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New Year: New Ideas in Agricultural Education

New Beginnings

by John C. Ewing.

The beginning of a New Year brings excitement of what opportunities are in store, both personally and professionally. This can be rejuvenating. While the start of a new year is a great time to reflect on the past year, it is even a better time to look forward to these many great opportunities that lie ahead. We can use this time to engage in new professional development, “spruce up” some of our current lessons, or find a new way to connect our students to their learning.

In the same regard, I am excited for the new beginning of becoming the editor for The Agricultural Education Magazine. This magazine holds great potential to aid in the growth of every person that picks up an issue, reads the articles, and determines how that information can be used to better their own instruction. If every person that reads the magazine takes even one small piece of information with them for future growth, we are changing the way we impact students. Because of that, I want to thank each contributor to this issue, as well as those that will provide articles over the coming year. You are making a positive impact on teacher growth through your contribution. I believe that each new issue will provide insight to becoming better in our profession of education. Each new issue will allow us to reflect on the positives of the educational endeavors that we undertake, as

well as allow us to see how others are making positive change. Each issue will allow us to become the best teachers, advisors, and advocates for agricultural education possible.

I hope that this issue of The Agricultural Education Magazine provides you with great insights into the New Ideas that are out there in our profession. Each article in this issue provides a unique perspective on areas of agricultural education where we can improve our teaching, and ultimately improve student learning. I am hopeful that each of the articles in this issue inspires you to try something new, for the benefit of your learners and maybe our own benefit; in this New Year for New Ideas!

The remaining themes issues for the 2016 calendar year are listed below. I encourage you to reach out to the Theme Editors listed below to be considered as a potential author for the upcoming 2016 issues of *The Agricultural Education Magazine*. Thank you for all that you do to make Agricultural Education the best profession in the world!



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March/April 2016	Dr. Benjamin Swan Associate Professor, Agricultural Education and Communication California Polytechnic State University, San Luis Obispo bswan@calpoly.edu	Safety in Agricultural Education Laboratories
May/June 2016	Dr. Wendy Warner Assistant Professor, Agricultural and Extension Education North Carolina State University wendy_warner@ncsu.edu	Utilizing Technology in our Programs
July/August 2016	Dr. Courtney Meyers Associate Professor, Agricultural Communications Texas Tech University courtney.meyers@ttu.edu Dr. Gaea Hock Assistant Professor, Agricultural Information Science and Education Mississippi State University gaea.hock@msstate.edu	Service Learning in Agricultural Education
September/October 2016	Dr. Daniel Foster Assistant Professor, Agricultural Education The Pennsylvania State University ddf12@psu.edu Dr. Melanie Miller-Foster Assistant Professor, International Agriculture The Pennsylvania State University mjm727@psu.edu	No Borders on Student Success: Global Learning in Agriculture
November/December 2016	Dr. Chaney Mosley Senior College & Career Readiness Specialist American Institutes for Research cmosley@air.org	Workforce Development and Credentialing our Students

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Article Submission

Articles and photographs should be submitted to the Editor or Theme Editor. Items to be considered for publication should be submitted at least 90 days prior to the publication date of the intended issue. All submissions will be acknowledged by the Theme Editor and/or the Editor. No items are returned unless accompanied by a written request. Articles should be approximately four double spaced pages in length (1500 words). Information about the author(s) should be included at the end of the article. Photos and/or drawings appropriate for the “theme issue” are welcomed. Photos/drawings should be submitted in an electronic format (jpg or tiff format preferred – minimum 300 dpi). Do not imbed photos/drawings in the Word document. A recent photograph (jpg or tiff format preferred– minimum 300 dpi) of all authors should accompany the article unless photographs are on file with the Editor. Articles in the *Magazine* may be reproduced without permission but should be acknowledged.

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2016: A Year of Innovation

The new year is a time of fresh starts and clean slates, celebrations and resolutions. It often includes self-reflection and intentional goal setting. Often in our profession the demands of the every day can take us to a place where creative energy is running on “E” by the end of the year. However, from my experience there is plenty that a snow day, hot mug in hand, and the latest issue of *The Agricultural Education Magazine* can do to renew your spirit and provide fresh inspiration. If you have not yet written out your plans for a brighter 2016 sharpen your pencils, fire up

the digital devices, and resolve to be motivated.

In a new year, new ideas, new approaches, and new technologies are easy to come by but aren’t always easy to apply or explain in a classroom. In this issue you will find an exciting new approach to explaining GMOs. You will find a way to design an experience of another world in order to increase student engagement. You will find how to integrate a Citizen Science project into your agriculture program. This is just a glimpse of what you will find inside.

Now that your cocoa is cool enough for more than just sipping, dive in! Our colleagues and contributors to this issue are not idly sitting by waiting for the snow to stop falling. They are implementing innovation and are wishing the same for you and yours throughout the year to come.

New month.
New beginning.
New mindset.
New focus.
New start.
New intentions.
New results.



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Here by the Owl

by Jason Bullock

We all reach that time at the end of the year when we begin to develop resolutions and plans for improving ourselves in the coming year. For me, this reflection time started a little earlier due to my participation in the XLR8 Conference at the NAAE Convention in New Orleans, LA in November 2015. The XLR8 Conference brought fifteen agriculture teachers with 7-15 years of teaching experience from across the United States together to help them reflect and reevaluate their roles in both a professional and personal setting.

Excited to be chosen for this opportunity, I packed my bags and headed off to a never before seen, famous city. To begin the conference, we were asked to write down our most honest reasons for coming to the conference. Through I had, quite frankly, applied simply for the trip to New Orleans, it would be apparent by week's end that there were other reasons I needed to attend. The conference allowed me to take much needed time to reflect and evaluate my professional and personal life. Harsh realities were revealed and I was challenged to implement plans to make changes to improve my life--- in and out of the classroom.

Juggling Elephants

Through the use of *Juggling Elephants* (Loflin & Musig, 2007), I dissected my life in three "rings": professional, relationships, and self. Prior to this conference, it was obvious that my life was very demanding and full of responsibilities and commitments both professionally and personally. I often found my calendar being full both during the week and on the weekends. Through the challenge of honestly evaluating my life, I was provided strategies to

but by the end, I made commitments to these strategies designed to help find the balance I had been missing

Eating Frogs

The next book, *Eat That Frog* (Tracy, 2007), provided steps and techniques to help stop procrastinating and gain control of the responsibilities in my life. With a very application minded directive, this book gave not only techniques, but also encouraged me to put those techniques into ac-

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help begin to focus my energy and time. One strategy is focusing on the "ring" I am in at the moment and asking myself is this activity pivotal to my overall purpose and goal. Another strategy is contacting friends biweekly on the phone or in-person and use less contact through social media. A personal strategy is to free up my time by evaluating activities and requests and learning to say "no" to things that are not beneficial for me in the long run. Finding the strength and courage to implement these needed changes will be challenging,

tion daily. One of the tips that has had an impact on my life since the conference is to "plan every day in advance". Tracy shares that, "It only takes ten to twelve minutes for you to plan out your day, but this small investment of time will save you at least two hours in wasted time and diffused effort throughout the day." Participants in the workshop shared different planning systems they used, and despite the diverse systems, I was encouraged to use some sort of planning system that worked best for my needs. In planning one's day in advance, stress can

be decreased and focus given to the tasks and commitments that will have more effective results in one's life. Another harsh reality I had to face was learning to say no. Oftentimes I am approached to complete or help with various tasks that are not directly related to my goals or needs and therefore I get distracted and off target with my responsibilities. This simple two letter word holds a lot of power and when expressed in a tactful and responsible way it can have a positive impact on one's life. I encourage anyone who is struggling with completing tasks in a timely fashion and finding a balance in their lives to read both of the mentioned books. This conference, these books, and the networking between fellow agriculture teachers has led me to re-evaluate my purpose for teaching and also re-ignited my passion for teaching.



