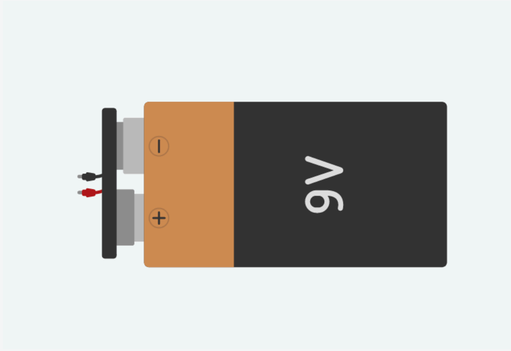
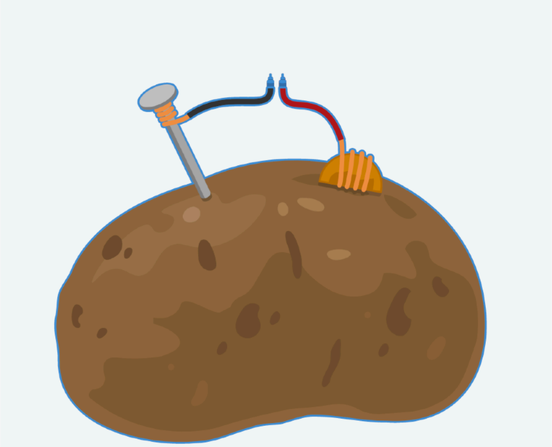
STARLIGHT EDUCATION

