The Recycling Roadrunners

Team Members:
Maia Schneider and Heather Devers

Do It Better, Make It Better

Assignment 1-Project Outline

Before I, Heather Devers, joined the group, Maia Schneider and Mark Bramhill made the original project outline a mission which stated:

1. Design and promote a website detailing:
    - The dangers of carbon dioxide (i.e. what makes it harmful, why it is important to decrease the amounts of carbon dioxide, and what people can do to make improvements on a daily basis)
    - What people can do to help (such as recycling, using natural energy, composting, etc.)

2. Talk to family, friends, schools, and businesses about the ease and benefits of starting a recycling program.

After I joined and Maia had some successes and failures, we modified the project a bit so I could contribute more and we could do more. That is when the plan came to be:

1. Design and promote a website detailing:
    - The dangers of carbon dioxide (i.e. what makes it harmful, why it is important to decrease the amounts of carbon dioxide, and what people can do to make improvements on a daily basis)
    - What people can do to help (such as recycling, using natural energy, composting, etc.)

2. Create a presentation for Reid Park Zoo that could continue educating after this project had finished including:
    - A similar layout to the website (dangers of CO2, ways to decrease CO2, and what people can do to help)

- Relating CO_2 increase to the impact it has on animals at the zoo (focusing mostly on the polar bear)

3. Hand seeds of flowers out to the public to create rain gardens which will harvest water and reduce CO_2

Overall, the main goal and theme to educate the people and involve them actively in reducing carbon dioxide stayed the same, but what changed was the approach and an added activity.

Assignment 2-What did you do? How did you do it?

Our original project idea was to create a website informing the public about CO_2 and start recycling programs around town, but that wasn't the final result.

I, Maia Schneider, am a volunteer at the Reid Park Zoo. When I heard about Project Polar Bear from Jennifer Stoddard, the zoo education coordinator, I decided I really wanted to enter (and win!). A few days later, I told my friend, Mark Bramhill, about the project and he agreed to be my partner. Mark had always been interested in computer programming, so he wanted to make a website about the causes and effects of CO_2 in the atmosphere and ways to help. So, as he designed the original website, I researched the effects of CO_2 in our atmosphere, how it is affecting the earth, how humans are increasing the dangerous greenhouse gas, and how they can make improvements. I also researched polar bears and facts about recycling. As we began to work on the project, it seemed that creating a website was not enough, so we decided to talk to businesses, schools, our friends and family, and people around town about starting a recycling program. We got to work on printing up some fliers about the benefits of recycling. After talking to the schools and some local businesses, the realization crept upon us that most already had

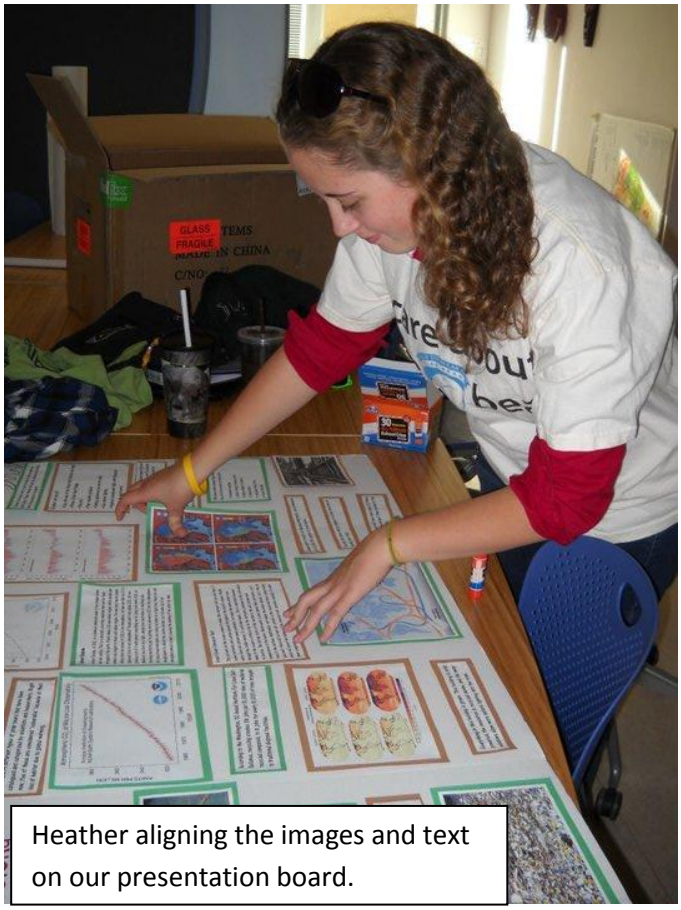
recycling programs installed, so we thanked those who had listened to us and used our energy to focus in our website.

