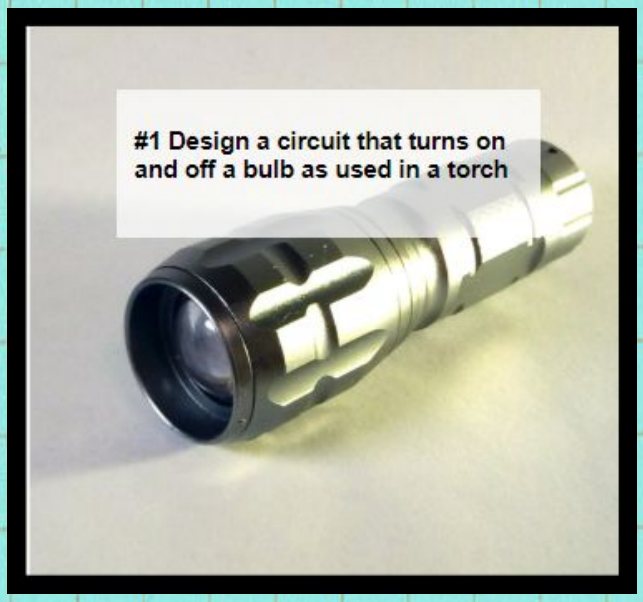
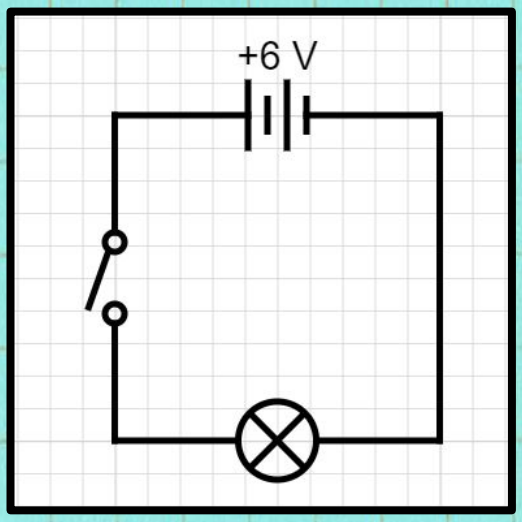
# Challenge #1

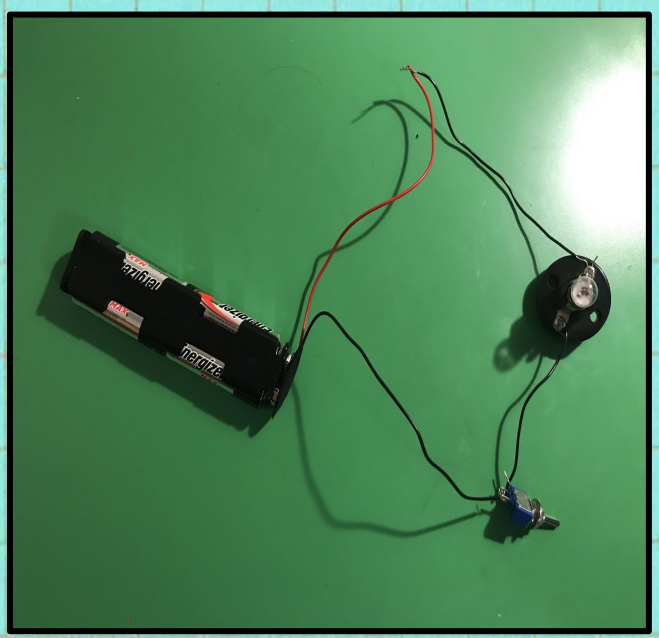



**Suggested circuit**
Battery, switch and bulb




**How circuit works**
Closing the switch allows current to flow around the circuit lighting the bulb.

**Circuit setup  using components**

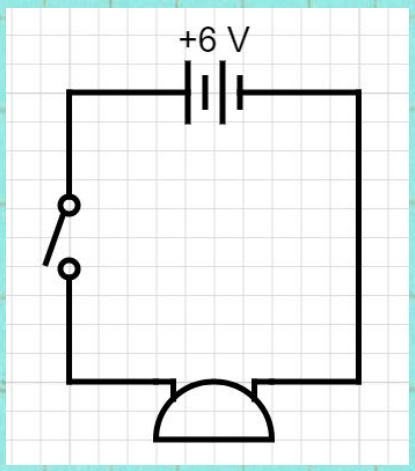


**Link to video of circuit in action**

https://youtu.be/f139wZft1xg

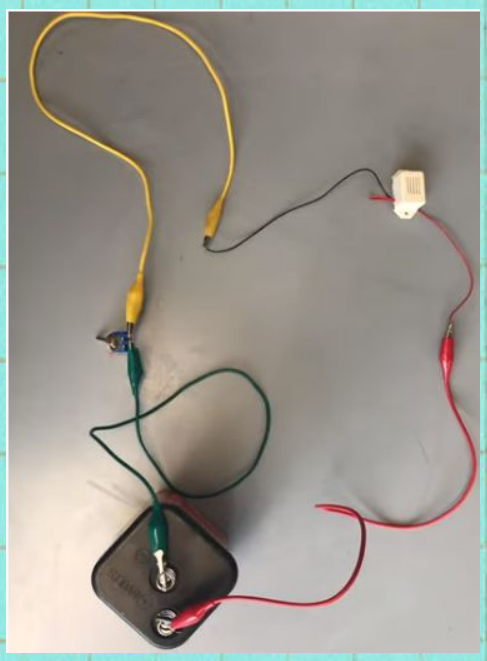
# Challenge #2


**Suggested circuit**
Battery, switch and buzzer




**How circuit works**
Closing the switch allows current to flow around the circuit causing the buzzer to make a sound

**Circuit setup using components**

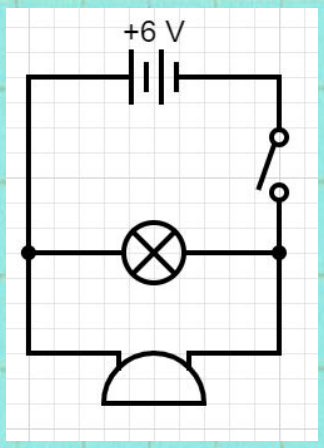


**Link to video of circuit in action**

https://youtu.be/iHa_Gj70CHI

# Challenge #3


**Suggested circuit**
Battery, switch, buzzer and bulb




**How circuit works**
The bulb and buzzer are wired in parallel. Closing the switch allows current to flow around the circuit causing the buzzer to make a sound and the bulb to light.

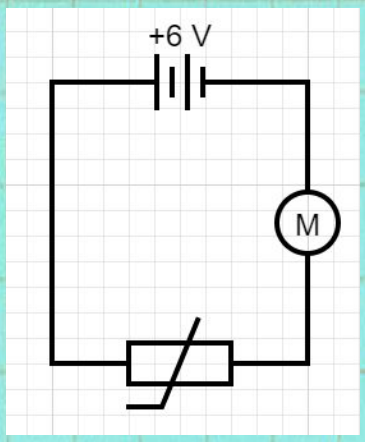
**Circuit setup using components**

**Link to video of circuit in action**

https://youtu.be/WyHF6dObxao

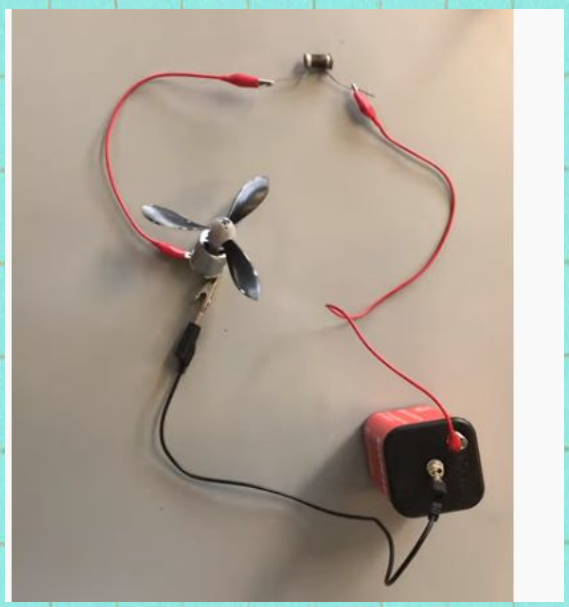
# Challenge #4


**Suggested circuit**
Battery, motor and thermistor




**How circuit works**
As the temperature increases the resistance of the thermistor decreases. At high temperature the resistance is low enough to allow a large current to flow and activate the motor.