Electrical Circuits
Energy Sources

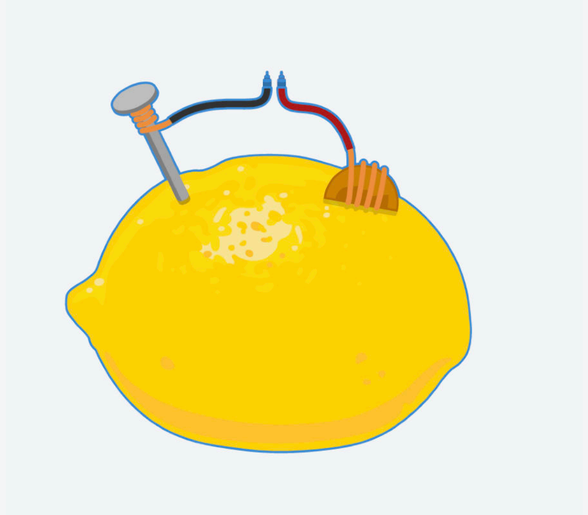
Energy Sources



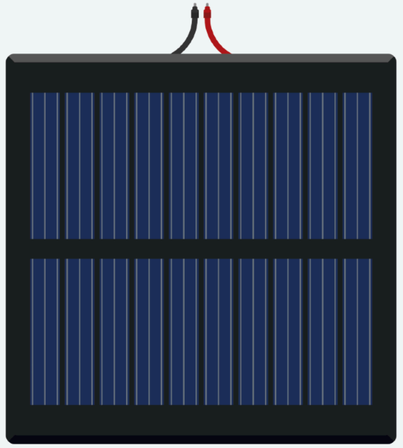
Energy Source
Battery



Energy Source
Potato



Energy Source
Lemon



Energy Source
Solar

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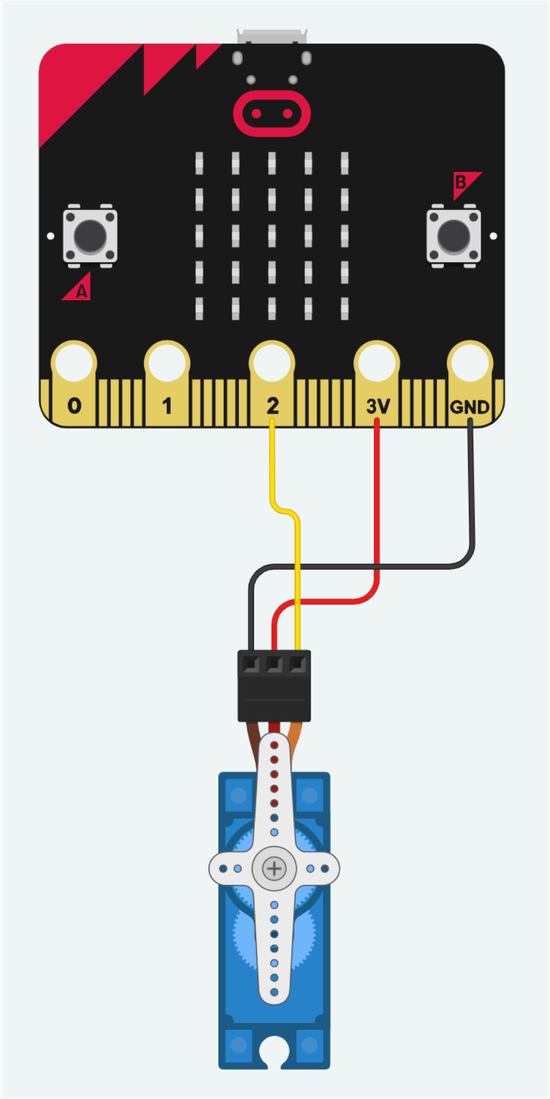
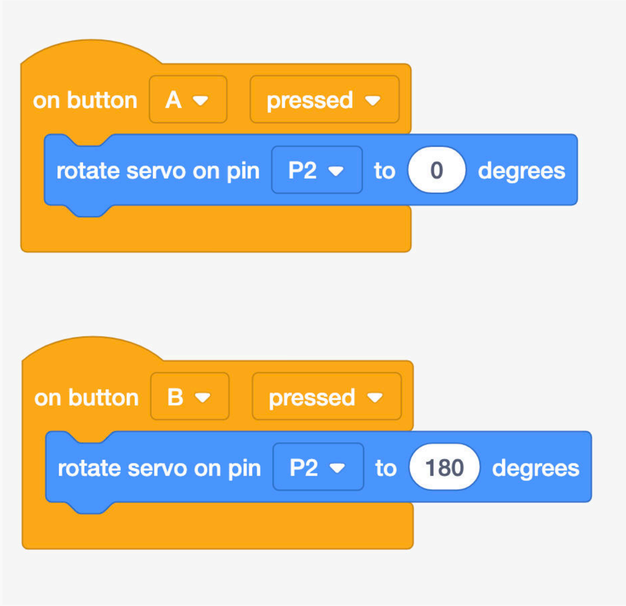
Electrical Circuits
Electrical Switches





Code Example

In this example, we have connected the Servo to a micro:bit. We are using Pin 2 as the Signal wire (Yellow) to control the Servo.

Please note, you need to use Pin 2 on the micro:bit and the Servo can only rotate from 0 to 180 degrees.

Try this Circuit in the Simulator and make the Servo move.

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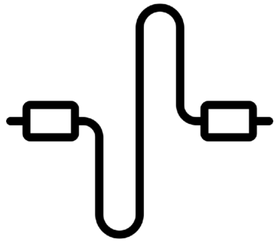
ELECTRICAL CIRCUITS

An electric circuit is a path for transmitting electric current. An electric circuit includes a device that gives energy to the charged particles constituting the current, such as a battery or a generator; devices that use current, such as lamps, electric motors, or computers; and the connecting wires or transmission lines.

Energy Source
Battery

Energy Use
Lamp



Connections
Wires

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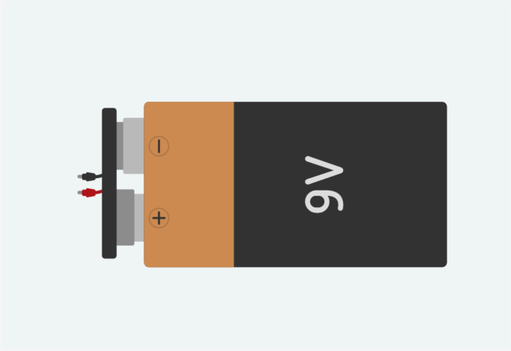
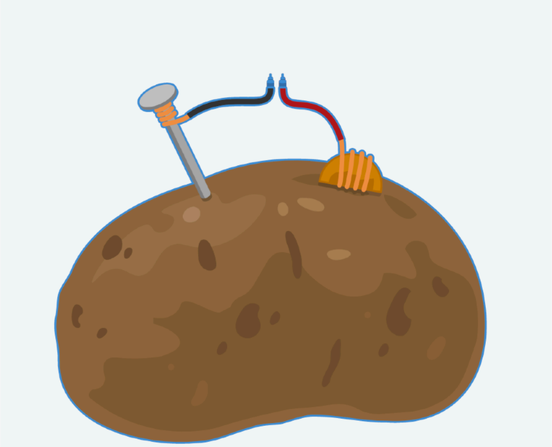
Electrical Circuits
Energy Sources

