WEEK 1: INTRODUCING ELECTRONICS

CENTENARY SUBURBS MEN'S SHED – ELECTRONICS GROUP

AGENDA

- Introduction
- Course overview
- What is electricity?
- Important terms and how they relate
- How to make your light shine

ARE YOU GUILTY OF THIS?

WEEKLY FORMAT

- Start 6pm
- Introduction and theory – 20 - 30 mins
- Q & A – 5 - 10 mins
- Practical demo – 15 - 20 mins
- Work on projects – 60 mins
- Finish 8pm

COURSE CONTENTS

- Week 1 (5/10/20) – 3 ways to blink a light (H/W)
- Week 2 (12/10/20) - 3 ways to blink a light (S/W)
- Week 3 (19/10/20) - Resistors, capacitors and inductors (H/W)
- Week 4 (26/10/20) – learning to count, again! (S/W)
- Week 5 (02/11/20) – Diodes and transistors (H/W)
- Week 6 (09/11/20) – loops and logic (S/W)
- Week 7 (16/11/20) – AC/DC, time and frequency domains (H/W)
- Week 8 (23/11/20) – functions and arguments (S/W)
- Week 9 (30/11/20) – digital-to-analog and analog-to-digital converters (H/W)
- Week 10 (7/12/20) – arrays and strings (S/W)
- Week 11 (14/12/20) - motors and how to drive them (H/W)

WHAT IS ELECTRICITY?

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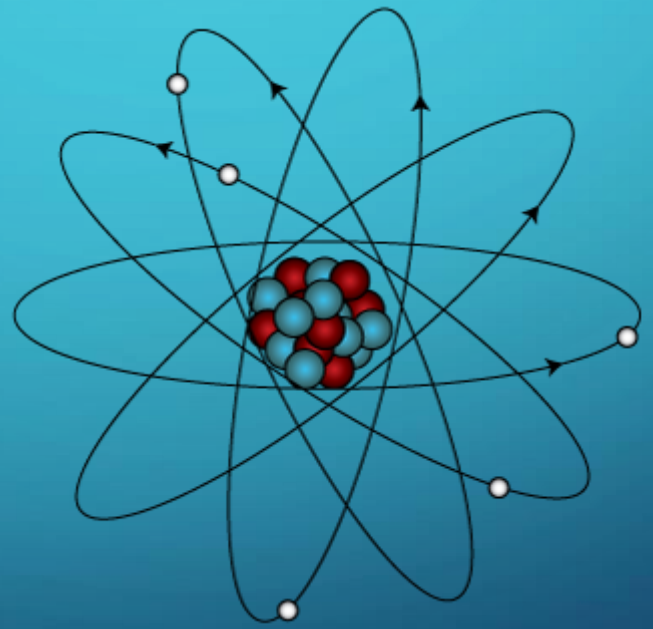
- Flow of charged particles called electrons



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- Flow of charged particles called electrons
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- Measure of their potential energy is called voltage (Volts)
- Rate of flow is called current (Amperes)

WHAT IS ELECTRICITY?

- Current and voltage are related by a term called resistance (Ohms)

MOST IMPORTANT EQUATION IN ELECTRONICS?

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Voltage = Current x Resistance

Or

V = IR

A VISIBLE ANALOGY

Voltage: the height of the water tank

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Voltage: the height of the water tank

