

Short Observation & Data Analysis (SODA) Webinar ENSO Phase III: Water in Our Environment



Does data drive questions or do questions drive data? A curious case of the chicken and the egg.

LIVE FROM DAVID WOOSTER MIDDLE SCHOOL STRATFORD, CONNECTICUT USA

Thursday, 26 April 2018 5:00pm EDT (9:00pm UTC)

Join us here: https://zoom.us/j/7578241037

Student Presenters: Lelia Mellen, Leon Nguyen, Natalie Melo, Lucas Jenkins, Anna Flockheart, Andrew Carmody

Teacher: Christopher Newlan

Short Observation & Data Analysis (SODA) Webinar ENSO Phase III: Water in Our Environment

Does data drive questions or do questions drive data?

A CUITOUS CASE OF CHICKEN OF THE EGG

By: Lucas Jenkins, Tyler Tripodi, Andrew Carmody, Lelia Mellen, Anna Flockhart, Leon Nguyen, Natalie Melo, Isabella Taccogna

David Wooster Middle School, Stratford, Connecticut USA

Background Information:

Lucas Jenkins and Natalie Melo

Lucas Jenkins

Introducing

Natalie melo



I am an 8th grader here at David Wooster Middle school. I have been in GLOBE almost since the beginning. I have recently been accepted to Fairchild Wheeler Interdistrict Magnet High School in Bridgeport, CT



I am 14 years old and I am an eighth grade student here at David Wooster Middle School. I have been a part of Globe since December. This year I won the Youth at its BEST volunteering essay for my volunteer work in the Stratford Community. I volunteer by helping kids with their homework.

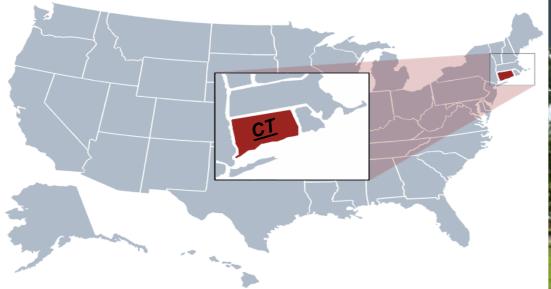
About our School:

Located in Stratford, Connecticut David Wooster Middle is one out of two middle schools in Stratford. The total amount of students in our school is roughly 550. Our school is divided into teams for seventh grade there is the 7th grade Lions, Panthers, and Cougars. And for 8th grade the teams are the Pumas, Jaguars, and 8th grade Lions. Our school mascot is also the wildcats and we are a part of the Pumas team.



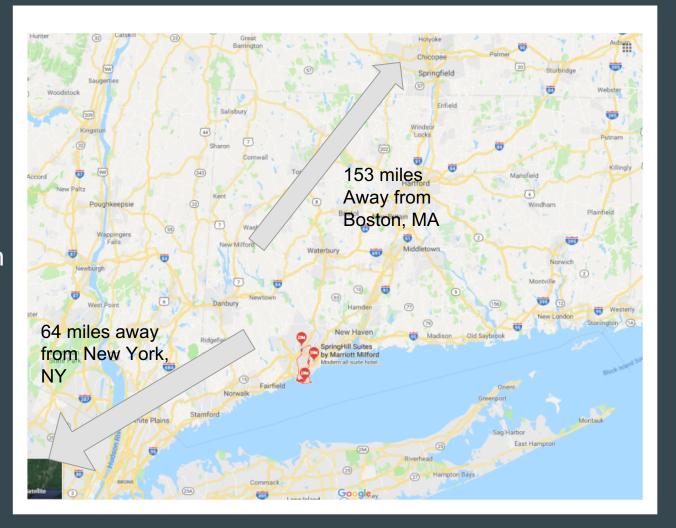
Where:

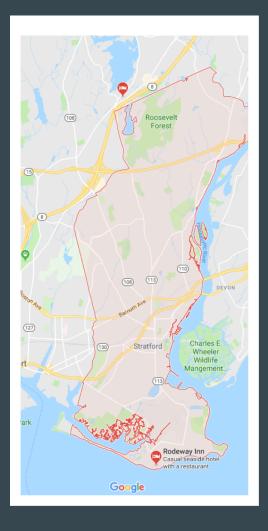
Connecticut is part of the United States, we are located in the New England region on the east coast. All of our testing is done at the pond that is near David Wooster Middle school in Stratford, Connecticut. The state of Connecticut is surrounded by 3 states New York, Massachusetts, and Rhode Island. South of Connecticut is the Long Island Sound.