Reality Check

As I came back to “reality”, I began to think about how to implement changes in my life both professionally and personally. I knew that some of the changes that were needed would not happen overnight. Professionally, I

began to make detailed lists of things I needed to accomplish and also prioritize them so that I could focus on completing the tasks with the most effective results. Through inspiration found from an article shared in a co-worker Facebook group, I decided to redesign the layout of my classroom and begin to re-envision each unit in my course curriculums. After teaching the same courses for the past twelve years, I wanted to rediscover the topics and find new ideas, activities, and strategies for teaching the information to my students. This challenge prevents me from becoming complacent and disinterested in the material, which would translate to my students if I was not careful. Since the start of a new semester, I have already seen a change in the excitement and interest of my students through the newly structured classroom setting and approach to my instruction.

Outside of the classroom, agriculture teachers have a much more influential role as an advisor of the local FFA Chapter. I began to reflect on why I became an agriculture teacher and the influences I had when I was an agriculture student and FFA member. As my reflection deepened, I began to think about these commonly spoken words:

“Here by the owl! Why by the

owl? The owl is a time honored emblem of knowledge and wisdom. Being older than the rest of you, I am asked to advise you from time to time as the need arises. I hope that my advice will always



be based on true knowledge and ripened with wisdom.”

“Why by the owl?”

I recall desiring to become a teacher for the simple fact of making a difference in the lives of young people and exposing them to experiences and opportunities that, otherwise, they may never witness or partake. After teaching for twelve years, I have to say not only have I influenced young people, but the young people I have encountered have impacted my life in ways they will never know. Sometimes we take for granted the difference that students actually make in our lives while we try to impact their lives.

“...a time honored emblem....”

These words impress upon me that the influence an agriculture teacher has on his/her students has

no definite ending. It is encouraging and rewarding to receive messages from former students who have shared with me how FFA and agriculture education has impacted their lives long after they graduated high school. Just recently two former chapter Presidents shared how FFA is still impacting their lives. One shared how learning parliamentary procedure and being on the parliamentary procedure team has helped her in her education and now career. The other thanked FFA for developing her public speaking skills as she shared her perfect score on a recent public speaking assignment in her college class. Moments like these are timeless and provide motivation and encouragement to remain “here by the owl”.

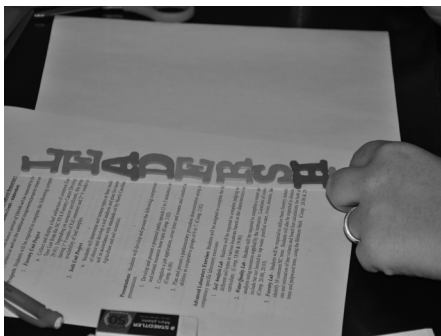
“knowledge and wisdom. Being older...”

My task daily is to impart knowledge and wisdom to my students and the FFA members. My goal as an agriculture teacher is to not only teach them agricultural based knowledge, but to also

My goal as an agriculture teacher is to not only teach them agricultural based knowledge, but to also help them to develop into productive and viable citizens...

help them to develop into productive and viable citizens who will take the life lessons learned during their FFA career and apply them to whatever path they choose. As resident owls, we must also re-

member that there is knowledge and wisdom that even our students can teach us if we take the time to listen and observe. Age is of no relevance because I believe that no matter what age I reach as an agriculture teacher, I believe that



students will continue to influence my life in a positive way, as I hope to continue influencing their lives.

“...advice based on true knowledge and ripened with wisdom.”

As resident owls, we are asked to fill multiple roles. Oftentimes we can be seen fulfilling roles such as a guardian, parental figure, financial planner, teacher, advisor, therapist, counselor, supervisor, and many more. Remember to stay mindful of the fact that you

may be the only positive influence a student has in their lives and choose your advice wisely. Understand that situations may arise at inopportune times, but delaying your advice to that situation

may have negative results. The next time you hear or speak those words, reflect on the true meaning of what you are saying and understand your role as an agriculture teacher is much more than imparting agriculturally based knowledge to young people.

As you continue your journey in life, I encourage you to find balance in your professional and personal life, complete tasks first that have a more effective result, plan your day in advance, and reflect on your purpose and passion for teaching and advising youth when you stand “here by the owl!”

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Supporting Our FFA Advisors

by Nina Crutchfield

Imagine for a moment that you did not take an agricultural education class in high school. Perhaps you knew about FFA but were never a member. You have been employed outside the education sector or were an educator in a different content area for most of your adult life. Increasingly, this isn't imaginary. In order to provide agricultural education in their school districts, administrators are hiring teachers with little or no agricultural education and/or FFA experience for a variety of reasons. These individuals serve

struggles faced by our alternative route teachers after presenting a workshop on National FFA resources. A wonderful gentleman approached me with several questions and I read on his notepad "What is a proficiency?". I felt about 2 inches tall when I realized I had managed to alienate him by extensively using our comfortable jargon and acronyms, causally assuming everyone in the room had my same background and experiences. I am determined not to repeat my behavior in the future. In addition, I pledge to rededicate myself to supporting all teachers on a greater scale.

development, engaging volunteers to help optimize work-life balance, and providing recognition for hard work and diligence to deliver the three-component model of agricultural education.

With supporting our FFA advisors at the forefront, the National FFA on-line learning system will be a place to explore our giant world of agricultural education, connect all the pieces, and build a knowledge base contributing to teacher success. The first lessons will be focused on the early career teachers, especially those who enter the profession from an alternative route. They will be available 24/7, and provide a safe learning environment for our newest professionals. The lessons could also be used by veteran teachers for online professional development, as continuing education credits, even contribute to graduate work through partnerships with university professors.

These individuals serve the vital role of ensuring the program is not lost in many communities. They should be embraced and supported.

the vital role of ensuring the program is not lost in many communities. They should be embraced and supported.

I entered the profession from the opposite end of the spectrum. I grew up in agricultural education and FFA, was a collegiate FFA member, and then became a career agriculture teacher. As such, I forget how much I absorbed in those early years, indoctrinating me into the culture, making it easier when I entered the classroom. I was recently reminded of the real

The New Year/New Idea portion of this support will manifest in 2017 as a new FFA on-line learning system providing resources and information around the 7 Keys of Local Program Success: classroom instruction, SAE, FFA, partnerships, marketing, program planning, and professional development. It goes without saying all too often, advisors are the heart of the FFA organization at every level. As such, the National FFA organization has the opportunity to support our advisors by providing quality resources and professional

National FFA staff have begun the work of creating the system with a delivery goal of January, 2017. With the assistance of various state agricultural education directors, state FFA executive secretaries, teacher educators, and secondary teachers, learning objectives have been identified to assist agriscience teachers as they work to:

- understand the basics of delivering a true blend of instruction, experiential learning, and leadership development;

- find great resources from FFA and our partners to address a wide-range of questions;
- build and manage a successful FFA chapter;
- gather data that tells the story of their local program to any and all stakeholders;
- engage volunteers in an effort to gain work-life balance;
- utilize an advisory committee to create a vision for the program; and,
- create champions for the program among colleagues, community members, and legislators.

