

# Going Green

By the Philadelphia eagles

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In our going green schooling project, we have four main topics. Each topic we express will contribute to a more efficient and economically cost effective school system. The topics our group have chosen to create for this resourceful proposal are: transportation and fuel economy, the Cree lighting system, reconstruction of the cafeteria utensils and reduction of waste, and the introduction of four day school weeks. These four topics will help to reduce costs and help budget planning for our school district.

The first proposal of our green school project is the introduction to a four-day school week. This brings many positive aspects to being able to cut costs and becoming a more efficient school. The idea of a four-day school week is that the classes on Monday through Thursday will be extended by a half an hour and lunch and flex will be shortened. This will enable the school to still have the maximum amount of hours to have the state law of 180 school days. Then the school can cut Friday out of the school week, which will decrease the spending for the whole school year. The savings will come from the day that we are not in school, the heating, air- conditioning, electric /utilities, staff costs and bus transportation.

There are two parts to the four-day school week that will help us save money. The first is that there will be one less day without heating, air-conditioning, electric /utilities and additional staff costs (Janitors, substitute teachers, etc.) that our school will have to pay for. The second is having one day without bus and van transportation in the district. These two parts will yield great savings in our school's budget program.

For the first part, to calculate the savings we gain by switching to a shorter school week we added each monthly cost of the Northwestern Elementary, Weisenberg Elementary, Northwestern Middle School, and the Northwestern High School heating and utilities. We only added the months September through June; the actual months students are attending school, and figured the power is on for about 305 days. We took the combined cost of each school, divided those costs by 305 days and came up with the amount each school spends a day on heating, cooling and utilities. Weisenberg spends \$303.77, Northwestern Elementary came up with \$176.07 a day, the Middle School is at

\$268.42, and the Northwestern High School spends \$628.24. The overall cost for the whole district is \$1,376.50 a day.

We figured out that by cutting out a Friday of every school week, there would be 36 less days of school. Then by taking the overall cost of \$1,376.50 times the 36 days students will not be attending school. This multiplies to be \$49,554.00. This is the amount of money the school will be saving on electric and such alone, by running a four-day week.

For calculating the transportation side of the project we had to find the amount of miles the school district drives in a year, which is 731,422 miles. We then took the amount of days we go to school, 180 days, and divided the total miles a year by that amount of days. This then gave us the number 4,063 miles our school district drives a day. We also figured the buses get about 8.6 miles per gallon at \$2.69 a gallon of diesel fuel. Once we figured that out, we took the amount of miles the school district drives per day and divided that amount by the fuel mileage the buses get, 8.6 miles per gallon. Then we took that number, which came out to be 472.50, and multiplied it by \$2.69, the amount the school pays for diesel. This gives us the amount, \$1,271.01, the money we spend on gas a day. After that we multiply that number by the 36 days the transportation will not be running and get the amount of \$45,756.45.

Adding up the dollars saved by cutting transportation and heating and electric for 36 days will save the school district a grand total of \$95,310.27 a year. This much money can be put back into the school's budgeting program to increase the allowance of money we can put into other school activities or needed supplies for the school.

Of course the amount of electric and heating will go up due to the additional amount of hours the school will be open on days Monday through Thursday, but this will have little significance to the school's overall spending. The amount of money we will save by switching to the four- day school week is so beneficial, the additional hours the heating and electric are being run won't affect the money we will be able to save by much.

Another major focus for this project was geared around the transportation department. With the rise in the price of diesel, transportation is a big area to save money. Some things our school could do to cut costs are, eliminating unnecessary bus stops and cutting back on the number of buses used. Also, we propose that kindergarten spend a whole day a school. Lastly, half days should only occur when the whole district has one. These are some of the ideas for transportation.

Today, kids walk the shortest distances to their bus stop then they did ever before. This means that there are more stops that the buses have to make. More stops means more fuel consumed by the engine, meaning greater costs. We propose that stops should be eliminated from the buses' trip and that buses only have a maximum of three stops. This will mean that there will be approximately 37 stops in one round of bus trips. Since the district is 107 square miles, this will meet the state law of each student only being able to walk 1.5 miles to their bus stop. There are many reasons for our proposed change. First, the cost of diesel has risen greatly over the last few years. This means that we need to change the route. By having students walk farther to the stops we can fill the buses to maximum capacity easier. This will save eight buses from the daily trips. With each bus traveling an average of 125 miles a day, we could save a lot of money in diesel. In addition to the fuel cost savings, we can also save money by not having to pay as many drivers. If a driver gets paid ten dollars an hour by cutting eight drivers, our school could save about 80,000 dollars. By having kids walk just a little farther and cutting down on our daily bus fleet, we could save the school a lot of money and also help the environment.