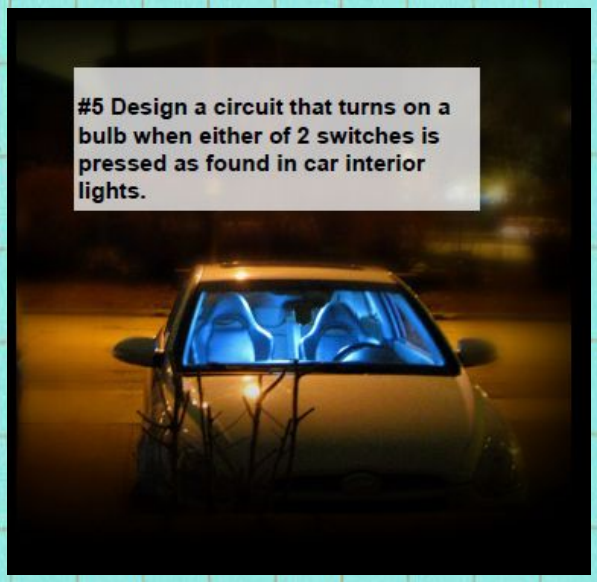
**Circuit setup using components**



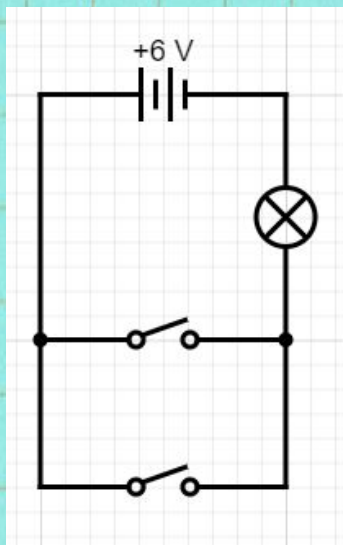
**Link to video of circuit in action**

https://youtu.be/yllT8K5h7CE

# Challenge #5




**Suggested circuit**
Battery, 2 switches and a bulb



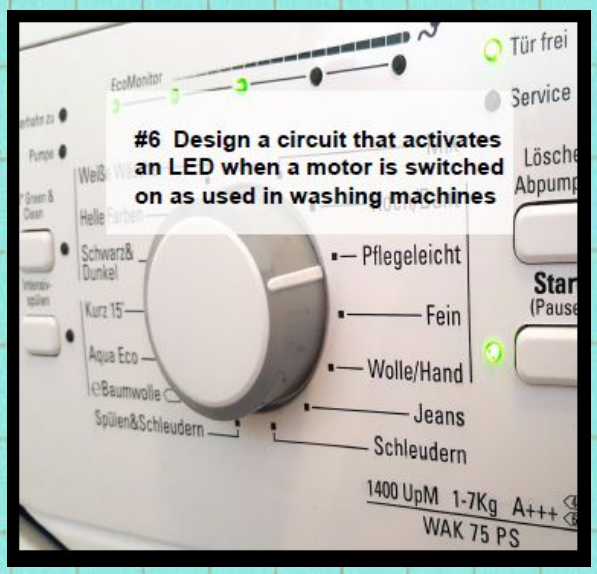

**How circuit works**
The switches are wired in parallel. Either switch completes a circuit allowing current to flow through the bulb

**Circuit setup using components**

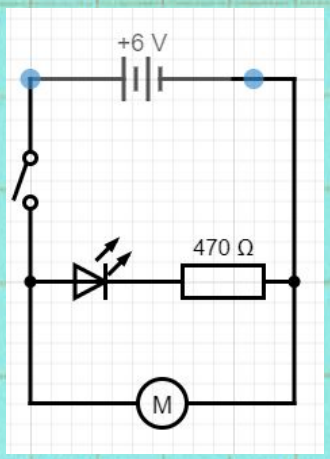
**Link to video of circuit in action**

https://youtu.be/aqNaZnm48JQ

# Challenge #6

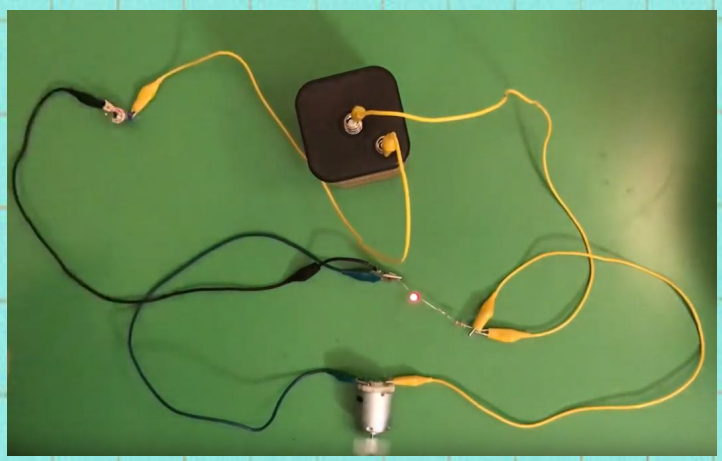



**Suggested circuit**
Battery, resistor, LED, Motor and switch




**How circuit works**
The motor and LED are connected in parallel. The LED has a resistor in series to protect it. When the switch is closed current flows through both the LED and motor.