Current: the rate at which the water is released

A VISIBLE ANALOGY

Voltage: the height of the water tank

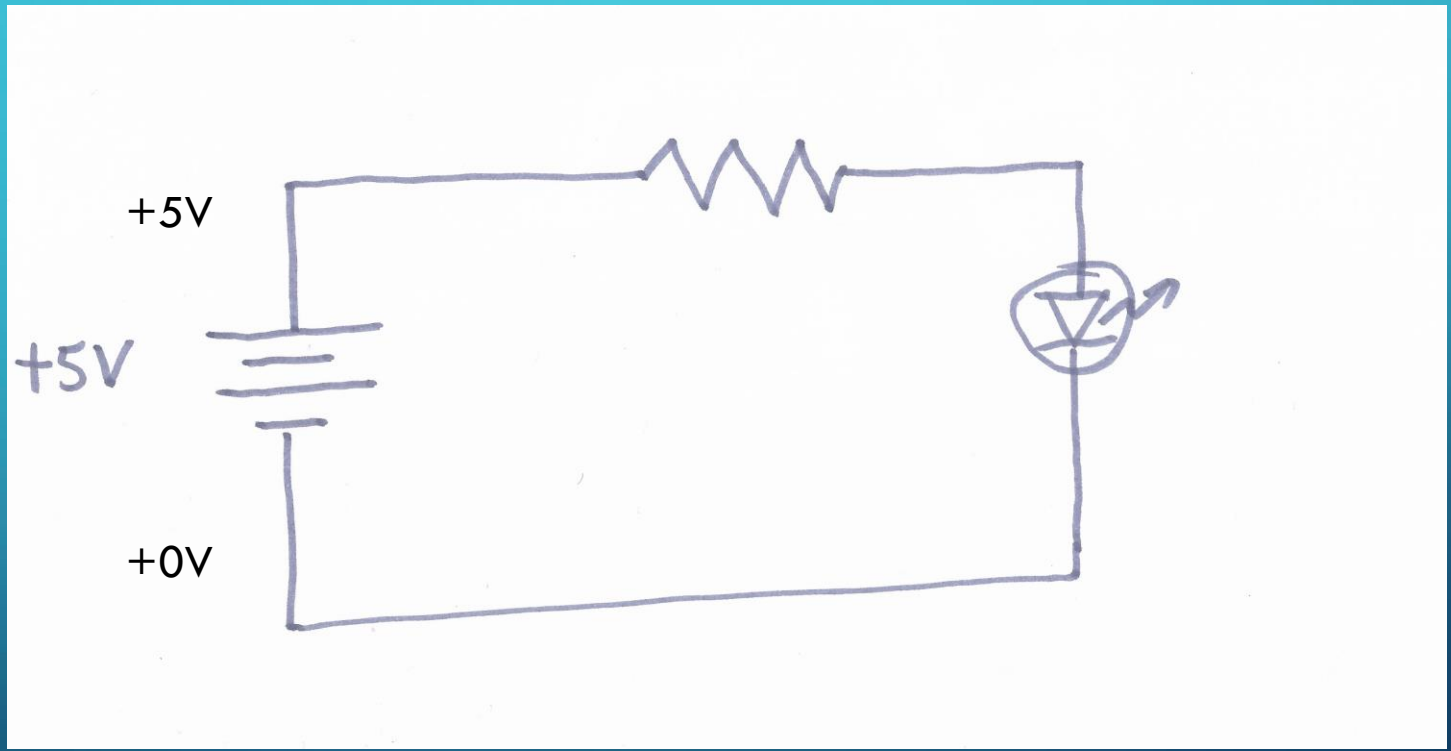
Current: the rate at which the water is released

