



NEW HORIZONS

WINTER 2018 TEACHING GUIDE



IN THIS GUIDE, YOU WILL FIND ACTIVITIES FOR SIX ARTICLES IN THE WINTER 2018 ISSUE OF FFA NEW HORIZONS. ANSWER KEYS ARE AT THE END OF THE ACTIVITY WORKSHEETS. THE ACTIVITIES ARE ALIGNED TO EDUCATIONAL STANDARDS. (SEE EACH ACTIVITY FOR THE SPECIFIC STANDARDS.)

SCHOLARS SAY...

A compiled list of discipline-specific or academic vocabulary found throughout this issue of FFA New Horizons:

Communication
Broadcasting
Scholarship
Recommendation
Documentation
Growing medium
Hydro
Hydroponics
Nutrition
Ponos
Autonomous
Phenotyping

Robot
Regenerative agriculture
Practitioners
Ecology
Nurture
Map interpretation
Timber estimation
Consecutive
Evaluation
Native
Incorporate
Devote

VOCABULARY ACTIVITY

Vocabulary scavenger hunt: Type the definition of the vocabulary words and number them. Print and hang the definitions around the room so that students will have to "find" the definitions. Students will then move about the room to find the definitions. On their own numbered paper, students will write down the vocab word when they find a definition. The student who brings you his or her paper first with the most correct answers wins! (Ex. If Johnny turns in his paper first and misses three and Susie turns her paper in second and only misses one, Susie wins.)



A Call to Communicate:

Someone in an agricultural communications career relays information about the agriculture industry to a specific audience. Learn how one student found her calling in this high-demand field and how you can find your way into the same career.

[Appendix 1: A Call to Communicate](#)



Apply Yourself:

Did you know National FFA awarded over \$2.5 million in scholarships in 2018? Read about the National FFA scholarship program and how you can prepare yourself to apply for scholarships.

[Appendix 2: Brag About Yourself](#)

[Appendix 3: Recommendations](#)

[Appendix 4: Thank You](#)



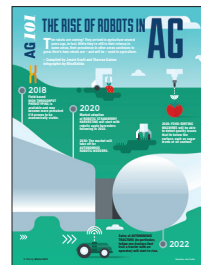
Out-of-the-Box Agriculture:

Did you know that you can grow plants without soil? Learn how one innovative chapter is "thinking inside the box" to learn about agriculture and feeding a growing world.

[Appendix 5: I Can Grow Food Without Soil?](#)

[Appendix 6: Climb out of the Box ... or Is It In?](#)

[Appendix 7: Putting Our Knowledge to Work](#)



The Rise of Robots in Ag:

Robots in agriculture have been slowly enhanced and implemented for many years and will continue to be. However, did you know the way that robots are being utilized in agriculture is becoming a "hot-button" topic? Learn how robots have changed, and will change, through time and what that means for the agriculture industry.

[Appendix 8: Rise of the Robots](#)



From the Ground Up:

Do you know what regenerative agriculture is? Kate Indreland is exploring this topic and recently landed a \$10,000 prize as a finalist in the General Mills Feeding Better Futures Scholars Program. Read this article to learn how her interest in this topic has allowed her to travel around the world and discover related career opportunities.

[Appendix 9: From the Ground Up](#)



The Future of Forestry:

Learn about a forestry-related supervised agriculture experience (SAE) program in this article! Read how Hendrix Paterson got involved with activities related to forestry and how his SAE was developed with support and assistance from a community member.

[Appendix 10: The Future of Forestry](#)



NEW HORIZONS

WINTER 2018 TEACHING GUIDE

CAREER Success

A CALL TO Communicate



ARTICLE SUMMARY

A Call to Communicate

The article "A Call to Communicate" discusses how one student found her enjoyment for agricultural communications through the FFA New Horizons magazine. Julie Groce explains the career of agricultural communications and her journey into the profession.

BELL RINGER:

What is agricultural communications?

DISCUSSION QUESTIONS

1. What role does agricultural communications play in the industry of agriculture?
2. Where could you work if you had a degree in agricultural communications?
3. What skills could you gain by competing in the agricultural communications career development event (CDE)?