Each point has been identified as crucial to the success of every agricultural education program. Efforts are extensive to harness materials that already exist at FFA.org and within our partners' resources. Teachers will enter the system through the My Journey platform. There will be a series of modules comprised of various lessons, including short quizzes at the end of each lesson. Should the teacher desire to have a record of mastery, an end of module assessment will be available, with the ability to generate a certificate of completion. If appropriate, the certificates can then be used to document ongoing professional development and/or continuing education units.

The lessons will be open to teacher educators as a potential instructional supplement/complement. Potential uses include self-directed assignments as part of a

course; a skeleton for building new courses related to agricultural education program development and management; or even the on-line textbook for appropriate units and/or courses.

State directors of agricultural education and FFA executive secretaries will be encouraged to use the system as they work with teachers. When technology allows, it could be possible to have teachers work through targeted lessons in the moment, followed by group interactions. Some may even want to go old-school, printing specific lessons for use when technology is limited.

Our vision is to create a platform used by teachers, regardless of the career phase. Every teacher struggles with at least one of the 7 Keys of Local Program success at any given moment. Imagine being able to pull up strategies, videos, templates, and practical applications in real-time to address the immediate problem being faced.

Sample lessons titles include:

- Strategies for recruiting students to enroll in courses and engage with FFA.
- Strategies for engaging every member in an affiliated FFA chapter.
- Managing a program budget.
- Strategies for infusing SAE into daily lessons.
- Managing fundraisers.
- Training chapter officers.
- Professional use of social me-

dia to promote the local chapter.

- Strategies for training and managing volunteers.
- Strategies for collecting and using student performance data.
- Developing collaborative relationships with colleagues.
- Learning to talk like an administrator.

If you are passionate about supporting our colleagues and wish to be a part of creating this environment, please contact me at ncrutchfield@ffa.org. Our profession only gets stronger and our students more successful when we can work together on projects like this one.



Nina Crutchfield is a Local Program Success Specialist with the National FFA Organization in Romance, AR.

Harnessing the Power of Industry to Invigorate the Classroom

by Stacie Turnbull

There are plenty of reasons why we don't bring industry into our classroom – or our students into industry. “I don't have time. I can't afford it. I don't know who to call.” What we miss, though, are physical resources, expertise and knowledge. It's time to ditch the excuses and delve into the benefits of engaging students with industry.

What does industry interaction look like for most of us?

- The FFA Officer Team visiting the local bank during National FFA Week.
- The Chapter President writing a letter asking for a donation from the hardware store.
- FFA Advisor picking up plates from the local seed dealer for the Chapter Pancake Feed.

All of these are worthy tasks that do create some level of interaction with industry. Those interactions are meaningful and do lead to spontaneous conversations. To get to a deeper level of learning and experience, though, we need to strive for purposeful and goal orientated interactions. ‘One shot’ experiences create just that – one brief moment of interaction. However, with some clear goals and a little planning, we can create strong, purposeful interactions within a strong partnership –

with clear benefits for the instructor, student, school and industry.

Agriculture Education has a long history of providing students with real world experiences, though not all experiences are equal. For educational philosopher, John Dewey, one of the key ideas of pragmatism is that reality can only be revealed as a result of activities (Biesta & Burbules,

Katz (2014) take an in depth look at building strong and sustainable partnerships. The key word is building – this is a process of creating a partnership, not a one shot experience for our students. In this process, consider one overriding principle – the business concept of return on investment. Everyone in the partnership must gain something from their relationship and that gain has to be

Our students, teachers and industry deserve more than “least imaginative” and one shot experiences.

2003), i.e. actively participating. The Official FFA Student Handbook reminds us that SAE projects allow students to apply agricultural skills and knowledge learned in the classroom (2011). At the same time, Mike Rose, faculty member at UCLA, reminds us that, “At their least imaginative, (School to Work programs) simply place kids in business settings where they perform low-level tasks with little educational content”. Our students, teachers and industry deserve more than “least imaginative” and one shot experiences. And, with initial investment, building an industry/education partnership is a very rewardable experience.

Return on investment

In their book, *Employer Engagement Toolkit*, Pawlowski and

quantifiable in the long term.

Look at the example of the advisor picking up plates for the pancake feed. The industry gains public relations from having their name on the plates. Will that name recognition create any new sales for them? Unlikely. Will it create some good will? Sure. Does good will necessarily translate into sales? No. The gain for the seed dealer is minimal and short term. They feel good about helping out the local chapter in that moment. A month later, they hopefully also receive a thank you card from the chapter. A second moment of feeling good about their donation.

The advisor, gained through a decrease of expenses. If the advisor spent 15 minutes discussing the current seed sales market, they also gained knowledge to share with their students. Stu-

dent gains are limited to increased profit and the possibility of learning more through their instructor's increased knowledge. All of these outcomes are important but short lived. To make these industry interactions long term and a true partnership, there must be goals set and in-depth interactions taking place. Pawlowski and Katz (2014) suggest listing your important partners and asking the following questions:

1. Have they helped design the programs they participate in?
2. What benefits do they get from being involved?
3. What do they contribute to the work?
4. How do we measure the outcomes that are important to them?

For example, when designing a work study program, are the industry partners being consulted in the design phase or simply at the end, when it is time to place students? When planning the pancake feed, are students seeking input on marketing or simply



asking for the plates? When the grocery store sponsors a coloring contest, are the winners displayed at the store – potentially increasing traffic in the store? When the manufacturing company donates steel for welding projects, are they seeing increased student interest in welding careers? When dealing with a student struggling to find their niche, are we simply giving them advice or are we setting up mentor relationships in the industry? Ultimately, do we know what industry's desired outcomes are? Have we asked them?

Pawlowski and Katz (2014) describe a one sided relationship as the sponsorship model versus the partnership model. This one sided relationship – industry providing sponsorship without measurable return or input - will not create the desired impact for our students, nor will it be sustainable. Partnerships, however, provide mutually agreed upon benefits, a long term and sustainable relationship and create opportunities that neither side would have originally considered.

Advisory Boards

Often, both industry and the education setting don't have a clear understanding of what we can offer each other. Consider the advisory boards as the courtship phase. Get to know each other, figure out what each has to offer and determine if there is mutual benefit to a relationship. As advisors, forming advisory boards tends to be put on the back burner. Who has time for one more meeting, one more night in the classroom? However, this is the start

of forming vital relationships, finding partners, seeking out resources and creating support for your program. This is where a return on investment begins.

Advisory boards provide a number of benefits, according to Pawlowski and Katz (2014, p. 42).

- Current industry information – providing our students with updated technical information, as well as helping to set the right outcomes for our programs.
- Increased community support – whether it is support when budget cuts come around, providing volunteers, supplies or financial resources, or finding SAE projects, community support is vital to program growth.
- Increased access to development opportunities – whether it's a welding training or sitting in on sales training, industry can provide training opportunities allowing the instructor and students to stay current.
- Stronger community awareness and support – this goes beyond the community support. We do amazing things in our classroom. Our community doesn't hear about many of the things we do. Bringing the industry into our programs lets them know what we do, how valuable our time is, and how vital our programs are.