Soon after that, Mark slowly started becoming frequently unavailable to work on the project. We finished the website, and ended there. I was gravely disappointed and sure that there was no chance of getting much further with the project.

A little while later, I went to the zoo for a Tundra Connections Webcast and to listen to a presentation from another zoo volunteer who had previously won the zoo's very own Project Polar Bear Contest. While I was there, Jennifer asked how the project was going, and I told her that I did not think it was going to go any further, but Jennifer informed me that if I found another partner to add to the group, I could finish with them. That's when Heather Devers stepped in and said that she wanted to help. Thus the duo became a trio, but that was not to last. We three decided it was in Mark's best interest to focus on other activities within his life that the Polar Bear Project would interfere with, so the trio became a duo once again. Over the next week or two, Heather and I began exchanging more ideas about our project at Heather's request, so

Our presentation board title and the website URLs.

Heather could add more to the project instead of simply latching on at the last moment. We decided since we both volunteer at the zoo, and because people often come to the zoo, we should make an education station for staff members, docents, and other volunteers to present to the public about polar bears and carbon dioxide. Talking face to face with our audience was a very



Heather aligning the images and text on our presentation board.

important aspect because it allowed us to interact with our community and witness our impact first hand. To start this project, Heather and I went to the zoo to look at the education stations (a station presented by volunteers with different artifacts such as skulls or fur, to educate the zoo's patrons) that already exist. There was already a station dedicated completely to polar bears and one dedicated to the Conservation Learning Center at the zoo (a platinum LEED approved education and event building). We typed up some ideas they got from both of the stations as well as what we had been learning in school and got permission to use some artifacts from the stations (a model polar bear skull, the samples of eco-friendly building material, etc.). We also used the website Mark and I had previously constructed for information. However, after looking at the website, both of us decided that the website was not perfect yet, so Heather remade the website, keeping most of the same information and also adding on new features such as fun, eco-friendly activities for all ages, information about other global issues such as the Great Ocean Garbage Pile, information about gardening, graphs and photographs to go with the information, and a guest book in which people can make comments about the website, make a pledge to help the environment, or, simply, to sign it. Over the duration of December, the website received over 18 pages worth of comments, signatures, and

pledges. Many of the comments aided in designing and improving the station for the zoo. When We met at the zoo again, Heather brought a tri-fold board, her computer, construction paper, as well as colored pens to begin putting the board together. We cut out letters spelling out "Easy to be Green" across the top of the board. Heather and I then wrote out their website URL, co2ucson.weebly.com, the PBI website, and the Reid Park Zoo website. I then began synthesizing the information gathered from their website, other sites, books, and people to put on the board. Heather also put the graphs from the website on the board along with various images of polar bears and other animals affected by climate change. We glued down information about polar bears, their habitat loss, how global climate change affects humans as well, and how to help.

This is a screenshot of co2ucson.weebly.com, our website.

Presenting how Polar Bears are losing their blubber because of climate change and what these people can do to help.

