



parting shot

NFL's Illinois Regional Representative Haley Siergiej teaches students at Cook County's Ag Day about the importance of soil health for corn growth and ways corn used to be harvested.

A young child is the central focus, wearing a black and white spider costume with a spiderweb pattern on the torso and a hood with two large eyes. The child is smiling and standing in a pumpkin patch with several large orange pumpkins visible in the foreground and background.

NUTRIENTS FOR LIFE

FALL
2013

COMING
HOME
TO THE FARM

Going STEM
WITH SOIL SCIENCE

Greener
Grass
this Fall

{ from the board }



I was shocked to learn that over 16 million children in the United States go to bed hungry every night. The numbers internationally are even more astonishing. And appalling. How can these numbers be true in a world that is so scientifically advanced? It highlights just how important the fertilizer industry is to human existence. Fertilizer is responsible for more than 50 percent of food production around the world. With today's population of 7 billion expected to swell to 9 billion by 2050, the role of fertilizer in food production couldn't

be more important. As I join the Nutrients for Life Foundation, I am eager to guide the Foundation in its mission to educate students and the public on the valuable role fertilizers play in feeding our growing world by developing and introducing curriculum into our nation's schools. The fertilizer industry should be commended for making a long term investment in educating future leaders about the importance of plant nutrients.

Thanks to previous professional experiences, I do know quite a bit about foundation efforts to educate students. In fact, I've been actively involved in enhancing future leaders' science education with an organization called the Chemical Educational Foundation (CEF). CEF's You Be The Chemist® (YBTC) programs are designed to enhance K-8 science education by introducing the central role of chemistry in all the sciences and in our everyday lives. Over the past decade, CEF's programs have expanded nationwide, educating hundreds of thousands of students about the vital role chemistry plays in our lives. I look forward to bringing some lessons learned to the Nutrients for Life Foundation.

Knowledge is power. It is our job to make sure our nation's children understand the science surrounding fertilizer and soil science, and ultimately, that fertilizer is responsible for a plate full of food at the dinner table and full stomachs each night.

I'm excited to join the Nutrients for Life Foundation and to work with you to further its mission. It's a worthy cause.

Sincerely,

Chris Jahn

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{ from the editor }

Diggin' in the Soil

I appreciate vibrant, nutrient-rich soil and all the opportunities it offers. As a farmer and gardener, I rely on it to provide tasty berries and healthy pumpkins, among other things. For some folks, soil may not be overly interesting, but for others it is the key to successful food production, which so greatly impacts our health and lives. I would say there's nothing more important than that! The Smithsonian Museum of American History realizes the value of soil, too, and hosted a panel discussion on soil and its history. I was honored to be on the panel along with Maxine Levin with the National Cooperative Soil Survey and Mark Smallwood from the Rhodale Institute.

As we look back on previous generations, farming practices and the general treatment of soil have had wide ranging affects, both positive and negative, on our food systems and our environment. Changing technologies in agriculture have led to changes in food production and farming methods. Historically, the introduction of fertilizer to the growing system created a production boom. Nutrients are taken out of the soil with each crop harvest and must be replaced in the soil for the success of the next season's crop.

During our discussion, I was asked how and why soil affects the plants that grow in it. First, soil is different in every part of the country. Some soils are rich in nutrients, some are sandy, some rocky, and some nutrient deficient. For plant growth, the most important job of soil is to provide the nutrients that plants need to grow. All plants need 17 essential nutrients – nitrogen, phosphorus, and potassium are the primary three required for healthy growth. These nutrients are available in the soil and travel to the plant via the roots.

Plants that are grown in soil that lacks nutrients will lack in overall quality and health.

We also spent time discussing organic nutrients compared to synthetic nutrients. We are fortunate to have so many options – from manure to fertilizer pellets to compost – and each person must decide which is best for them based on their situation. In sharing my experience, I noted that after testing the soil in my fields, I like to add synthetic fertilizer because I know the nutrient content of the product. Compost is a great option to build up the organic matter in smaller plots, but it can be a guessing game as to the exact nutrient content, plus a bit unmanageable with larger acreage. I also shared that application ease and availability is almost always guaranteed with synthetic fertilizers.

I know farmers that use a combination of manure and synthetic fertilizers, and gardeners that supplement compost with synthetic fertilizers. I think that being aware of all nutrient sources available means we can come up with many different solutions that provide us with healthy soil.

Soil is a precious natural resource. Did you know it takes 500 years to form an inch of topsoil on the ground? If I take care of the soil, it will take care of me. I use this wonderful natural resource to grow food for my family and my community. I plan to pass my farm down to my three young sons and to do this, it is essential that I take care of the land.