ACTIVITY

Students should first complete the bell ringer activity listed above. Have students answer the bell ringer question on their own paper. Once all students have written down an answer, have them discuss and explain their answers with their neighbors. After five minutes, call on a few students to share their answers. Generate a list as a class.

Have students read the article "A Call to Communicate" and then complete the related worksheet (Appendix 1). The activities in Appendix 1 require internet access. Students should explore FFA.org to learn about the agricultural communications CDE.

After students have completed the worksheet, they should go to AgExplorer.FFA.org to learn about associated careers. Have students complete the exit ticket.

FFA TIP

Create flyers, utilize social media and write articles for the local newspaper to communicate about agriculture to your school and community.

SAE TIP

Have your students define agricultural communications and list careers in the field.

What are the skills needed for a career in agricultural communications?

How can your students develop these skills through their existing SAEs?

What local SAE opportunities are there in agricultural communications?

- o Local newspaper
- o Local radio station
- o School newspaper, radio or television station
- o Web-based

VOCABULARY

Communication
Broadcasting

EXIT TICKET

How can you communicate the message of agriculture and FFA throughout your school?

CAREER FOCUS AREA

All areas

RELATABLE WEBSITE

AgExplorer: AgExplorer.FFA.org

FFA: FFA.org

RESOURCE HIGHLIGHT

Visit AgExplorer, AgExplorer.FFA.org, to learn about unique careers in agriculture!

APPENDICIES

Appendix 1: A Call to Communicate

STANDARDS ALIGNMENT

• **AFNR Performance Element:** CS.02, CS.05 • **FFA Precepts:** FFA.PL-A, FFA.PL-C, FFA.PL-E, FFA.PL-F, FFA.CS-N • **Common Career Technical Core:** AG2, AG5 • **Common Core-Speaking and Listening:** CCSS.ELA-Literacy.SL.9-10.2 • **Common Core-Literacy in Science & Technical Subjects: Writing:** CCSS.ELA-LITERACY.WHST.9.10.4 • **AFNR Career Ready Practices:** CRP04, CRP06 • **P21 Skills:** Communication, Critical Thinking and Problem Solving, Initiative and Self-direction

A CALL TO Communicate

This FFA alumna credits the organization – and this magazine – with helping her uncover her path to professional success.



It was an *FFA New Horizons* article, much like the one you're reading now, that helped Julie Groce determine she wanted to pursue a career in agricultural communications.

Groce, a second-generation FFA member and former member and past president of the Hillsdale FFA in Jeromesville, Ohio, was interested in agricultural broadcasting and competed at the state level in Creed speaking and prepared public speaking leadership development events. She didn't realize her passions and talents could easily be transformed into a rewarding career. She remembers flipping through *FFA New Horizons* and landing on an article that outlined the career possibilities

in agricultural communications, and that was when she knew it was the path for her.

"I was so excited to discover that people in ag communications often wrote about agriculture or worked on the broadcasting side, because both of those sounded perfect for me," Groce says. "After reading that article, a light bulb went off for me, and I got even more involved in FFA. I became my chapter's first female president and served

in that role during my junior and senior years. During both of those years, I was also selected to participate in the National FFA Band."

Groce went on to major in agricultural communications at Ohio State University. As she was earning her degree, she landed an internship as a farm broadcaster with the National

FFA Organization at the 1987 National FFA Convention.

"As an intern, I interviewed some really interesting people, including celebrities and National FFA Officer candidates, and it really solidified my interest in ag communications," Groce says.

After graduating with her bachelor's degree in 1989, Groce moved to North Carolina and began her first job as a client services manager at a public relations and marketing agency. Since then, her career has evolved as she's taken on roles at Syngenta, Novartis Animal Health U.S., Elanco and the North Carolina Association of Soil and Water Conservation Districts. Groce now serves as the manager of communications and content marketing for the U.S. pork and poultry division of Zoetis.