Our coastline is densely populated while inland sections of Connecticut are much more rural with not that much population.







A community connected by water

To the east of town, there is the Housatonic River which starts in Massachusetts and ends in Long Island Sound and south of the town is Long Island Sound which borders New York and Southern Connecticut.

About Our Town:

Stratford, Connecticut was founded in 1639 and is now 379 years old. Stratford is the easternmost town in Fairfield County next to Shelton up north, Bridgeport to the west, and Trumbull northwest of town. The population of Stratford is currently 52,112 residents living in stratford. We have two high schools, two middle schools and 10 elementary schools. We also have 2 beaches short beach and long beach.





Weather:

The average yearly temperature in the summer is 78 degrees, in the winter the average is 43 degrees, and in the spring its 56 degrees. The average rainfall is 48 inches and the the average 32 inches. Summers in Stratford are warm and humid; winters are very cold and windy; and Stratford is partly cloudy year round. Stratford also passes through all the the 4 seasons.





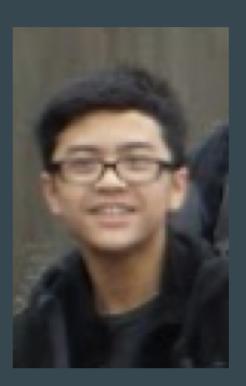
Climate:

The climate in our area of Stratford is very temperate or mild. This means that Stratford is a place where there is a never extremely hot or extremely cold temperatures.



How we started GLOBE at Wooster

Introducing



Leon Nguyen

I'm 13 years old, and I'm an 8th grade student at David Wooster Middle School. I'm a National Junior Honor Society student. I enjoy playing piano and painting with watercolors in my spare time. I joined GLOBE halfway through the year because I wanted to learn more about other sciences.



History of GLOBE at Wooster

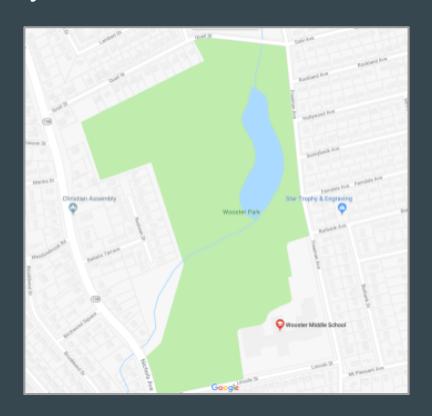




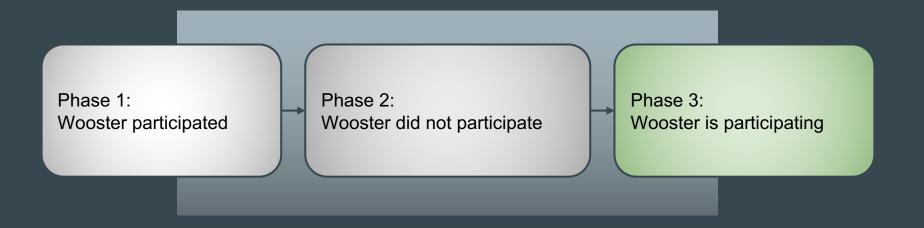


How did GLOBE start this school year?

- What is GLOBE?
- After School club
- Population increase



GLOBE at Wooster's involvement with ENSO Student Research Campaign Phases until now



GLOBE at Wooster's involvement with ENSO Student Research Campaign Phase III: "Water in Our Environment"

Water Quality:
What is the quality of the water in my environment?

Water's impact: What impact does water-both above and below ground-have on our environment?

Water and Life: How does water in our environment impact living organisms?



Frozen Wooster Pond

Research Question Extrapolation

Protocols we used:

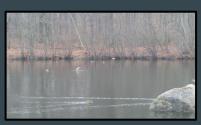
- Air temperature
- Nitrates
- Soil moisture
- pH
- Surface water temperature
- Transparency
- Conductivity

Protocols we will be implementing this spring:

- Freshwater macroinvertebrates
- Relative humidity
- Mosquito larvae
- Dissolved oxygen







Some questions that arose after gathering data:

- Do seasons affect the pond?
- How do seasonal temperatures affect the pond?
- How does rainfall pH affect the pH of the pond?
- How does rainfall affect soil and/or air temperature?
- How does air temperature affect soil moisture?
- How does pond temperature affect wildlife?
- Is the turbidity of the pond affected by different water sources?
- How does snowfall affect soil temperature?
- Does soil moisture differ from place to place?
- Is rainfall, air and soil temperature consistent in all parts of Stratford?
- How do humans affect the water in their environment?

