**TEAM research**

**RASP PI 0W info**

1. <https://www.microcenter.com/product/627789/vilros-raspberry-pi-zero-w-complete-starter-kit>
2. <https://www.youtube.com/watch?v=3VO4vGlQ1pg>
3. <https://cdn.sparkfun.com/assets/learn_tutorials/6/7/6/PiZerov2.pdf>

**RELAYS**

1. <https://www.microcenter.com/product/617949/inland-single-5v-relay-module-for-arduino>
2. <https://www.amazon.com/gp/product/B0057OC6D8>
3. <https://lastminuteengineers.com/one-channel-relay-module-arduino-tutorial//>
4. <https://www.microcenter.com/product/503936/adafruit-industries-power-relay-featherwing>
5. <https://www.parallax.com/product/parallax-feedback-360-high-speed-servo/>
6. <https://readthedocs.org/projects/360pibot/downloads/pdf/latest/>

**Battery power and backup**

1. <https://youtu.be/opYVS0EXZIg>
2. <https://www.arrow.com/en/research-and-events/articles/battery-power-your-pi>
3. <https://www.adafruit.com/product/1566?gclid=CjwKCAjw_L6LBhBbEiwA4c46urzf1ZSZq4Kdsy4krwNT6f5uU5bs8HWAw0HGy2gtKBoqwB9V25opSBoC5kwQAvD_BwE>
4. <https://www.youtube.com/watch?v=Z1m7tuz_BJg>
5. <https://www.youtube.com/watch?v=yFSfcYnP3ZI>
6. <https://www.youtube.com/watch?v=opYVS0EXZIg>
7. <https://www.adafruit.com/product/1944?gclid=CjwKCAjw_L6LBhBbEiwA4c46um7L3sVVOh2hs-CgD_f-0C6tqLXWbdhNI5sEsdbaTRwbNj_WDAoFDhoCPMYQAvD_BwE>
8. AC TO DC conversion at the wall plug in

<https://www.allelectronics.com/category/914/ac-dc-wall-adapters/power-supplies/1.html>

<https://resources.pcb.cadence.com/blog/2020-understanding-ac-to-dc-transformers-in-electronics-design>

1. <https://sciencing.com/charge-12v-battery-dc-motor-6085453.html>
2. Build your own transformer with rectifier…. Idk if we’d want to go this route but cool info nonetheless

**CAMERA**

1. <https://www.pishop.us/product/raspberry-pi-camera-module-v2/>
2. <https://www.adafruit.com/product/3099?src=raspberrypi>

**STEPPER MOTOR**

1. <https://www.digikey.com/en/products/detail/pololu-corporation/1208/10449951?utm_adgroup=Motors%2C%20Solenoids%2C%20Driver%20Boards%2FModules&utm_source=google&utm_medium=cpc&utm_campaign=Shopping_DK%2BSupplier_Pololu%20Corporation&utm_term=&utm_content=Motors%2C%20Solenoids%2C%20Driver%20Boards%2FModules&gclid=CjwKCAjw-sqKBhBjEiwAVaQ9a5ydxkZlHlWfqFQGc_q4UutAwQBrupnOzT-7mEiJKhpNJ1s2jnJi-xoCVDEQAvD_BwE>
2. <https://components101.com/motors/28byj-48-stepper-motor>
3. [DIGIKEY NEMA 14 stepper motor holds 14oz/inch](https://www.digikey.com/en/products/detail/pololu-corporation/1208/10449951?utm_adgroup=Motors%2C%20Solenoids%2C%20Driver%20Boards%2FModules&utm_source=google&utm_medium=cpc&utm_campaign=Shopping_DK%2BSupplier_Pololu%20Corporation&utm_term=&utm_content=Motors%2C%20Solenoids%2C%20Driver%20Boards%2FModules&gclid=CjwKCAjw-sqKBhBjEiwAVaQ9a5ydxkZlHlWfqFQGc_q4UutAwQBrupnOzT-7mEiJKhpNJ1s2jnJi-xoCVDEQAvD_BwE)
4. <https://www.amazon.com/gp/product/B01N56RTQQ>

**SOLENOID**

1. <https://www.google.com/search?client=firefox-b-1-d&q=connecting+solenoid+to+raspberry+pi+0WH#kpvalbx=_mc9oYcvqO9qUwbkPk_SSkAY17>

**LCD SCREEN**

1. <https://www.youtube.com/watch?v=3XLjVChVgec>
2. <https://www.circuitbasics.com/raspberry-pi-i2c-lcd-set-up-and-programming/>
3. <https://www.pishop.us/product/128x64-1-3inch-oled-display-hat-for-raspberry-pi/>
4. <https://www.pishop.us/product/adafruit-pioled-128x32-monochrome-oled-add-on-for-raspberry-pi/> (THIS one uses pYTHON code. Idk if that would be an issue with ‘.js’ but maybe we won’t need this portion to connect to the internet..