**Circuit setup using components**

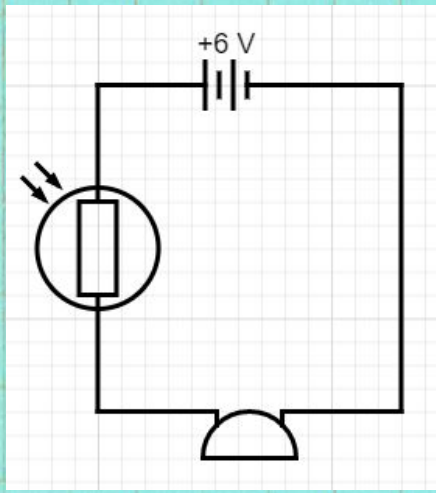


**Link to video of circuit in action**

https://youtu.be/RAqXavTH70w

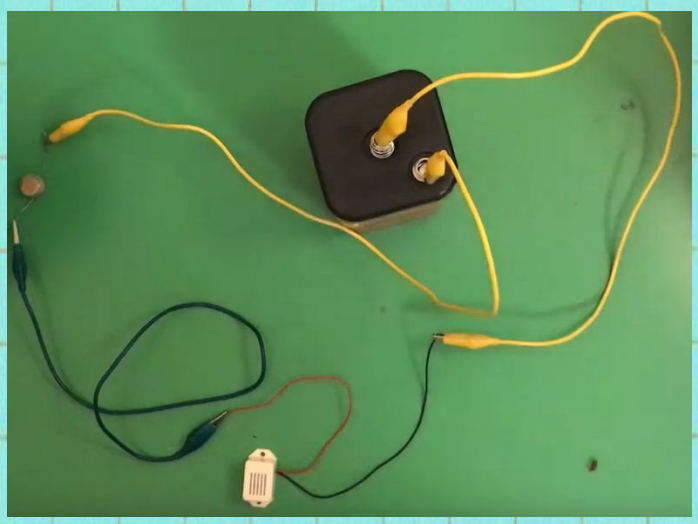
# Challenge #7


**Suggested circuit**
Battery, LDR and buzzer




**How circuit works**
When light falls on the LDR its resistance decreases allowing current to flow through the buzzer

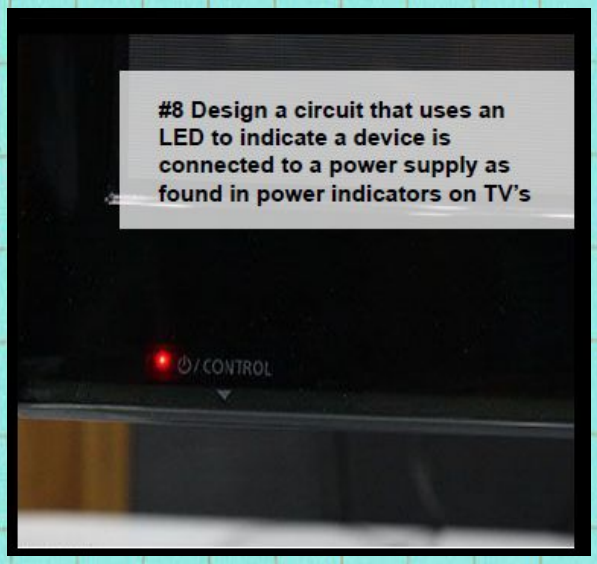
**Circuit setup using components**



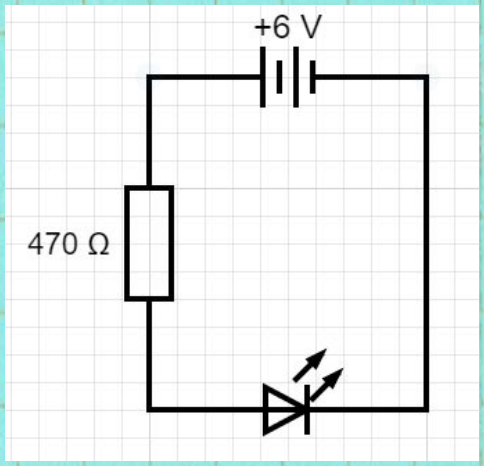
**Link to video of circuit in action**

https://youtu.be/IUT-3eODTGE

# Challenge #8

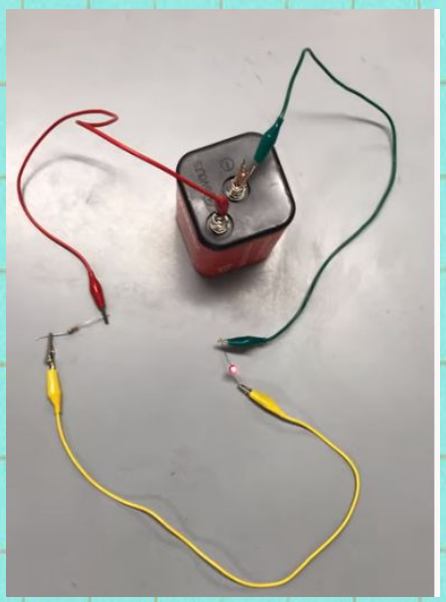



**Suggested circuit**
Battery, resistor, LED




**How circuit works**
The resistor produces light when a current passes through it. Resistors use very little power and must have a resistor in series to protect them.

