❑ Voltage  $V$  (V)
- ❑ Power  $P$  (VA)
- ❑ Energy  $E$  (VAh)

## Relationships

- ❑  $Q = It$
- ❑  $E = VQ$
- ❑  $P = \frac{E}{t} = VI$



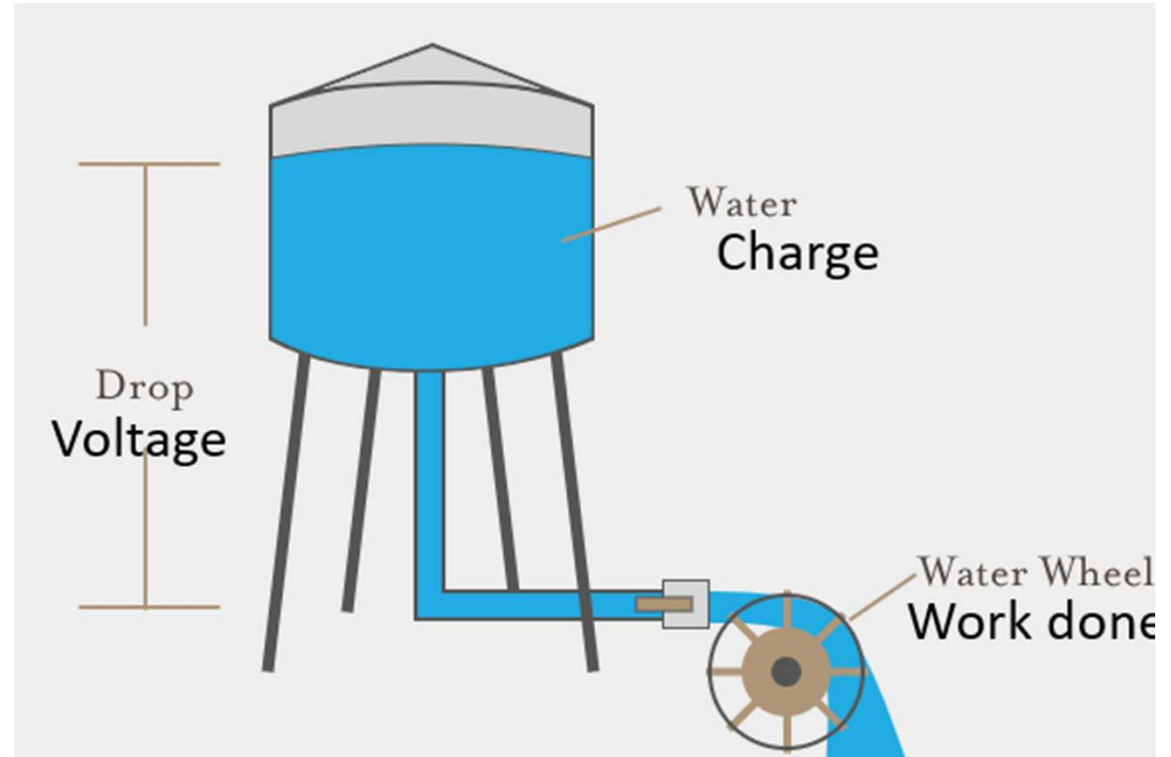
# Summary 2

## Using multimeter

- ❑ Continuity
- ❑ Test LED
- ❑ Resistance
- ❑ Voltage  $V(V)$
- ❑ Current in series
- ❑ Transistor