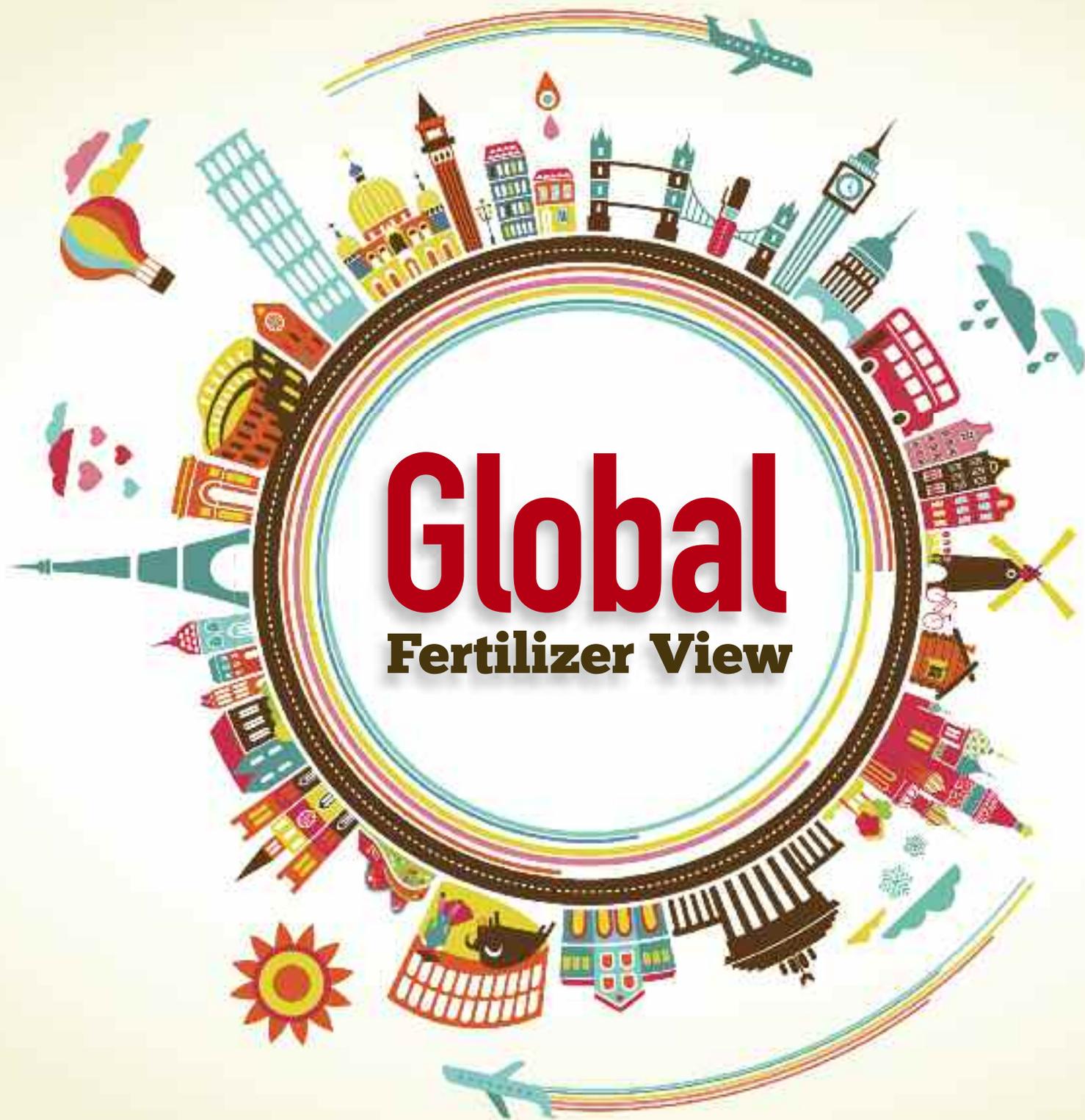
Harriet E. Wegmeyer

Harriet Wegmeyer

Executive Director, Nutrients for Life Foundation



Pictured from left to right: Susan Evans, Program Director with the Smithsonian American Food History Project, Mark Smallwood with the Rhodale Institute, Harriet Wegmeyer, Executive Director of the Nutrients for Life Foundation, and Maxine Levin with the National Cooperative Soil Survey.



COUNTRIES AROUND THE WORLD SHARE THEIR ADVANCES IN SUSTAINABILITY



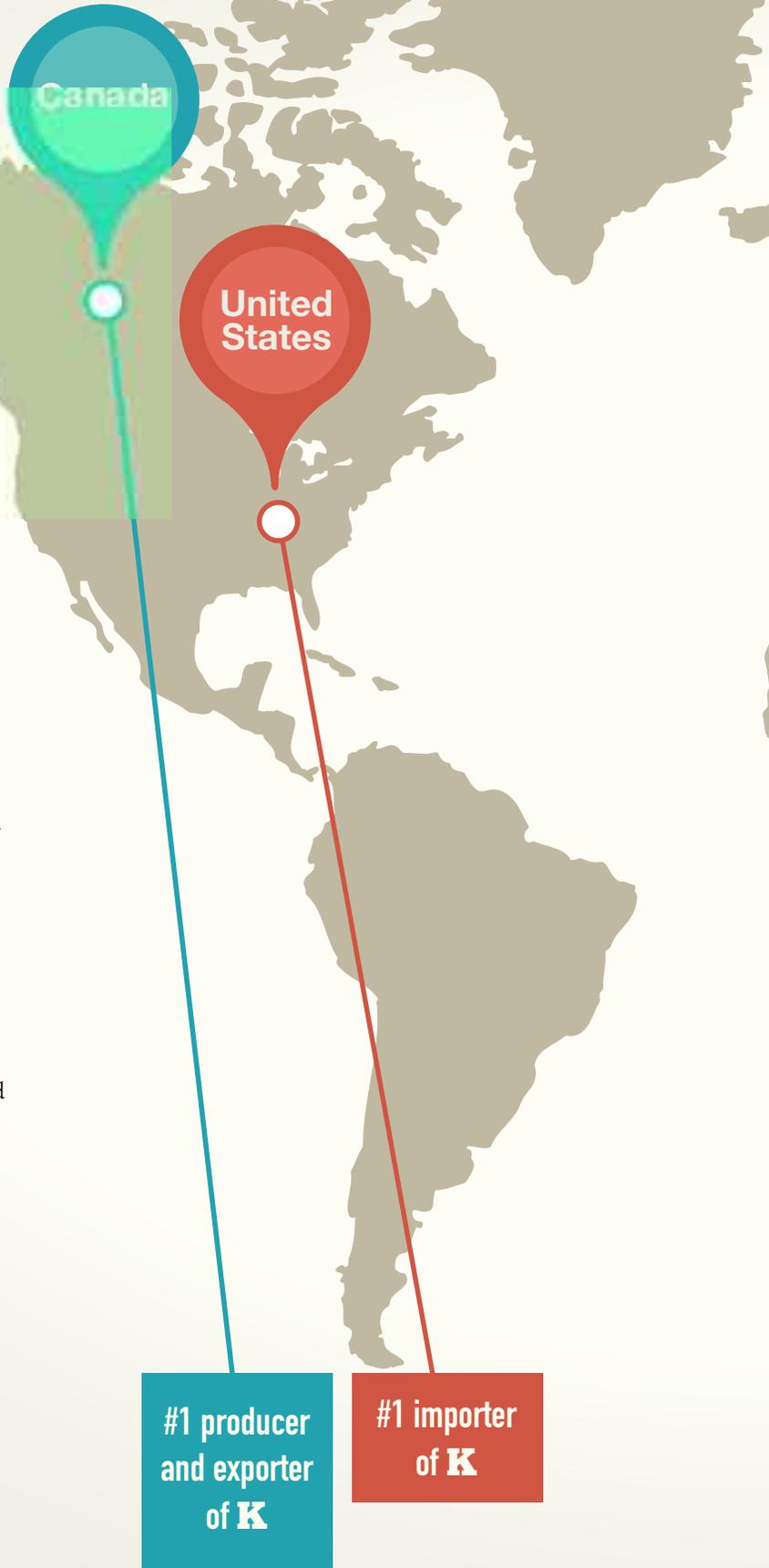
Did you know that crops are shipped around the world? Shipping food to other countries means crops, such as fruits and vegetables, are available in grocery stores, even when it's cold in that region and the fruits can't grow. Have you ever seen strawberries in your grocery store in December? Most likely, those strawberries were grown in a tropical climate and shipped to your town. Just as crops are shipped around the world, nutrients are even more likely to leave the country they were produced in.



Global Fertilizer View

Soybeans travel the most of any crop. Thirty-six percent of soybeans grown around the world are exported to be used somewhere else. In the fertilizer world, potash logs the most miles. Eighty-three percent of potash produced globally is shipped to another country to be used as fertilizer. That means that if potash were represented by 10 kids in a classroom, 8 of them would move to another country! In order to produce enough food for our growing population, it is vital that nutrients can be shared by farmers across the globe. Our global transportation infrastructure, including trucks, planes, boats, and trains, sends fertilizer to nutrient depleted soils around the world.

