Middle School Wednesday STEM activity 3-20-13

Scientific Research and Storm Drain Stenciling

8:10 – 8:30 Book buddies

8:30 – 9:00 Warm up activity (ice breaker) Black Box

Turtle Hurdles outside

Go over groups and expectations for the day

9:00 –9:30 **Group 1** with Ms. Yeoman (Caroline, Julia, Mia, Brenna)

Everyone else go to assigned rooms and begin working on research

9:30– 10:00 **Group 2** with Ms. Yeoman (Saeed, Max G, Adam, Amanda)

10:00 – 10:30 Brain Break (outside)

10:30 – 11:00 **Group 3** with Ms. Yeoman

(Max C., Bradley, Grace, Caroline, Julia, Mia, Brenna)

11:00 – 11:30 **Group 4** with Ms. Yeoman

(Sean, John, Magnus, Camille, Saeed, Max G, Adam, Amanda)

11:30 – 12:00 clean up, share

12:00 – 12:30 Lunch

Huggins	Farley	Bennett	White
Saeed (2, 4) Caroline (1,3) Alston Trey Max G (2,4) Max C Dylan	Amanda (2,4) Bradley (3) John (4) Nolan Kevin Tavon Travon Yaakov (ipad)	Devin Elias Grace (3) Mia (1,3) Camille (4) Julia (1,3) Sawyer	Brenna (1,3) Adam (2,4) Peter Natan Magnus (4) Sean (4) Aiden Kayla

Extra support staff should report to the computer lab or Ms. Bennett's room for extra support

Some students will have to share computers. When students are out painting, others may use their computer.

When a computer is not available, students should be working on the Designing a City Activity.


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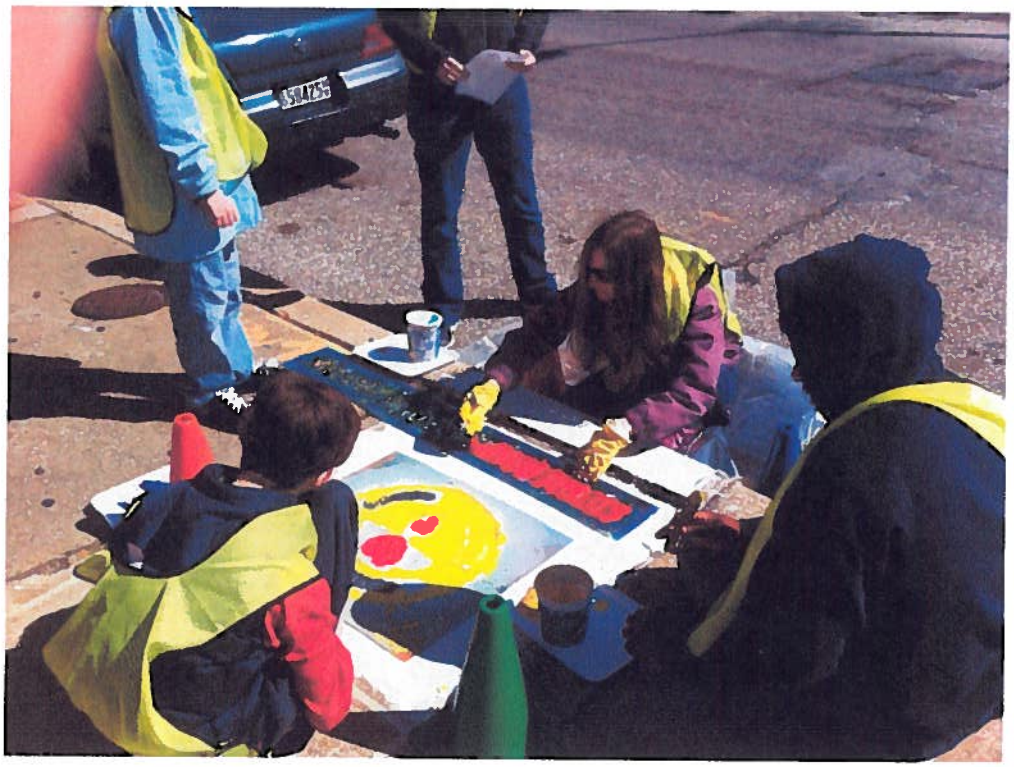
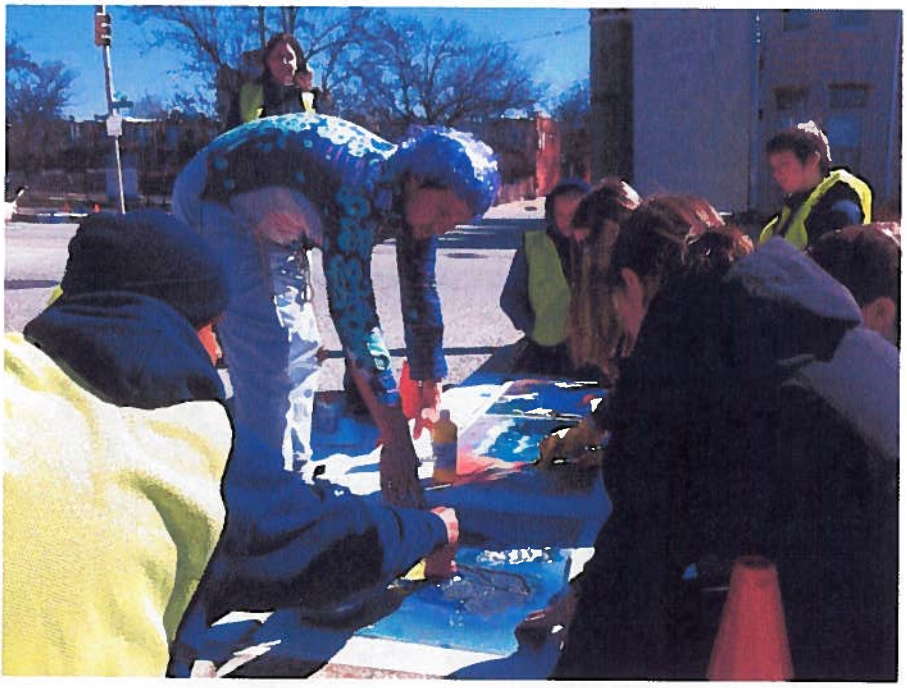
PRIVATE PROPERTY