**RANDOM UNSORTED ~~~~~~~~~~~~~~~**

**Hardware and software intermingling**

1. <https://u.osu.edu/esltech2011fall2017/additional-pages/what-i-am-interested-in-learning-more-about/>
2. <https://www.w3schools.com/nodejs/nodejs_raspberrypi_components.asp>
3. <https://learn.adafruit.com/force-sensitive-resistor-fsr/using-an-fsr>
4. <https://pimylifeup.com/raspberry-pi-pressure-pad/>
5. <https://www.learnrobotics.org/blog/raspberry-pi-servo-motor/>

10. [Water pump](https://www.amazon.com/water-pump/s?k=water+pump) could be useful for circulating and keeping water clean. Would also make the water part of our design not just mechanical and gravity fed but more interesting for our class…. Just a thought.

<https://www.amazon.com/LEDGLE-Submersible-Ultra-Quiet-Dual-Purpose-Hydroponics/dp/B085NQ5VVJ/ref=sr_1_16?dchild=1&keywords=water+pump+small&qid=1632877976&sr=8-16>

11. **SECURITY** (just found a couple articles talking about exploits)

<https://blog.securityevaluators.com/remotely-exploiting-iot-pet-feeders-21013562aea3>

<https://www.securitynewspaper.com/2019/10/25/this-girl-hacked-11000-dogs-and-cats-smart-feeders-would-she-dare-to-harm-your-pets/>

1. Not really reliable sourcing but interesting and probable.

[IC’s H bridge?](https://www.jameco.com/z/L293DNE-National-Semiconductor-IC-L293DNE-Quadruple-Half-H-Drivers-4-5-to-36V-600mA_1341966.html)

[Sketch of IC H bridge](https://www.sparkfun.com/products/315)

[L298N H bridge which can separate my current and voltage input from the arduino.](https://www.amazon.com/Qunqi-Controller-Module-Stepper-Arduino/dp/B014KMHSW6)

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**ARDUINO STUFF**

6. LCD display with arduino

[Using LCD Displays with Arduino](https://www.youtube.com/watch?v=wEbGhYjn4QI)

I2C adapter

1. 4 pins
2. Vcc 3.3 or 5 V connects to 5V
3. GND connects to ground
4. SDA- serial data SDA on arduino above AREF or analog A4
5. SCL- serial clock SCL or A5

B. connects to back of arduino

C. I2C scanner need to find hex code for the adapter

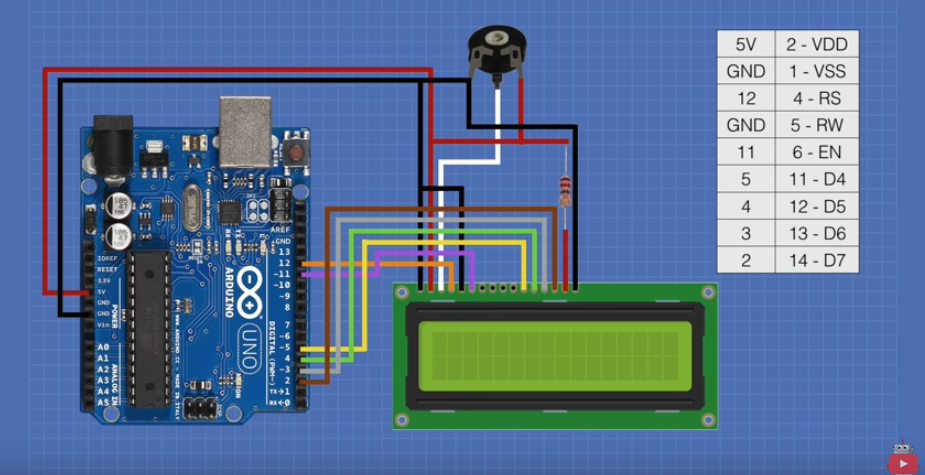
1602 display

1. Pin outs
2. Ground
3. 5vdc
4. Bright
5. Register select
6. Read write
7. Enable
8. 7-14 data inputs pins D0……..D7

15. Anode

16. cathode

B. arduino has library “liquid crystal”

1. 

Arduino shield

1. Allows for more connections to the arduinooooo
2. Screw shield will give you access to more pens (goes in between the shield and the arduino
3. Has analog inputs which could program time, and when to feed maybe?

7. [Controlling a Linear Actuator with an Arduino and Relay](https://www.youtube.com/watch?v=J1VMrT2P0Ac)

8.[Using Servo Motors with Arduino](https://www.youtube.com/watch?v=kUHmYKWwuWs)

1. Worked with servo’s before if we have a use for it...

9. Looking around it seems that max current on any output pin for arduinos is 40 milli amp and max operating voltage is 5-6 volts. This could be an issue depending on all we want it to control.

1. <https://www.instructables.com/Arduino-Tutorial-Handling-High-Power-Devices/>
2. Lists some info on relays, mosfets and BJT’s which could be useful in these situations. Will add more to this later.

B. DC power supplied to arduino. Lots of information out there on arduino.cc and i’m sure other places. Will need to look into this more.