We made fliers to hand out to people at the zoo advertising their website and cut

out paper polar bears for people to make a pledge on and take home as a nice reminder to help the environment. Over this time, Heather and I had contacted approximately 45 people from newspapers, news stations, radio stations, and professors at the University of Arizona, as well as representatives of Arizona to spread our website into the world. They all yielded fantastic results. Although none of the newspapers, news channels, or radio stations could feature the website in their programs, many of the employees decided to update their Facebook and twitter accounts with the website. One of Heather's professors allowed her to present to the class (60+ students) and another emailed all of his colleagues. A local high school even featured the website and is now working with Heather and I to set up a "Reduce, Reuse, Recycle" day for the students which will include a presentation and at least one hour where the lights in the school are shut down. In addition, Heather contacted over 100 renown artists in the community, DeviantArt (www.deviantart.com) (of which only ten blogged about the website). The zoo was even inspired to create a CO2 Awareness Day of February 26th of next year, during which the teen volunteers will be promoting some of the eco-friendly crafts of CO2ucson and we will be presenting our brand new station and teaching it to any teen who wants to learn to present it.

Heather posing with 1/3 of the donations received.

Over the next week, Heather surprised me by adding something new and very cool to the project. She had gone to Ace Hardware, Home Depot, Lowes, and five local nurseries telling them about our project and asking if they could donate some gardening information or flower

seeds to help us decrease carbon dioxide, give back to the community, and also reduce erosion and runoff. She cut four sandwich bags into small portions (to reduce wasting) so they could be handed out to people at the zoo while we presented to make their own rain gardens and to direct them to the website.

During the presentation, we talked to over 100 people, handed out all of the fliers we had printed (on recycled paper, of course), distributed seeds for people to grow their own garden, and hopefully touched people enough for them to pass on the word.

Between the website and the presentations, people will continue to be educated for a long time. This project will continue on long after December 31, 2010.

Assignment 3- Data Collection, Calculation Methods, and Estimated CO2 Reduction

Part One:

In order to calculate the amount of CO2 reduced by our efforts, we first researched how much carbon dioxide the flowers we gave out reduced. We looked online for hours, and even used our local university's library system. These efforts proved fruitless as most of our search results only revealed the amount of carbon dioxide trees absorb. We decided we were spending too much time and energy on that subject even though it was not our main focus, so we switched tracks to the pledges. We first logged onto our website to view the promises we received. The promises had the greatest impact on us and were the most important factor in determining our success in this project. We created a table in which we chose certain aspects from our website and counted the number of promises in each category:

Number of People	Category
4	CF Light Change
56	Vampire Energy
25	Walking/biking
22	Public Transport
24	Recycling
2	Planting trees
76	Unplug charger

Since we could not analyze everyone's house or habits specifically, we used the average American situation for each of our statistics. To avoid unnecessary strings of numbers, when calculating we rounded to the nearest tenth and for our final numbers we rounded to the nearest whole number.

To find out how much carbon dioxide was saved by changing from incandescent lights to compact fluorescent lamps, we found the type of wattage people were most likely to use (60 watt incandescent bulbs and 15 watt CFLs) and looked up the amount of kilowatts per hour each produced (Incandescent=0.06 and CFLs=0.02). Next, we researched the average time a light stays on (3 hours per day) and the average number of lights in a house (30). Then, we multiplied the kilowatts per hour, average time lights are on, and the average number of lights in a house to get the amount of watts a light uses per day.

Incandescent:

$0.06 \times 3 \times 30 = 5.6$

CFLs:

$0.02 \times 3 \times 30 = 1.9$

We came to the conclusion that 3.7 kilowatts per hour were saved by switching to CFLs by subtracting the watts Incandescent bulbs use per day by the watts CFLs use per day.

$5.6 - 1.9 = 3.7$

We then multiplied 3.7 by 30 to obtain a monthly estimation of kilowatts per hour used (111 kWh). We entered that calculation into an online carbon footprint calculator. The calculator normally tells people how much carbon dioxide they are producing by using electricity. Instead, we used this tool to tell us how much is saved. We know that the calculator converts the amount of kilowatts per hour into carbon dioxide, so we could disregard the jargon about the negative impact we were having on the planet and focus on the conversion. The calculator gave us 697 pounds of carbon dioxide a year as how much was reduced.

