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| Table of  Contents  [Introduction](http://docs.google.com/title.html)  [Prediction/](http://docs.google.com/pred-hypo.html)  [Hypothesis](http://docs.google.com/pred-hypo.html)  [Procedure](http://docs.google.com/procedure.html)  [Data](http://docs.google.com/data.html)  [Conclusion](http://docs.google.com/conclusion.html)  [Bibliography](http://docs.google.com/biblio.html) | Daily Log  [[Emails with Bonnie Bassler]](http://docs.google.com/emails.html)   |  |  | | --- | --- | | 1/5/00 | Got permission to use the gyratory shaker at Clorox. We went there today and checked it out and talked to a guy named Denis Haire who said to give him a schedule for when we will be using it. | | 1/6/00 | Jasper and I tried to call Carolina during lunch to see if they had a Vibrio harveyi sub-culture to sell. They were too busy and we had to go to class. Tonight I looked on their web page, online catalog and they donot have V.harveyi. Some company in Germany sells it and a lady named Bonnie Bassler at Princeton is experimenting with it and may be able to give us some. I must talk to Jasper tomorrow. Been wracking our brains about the procedure and time management. I wrote a schedule out. | | 1/7/00 | During another meeting at lunch with Jasper, we have decided to cantact Bonnie Bassler and ask her about how long it takes for V.harveyi to grow and how long it will last outside of the water bath shaker. Also, to diplomatically aske her if she will send us some of the bacteria. We also figured that 1 flask with 40 mL of bacteria will last us for 3 experiements, so we are going to grow 2 flasks at different times so we will have 6 experiments to analyze data from. I am so excited, I cannot wait until we finally get this experiment on its feet! | | 1/12/00 | Jasper and I sent out an email to Bonnie Bassler on Friday and we did not expect an answer until Monday. However, we did not receive a reply, nor did we on Tuesday. Today, during a meeting, I told Jasper that I looked at the Princeton web page and it said that the spring term would not start until Jan. 31. So we thought we would not hear from her until then and decided to try somewhere else. Then, I got home and looked at my email and saw that she replied and is happy to send us a strain of the bacteria. She also answered our questions. How exciting! Now, all we have to do is email her back with an address to send it too, and figure out the days when we will grow the bacteria. | | 1/13/00 | After a long telephone conversation with Jasper, we sent Bonnie Bassler the school address to send the bacteria to. We also discussed the days that we will be using the water bath shaker at Clorox. These days are: Jan. 31-Feb. 1, Feb. 14-Feb. 15, and Feb. 28-Feb. 29. We want to be able to have three run throughs of our experiment done so we have enough data. Hope Bonnie Bassler sends the bacteria to us soon! | | 1/19/00 | We had a meeting after school today where Jasper fixed our box and I took home the Calculator Based Labortory and Venier Light Sensor in order to figure out how we are going to tell the CBL what data we want collected. I figured this out at home and also that we may need some reflector material in order to make the bioluminescence readible by the light sensor. Plus, I have to punch in a conversion equation for irradiance from voltage. Tomorrow, I plan to give Jasper's calculator the same lists that I made that control the CBL. The bacteria hasn't arrived yet. | | 1/25/00 | Jasper and I got a lot done today. We went to the creek and collected 3 water samples. One from under the bridge, another from under the first weeping willow tree, and the last from under the railroad bridge. Then we also collected distilled water and Pleasanton tap water. We made each sample have a 10% salinity, using only 10mL. So, if we use 1/2mL for each 2mL of bacteria for each sample in one experiment, then we have enough for next Tuesday and maybe even the Tuesday in February, the 15th. Tomorrow, I'm not sure what we'll do. I got a more sensitive light sensor from Mr. Little, my calculus teacher, and I took it home and just got done using it to test the light-glow on my watch because I think that my watch's light woule have about the same light intensity as the bioluminescent bacteria. I did this with a different light sensor because the one I used in the CBL kit didn't really pick up the watch's light, however, this new one did. I'll show Jasper the graph tomorrow and we may work out the physical