

7.3.5 - Separating Oil and Water

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Background Research

Based on what we know about oil and water, we need to find a way to separate oil from water without manual separation and monitoring. Our thinking led us to design a structure that allowed water to flow slowly so that the oil had time to separate from the water. This design also allowed for water to pass through the tiny holes but oil may have been too viscous (or the molecules too large) to pass through the holes in the bottle cap. We decided to include the paper towels as a back-up filter to soak up excess oil.

Description of Prototype Structure and Function

We constructed a filtering system made out of a recycled water bottle. We put 40 holes in cap of water bottle with a push pin. We then made a small filter out of paper towels and attached to the end of our water bottle with a rubberband. When the water was dumped into the filtering system it separated and the oil rose to the top, and the water drained to the collection flask. Which we had to collect the runoff.

Materials:

- Water bottle with bottom cut off and holes poked in the cap using a push pin
- Paper towels
- Duct tape
- Erlenmeyer flask

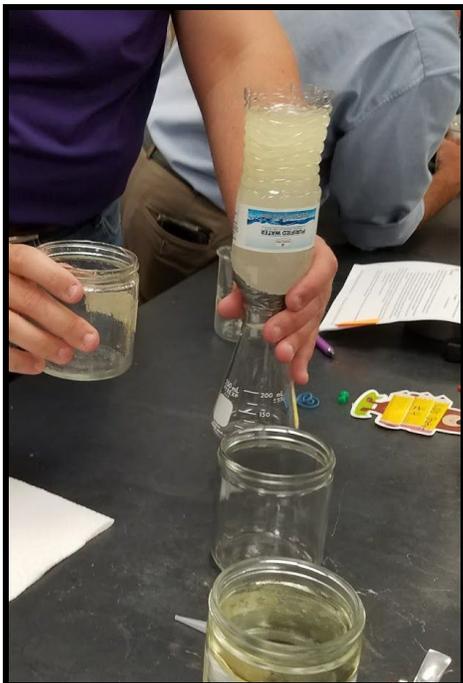
The paper towels were wrapped around the bottle cap and secured with duct tape. The water bottle was placed cap-side down into the Erlenmeyer flask and then secured again with more duct tape.



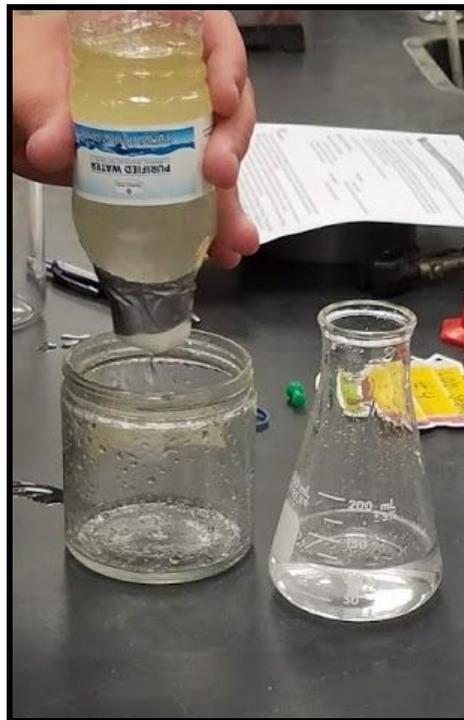
Holes were poked in the lid of the cap and paper towels were placed over the cap.



The bottle was placed in an Erlenmeyer flask to run the test.



Oil filled water was poured in the bottle and we ran the test.



Cleaned water is on the right. We have left the water to see the effectiveness tomorrow.

Analysis of Results

We were able to successfully extract 100 ml of water without any traces of oil. We stopped collection after hitting the 100 ml level.

As our prototype was being tested, we noticed that water started to flow more slowly through our filtration system. We think that this is due to the paper towel becoming clogged with oil as time passed. Based on this understanding, we would not recommend this technique in a real-life scenario.