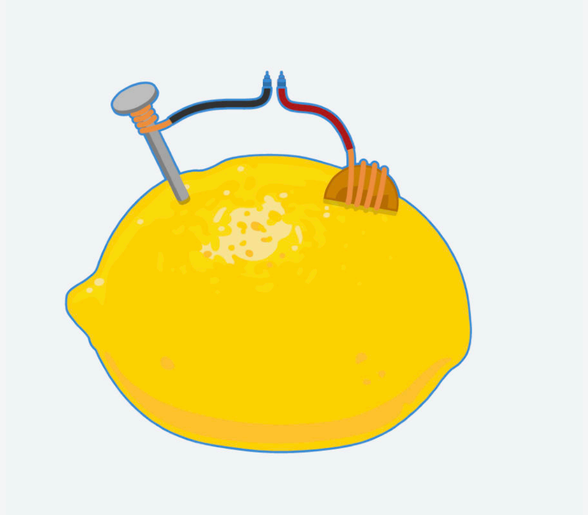
Energy Sources



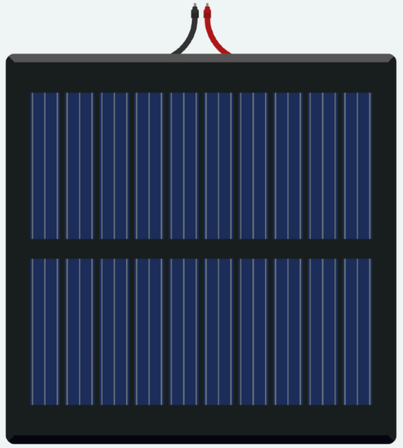
Energy Source
Battery



Energy Source
Potato



Energy Source
Lemon



Energy Source
Solar

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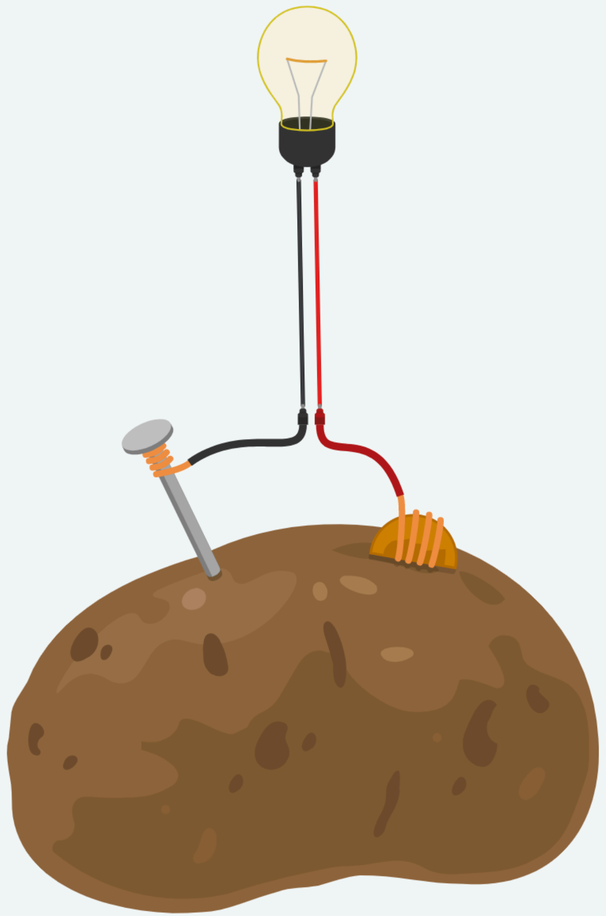
Electrical Circuits

Power Sources



Did you know?

The potato battery is a type of Electrochemical Battery. Certain metals (zinc in the demonstration) experience a chemical reaction with the acids inside of the potato. This chemical reaction creates the electrical energy that can power a small device like a lamp.

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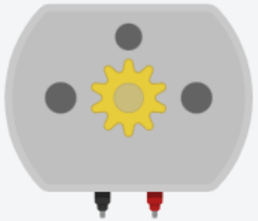
Electrical Circuits
Energy Users

Energy Users

Energy User
Light



Energy User
Motor

Energy User
Speaker

Energy User
Servo

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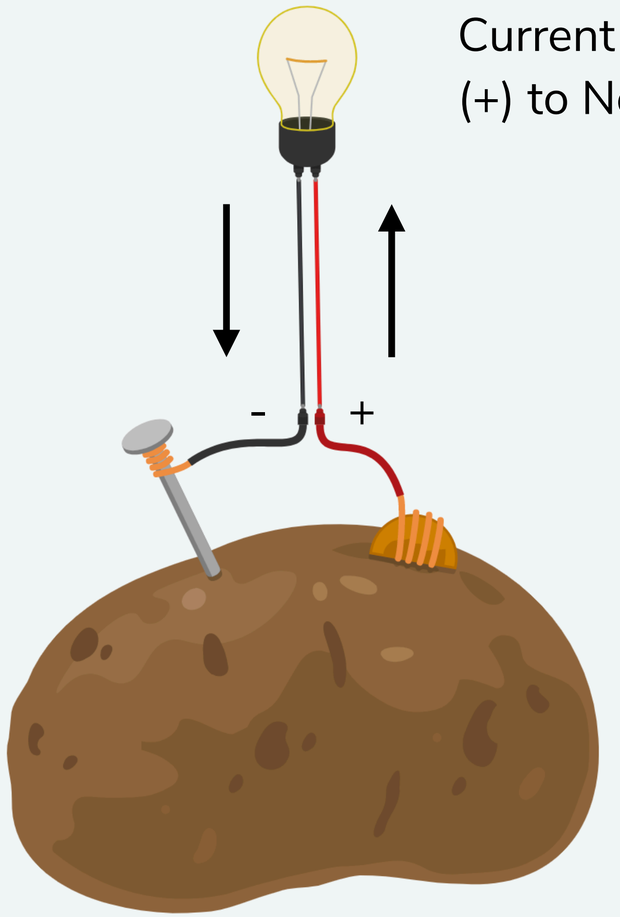
Electrical Circuits

Connectors (Wires)



Current flow, Positive (+) to Negative (-)

Wires

When creating electric circuits, the different components (like a battery or a lamp) are connected with wires. If the wires are connecting to a power source (like a battery) the standard is that Positive (+) is using RED Wires and negative (-) is using BLACK Wires. Please use this standard when designing your circuits.

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Design Your Own Circuit

Simple Solar Power

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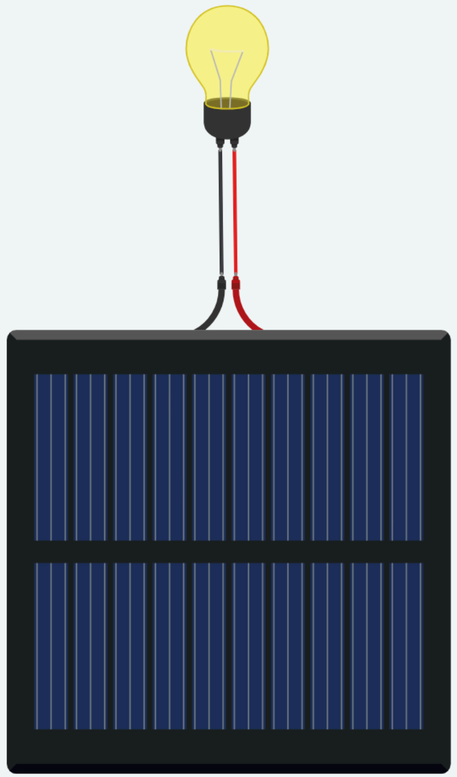

