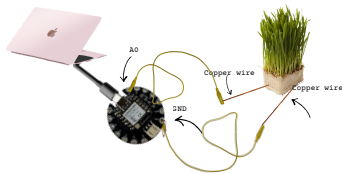


Item	Quantity	Notes
LiPo batteries	2(1)	
Battery charger	2(1)	
ESP 32	2(1)	
Copper wire	2(1)	
Conductive thread	2(1)	
Labster wires	2(1)	
Touch sensor	2(1)	
Vibration motor	2(1)	
Aligator clips	2(1)	
USB C	2(1)	
Breadboard	2(1)	
Transistor	2(1)	
Resistor	2(1)	

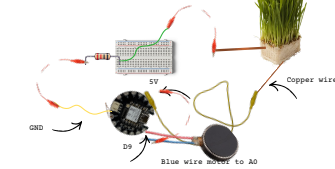
Reading the bio electrons of wheat grass

- Components needed:
- Wheat grass
 - Copper wire
 - Alligator clips
 - ESP 32
 - USB C

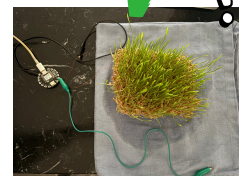


Vibrations of the wheatgrass: exploring symbiosis, grounding, reconnection

- Components needed:
- Wheat grass
 - Copper wire
 - Alligator clips
 - ESP 32
 - USB C
 - Breadboard
 - ESP 32

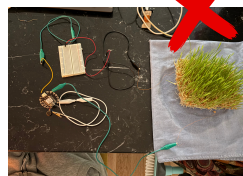


Attempt 1



Link to the numbers

Attempt 1



In hindsight, after connecting the vibration motor on its own:
 -> The wrong resistor
 -> No transistor
 -> No battery
 -> No soldering of vibration motor
 -> Motor must be connected to GND
 Method to this madness
 -> 'FireDome'
 -> Trying to copy another experiment I did in the past

Code

```

// Arduino code for vibration motor
void setup() {
  pinMode(9, OUTPUT);
  Serial.begin(9600);
}

void loop() {
  // Data = map(data, 0, 4095, 0, 255);
  int val = analogRead(A0);
  // PRINTING A0 VALUE
  Serial.println("Before map: ");
  Serial.println(val);
  delay(10);

  val = map(val, 0, 2095, 0, 255);
  Serial.println("After map: ");
  Serial.println(val);
  delay(10);

  digitalWrite(9, val);
  delay(1000);
}

```

Code

```

// Arduino code for vibration motor
void setup() {
  pinMode(9, OUTPUT);
  Serial.begin(9600);
}

void loop() {
  // Data = map(data, 0, 4095, 0, 255);
  int val = analogRead(A0);
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  delay(10);

  val = map(val, 0, 2095, 0, 255);
  Serial.println("After map: ");
  Serial.println(val);
  delay(10);

  digitalWrite(9, val);
  delay(1000);
}

```

The vibration motor

- Components needed:
- Vibration motor
 - Alligator clips
 - Breadboard
 - USB C
 - Jumper wires
 - Breadboard
 - 3V battery
 - Transistor
 - Resistor 1,000 kilohms

Code

```

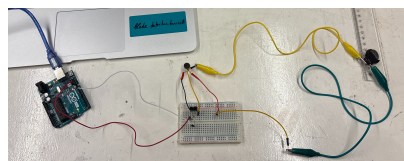
// Arduino code for vibration motor
void setup() {
  pinMode(9, OUTPUT);
  Serial.begin(9600);
}

void loop() {
  // Data = map(data, 0, 4095, 0, 255);
  int val = analogRead(A0);
  // PRINTING A0 VALUE
  Serial.println("Before map: ");
  Serial.println(val);
  delay(10);

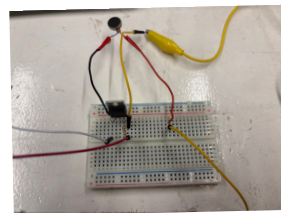
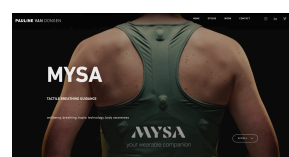
  val = map(val, 0, 2095, 0, 255);
  Serial.println("After map: ");
  Serial.println(val);
  delay(10);

  digitalWrite(9, val);
  delay(1000);
}

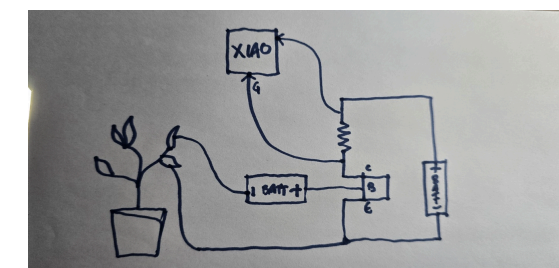
```