Farmers around the world must share the 17 essential nutrients for plant growth. If Farmer Jones in Iowa goes to his or her local co-op to buy potash and phosphate fertilizer for soybean fields, it is likely that the potash has already travelled from Canada, Russia, or Belarus and the phosphate from China, Florida, or Morocco. Another example is rice grown in India. Rice needs ample nitrogen to grow well. An Indian farmer could be spreading nitrogen fertilizer that was produced in Russia, China, Ukraine, Canada, or Egypt. Fertilizer and food production are truly a global industry. Just as we are dependent on farmers around the world that grow our food, farmers are dependent on the fertilizers produced around the world that nourish their soils. The American grown food on your plate probably had a little help from nutrients from an entirely different continent. 🌱



GLOBALLY SHARE THE 17 ESSENTIAL NUTRIENTS FOR PLANT GROWTH



IF YOU
PLANT IT

they will

COME
FARM FRESH

SINCE 2000

A Family Farm Strives to Educate while Entertaining Families



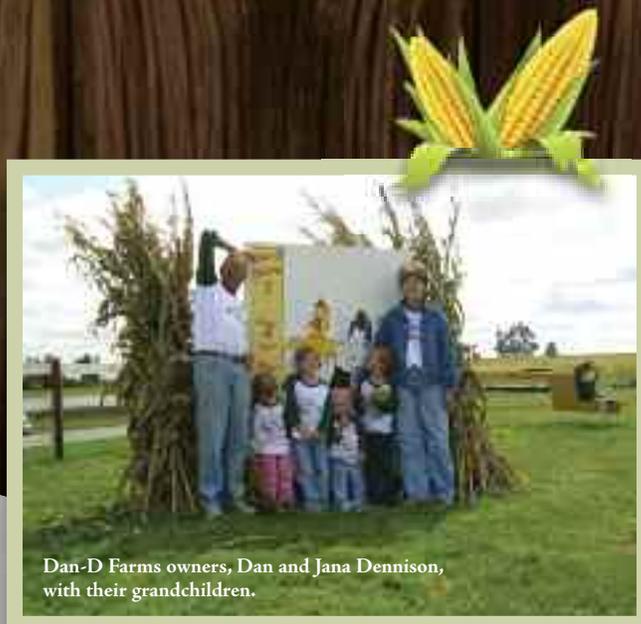


very fall, American families come home to the farm! In the past, everyone had a farmer in the family to visit, but that just isn't so anymore. Many farmers have begun making their farm a place for people to visit when the temperatures start to drop. My Dad still farms and for the past thirteen years, he has opened his farm in the fall to the community.

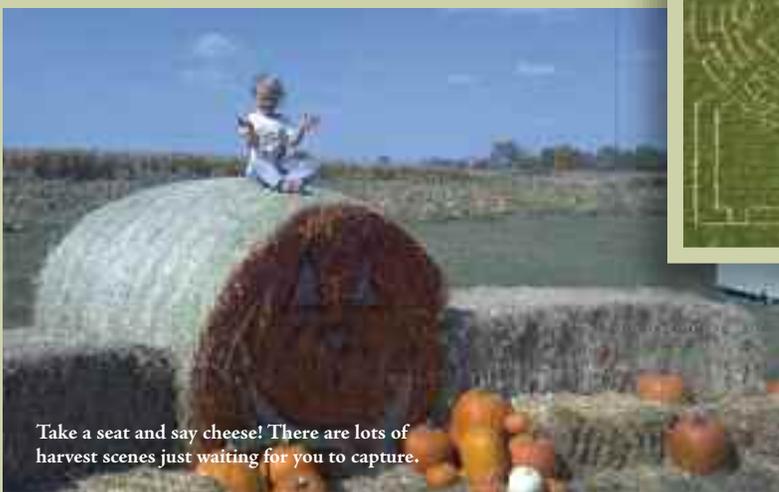
As autumn arrives, his farm, called Dan-D Farms, and lots of other corn mazes and pumpkin patches across America open their gates and barns to families for a "farm-tastic" good time! Getting lost in a corn maze, hunting down the perfect pumpkin, and feeding the farm animals in the barnyard are becoming family traditions. Each year, I dress my kids in pumpkin shirts and snap photos of them laughing and running through the fields. The freedom and fresh air brings out the fun in everyone!

Entertaining the community on the farm has provided an opportunity for farmers like my Dad to educate others about food production. He chuckles at the thought that people actually pay to walk through his corn field, something he has done all his life. He is most comfortable in the fields, and it is sad to think that most people have not experienced the simple pleasure of seeing a plant grow. Creating a corn maze year after year allows him to share this experience with others.

He proudly works from sun up to sun down, 365 days of the year in a career that feeds the world.



Dan-D Farms owners, Dan and Jana Dennison, with their grandchildren.



Take a seat and say cheese! There are lots of harvest scenes just waiting for you to capture.



Dan-D Farms' patriotic corn maze in 2011.



Get corny! Visit a corn maze this fall with your family!

The most common question asked during the corn maze season is, "How do you get the pattern in the field?" The details could be lengthy, so here's the gist of it. First, the design is created and drawn out on grid paper. Then, he double plants the corn in the field. This means he plants rows from north to south and then plants the field going east to west. As the corn grows it creates a pattern of squares, just like you see on grid paper.

When the corn is about twelve inches tall, he cuts the maze pattern into the field of corn. Not every corn maze is cut the same. Some farmers use GPS, others will count the rows as they go. Over the past thirteen years, my Dad has used three different methods of removing the corn to create the pattern including herbicide, mowing, or tillage.

Due to the location and nature of the business, the same soil has been growing corn for thirteen years. The corn maze soil is maintained like all of the other soil on Dan-D Farms. Each year, crop nutrients have to be replaced that were taken out with last year's harvest. Without fertilizer, the corn would be weak and malnourished. The right type of nitrogen, potassium, and phosphate fertilizer is added at the right time in correct quantities for the crop to properly revitalize the soil. Herbicides are applied to keep grass and other weeds from growing. This is necessary because if the weeds were allowed to grow, they would use up all of the nutrients and water in the soil, essentially suffocating the young corn plants.

As my family walks the twist and turns of the corn maze, I smile, knowing that Dad continues to farm the ground my grandfather and great-grandfather farmed. He proudly works from sun up to sun down, 365 days of the year in a career that feeds the world.

School buses of kids and mini-vans with families come to the farm to play in the corn box and jump on the hay bales. They experience agriculture and leave with memories that will last a lifetime! I encourage you to take the time this fall to visit a corn maze near you – there is so much to learn about food, soil, and nature! 🌽

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Contributed by NFL Blogger Dee McKenna about her Dad, Dan Dennison and his farm in Knoxville, Iowa.

Follow along with Dee and her family's adventures in agriculture at blog.nutrientsforlife.org!



SOIL SCIENCE CURRICULUM GOES STEM

Nutrients for Life Foundation has been providing educators with science-based relevant materials for almost ten years. As the Foundation was developing the *Nourishing the Planet in the 21st Century* high school curriculum in the early years, the Foundation steered the modules toward inquiry-based instruction and the 5E Instructional Model. With STEM (Science, Technology, Engineering, and Mathematics) gaining popularity across the country, educators are encouraged to weave inquiry into content to help with understanding foundational goals in science. When STEM caught on nationwide, the Foundation's curriculum was already in the hands of teachers emphasizing hands-on modules and experiential lessons mixed with content.