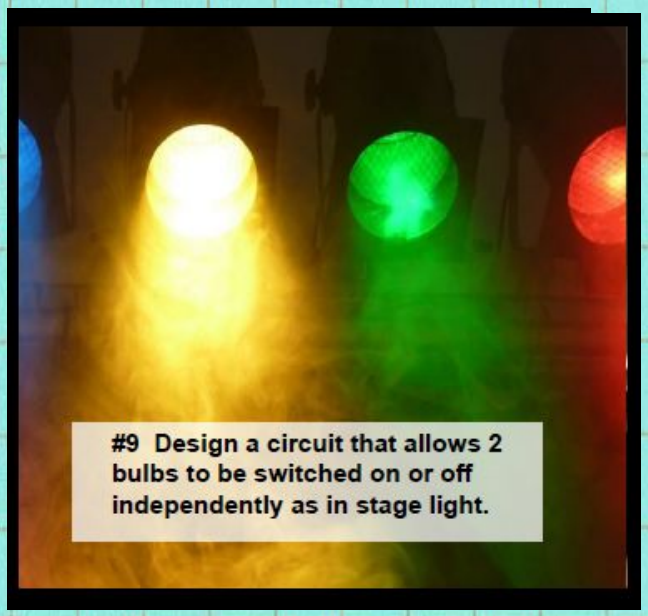
**Circuit setup using components**



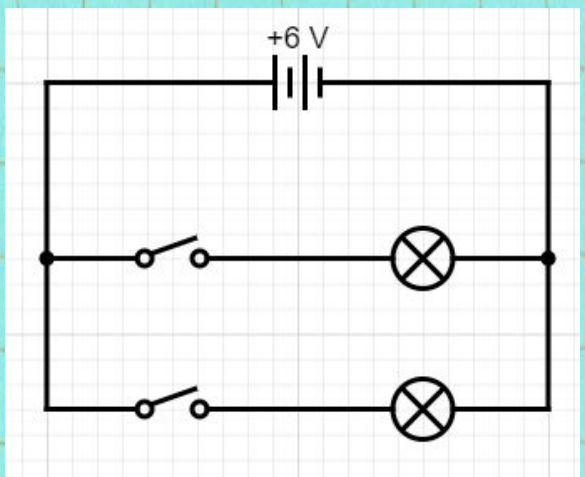
**Link to video of circuit in action**

https://youtu.be/A5O05gNThhI

# Challenge #9

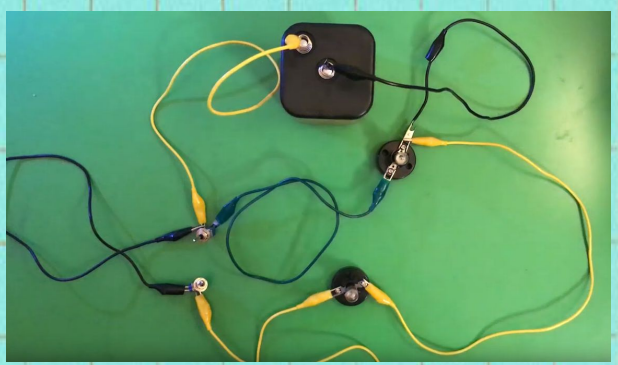



**Suggested circuit**
Battery, 2 switches and 2 bulbs




**How circuit works**
Each bulb has a switch in series. Both bulb+switch systems are connected in parallel.

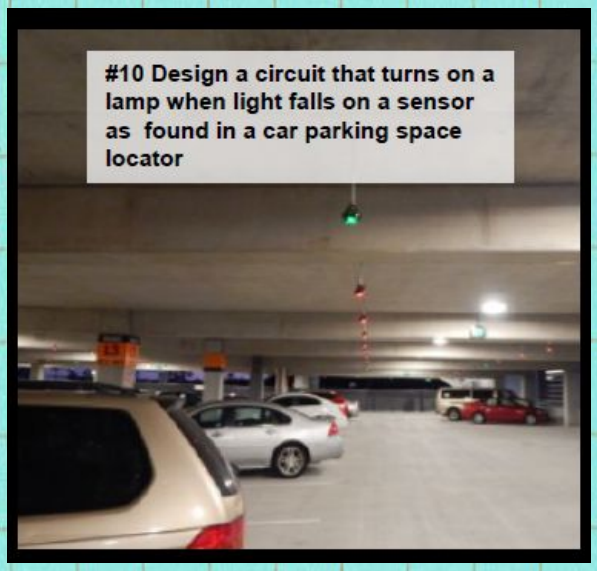
**Circuit setup using components**



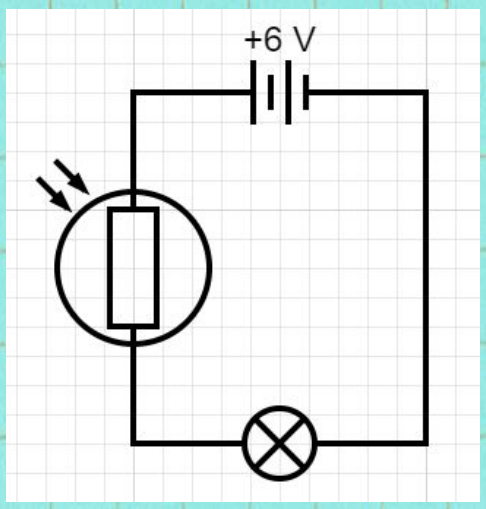
**Link to video of circuit in action**

https://youtu.be/H28a2_1B2RM

# Challenge #10

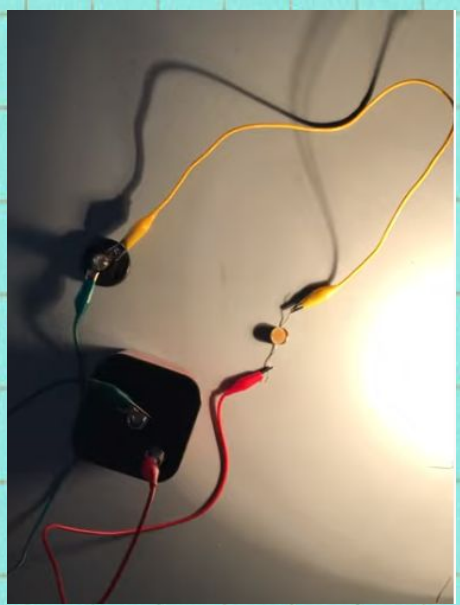



**Suggested circuit**
Battery, LDR and bulb




**How circuit works**
In bright light the LDR has low resistance and allows current to flow through the bulb. In darkness the LDR has a high resistance and the flow of current through the bulb is reduced.

**Circuit setup using components**

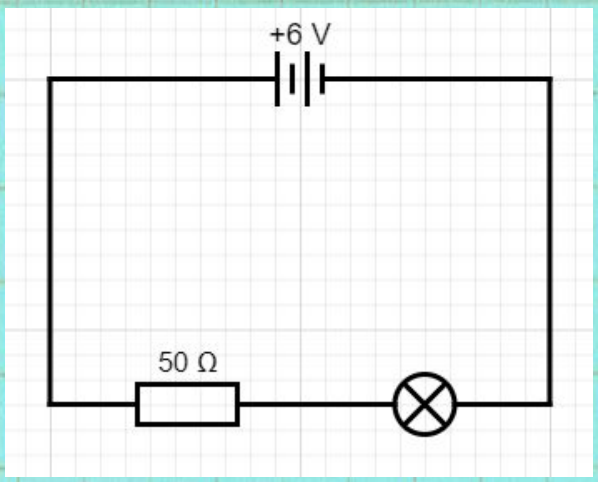


**Link to video of circuit in action**

https://youtu.be/l3NZnNVLDIU

# Challenge #11


**Suggested circuit**
Battery, resistor and bulb



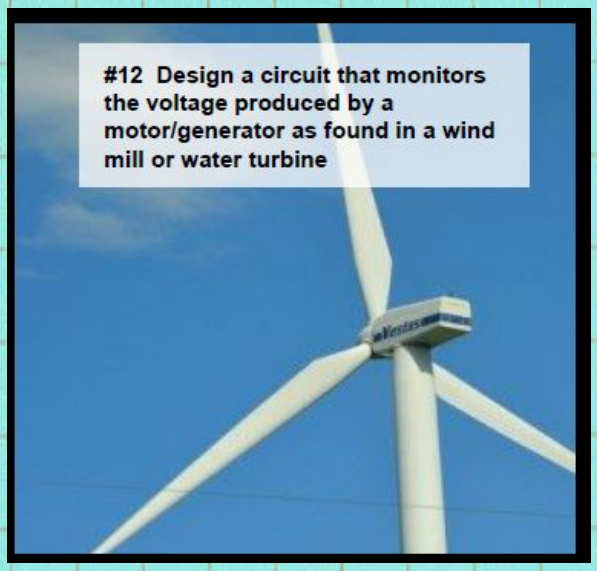

**How circuit works**
The resistor reduces the flow of current through the bulb

**Circuit setup using components**

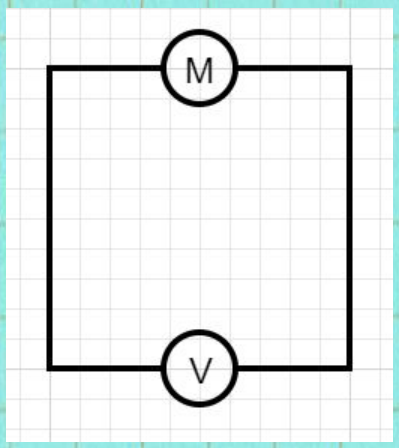
**Link to video of circuit in action**

https://youtu.be/da7hbxg91gw

# Challenge #12




**Suggested circuit**
Motor and voltmeter



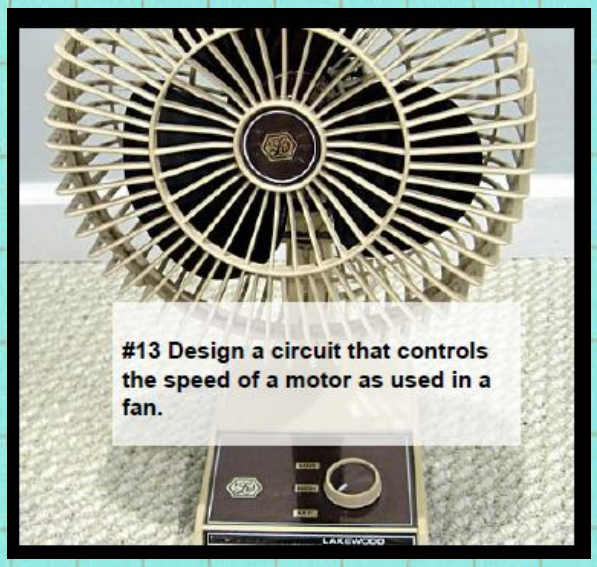

**How circuit works**
Motors can act as generators. When the motor is turned a voltage or potential difference is produced which can be measured with a voltmeter. The faster the motor is turned the higher the voltage produced.

**Circuit setup using components**

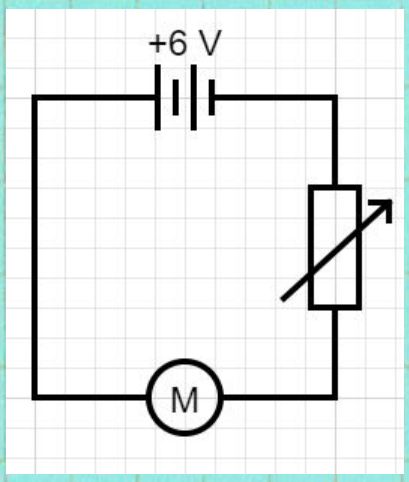
**Link to video of circuit in action**

https://youtu.be/hUNXavame88

# Challenge #13

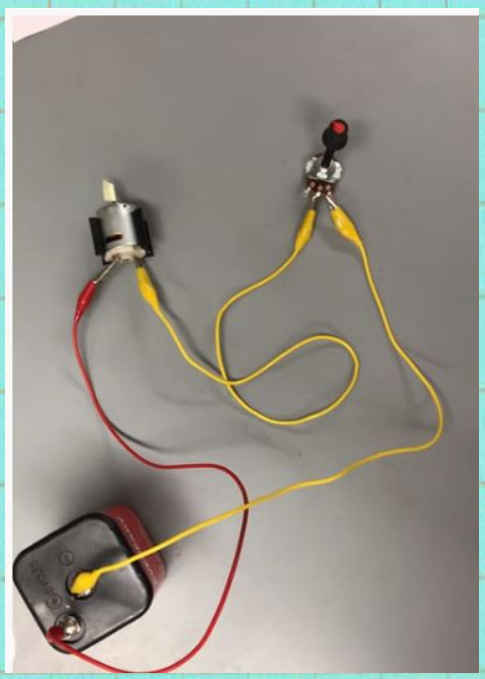



**Suggested circuit**
Battery, variable resistor and motor




**How circuit works**
As the resistance of the variable resistor is decreased, the current through the motor increases and it turns faster.