Advisory boards don't have to be daunting – but they should

also be more than a quick once a year, check off the box meeting. Your advisory board is there to advise your program. In that vein, be prepared to listen. Listen to what they feel is important within the industry. Listen to what skills they see employees lacking. Be willing to listen and you will soon find that they can help you with the resources to make your program a success, to help your students succeed, and make your job easier.

A general rule, consider having 75 percent of your advisory board made up of industry representatives. Pawlowski and Katz (2014) recommend including large, established employers, smaller, fast-growing companies, someone with extensive management experience, a leader from a connector organization (Chamber of Commerce, Economic Development Board), and a leader from a trade association. Additionally, faculty from postsecondary programs, past students or parents and teachers can all provide good insight to move a program forward. Your advisory board, with their industry knowledge and resources, can help you to set the goals for your individual partnerships.

Purposeful Interactions

Purposeful interactions are powerful, but require upfront effort. In a purposeful interaction, there is a planned reason for the interaction and an educational goal associated with the interaction. While not every interaction will be meaningful, we need to strive to make more of our interactions meaningful. Guest speakers are a common interaction in

the classroom. When bringing in a guest speaker, do we have a clear goal of that 45 minutes of interaction? Is the speaker clear on your goal? Have the students prepared for that interaction and will they follow up on their learning? Too often, a guest speaker is simply filling a spot – leading to bored students and disillusioned speakers. A few small scale examples of making a purposeful interaction include having someone in Human Resources evaluating students' resumes and conducting interviews, salespeople serving as customers and evaluating sales assignments, a local florist performing the role of Career Development Event coach, a retired electrician demonstrating electrical skills, and the welding company providing training and use of a plasma cutter.

Roadblocks

It's easy to see the benefits of industry involvement, but the roadblocks are tough to ignore. Time is an overwhelming roadblock many days. Money for field trips is scarce and quality contacts within the industry are difficult to find.

That's where it comes back to the return on investment. It requires a time commitment. However, that upfront work pays off in the long run. Well-functioning advisory groups will lead you to the resources you need, whether financial, finding the right contact, or finding the supplies you need. Time is a roadblock that will continue to come up. However, with an initial investment of time, this too shall pass. Start small, but start somewhere. While each of

us could come up with countless reasons why we can't do it now, it is truly time to ditch the excuses - for the benefit of you, your students and the industry.

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New Year, New Ideas: Let's Ignite, Inspire, and Innovate Others

by Lori Trovato

PROOF, an Agriculture Education teacher swooshes their magic wand, students are instantly engaged, focusing in on the content for the duration of the class period. This fictional sentence may seem like some far-fetched scene from a movie, but

from dull textbook data to learn content. In my experience, students find inspiration about a lesson when they take metamorphic educational journeys that arise from scrolls, warp back in time, travel to fictional planets in the future, or have them embark on lessons created utilizing a resource not found in any textbook.

scrolls, personally addressed to each student “written” by Queen Ankhesenamun, King Tut’s wife. The scroll had factual data, but delivered it in a way that was adapted to them. This particular scroll contained a bit of fiction, with a tall tale of the mysterious disappearance of the floral designer to the King. In the student-centered lesson, students were asked to warp back in time, research what ingredients went into creating King Tut’s funeral collar and then create it, as their final assessment. Student interest ignited as soon as students saw the scrolls sitting on their desks. Questions started flowing about the scrolls. Once the scroll was read I could see the students’ curiosity flame ignite with the unfurled parchment. The unveiling of the content scribed on the scroll was all it took to catapult what would normally have caused many students to disengage, if I had merely stated “read pages 34-38 in your text book entitled Egyptian Floral Art History and do the questions at the end”, into students inspired through the

With this New Year, I find that even in the ever-busy world of Agriculture Education, I want to constantly reinvent lessons and create new ways to approach content that will invoke enthusiasm in my students.

nonetheless, this type of creative vision may be just what is needed to ignite student enthusiasm, inspire them to create epic projects, and allow teachers to find some innovative creativity within themselves. With this New Year, I find that even in the ever-busy world of Agriculture Education, I want to constantly reinvent lessons and create new ways to approach content that will invoke enthusiasm in my students.

As an Agriculture Education teacher, my mission is to ignite students into being passionate about topics they may have found daunting. I challenge students to conjure up original ideas through lessons that delve into their mind’s eye, with creativity at the forefront. Students embark on epic, innovative missions, transformed

Ignite Through Unexpected Presentation of Data

In my own experience, many students express that they dislike learning history or reading textbook data to any great extent. A repetitive theme uttered from students starts with phrases such as “reading is boring” to finishing with “I took Ag Ed, so I didn’t have to read”, which we all know is a gross misconception. I wanted to change the way students viewed content within the classroom curriculum.

One approach I took to combat issues started when I was creating lessons on floral art history. I transformed textbook data about the history of Egyptian floral art into



same textbook data, presented in an inventive format.

Teacher's Interest Sparks Inspirational Lessons

In my Wildlife Management Class, as well as other Agriculture Education classes, I notice a common thread: Students love to embark on learning through exploration of hands-on scenarios. When my students traverse through the woods behind our school in search of animal sign, such as whitetail deer and black bear, or harvest native plants to learn about animal-plant relationships, the world of school is pretty neat. No extra flair is needed to encourage them to collect data from the wildlife cameras, or engage in an impromptu lesson when unexpected flock of geese laden our soccer field; their metaphoric flame glows. However, when it comes to learning



written facts such as the history of wildlife treaties, wildlife law, regulations, and rote data, I watch

as students' flames dim to a lowly flicker to being practically extinguished.

I decided to delve into my own love of science fiction and utilize my love for table top Role Play Games (RPG) from my teenage years to revisit the way I would approach teaching the history sec-

tion of wildlife management laws and regulations. My hope was to find inspiration, whilst renewing student interest in learning a history lesson. The aforesaid was the catalyst for a fictional world, Planet Linnaeus that I revamped from plant science curriculum I had previously created.

The story encompasses student names, giving them ownership of the experience as they receive messages from the Linnaean people. Students are asked to help the Linnaeans create and negotiate a wildlife management treaty with Lord Phytophthora, ruler of the neighboring planet Botrytis. It gave specific fictional creatures and scenarios, even asking students to give examples of laws from Earth to help validate the treaty. I observed that students

were engaged as they embarked on a this new mission. They learned about our local and federal laws and researched treaties through their own reconnaissance, in order to invent a proper negotiation and proposed treaty to Lord Phytophthora. I found that students seized the fictional scenario, took ownership to create authentic responses

Students love to embark on learning through exploration of hands-on scenarios.

in order to learn the content. I reflected on the positive impact this learning had on the students and thought if they are engaged when I embark on lessons from things that I am passionate about, what if I turn toward their interests?

Innovation through Students' Interests

I find the challenge with engaging some students may all too often be a battle with an invisible force shield looming about the room. I find the force field includes cellphone distractions, high school gossip, sleep deprivation and sheer lack of motivation. This sampling of reagents seem to work against, at times, my best laid plan. Class begins, yet a student is blocked in a haze of whatever anomaly has infiltrated their world.

In addition to me creating fictional worlds or having students warp back in time, I asked myself what are some other ways I could disengage the force field in order

to engage my students? I found myself turning to a resource literally sitting right in front of me, them.

I find when I include student interests and aspirations into part of the lesson content engagement is more attainable. Playing music from a favorite student's band, adding a picture of their favorite movie star, or TV show is the mere catalyst I sometimes need to help transform disengaged or gloomy faces into ones that are hooked into the moment at hand.