Although it's her hard work that's gotten her where she is today, Groce credits FFA with helping her find success. She continues to give back to the organization as a mentor and has served on the North Carolina FFA Foundation Board of Directors. She's even passed her love for FFA down to her daughter, a third-generation member who is also pursuing a career in agriculture.

"It's important for me to remain involved with FFA because the organization has given me so much," Groce says. "The leadership and communication skills I learned have benefited me throughout my career; the lessons I learned in FFA have never left me."

To learn more about careers in agricultural communications, visit **AgExplorer.FFA.org**.

– By Jessica Walker Boehm

NAME: _____

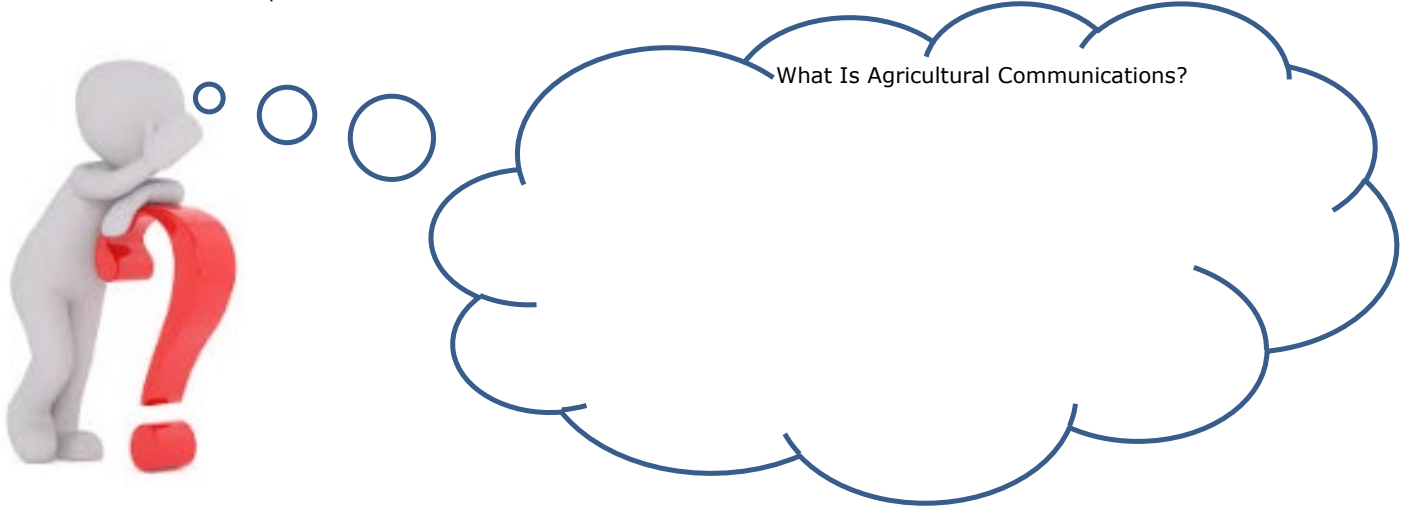
Aligned to the following standards:
CS.02; CS.05; FFA.PL-A; FFA.PL-E; FFA.PL-F; FFA.CS-N; AG02; AG05;
CCSS.RI.9.10.4; CCSS.SL.9.10.2; CCSS.WHST.9.10.4; CRP.02; CRP.04; CRP.06

Appendix 1: A Call to Communicate

Created: Winter 2018 by the National FFA Organization

DIRECTIONS:

Begin reading the article "A Call to Communicate" in the winter edition of *FFA New Horizons* and complete the following activities. Internet is required.



DIRECTIONS:

Go to the National FFA website (FFA.org). Click on Explore FFA and select Career and Leadership Events. Read through and select a career and leadership development event that would utilize the skills you would need and best prepare you for a career in agricultural communications. Learn about that event through the provided resources and record responses below.

National FFA strives to help prepare youth to be successful in their future careers. Which career and leadership event would be the BEST preparation for a career in agricultural communications?

Why did you select this event?

What are the different parts of the identified career and leadership development event?