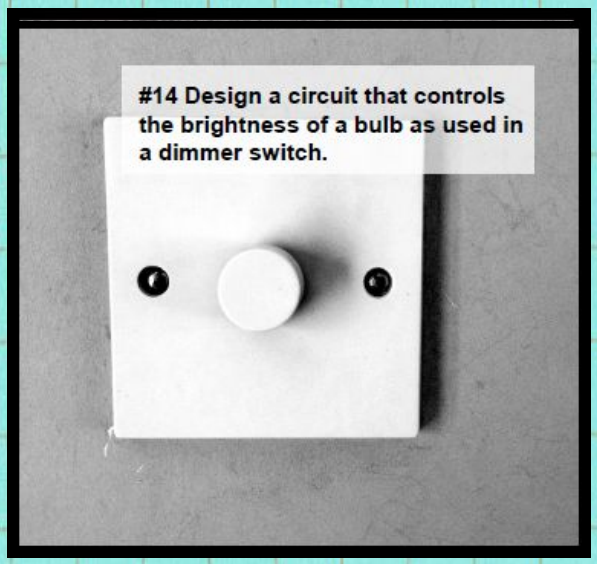
**Circuit setup using components**



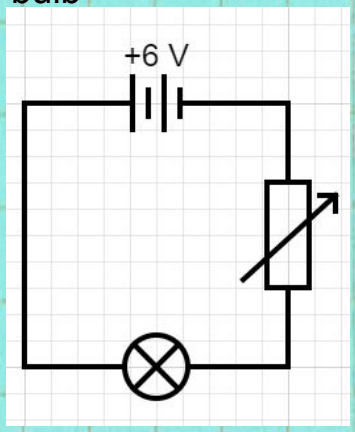
**Link to video of circuit in action**

https://youtu.be/cgZfzWLbzr8

# Challenge #14

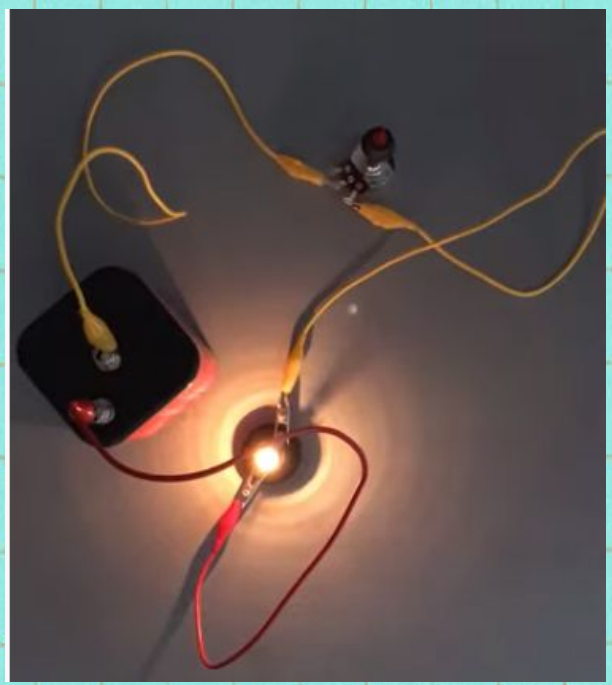



**Suggested circuit**
Battery,variable resistor and bulb




**How circuit works**
As the resistance of the variable resistor is decreased, the current through the lamp increases and it becomes brighter.

**Circuit setup  using components**

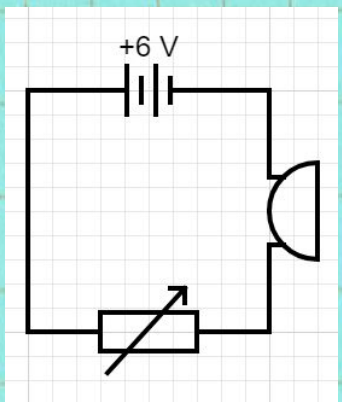


**Link to video of circuit in action**

https://youtu.be/Fvpzsn0ypqE

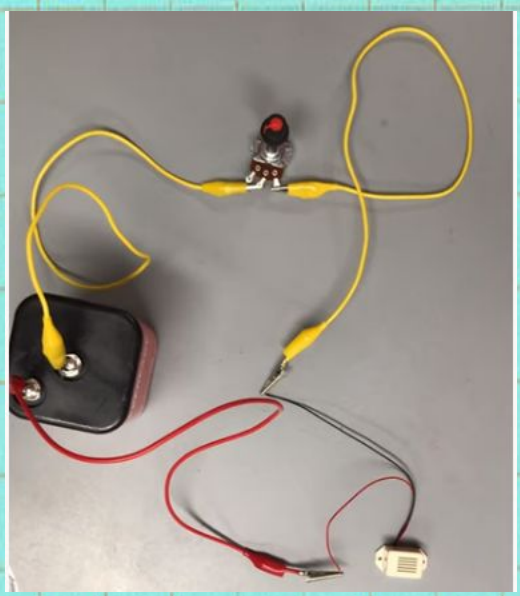
# Challenge #15


**Suggested circuit**
Battery, variable resistor and buzzer.




**How circuit works.**
As the resistance of the variable resistor is decreased, the current through the buzzer increases and it becomes louder.

