Innovation Park Water

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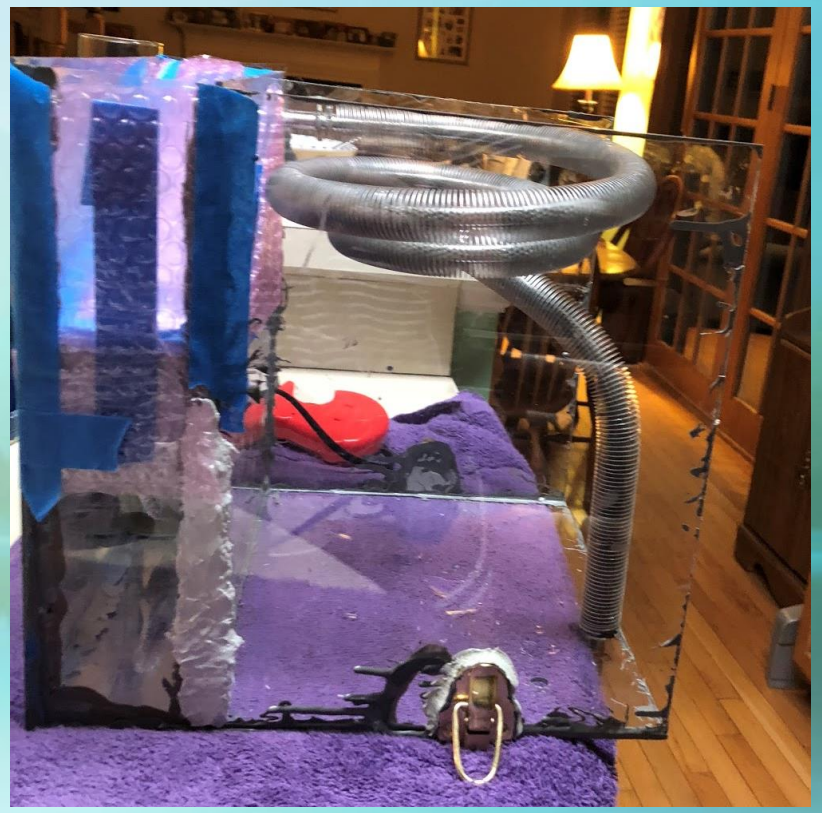

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Background

- U.S. citizen uses 300-500 liters a day
  - Person in Africa uses 20-50 liters a day
  - Person in Asia uses about 100 liters a day
- Portable/small water distillation devices take 8 hours to distill 5 liters
  - Eliodomestico
- Water distillation plants take all day to generate enough water
  - Using solar desalination

Question

Can a water filter be modified by incorporating an immersion water heater, and safe water storage, to minimize the time taken to purify water and prevent recontamination?

Hypothesis

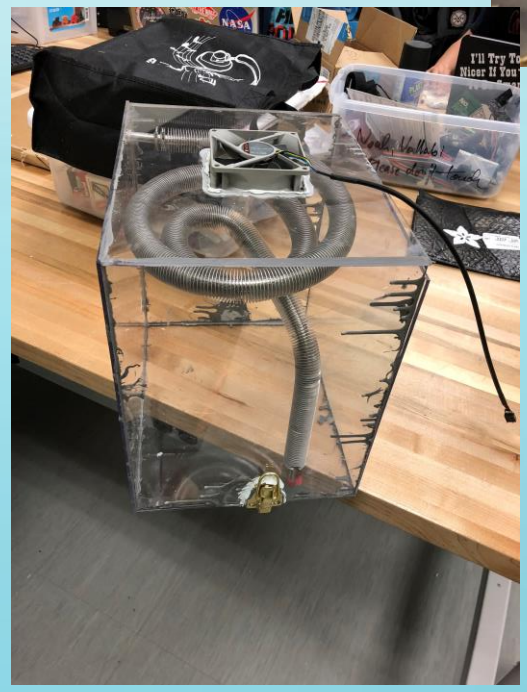
If a water purification device incorporates an immersion water heater, the amount of time needed to purify water will decrease.

Materials

- Polycarbonate plastic
- Immersion water heater
- Steel condenser coil
- Thermometer
- TDS water purity tester
- Saltwater and tap water
- Fan
- Timer
- Wires
- Bubble wrap
- epoxy
- Container for safe water storage

Methods

- Design/modify water purification device
- Construct two plastic chambers
  - Evaporation and condensation
- Connect chambers to form the device
  - Steel condenser coil connects chambers
- Test of first chamber
- Test the device as a whole
  - TDS water purity tester



Data and Results

Type of water	Before purification (PPM)	After purification (PPM)	Time taken to purify one cup (minutes)
Tap water	248	80	58

Problems

- Condenser coil
  - Hole in the top of coil
  - Not bent so the water vapor travels downwards the whole way through
- Epoxy wasn’t strong enough
  - Under the pressure built up in first chamber and heat of the water, plastic pieces separated.
- Water vapor condensing on inside before passing through the coil
  - Changed angle of top of first chamber
  - Added insulation around the outside

Conclusion

- Hypothesis partially supported by data
  - Water purity significantly increased
  - Time taken to purify water was average
    - Same amount of time taken for solar energy devices
- Future testing/modifications
  - Change condenser coil design
  - Alter orientation of second chamber to first chamber

Extensions

- Testing with different types of water
  - Salt water and murky water
- Holding plastic together with different adhesive
  - Adhesive that is both water proof and temperature resistant
- Different location for condenser coil
  - Place condenser coil on top so vapor naturally travels up through the coil instead of being forced through coil on side (would require a different condenser coil)

References

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