Currently our kindergarten has a half day for school. We propose that kindergarten attends school for a full day. By doing this, the school will save two bus routes that it is currently running. The buses that run for kindergarten through fifth grade currently drive 365,711 miles a year. This equals out to an average of 22,164 miles per bus. By having a full day of kindergarten, eliminating two of the routes, our school could

save 15,000 dollars' worth of diesel fuel. Also, this will be fewer hours that we need to pay the drivers that drive the kindergarteners. Having a full day of kindergarten will save money and make us a more environmentally friendly part of the community.

Our final idea to help reduce cost and make the bus system more eco-friendly is to have only district wide half days. Currently the middle and high schools can have half days on different days. When this occurs, the buses have to run an extra route. We propose that if one has a half-day then the other should as well. By cutting out this route that may occur up to ten times in a year, we can save a lot of diesel fuel. By not burning this fuel we can save money. Also we can prevent having more pollutants entering the air. This is another initiative our school can take to become more eco-friendly, while still saving money.

Money isn't the only goal of changing the busing system, but making our school more eco-friendly is as well. Although diesel engines have come a long way in terms of lowering harmful emissions they still are a major contributor to air pollution. Lowering the number of buses will help cut down on the emissions our school creates. Also, by consuming less diesel fuel we will be helping to conserve fossil fuels. By instituting some of these proposed ideas, we will become an eco-friendly member of the community.

Altering the busing system will do two things for the school. It will save the school money, while also making us more environmentally conscious. We can accomplish these by changing the bus routes and also by having a full day of kindergarten. With the need to become environmentally friendly these changes are helpful and also save money. Altering the busing system will help not only Northwestern but the entire community as well.

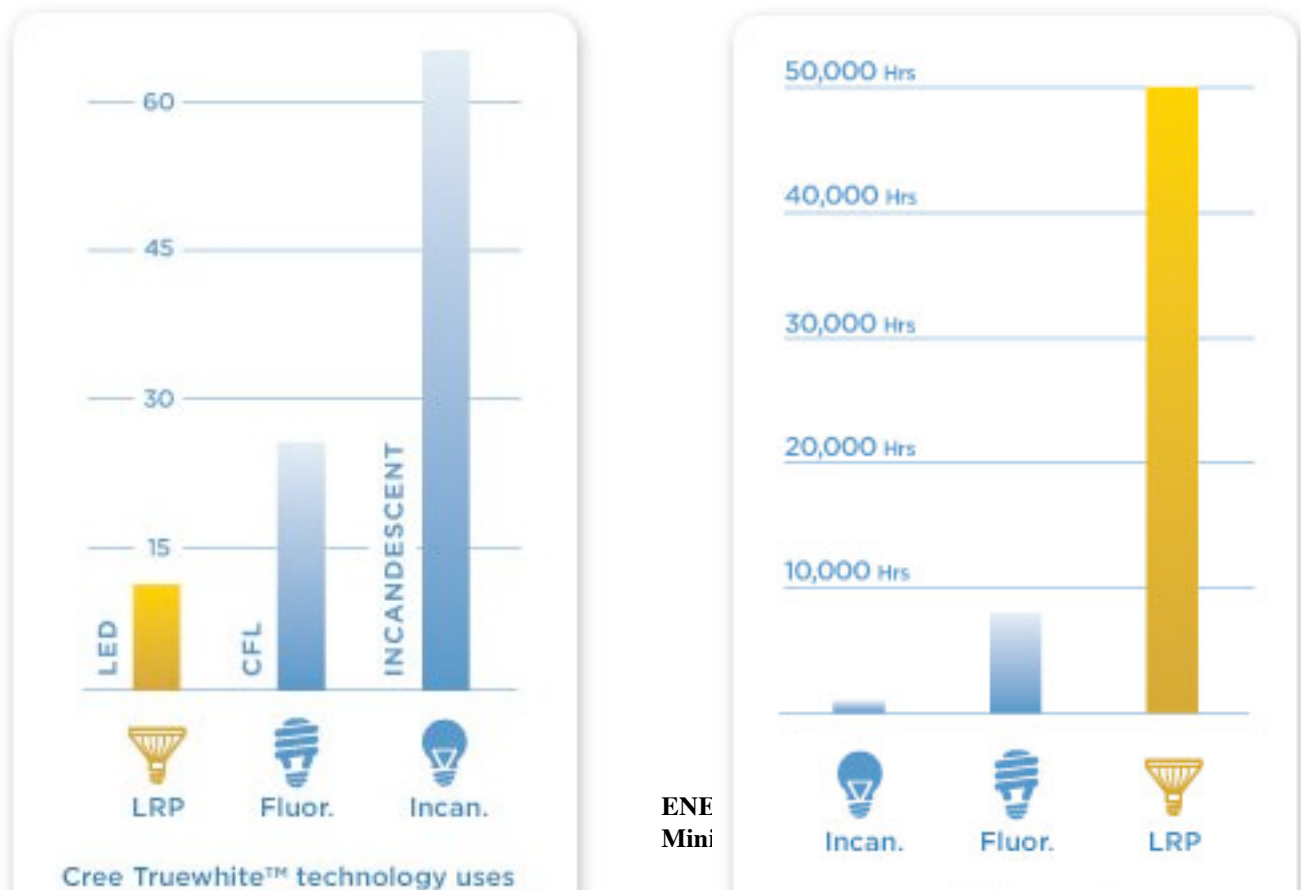
Food and lunch containers aren't the only things Northwestern wastes, electricity is also a major cost factor that could be greatly reduced if not wasted. Some of the most basic things that could be done to reduce electrical cost is to turn off the lights when they aren't needed, take out a fluorescent tube from the fixtures in classrooms, and the last thing that we could do is change our lighting to Cree LED light fixtures.

Turning off the lights is a very simple easy task that in turn could save a good amount of money. The cafeteria alone has over 172 lights that are only needed from 10:34 to 11:53 however; they are kept on the entire day. This is a completely unnecessary use of electricity.

Secondly, if some of the lighting tubes could be removed from the fixtures that could save electricity also. Each fluorescent tube uses 32 watts and most fixtures have 3 tubes by removing one tube per fixture many watts could be saved. The numbers are shown in the graphs below.

Lastly, Cree LED light fixtures use 60% less energy and can pay back in as little as six months. The use of LED lights along with a fixture that projects the light upwards and diffuses it down creates a more natural lighting and saves energy.

Another aspect that could be considered not to save money but to earn money is putting ads on the marquee. The sign is placed at a great location for advertisement right on 309 and by charging \$200.00 for an ad to be run for a month Northwestern could make \$12,000.00 annually with only 5 ads a month. This isn't going to save energy or cut cost but it is a way to earn money and use resources that our school already has to do so.



<b>Efficacy</b>	35 LPW	46 to 80 LPW
<b>Color Rendering Index</b>	75	90
<b>Rated Lifetime</b>	25,000 hours	50,000 hours
<b>Minimum Lumen Output <math>\leq 4.5</math>" diameter</b>	375 lumens	515 or 540 lumens
<b>Minimum Lumen Output <math>&gt; 4.5</math>" diameter</b>	575 lumens	650 or 1000 lumens

The last area we researched to make Northwestern Lehigh more cost effective and economically friendly was regarding the cafeteria. The school's cafeteria has a difficult job of feeding about 800 students every day, but this doesn't mean that there can't be any improvements made to make our lunch service more efficient. There were two major goals we had when we looked into improving the cafeteria: eliminating unnecessary waste generated and cutting costs. After thorough research we have come up with what we believe to be the best ways in achieving our endeavor.

The school's cafeteria is one of the largest generators of waste at Northwestern. Every day multiple cans of trash are filled just by the students alone during lunch and even more waste is produced behind the counter as they serve and prepare the meals. The combination of student's waste and the waste from the packaging of the food yields a significant amount of trash produced from just one department. In fact the cafeterias across the district fill 10 50 gallon totes a week. That's 500 gallons of additional trash stored forever in a landfill each week. While much of this might be unavoidable there are ways to chip at this number in hopes of diminishing it. One such way we came up with achieving this dilemma was by eliminating the french fry and perogie containers completely. Every day the trash cans are filled with these french fry boats and perogie cups when they are completely unnecessary altogether. If the lunch servers just directly served the students the fries and perogies we could eliminate the need for these containers completely; reducing the amount of waste generated by the cafeteria.

To determine how much trash would actually be eliminated we took a sample of each the fry and perogie container and estimated the volume of it. For the perogie boat we first measured the wider circle up top and calculated the volume of the cup as a

cylinder using that measurement as the radius. We then did the same thing with the smaller base as the radius. After calculating these two numbers we averaged the two of them together to get our estimated volume. The same was done for the fry boat. After we calculated the volume we had to account for the fact that in the trash the containers would be crushed and other trash could fit inside these cups. So taking these two points into consideration we estimated that only about 10 percent of the fry boat would actually take up space in the garbage bin and only about 5 percent of the perogie cup's volume would count. Now that we had an accurate estimate of how much space these containers take up in the trash we multiplied it by 200 which is the total amount of containers used every day for each separate container. To see how much waste it would actually eliminate over time we calculated the amount accumulated over several time periods. All the information and numbers can be seen in the graphs below. It is important to note that the volume has been converted to gallons from cubic inches to better compare how much waste this actually eliminates since the totes are measured in gallons. Also the last graph shows what the numbers would look like if we implemented a 4 day week.