Resistance: the thickness of the water pipe

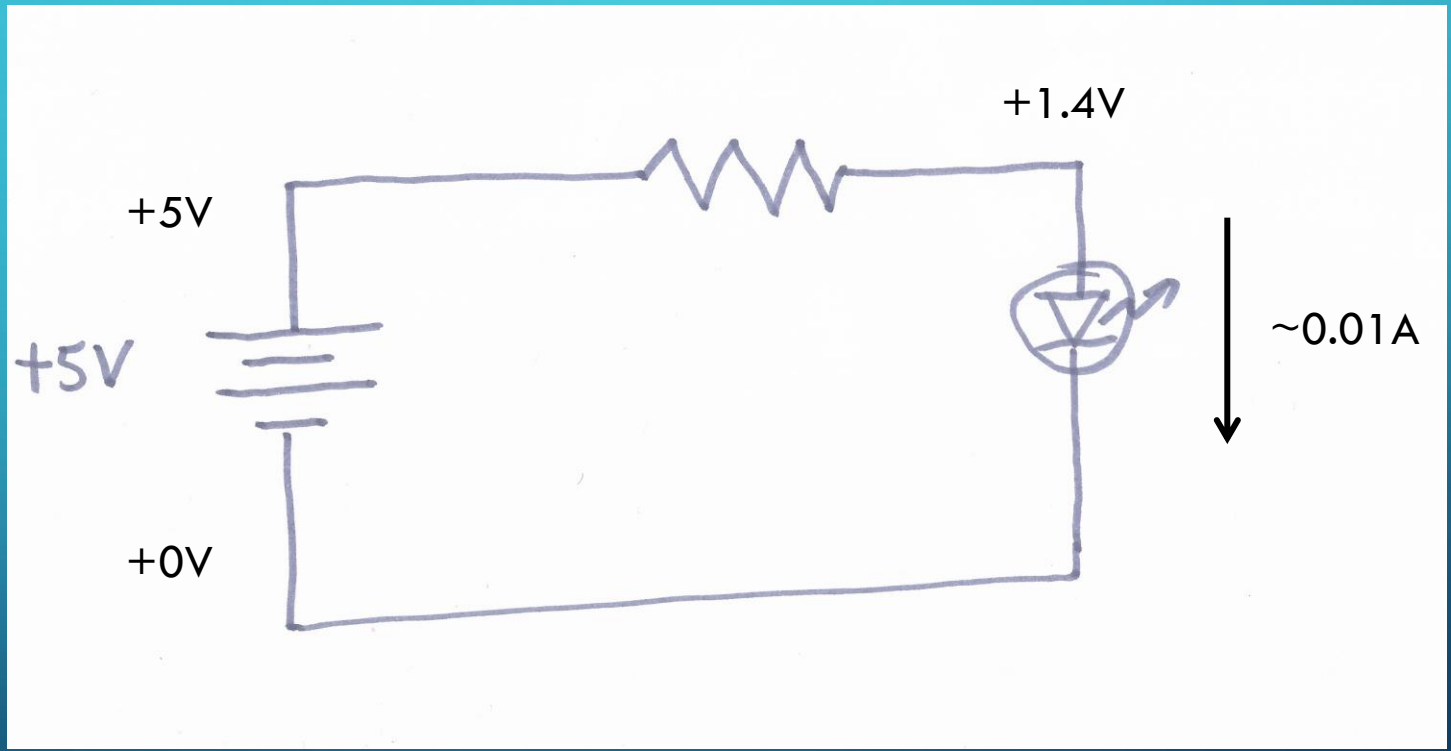
MAKING OUR LIGHT SHINE

- A simple circuit using a:
  - Power source (+5V)
  - A Light Emitting Diode (LED)
  - A resistor
- How big should the resistor be?

MAKING OUR LIGHT SHINE



MAKING OUR LIGHT SHINE



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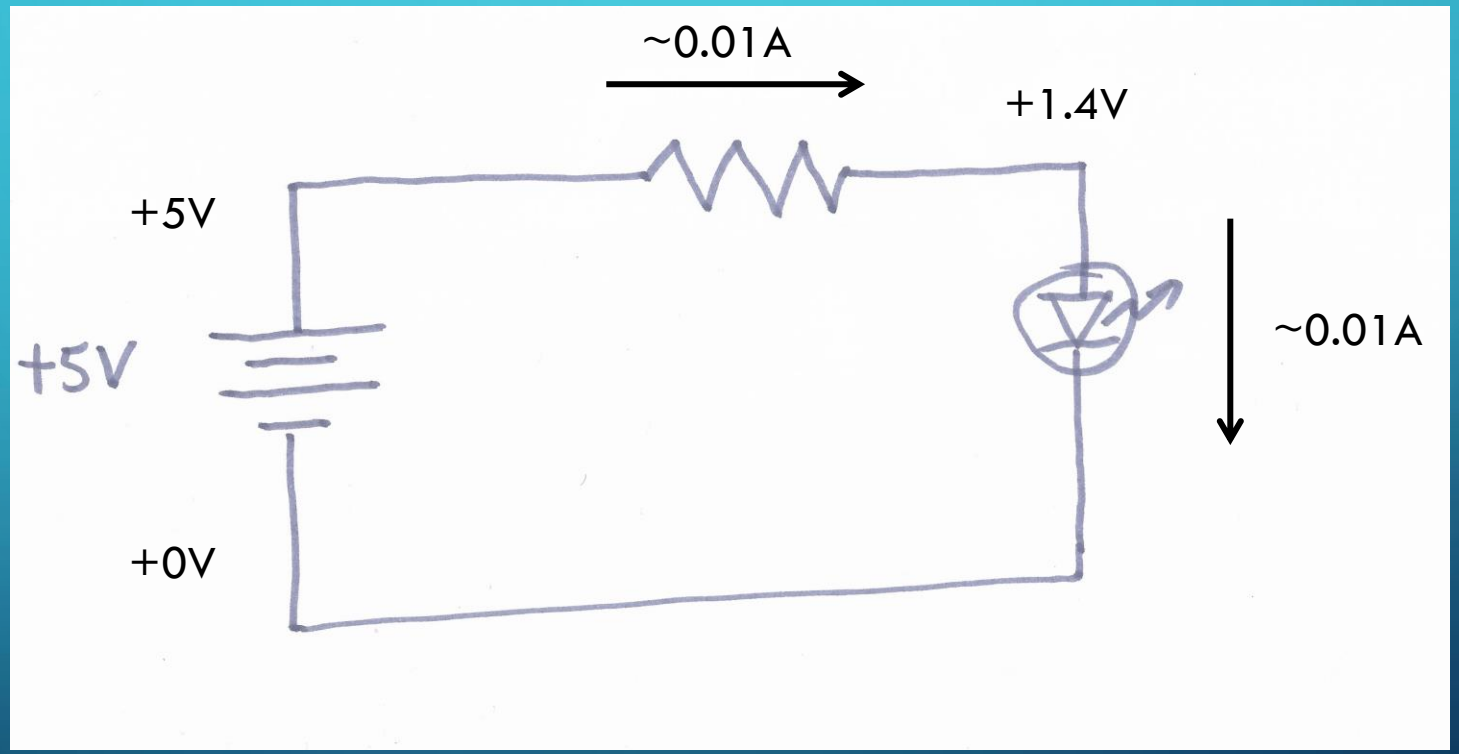