We did something similar in finding the amount of carbon dioxide reduced via eliminating vampire energy. When we researched the amount of vampire energy each household fell victim to, the statistic came back to us as 5%, so we then had to find the average amount of electricity a household used (920 kWh per month). We took that amount and multiplied it by 0.05 to determine that a household used 46 kWh of vampire energy per month:

$0.05 \times 920 = 46$

Once again, we entered the kWh per month into the carbon footprint calculator to figure out how much CO_2 was reduced. The calculator said 289 pounds of carbon dioxide a year were reduced.

Next, we determined how much carbon dioxide was reduced from walking or biking. Walking or biking was generally stated within 5 miles by anyone who specified a length in their promise. First, we researched the average miles per gallon cars get (24), carbon per gallon of gas (19 lbs), average miles people drive per day (33), and assumed people would only walk or bike three times a week. This allowed us to determine how much carbon would be saved by walking or biking per week. We divided 1 by 24 to find how much gas was used in one mile and got 0.04. We multiplied 0.04 by 5 miles, and multiplied the product of that by 3 days to get 0.6 pounds of CO_2 per week.

$1 \div 24 = 0.04$

$0.04 \times 5 = 0.2$

$0.2 \times 3 = 0.6$

Next, we multiplied 0.6 by 52 weeks and estimated to the nearest pound to receive the amount of carbon dioxide reduced in a year. The final count per year was 31 pounds.

$0.6 \times 52 = 31$

For public transport, we used the same statistics of average miles per gallon and miles driven per day. We entered these into an online carbon savings calculator specific to public transportation. We got 26.67 pounds per week back, so we rounded it to 27 pounds and multiplied it by 52 to get the amount of pounds of carbon dioxide saved per year: 1404.

Next, we calculated the amount of carbon saved by recycling the three most common materials (paper products, PET plastic water bottles, and aluminum soda cans) as a worst case scenario equation. We researched the tons of CO2 per ton of material (paper: .04, PET plastic: 1.5, aluminum: 15), the weight of an individual soda can (30 cans is equal to one pound) and water bottle (12.7 grams) , the average amount of water bottles people use in a week (3), the amount of soda cans people use in a day (2), and the amount of paper products people use in a year (700 pounds).

First, we calculated the amount of carbon dioxide cans would save. We multiplied the average number people had each day by 7 to get how much was used per week, then multiplied that by 52 to get the amount of cans per year. We took the product of that and divided it by 30 to get the weight of the cans in pounds and rounded.

$2 \times 7 \times 52 = 728$

$728 \div 30 = 24$

Then, we calculated the amount of carbon dioxide recycling PET plastic would reduce. We multiplied the amount of water bottles per week times the weight of each bottle was, and multiplied the product of that by 52 to find the weight per year. Then we converted the grams to pounds and rounded to the nearest pound:

12.7×3×52=1981.2

1981.2÷453.5=4

Because we already had a weight for paper products per year, we did not need to calculate it.

Next, we solved the ratios for tons of CO2 per ton of materials and the weights we got from our previous equations to reveal the amount of CO2 per year saved by recycling. We started with ratios in tons for each material (Aluminum- 15:1, Plastic- 1.5:1, Paper- 0.4:1) and converted them from tons to pounds. After we converted them, we put them into an equation to solve for x. For each material, we put the pounds of carbon dioxide saved over one ton equivalent to x over the weight per year we got in the previous step.