I make it a priority to ask students to fill out an index card that I utilize as an invaluable resource for amending and creating new lessons. I ask them to write down interests such as video games, movies, TV shows, and musical interests.

In addition to gathering that initial data, I find engaging in a routine brief conversation at the beginning of the class period accomplishes many wonderful side effects. Mutual rapport and respect grow with each passing day,

accomplishing multiple goals. It provides me with invaluable resources to help with the lesson creations, while allowing me to be more connected with my students. I utilize items, such as the aforesaid notecard together with common knowledge attained during our class warm-up chats to amend written activities to include pictures of their interests, or add in creative adages from their personal curiosities. From my observations, the lessons I amended or created with authentic touch help grab hold of my students' attention. When students walk in the room, only to hear their favorite band playing on the speakers, pick up a vocabulary warm-up sheet with pictures of their favorite TV Star or have a lesson include student's favorite movie character, the evidence of the connection is quickly validated. I hear them share comments with their classmates and me about the unexpected surprises.

Summary

As Agriculture Educators, we have a menagerie of resources to gather amazing lesson ideas that include our own existing curricula, a plethora of educational books, magazines, online and local workshops, videos, and amazing websites such as NAAE's Community of Practice (CoP). Perhaps, we can take all our existing epic resources, delve into our own mind's eye, open the door of creativity to invent or reinvent, anew. By aspiring to fashion new projects and find innovative creativity in ourselves, we may find we have ignited a new love of learning and inspiration for our students as this New Year continues to unfurl.



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Ancient Agriculture in Agricultural Education

by Thomas Hart

Ancient Agriculture in Agricultural Education

Over the past 100 years, archaeologists and anthropologists have uncovered a treasure trove of discoveries surrounding subsistence practices and how humans produce food. These discoveries range from unearthing the origins of wheat and cattle in the Middle East 11,000 years ago to unraveling the complex Milpa farming system used by modern Maya in Central America. Present day agricultural students face challenges such as climate change and shifting consumer demands and may benefit from being able to access and use this information.

Developing a high school program that provides basic knowledge of agricultural history and modern subsistence strategies is important for helping students develop the problem solving skills necessary to search for novel and innovative solutions. Learning about other cultures both past and present would broaden students' worldviews by exposing them to cultures and new ideas that may stimulate innovation and creativity. A program such as this would also provide an excellent foundation for students involved in the FFA global program; a program that shares many of the same goals. Finally, an ancient agriculture program would serve to rein-

roduce many elements of agricultural education that John Hillison in the November/December 2015 (vol 88, issue 3) issue of *The Agricultural Education Magazine* suggests are missing from today's agricultural education programs such as agricultural literacy and academic instruction. In this article I provide several examples of how archaeology and anthropology have positively impacted agricultural practices and how an ancient agriculture program

ture in the Lake Titicaca Basin, Putting Ancient Agriculture Back to Work", archaeologist Clark Erickson (1988) uses archaeology to help the local Aymara and Quechua farmers of Peru resurrect the raised field agricultural strategies used by their ancestors. Between 1981 and 1986 Professor Erickson excavated a series of raised mounds on the northern shore of Lake Titicaca in South America. Through excavations and field surveys, Professor Erickson dis-

Learning about other cultures both past and present would broaden students' worldviews by exposing them to cultures and new ideas that may stimulate innovation and creativity.

would provide students with the tools necessary to use archaeological and anthropological information to solve their own agricultural problems.

Raised Field Agriculture in the Lake Titicaca Basin, Putting Ancient Agriculture Back to Work

Climate change and shifting consumer demands are problems faced by all students interested in agricultural science. Exploring how ancient societies adapted their agricultural strategies to fit their own unique environment may prove useful for students. In the paper "Raised Field Agricul-

covered that ancient people in the region had created these raised fields to maximize crop production in a region that is notoriously poor for farming.

Professor Erickson, however, was not done with his research and conducted a series of experiments in which he worked with local farmers to test his theories on raised field agriculture by creating new, raised fields. These fields were built in the same way as the ancient ones in which dirt was piled up in a line to make a long mound and then trenches were dug beside them to facilitate a canal system. This experiment

turned out to be a great success with the fields helping to mitigate damaging frosts and producing high yields of important local crops such as potatoes and quinoa. The results of this project led to the Raised Field Agricultural Project in 1982 that worked with the Peruvian and Swiss governments to help local farmers adapt this ancient technology to suit their own needs. The ability to search for projects like the one conducted by Professor Erickson is critical for students if they wish to search for ways to tackle their own agricultural problems.

Ritual, Irrigation, and Agriculture in Modern Bali

The research by the cultural anthropologist Professor J. Stephen Lansing (1987) demonstrates how incorporating local knowledge and customs into industrial agricultural systems can help solve environmental problems and boost crop production. In the late 1970s, Professor Lansing began studying the role of ritual meetings in the farming practices on the island of Bali in Southeast Asia. The results of his study showed that irrigation, pest control, and harvest were all part of a complex ritual system that resulted in low pest populations and high crop yields. The brief introduction of Western agricultural practices associated with the Green Revolution during the late 1970s resulted in water shortages, pest infestation, and lower productivity. These problems emerged because scientists had failed to take into consideration the positive impact that these

rituals had on field management strategies. Subsequent reassessment of the industrialized system by the Asian Development Bank resulted in a compromise in which farmers would participate in the traditional ritual system but would use newer, higher yielding varieties of rice. The combination of traditional and modern agricultural strategies in Bali provides an example of how studying and incorporating traditional cultural practices into modern agricultural strategies can have beneficial results.

Ancient Agriculture Program

Developing problem-solving skills in the 21st century is critical for student growth and success. Knowledge of ancient agricultural strategies would provide students with a range of templates to choose from when developing

terdisciplinary program in which students would use knowledge gained in different classes to try and answer a specific challenge proposed in their agricultural ed-



ucation course. The end result of an ancient agricultural program would be for students to be able to tackle their own agricultural problems using anthropological, archaeological, and/or historical resources.

An excellent model for this thematic program is the World History Project at the West Perry Middle School in Ellitsburg, Pennsylvania. The World History Project began in 1994 and was

Developing problem-solving skills in the 21st century is critical for student growth and success.

agricultural strategies that best suit their needs. The Ancient Agricultural Program would be an in-

the brainchild of 8th grade history teachers Victor Hart Jr. and Steve Johnson. This project revolves around the themes of civilization

and archaeology in which students learn about ancient civilizations, reproduce ancient artifacts, and then recover and analyze them in a simulated dig at the end of the school year.

The World History Project is divided into two parts, understanding and reproducing elements of ancient civilizations, and studying archaeological methods. In the first part, history students study institutions such as religion, government, families, economic systems, and burial practices of ancient civilizations in Europe, the Middle East, East Asia, North Africa, and the Americas. While this is going on, each class is randomly assigned a civilization and institution to learn about in more detail. The students then work with their art programs to reproduce many of the artifacts that would be found within that particular institution and civilization.