appearance of the inside of our portable dark room. Like, where is the test tube of bacteria and sample go and how will the light sensor hang? | | 1/26/00 | We gathered up five test tubes for use in our experiment and we also figured out the physical appearance of our "portable dark room" and the llight sensor with test tubes. Tomorrow, we plan to prepare the growth medium. | | 1/27/00 | We made the growth medium, only 40mL of it and now we are waiting for it to cook. However, something very exciting has just happened. We got our bacteria from Bonnie Bassler today. We're kindof unsure about how to satrt this whole thing. We'll have to read over our experiment outline and other notes. Everything seems to be going according to schedule and I can't wait untill Tuesday when we finally collect our first stem of data! | | 1/31/00 | Today, Jasper and I innoculated the growth medium and put it in the water bath shaker at Clorox at 3:55pm. Tomorrow, we plan to set up our "portable dark room" with the digital camera during lunch so we are all ready for afterschool and collecting data. | | 2/1/00 | Unfortunately, our bacteria did not grow. We believe it is because the growth medium was gel instead of a broth or because our bacteria sis not show any signs of growth from when we received it from Bonnie Bassler on Monday, when we innoculated  the growth medium. Today, I will send and email to Bassler explaining our situation and asking her if she couldsend us the procedure she uses for preparing the growth medium. Jasper has a list of 6 other scientist who have worked with bioluminescent bacteria. He will send an email to these people asking them for their procedures of preperation of growth medium. I hpe we get information back from them as soon as possible so we could keep on schedule. | | 2/2/00 | So I got an email back from Bassler with what she usus for her growth medium and rpm and temperature. Jasper also got back his letter from the scientist that he contacted. We decided to use Bassler's procedure because it is the simplest. I emialed Denis Haire, at Clorox, to ask him if we could use the water bath shaker next Tuesday, the 8th through Wednesday the 9th. That way we could start collecting data on Wednesday. We also have to connect a computer to a calculator so we could save our CBL data to a floppy disk. | | 2/5/00 | I got information from Denis Haire, saying we could use the water bath shaker on the chosen dates. So during lunch on Monday, Jasper and I are going to make the growth medium and innoculate it after school and shake it at Clorox. Then on Tuesday, we will pick it up, hopefully it will grow and collect data. I will find out either Monday morning or Tuesday morning, how to get a list off our calculator, onto a computer and eventually on a floppy disk. | | 2/8/00 | Yesterday we prepared the growth medium according to Dr. Bassler's procedure. Today, we retrieved our bacteria from the gyratory shaker at Clorox to find that our bacteria had frown during the night. The solution we prepared was differently colored and much cloudier than it had been the night before. Unfortunately, it was not glowing. We brought it back to school to see if our light sensor could pick up anything that our eyes couldn't. The light sensor picked up nothing. We put a drop of our bacteria on a slide and looked at it under a microscope to see if it was actually alive, which it was. But it was not glowing!! We are again going to email Dr. Bassler to see what is going on. Hopefully she's not too annoyed with us yet...  We are beginning to think of alternatives. The most obvious one would be to contact Carolina and order Vibrio fischeri, another strain of bioluminescent bacteria. The V. harveyi just doen't seem to want to cooperate with us. | | 2/14/00 | Today we tried V. harveyi again. Hopefully our bacteria will glow. | | 2/15/00 | No luck this time. It is not glowing. One more time and that's it, V. harveyi! | | 2/28/00 | We decided to try V. harveyi one last time and also try V. fischeri. With the V. harveyi, we will make two cultures, one that we will shake for one day and the other we will shake for two days. Then we might try to make a broth culture of V. fischeri. Trying all these different times to incubate, we may find that growing it longer may turn out that we get a glowing culture because it will be denser. I found that some bacteria will only light up when in a very dense environment where the bacteria can communicate with each other and decide to glow. Jasper and I are