Aluminum:

$$\frac{30{,}000}{2{,}000} = \frac{x}{24}$$

$720{,}000 = 2{,}000x$

$$x = 360$$

Plastic:

$$\frac{3{,}000}{2{,}000} = \frac{x}{0.4}$$

$12{,}000 = 2{,}000x$

$$x = 6$$

Paper:

$$\frac{800}{2{,}000} = \frac{x}{700}$$

560,000=2,000x

$x = 280$

Next, we added the carbon dioxide saved per year of each material together to determine the final amount of CO2 people would save by recycling the most common materials. The total came to 646 pounds of CO2 per year.

360+6+280=646

For our next step, we researched the average amount of carbon dioxide trees absorb. We found that a fully grown tree can absorb about 48 pounds a year.

When we found that several people had not made a specific promise, we decided to group them in with the people who promised to begin their efforts in reducing CO2 by unplugging their cell phone charger each day. We chose this specifically because it is a simple act that requires minimum effort. Since we did not know what the specific promises were it would allow us to count them in anyway even though it is probably drastically less than what the people are actually doing.

We then found that having a phone charger plugged in without being used consumes one watt a day. Multiplied by 365 to represent the days in a year, we found that forgetting to unplug a phone charger uses 365 watts a year. We plugged in 365 to the carbon footprint calculator we used for determining the CO2 CFLs and vampire energy save, and got 2,295 pounds per year of CO2.

When finished calculating the amount of carbon each year by one person, we included it into our chart and then multiplied that by the number of people whose promises included that specific category.

Number of People	Category	Amount saved per year	Total
4	CF Light Change	697 lbs	2788
56	Vampire Energy	289 lbs	16184
25	Walking/biking	31 lbs	775
22	Public Transport	6916 lbs	152152
24	Recycling	646 lbs	15504
2	Planting trees	26 lbs	52
76	Unplug charger	2295 lbs	14336

For example, since the category CF Light Change had 4 promises, and the amount of CO2 saved per year, per person was 697 pounds, we multiplied 4 by 697 to total 2788.

$4 \times 697 = 2788$

By educating the people of the world via our website and collecting the promises of those people, The Recycling Roadrunners will have reduced 201,791 pounds of CO2 by the end of next year. Even if all of the people only continue their promise for a month, it is still a whopping 16,815 pounds of carbon dioxide saved. But this number will also continue to increase as we will be presenting at the zoo often and constantly updating and improving the website.

Part Two:

For our research, we tried as much as possible to keep to reliable sources. We also attempted to take the most modern measurements to ensure our accuracy.

Electricity Resources:

1. http://www.pge.com/microsite/calculator/calc1.jsp?electricity=112&gas=0&miles=0&mpg=0

The website is a company dedicated to finding energy solutions for homes and businesses. This is the carbon footprint calculator we used for determining the amount of carbon dioxide reduced for switching from incandescent bulbs to CFLs, vampire energy, and unplugging a phone charger.

2. http://www.energystar.gov/ia/partners/manuf_res/downloads/2009_LED_partner_resource_guide.pdf

   This page is from an energystar document created to help people understand lighting. We used this website to inform us about the average time a light spends on everyday.

3. http://www.eia.doe.gov/ask/electricity_faqs.asp

   The statistics were taken from the U.S. Energy Information Administration which focuses on statistics and analysis on various energy sources. This webpage was full of frequently asked questions and allowed us to make calculations on how many kWh vampire energy consumes by informing us on the amount of energy the average household.

4. http://www.ucsusa.org/publications/greentips/energy-vampires.html

   This information is from the Union of Concerned Scientists, a group committed to "leadership for a healthy planet and a safer world." This article was about vampire energy and showed us that vampire energy was 5% of each household's electricity use.

5. http://www.matternetwork.com/2007/1/unplug-your-chargers.cfm

   The Matter Network is composed of bloggers and writers concerned with "New ideas for a sustainable world." This article was specifically about unplugging phone chargers. We were able to find how many watts a phone charger uses per day through it.

Recycling Data:

6. http://www.ecorewards.com/infostore/ECalculator.asp

   Even though EcoRewards is more centered upon the money saving aspect of going green, they have many tools and resources for both businesses and homes. This page was a Recycling Environmental Impact Calculator. We used it for recycling statistics on Paper, aluminum, and PET bottles.

