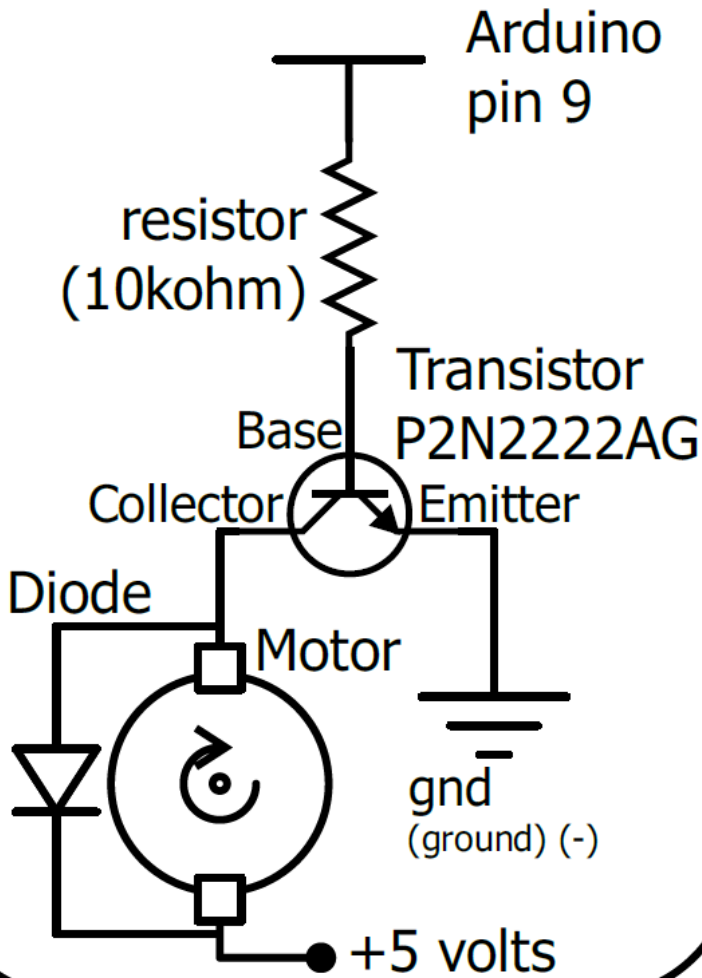


# Schematic



A transistor is incredibly useful. It switches a lot of current using a much smaller current. A transistor has 3 pins. For a negative type (NPN) transistor, you connect your load to collector and the emitter to ground. Then when a small current begins to flow from base to the emitter, a current will flow through the transistor and your motor will run. There are literally thousands of different types of transistors, allowing every situation to be perfectly matched. We have chosen a P2N2222AG - a rather common general-purpose transistor. The important factors in our case are that its maximum voltage (40v) and its maximum current (200 milliamp) are both high enough for our toy motor.

## Diode:

### What it Does:

The electronic equivalent of a one-way valve. Allowing current to flow in one direction but not the other.

### Identifying:

Usually, a cylinder with wires extending from either end. (and an off-center line indicating polarity)

**No. of Leads:**

2

**Things to watch out for:**

Will only work in one direction (current will flow if end with the line connected to ground)

**Resistors****What it Does:**

Restricts the amount of current that can flow through a circuit.

**Identifying:**

Cylinder with wires extending from either end.

The value is displayed using a color-coding system.

**No. of Leads:**

2

**Things to watch out for:**

Easy to grab the wrong value (double check the colors before using)

**Transistor****What it Does:**

Uses a small current to switch or amplify a much larger current.

**Identifying:**

Comes in many different packages but you can read the part number off the package found in the kit. Datasheets can be found online.

**No. of Leads:**

3 (Base, Collector, Emitter)

**Things to watch out for:**

- Plugging in the right way round (also current limiting resistor is often needed on the base pin)