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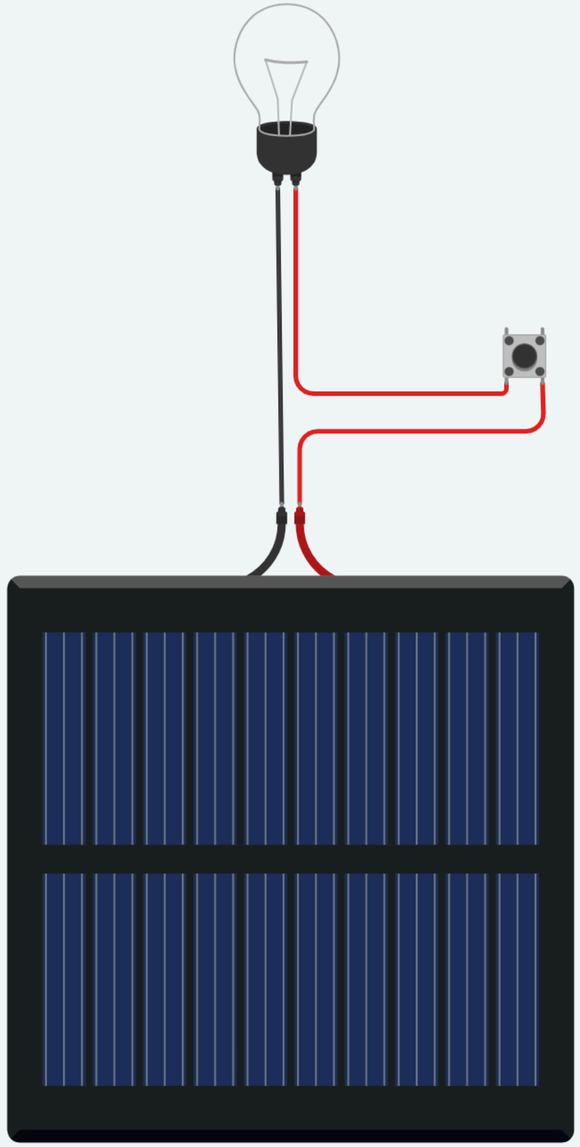
Electrical Circuits
Buttons



Buttons - Open & Closed Circuits

A button can be added to a Circuit to make it either Closed or Open.

An open Circuit can not conduct the current as the path for the current is broken.

A closed circuit, is when the current can freely flow from the positive pole on the energy source to the negative pole.

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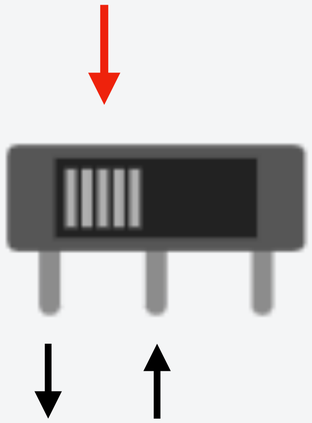
Electrical Circuits
Switches

A Switch

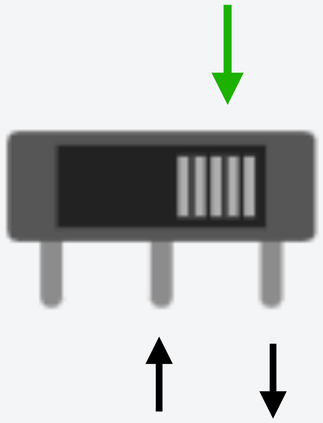
Switch Position Left



Current flow

The current flow Changes when you change the Switch Position (Left or Right)