Landfill	Greenhouse
Material	Greenhouse Benefits(Tons CO2 eq per ton recycled)
Paper/Cardboard	0.4
Glass Bottles	0.35
Aluminum Cans	15.17
Steel Cans	0.80
HDPE Containers	0.49
PET Bottles	1.51
Total	

7. http://www.kgbanswers.com/how-many-12-oz-cans-of-soda-does-the-average-american-drink-per-year/4212043

   Since we could not find an exact estimation on how many soda's a person drinks per year, we had to rely on some statistics that were not provided by professionals, so we used a common question and answer website. For the amount of soda a person drinks per day, we used this link.

8. http://www.tappi.org/paperu/all_about_paper/faq.htm

   The Paper University is a resource for teachers and students all about paper. The webpage we visited was a frequently asked question page about paper. To calculate the amount of paper used by a person each year, we used this website for statistics.

9. http://www.refillnotlandfill.org/whatcanyoudo.html

   Refill Not Landfill is an organization concerned about reducing waste from disposable water bottles. This webpage was about ways people can help recycle and reduce landfills. It also allowed us to figure out the amount of plastic water bottles one person used per year.

10. http://www.bottledwater.org/news/earth-day-2010-finds-weight-plastic-water-bottles-reduced-32-while-maintaining-very-small-envir

    The International Bottled Water Association helps to improve and regulate bottled water. The article on this webpage featured how plastic bottles have decrease their mass. By visiting this website, we were able to find the weight of PET plastic bottles.

Walking , Biking, and Public Transportation Facts:

11. http://genxfinance.com/2009/06/18/your-car-is-making-you-poor-and-what-you-can-do-about-it/

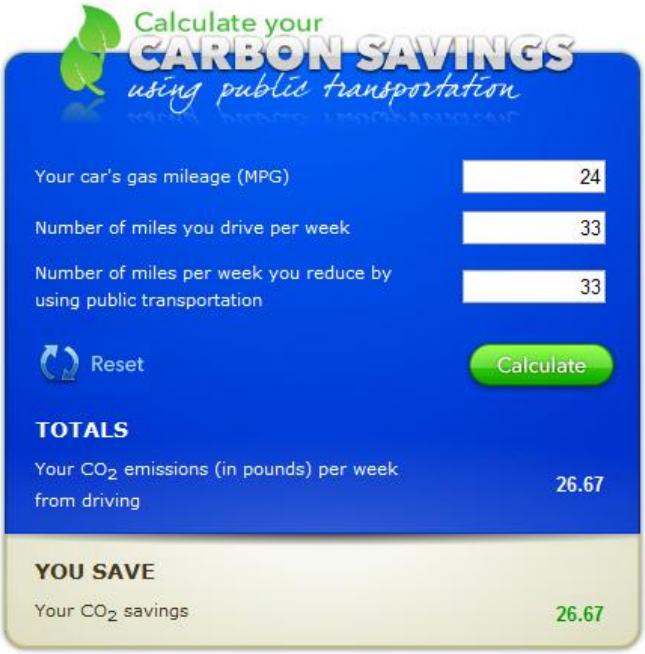
    Generation X Finance is a website with tips on saving money. This article covered how to save money by fixing your car. For our project, this page allowed us to determine the average miles a person drives per day.

12. http://www.slate.com/id/2151794/

    Slate is a magazine that covers every aspect of news. This article was about burning less CO2 and told us what the average miles per gallon was and how much carbon was in on gallon of gasoline.

13. http://www.publictransportation.org/calculators/carbon_08.asp

    publictransportation.org contains any needed information about public transportation. This webpage contains a calculator which helped us figure out the amount of carbon dioxide savings from using public transportation.