In the second part of the World History Project, the students learn about the methods used in archaeology and then get a chance to put these skills to the test. The students take the knowledge of their civilization and design what they would expect to find if they were excavating that civilization. Each class then goes out behind the middle school and lays out their artifacts in predug squares. The squares are then covered over with dirt and now serve as brand new archaeological sites. Each class is then assigned a square from one of the other history classes to excavate using the skills they learned in the classroom. By assigning

them a different square, each class does not know which civilization and institution they are digging up. Mathematics and geometry curriculum comes into play here as they apply the skills they learned in those classes to triangulate the locations of the artifacts that they recovered and record their locations on their maps. Once they have excavated their unit, they then collect the artifacts and begin to figure out which civilization and institution they have recovered. The results of their projects are then submitted as book reports in their English class.

The World History Project has made a positive impact on students learning history in the West Perry School District and continues to this day long after Mr. Hart and Mr. Johnson have retired. A similar interdisciplinary program could be developed for learning about ancient agriculture in agricultural high school classes using the World History Project as a model. This program could provide the basic knowledge of different subsistence strategies within different ecosystems around the world and then challenge the students to solve some sort of problem that arises within these ecosystems. These students could then test these solutions in a laboratory or greenhouse setting ultimately writing up a paper or poster to be presented at a 4-H or FFA conference. The end result being that the students are given the rote knowledge and the critical thinking and problem solving skills to explore the greater world

around them and develop solutions to modern day challenges facing agriculture.

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New Perspectives on Teaching GMOs

*By Michael J. Martin, Kellie Enns,
and Kathleen Stewart*

Genetically Modified Organisms (GMO) have become the subject of many heated debates as technological improvements allow agriculturists to provide for an ever-changing world with increasing food demands. The topic of GMOs elicits a wide range of emotion and argument between groups of agricultural representatives and the general public. Agriculture teachers are on the forefront of these debates as they educate students on the facts of GMOs and prepare students to become knowledgeable advocates for agriculture. These tasks may seem simple but emotions surrounding the public GMO debate can complicate the debate. Agricultural education teachers should not shy away from the emotions surrounding GMOs. Instead, their goal should be to use these emotions, whether they be in favor of GMOs or against GMOs, to facilitate an effective discussion.

A recently conducted study of high school students' GMO knowledge (Stewart, Martin, & Enns, 2015) asked one open-ended question and 10 multiple choice questions. The questions were grounded in data from USDA fact sheets and reviewed by content experts. Fifty-seven students from two different high school agriculture programs, representing all grade-levels, were surveyed. The results were surprising. The

open-ended responses revealed that a majority of high school students had some GMO knowledge, but they struggled to develop a logical argument without drawing on some emotional premise. The students averaged only 30% correct on the multiple choice portion of the survey.

From this study, we learned that most students have limited knowledge to factual information on GMOs. As evidenced by the responses to the open-ended question, most students were basing their position on GMOs solely off of talking points they had heard. Very few students were able to validate their opinions with facts. This study was only a localized view of high school students' GMO knowledge. Therefore, we cannot make assumptions and argue that all high school agriculture programs lack a solid GMO knowledge-based curriculum;

has been developed to provide students with information on GMO technology—without ignoring the emotions surrounding GMOs. This balance of logic and emotion will help initiate educated conversations that allow proponents and opponents to share their ideas and reach new conclusions about the viability of GMO technology. We ignore the “middle ground” and instead empower opposing views in a respectful manner backed up with substantiated information.

One goal in agricultural education may be to encourage skilled agricultural advocates; therefore agriculture students need to have a sound factual background on GMOs, the ability to differentiate between a logical and emotional argument, and the communication skills to conduct productive dialogue on the issue. To do so, agriculture teachers need to explain the differences between emotions

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however, we believe that these findings reflect the views of agriculture students across the country, and it also raises a challenge as to how agriculture teachers can improve GMO education.

Utilizing a balance of perspective and logic, a new curriculum

and facts and assist students to develop a strong GMO argument—regardless of whether they support GMO development or not.

Students must be exposed to fundamental facts about GMOs, which present the complex nature of genetic engineering and the

agricultural production of such organisms. Even this base knowledge is often absent in conversations on the issue. These facts are from various USDA factsheets.

1. Plants and animals have been genetically modified for thousands of years by humans. However, genetic engineering is much different than genetic modification as genetic engineering involves taking specific genes from one organism and placing them into a different organism.
2. GMOs have been developed to have special traits that enable crops to be more resistant to pest and diseases, which, subsequently, increases crop yield.
3. GMOs have been developed that have special traits that enable crops to have a higher nutritional value.
4. The use of GMO crops that require powerful chemicals to kill pests have created some unintentional mutations in certain pests which has resulted in their resistance to the chemicals.
5. GMO crops have been created for third world countries that would improve the quality of life in these developing countries.
6. The system of patents that regulate GMO seed use has created economic relationships between the farmer and seed corporations

that is unique in American agricultural history.

7. No repeated and rigorous research has been able to prove that GMO crops and their food byproducts are dangerous or unhealthy for humans and animals to eat.

While these facts are important for students to understand, few students may pick up a USDA Factsheet to read through the in-

formation. Rather, agriculture teachers should discuss the context and implications of these emotions for both supporting and condemning arguments.

The emotional examples can be difficult conversations for agriculture teachers to have with their students. The teachers and students may have strong emotions on GMO issues that can complicate how they think about the topic. Teachers must be diligent and

The ultimate goal for agriculture teachers should be to educate students to have meaningful dialogues about GMOs based on fact despite the emotion that so often creeps into these discussions.

formation. One way to open conversations with students may be to provide an Infographic with condensed facts to spark questions and conversations.

Once the students develop a firm comprehension of GMO facts, teachers can then begin to cover the emotional issues surrounding GMOs. To enhance this portion of the lesson, strong opinions on opposing ends can be explored off of different YouTube video clips. Each of the facts listed above will most likely elicit an emotional response from any interested party—this emotion is fine and to be expected. However, the strong emotions and values that accompany GMOs often overshadow the facts regarding GMOs. This reality should not be

thorough in their instruction of the differences between GMO facts and emotions. Teachers must also be honest about their views and intention in the instruction. Instructional methods on effective skills in listening, conducting factual research, and communicating findings should also accompany the discussion on the topic.

GMO conversations can be challenging, as the discussion topics often stray from fact into the realm of emotion. When discussions are emotion based, the educated conversation often becomes a heated defense of one's own opinions—whether the opinions are based on fact or not. The ultimate goal for agriculture teachers should be to educate students to have meaningful dialogues about

GMOs based on fact despite the emotion that so often creeps into these discussions.

In an effort to expand the understanding of many contentious issues in agriculture, GMO is one of ten different curriculum lessons that has been created to help enable knowledge and emotion around agriculture topics. These are included in a curriculum promoted by the Colorado Young Farmer Educational Association (CYFEA) called “A Call to Action: A Curriculum to Ignite Agriculture Issues and Agriculture Values.” Useful for high school students, adults or community members; this curriculum is designed to explore and engage agriculture stakeholders in challenging conversations on differing values and issues in agriculture. This curriculum is designed to value differing opinions, challenge beliefs and encourage individuals to promote agriculture in unique ways. The curriculum has been successfully used in agricultural education classrooms, in agriculture community groups and in non-agriculture groups as well. Links to the curriculum requests can be found at <http://www.cyfea.org/a-call-to-action-assessing-agriculture-values>. Topics such as organic agriculture, the age of the American farmer, clean energy, antibiotic use in livestock, food access, and high fructose corn syrup are also included in the curriculum modules.