Switch Position Right



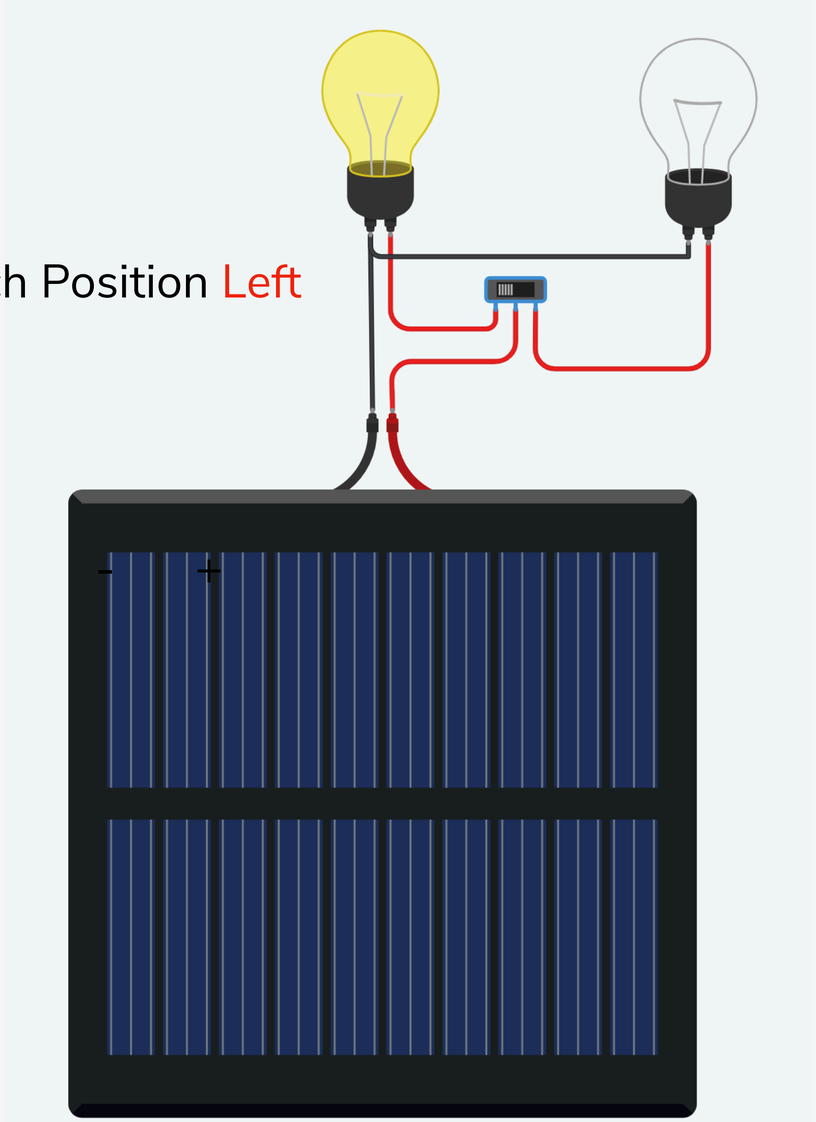
Current flow

STARLIGHT EDUCATION

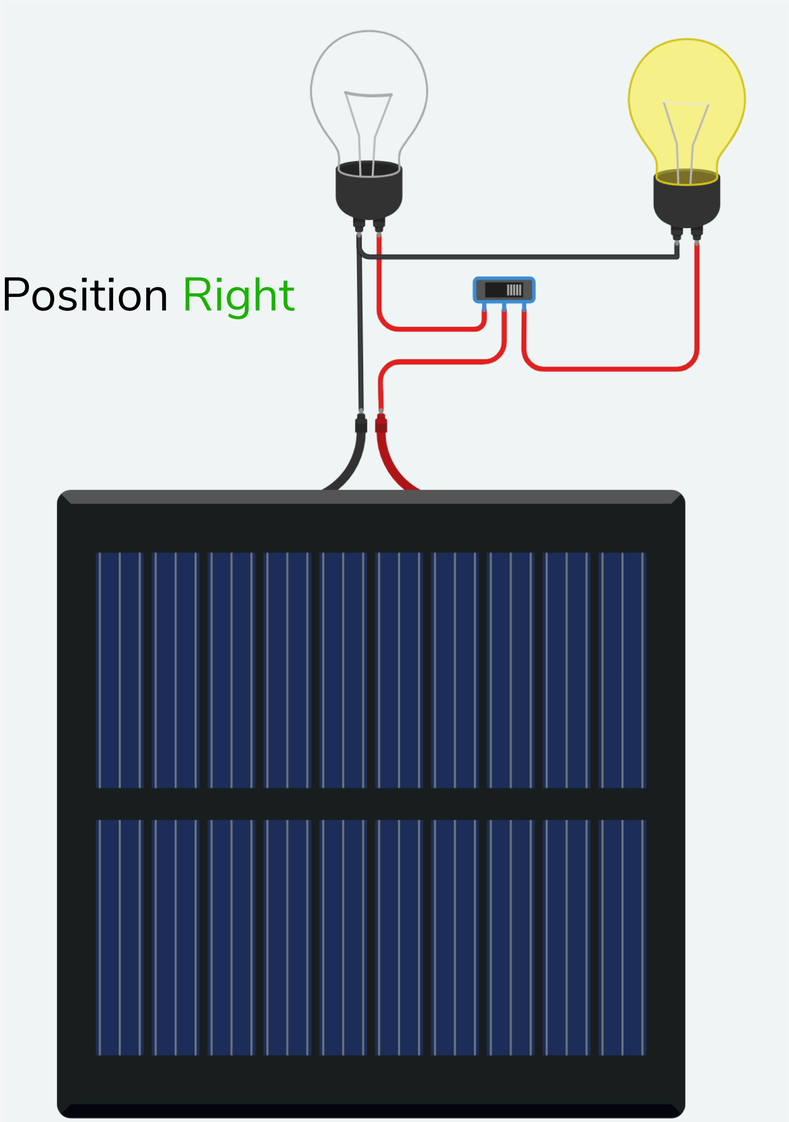
Electrical Circuits

Switches

Switch Position Left



Switch Position Right



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Design Your Own Circuit

Switched Circuit

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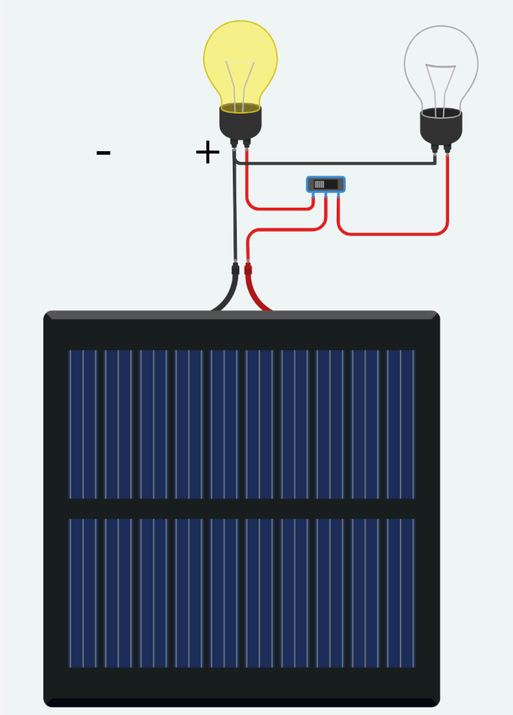

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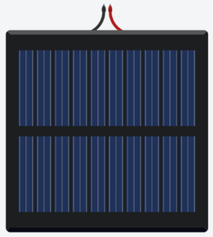
Your assistant robot needs a new power source and a motor switch to work properly. Can you design a circuit that use the components below to power and run the two drive motors? A switch should be used to decide witch motor is on (rotating).

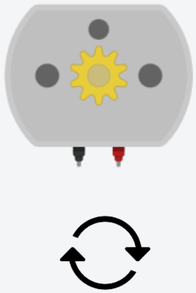
It is a critical requirement that one of the motors should rotate clockwise and the other counter-clockwise to make the system work correctly.

Hint! The motor will spin in different directions depending on the flow of current.