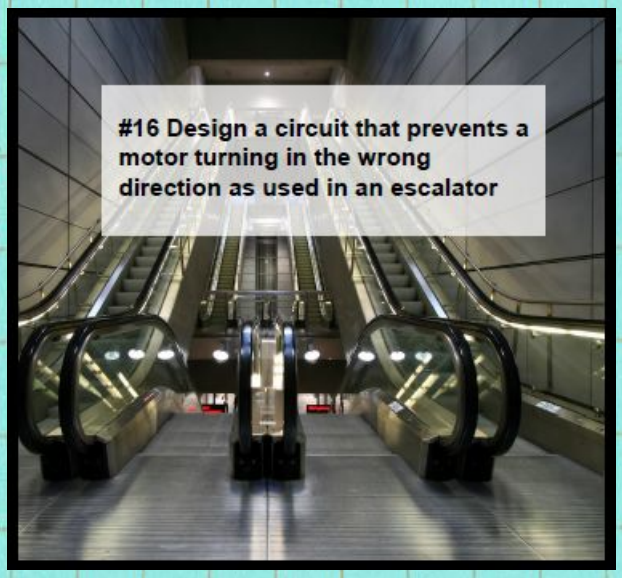
**Circuit setup using components**



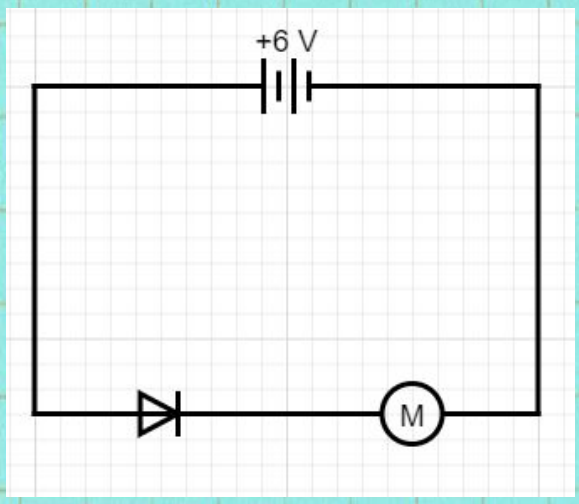
**Link to video of circuit in action**

https://youtu.be/S_qDZ7LUxRc

# Challenge #16




**Suggested circuit**
Battery, diode and motor



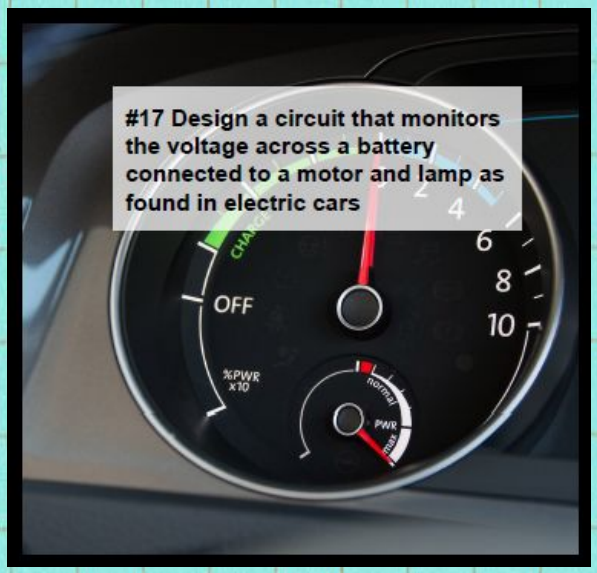

**How circuit works**
Diodes only allow current to flow in one direction.

**Circuit setup  using components**

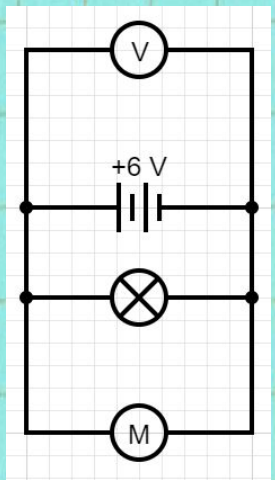
**Link to video of circuit in action**

https://youtu.be/9Fwd9vNCLPY

# Challenge #17

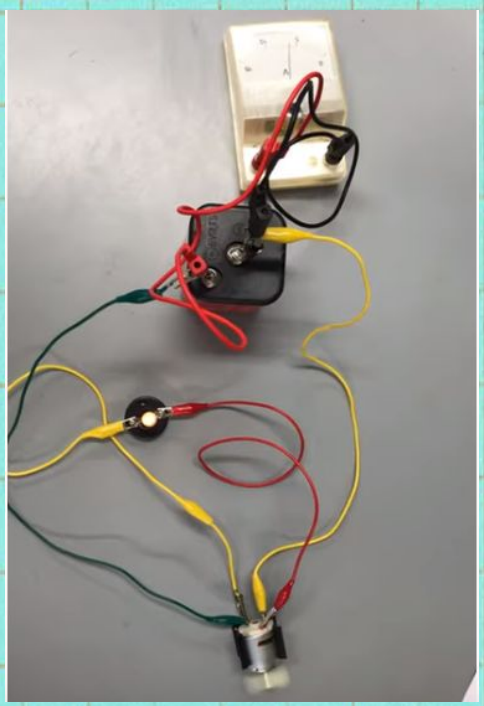



**Suggested circuit**
Battery, bulb, motor and voltmeter.




**How circuit works**
The voltmeter is connected in parallel to the battery. The motor and lamp are connected in parallel to the battery also.

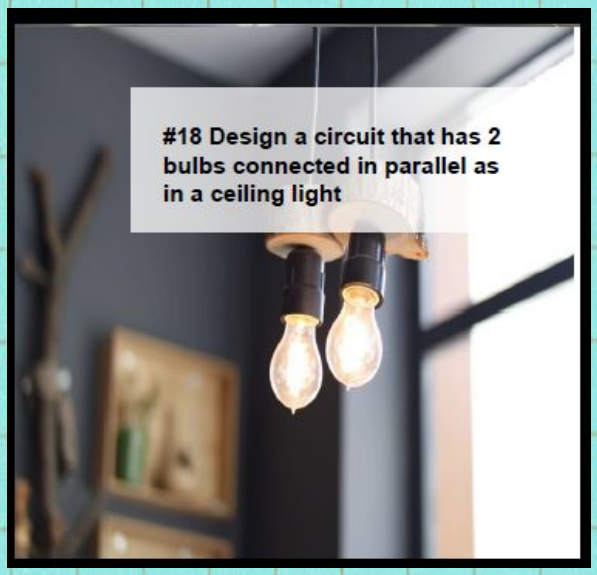
**Circuit setup using components**



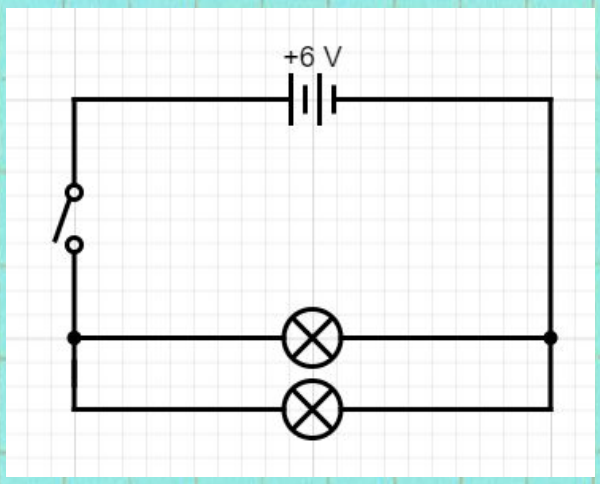
**Link to video of circuit in action**

https://youtu.be/Rv8WIwL2o3w

# Challenge #18

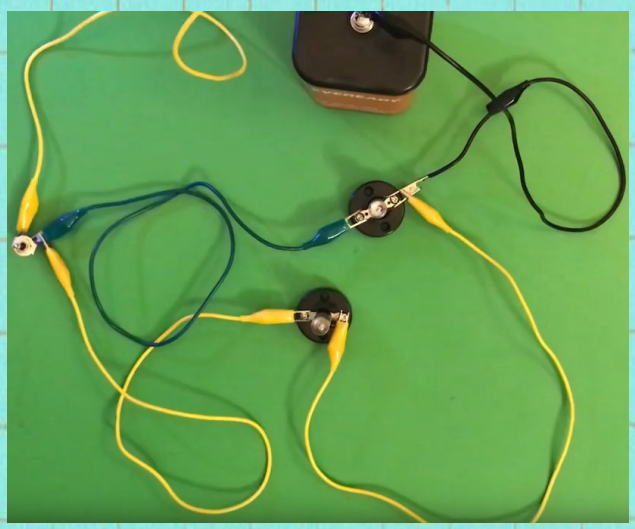



**Suggested circuit**
Battery, switch and 2 bulbs




**How circuit works**
Closing the switch allows current to flow through both bulbs connected in parallel. Bulbs in parallel are brighter than bulbs in series .

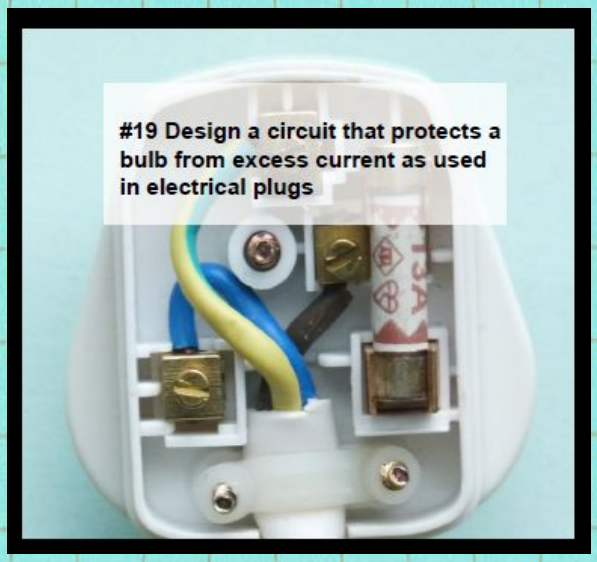
**Circuit setup  using components**



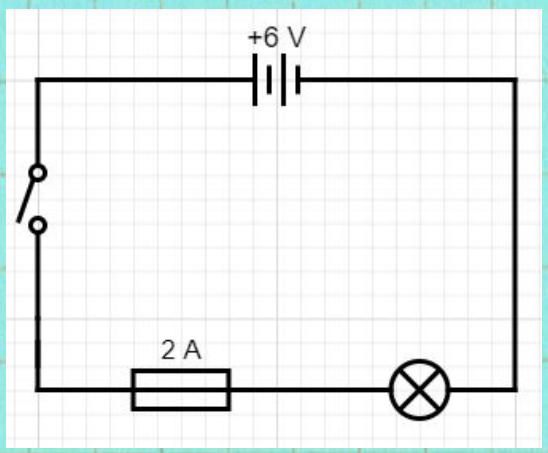
**Link to video of circuit in action**

https://youtu.be/KJlVL5CrcEg

# Challenge #19

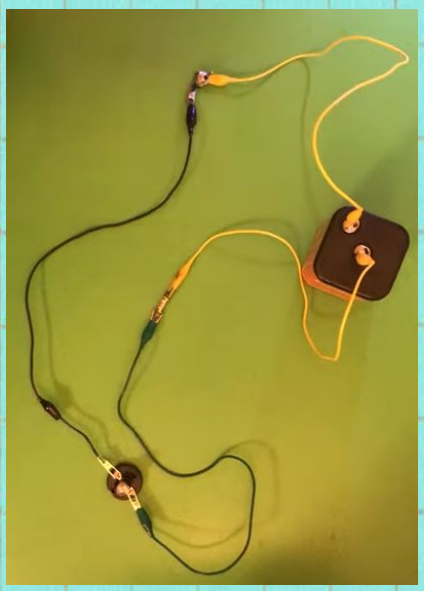



**Suggested circuit**
Battery, switch, fuse and bulb




**How circuit works**
The fuse is connected in series with the bulb. The small wire inside the fuse will melt and break the circuit if the current is too great.