The elementary level of the curriculum helps students achieve several major goals associated with scientific literacy:

- ♦ To understand a set of basic concepts related to plant growth.
- ♦ To experience the process of scientific inquiry and develop an enhanced understanding of the nature and methods of science.
- ♦ To hone critical thinking skills.
- ♦ To begin to understand the relationship between science and events in their everyday lives.

The middle and high school curricula helps students achieve four major goals associated with scientific literacy:

- ♦ To understand the basic elements related to food production.
- ♦ To experience scientific inquiry and develop an enhanced understanding of nature and methods of science.

- ♦ To hone critical-thinking skills.
- ♦ To recognize science's role in society and the relationship between basic science and human health.

The lessons are organized into a conceptual framework that allows students to move from what they already know about agriculture, or think they know, to gaining a more complete and accurate perspective on the soil and nutrients.

In all three levels of the curriculum, students use scientific practices. Teachers use STEM to connect inquiry with content, which results in an understanding of foundational goals in science. For instance, the Foundation's curriculum, students use observation and critical thinking skills to connect N, P, and K to the periodic table of elements and then further to feeding the world's growing population. Some of the other content goals are "atoms and molecules on earth cycle among the living and nonliving components of the biosphere" and "natural ecosystems provide an array of basic processes that affect humans."

**NUTRIENTS FOR LIFE FOUNDATION HELPS EDUCATORS STAY
ON TOP OF GROWING TRENDS WITH STEM-BASED CURRICULA**



As **STEM** continues to guide educators and inspire students, the Foundation will continue to create effective and meaningful soil science activities for the classroom.

SOIL SCIENCE CURRICULUM GOES **STEM**

In addition, STEM challenges students to gain sufficient knowledge so they can engage in public discussions. In our curricula, the Foundation aims to assist students in understanding why crop nutrients and soil science are essential. Through our modules, students are able to answer the driving question, “How do we feed the world’s growing population?” By the end of the modules, students have a deeper understanding of the basic elements related to food production and its role in society. None of the lessons or activities encourages simple memorization of nutrients, but the lessons and activities create connections on how nutrients feed a plant and what it means on a global scale.

Furthermore, the essence of engineering is solving problems that arise from a specific human need or desire. In the Foundation’s modules, students conduct meaningful investigations while looking into the properties of soil with the soil separation experiment. After significant time learning about soils and crop nutrients, students select three recommendations that they feel are the most important for farmers to meet the challenge of nourishing the world’s population in the year 2050.

In STEM, mathematics is essential in scientific inquiry. In Lesson 5 of the high school curriculum, for instance, students calculate percentage in relation to farming land versus land for parks, homes, industries, etc. In the elementary curriculum, students graph and measure amounts of fertilizer needed for specific crops, like corn and carrots. In addition, the elementary curriculum includes measuring plant growth from seedlings in their classroom.

The Foundation is also developing a series of videos on mining and producing NPK. These videos feature science, industry, and engineering careers. There is a growing shortage in STEM careers, because students are unfamiliar with them. Brad Smith, executive vice president and general counsel for Microsoft, told attendees of a Brookings Institution event Sept. 27, 2012:

“The talent shortage in science, technology, engineering and math (STEM) fields is getting worse and should be a concern for employers regardless of their industry as manufacturing increasingly becomes computerized.”

The Foundation’s curricula proudly display the STEM-based sticker on the covers of each elementary, middle, and high school versions. As STEM continues to guide educators and inspire students, the Foundation will continue to create effective and meaningful soil science activities for the classroom. Soil and crop nutrients are ‘at the root’ of the food on our plates. Let’s tell the world! 🌱

{ industry }

Nutrients for Life **Golf Tournament**

Annual Golf Tournament Raises Over \$100,000 to Support Education Efforts

The fertilizer industry, suppliers, and customers gathered for the largest fundraising event of the year to benefit the Nutrients for Life Foundation. The ninth tee-off of the Foundation Golf Tournament was framed with picture perfect weather and playing conditions at the Golden Bear Golf Club at Keen's Point in Celebration, Calif. The Gavilon Fertilizer team of father-son duo Brian and Brent Harlander, Tom Mulrooney, and Matt Skov claimed bragging rights – best of 28 other teams - and walked off the links with the 2013 Fertilizer Cup.



More importantly, they and the other participants were able to benefit the Foundation's ongoing efforts in many areas such as the *Life's Main Ingredient* campaign, new education resources, and regional representatives. Through the supporters and fifteen hole sponsorships, the tournament netted over \$100,000 to benefit the Foundation.

Above: the winning team from Gavilon: Tom Mulrooney, Matt Skov, Brent Harlander and Brian Harlander.



The Foundation will hold the 2014 Nutrients for Life Golf Tournament on Feb. 3rd at the Del Mar Golf Club in San Diego, Calif. Mark your calendar!

{ industry }

NFL Days Garner Industry-wide Support



This year's third annual Nutrients for Life Days proves PotashCorp's support for the Foundation has only grown as the years pass! The presentations at PotashCorp facilities nationwide took place from July through September and had a true community feel. Employees were treated to delicious lunches, prizes, and other fun while a Foundation team member was at their facility.

Thanks to the generosity of PotashCorp employees and other supporters, the Nutrients for Life Foundation is able to offer all its resources for free!