Tree Planting Data:

14. http://www.coloradotrees.org/benefits.htm

    Colorado Tree Coalition is an organization “leading Colorado’s efforts to preserve, renew, and enhance community forests.” This particular webpage explained the benefits of trees in urban areas. For our project, it informed us that a fully grown tree can absorb 48 pounds of carbon dioxide.

Assignment 4 – Social impact and Outcomes

On our website, we have received over 3,000 visitors since it started earlier in December, and over 18 pages of pledges and promises from people all over the country and even the world. People have promised to walk or bike instead of drive, have shorter showers, hand wash dishes, recycle everything possible, unplug electronics when they're not being used, put a one-liter bottle in their toilet tank to save water, talk to friends and family about the environment, and many other things. Not only were we very ecstatic and excited about all of the comments, but also what the comments stood for. They showed us that we had managed to educate many different people about the environment and inform them of great ways to take action themselves. These people are now all able to discuss climate change with others and also the changes they have made in their life to help the environment and to spread the word. This is probably our biggest success in the whole project.

Our station at the zoo has not received as much publicity as our website, but we know we were able to convince most of the people we talked to about considering changing a few things in their lives to become a "greener" person. We handed out fliers to most of the adults so they could see our website for more ideas. We also offered seeds to the adults, though not everyone wanted seeds. Those who did seem empowered to start their own garden often commented on how they would involve their children in the garden, which was an aim for us. The kids, however, seemed most interested in making change so they could "save Boris's (the male polar bear at Reid Park Zoo who recently passed away) family!" With the kids telling their parents to change and the parents telling their kids, the changes, even if they're small, have already begun.

This project also allowed us to reach out to the community in a more wide scale way. First, handing out seeds to create rain gardens helps to absorb water back into our depleting

water table that Tucsonans rely on heavily for water, thus helping the whole city while also reducing CO2. Second, we reached out to two different schools, college and high school students, which allowed us to spread the word to the future leaders of the world and people who were not as set in their ways yet. Finally, in creating a new station for our zoo's volunteers and staff to use, we ensured the continuing education of youth and adults as well as any volunteer who decides to present it.

On a personal level, I (Maia Schneider) have a friend who doesn't like animals very much, but she does care about them and the environment. Her family did some things to help the environment, but not too much. They had a recycling bin, but they didn't use it very much. They knew some basic ways to conserve water, but there was still much more to be done. My friend saw our website and told me it had some great ideas for her to help the environment without changing her lifestyle very much. I'd go over to her house sometimes and I'd see her leave the water running or throwing away a recyclable item. I kept telling her not to do those things, and she'd stop but be slightly annoyed at my nagging. However, after a short amount of time, she started turning simple ways of helping the environment into habits. When I go over to her house now, she's always telling he family to turn off the lights when she leaves a room, turn off the water in the kitchen sink when she's not using it, close the refrigerator door, and now *she's* the one nagging her family to remember to recycle the recyclable items (as it take no more effort to do so). Her family might get slightly annoyed with her now, but maybe she'll begin to change their lifestyles just like she did.

On a person level, I (Heather Devers) was given the nickname P.B.A. or "polar bear advocate" in my Environmental: History and Policy class. I have also been successful in influencing several family members to do at least one thing green on a daily basis, such as

unplugging their phone chargers every day. My professors and school advisor now view me as a dedicated student who is willing to power through struggle to achieve what I want, and allow nothing to stand in my way and also to use the resources I have at my disposal efficiently to accomplish my goal.