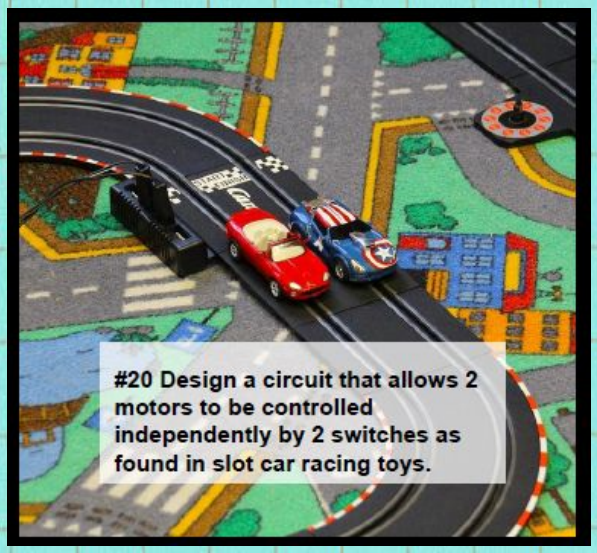
**Circuit setup using components**



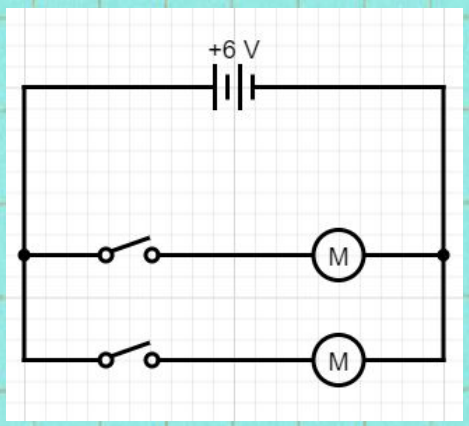
**Link to video of circuit in action**

https://youtu.be/gwc04FifcGw

# Challenge #20

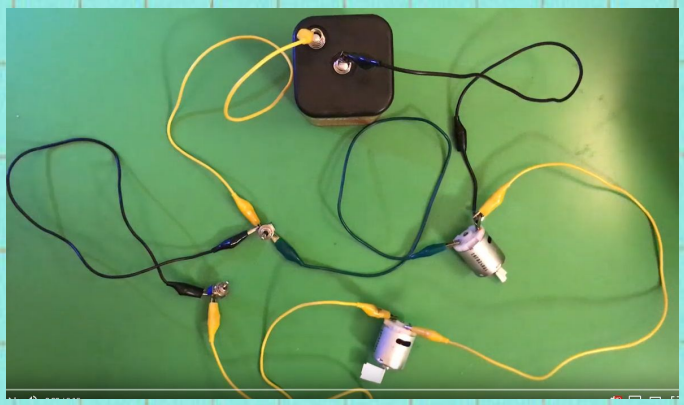



**Suggested circuit**
Battery, 2 switches and 2 motors




**How circuit works**
Each motor has a switch in series. Both motor+switch systems are connected in parallel.

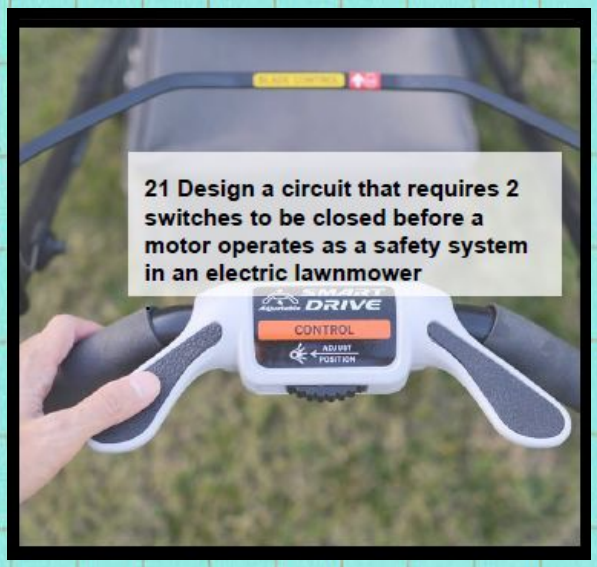
**Circuit setup using components**



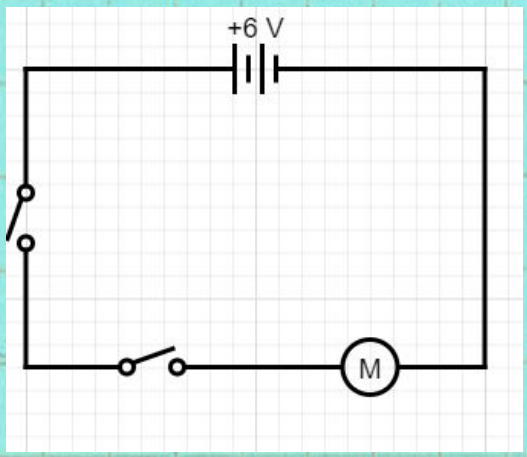
**Link to video of circuit in action**

https://youtu.be/lvizmDUy-i4

# Challenge #21

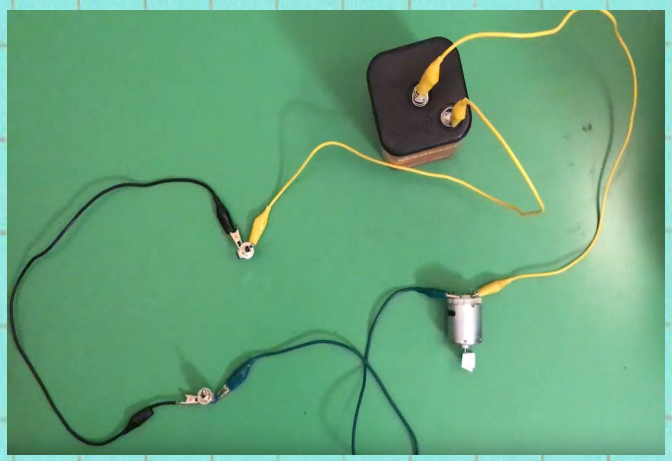



**Suggested circuit**
Battery, 2 switches and motor




**How circuit works**
Both switches are connected in series with a motor. Both switches must be closed for current to pass through the motor