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

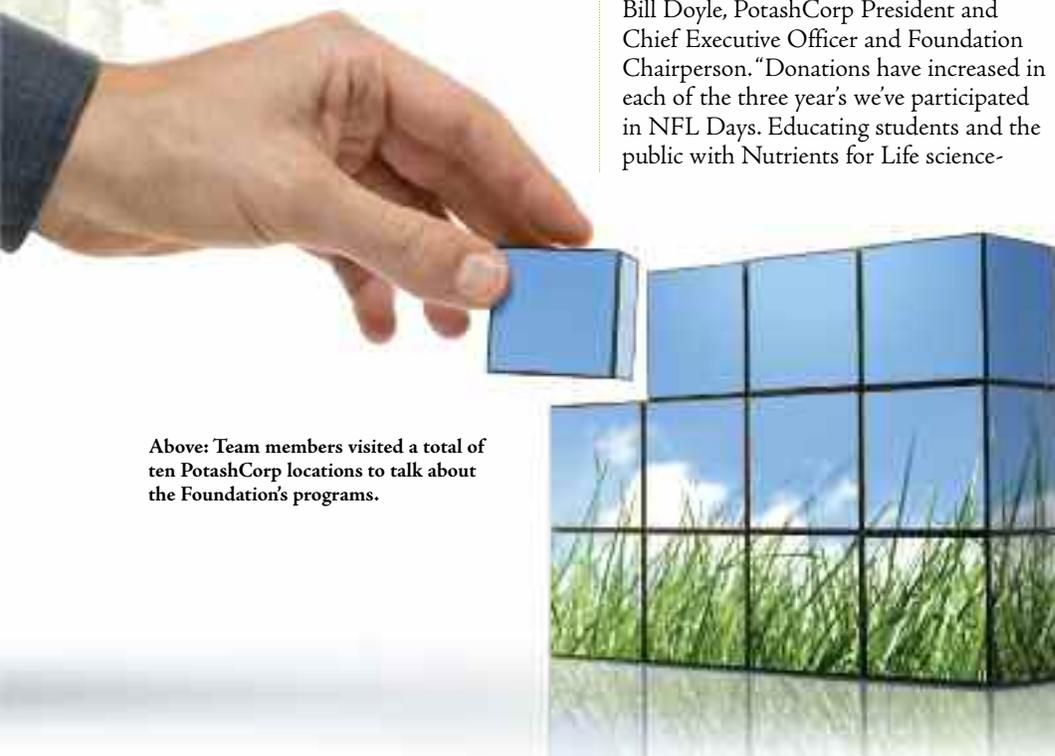
PotashCorp employees are a natural fit as members of the Foundation since Nutrients for Life Foundation promotes education about crop nutrients like those that PotashCorp produces. "PotashCorp employees see the real value in supporting the Nutrients for Life Foundation," said Bill Doyle, PotashCorp President and Chief Executive Officer and Foundation Chairperson. "Donations have increased in each of the three years we've participated in NFL Days. Educating students and the public with Nutrients for Life science-

based materials spreads the word of the good work of our industry and creates a beneficial situation for everyone. I am proud to support the Foundation and the great work they are doing."

Last year, Nutrients for Life Days involved nearly 2,500 PotashCorp employees in the United States, with 70 percent participating in this endeavor donating well 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 approximately \$230,000 last year, and this year's generous totals were still coming in at the publication deadline from the various Nutrients for Life Day events.

To donate, please visit www.nutrientsforlife.org/donate.

Above: Team members visited a total of ten PotashCorp locations to talk about the Foundation's programs.



Nutrient for Life Team Expands

In just five short years, the Nutrients for Life Foundation has grown from a one person staff to three full-time and nine part-time team members. “The demand for quality science-based resources about soil science and nutrients is high,” said Nutrients for Life Executive Director Harriet Wegmeyer. “With the addition of these three highly motivated and knowledgeable team members, Nutrients for Life is poised to meet the ever-growing demand for our resources.”



Tiffany Ballow

Louisiana Regional Representative

“I am excited in being part of the Nutrients for Life team, and share our message in Louisiana,” said Ballow. “I look forward to educating Louisiana residents on the important role fertilizer plays in feeding our world.

Nutrients for Life provides teachers with excellent standards-based science materials to enhance their programs and promote a greater understanding for the need for fertilizers in the world’s growing need for food production.”

Ballow graduated from the University of New Orleans with a bachelor’s degree in psychology and Southeastern Louisiana University with a master’s degree in psychology before beginning her career as an administrator in the school system. Ballow is based in Belle Chasse and can be reached via e-mail at tballow@nutrientsforlife.org or by phone at (202) 802-0378.



Melissa Buehler

Nebraska Regional Representative

Buehler is excited to return to working in agriculture and science education to offer teachers the curriculum and support materials available to help them in the classroom. “It is great to be back in the education sector, and to be able to

give back to the programs like FFA and the teachers that provided me so much during my scholastic years. I am looking for-

ward to meeting all of the teachers and industry folks in Nebraska to partner with them on our Foundation programs,” said Buehler.

Melissa and her husband Brandon are very active in the family purebred Hereford cattle and Boer Goat operation. Since showing Hereford cattle nationwide, she has stayed active in the Nebraska Hereford Association. Buehler was also an active member in 4-H and FFA throughout her youth.

Buehler is a graduate of the University of Nebraska – Lincoln, earning her bachelor’s degree in agricultural education. After graduating, she embarked on a sales career spanning over 10 years with Land O Lakes Purina Feeds, Inc. and Stine Seed Co., before coming to work for the Nutrients for Life Foundation. Buehler resides in Fairbury and can be reached via email at mbuehler@nutrientsforlife.org or by phone at (402) 239-9712.



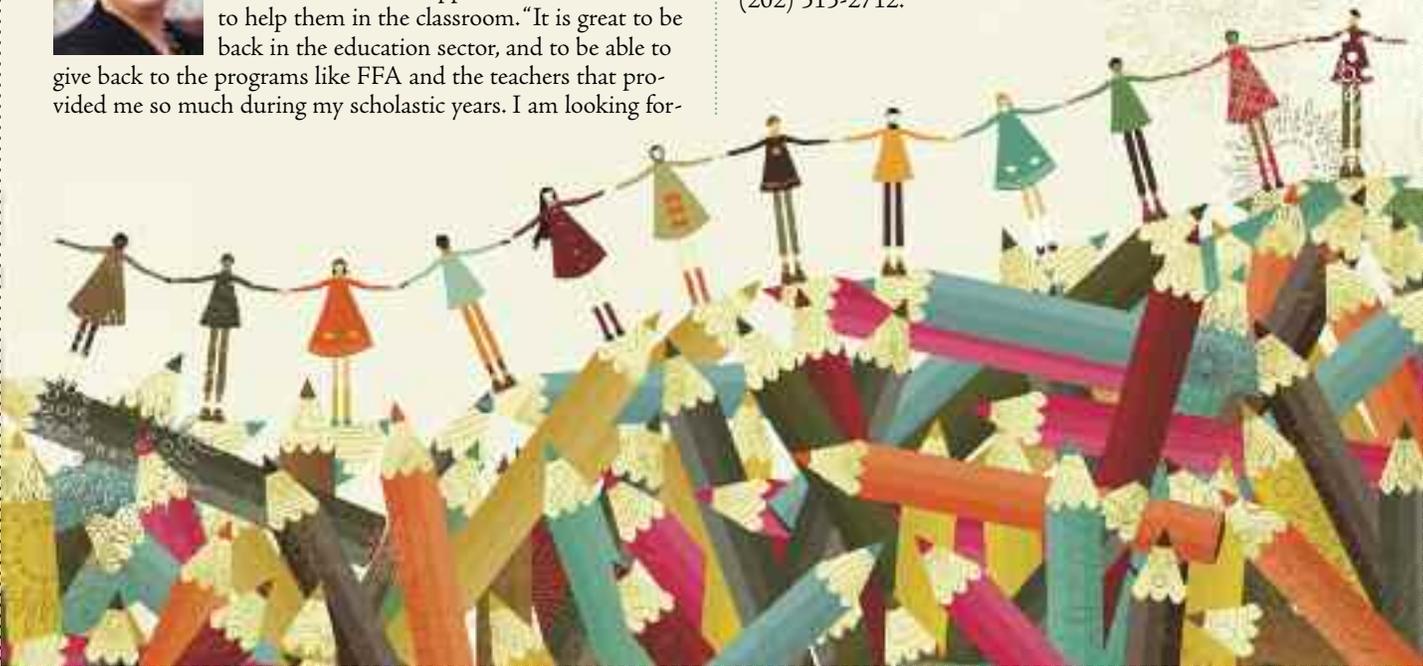
Emily Stubbs

Communications Specialist

“It is essential that students and teachers alike understand the importance of fertilizer to their own diets, as well as the challenge of feeding the other seven billion people on our planet,” said Stubbs. “After interning with the

Foundation last year, I am thrilled to become a member of the team and support the important work being done.”