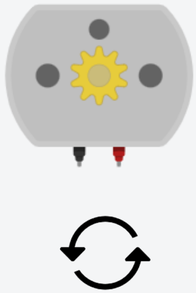
Power Source



Motor 1



Motor 2



Current Switch

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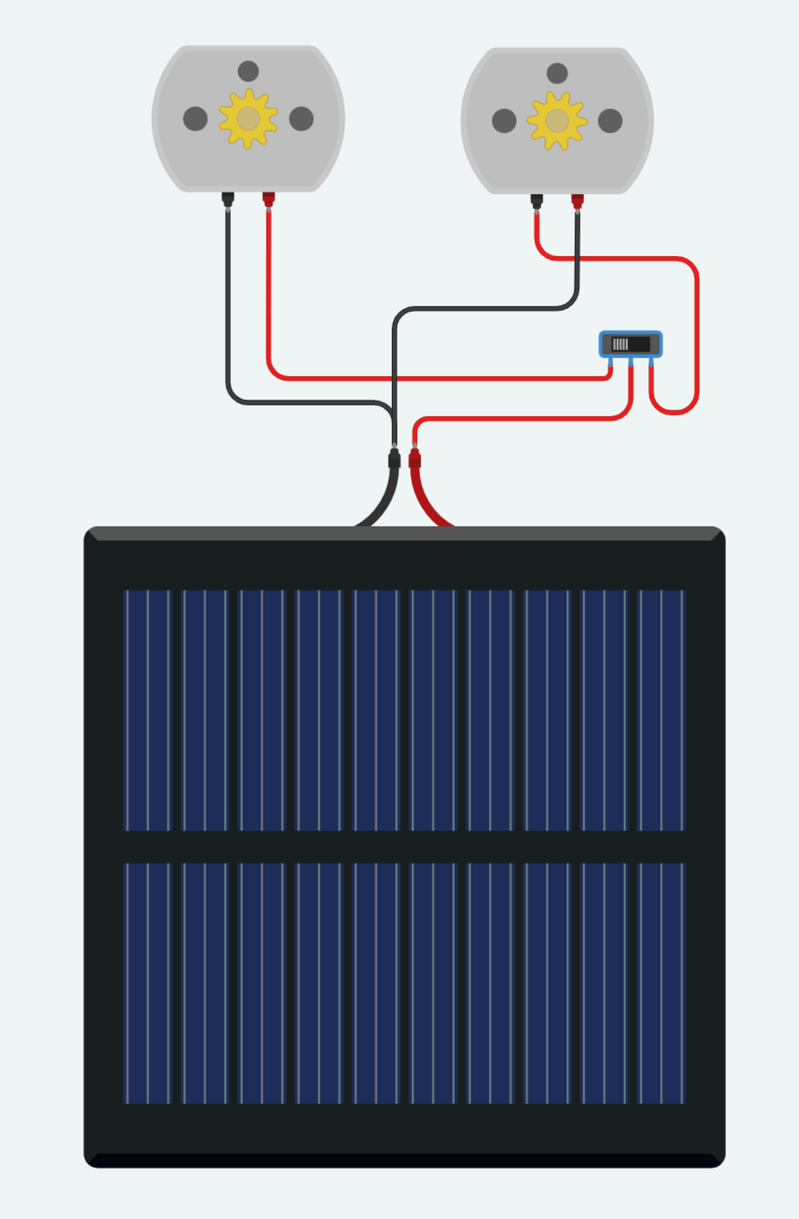
Electrical Circuits

Motor Challenge



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Design Your Own Circuit

Extension Challenge - Servos

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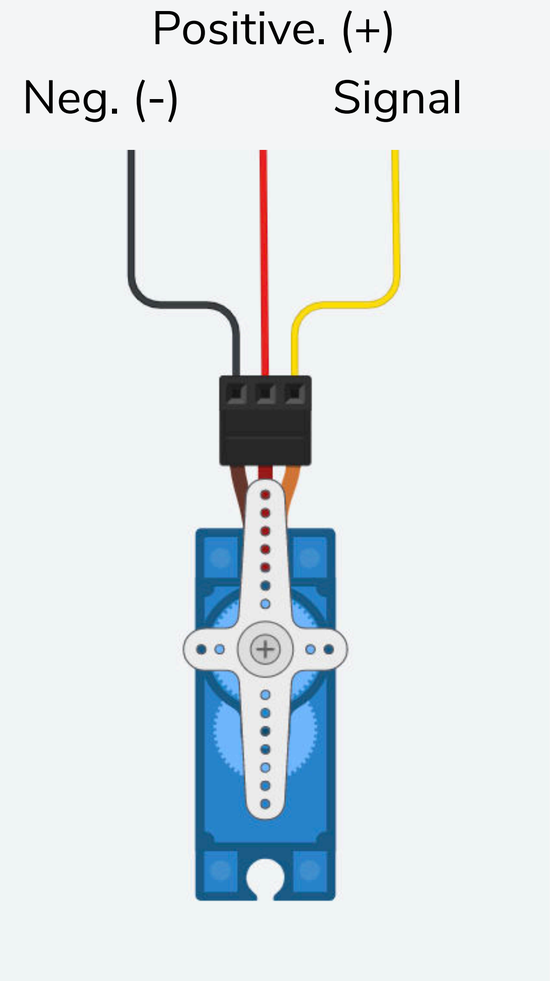
Electrical Circuits
Electrical Switches



What is a servo?

A Servo is a small motor that we can use to move for example a Robot arm. The Servo has three connections, Negative (-), Positive (+), and a Signal wire. By connecting the Signal wire to a micro:bit, we can control the motion of the motor. We can for example send a signal to rotate the Servo 90 or 180 degrees.