Research Methods and Protocols



Introducing

Tyler Tripodi

I am an 8th grader at Wooster Middle School. I just played a leading role in our school play bye bye birdie last weekend. Science is a big part of my life since I have been accepted to the Bridgeport Regional Aquaculture Center. I am also not new to Globe since my older sister was one of the founders of our Globe program here at David Wooster Middle School.

Study Sites

The study sites that our team used in this investigation are as follows in testing order

- Inlet stream
- Storm Drain (Pipe 1)
- Intermittent Pipe (Pipe 2)
- Pond
- Outlet Stream



Pictures of Study Sites



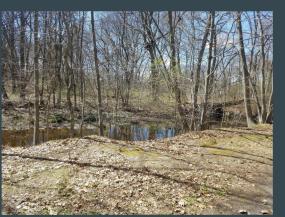
Pipe 1



Pond

Outlet Stream





Pipe 2



Inlet Stream

Data Collection

Beginning in November 2017 data was taken weekly from 4 locations in Wooster pond. These locations are the inlet stream located at the north side of the pond, the outlet stream located at the south side of the pond, the east shore of the pond, and at the storm drain. Atmospheric data is also taken at the weather station located in front of the school building, which is 297 meters away from the pond to the north. We take the samples about once a week from each site. Data is collected at the pond on Thursdays, the weather station on Wednesdays and rainfall measurements are made as often as possible.

*Missing or absent data points were due to technical difficulties including broken equipment, frozen ponds, and lack of time.

Here at Wooster Middle School we didn't start with a Hypothesis, we started as a group of students just wanting to do science. We took our love for science and the globe sites created by past groups and we went from there. Slowly but surely questions started to come from our research until we were left with the question below. Which became our Hypothesis

Hypothesis

Our hypothesis is that the storm drain (Pipe 1) affects the pond because the water in the pipe has more nitrates than anywhere else in the pond

Protocols

Inlet Stream
Pond
Pond
Using A 2 Point Calibration 4, 7, 11
None of us knew this had to happen until we joined Globe
Conductivity
Conductivity
Temperature
Temperature

Nitrates

PH Meters Are Calibrated
Using A 2 Point Calibration 4, 7, 11
None of us knew this had to happen until we joined Globe
Using A 2 Point Calibration system
Using A 2 point calibration system

Temperature Probes are Calibrated
Using ice water (0 Degrees C) and boiling
water (100 Degrees C)

Outlet stream

Transparency

Nitrates

Transparency

Pipe



Introducing:

Lelia Wellen and... ANDREW CARMODY





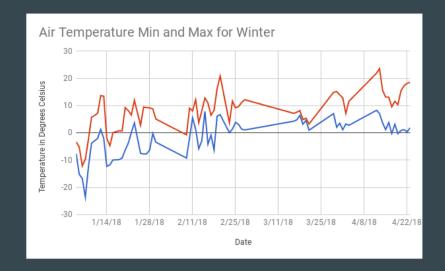
Data Findings From the Weather Instrument Shelter

Our school has a weather station out in the front of the building, and we take measurements from it weekly. We measure air and soil temperatures from the past seven days, as well as rainfall.

Air Temperature Min and Max

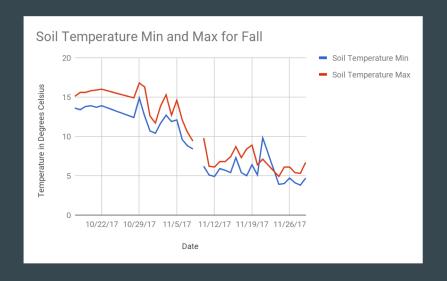
We observed air temperature weekly from 10/17/17 to 11/29/17 in the winter, then from 1/4/18 to 4/23/18.





Soil Temperature Min and Max

We observed soil temperature weekly from 10/17/17 to 11/29/17 in the winter, then from 1/4/18 to 4/23/18.