Stubbs obtained her bachelor’s degree in environmental science and minor in sustainability from the University of Maryland, College Park. She has a background in raising 4-H market hogs and works closely with the Montgomery County Agricultural Fair. She works in the Washington, D.C. office, and is available for media inquiries regarding the Foundation. If interested in arranging a call or meeting with Stubbs, she can be reached via e-mail at estubbs@nutrientsforlife.org or by phone at (202) 515-2712.



{ consumers }

10. F
9. T
8. F
7. T
6. T
5. T
4. F
3. T
2. T
1. F
Answers

Test Your Soil Science Knowledge!

Do you know how the plants around us grow? Could you explain how soil, air, water, plants, and people all interact? Answer these true or false questions to test your plants, soil, and crop nutrient knowledge!

True or False?

- T F** Plant roots grow until they find water.
- T F** Nutrients enter root cells through the process of diffusion.
- T F** Excesses and deficiencies in nutrients can have negative impacts on water, soil, and air.
- T F** Farmland is not a finite source.
- T F** General yellowing of a plant signifies a nitrogen deficiency.
- T F** The plant vascular system has many similarities to the human vascular system.
- T F** Soils need both air space and water to support a plant's root system.
- T F** Soils are dead and do not change over time.
- T F** Plants require 17 essential nutrients to complete their life cycle, including nitrogen, potassium, and phosphate.
- T F** Plants can use elemental nitrogen found in the atmosphere.

Results

7 to 9 answers correct: Soil Science Master: Abundant Corn Plant

Wow! You really know a lot about plants, nutrients, and soil! Learn even more by visiting the Foundation's website, www.nutrientsforlife.org, and check out the virtual classroom. Our blog is another great place to find information such as seasonal gardening tips and outdoor how-tos.

4 to 6 answers correct: Basic Soil Science Comprehension: Prospering Seedling

Good Job! You have a nice comprehension about soil science and crop nutrients. Strengthen your knowledge by requesting fun resources about crops, food, and soil science at www.nutrientsforlife.org. All resources are free!

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.



Greener Grass This Fall

Your fall lawn can be a source of pride, a place for your family to play, or the scene for a barbecue with friends. Whether you like it or not, the way your yard looks is a direct reflection of your personal green thumb, or lack thereof. The good news is you can make your yard look lush and beautiful with a few simple steps and regular care. Of course, mowing is one of the most significant things you do to your lawn to keep it looking respectable. However, having sound fall lawn care practices may help your lawn the most in the long run.

There is no doubt about it, summer is tough on lawns! High temperatures and consistently high humidity levels left many of us with dead patches of grass or thin grass stands as shown on the left. Luckily,

tently moist while the new grass germinates. For instance, Southern Nebraska is in growing zone 5b. This means that Tall Fescue lawns should be over-seeded from August 20-September 20. Kentucky Bluegrass should be seeded from September 1-October 15. To find the correct dates for seeding where you live, determine your growing zone on the USDA website www.planthardiness.ars.usda.gov/PHZMWeb/.

Lawns that have light insect or disease damage can be encouraged to recover with an application of fertilizer. Apply 1 lb. of nitrogen fertilizer per 1,000 square feet to Kentucky Bluegrass lawns from early to mid-September. Tall Fescue lawns should receive a rate of 1/2 lb. of nitrogen per 1,000 square feet.

tilizer can make the most impact.

As your lawn recovers, additional watering will also be helpful. Many mistakenly assume that cooler temperatures mean water isn't needed. However, fall is the driest season for many parts of the country. Applying one inch of water per week will help the grass grow more quickly. Make two 1/2 inch applications of water per week. This encourages a deep root system that increases the overall health of the turf. More frequent watering, or even daily watering, is not recommended and will only promote increased insect and disease problems. One of the few times a turf area should be watered daily is during the germination process of a new seeding.

When setting the mower height, it is best to set it in the spring at a constant height and leave it that height throughout the year. Different types of grass require different mower heights, so be sure to research your areas recommendations on mower heights in your area. Depending on the grass types, 2.0" - 3.5" is common in most areas.

Green thumb or not, having a nice looking, lush green yard can be a source of pride to any homeowner. Much of this information was provided by University of Nebraska Turf Management Extension specialists. You don't have to be from Nebraska to be excited about the fall season and making your yard the talk of the neighborhood!

For some of the best, regionally-specific advice you can get on gardening and turf management, search the Master Gardener Website to find a program or contact near you at: <http://www.ahs.org/gardening-resources/master-gardeners>. Your local University can also be a place to contact when gathering more information for your region.

temperatures are cooling off slowly. This promotes increased growth in cool season grasses like Kentucky Bluegrass and Tall Fescue, making now the perfect time to repair any damage the summer left behind in your lawn.

Many lawns are damaged in summer by insects or fungal diseases like Brown Patch, Summer Patch (or FrogEye), and Dollar Spot. Fall is the ideal time to repair this damage by over-seeding. Begin by raking out the dead grass in damaged areas, or by having the lawn aerated by a professional. Next, over-seed with a disease resistant grass variety that matches your existing turf.

Finally, keep the over-seeded areas consis-

Use a slow release fertilizer containing a nitrogen source, as this will provide the nutrients the turf needs to actively grow and replace the damaged leaf blades. The final fertilization for both Kentucky Bluegrass and Tall Fescue lawns is applied from October 15- November 15. Again, 1 lb. of Nitrogen per 1,000 square feet is suggested using a slow release fertilizer.

Over fertilization at this time could cause too much young, soft growth that would be susceptible to winter injury. However, this end of season fertilization is an important one that many miss. At this time of the year, grass stores energy for next spring, thus your fer-



{ teachers }

Calling All FFA Members



A critical component of our ability to continually feed the world is fertilizer. Fertilizer use helps stave off famine and lift people from poverty. It helps provide a stable foundation for civilization itself.

The Nutrients for Life Foundation, believes that agricultural education should be taught in every classroom. In 2009, the Foundation created the *Helping Communities Grow* program and offered the program to FFA chapters in two states, Florida and Idaho. Since that time, the program has expanded to Arizona, California, Colorado, Florida, Idaho, Illinois, Iowa, Kansas, Louisiana, Nebraska, Ohio, Washington and an at-large category. The *Helping Communities Grow* program rewards FFA chapters for educating and engaging their local communities in hands-on and innovative agricultural literacy programs utilizing the Nutrients for Life curricula and materials.

