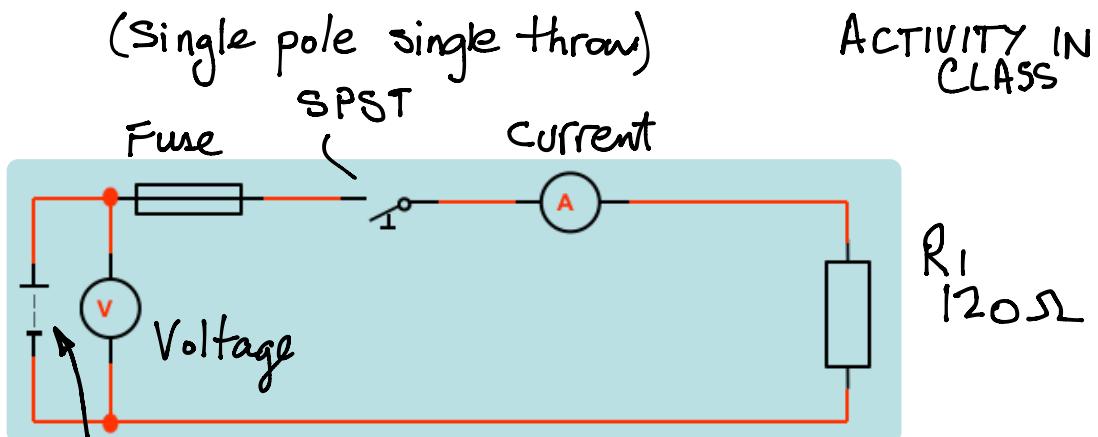


Feb 2017 to Demonstrate Current meter R internal.

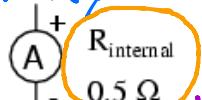


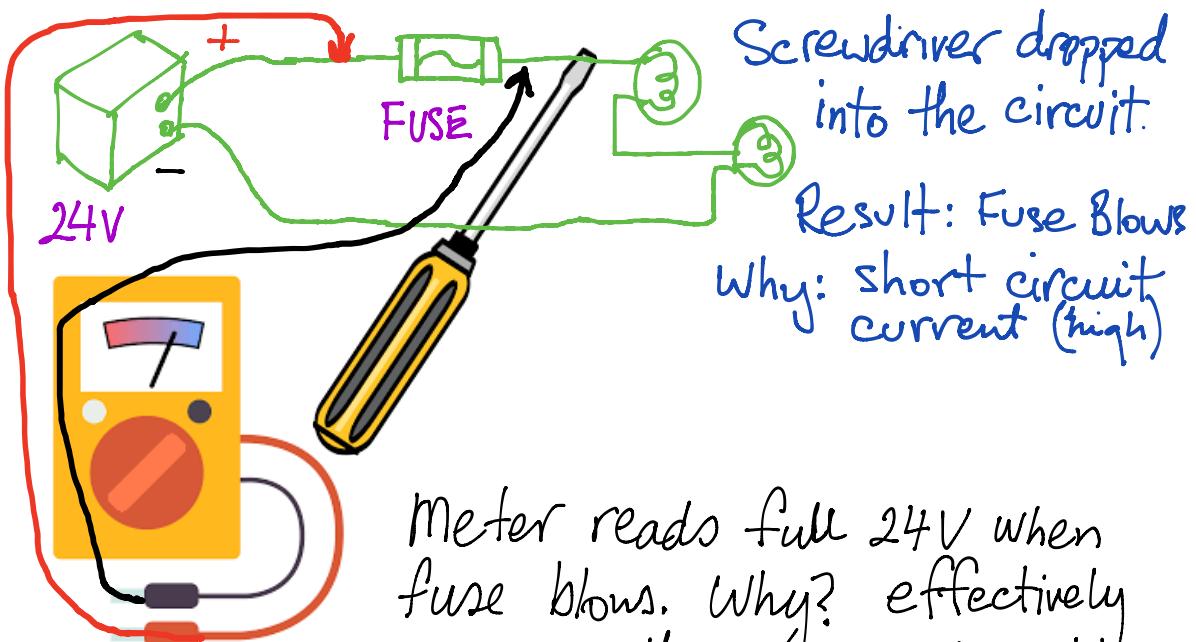
- 12 Volts
- ① Construct this circuit in circuit maker 2000
- ② Be sure to set the meters for Voltage & current.
- ③ Show your teacher when you finish.
- ④ What current was seen? 100mA $I = \frac{V}{R} = \frac{12}{120} = 0.1A$
- ⑤ modify your current meter to have a high internal resistance. Note: the default for the meter is $1\mu\text{ohm}$. Let's make it 50Ω .
- ⑥ Note the new current reading in the circuit.
70.59mA Why is the current now lower?