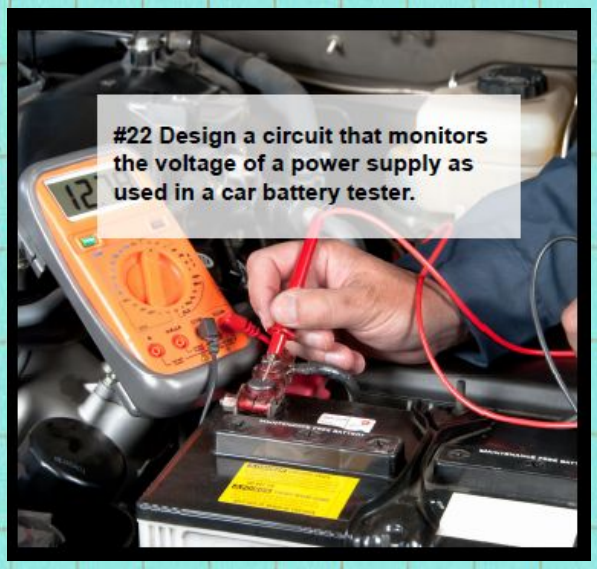
**Circuit setup using components**



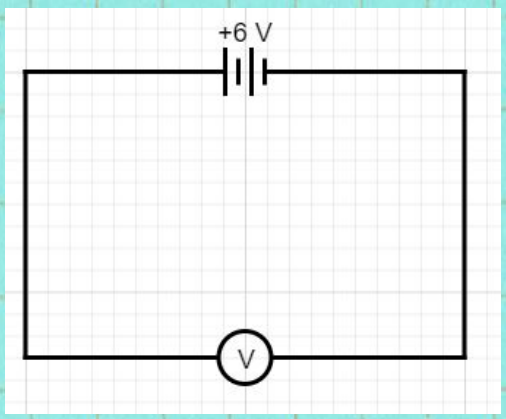
**Link to video of circuit in action**

https://youtu.be/suEDYMvGma8

# Challenge #22




**Suggested circuit**
Battery, voltmeter



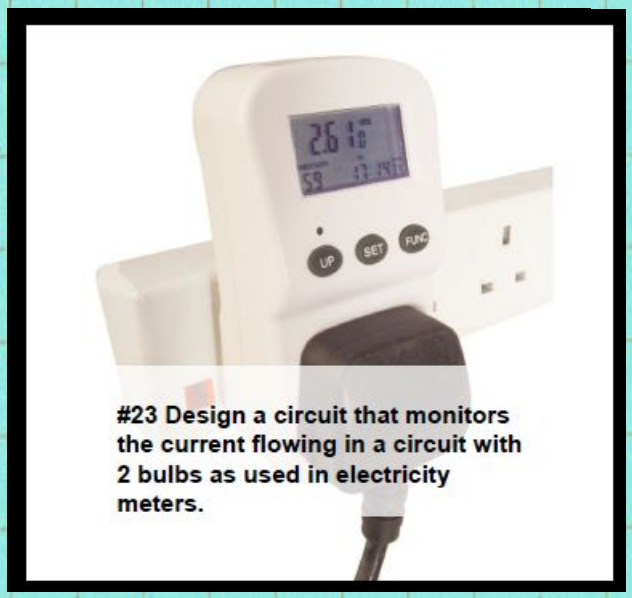

**How circuit works**
Voltmeters are always connected in parallel to devices.

**Circuit setup  using components**

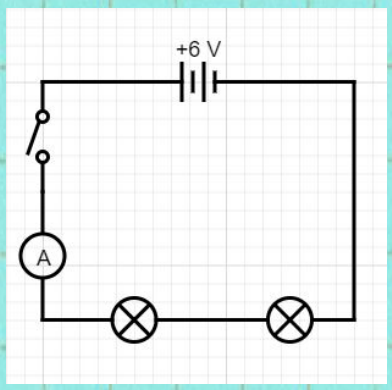
**Link to video of circuit in action**

https://youtu.be/yEMRJCmMisI

# Challenge #23

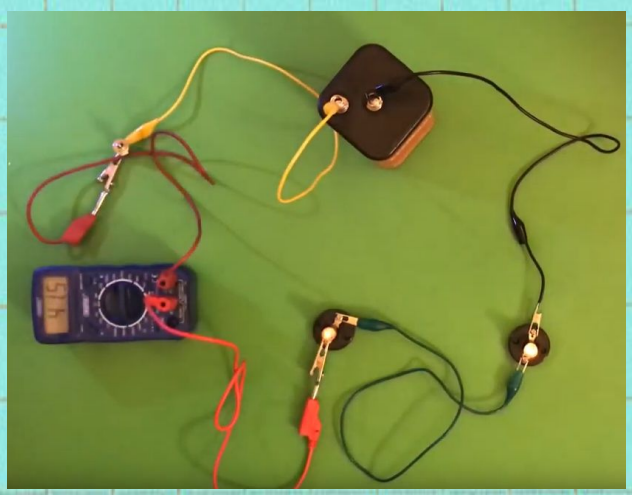



**Suggested circuit**
Battery, switch, ammeter and 2 bulbs.




**How circuit works**
Both bulbs are connected in series to an ammeter which monitors the current flowing in a circuit. Ammeters are always connected in series in a circuit.

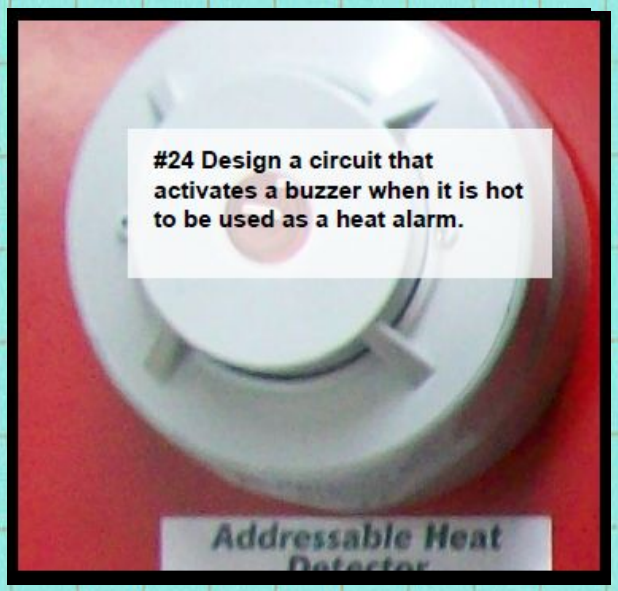
**Circuit setup using components**



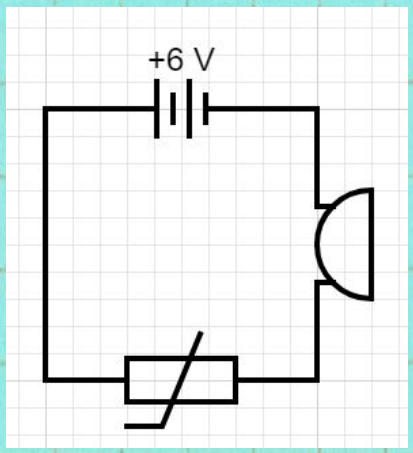
**Link to video of circuit in action**

https://youtu.be/rPZwl_IA8k0

# Challenge #24

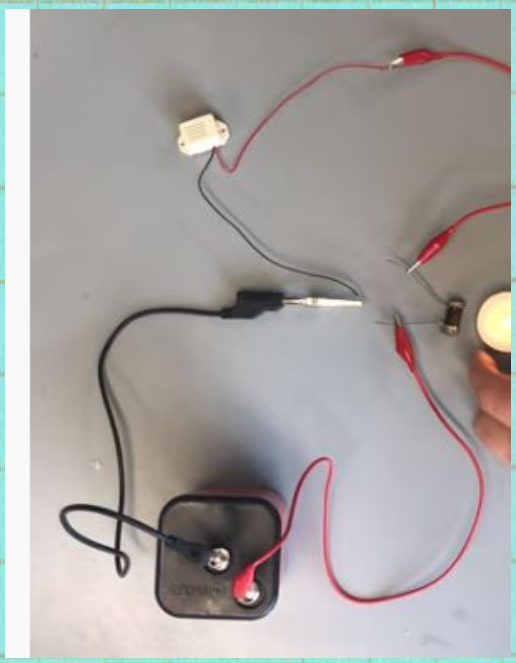



**Suggested circuit**
Battery, thermistor and buzzer




**How circuit works**
As the temperature increases the resistance of the thermistor decreases. At high temperature the resistance is low enough to allow a large current to flow and activate the buzzer

**Circuit setup using components**



**Link to video of circuit in action**

https://youtu.be/OK542vygi5k