Assignment 5-Personal Impact

Throughout this process, we have faced misfortune, frustrations, but mostly unexpected surprises and happiness. The first frustration came when Mark could no longer dedicate the time needed to make this project a success. After parting ways, it seemed as though the project was over before it had really gotten started. Thankfully, that is when I (Heather) joined the group in a great stroke of luck. Maia was very disappointed that her project was not going to be up to par with her expectations, and was desperate for help. She was doing as much as she could in her own, but it did not please her and she felt she was not accomplishing enough. Then Jennifer, one of our zoo's education employees offered some encouragement and told her to look for a replacement and ask if a member could be added. That is when I offered to help out. I knew that registration for PPB had closed, and most groups were already well through the projects so I was probably not going to be allowed to officially join the group or earn any of the benefits if our group won, but it did not deter me, I decided to volunteer my time and effort anyway. Maia and I figured it would not hurt to try to have me join the group officially, so I shot an email to the director and the coordinator of Project Polar Bear with hope that it would return with the news that I became an official member. Even if the answer had been no, I still would have helped, but being an official member of the team made the work more satisfying. We were so very grateful

we were allowed to team up officially! After that challenge and after our website was up and running smoothly, all the pieces fell together fairly easily.

Another frustration we encountered was trying to advertise our website. Tucson is a difficult city to contact people in and get a response, especially with any media people. Every one of the employees we contacted from newspapers, news channels, and radio stations either said they could not mention the site or they would try to contact their supervisor and see what they could do, sadly, none of it worked out so we were not able to get a mention out to a great number of Tucson residents through those means. Either way, we were persistent in a way neither of us had been before. In dealing with the disappointment of mass media cooperation, we found we have been more optimistic, which is a change of traits for us. We recognize now that very little will work in our favor, and when it does to not take it for granted, and use each small victory to fuel us more to conquer the next battle. It also allowed us to build our courage and confidence and not be afraid to be told no.

Similarly, we learned was how to deal with disappointment. Before this project, approaching strangers to ask them for favors was a near impossible task for either of us, even through electronic means such as email. The idea of disappointment and being told no was enough to deter us, and the nervousness was so great we attempted to avoid such confrontation, but the first success in asking for seed donations and our first success of asking people to visit our website enabled us to continue on with little anxiety. Even when people told us they could not help or did not believe Global Climate Change was affected by humans, we did not argue or become overly frustrated but instead respected their choices and moved on.

As we were researching climate change, polar bears, and ways to help, we recognized that there were a lot of things that we could do to help, too. While we were informing people of

ways they should help the environment, we realized that we were not doing all of the simple things we were telling others to do. Doing this project helped us understand that in order to teach people the right way to do something, we have to be examples of our own lessons, not just preach the lessons. This project also gave us some really good advice on how to make our own homes better and gave us confidence in talking to people about changes that we didn't have before.

Another change we realized within ourselves was our ability to work as a team. Team work was a very easy process for both of us even though we had hardly spoken to each other before this project. We had helped teach children in summer camp at the zoo for a week, but during that time we were so busy tending to the children that we never got the chance to talk and we hardly volunteered at the same time or on the same days. We were very open to feeding new ideas to each other and giving constructive criticism on our ways of presenting or our project itself. We were able to energize and learn from each other as well. Presenting together was also a very easy task. We split the subjects by what each of us were more passionate about and were able to cohesively present.

Something we never expected was the affects on our community. The involvement of our community, both city-wide and world-wide, was a wonderful and amazing piece of this project for us. Never did we think that we would be reaching different states with our website, let alone different countries! With that, we also informed the thousands of people who visited our site and the hundreds who decided to make a promise! The fact that we, two teenagers, could affect this much was beyond the reach of our imaginations! Most teenagers think that we are much too young to make any impression on anyone, but the fact that we did is overwhelming. It really gave us a sense of empowerment. We then were informed by the zoo education staff that an

entire day dedicated to climate change was in the works that we influenced because we were so passionate about improving the conditions of Earth. After that, the student council of a local high school emailed us asking for assistance in having their very own recycling day. Aside from that, the wonder in the eyes of the kids we presented to as well as the adults astounded us. We did not expect many to be as enthused about learning how to be green as we thought most people would be sick of hearing about it, but we were wrong.

In conclusion, we have found our participation in Project Polar Bear has been very rewarding. It enabled us to explore ourselves, influence our community, and aid the world. While most would be grateful this project has ended, the recycling Roadrunners will continue on, educating, improving the environment, and involving our community.