Answer: Ammeters must have low internal resistance so they do not interfere with circuit operation

$$50\Omega + 120\Omega = 170\Omega \quad I = \frac{V}{R} = \frac{12}{170} = 70.59\text{mA.}$$

I have shown more about this further down the pages here. There are many poor quality meters on the market & an ammeter with 500milli Ω is BAD!

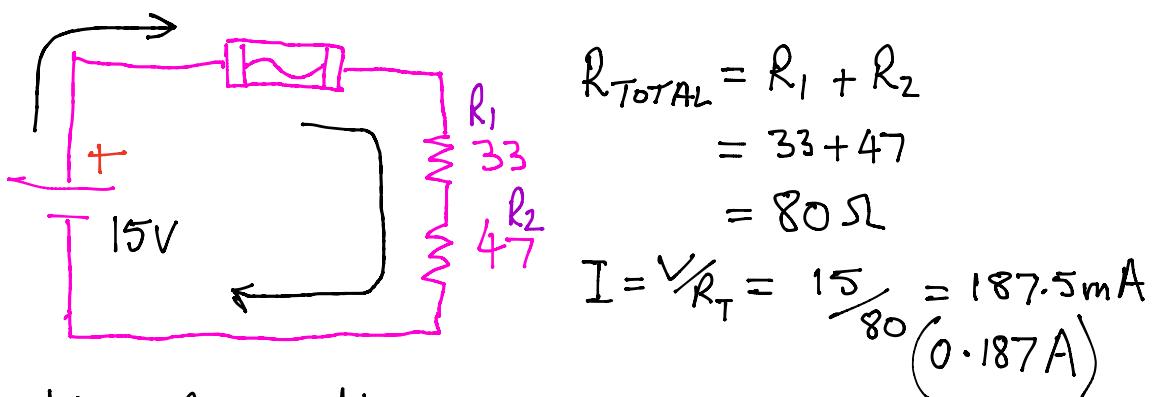




Screwdriver dropped into the circuit.
Result: Fuse blows
Why: short circuit current (high)

Meter reads full 24V when fuse blows. Why? effectively measures the power supply voltage & will conduct via the screwdriver.

Even with the screwdriver taken away, the lamps represent a very low resistance & the voltmeter is a high resistance, so tiny current flows through the voltmeter & no appreciable voltage drop will be seen & the full circuit voltage is measured.