1. _____
2. _____
3. _____
4. _____
5. _____



NAME: _____

What skills do you learn in the agricultural communications CDE? Identify as many as you can.



How can you apply these skills to interactions with friends?

How can you apply these skills to your extracurricular activities?

How can you apply these skills in your math or English class?

Skills for the Future

DIRECTIONS:

Go to AgExplorer.FFA.org to learn about careers associated with agricultural communications. Identify and describe three careers that you could have if you were to earn an agricultural communications degree in college.



In complete sentences, describe why the field of agricultural communications is important and how students completing a degree in this area could prepare for their career goals.



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WINTER 2018 TEACHING GUIDE



ARTICLE SUMMARY

Apply Yourself

Each year the National FFA Organization promotes learning beyond high school by offering a scholarship program to help students pay for their post-secondary training and education. In 2018 alone, the National FFA Organization awarded \$2.5 million in scholarships to 1,842 members in 44 different states. Get ready to "Apply Yourself" to prepare for the future.

BELL RINGER:

What is a scholarship? Why are scholarships beneficial?

DISCUSSION QUESTIONS

1. What is a scholarship?
2. Where does scholarship money come from?
3. How can you effectively apply for a scholarship?
4. Why might you need a recommendation letter for a scholarship?

ACTIVITY

Students should complete the bell ringer activity listed above on their own paper. Once all students have written down an answer, have them discuss and explain their answers with their neighbors. After five minutes, call on a few students to share their answers. Generate a list as a class. Students should read the article "Apply Yourself" and complete the "Brag About Yourself" worksheet (Appendix 2). This activity does not require internet access.

Next, hand out the "Recommendations" worksheet (Appendix 3) to students. Students will then watch the video "Asking for a Letter of Recommendation." Have students complete the worksheet. Internet access is required for this activity.

Students will now learn how to construct an appropriate thank you letter for their recommendation letters. Hand out the "Thank You" worksheet (Appendix 4) to students. Internet access is required for this activity. Have students go to www.aresearchguide.com/professional-thank-you-letter.html and learn how to compose an appropriate thank you letter. Students will then compose a thank you letter for one of the individuals that they selected to ask for a recommendation.

Students should complete the exit ticket on their own paper. Have students share their experiences with the class if there is time.

FFA TIP

Utilize the FFA Resume Generator to help students compile their accomplishments to create a working resume.

SAE TIP

Help students select scholarships for which they have an advantage or are qualified because of their supervised agricultural experience (SAE) programs.

Expose younger students to SAE-based scholarship opportunities so they can explore interests and plan future SAE programs to maximize scholarship opportunities.

VOCABULARY

Scholarship
Recommendation
Documentation

EXIT TICKET

Why should you keep track of your accomplishments and maintain professionalism throughout high school?

CAREER FOCUS AREAS

All areas

RELATABLE WEBSITES

National FFA Scholarship application:
FFA.org/participate/grants-and-scholarships/local-engagement-programs-scholarships/

RESOURCE HIGHLIGHT

Research Guide: <https://www.aresearchguide.com/professional-thank-you-letter.html>

APPENDICIES

Appendix 2: Brag About Yourself
Appendix 3: Recommendations
Appendix 4: Thank You

STANDARDS ALIGNMENT

• **AFNR Performance Element:** CS.01 • **FFA Precept:** FFA.PL-A.Action, FFA.PL-C.Vision, FFA.PL-F.Continuous Improvement, FFA.PG-J.Mental Growth, FFA.CS-N.Decision Making • **Common Career Technical Core:** AG1 • **Common Core-Reading: Informational Text:** CCSS.ELA-Literacy.RI.9-10.2 • **Common Core-Literacy in Science & Technical Subjects: Writing:** CCSS.ELA-Literacy.WHST.9.10.4 • **AFNR Career Ready Practices:** CRP02, CRP04, CRP05, CRP06

APPLY *Yourself*

FFA SCHOLARSHIPS ARE DESIGNED TO FIT EVERY MEMBER'S INTEREST. GIVE THEM A TRY!