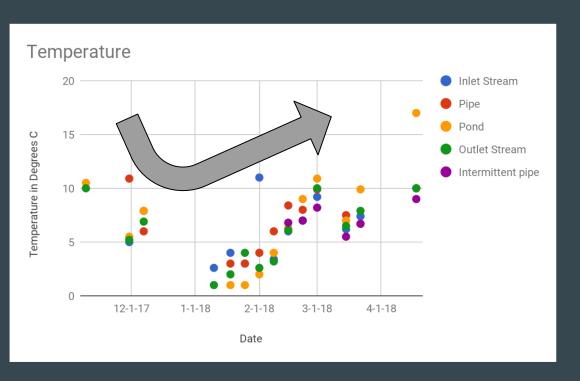




Data Findings From the Pond

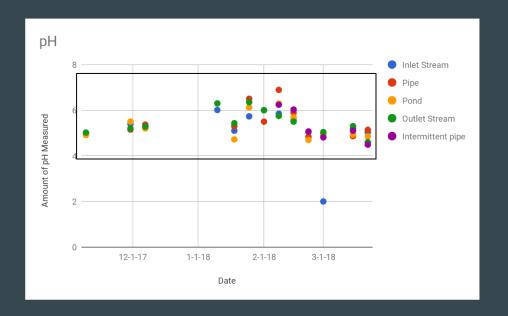
We found that values for most of the data we collected at all five pond stations were mostly the same - except for the nitrates. The nitrates that were going into the pond were significantly higher coming from the storm drain. On the next couple slides we incorporated all the findings into graphs, as you will see, to better show our results.

Surface Water Temperature



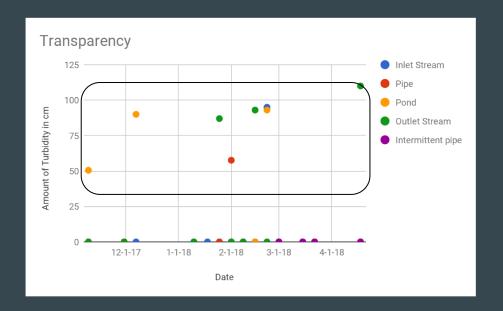
As you can see, all the temperatures of the different sites are generally the same as winter comes and the temperature drops. Then they all rise up again in the spring.

Surface pH



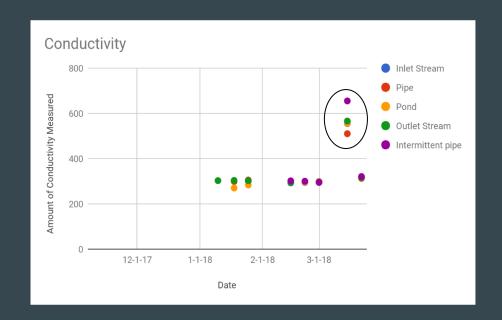
In this data set you can also see a bit of a trend with the graph, most data points slope up and then down again over February.

Transparency



We can see that mostly the transparency is clear, but on occasional spikes do show when the transparency was a bit elevated. We also had rain data, and some of the spikes happened after major rain showers.

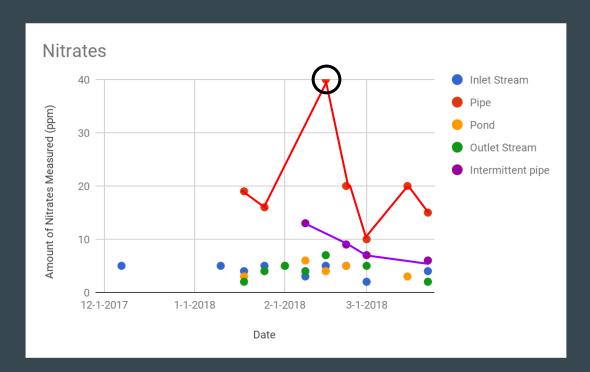
Conductivity



The conductivity in all five sites stays fairly constant, but one day it spikes.

It snowed two days before the spike in conductivity, and promptly melted. We began to wonder: could that have affected the conductivity? Or could road salt gotten through the drain pipe?

Nitrates



The nitrates in the inlet stream, pond, and outlet stream stay within the same range, but the nitrates in the storm pipes are significantly higher, giving us readings of up to 40.

New Research Question

After we saw that the level of nitrates in the pipes was significantly greater than in any of our other sites, we began to think: how do different water sources affect the pond? If they do have a big effect, then that can change the habitats that different animals live in. We also began to wonder about the effect increased nitrates might have on different habitats. That became our new research question.

Data Sets:

We're working to finish uploading our data to the GLOBE website - in the meantime if you would like collaborate, we can share all of it through a link to our Google Sheets.

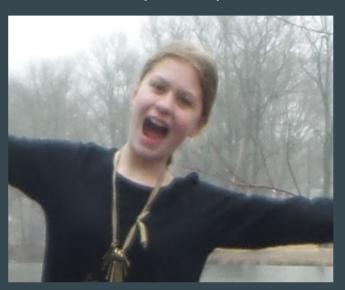






And introducing...