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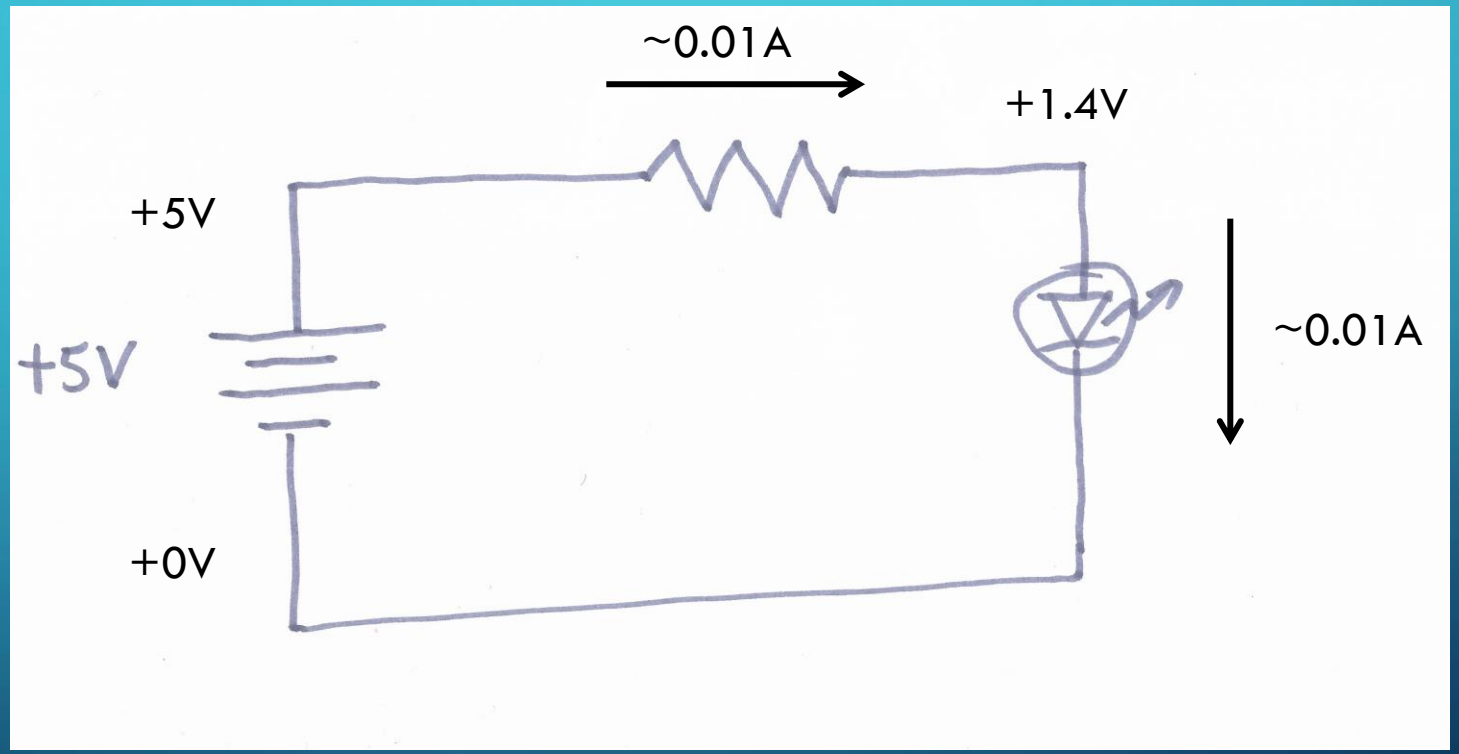

V = I x R

I: 0.01 A

V: 5 – 1.4 = 3.6V

R = ?

MAKING OUR LIGHT BLINK

- Introduce a switch
- Build an oscillator
- Multivibrator
- 555 Timer

QUESTIONS