"This program has really helped our FFA chapter focus on educating youth to develop agriculture awareness, which is vital to our society. Kids are energetic and soil nutrition education is a way to plant a small seed in young minds which in years to come will grow into innovative ideas," said West Liberty FFA Advisor Kayla Kaalberg from West Liberty, IA.

FFA chapters have conducted field trips,

created billboard signs, presented garden workshops, conducted experiments with different rates of fertilizer on plants, elementary presentations, wrote newspaper articles, made YouTube videos, promoted best management practices, as well as educated themselves about the role fertilizer plays in food production.

"One of our FFA chapter members mentioned the other day, "Aren't fertilizers bad?" Because of the opportunity to share the message of *Nourishing the World* we helped this student realize that N-P-K are important, necessary, and safe to our

FFA chapters complete against other participating chapters from their state or at-large category. Monetary awards of \$5,000, \$3,000, and \$1,000 are awarded to the first, second and third place chapter programs, respectively. Up to 30 chapters per state and 30 chapters in the at-large category will receive a participation award for \$500.

"I am so impressed with the quality of projects we received in our *Helping Communities Grow* program," said Nutrients for Life Foundation Executive Director Harriet Wegmeyer. "It gives us great honor to award these checks to such

The application is available online at www.nutrientsforlife.org/helpingcommunitiesgrow

world, when applied properly," said OHP Kenton FFA Advisor Morgan Latham. "We would like to believe that our message helped educate many others who may have felt the same way about nutrients."

To be eligible for the award program, FFA chapters must complete a three step application process. For the first time, the application process must be submitted through a web based application found at www.nutrientsforlife.org/helpingcommunitiesgrow.

deserving students. Not only did they educate fellow students and their communities about the important value of fertilizer, they expanded their leadership ability, communication skills and knowledge base during the year-long projects."

Above: FFA Members from the Plateau Valley FFA in Collbran, Colorado, engage elementary students in crop nutrient education. **Below:** Eisenhower Middle School FFA Chapter members from Gibsonton, Florida, are wearing the "big three" crop nutrients - Nitrogen, Phosphorus and Potassium.



Where in the World are We?

SEPTEMBER 2013 - JANUARY 2014

Mid-America Crop Life Convention
Denver, CO • September 3-5

Nebraska Association of Teachers
of Science Conference
Fremont, NE • September 26-28

North American Association of
Environmental Educators
Baltimore, MD • October 10-12

Iowa Science Teachers Conference
Ames, IA • October 22-24

California Science Teachers
Palm Springs, CA • October 24-26

Florida Association of Science Teachers
Miami, FL • October 24-26

Illinois Science Education Conference 2013
Tinley Park, IL • October 24-26

NSTA Area Conference
Portland, OR • October 24-26

National FFA Convention
Louisville, KY • October 30-Nov. 2

LSTA Conference
Baton Rouge, LA • October 31-Nov. 2

NSTA Area Conference
Charlotte, NC • November 7-9

National Association of Biology Teachers
Atlanta, GA • November 20-23

Colorado Science Teachers Convention
Denver, CO • November 22

Agricultural Retailers Association
Miami, FL • December 3-5



National Association of
Agricultural Educators
Las Vegas, NV • December 3-7

NSTA Regional Convention
Denver, CO • December 12-14



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Sneak Peek **AP ENVIRONMENTAL EDUCATION RESOURCE**

The Nutrients for Life Foundation strives to stay up-to-date and relevant in the ever-changing world of education. Currently, the Foundation is working to develop lessons and activities for use in the AP Environmental Science course. Students will follow a farmer who uses fertilizer to nourish and rejuvenate the fields, while incorporating the 4R Nutrient Stewardship framework. Additionally, students will consider various federal laws, while studying many fertilizer-manufacturing processes. States have the primary responsibility for regulating fertilizer; however, there are many federal laws that govern the mining, production and use of fertilizer. The Foundation expects to have this exciting new educational resource available through the website by spring 2014.

There's a **Search Bar** for That

Have you wondered how *Nourishing the Planet in the 21st Century* aligns with your state's standards? The Nutrients for Life Foundation is very proud to announce that its website, www.nutrientsforlife.org, now has a search tool allowing teachers to select their state and find soil science lessons that correlate with their state's educational standards. The search tool will make the process of choosing lessons and planning activities easier for teachers nationwide! This is exciting news, considering the Foundation is also delighted to announce all three levels of their curricula, *Nourishing the Planet in the 21st Century* align with Science State Standards for all 50 states, National Sciences Education Standards, Common Core and Next Generation Science Standards!

Nourishing the Planet in the 21st Century offers five elementary or six middle/high school lessons to teach students about the essential nutrients plants need to grow, why it's important to improve soil health, and how to relate those nutrients to their personal growth. Each of the lessons is accompanied by an easy-to-implement, hands-on learning activity appropriate for their grade level. All the activities encourage and support student inquiry, promote discourse among

students, and challenge students to share responsibility for their learning. The use of the BSCS (Biological Sciences Curriculum Study) 5E Instructional Model, joined with active STEM learning allows teachers to respond effectively to students with diverse backgrounds and learning styles.

This module encourages science teachers to plan inquiry-based science lessons by providing students with short-term objectives. The module is fully annotated, with suggestions on how to encourage curiosity, model science skills, and inspire new ideas about science and data. Each lesson includes planning tools for teaching, such as a conceptual flow of the lesson and suggested timeline. The focus on active, collaborative, and inquiry-based learning nurtures the development of community-based science learners in all grades. Visit www.nutrientsforlife.org to use the new search tool and request your copy of *Nourishing the Planet in the 21st Century*!





1 Fertilizer Is Life's Main Ingredient Posters

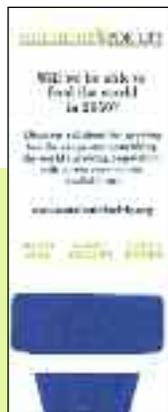
A series of four educational campaign posters.



2 Fertilizer Is Life's Main Ingredient Bumper Sticker

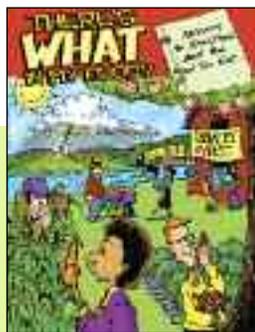
Showcases the Foundation's message of Fertilizer, Life's Main Ingredient.

Materials Available



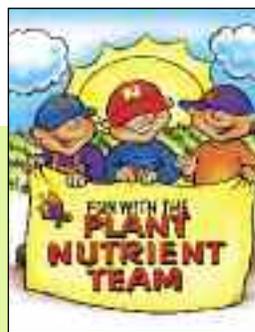
3 Seed Bookmarks

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.



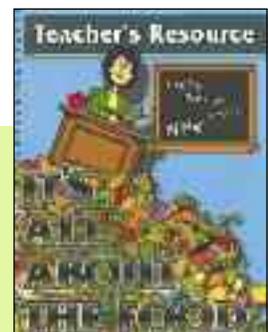
4 There's What in My Food?

