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| ***� Why Acid Rain Makes Plants Go Brrr�*** ��� Daily Journal |

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|  | July 16, 2000  Chris met for lunch with George Hermann of Fogherty Engineering at Stanford University to discuss possible projects.    August 26, 2000  Today we started to think together about what our project is going to be about, we predict acid rain will have to play some role in it because that is what interests us both.    September 1, 2000  We think we should plan an experiment on the damage acid rain produces and if it can be reversed with antacids. This seems very interesting because it could help our future if the antacids did work.    September 4, 2000  We narrowed our topic to what we were thinking previously, the topic is not due until October so we have a little more time to think about it and decide whether we have sufficient information to proceed.    September 6, 2000  Chris went on the Internet to see if he could find any interesting information, he found a lot on acid rain but not really anything on antacids.    September 12, 2000  I looked on the Encarta Encyclopedia- CD Rom version- and found a lot of information on the effects of acid rain. It did not give the exact information I wanted because it was more on the effect that Canada has because of our polluting industries and the air stream that carries it over to them.    September 20, 2000  Research, research, research! We went to the library to see if there were any interesting books on acid rain but we found very few which we were looking for.    October 1, 2000  We have done more research in the past couple days and our research topics are due October 9th, so we are ready to submit that. Also we thought more about what our hypothesis and prediction would be because that is probably due this month also.    October 8, 2000  We submitted our research topic online.    October 12, 2000  I spoke with Mrs. DeBoer about our project and she seemed very interested with it, especially because it has to do with chemistry a little, she gave me some good advise about acid rain and plants.    October 15, 2000  Since we are experimenting on algae and the affects pollution has on it, we went down to the creek to look at different types of algae and where it mostly occurs.    October ?, 2000  We submitted our hypothesis and prediction online. Mr. Thiel will talk to us about our project very soon, so we will get to see if he agrees or has and worries about it.    October 21, 2000  Now that we have researched a lot about acid rain we are trying to gather our information and make some sense of it. We know all there is to know about acid rain and the damage it produces but now we have to figure out how we will carry out everything to make this project successful.    November 2, 2000  Mr. Thiel talked to us about our project and told us it might need to be a little more specific. It might be difficult to find the pollution level of algae and that is a very important part in our project. We might need to start thinking about something else dealing with acid rain!    November 7, 2000  Our best bet right now is to continue our research about acid rain and if we happen to fall across something that interests us even more than to find enough information on that to be able to do a project on it.    November12, 2000  We looked on many Internet sites and found quite interesting information on aluminum toxicity. It is fascinating because it deals with not only biology, but chemistry also.    November 18, 2000  Chris talked to Mr. Simms because he wanted some insight on this new idea we found. Mr.Simms told him that id we wanted to carry out a project dealing with this information we would need to have a lot of plants and be able to simulate acid rain.    November 27, 2000  Over thanksgiving break we found even more information on aluminum weakening the plants metabolism. We decided our project would involve growing many plants in a similar atmosphere as the east (same precipitation conditions) and then subjecting the plants to freezing temperatures and collecting data (what would be the survival rate).    December 1, 2000  Emilia spoke with Mrs. DeBoer on this new topic; she was thrilled it had to do so much with chemistry. Emilia asked her how could we simulate acid rain in our project and see told her that we could test different concentrations of sulfuric and nitric acid.    December 4, 2000  We have been sending out e-mails� to several places but have received nothing back yet. We e-mailed this chem.-center (government organized) asking how we could make acid rain.    December 6, 2000  Chem.-center actually sent some stuff back to us. They attached many helpful sites to their e-mail and it helped a lot because it had almost exactly what we needed. We know the ranges of acid rain and the pH of it in the east so we will go along with, probably, the pH of 4 for our experiment.    December 12, 2000  We decided we are going to use radishes as our plants because they grow in about 21 to 28 days, which is perfect. Also they have many advantages over other plants, including their tolerance for cold temperatures.    December 20, 2000  We started typing up our report: the hypothesis, prediction, procedure, etc.  We figure if we get that portion out of out way we will have time to observe and collect better data.��    December 27, 2000  Chris went to Home Depot and bought the radishes. The brand name is Burpee and just like we found out they are fully grown in about 28 days.    