$$V = I \times R \quad \therefore V_{R_1} = 0.187 \times 33 = 6.19 \text{ V}$$

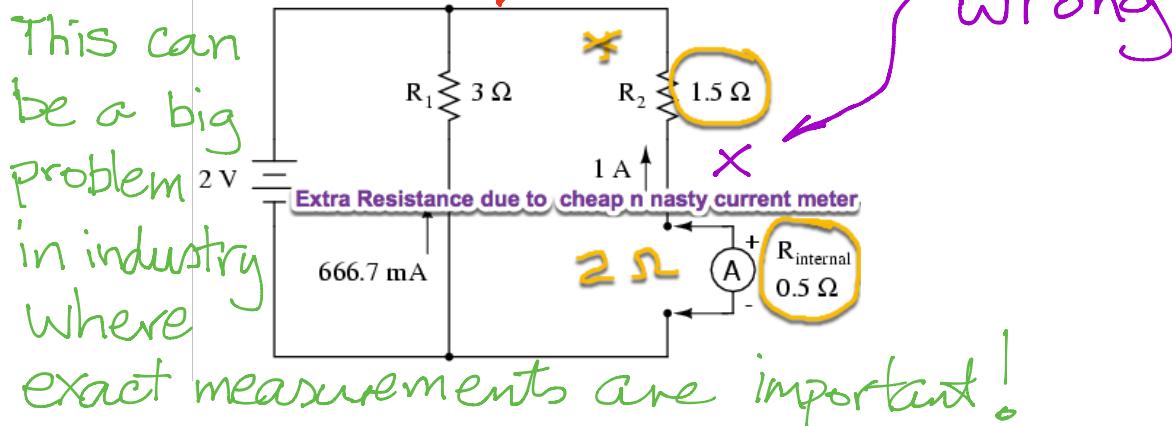
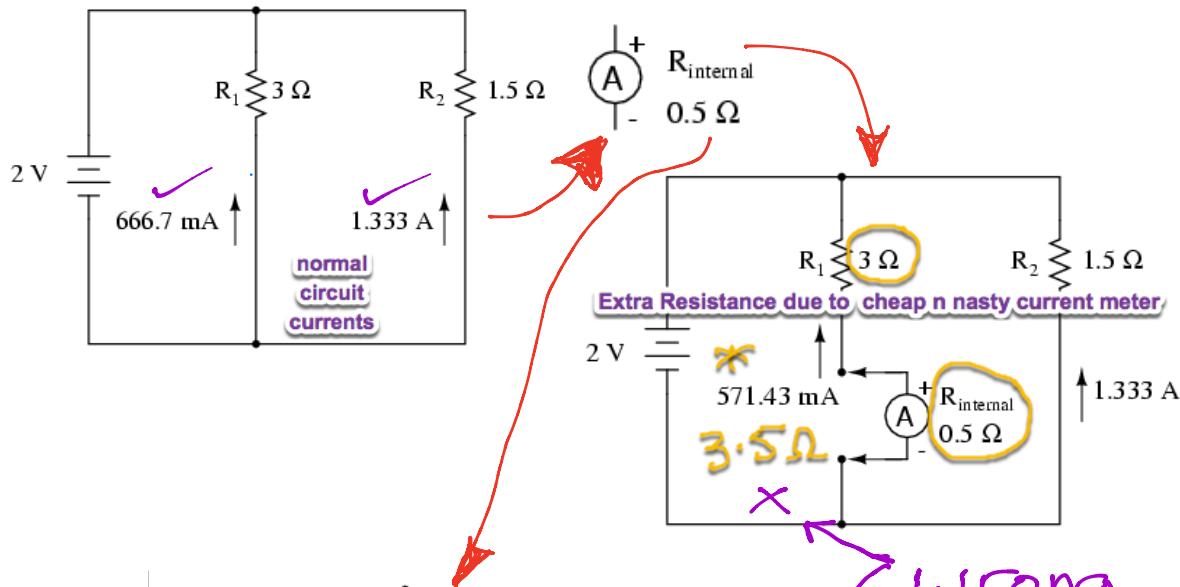
$$V_{R_2} = 0.187 \times 47 = 8.81 \text{ V}$$

Question Do the individual voltage drops add to equal the supply voltage?

$$\begin{array}{r} 6.19 + \\ 8.81 \\ \hline 15.0 \end{array}$$

More about ammeter Rint

<https://www.allaboutcircuits.com/textbook/direct-current/chpt-8/ammeter-impact-measured-circuit/>



Never use cheapo ammeters & VOLTMETERS !