ANNA FLOCKHART:



Anna is obsessed with cats. In her free times she reads and talks to herself. In the future she plans to become a forensic scientist.

Jzzy enjoys
performing and being
with her friends. Jn
her free time she does
something beauty
related, or plays
computer games.

Izzy Taccogna



Looking to the Future

In the next couple of years, we plan to:

- Get the elementary schools to help, by putting weather stations in front of all the schools so they can collect data too!
- Get a new schedule at our school so we can collect samples during school hours (CSEP School)
- Enter at least 1 research project in next years Northeast Student Research
 Symposium and/or the Virtual International Science Symposium
- Have fun

Shumate's Inspiration: Elementary Schools

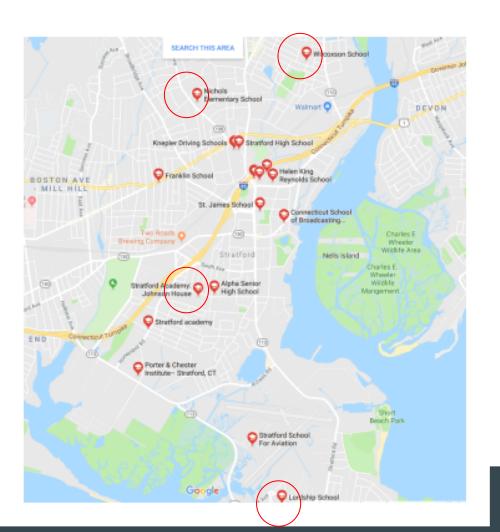
Shumate Middle School, Jeff Bauman



We wrote a grant to Stratford BEST Committee for \$500 to build weather instrument shelter for 4 elementary schools whose students come here.

We are turning them into minions so...

- 1. They can collect data to support our research questions
- 2. So that they are prepared and know how to do it when they get to middle school
- 3. To increase teachers involved in program
- 4. To get more kids doing science instead of just reading about it





Building instrument shelters

We came in during April vacation and built instrument shelters.

We plan to install these outside the elementary schools with the help of the students in May.

This will get them more into science through fun activities and support our research through their data collection

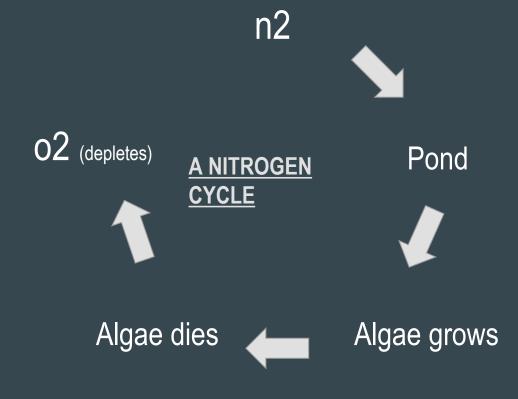


Questions We Hope To Work On Together:

- 1. Does Stratford have it's own microclimates (is the weather the same everywhere in town)
- 2. How does rainfall change as we move further away from Long Island Sound?
- 3. Is rainfall, air temperature, and soil temperature, the same in all of Stratford?

Mahopac Inspiration

We were inspired by Mahopac High School and all they've done to reduce nitrogen in their pond and river. We hope to take some of their ideas and implement them in the future.



Medford's Inspiration! New Schedule = CSEP School????

Next year we are going to have a new schedule called a modified block schedule. On Monday, Tuesday, and Friday, we will have normal schedules. But on Wednesday and Thursday, classes will be extended. But if you notice, we only have 7 classes on normal days and 8 on the special days. We have proposed that the 8 class will be used for a CSEP style class, or a "Challenge Class". With this class, we might be able to work on Globe during school!

M 1 2 3 4 5 6 7	T 1 2 3 4 5 6 7	W 1 3 5 7	TH 2 4 6 8	F 1 2 3 4 5 6 7

We would like to dedicate this presentation to lancelot the water bug and chubbs the snapping turtle. Both are incredible creatures found in wooster pond





Thank you

BEST Committee





Other Schools who have shared during these webinars, we have learned something from each of your presentations.

Lucas not breaking anything, Lancelot and Chubbs for not killing us, Brian, Dorian, other GLOBE organizers, Anna, Lelia (the data master!) for keeping the notebook neat, the shovel for always being there. And of course, Mr.Newlan for dealing with us at least 2 times a week. :)