As the agriculture industry continues to evolve and expand in its methods and practices, those on

opposing ends of the agriculture values will have their viewpoints challenged. When this happens, we often see conflicts arise from a place of deep emotion and values. Through teaching about agriculture values and using an approach of both logic and perspective, taking on the issues of agriculture, such as GMOs, we encourage students to understand their stance, and to back it up with a practical base knowledge. This curriculum will encourage students to not give the rote emotional responses often perpetuated in agriculture, but instead to understand where other values come from and to learn to be an effective advocate for their viewpoint. “A Call to Action” curriculum will be a curriculum tool to enable just such skills.

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Teach Local: Incorporating the Local Food Movement into Agricultural Education Curriculum

by Sarah LaRose

Over the past ten years, the local food movement has gained significant traction in many communities across the United States, attracting more consumers to learn about the source of their food, and creating an opportunity for School-Based Agricultural Education to garner support and community involvement. Likewise, it also creates an opportunity for the local agricultural education program to provide educational outreach to their local community. Since agricultural education programs “should be designed to meet the needs of the local community” (Talbert, Vaughn, & Croom, 2005, p. 86), agriculture education instructors should regularly evaluate the needs of their community to determine if the agriculture education program is indeed meeting those demands. Agricultural education programs incorporating and addressing aspects of the local food movement into their curriculum and programming have the potential to gain new support and interest in supporting School-Based Agricultural Education and FFA, as well as providing relevant learning opportunities for students preparing for careers in agriculture.

Responding to the Changing Agricultural Economy

While I worked as an agricul-

ture education instructor at the Ellis Clark Regional Agriscience and Technology Program at Nonnewaug High School in Woodbury, Connecticut, I noticed an increasing number of farms in the area had

farms. In subsequent years, it has grown to provide a wide range of programming offerings in animal science, ornamental horticulture, natural resources, and agricultural mechanics, but the last time

Agricultural education programs incorporating and addressing aspects of the local food movement into their curriculum and programming have the potential to gain new support and interest in supporting School-Based Agricultural Education and FFA, as well as providing relevant learning opportunities for students preparing for careers in agriculture.

revised their production methods, products, services, and marketing strategies in order to capitalize on local markets. In particular, fruit and vegetable production was becoming a more common practice of area farms, with many converting from exclusive dairy production to small-scale diversified crop operations. More and more of the SAE projects that I was visiting focused on direct-to-consumer sales of produce such as farmers’ market sales and Community Supported Agriculture (CSA) business models, and some program graduates were the employers of these students. Nonnewaug’s agricultural education program began in 1920, originally focusing on educating young men returning to work on their parents’ dairy

that curriculum offerings focused on fruit and vegetable production was over thirty years ago!

In response to the growing industry trend towards localized food sales, I created and implemented a Local Food Production curriculum within the agriscience program beginning in the fall of 2012. The course has grown from a single unit within the scope of a sophomore livestock production class, to an independent sophomore class, to now an independent junior/senior course offering in addition to a sophomore class. During this time our school constructed a hydroponic greenhouse and I obtained a National FFA Food For All Grant to begin a school garden. Both the garden and the greenhouse now supply



Students in the Jr/Sr Local Food Production class pose with the 75 hydroponic tomato plants and lettuce during a visit from National FFA Officer Caleb Gustin. (LaRose Images)

produce to the town's food bank along with the school's culinary arts classes, school cafeteria, and most recently a few different restaurants. As a result, new community partners have been brought on board to support the programming offered by the agriscience program.

Local Food Curriculum

The curriculum was constructed based off the feedback from advisory committee members, SAE employers, agricultural organizations throughout the state, as well as previously existing syllabi from community colleges, junior colleges, and two-year associate's degree programs. Initially, a nine-week sophomore class was written, followed by one year of a two year alternating junior/senior class.

Unit content for each of the courses are as follows:

Sophomore Class (9 weeks)

Junior/Senior Class (1 year)

- What is Local?
- Soil Science
- Crop Production
- Harvest, Processing, & Preservation
- Hydroponic Food Production
- Garden & Greenhouse Maintenance
- Introduction to Local Food
- Production Methods
- Food Quality & Safety
- Winterization of Outdoor Facilities
- Hydroponics
- Garden Planning & Preparation
- Spring Maintenance
- Principles of Composting
- Facility Planning & Design

Students are engaged in a variety of activities involved with planning, planting, maintaining, and harvesting produce in both the hydroponic greenhouse and the school garden. They also participate in field trips to area farms and businesses, deliver produce to the town's food bank, assess food labels at the grocery store, and design their own farms and food safety protocols in accordance to Good Agricultural Practices (GAP). Perhaps one of my favorite things to do with students as a part of this curriculum was teaching them how to use the food they grew by cooking together! Using

in-season vegetables we grew as a class, we made vegetable pizza and a side salad, sometimes accompanied by bruschetta or sautéed Swiss chard. Allowing students to complete the full farm to table process provided them with a more holistic view of food production, as well as helping to emphasize the need for producers engaged in direct-to-consumer sales to be able to make cooking recommendations for their products to consumers.

How the Program was Implemented

During the first year of the project, two area businesses donated supplies and seedlings, and two local chapters of the Connecticut State Grange donated seeds and seed potatoes to be grown in our newly constructed Food For All school garden. Two student volunteers managed the garden as their SAE project, but since that first year, the school garden is now an SAE site for approximately ten students each summer. The school constructed a hydroponic greenhouse which was the main vehicle for delivering instruction regarding production and harvest of produce during the winter months. During this time, I attended workshops hosted by the Connecticut Northeast Organic Farming Association (CTNOFA) and the Connecticut Farm Bureau regarding marketing and production of local food products.

While at some of these events, I noticed that a majority of workshop attendees had never heard of

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Citizen Science--Inquiry in Action

by Darla J. Romberger

Agriculture programs are known for equipping students with problem-solving abilities, industry experience, and communication skills through classroom instruction, FFA, and SAE programs. The hallmark of Agriculture Education is incorporating hands-on activities into our curriculum that allow students to apply content knowledge in a practical way that connects to the real world. Classrooms frequently utilize open-ended problems and weave various levels of inquiry-based instruction into student projects allowing students to construct their own understanding of technical content knowledge. However, the majority of these skills are learned at the local level (i.e. in our own programs) and students may not get to see the regional, state, or national perspective for a given topic or issue. Integrating a Citizen Science project into the local Agriculture program has the possibility to allow students to experience agriculture in other regions, states, and even across the globe while learning how to communicate professionally and collaborate with other students in a scientific environment.

Citizen Science 101

Citizen Science is defined as scientific inquiry that is conducted, in whole or in part, by amateur or non-professional scientists (Bonney et al., 2009). Some researchers desire data collection over long spans of time and in a vari-

ety of locations to develop long-term trends or monitor changes in a particular habitat or population. In an effort to collect necessary data in a reasonable time frame, researchers will sometimes call upon the general public, science classes, or interested groups to serve as investigators in a large research study. Researchers will develop user-friendly methodologies and create field-tested booklets or webpages that outline the procedures to collect and report data to their organization. Great care is taken to insure that instructions are not intimidating so volunteers of all ages and abilities can participate in the research project and still report reliable data that can be published within the scientific community.

Inquiry-based instruction offers the construct that classrooms should shift toward student-centered learning with open-ended, hands on activities (Colburn, 2000). Although agricultural educators have been utilizing IBI in their curriculums for some time (due to the real-life application of content through agricultural contexts), citizen science can easily become another method to include IBI in classroom settings. Due to the open-ended nature of citizen science experiences, students become engaged in a project that does not have a known outcome. In some cases, even researchers developing the study are unaware of the trends that may be revealed during the research project. With students involved in daily or

weekly data collection, graphing trends, and reporting their data to the researchers, citizen science projects are an excellent example of a student-centered activity that offers endless potential for the student to become engaged in real-life application of agricultural content.