The inspo

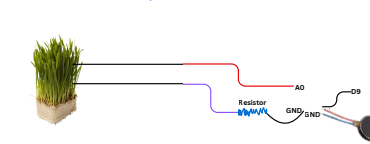


Rice's drawing of measuring plant bio electrons



Feeding energy into the plant circuit, instead of only observing it.
 Specifically:
 The battery + transistor loop shares ground and signal paths with the plant.
 That means:
 The plant signal is being overwritten.
 The ADC reading is contaminated.
 Risk abiotaxis in the plant (roots/leaves get damaged).
 Measurements become meaningless (looks "alive" but it's just your battery).
 In bio-signal terms:

Measuring plant to trigger vibration motor



```

// Vibration motor test
int pin = 09; // motor connected to pin 9 (PWM pin)
// int data = A0; // strength

void setup() {
  // SETTING THE OUTPUT
  pinMode(pin, OUTPUT);
  // STARTING SERIAL MONITOR
  Serial.begin(9600);
}

void loop() {
  //data = map(data, 0, 4095, 0, 255);
  int val = analogRead(A0);
  // PRINTING A0 VALUE
  Serial.println("Before map: ");
  Serial.println(val);
  delay(10);

  val = map(val, 0, 2095, 0, 255);
  Serial.println("After map: ");
  Serial.println(val);
  delay(10);

  digitalWrite(pin, val);
  delay(1000);
}

```

Mapping the vibration

```

// Arduino code for vibration motor
void setup() {
  pinMode(9, OUTPUT);
  Serial.begin(9600);
}

void loop() {
  // Data = map(data, 0, 4095, 0, 255);
  int val = analogRead(A0);
  // PRINTING A0 VALUE
  Serial.println("Before map: ");
  Serial.println(val);
  delay(10);

  val = map(val, 0, 2095, 0, 255);
  Serial.println("After map: ");
  Serial.println(val);
  delay(10);

  digitalWrite(9, val);
  delay(1000);
}

```

Detect meaningful change

```

// Arduino code for vibration motor
void setup() {
  pinMode(9, OUTPUT);
  Serial.begin(9600);
}

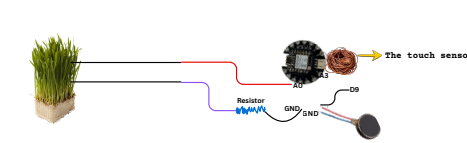
void loop() {
  // Data = map(data, 0, 4095, 0, 255);
  int val = analogRead(A0);
  // PRINTING A0 VALUE
  Serial.println("Before map: ");
  Serial.println(val);
  delay(10);

  val = map(val, 0, 2095, 0, 255);
  Serial.println("After map: ");
  Serial.println(val);
  delay(10);

  digitalWrite(9, val);
  delay(1000);
}

```

Adding a touch sensor



Arduino code

```

// Arduino code for vibration motor
void setup() {
  pinMode(9, OUTPUT);
  Serial.begin(9600);
}

void loop() {
  // Data = map(data, 0, 4095, 0, 255);
  int val = analogRead(A0);
  // PRINTING A0 VALUE
  Serial.println("Before map: ");
  Serial.println(val);
  delay(10);

  val = map(val, 0, 2095, 0, 255);
  Serial.println("After map: ");
  Serial.println(val);
  delay(10);

  digitalWrite(9, val);
  delay(1000);
}

```