## Using Makey-Makey

- ❑ Interacting with world
- ❑ Exploring Ground loops



# Summary 3

Using multimeter  
Using Voltage Source

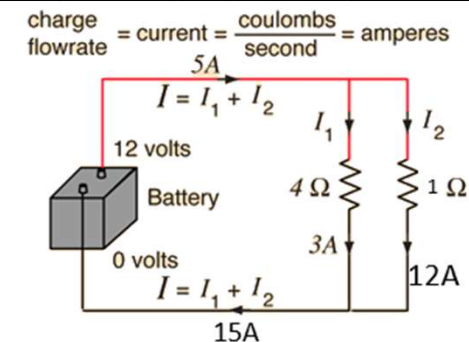
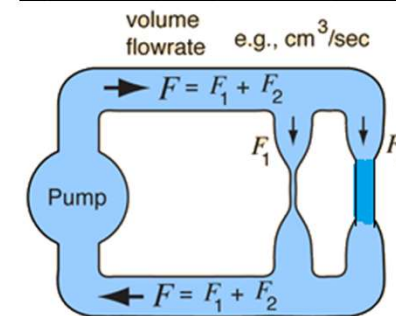
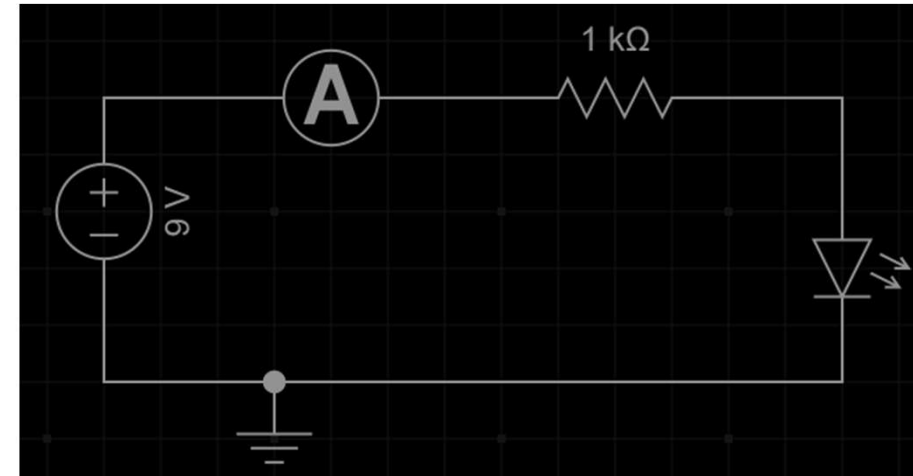
- ❑ Set voltage
- ❑ Vary voltage

Resistors

- ❑ Reducing current
- ❑  $V_r = IR$
- ❑ Parallel resistors take the easier path

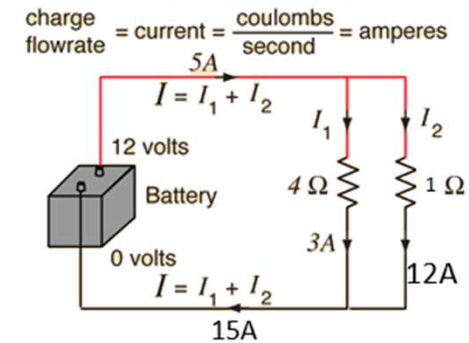
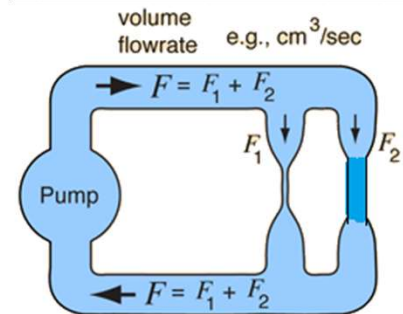
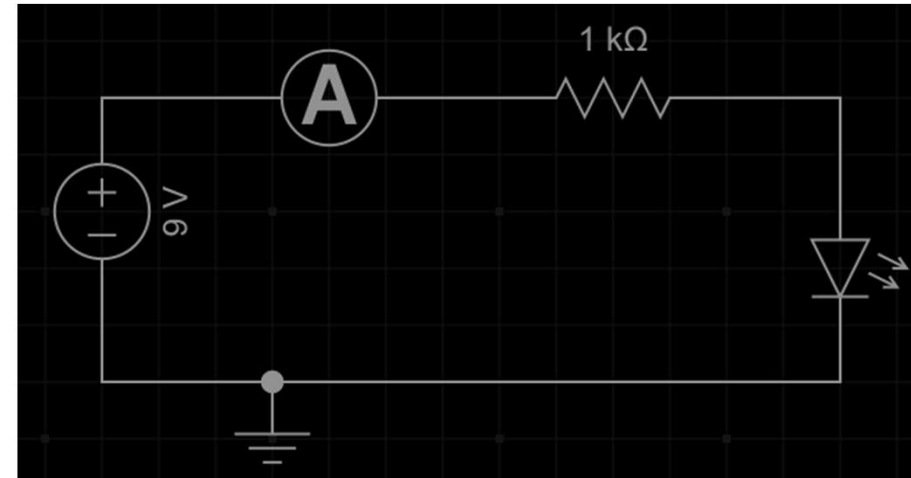
Simulators