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

The perfect activity book to help children (grades 3-5) understand the basics of crop nutrition.



6 It's All About the Food

A resource for high 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 visit the Nutrients for Life Foundation website's teacher section: www.nutrientsforlife.org/teachers.



11 Cross-curricular Magnets
Promote cross-curricular connections with the new word magnets. Make sentences with agriculture buzz words color-coded by the part of speech.

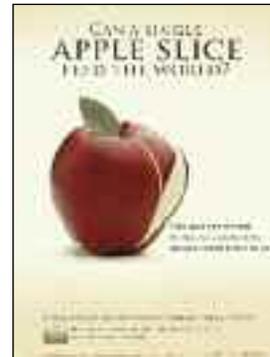
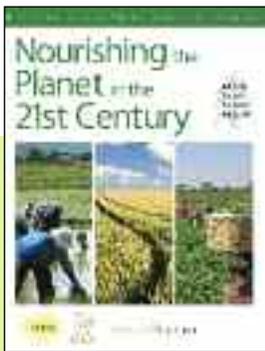


12 Periodic Table
Connect biology to chemistry in this colorful periodic table of elements poster. This piece highlights the primary macronutrients, secondary macronutrients, and micronutrients; all of which are essential for plants.

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 Curriculum is a science-based curriculum for middle and high school students. The supplement offers six STEM-based lesson plans designed to teach students about feeding the growing world.

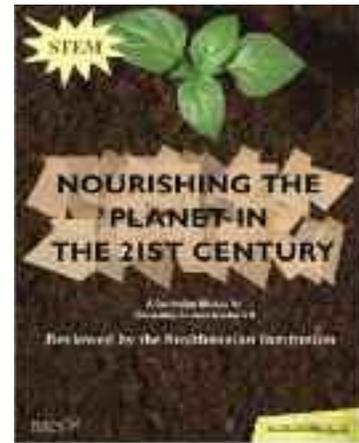
8 5 Key Message Cards
The wallet-sized 5 Key Message Card concisely states five of the top truths about fertilizers.

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





14 NPK Poster
Plants, like humans, need nutrients. This resource poster is a great addition to your classroom showing the basics of primary nutrients.
(Also available in Spanish)



15 Elementary Curriculum
Smithsonian-approved, these five STEM-based, supplemental lessons teach plant and soil science, while using gardening to make the lessons fun, interactive, and educational.

More **Materials** Available



16 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*.



17 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 visit the Nutrients for Life Foundation website's teacher section: www.nutrientsforlife.org/teachers.

18



Phosphate Mining Video

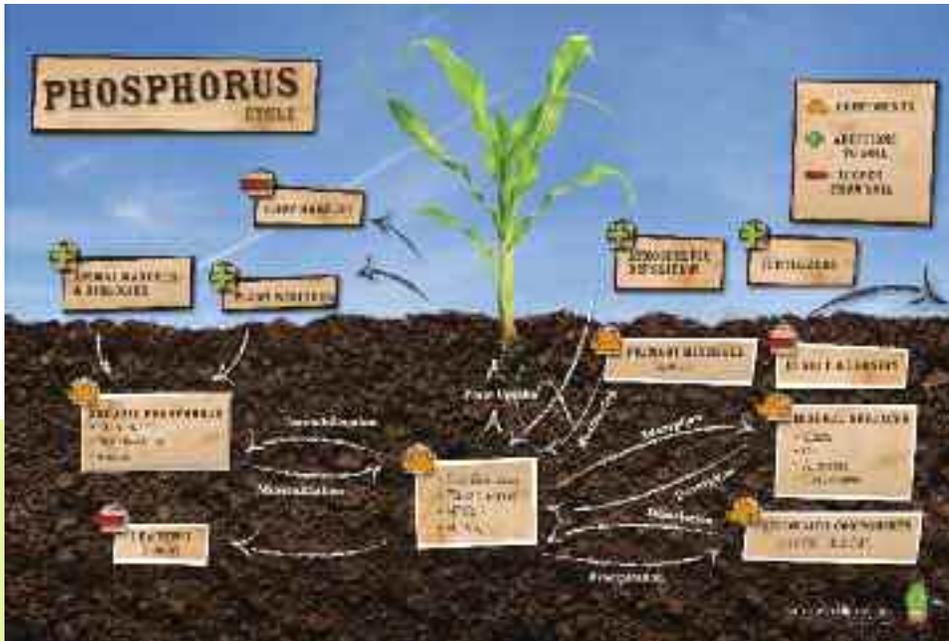
This lively video shows students the amazing process of mining phosphate and its relevance in global food security. Available to stream online!



20

Curriculum and Virtual Classroom Videos USB Flash Drive

The USB flash drive includes all three levels of curriculum, the virtual classroom videos, and pre- and post-test assessments. Introduce lessons from the *Nourishing the Planet in the 21st Century* curriculum with the short, interest grabbing Virtual Classroom videos, featuring spokesperson Dee McKenna. Also available online.



19

Phosphorous Cycle Poster

Perfect for the high school classroom, this poster focuses on the movement of phosphorus.

Planted Parsley	Planted Fennel	Planted Bell Pepper	Planted Peas	Student
YES	X	X	X	Emily
X	YES	X	X	Rick
X	X	X	YES	Tiffany
X	X	YES	X	Jerry

Seed Logic Puzzle Answer Key from page 26

{ students }

Seed Logic Puzzle

Students in Mr. Nitrogen's class learned the importance of soil, soil testing, and fertilizer. After carefully planning the school garden, each student was assigned seeds to plant. To find out who planted what, use the clues and seed packet information below to fill in the chart. When you find a match, write **YES** in the appropriate box. If it doesn't match, place an **X** in the box.

(Answers can be found at the bottom of page 25.)

Student	Planted Peas	Planted Bell Pepper	Planted Fennel	Planted Parsley
Emily				
Rick				
Tiffany				
Jerry				

Clues

- Jerry planted his favorite vegetable.
- Emily was disappointed with what she was assigned because the seeds had the longest germination time, and she was afraid they wouldn't germinate before school let out for summer.
- Rick planted an herb, and his seeds were a little bigger than Emily's.
- Tiffany received the largest seeds to plant.

Seed Packet Information

Seeds/Plants	Seed Size	Approximate Germination Time (Days)
Peas	Large	3-5 days
Radishes (2 varieties)	Medium	4-7 days
Carrots (short variety)	Small	10-25 days
Fennel	Small/medium	14 days
Beets	Medium	5-25 days
Coriander (cilantro)	Medium	7-10 days
Parsley	Small	21-28 days
Bell pepper	Medium	10-12 days
Lettuce (leaf)	Small	7-14 days
Lettuce (romaine)	Small	5-10 days
Chives	Small	8-12 days
Chard	Small/medium	10-15 days

Table found in *Nourishing the Planet in the 21st Century Elementary Curriculum*.





THIS L.O.L. MOMENT

➤ *brought to you by* ➤

N.P.K.

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.

fertilizer 

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