January4, 2001  We discussed what we could use for the soil because it needs to have aluminum in it but also have low concentrations of other elements that could interfere with our experiment. We went to home depot and looked at the ingredients of various soils and decided Perlite would be the best for our experiment. We didn�t buy it yet because we wanted to find out more information about it.    January 12, 2001  Chris went and bought the Perlite after we did some research on it. We concluded it would be perfect because it has all the necessary elements we need to have a successful project.    January 22, 2001  We worked on our report    January 26, 2001  Chris got all the chemicals: sulfuric, nitric and hydrochloric acid from his dad�s  work. We cannot begin to do anything with the acids until all the papers are approved.    January 30, 2001  We worked on our report    February 3,2001  We planted our radishes, 150 of them, in the Perlite today. Now we wait and see how fast they will grow. We plan to grow them for about three weeks because by then our science fair papers will be approved by Mr. Thiel and we will be able to water them with acid rain.� By this time, they will have grown enough to survive pH changes, too.�    February 7, 2001  The plants are already growing fast, we expose them to sunlight and water them the same amounts so that they have an equal opportunity to grow.� We have been watering them every day, as we discovered was necessary.    February 10,2001  Watered plants    February 11,2001  Watered plants    February 12,2001  Watered plants    February 13,2001  Watered plants    February 14,2001  Watered plants.    February 15,2001  Watered plants    February 16, 2001  Took pictures of the plants, watered.    February 17,2001  Watered plants    February 18, 2001  Watered plants    February 19,2001  Watered plants    February 20,2001  Watered plants    February 21,2001  Watered plants    February 22,2001  Watered plants    February 23, 2001  We got all our papers approved by Mr. Thiel and now we can begin to simulate acid rain, watered plants.    February 24, 2001  We made acid rain today: diluted sulfuric and nitric acid in water to have a pH of about 4, we will use this to water group B and C for the next three weeks starting on the 25th. We also made an antacid made up of lime diluted in water. This will serve as the buffer for group C.    February 25, 2001  Today we start watering  Group A: water  Group B: acid rain  Group C: acid rain and the buffer  We water them for two weeks under the leaves, making sure not to splash on the leaves, which would ruin the waxy cuticle, which might obstruct our experiment.  We water them every day because it is warm outside and they get sufficient sunlight.    February 26, 2001  Water the plants with the three solutions.    February 27, 2001  Water the plants with the three solutions.    February 28, 2001  Water the plants with the three solutions.    March 1, 2001  Water the plants with the three solutions.    March 2, 2001  Water the plants with the three solutions.    March 3, 2001  Water the plants with the three solutions.    March 4, 2001  Water the plants with the three solutions.    March 5, 2001  Water the plants with the three solutions.    March 6, 2001  Water the plants with the three solutions.    March 7, 2001  Water the plants with the three solutions.    March 8, 2001  Water the plants with the three solutions.    March 9, 2001  Water the plants with the three solutions.    March 10, 2001  Water the plants with the three solutions.    March 11, 2001  Water the plants with the three solutions for the last time. Today marks the end of our two-week watering period. Tomorrow we will start subjecting them to cold temperatures.    March 12, 2001  The first 15 plants went in today. (5 from each group)  They go into the refrigerator for an hour and then to the freezer for 2 ours. We take them out after that and after 48 hour we declare them alive or dead.    March 13, 2001  The next set of 15 went in.  That�s 30 all together    March 14, 2001  The next set of 15 went in.  That�s 45 all together  Collected data from 1st freezing    March 15, 2001  The next set of 15 went in.  That�s 60 all together  Collected data    March 16, 2001  The next set of 15 went in.  That�s 75 all together.  Collected data    March 17, 2001  The next set of 15 went in.  That�s 90 all together.  Collected data    March 18, 2001  The next set of 15 went in.  That�s 105 all together.  Collected data    March 19, 2001  The next set of 15 went in.  That�s 120 all together.  Collected data    March 20, 2001  The next set of 15 went in.  That�s 135 all together.  Collected data    March21, 2001  The last 15 plants went in today, that is 150 all together. Now we just have to wait for the results of these last 30 plants and we can finish up our report.  Collected data    March 22, 1001  Collected data, finishing up report and starting poster board.    March 23, 2001  Today is the last data collecting day and finishing the statistical analysis of our data. Continuing to make poster board look good for the science fair.    March 24, 2001  Finishing up graphs and conclusions of our experiment. Almost finished with the board.    March 25, 2001  Glued everything on the board and do some finishing touch ups.    March 28, 2001  Took our project to the automobile museum in San Ramon. Set everything up and made it all organized.    March 29, 2001  Present our project to the judges, answered all their questions. Went to the ceremony at night, got 2nd place! Yippee!    RELAX A LITTLE and�    Spring break April 13 to April20, 2001  Perfect our write-up so it is perfect and presentable. |  |
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