Dear Ben Oaks Community Organization,

My name is Chris Scholz and I am working with my classmate Ryan Karwacki. Our Environmental Science class went on a trip to your community, with the purpose of testing the water quality of the Bear Branch Creek and the Severn River.

We found that the Bear Branch Creek has a pH of 7.0 which is in the healthy range. It contains 2.0 ppm (parts per million) phosphates, which is considered too high when they exceed 0.015 ppm. The Bear Branch Creek has a dissolved oxygen (DO) content of 4 ppm DO, lower than the normal concentration of 5.0 – 8.5 ppm DO. In addition we found the Bear Branch Creek had a nitrate concentration of 5 ppm nitrates, which greatly exceeds the ideal levels of 0.3 ppm nitrates. We found a single pollution tolerant macro organism, an aquatic worm, which is not a great sign. Finally, we found that Coliform Bacteria present in the Bear Branch Creek which indicates that untreated human sewage is leaking into the water. We found four tires along the Bear Branch Creek.

In the Severn River we found it has a pH of 7.0, a phosphate content of 2 ppm the level of which is increase by runoff from the animal, industrial, and agricultural wastes. The river had a DO content of 4 ppm, which is changed by the presence of respiring organisms like bacteria. Also a nitrate content of 5 ppm, which can be elevated by animal and agricultural runoff. We found two pollution tolerant macro organisms, and the presence of Coliform Bacteria.

Based on our findings, both the Bear Branch Creek and the Severn River are not healthy, the presence of Coliform Bacteria, the lack of pollution intolerant organisms, and the high nitrate content.

Some possible sources of these problems might be, the runoff from the highways, leakage from the sewage plant, the lack of riprap, and improper disposal of garbage. Possible solutions are to stop the weed-whacking of the riprap, monitor the disposal of trash. Also increasing neighborhood awareness of the problem would help greatly.

Sincerely,

Chris Scholz

And

Ryan Karwacki

Dear, Ben Oaks Community Organization

Our names are Sam Eldridge and Kameron Williams. I and members of my high school Baltimore Lab School came to your neighborhood for an Environmental Science field trip on April 17th 2013 to test the water quality in two different areas. One of our teacher chaperones is actually a member of your organization Mrs. Patti Childs. We took our samples and took various tests on the water. We took water from the Severn River bank and bear branch creek.

