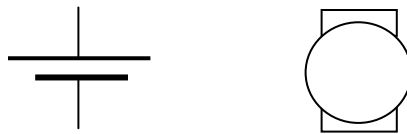


## Basic Switching

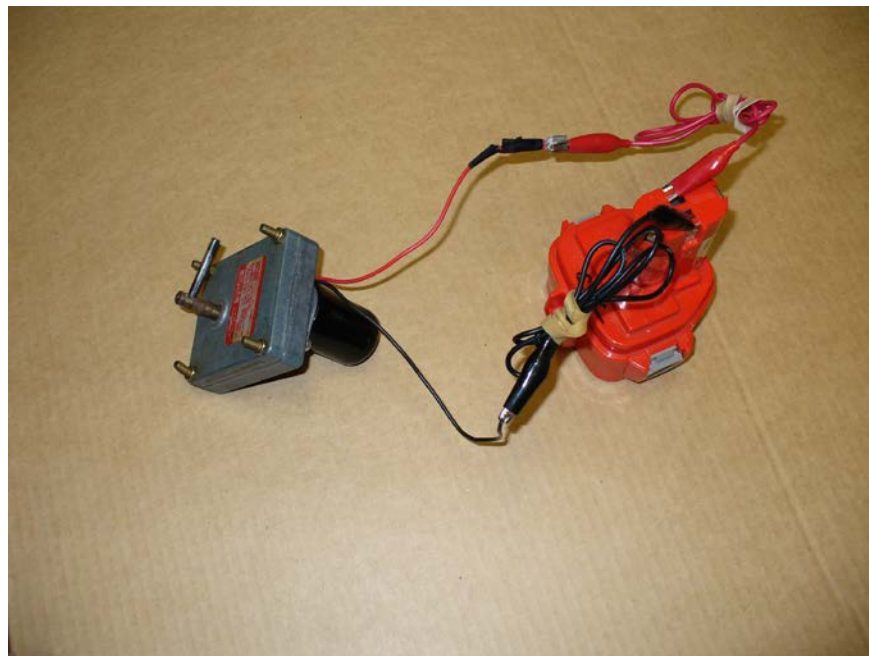
How to use a simple switch to control motors.

1. Hook your motor to the battery without a switch to test that it works.

- a) Diagram the circuit you need to build:

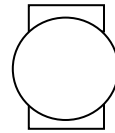
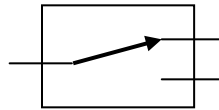
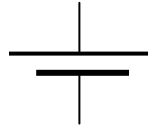


Here's what it might look like in real life:



2. Put a switch in the circuit to allow you to turn it on and off.

a) Diagram this circuit:

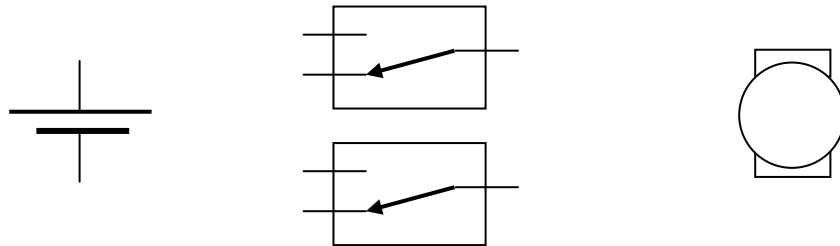


Here's what it might look like in real life:



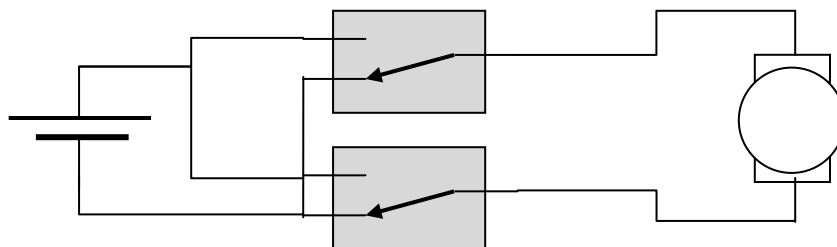
3. Put a second switch that will allow you to turn the motor on forward or backward.

a) Diagram this circuit:



*(Hint: attach motor+ to one switch and motor- to the other.)*

Here's what it might look like:



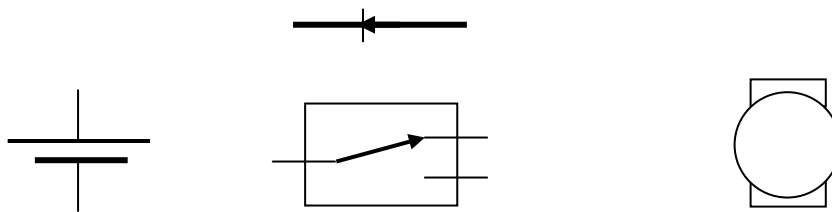
When the top switch is thrown, the top of the motor gets + power and it turns. Instead if the other switch is thrown, the bottom side gets + power, it spins the other way.

#### 4. Limit switch.

A limit switch is placed in the way of a moving motorized object so that when the object hits the switch it will shut off the motor. This saves power and it keeps the object from travelling farther than you want. It will automatically stop at exactly the position that you intended.

The trick is to allow the motor to *then* be turned on when it's time to reverse the motor. Remember, the switch has effectively disconnected the motor.

Place a diode across the switch so that current will flow only *in the reverse* direction. This will allow the motor to reverse enough to move off the switch and return full control to the motor. (The diode should be able to carry at least 1A.)



Here's what it might look like in real life:

