
NUTRIENTS FOR LIFE
FALL
2012
NFL
Become A
MEMBER TODAY
Racing
{TO FEED THE WORLD}
It's all in
the Water

{ from the board }

As the president of both the Nutrients for Life Foundation and The Fertilizer Institute, I am passionate about fertilizer. For hundreds of years, people understood there were certain benefits from fish bones and banana peels, but the science was unknown. It turns out those fish bones and bananas were the earliest sources of phosphate and potash, respectively. In the last 50 years, scientists have made tremendous strides understanding the science behind healthy crops and, at the same time, a healthy environment. It is the job of the Nutrients for Life Foundation to take the proven science and create resource materials for the classroom.

The world population climbed to 7 billion people last fall and is expected to top 9 billion by 2050. To feed these additional mouths, our world's farmers will ask a lot of their soil – higher yields and more efficiency. The crop nutrients added to replenish the soil after each crop is harvested give us nearly half of our yields – without them, that would be 50 percent less food.

Scientifically, fertilizer's role is pretty straightforward. Plants require 17 elements to survive. The three primary nutrients are nitrogen (N), phosphate (P) and potassium (K), which are the most common elements in fertilizer mixtures.

We also must look at our social responsibility. Social responsibility is an ethical ideology that an organization has an obligation to act to benefit society at large. Social responsibility is a duty every individual or organization has to perform to maintain a balance between the economy and the ecosystem.

The fertilizer industry's answer to social responsibility in the use of fertilizer is the development of the 4R nutrient stewardship framework. This framework is an innovative and science-based approach that offers enhanced environmental protection, increased production, increased farmer profitability, and improved sustainability. The concept is to use the right fertilizer source, at the right rate, at the right time, and in the right place. Properly managed fertilizers support cropping systems that can provide economic, social and environmental benefits. Fertilizer is a component of sustainable crop production systems, and the fertilizer industry recognizes the need to efficiently utilize these nutrients.

The 4R nutrient stewardship framework requires the implementation of best management practices (BMPs) that optimize efficient fertilizer use. The goal of fertilizer BMPs is to match nutrient supply with crop requirements and to minimize nutrient losses from fields. Selection of BMPs varies by location, and those chosen for a given farm are dependent on local soil and climatic conditions, crop, management conditions and other site specific factors.

The Nutrients for Life Foundation and 4R nutrient stewardship framework are closely aligned through science-based requirements. The Foundation has integrated the 4R framework into the *Helping Communities Grow* program for FFA chapters. Fertilizer makes an enormously significant contribution to society and the industry is keenly focused on its social responsibility.

Sincerely,

Ford West

NUTRIENTS FOR LIFE FOUNDATION

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FALL
2012

in every issue

features

{from the editor}

Powerful Resources, Powerful Membership

Knowledge is power. Students fill classrooms in the fall with the hope of learning something new and exciting each and every day. Whether it's algebra, biology, English or history, educators are the special people who give power to their students. To make their classrooms come alive, teachers rely on all sorts of resources including those from the Nutrients for Life Foundation. As an educational foundation, we are proud to offer our science-based curriculum and resources at no cost to our nation's teachers. All of this is made possible by the nearly 2,000 members of Nutrients for Life.

Membership is the foundation of our success. People who believe in Nutrients for Life, offer the opportunity for us to expand our educational resources, and by doing so, aide teachers in continuing to teach soil science in schools. In the coming year, Nutrients for Life is looking to further expand its membership base and hope that you will become part of the collective voice for science-based plant and soil science education.

Our members include both individuals and companies. Each one of our members firmly believes in the value of education and the importance of putting scientifically-sound resources into the classroom. Membership in Nutrients for Life is just $25 – the cost of sending a copy of the Smithsonian-approved *Nourishing the Planet in the 21st Century* supplemental curriculum to a classroom.

This year, our members have ensured that well-over 100,000 students are learning about crop nutrients and soil science through *Nourishing the Planet in the 21st Century*. If you work in the fertilizer or agriculture industry, or believe in agronomic science education, I ask that you support Nutrients for Life and become a member today.

Collectively, the support of our nearly 2,000 donors in 2011 has had an impact in classrooms from elementary to high school. Posters, flashcards, activity books and much more can now be found at a school near you. Our educational resources stress the essential 17 elements plants need to survive with a heavy emphasis on the primary macronutrients – nitrogen, potash and phosphate. With an increasing demand on the industry to produce enough food to keep the world healthy, your donation helps raise awareness of the issues that today's farmers are facing. With each educational piece the Foundation creates, there is one more opportunity to educate someone new about the role plant nutrients play in helping farmers feed the world.

With on-going support for Nutrients for Life, the good work will continue. If this is a cause that is important to you, please become a member today! A teacher will thank you for it – and so will their students!

Harriet E. Wegmeyer

Harriet Wegmeyer
Executive Director, Nutrients for Life Foundation

Hydroponic farming is different from traditional farming in many ways. However, one constant between the two is the necessity of water and nutrients. Check around in your community and chances are good that you will be able to find a hydroponic farm, even if it's just at your neighbor's house.

It's all in the Water

Can plants grow without soil? This might sound like a trick question. We are taught that soil provides stability for roots and holds the important nutrients that plants need to survive. But the answer is yes! In fact, a long list of vegetables can be found in hydroponic farms and gardens around the country including tomatoes, sweet peppers, cucumbers, squash, snow peas, beans, spinach, lettuce, chard, hot chilies, and broccoli. How can this be?

{It's all in the Water}

Hydroponics is not a new concept. It actually began thousands of years ago with the famous Hanging Gardens of Babylon built around 600 B.C. The idea to produce plants in water using different growth media for plant support has been utilized due to lack of adequate agricultural soil, marshy conditions, soaring populations, drought, and individual self-sufficiency. Hydroponics lends itself to producing crops in caves, on rooftops, greenhouses, and even in residential areas.

Over the last hundred years, scientists and horticulturists have experimented heavily with hydroponics. The goal has been to grow fresh produce in areas of the world without soil. It was even used to feed troops in World War II and has now been integrated into the space program. More recently, farmers and hobby gardeners have adopted hydroponics, because they see the method of hydroponic growing, including the ability to produce higher yields with less water waste.

In natural conditions, soil acts as a mineral nutrient reservoir, but through hydroponics, plant nutrients dissolve in water so plant roots are still able to absorb the necessary amounts of nitrogen, phosphorus, potassium and micronutrients. When the required mineral nutrients are introduced into a plant's water supply artificially, soil is no longer required for the plant to thrive. Natalie Parkell runs Florida's X Farm with her husband Kevin Osburn and explains she chose the hydroponic method of farming because, "the soil was extremely poor quality. We also had no real land on which to build a farm, so we decided to start with the smallest research-sized, prototype farm that we could find."

Parkell also added, "We feel several features make our hydroponic growing exceptional. The system is very clean and by removing soil from the growing system, nematodes and other ground-borne organisms are eliminated. Second, we love the amazing control of our plants' nutritional needs, which results in nutrient dense and delicious produce! People tell us our vegetables are the best they have ever tasted!"

Hydroponic farming can provide many advantages to new and old gardeners alike, including:

- Hydroponically grown plants can be provided with the exact amount of water needed – not a drop more, not a drop less. In fact, the water use efficiency with hydroponics is astoundingly high; a properly designed hydroponic setup will use 10 percent of the water it would normally require to grow in soil outdoors.
- Hydroponically grown plants require much less land surface. A hydroponic greenhouse can produce as much plant matter as a conventional field ten times its size.
- Hydroponics do not require any soil, meaning that farming can be done in areas with poor or even no soil.
- Hydroponic farms can be located wherever power and water are cheap, and can be placed in close proximity to the demand for the crop, reducing or even eliminating shipping costs.
- Because hydroponic greenhouses are environmentally controlled, there is a great opportunity to better manage what crop protection products are used around your plants.

Hydroponic farming also has its disadvantages, which include:

- An increased cost for large scale operations.
- Without natural soil tendencies, maintaining hydroponic gardens can be labor intensive.
- Water supplies must be analyzed for proper element levels, which lead to the potential issue of water quality.
- Nutrients can potentially be over applied because it's more difficult to track nutrient dissemination.
- Without natural predators in the outdoors, disease and pests can spread rapidly in a greenhouse environment.
- Because these farms require an increased amount of energy, a power failure can completely destroy a crop.

Above: Mary Ellen Taylor, Endless Summer Harvest, grows gourmet lettuces and salad greens in Purcellville, Virginia.

Nutrients for Life sat down with Ray Cruz to learn more:

NFL: Why did you get involved in hydroponic farming?

RC: For the last 18 years, my agriculture students have been producing row crops using traditional growing practices, which include plastic mulch on raised beds with drip irrigation. We also had a nursery production program that put our five greenhouses to use, growing everything from herbs and ornamentals to shrubs and trees. We eventually ran out of space to increase our row crop production. Once the economy started to slow, I began researching alternative uses for the greenhouse. While visiting my parents in Tennessee, I stopped by a hydroponic farm to inquire about how the process works and what they are able to grow. That gave me the idea to expand our vegetable production program using hydroponic growing methods.

NFL: Why did you choose this method versus farming in the soil?

RC: The opportunity kind of found me. I am always looking for new ways to teach my students about innovative technology and farming practices, especially those associated with food production. We still grow crops in the ground, but are able to grow more crops in less space, using less water with hydroponics.

NFL: What is your favorite part of hydroponics?

RC: I would say water and nutrient conservation, because water and nutrients are applied directly to the roots in precise amounts in soil-less mixes that retain both resources. The soilless mixes used in hydroponics have a high water holding capacity and excellent cation-exchange capacity (CEC).

NFL: What makes your operation unique?

RC: Roosevelt Farms is unique because it is run by students and gives them the opportunity to apply what they learn in the classroom to produce food crops that are harvested and sold the same day. We use two forms of hydroponics and each has their own benefits. One method uses coir (coconut fiber) bags that are used for up to three crops cycles, and the other uses a vertical growing system that allows more crops to be grown in less space than traditional row crop methods. I must say I receive a lot of support from the agricultural community made up of growers and suppliers that contribute their time and resources to help make my teaching opportunities a success. Without them, a lot of what we are able to do wouldn't be possible.

Above: Students work on Roosevelt Academy's farm in Lake Wales, Fla. Each year, students maintain a variety of vegetables and herbs.

Roosevelt Academy Hydroponic Farm
Ray Cruz • Lake Wales, Florida

Farm Profile: Roosevelt Academy uses two types of hydroponic technologies. One method is a vertical growing system that uses a perlite/vermiculite mix; the other primarily uses coir (coconut fiber) in grow bags. Both systems use low volume irrigation to apply water and nutrients. Two fertilizer injections provide the proper nutrients to the crops three to four times per day. One injector provides nitrogen, potassium and phosphate, and a second injector provides calcium. Roosevelt Academy focuses on growing tomatoes, peppers, romaine and bib lettuce, bush beans, cucumbers and herbs with hydroponic methods. This fall, students will be planting approximately 1,500 pepper and tomato plants.

THE ROOT OF THE PROBLEM

AN RX FOR BLOSSOM-END ROT

BY DEE MCKENNA, MASTER GARDENER AND NFL BLOGGER

My three-year-old and I were watering the garden and saw something red in the midst of green leaves. We reached in with excitement: our first tomato of the season – yum! Our excitement quickly turned to disappointment as we turned the fruit to see the bottom was rotten. The tomato had blossom-end rot! From experience, I know that this is from a lack of a specific nutrient, calcium. I dreaded a season of blossom-end rot, so I headed to the computer to research my calcium problem.

This condition is not considered a disease, rather a nutrient deficiency

Upon thorough research from multiple university extension sites, I learned that I do indeed have blossom-end rot. Blossom-end rot is described as having a sunken, brown, leathery patch on the bottom of the fruit. This condition is not considered a disease, rather a nutrient deficiency.

At first I assumed that meant my soil was missing calcium, but through a soil test, realized that I had plenty of calcium in my soil. The calcium just wasn't getting from the soil to the fruit. So what caused my blossom-end rot? Actually, there are a number of possible causes. Let's look at some of them as described by the Kansas State University Agricultural Experiment Station:

- **Tomato tops often outgrow the root system during cooler spring weather.** As long as it is cool, the root system can keep up. When it turns hot and dry, the plant has a problem, and water — with the calcium it carries — goes to the leaves and the fruit is bypassed. The plant responds with new root growth and the condition corrects itself after a couple of weeks.

- **Heavy fertilization, especially with ammonium forms of nitrogen, can encourage this condition.** Heavy fertilization encourages more top than root growth and the ammonium form of nitrogen competes with calcium for uptake.

- **Anything that disturbs roots such as hoeing too deeply can encourage blossom-end rot.** Mulching helps because it keeps the soil surface cooler and therefore a better environment for root growth.

- **Inconsistent watering is sometimes a factor.** Keep soil moist but not waterlogged. Mulching can help by moderating moisture levels over time.

Blossom-end rot is a temporary condition, and plants should come out of it in a couple of weeks. You may want to pick off affected fruit to encourage new fruit formation. Soils with adequate calcium will not benefit from adding additional calcium. If your soil is deficient in this nutrient, add 1-pound gypsum per 100 square feet.

I am quite certain that our blossom-end rot is a result of inconsistent watering not a lack of calcium. My three-year-old junior gardener is very helpful but may be giving the garden too much water. I think for the sake of delicious, healthy tomatoes, I will take back control of the garden hose.

Natalie McKenna shows off the first tomato of the season.

Super-charge the Next Generation

BECOME A MEMBER AND MAKE A DIFFERENCE

The Nutrients for Life Foundation offers you an opportunity to actively support its efforts to educate teachers, students and other audiences about the importance of plant nutrients as we work to feed a growing population. A new membership-based organizational structure opens the doors for involvement and contribution to individuals, organizations and business of all sizes.

A small annual donation of $25 will make you a member of Nutrients for Life, which gives you access to the Foundation's resources and a bi-yearly magazine to learn more about the Foundation's activities.

"Fertilizer's role in feeding our global population is something that each and every person working in this great industry should be proud of," said Nutrients for Life Executive Director Harriet Wegmeyer. "Membership in NFL supports the development of new and engaging educational resources for teachers and students in our communities."

An annual donation of $100 gets you the same benefits above and a new Nutrients for Life graphic t-shirt.

Super-charge the Next Generation

> "What I most enjoy about the Nutrients for Life curriculum is that it is completely hands on. For many of my students, it was the first time they had put their hands in dirt and had the opportunity to plant and explore. It opened their eyes to the fact that they can actually grow and produce food in their own backyards."
>
> – **Kristen Garcia,** *Third Grade Science Teacher*

Learn more about the value and importance of becoming a Nutrients for Life member:

Your donation directly supports education. Nutrients for Life soil science curriculum has been taught to more than 200,000 elementary, middle and high school students. The Foundation has developed other educational materials such as posters, flash cards, videos and more to help provide teachers the tools they need to effectively share the message of plant nutrients and agriculture. With an interested-parties list of more than 5,000 teachers, Nutrients for Life sends out a bi-monthly teacher newsletter that provides an inside look into the Foundation's activities and highlights the work teachers are doing to teach about fertilizer and the importance of plant nutrients.

You're helping teachers and students across the country. With more than 3,000 teachers who are using the *Nourishing the Planet in the 21st Century* curriculum in their classrooms, your donation goes directly to the teachers and the students across the country. Your contributions also help place regional representatives on the ground to work with teachers to use the Foundation's resources to their full capacity.

You're advancing the industry and its efforts to feed a growing population. With an increasing demand on the industry to produce enough food to keep the world healthy, your donation helps raise awareness of the issues that today's farmers are facing. With each educational piece the Foundation creates, there is one more opportunity to educate someone new about the role plant nutrients play in helping farmers feed the world.

★★

If you are interested in donating to Nutrients for Life, please visit https://www.nutrientsforlife.org/donate to make an online contribution.

★★

"Soil science serves as the foundation of our food supply. When students first begin learning about soil they think it is just a piece of 'dirt' with no purpose. As students conduct labs and research the value of nutrients within the soil, they begin to truly appreciate how important the soil is. It is a great experience as a teacher seeing students develop an understanding of the soil and watch them engage in strategies to get the most productivity as possible."

– **Zachary Morris,** *Eighth Grade Agricultural Exploratory, Horticulture and Animal Science Teacher*

"The Nutrients for Life Foundation has given me the ability to help my AP environmental students understand that fertilizers are necessary for replenishing the nutrients in the soil. If we want to eat healthy food, we must make sure that the plants are healthy and to keep the plants healthy, the soil must be properly cared for."

– **Nancy Bridge,** *AP Environmental Science Teacher, Science Department Chair*

Opposite: #31 Brandt driver Justin Allgaier alongside Nutrients for Life team Julie Buratowski and Harriet Wegmeyer with Clark Mica of The Fertilizer Institute.

Top Inset: NFL President Ford West joins #31 Brandt driver Justin Allgaier, student Hunter Belfield, and Hanover High School agriculture teacher Adrian Austin.

Bottom Inset: Allgaier and Belfield display the winning design.

RACING to Feed the World

Ladies and Gentlemen, Start Your Engines!

For NASCAR fans, these words bring a rush of adrenaline and excitement. One lucky student, Hunter Belfield of Hanover High School in Virginia, got to hear those words up close at the Nationwide series Richmond International Raceway as the winner of the "Racing to Feed the World" contest.

Look for more "Racing to Feed the World" competitions at racetracks in the future.

Nutrients for Life partnered with Brandt Consolidated - a leading agricultural company that serves growers around the globe – to organize the first-ever "Racing to Feed the World" contest for students in the Richmond, Va. area. Belfield's winning racecar design included an ear of corn with the slogan, "If it's not growing, we're not eating: plant." NASCAR #31 Brandt driver Justin Allgaier came to Belfield's high school class to share the good news with him and invite him to the Richmond race. During Allgaier's visit, the driver shared racing stories and insight. He also talked about plant nutrients and Nutrients for Life's educational materials.

"It is guaranteed that these students will remember the role fertilizer plays in growing a healthy and abundant food supply thanks to the #31 Brandt driver Justin Allgaier," said Nutrients for Life Foundation Executive Director Harriet Wegmeyer. "Taking the crop nutrition message to the classroom in this fun, engaging and memorable way will stay with these students forever."

The world's population hit 7 billion people last fall, and the population is expected to reach 9 billion by 2050. Feeding an ever-growing population is a challenge, and one that must be met. The Nutrients for Life Foundation has teamed up with NASCAR's Brandt #31 car to increase awareness about what it takes to feed our world's population.

"Our roots are in the fertilizer industry, and with foundations such as Nutrients for Life, we can be assured a bright future," said Brandt President and CEO Rick Brandt. "There are many misconceptions about fertilizer and the Nutrients for Life Foundation does a wonderful job both in the classroom and in public educating on the benefits of fertilizers. With a growing world population, fertilizers are essential to help maintain and grow a healthy world food supply."

"Brandt has given Nutrients for Life a rare opportunity to reach out to a whole different audience through the 'Racing to Feed the World' competition," said Wegmeyer. "Justin adds such star power and really grabs the students' attention when he walks into a school. We are so fortunate to have him as a friend of Nutrients for Life."

With a reported 75 million fans of NASCAR, Brandt led an initiative to put an "all agriculture" car on the track, helping to spotlight the hard work and dedication that powers agriculture into a crucial global industry. In addition to the Nutrients for Life Foundation, the Brandt racecar features logos for FFA, Precision Tank & Equipment and Trademark Nitrogen.

NFL Days Garners Industry-wide Support

Thanks to last year's overwhelming success, PotashCorp's Nutrients for Life Days are back for 2012! The July through September event takes shape in the form of exhibit tables, delicious food, and presentation-style meetings to highlight the Nutrients for Life materials. New this year was a "thank you" video that featured clips of science and agriculture teachers showing their appreciation of the donors that make the Foundation's materials available at no cost. "I think that soil has been overlooked as a natural resource. And I try to make that very important to my children because without soil, we wouldn't have food," remarks one teacher in the video. Another educator adds, "It's wonderful that people like you give us an opportunity to do our jobs in the best way." The Foundation provides complimentary materials to classrooms nationwide because of donations like the ones from Nutrients for Life Days.

The donor membership program, another new feature this year, encourages individual donors to give $25 to become a member. Members from the Nutrients for Life team attend every event to make presentations, say thank you for last year's support and to inform participants about the new membership program. "PotashCorp has strongly supported the Nutrients for Life Foundation since it was first established in 2004," said Bill Doyle, President and Chief Executive Officer of PotashCorp and Foundation Chairman. "It is critical that our industry has an organization committed to educating the public about the benefits – and necessity – of the life-giving nutrients we produce. Nutrients for Life is doing an exceptional job explaining fertilizer's role in putting nutritious food on tables around the world."

{ If you would like to host a Nutrients for Life Day at your company, please contact Harriet Wegmeyer at hwegmeyer@nutrientsforlife.org. }

PotashCorp employees are a natural fit as members of the Foundation because the Nutrients for Life Foundation promotes education about crop nutrients, like those that PotashCorp produces. "Our purpose for conducting annual Nutrients for Life Days at all PotashCorp locations is twofold," explained Doyle. "First, we want all of our employees to be aware of Nutrients for Life and understand why they have a vested interest in its ongoing success. Second, we want our employees to recognize that the Foundation works on their behalf, and their financial support is both appropriate and necessary. The response from our employees has been overwhelmingly positive."

Last year, Nutrients for Life Days involved nearly 2,500 PotashCorp employees in the United States, with 70 percent participating in this endeavor donating over $100,000. PotashCorp has generously matched funds dollar-for-dollar through its corporate match program this year and last year. In total, PotashCorp and its employees donated over $200,000 last year, and this year's generous totals were still coming in at the publication deadline from the various Nutrients for Life Day events.

Simplot's "Heroes of the American Table" tour is on the move this fall to share the story of modern agriculture! The eye-catch-

Colorado and Illinois Add Soil Science Regional Representatives

Colorado and Illinois joined the expanding set of states with Nutrients for Life Foundation representatives. Jerry Alldredge and Haley Siergiej were selected this past spring to provide grassroots, educational and public awareness services in the states of Colorado and Illinois, respectively. Each work with primary and secondary educators in the school system to promote the Foundation's plant and soil science curriculum, *Nourishing the Planet in the 21st Century*. Alldredge and Siergiej also work with industry members to share the Foundation's core programs and enhance community relations.

"We are so fortunate to have found two knowledgeable and passionate agriculture educators in Jerry and Haley," said Foundation Executive Director Harriet Wegmeyer. "Each hit the ground running and has already provided teachers with the tools they need to educate their students effectively about fertilizers and soil science."

With successful regional representatives based in Florida, Idaho and Iowa, the Foundation recognized a need for more 'on-the-ground' educational resources and expanded the regional representative program.

"What an honor it is to be a part of this accomplished and talented team which provides science based materials and curriculum," Alldredge shared. "We are faced with a tremendous challenge to help our nation understand that our farmers have to feed the explosive population growth in the world with the same amount of land available for crop production. Our society is generations removed from our farming heritage and many take their food source for granted. These Nutrients for Life materials will give our educators and their students a better understanding of the science of a healthy food supply and its role for the future."

Siergiej graduated from the University of Illinois with a bachelor's degree in Agricultural Communications and Education before beginning her career in the agriculture industry. She serves on various boards and is a recent graduate of the Illinois Ag Leadership Program. Siergiej, who is based in Chicago, can be reached by e-mail at hsiergiej@nutrientsforlife.org or by phone at (202) 384-6236.

Alldredge comes to NFL with more than 40 years of agriculture experience and is based in Windsor, Colo. Alldredge's experience in agriculture and related industries, as well as work with the Cochran Fellowship Program (USDA-FAS), and position on the Colorado Ag in the Classroom Board make him a perfect fit. Teachers in Colorado can reach Alldredge at (202) 384-4865 or via email at jalldredge@nutrientsforlife.org.

Each regional representative represents Nutrients for Life at their state science educators meetings, state Ag in the Classroom meetings and numerous other workshops. Regional Representatives also organize the FFA Helping Communities Grow program where chapters compete for top honors with their crop nutrients knowledge.

"By providing factual, science-based plant and soil resources, Nutrients For Life is educating the consumers of the future," said Siergiej. "In general, most people don't have the opportunity to visit a farm, and certainly not on a regular basis so that they can fully understand this complex industry that feeds the world. So, I believe it's our responsibility to try to bring the farm, or at least what farmers do, to them. Having free resources that help in addressing misconceptions about the agriculture industry, and in particular the importance of crop nutrients, couldn't be more crucial than any other time but now. Nutrients For Life is dedicated in bringing the facts to the classroom, and I personally am dedicated to bringing the facts and these wonderful resources to this agriculturally driven state of Illinois."

ing, graphically enhanced truck and trailer are visiting Simplot facilities in California, Idaho, Utah and Wyoming to share the positive message that fertilizer is a main ingredient on every American table and that the fertilizer industry should be proud of its contribution to feeding the world.

During the tour, attendees will be treated to a tailgate-style gathering where they can get a closer look at Simplot's refurbished 1945 Ford Farm Truck. Amid hot dogs and hamburgers, participants will play carnival games that revolve around crop nutrient trivia and soil science facts, such as a soil guessing game for different types of soil and their respective locations. Finally, attendees will be encouraged to become members of the Nutrients for Life Foundation to further support crop nutrient education in classrooms across the nation.

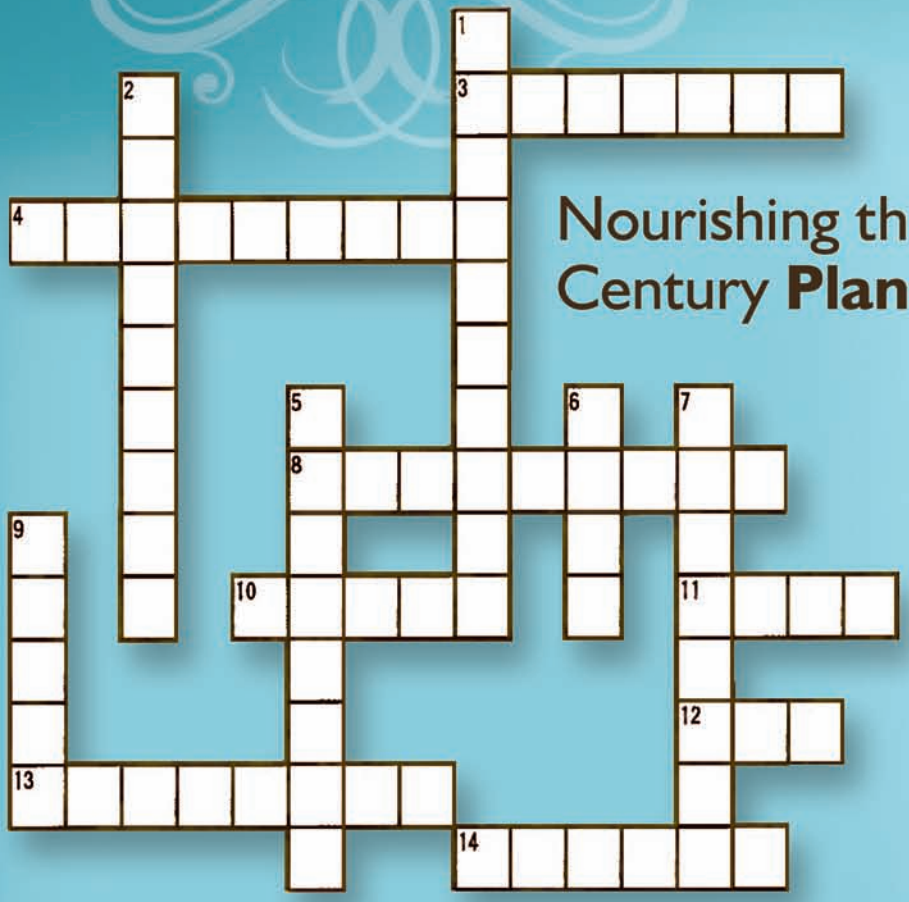
Nutrients for Life **Golf Tournament**

Education Efforts Even Stronger After Raising $120,000 at the Nutrients for Life 2012 Golf Tournament

As the members of the Intrepid Potash Team completed the eighteenth hole at the Maderas Golf Club in Poway, Calif., they knew they had the potential to be significant competition in the tournament. With a score of 60, the Intrepid Potash Team, Justin and Phil Gough, R.L. Moore and Van Rucker, earned the coveted Fertilizer Cup. The other teams finished the course soon after and the 8th annual Nutrients for Life Golf Tournament came to a suspenseful close. On February 9th, 29 teams competed at the picturesque Maderas Gold Club. It was a close competition with the Gavilon Fertilizer Team of Brian and Brent Harlander, Tom Mulrooney and Matt Skov, who came in a close second.

More importantly, all participants were able to benefit the Foundation's ongoing efforts, including the spokesperson and FFA chapter scholarship program, *Life's Main Ingredient* campaign and the continued promotion of the plant and soil science curriculum. Through the supporters and sixteen hole sponsorships, the tournament netted over $120,000 to benefit the Foundation. The Foundation will hold the 2013 Nutrients for Life Golf Tournament on Monday, Feb. 11, at the Golden Bear Golf Club at Keene's Pointe in Celebration, Fla.

Nourishing the Planet in the 21st Century **Plant and Soil Science***



Down:

1. _____ comes from the remains of ancient sea life (shark's teeth).
2. _____ comes from salt left over from evaporated oceans.
5. _____ comes from the air.
6. Food is grown on a _____.
7. Soils need both _____ and water to support a plant's root system.
9. This part of a plant is below ground and soaks up water and nutrients.

Across:

3. Farmers _____ the crops after they have been fed, watered and are ready to eat.
4. Farmers and gardeners use _____ to feed their plants and keep them healthy.
8. Soils contain both organic and _____ materials.
10. Food, lawns, gardens and ornamental plants such as flowers are all considered _____.
11. Seeds are planted in the _____.
12. Plants get their nutrients from water, soil and _____.
13. Farmers perform a _____ to figure out what nutrients their plants need in order to be healthy.
14. Water provides _____ to plants.

Answer Key: 1. Phosphorus 2. Potassium 3. Harvest 4. Nutrients 5. Nitrogen 6. Farm 7. Air Space 8. Inorganic 9. Roots 10. Crops 11. Soil 12. Air 13. Soil test 14. Oxygen

New Ideas Abound at **Teacher's Retreat**

Against the calm flow of the Pamlico River, eight educators from around the country convened at the PotashCorp Bath Lodge in Bath, N. C., in July to "talk soil." Their mission was an important one: guide the development of future education materials for the Nutrients for Life Foundation. Comprised of elementary and secondary science and agriculture teachers, the small group met to discuss the desired path for future materials and programs for NFL.

"This group of diverse teachers examined each component of the Nutrients for Life curriculum and arrived at a 'top ten' list of curriculum additions that they believe would be beneficial to teachers who teach soil science and plant nutrients," explained Nancy Bridge, chair of the retreat and science department chair for Olympia High School in Orlando, Fla. The list included the development of a new edition of *Nourishing the Planet in the 21st Century* high school curriculum, originally released in 2007.

"We want to develop resources and materials that are precisely what teachers will find useful in effectively teaching soil science. To do this, we wanted to hear straight from the teachers," shared Julie Buratowski, education specialist for the Foundation. Other materials to be developed include new classroom visuals to illustrate the nitrogen and phosphorus cycle.

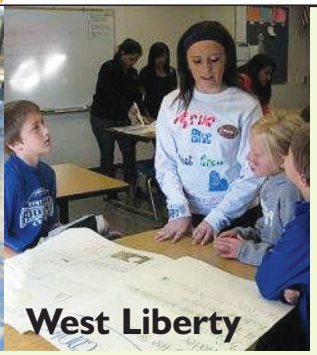
During the retreat, educators had the opportunity to tour the neighboring PotashCorp phosphate mine in Aurora, N.C. The teachers observed a dragline, toured the lush reclamation land, and observed the fascinating process of mining phosphate from the earth and its development into part of our world's fertilizer. "The Aurora phosphate mine tour was an eye opening experience. Not only did it bring to life the complex process of mining phosphate, but it also drove home how essential the production of phosphoric acid is for our food products and other necessities. This experience and knowledge will be helpful tools that I can really use in the classroom," shared Reed Fisher, an AP science teacher from Arkansas. The Foundation is currently developing a classroom-ready phosphate video that will share this fascinating process with those that are not fortunate enough to have a neighboring phosphate mine to tour.

Although only two days in length, a whole host of new ideas sprung from the meeting. Attendees agreed that this curriculum is valuable to elementary and middle school science teachers, as well as agriculture and general science high school teachers. What would you like to see NFL develop next? Share your soil science-based material ideas at info@nutrientsforlife.org.

The **Best** and **Brightest**


Colfax


Norco


West Liberty


Pettisville


Ft. White


Hansen

{ *Helping Communities Grow* program brings out the best in FFA chapters across the nation. }

Colfax FFA chapter members of Colfax, Wash., won first place in their state for teaching 343 elementary students about the global nitrogen cycle and its role in agriculture.

The Nutrients for Life judges recognized the **Norco FFA** chapter of Norco, Calif., for their work in hosting local elementary schools for a spring and fall field day. FFA members taught elementary students about the importance of agriculture and where their food comes from.

The students of **West Liberty FFA** chapter in West Liberty, Iowa, earned first place by sharing the important role fertilizer plays in growing food. The students developed a brochure to distribute during their poinsettia sales educating the effects of fertilizer management. The FFA students also connected with younger students, especially in elementary grade levels, on the important role of nutrients. Additionally, the chapter used social media to promote their poinsettia sales and soil nutrient education events.

In Ohio, Pettisville FFA and Ridgemont FFA tied for first place. The **Pettisville FFA** chapter grew fresh greens and herbs for the school's cafeteria salad bar. **Ridgemont FFA** also earned the first place award by hosting a Hunger Banquet for more than 140 students.

In Florida, **Ft. White FFA** submitted an extensive experiment that evaluated irrigation and fertilizer Best Management Practices (BMP's). The students achieved their results through a team approach and extensive study of the Nutrients for Life curriculum, *Nourishing the Planet in the 21st Century*. By working with their community, Florida Farm Bureau, University of Florida IFAS Extension and PotashCorp, FFA students were successful in developing a technical base for the experimental design, implementation and conclusion of their project.

For the third consecutive year judges awarded **Hansen FFA,** of Hansen, Idaho, first place recognition. They approached their project this year by expanding their base of partnerships to include four fertilizer companies, the city of Hansen, local businesses, and the local middle school. Hansen FFA students participated in a local radio talk show, labeled over 1,800 water bottles with a crop nutrient message, and hosted an Annual Fertilizer/Arbor Day.

{teachers}

NSTA Conference

Educators flocked to Indianapolis earlier this year to see the latest and greatest science materials and programs. The National Science Teachers Association Conference, held March 29th through April 1st, gave teachers a unique chance to attend workshops, listen to notable speakers, and find the perfect materials to enhance their lesson plans.

The Nutrients for Life Foundation team participated with a booth that offered extensive materials and complimentary copies of the plant and soil science curriculum, *Nourishing the Planet in the 21st Century*. The Foundation's team including Regional Representatives from Florida, Illinois, and Iowa answered attendee questions about the ever-expanding group of materials available at no cost to educators. During NSTA conferences, teachers attend workshops focused on the latest in effectively teaching science, visiting with exhibitors, and creating a network of top professionals. The Foundation will attend the regional conferences in the fall, in addition to the 2013 national conference in the spring. Upcoming regional conferences include Louisville, Atlanta and Phoenix. Regional conferences allow for more one-on-one time with teachers and are often smaller in attendance. The national NSTA conference brings more motivated science teachers from around the country together with the purpose of learning new information to take back to their classrooms.

Teacher Nancy Bridge presented the Nutrients for Life *Nourishing the Planet in the 21st Century* curriculum in two workshops at the 2012 National NSTA Conference. The elementary workshop, **"How Do Plants Grow?,"** focused on teaching biological concepts through hands-on activities. Teacher participants made Garden Monsters with seed, nylon hose, and soil. In addition to the curriculum, attendees were given posters, flashcards, and resource manuals found on page 24-26.

Bridge's other workshop, **"What's Dirt Got to Do with It?"** introduced creative ways to explore properties of soil, soil-plant interactions, plant life cycles, and plant nutrition with secondary education teachers. Similar to the elementary workshop, secondary teacher attendees received Nutrients for Life free resources and plenty of ideas on how to teach soil science with the *Nourishing the Planet in the 21st Century* curriculum.

Test Your Soil Science Knowledge!

Could you grow a field of crops or would a houseplant wilt under your care? Answer this quiz to test your plants, soil, and the crop nutrient knowledge!

1. Plants require nutrients to be present in certain amounts to be healthy. The essential components of most fertilizers are _____.
   a. Nitrogen, Zinc, Boron.
   b. Nitrogen, Iron, Manganese.
   c. Nitrogen, Phosphorus, Potassium.

2. Plants primarily use _____ to absorb water.
   a. filaments
   b. root hairs
   c. the anther

3. Plant roots grow _____.
   a. Until they find water
   b. Where there is room
   c. Randomly
   d. Where water is already present

4. Plants require _____ different elements to be healthy.
   a. 2
   b. 17

5. Plants and humans require _____ essential elements
   a. Similar
   b. Different

6. Soils _____.
   a. Serve as a nutrient bank for plants
   b. Contain both organic and inorganic material
   c. Differ in their ability to hold and transmit water
   d. All of the above

7. What country did Dr. Borlaug leave the United States to work as a geneticist and plant pathologist?
   a. Mexico
   b. India
   c. Ireland
   d. Chile

8. Crop nutrients can be added to soil in which of the following form(s)?
   a. Liquid
   b. Gas
   c. Solid
   d. All of the above

9. Approximately _____ of land in the world is devoted to farming.
   a. 83 percent
   b. 11 percent
   c. 55 percent
   d. 76 percent

7 to 9 answers correct:

Soil Science Master: Abundant Corn Plant

Excellent work! You obviously have a well-rooted understanding of soil science, crop nutrients, and the essential role they play in feeding the world's growing population. Secure your position as a "Soil Science Master" by becoming a member of the Nutrients for Life Foundation. Donate $25 on the Foundation's website and stay up-to-date with the happenings of the Foundation by following our blog and social media channels.

4 to 6 answers correct:

Basic Soil Science Comprehension: Prospering Seedling

Good Job! You have a nice comprehension about soil science and crop nutrients. We suggest you check out the Foundation's virtual classroom on www.nutrientsforlife.org to add some extra growth to your existing soil knowledge. Moreover, consider becoming a Nutrients for Life member. For $25, you can help provide free education materials to classrooms around the nation. It's just what the agronomist ordered!

1 to 3 answers correct:

Beginning Concept of Soil Science: Spread Your Roots

It seems you have some studying to do, but never fear, *Nourishing the Planet in 21st Century* curriculum is here to help you spread your roots with soil science. Our curriculum is free to download on www.nutrientsforlife.org and will help branch out your soil science knowledge. Please also consider joining the Nutrients for Life Foundation with a $25 membership. We have a big job to do; as the world's population increases, we must educate the nation on the essentialness of crop nutrients in feeding the world.

Answers: 1.c 2.b 3.d 4.b 5.a 6.d 7.a 8.d 9.b

1 **Fertilizer Is Life's Main Ingredient Posters**
A series of four educational campaign posters.

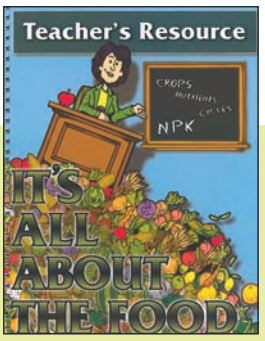
2 **Fertilizer: Life's Main Ingredient Bumper Sticker**
Showcases the Foundation's message of Fertilizer: Life's Main Ingredient.

Materials Available

3 **Seed Bookmarks**
Deliver these cute and creative seed bookmarks to the classroom. The bookmark coordinates with the ***Nourishing the Planet in the 21st Century*** curriculum. Students can remove the "plant container," plant it in the soil and watch the flowers grow.

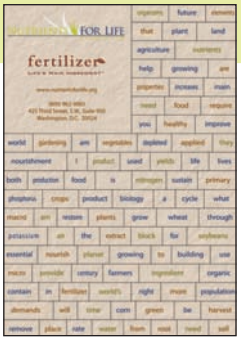
4 ***There's What in My Food?* Resource Manual**
A fun and valuable resource for teenagers and adults, ***There's What in My Food?*** offers insight to improve understanding about modern production agriculture and why it is so important in assuring plentiful, affordable and safe food supplies.

5 ***Fun With the Plant Nutrient Team* Activity Book**
The perfect piece to help children (grades 3-5) understand the basics of crop nutrition.



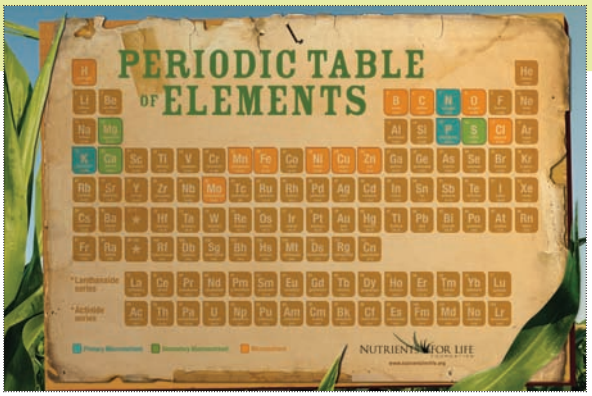
6 **It's All About the Food**
A resource for middle school teachers that focuses on problem solving and critical thinking in relation to food. ***It's All About the Food*** is divided into three sections to teach students about food production, plant nutrients and fertilizer.

>> For more information on items featured here, please contact the Nutrients for Life Foundation, at **info@nutrientsforlife.org**.



11

Magnets
Make sentences about gardening, growing crops and nutrients with these word magnets.

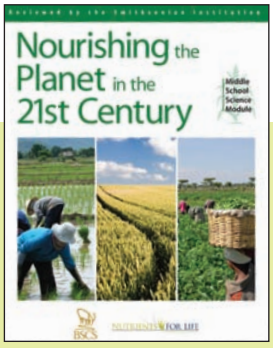


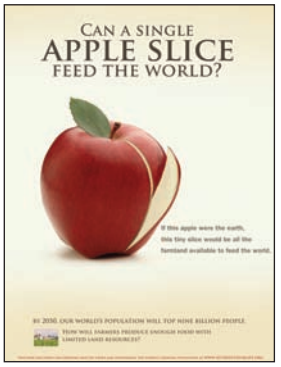
12

Periodic Table of Elements Poster
Connect biology to chemistry in this colorful periodic table of elements poster. This piece highlights the primary macronutrients, secondary macronutrients and micronutrients; all of which are essential for plants.

10

Apple, Air and Ocean Postcards
Series of three postcards highlighting the origins of nitrogen, potash and phosphate.





Apple Poster
Can a single apple slice feed the world? This is a great resource poster for teachers to use as they address the challenges of feeding a growing population.

13

7

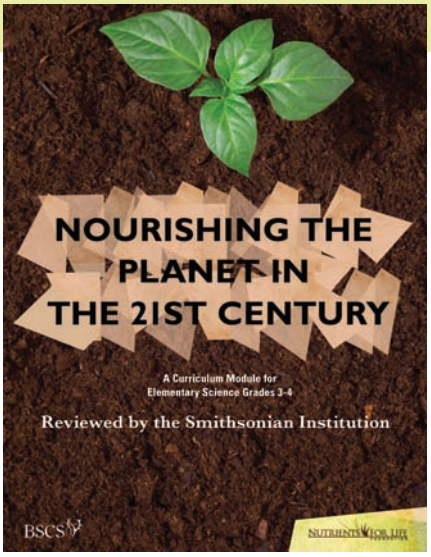
***Nourishing the Planet in the 21st Century* Curriculum**
Nourishing the Planet in the 21st Century is a science-based curriculum supplement for middle and high school students. The supplement offers six lesson plans designed to teach students about feeding the growing world. Also available on a USB flash drive.

8

5 Key Message Cards
The wallet-sized 5 Key Message Card concisely states five of the top truths about fertilizers.

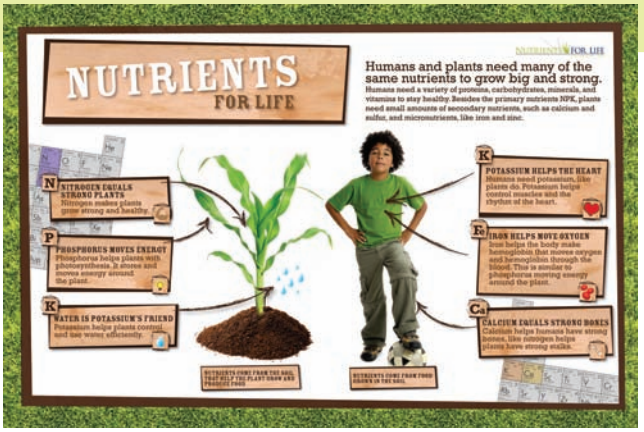
9

Ruler
Six-inch ruler that publicizes the *Nourishing the Planet in the 21st Century* curriculum.



14 Elementary Curriculum

Smithsonian-approved, these five supplemental lessons teach plant and soil science, while using gardening to make the lessons fun, interactive and educational. Also available on a USB flash drive.



16 NPK Poster

Plants, like humans, need nutrients. This resource poster is a great addition to your classroom showing the basics of primary nutrients.

15 Pre and Post Test Assessment

Educators can gauge students' learning with the Foundation's pretest and post test assessment for use before and after lessons from *Nourishing the Planet in the 21st Century* curriculum.

More **Materials** Available

17 Virtual Classroom Videos

Introduce lessons from the *Nourishing the Planet in the 21st Century* curriculum with spokesperson Dee McKenna in these short, interest grabbing videos. Available for elementary, middle, and high school levels online or on a USB flash drive.

18 Recipe Cards

A series of eight recipe cards. Recipes include ***pumpkin soup, chocolate chip cookies, raspberry crumb bars, moist carrot cake, apple cookies, baked spaghetti cakes, broccoli quiche*** and ***vegetable soup***.

19 Flashcards

Play a fun game (Around the World, Beat the Clock or Circle Up) and test your students' plant and soil science knowledge. Designed specifically for the elementary curriculum, these cards can also be used with the middle school curriculum.

>> For more information on items featured here, please contact the Nutrients for Life Foundation, at **info@nutrientsforlife.org**.

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To some, it's a place to play. To others, a place to think. And on those lazy days, even a place to sleep. It's our lawn. And it's a place made beautiful thanks to the main ingredients of fertilizer – N (Nitrogen), P (Phosphorus) and K (Potassium). Together, they're helping grow beautiful lawn and gardens, and in turn, priceless moments as well. Learn more at *NutrientsForLife.org.*

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parting shot

NFL's Colorado regional representative Jerry Alldredge engages students in a lesson about crop nutrients.