Environmental and Seasonal Change Effect on Dissolved Oxygen amounts in the Stony Run River project.

Ava Drum, Prabhnoor Kaur, and Emma Shaw

Methods

How was data collected?

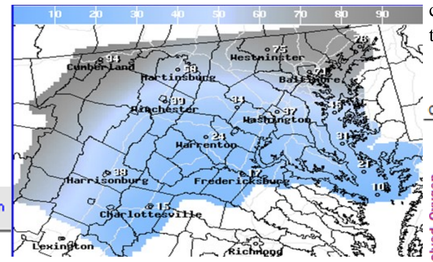
- Using devices such as the digital thermometer and pH probe, temperature and pH were measured.
- Why is pH and water temperature important?
  - As dissolved oxygen increases, more CO_2 is released, which increases the pH levels and makes the water more basic.
  - As temperature increases, water evaporates, decreasing the amount of dissolved oxygen in water.

Digital Thermometer

pH Probe

- Ablative cover was collected for four periods of the day and the percentages were averaged together every day for consecutive weeks provided by NOAA.org.

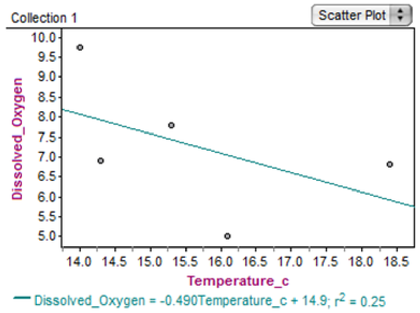
Sky Cover	7am	10am	1pm	4pm



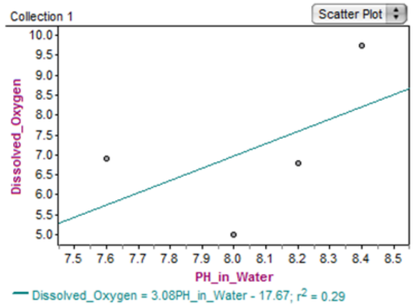
- Different chemicals were added to test for dissolved oxygen through a process of titration and this process has three major parts to measure the amount of dissolved oxygen.

Factors to Consider-

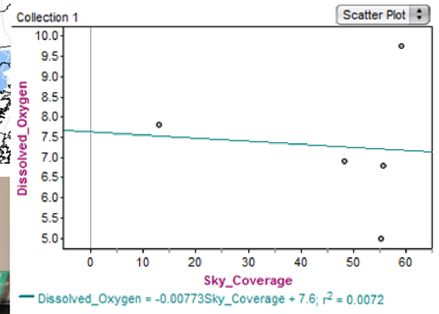
- When the data was collected: pH, temperature, cloud coverage, and dissolved oxygen were all collected on the same day because each of these factors impact each other.
- Where the data was collected: all of these factors were collected in the same area of the stream so each of the variables and their data were controlled.
- Website to collect ablative cover: same website to collect cloud coverage so time periods and areas did not vary and were kept consistent every day.



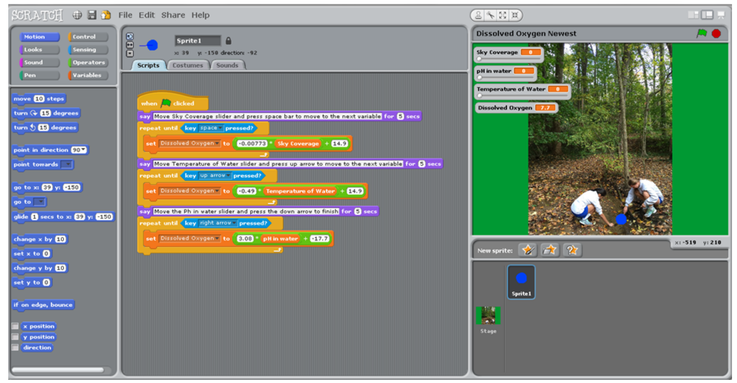
- This graph shows that as temperature increases, the dissolved oxygen decreases.
- This graph makes sense because as the temperature rises, the water evaporates with the dissolved oxygen. This causes there to be less dissolved oxygen in summer, compared to the winter because water does not evaporate in the winter.
- A line of best fit graph is an appropriate way to graph this data because the new graph would need to stay above the x-axis using only the top two quadrants.



- This graph shows as pH increases, dissolved oxygen also increases.
- This graph makes sense because microorganisms in the water use oxygen (reducing the dissolved oxygen) and produce carbon dioxide (which is more acidic).
- A more appropriate way to graph this data would not be on a line of best fit graph. pH can only be from 0-14, so the best graph would be a graph with end points.



- This graph shows that as sky coverage increases, dissolved oxygen decreases.
- This graph does not make sense because the data is too inconsistent.
- This data should not be graphed at all.



- The Scratch program helps to find one condition, knowing the other conditions.
- The program was a good predictor. However, when using the equations, the product was close, but not perfect to the exact answer.

Conclusion

- It was concluded that the change in season was very irregular due primarily to a varying temperature which prevented a valid conclusion from being made. If the data had been collected over a longer period time, it is speculated that a trend would be observed.
- Though our observations do make sense as individual pieces, when looked at over time, the temperature and other variables were irregular which made the observed trend irregular preventing a conclusion form being made.
- This data cannot be used to make future predictions because the inconsistent change in the data did not provide a very accurate representation of the change because a significant change throughout the season was not observed.
- This experiment is reproducible, but the data collected in future fall seasons may not be the same because the temperature of the day the data is collected may vary.

Future Work

- Both of the groups came to a similar conclusion that the data was not reliable enough on its own because a particular trend did not appear during the amount of time that the data was collected.
- Both groups agreed that by continuing to collect the data for a longer period of time they could come to a better conclusion. By collecting the data for a longer period of time a bigger trend may have been seen due to the larger amount of data.

Why is no trend observed?

- No trend is observed because the r^2 value for the water temperature vs. dissolved oxygen graph was 0.25 and in the pH in water vs. dissolved oxygen was 0.29. Since the r^2 values are so far from 1 it shows that the points are far from the line of best fit which shows the accuracy of this graph is very low.