going with the three-day plan. We dropped our bacteria off at Clorox today. We also autoclaved the growth medium, hoping that may be that is what we were doing wrong the whole time, not autoclaving. | | 2/29/00 | We dropped off the second two cultures at Clorox. Tomorrow we will get one in the morning and the rest in the afternoon. | | 3/1/00 | The one we were going to pick up in the morning didn't look like it grew much, so we put it back in and decided to pick it up with the others after school. So after school, we picked them up and looked at them. None of them were glowing. Now we will switch to Plan B, growing V. fischeri on agar slants (broth is not working) and devise a way to do the experiment that way. | | 3/6/00 | We keep making new cultures of the V. fischeri because they need to be put on fresh agar twice a week to stay fresh. We are waiting for a shipment of 20 agar slants from Carolina Scientific Supply to do our experiments on. My dad is working on a circuit for us using an Avalanche Photodiode chip, a highly light sensitive chip that will be able to detect bioluminescent light. | | 3/17/00 | Our order came in today and wee are planning to do our experiment on Thursday night. We are going to add our samples to the agar slants and have the light sensor detect the decrease in light intensity that way, with the solution in the agar slants. | | 3/23/00 | Tonight, we were playing with the light sensor, trying to get the right settings. We had five tubes of agar slants for five solutions: 1 of bleach, 1 of tap water, 1 of distilled water, and 2 of creek water. On the 15th of March, we went back to the creek and collected new water samples. One from under the bridge, one from under the first weeping willow, one from rapid-flowing water under the railroad bridge, and one from dirty, stagnant water, also from under the railroad bridge. Then we make salt solutions out of all except the bleach. Anyway, we were playing with the light sensor (which is hooked up to a digital ocilliscope in order to record data) when suddenly it poops out, right before we were ready to experiment. So, Jasper and I decided to do what last year's group proposed, looking to see if the bacteria dims, and timing it, using our eyes. This is very inprecise, but we needed to get some data. We also decided to do a before and after type test when doing the experiment. For example, take a light reading before sample is added, then take one every five minutes after to see any change. We want to do this because our power source is kind of unstable and the voltage fluctuates a little and we thought this will be better rather than trying to collect data of the whole time the light should be decreasing. On Saturday, we will do this with the rest of the agar slants we have. | | 3/24/00 | Jasper innoculated the 15 agar slants and took them home with him for tomorrow. Hope everything works out just right tomorrow! | | 3/25/00 | Today we did the experiment. What we did is take our 15 agar slants, leaving one empty of solution for a standard to calibrate the sensor, and the other 14 for the samples. We calibrated the light sensor, using our standard, for one minute. Then we took each agar slant and added the solution to it (10mL), and took data from the light sensor for 1 minute. Then at the end, we calibrated the sensor again, using the standard, to see if the gain changed. Now we are waiting two hours to do the second data collection. Hopefully, we will see a change in light intensity.  We did the experiment again, the after reading. Some problems occured: some of the agar dislodged and rotated, coming closer to the sensor; and there was a dispersion of luminescent bacteria causing the ambient light to over power the bioluminescence, causing false data. If we were to cover the test tube with aluminum foil, we could cancel out the ambient light. To fix the agar rotating, we need to go back to the broth idea and try to get it to glow in a broth. Lastly, we need better electronic equipment to get the best results of light intensity and to keep the voltage stable. | | 3/29/00 | Jasper and I decided that we want to do the experiment again, using some improvements on our protocol. Even though we will not have this new set of data in time for the Tri-Valley Science and Engineering Fair, I still want to see if we could get some conclusive data. This time, we'll have just 10 agar slants. | | 3/31/00 | Working on our display board and web page. Tomorrow we will work on it some more. |   [[Top]](#gjdgxs) |