Transistors – amplifiers/switches



# Summary 4

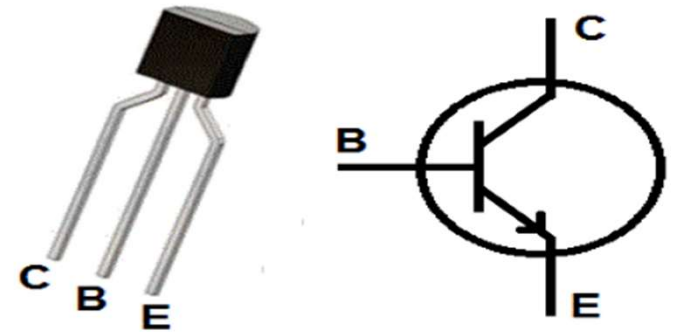
Created



# Transistor

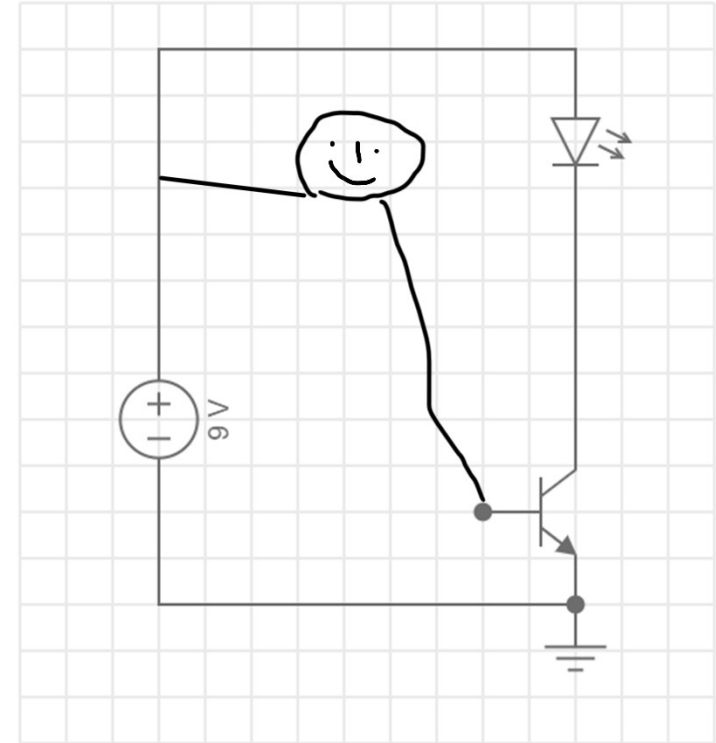
- Understand the connections of a transistor. Test it using multimeter. The setting for this is the  $h_f$  ( $h_{fe}$ ). A high  $h_{fe}$  rating indicates the correct direction to use the transistor.
- $h_{fe}$  indicates the gain of current from  $i_B$  to  $i_E$ .
- Physically for a npn transistor here is the expected pin out. Try both combinations.

**NPN Transistor**



# Simple use of a transistor

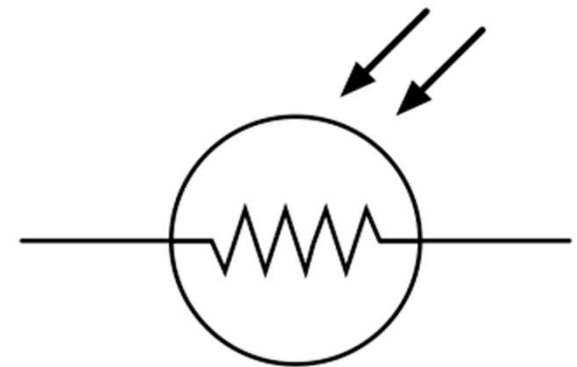
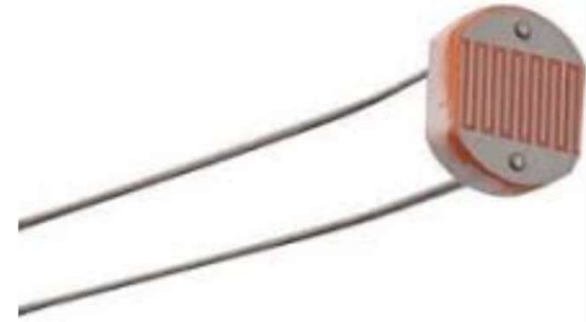
- Remember we lit the LED with our body.
- Can we use the same body resistance and give current to the base (B) and see an amplified current in the collector (C) and emitter (E)? Does this give a brighter LED than before?



# LDR

**LDR (Light Detection Resistor)** Just as light is produced when we pass electricity through a LED, light also has energy and can change the resistance of a photo sensitive device. This can be used for light detection using LDR.

**Activity:** Measure the resistor with a multimeter and see the value change as you shine more light on it. Use cellphone light, ambient light, cover it, etc.





# Challenge Brightest Light

What is the brightest light you can create with 100 mA. Measure it using LDR.