We tested the PH levels or level of acidity of the water. The dissolved oxygen levels in the water that all underwater organisms need to survive. Nitrate levels in the water or amount of fertilizers and animal waste in the water. Phosphate levels which record how much animal, industrial, and agricultural waste is in the body of water. Most of these tests in small amounts is okay but in large amounts like nitrates and phosphates can be devastating to an ecosystem. Carbon dioxide levels which interfere with fish's ability to breathe dissolved oxygen through their gills.

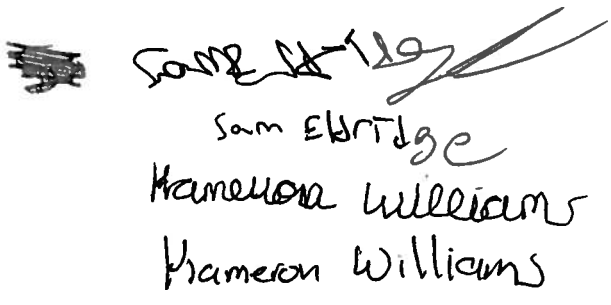
We tested for pesticides and finally fecal coliform or raw human waste in the water. Now PH in both the creek and the bank were in good ranges both coming up 7.0 on a chart of 13.0. To give you an idea of having a PH over 8.5 is like swimming in lemon juice and having a PH lower than 5.0 is like swimming in cleaning detergent. With this first result we thought that the creek would be very healthy but we found that phosphate levels were 1.895 PPM over the acceptable as healthy limit. PPM stands for parts per million a scientific term that helps to show a gas or chemical ratio in per million units. Normal water contains 5.0-8.5 PPM of dissolved oxygen but the creek only contained 4.0 PPM.

As for nitrates in the creek it contained 4.50 PPM over acceptable limits with a readout of 5.0 PPM. The creek also tested positive for fecal coliform possibly coming from the close by waste treatment plant. The bank of the Severn River did not fare better all the results were basically the same. 7.0 on the PH scale. Phosphates at 2 PPM, dissolved oxygen at 4 PPM, Nitrates at 5 PPM, and positive testing for fecal coliform.

We left the decision making up to you but we suggest lobbying to local government for assistance and protection of the Severn River and bear branch creek, and constant monitorization of the creek and Severn River. We can also suggest that you don't go swimming in the creek or the Severn River for a while. We thank you for the chance to come out and have our field trip with your organization and neighborhood.

Sincerely,

Watershed Stewards of Baltimore Lab School



Baltimore Lab School

2220 St Paul St

Baltimore, Maryland

Dear Ben Oaks Community Organization, our names are Patrick and Josh and we are 12th grade students at Baltimore Lab School. We visited Ben Oaks to test the water quality of the creek and the Severn River Bank. Now we would like to show you our findings.

The results of our tests show that these two bodies of water are polluted. We found out that both bodies of water had a normal pH of 7.0, but that was the only thing that was correct. The levels of phosphates and nitrates in the water were way too high. Phosphate levels were at 2 ppm instead of their normal .015 ppm and the nitrate levels were at 5 ppm when they should be no more than .3 ppm. Also we tested for the coliform bacteria which tested positive in both bodies of water even though there shouldn't be any. Most of our tests had similar results except for when we tested for turbidity and macro invertebrates. The turbidity in the creek was 0 JTU which is good, but the turbidity in the Severn River Bank wasn't nearly as good because it was at 6.0 JTU. Finally there were the macro invertebrates in both the creek and the Severn River Bank. In the creek, we found one macro invertebrate and in the Severn River Bank, we found two macro invertebrates. The invertebrates we saw were grass shrimp, minnows, midge fly larva, and aquatic worms.

All of our findings show that the creek and the Severn River Bank are polluted. Then there is the fact that we found coliform bacteria in the water which is a sign of sewage pollution.

Also all the macro invertebrates that we found were creatures that can survive in very polluted water. The macro invertebrates that we found are considered third level macro invertebrates.

There are a few ways to deal with these problems. For example figure out where the sewage is coming from and redirect it to the sewage treatment plant. Another way to fix the amount of runoff is by planting more trees near the water or we could lower the amount of runoff by redirecting the flow of it somewhere where it can't do any harm. Finally you could start community service projects to clean up the creek and the Severn River Bank.

Sincerely

Patrick Marcotte

Patrick Marcotte

and

Josh Crenshaw

Joshua Crenshaw