Many benefits can be realized by implementing a Citizen Science project into a secondary agriculture education curriculum. The most tangible benefit is a real-life application of the scientific method with a heavy emphasis of data collection and data analysis. Although students do not take part in designing the research project, educators can emphasize the importance of accurate measurement, recording adequate detail, and contributing to a community of learners—all of which provides an extra motivation for students to “buy-in” to the project. Citizen science projects may also provide a new perspective for students who traditionally do not enjoy science. Some students may perceive science being completed in an isolated location by highly educated individuals with years and years of experience in a laboratory setting. With many citizen science projects being completed in everyday settings (such as woodlands, backyards, and outdoor classrooms), students can develop an attitude of “I can do science” which improves student self-image and can positively influence student participation in classroom activities (Raddick et al., 2009).

Global Awareness to Global Contribution

Citizen science projects can serve numerous purposes in the classroom—from a way to engage disinterested students to an independent study project for an advanced student. However, these unique projects offer a larger opportunity to broaden the educational experiences for students beyond the classroom walls. Although numerous classroom activities allow students to apply content from other academic areas in an agricultural context, many times students are unaware of how agriculture varies throughout their state, country, or continent. As the world continues to become more interconnected, it becomes imperative to take a global view of agriculture. Linda Cook offers a “Global Science Education Continuum” that provides six opportunities for educators to integrate a citizen science project into their classroom. A project could encompass multiple portions of the continuum or chose to focus on a given section to enhance classroom learning (Cook et al., 2015).

- **Global Awareness**-Students can utilize tools such as Google Earth and ArcGIS to compare the geographic and topographic differences of other individuals participating in the same citizen science project.
- **Parallel Activity**-Classrooms participate in a given project on the same day knowing they are contributing to a singular cause. An example could be a global celebration of Earth

Day with classroom across the country participating in water quality studies simultaneously and reporting results to a researcher.

- **Shared Data**-Participants can share data to a common location (commonly a website). Any group contributing data is allowed to view data reported by other groups as a means for comparing and contrasting results. Comparing and contrasting data is an excellent opportunity to facilitate discussions on global comparisons.
- **Limited Communication** - Various classrooms participating in the same project reach out to one another via asynchronous (letters, emails, or videos) or synchronous (Skype, Google Hangouts) communication. Depending upon the reliability of technology, teachers choose the best method for students to share their observations and offer a description of their geographic locations and surroundings.
- **Engaged Collaboration**-This portion of the continuum involves more frequent communication between classrooms and extensive face-to-face collaboration. Additionally, classrooms may share data on a joint blog, classroom website, Social Media outlet, or Google Doc to add to real-time communications.
- **Global Contribution**-At the end of the project, students may find a way to give back to the local or global commu-

nity. Contributions could be anything from an international service trip, sharing project results with legislators that may influence policy, or creating an exchange program between participating classrooms.

Relevant Projects for Agricultural Science

There are several established citizen science projects that can be integrated into existing coursework with little difficulty. Numerous projects are involved in observing wildlife populations while others may send citizen scientists a research kit to utilize during the study. Three relevant projects are highlighted below and a complete listing of projects can be found in the table at the conclusion of this article.

GMO Corn Experiment-Have you ever wondered if animals have a preference about GMO versus non-GMO crops? This project sends citizen scientists ears of field corn to set in their backyard and observe if wildlife have a preference of GMO or non-GMO corn.

World Water Monitoring Challenge-In an effort to protect and monitor the Earth’s freshwater, classrooms and individuals can request water kits from the organization to collect data and share their results with participants in over 51 countries. “Water Champion” awards have even been created to encourage participation.

Great Backyard Bird Count-Outdoor enthusiasts of all ages are encouraged to spend as little as 15 minutes per day (or more if they

wish) observing bird populations in their backyard. Participants are asked to report their findings during the project's time frame, which is usually February of each year. Data reported online helps researchers at the Cornell Ornithology Lab and the National Audubon Society track bird populations the changing environment around us.

Citizen Science projects offer limitless potential for inclusion into the secondary agriculture classroom and integration can appear in many different forms. From sharing data with classrooms across the globe to developing an appreciation for changing wildlife populations in a specific region, citizen science is another option to integrate rating

real-life, hands-on activities that develop a student's ability to think critically, examine data, and make connections to agricultural issues in the 21st century.

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Citizen Science Project List	
Budburst	www.budburst.org
eBird	www.ebird.org
eMammal	www.emammal.si.edu
Cornell Ornithology Lab	www.birds.cornell.edu
Great Nature Project	http://greatnatureproject.org
GMO Corn Experiment	https://experiment.com/projects/the-gmo-corn-experiment
HerpMapper	www.herpmapper.org
iNaturalist	www.inaturalist.org
JASON Project	www.jason.org
SciStarter	http://scistarter.com
Shark Tracker	http://oceanresearch.org/#SharkTracker
Project Noah	www.projectnoah.org
REEF	http://www.reef.org/db/reports
World Water Monitoring Challenge	www.worldwatermonitoringday.org
Zooniverse	www.zooniverse.org/projects

Teach Local (continued from page 23)

school-based agricultural education programs, and identified the need to create a relationship between our program and these organizations. Members of the advisory committee were instrumental in helping to build new relationships with other area stakeholders. As a result, we were able to engage twelve new members as part of the advisory committee to help direct and shape the work of the Local Food Production curriculum. New members included area farmers, as well as a grocery store owner, produce manager, and a chef/restaurant owner. These new supporters were eager to support Woodbury FFA Chapter and the efforts of the Local Food Production class and as of October 2015, Woodbury FFA Grown produce has been featured in two restaurants, a high-end resort, a grocery store, the Woodbury Food Bank, and the school cafeteria. Produce from the school's greenhouse and garden has brought new awareness to the program from new stakeholders who previously had not heard of the program, and over 4,000 pounds of produce has been donated to the food bank. Additionally, Woodbury FFA members have been invited to attend the Winter Conference of CTNOFA, where they have been able to make new connections with SAE employers and spread awareness of the FFA and its mission.

The latest impact of these new relationships was the establishment of a Farm to Table Dinner Fundraiser for the FFA Chapter,

which featured four premier area chefs preparing locally grown food. The dinner was hosted at the school, and ticketholders were treated to a tour of the agriscience program facilities by Woodbury FFA members prior to eating. The event was wildly successful, garnering several thousand dollars in donations from over one hundred attendees, most of whom had never visited the school before. Furthermore, even more positive press about the program was generated as a result.

Implications

Agricultural education programs have the potential to harness new supporters by harnessing the energy and interest of those newly interested in food production. Though each program is situated in a unique community, "forming key partnerships with parents, knowledgeable individuals, businesses, groups, and other volunteers is a key to local program success. Partnerships allow the community the privilege of being a part of the agricultural education program and provide resources to make the program stronger" (Talbert, Vaughn, & Croom, 2005, p. 110). Capitalizing upon the current local food movement led to increased community engagement and support for our agricultural education program, as well as new SAE opportunities for students and educational resources for the agriculture education staff. Imagine what this approach could do for your program!

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