C. <https://www.jameco.com/z/GSM60A12-P1J-MEAN-WELL-12V-5A-60W-Class-1-AC-DC-Single-Output-Medical-Power-Supply-with-2-1mm-Plug_2189759.html>

12. <https://www.instructables.com/Automatic-Arduino-Powered-Pet-Feeder/>

1. Some guy did our project at a base level with arduino and augur thats 3-D printed

[Stepper Motors with Arduino - Controlling Bipolar & Unipolar stepper motors](https://www.youtube.com/watch?v=0qwrnUeSpYQ)

Using stepper motor to drive the auger.

I will need a separate power supply to use this. It uses a lot more current than the arduino can supply.

[Controlling DC Motors with the L298N H Bridge and Arduino](https://www.youtube.com/watch?v=dyjo_ggEtVU)

<https://duino4projects.com/a-simple-auger-pet-feeder/>

[Arduino mega?](https://store-usa.arduino.cc/products/arduino-mega-2560-rev3?gclid=CjwKCAjw-sqKBhBjEiwAVaQ9a3PZuqhjwJYCrMwdSF_g16AqR4ovavVJWn6EG6nUiuWTOYOWlXoOkBoCWaMQAvD_BwE)

[Communications for multiple arduinos](https://everythingwhat.com/how-do-i-connect-two-arduinos-together)

<https://www.circuitbasics.com/wired-communication-between-two-arduinos/>

<https://www.trossenrobotics.com/robotgeek-relay>

<https://www.trossenrobotics.com/robotgeek-geekduino-sensor-kit>

**Pros and Cons of other auto pet feeders:**

1.

These pros and cons from: [Top 5 Best Automatic Cat Feeders (We Tested Them All)](https://www.youtube.com/watch?v=TGW9e6SHrTk)

NOTE: this video was feeders for cats but a lot of the pros/cons remain for any animal

PROS:

-compatible with any type of food

-safe and secure (animal can’t access unportioned food)

-affordability

-could contain ice packs

-slow feed mode

Large storage capacity = less work

Splitter to feed multiple animals?

-pet cam

- custom voice messaging

-consistent and reliable

-easy removal of compartments for cleaning

-power cord is nice

CONS:

-doesn’t portion for you

-amount of compartments being too little

-bowl hard to eat from

-batteries

-just programs a time to give food. No app and bad user interface

-noisy operation

-confusing setup

-expense for extra functions (WOPET Feeder, smart feeder was 170$)

-unwieldy and too heavy

2.

These from [Top 10 Best Automatic Dog Feeders](https://www.youtube.com/watch?v=IV_0KP-Tpmo)

Pros:

-back up batteries in case of power outage -\_-

-notifies how much food dispensed, when food is running low (one called Petnet can order more food for you holy cow)[**User Manual**](https://images-na.ssl-images-amazon.com/images/I/B1x3ytJYwYS.pdf) **for petnet. Kinda interesting..**

-changeable portion sizes up to really small so the dog eats slower throughout the day.

-an “anti jam“ feature in case food gets stuck

-LCD screen. No need for mechanical i think. Also none of us are mechanical so thats something.

Cons:

-large dog feeder costs 329$ just for the food dispenser, (this one called “pet treat” holds 10 lbs and has a spindle at the top that lifts the food and pushes it out near the top and into the bowl.”

**EXAMPLES OF HOMEMADE PET FEEDERS**

1. [**http://drstrangelove.net/2013/12/raspberry-pi-power-cat-feeder-updates/**](http://drstrangelove.net/2013/12/raspberry-pi-power-cat-feeder-updates/)
2. [**https://hackernoon.com/build-a-connected-food-dispenser-with-raspberry-pi-19f5cdcc1541**](https://hackernoon.com/build-a-connected-food-dispenser-with-raspberry-pi-19f5cdcc1541)
3. [**https://www.instructables.com/Internet-Enabled-Raspberry-Pi-Pet-Feeder/**](https://www.instructables.com/Internet-Enabled-Raspberry-Pi-Pet-Feeder/)
4. [**https://medium.com/@ian.k9.burton/automated-cat-feeder-using-a-raspberry-pi-and-pi-camera-31743f7f05da**](https://medium.com/@ian.k9.burton/automated-cat-feeder-using-a-raspberry-pi-and-pi-camera-31743f7f05da)
5. [**https://imgur.com/a/ttmov#BTA4XvQ**](https://imgur.com/a/ttmov#BTA4XvQ)
6. [**https://www.reddit.com/r/raspberry\_pi/comments/7qkp86/my\_raspberry\_pi\_powered\_automatic\_pet\_feeder/**](https://www.reddit.com/r/raspberry_pi/comments/7qkp86/my_raspberry_pi_powered_automatic_pet_feeder/)
7. [**https://storiknow.com/automatic-cat-feeder-using-raspberry-pi/**](https://storiknow.com/automatic-cat-feeder-using-raspberry-pi/)

**MY ANIMALS**

My growing German shepherd can drink about a liter of water everyday. Personal experience.

1. Large dog eats about 3 cups of food a day