Filtration Station 2.0

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Project ID#

Q1: Research Question/Engineering Goal

Scientific Question- Does the amount of activated charcoal in a homemade water filter impact its effectiveness?

Why it Matters?- Understanding the perfect amount of charcoal needed in a water filter could help people around the world have access to cheap and clean water.

Q3: Data Analysis & Results

Control Sample pH- 7.8 Chlorine- .0 ppm Turbidity- 40 JTU		
.005 Charcoal in Filter	**.01 Charcoal in Filter**	**.015 Charcoal in Filter**
Trial 1 pH- 7.2 Chlorine- 0 ppm Turbidity- 40 JTU	**Trial 1** pH- 6.8 Chlorine- 0 ppm Turbidity- 0 JTU	**Trial 1** pH- 6.2 Chlorine- 0 ppm Turbidity- 100 JTU
Trail 2 pH- 6.8 Chlorine- 0 ppm Turbidity- 40 JTU	**Trial 2** pH- 6.8 Chlorine- 0 ppm Turbidity- 0 JTU	**Trial 2** pH- 6.2 Chlorine- 0 ppm Turbidity- 100 JTU
Trial 3 pH- 6.8 Chlorine- 0 ppm Turbidity- 40 JTU	**Trial 3** pH- 6.8 Chlorine- 0 ppm Turbidity- 0 JTU	**Trial 3** pH- 6.2 Chlorine- 0 ppm Turbidity- 100 JTU
Trial 4 pH- 7.2 Chlorine- 0 ppm Turbidity- 40 JTU	**Trial 4** pH- 6.8 Chlorine- 0 ppm Turbidity- 0 JTU	**Trial 4** pH- 6.2 Chlorine- 0 ppm Turbidity- 100 JTU
Trial 5 pH- 7.2 Chlorine- 0 ppm Turbidity- 40 JTU	**Trial 5** pH- 6.8 Chlorine- 0 ppm Turbidity- 0 JTU	**Trial 5** pH- 6.2 Chlorine- 0 ppm Turbidity- 100 JTU
Trial 6 pH- 7.2 Chlorine- 0 ppm Turbidity- 40 JTU	**Trial 6** pH- 6.8 Chlorine- 0 ppm Turbidity- 0 JTU	**Trial 6** pH- 6.2 Chlorine- 0 ppm Turbidity- 100 JTU
Average: pH- 7.066 Chlorine- 0 ppm Turbidity- 40 JTU	**Average:** pH- 6.8 Chlorine- 0 ppm Turbidity- 0 JTU	**Average:** pH- 6.2 Chlorine- 0 ppm Turbidity- 100 JTU

Q2: Methodology/Project Design

In order to get started I collected the water sample from Farmington Lake and test the sample to act as the control. Once that was completed I made 3 water filters using the same household materials and products, the only variable was the amount of charcoal in each filter. Some of the materials included a 1 liter plastic bottle, coffee filters, cotton balls, activated charcoal, sand, pebbles, and lava rock.

Once each of the filters were made I shook the collection jug for one minute prior to each trial in order to stir the sediment equally. Once that was completed I took the first filter and poured 5oz of water into the filter and waited for the water to pass. Once it passed I tested pH, turbidity, and chlorine levels for each sample. This was then repeated for a total of 6 trials per filter or 18 trials overall.

Following each trial I made sure to document the results on my notebook chart.

Q4: Interpretation & Conclusions

Results- In regards to chlorine the control did not show any signs of chlorine and the filters showed the same results. As for the pH levels, I found that the more charcoal you have in a filter the more acidic the water becomes. That being said all of the water was filtered into a safe drinking range from an average of 6.2-7.066 pH. As a result, one would have to monitor the amount of charcoal used in order to keep the water in a safe pH range. Lastly, in regards to the turbidity tests the filter with the least amount of charcoal had no effect on turbidity, while the filter with the highest amount of charcoal increased turbidity from 40JTU to 100 JTU, which negatively impacted clarity. However, the filter with .01 charcoal actually improved turbidity from 40 JTU to 0 JTU and had improved clarity thus making it the only water sample in a safe drinking range based JTU. In conclusion I found that all filters were able to filter some parts of the control. However, the filter .01 activated charcoal was the most effective since it not only improved the pH but also brought the turbidity to a safe drinking level. As a result, my hypothesis was correct.