1 Day	1 Week	1 Year
4.72GALs	23.6GALs	849.6GALs = 16.992Toters
5 Yrs	10 Yrs	
4248GALs = 84.96Toters	8496GALs = 169.92Toters	
15 Yrs		
12744GALs = 254.88Toters		

French Fry Container Volume	
Amount	200
Volume	21.765in <sup>3</sup>
Total	1.61GAL
Perogie Conatainer Volume	
Amount	200
Volume	83.605in <sup>3</sup>



Total	3.11GALs
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4 Day School Week (144days)			
1 Week	18.88GALs	1 Year	679.68GALs = 13.593Toters
5Yrs			
	3398.4GALs = 67.968Toters		
10Yrs			
	6796.8GALs = 135.936Toters		
15Yrs			
	10195.2GALs = 203.904Toters		

As you can see in the graphs above eliminating just these two containers eliminates 23.6 gallons a week or about a half of a tote. The half a tote is just from the high school. If the middle and elementary schools eliminate the containers as well the total waste reduced will be much higher. While we don't have exact numbers for the other school's we estimate that if the high school goes through about a half tote each week by itself the other three schools combined go through about 1 tote of garbage caused solely by the fry and perogie containers. So in total we believe that about one and a half totes can be eliminated a week by cutting out these containers. Remember that all of our cafeterias district wide produce 10 totes of waste a week so if the cafeterias stop using these cups they will eliminate the amount of waste they produce by about 15 percent.

Eliminating these containers will not only reduce environmental waste but it will also save the school's cafeteria some money. As we have already stated the high school uses about 200 of each container a day and while these containers aren't very expensive over time eliminating them can save Northwestern a fairly decent amount of money. The school buys the fry boats for \$.015 and the perogie cups for \$.026. After multiplying each item by 200 and adding them together we found that the total cost of these products is \$8.20 a day. While this isn't a large amount of money with time it can grow into a

modest amount of money which can be given back to the students. Shown below is a table that gives the amount of money saved over several periods of time. The last graph again shows what the savings would be in a 4 day week.

French Fry Container Per Day	
Amount	200
Cost	\$0.015
Total	\$3.00

Pierogi Container Per Day	
Amount	200
Cost	\$0.026
Total	\$5.20

1 Day	1 Week	1 Year
\$8.20	\$41.00	\$1,476.00
Future Savings In 5 Yrs		
\$7,380.00		
Future Savings In 10 Yrs		
\$14,760.00		
Future Savings In 15 Yrs		
\$22,140.00		

4 Day School Week (144days)			
1 Week	1 Year		
\$32.80	\$1,180.80		
Future Savings In 5 Yrs			
\$5,904.00			
Future Savings In 10 Yrs			
\$11,808.00			
Future Savings In 15 Yrs			
\$17,712.00			

As you can see over time this little cutback can formulate into a modest amount of money. Now while the school's cafeteria is only supposed to break even and not make a profit it can use the money saved to give back to the students by increasing the quantity

or quality of the food. Here is an idea we considered that they could do with the surplus. Every month the school saves about \$164 from this proposal. We figured there are about 800 students in this school and if we divide the surplus evenly amongst the students it comes out to be 20.5 cents. For a school purchasing in bulk it could easily find a snack for 20.5 cents that it could give to every student to break even. It might not be much but it would be nice if every student received a free cookie on the first of every month for example. It would definitely be popular among the students and it wouldn't be at any additional cost to the district.

While the plan to eliminate the perogie cups and french fry boats may seem too small to do anything at first, over time the combined effects of the reduced waste and the lower cost can make a positive difference. Cause after all the longest journeys begin with one small step.

Another way to reduce waste in the cafeteria is by recycling. Our group has discovered a program that comes to our school and pays us for scrap plastic. If we create a separate bin for plastics in the cafeteria for recycling we can sell it this company for a small profit. Plus all the plastic from the packaging could be sold as well. Not only will this save us money but it will also eliminate the waste the plastic generated since we will be recycling it. Unfortunately the actual program did not disclose how much they will pay for the scraps and we do not have the actual amount of plastic our school uses. So while we cannot provide the amount of money we will save or the total amount of waste eliminated utilizing this program can only provide benefits for our school.

In these economic times it is crucial to eliminate unnecessary costs and waste to make Northwestern Lehigh more economically and environmentally friendly. To remedy this situation we proposed to reform the School's transportation system, lighting, the school week, and the cafeteria. While implementing these policies will not save our school millions or provide an easy fix to this crisis, it would set our school on the right path. Over time we could save a good amount of money and reduce unnecessary waste that is being placed in landfills.

## Sources

<http://www.industrialrecyclers.com/>

<http://www.creeledlighting.com/>

Ms. Graver (Transportation)

Ms. Seier (Food Services)

Mr. Kripplebauer (District Operations)

Ms. Spanitz (Secretary to the Buildings & Grounds Department)

Ms. Steigerwalt (Secretary to the Business Administrators)