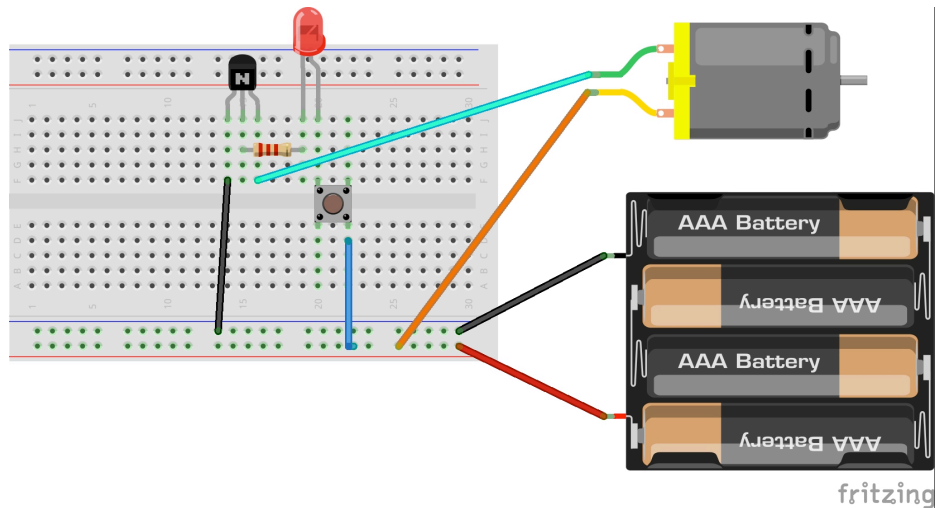## Conceptual

A transistor is a digital switch.

- ☐ Review the water model for a NPN bipolar transistor
  - o Determine what voltage at the base turns on or off the transistor?
- ☐ Draw a connection diagram for a NPN bipolar transistor – label *Base*, *Collector* and *Emitter*

Basic Make

- ☐ Make this circuit
- ☐ Make a schematic wiring diagram of this circuit

Advanced/Extended Make

- ☐ Does the order of where the motor is connected matter?
  - o Connect to the emitter side
  - o Connect to the collector side
- ☐ Duplicate diagrams using Fritzing

Equipment

- ☐ Computer with access to Fritzing and Arduino
- ☐ Circuit components: NPN bipolar transistor (2N 3904)

Objective

Physics Concepts
- ☐ Semiconductor devices
- ☐ Transistors

Experimental analysis
- ☐ Circuit design

Technology Concepts
- ☐ Schematic Symbols
- ☐ Programming Syntax