What about a thematic organisation of **Earth**, **Energy**, and **Environment**?

Earth: something related to recycling, food packaging, sustainability; could also relate to wildfire risk assessment (or that could go in Environment)
Energy: renewable energy - solar, wind, pinwheels, updrafts
- Pinwheels could be used with the existing power meter
Environment: environmental sensing - water, air, sound, soil, etc.

- Quality Measurements *******
  - Water
    - https://www.hackster.io/eani/water-quality-monitoring-and-notification-system-f85d23
    - https://www.instructables.com/Arduino-Water-Pollution-Monitor/
    - https://www.irjet.net/archives/V5/i3/IRJET-V5I3302.pdf
    - https://www.instructables.com/Arduino-Water-Quality-Monitoring-System/
    - Turbidity; from the spec sheet "The turbidity sensor detects water quality by measuring the levels of turbidity. It uses light to detect suspended particles in water by measuring the light transmittance and scattering rate, which changes with the amount of **total suspended solids (TSS) in water**. As the TTS increases, the liquid turbidity level increases. Turbidity sensors are used to measure water quality in rivers and streams, wastewater and effluent measurements, control instrumentation for settling ponds, sediment transport research and laboratory measurements." So TTS may be different from TDS and this may explain why you did not see a difference with food coloring.
  - Air; from ChatGPT (need to verify, but makes sense): "The MQ-135 gas sensor is commonly used to detect a variety of gases, making it suitable for air quality monitoring. It can measure the concentration of gases such as: Ammonia (NH3), Nitrogen oxides (NOx), Alcohol, Benzene, Smoke, Carbon dioxide (CO2). This sensor is often used in indoor air quality systems to ensure environments remain safe and free from harmful gas concentrations. The MQ-135 gas sensor does not detect every kind of gas, but it is sensitive to a range of gases typically associated with air quality issues."
  - Soil
  - Sound
    - Measure noise pollution
    - Noise level chart
      - https://www.cochlea.org/en/noise
  - temp/humidity
  - Urban noise and air pollution monitor
    - https://www.instructables.com/Urban-Noise-Air-Pollution-Monitoring-Device/
  - CO2 monitor

- Renewables
  - Solar

- ○ Wind
  - ■ Could combine these into a circuit where you can plug in a wind turbine or solar cell
  - ■ Could have real time power bar showing how much power is being produced
  - ■ Maybe could have a button where you press it and then it records how much power is being produced for like 30 seconds then displays it, might be a game for kids to produce the most power and compare solar and wind
- ○ LEGO water wheel
- ○ Designing paper pinwheels that can attach to a dc generator and the students can try to make a design that produces the most power
  - ■ https://www.sciencebuddies.org/stem-activities/just-keep-spinning-find-the-best-pinwheel-design
  - ■ Maybe use a blowdryer or something to spin the wheels so it's more consistent – GOOD IDEA; CAN WE PURCHASE SOMETHING THAT BLOWS AIR WITHOUT HEAT?
    - ● We could use a blower fan maybe
    - ● https://www.mouser.com/ProductDetail/CUI-Devices/CBM-5015CF-135-293-20?qs=ulEaXIWI0c9yKPdEzuL2ag%3D%3D&mgh=1&utm_id=17222215321&gad_source=1&gclid=CjwKCAjw65-zBhBkEiwAjrqRMG20DJQcrhDVtWy5LU5kVp5IbYOv0znHEBFewB8oMnL-H01W9L01pxoCO2AQAvD_BwE

    - ● Datasheet
    - ● https://www.mouser.com/datasheet/2/670/cbm_50cf-3180101.pdf
- ○ Solar updraft tower
  - ■ https://www.sciencebuddies.org/stem-activities/solar-updraft-tower

- ● Recycling / Reusing
  - ○ Recycling bin that lights up when opened
  - ○ Use old wires to connect leds together and make an art piece
    - ■ Maybe could have a board with leds on it already and empty sockets for wires, students could be given some wires that they can bend and shape onto the board to make some art and then turn on the leds
  - ○ E-waste sculptures
  - ○ Using capacitive sensors to detect plastic items or other materials and then students can test different materials and sort them into the right recycling bin

- ● Other
  - ○ UV light water purification
  - ○ Solar oven
    - ■ https://www.jpl.nasa.gov/edu/teach/activity/solar-oven/
  - ○ Wildfire risk assessment, detect wind speed, humidity, temperature and calculate fire risk
    - ■ https://news.samsung.com/us/9-mind-blowing-stem-projects-by-teen-environmentalists/

- https://www.weather.gov/gjt/firewxcriteria
- https://www.nps.gov/articles/understanding-fire-danger.htm
- https://ijirt.org/master/publishedpaper/IJIRT152293_PAPER.pdf