Did you know the National FFA Organization awarded \$2.5 million in scholarships in 2018, consisting of aid to 1,842 members from 44 states? That's a lot of cash for college! Since FFA members come from a wide variety of backgrounds, the FFA scholarship program exists to help students achieve success in a large number of fields in agriculture. The top five areas awarded are agribusiness systems; animal systems; power, structural and technical systems; plant systems; and biotechnology systems.

Ready to get started? Now's the time. The 2019 scholarship application opened on Nov. 15, and the deadline to apply is Feb. 6, 2019.

The 2019 FFA scholarship application is on a new platform that will provide a more robust experience for applicants. You'll be able to log into your password-secure account from any device with an internet connection, check the status of your application in progress, save your progress and return to complete your application, and upload required materials directly to your application. Submit just one application, and you'll be considered for all scholarships whose criteria you meet.

Visit FFA.org/Scholarships for more information and to apply. If you have questions, email Scholarships@FFA.org.

— By Jodi Helmer

CALENDAR

Nov. 25:

REGION II (B) REGIONAL DEVELOPMENT CONFERENCE REGISTRATION CLOSES

Be sure to register for this RDC, which will be held in College Station, Texas, Dec. 7-8. Visit FFA.org/GoToRDC.

Dec. 17:

REGIONAL DEVELOPMENT CONFERENCE REGISTRATION OPENS

Claim your spot at this Alumni and Supporters RDC, which will be held Feb. 8-9 in Kansas. Visit FFA.org/GoToRDC.

Jan. 1:

SPRING SEMESTER LIVING TO SERVE GRANT APPLICATION OPENS

Looking for \$1,200 to implement a semester-long service-learning project in your community? Visit FFA.org/LivingToServe/Grants to apply.

Feb. 6:

NATIONAL FFA SCHOLARSHIP APPLICATIONS DUE

Scholarships are sponsored by businesses and individuals and are given for a wide variety of experiences, career goals and higher-education plans. To apply, visit FFA.org/Scholarships.

Feb. 16-23:

NATIONAL FFA WEEK

Show your FFA pride along with members from across the country. Get ideas for your party plans and more at FFA.org/FFAWeek.

Feb. 19:

GIVE FFA DAY

Your gift at donate.FFA.org will help prepare and inspire FFA members to become active leaders in agriculture.

Talking Points: **THE OPIOID EPIDEMIC**

DID YOU KNOW THAT LIVING IN A RURAL AREA INCREASES YOUR RISK FOR OPIOID ABUSE AND OVERDOSE? THE OPIOID EPIDEMIC IS CONSIDERED A NATIONAL PUBLIC HEALTH EMERGENCY AND KILLS AN AVERAGE OF 115 AMERICANS EVERY DAY.

AS AN FFA MEMBER, YOU CAN HELP SPREAD THE WORD AND BREAK DOWN THE STIGMA OF OPIOID ABUSE. THERE'S A NEW PROGRAM CALLED #FARMTOWNSTRONG DESIGNED TO HELP YOU AND OTHER LEADERS WAGE THE ATTACK. HERE'S WHAT YOU SHOULD KNOW.

Q: WHAT IS OPIOID ADDICTION?

A: Opioids include prescription pain relievers such as oxycodone, hydrocodone, codeine, morphine, and many others, plus heroin and synthetic drugs, such as the highly lethal fentanyl. Addiction often begins when a prescription painkiller

is used longer or differently than it was prescribed.

Q: WHY DO FARMERS AND RANCHERS NEED TO BE CONCERNED?

A: The rate of drug overdose deaths in rural areas has surpassed rates in urban areas, according to the Centers for Disease Control and Prevention. Last year, the American Farm Bureau Federation (AFBF) and National Farmers Union (NFU) conducted a survey of 2,100 rural adults, including farmers and farmworkers. They found that opioid abuse has directly impacted nearly half of all rural adults and three quarters of all farmers and farmworkers.

Q: HOW CAN #FARMTOWNSTRONG HELP?

A: At the start of 2018, AFBF and NFU joined forces to start #FarmTownStrong. They enlisted FFA to help build awareness and encourage discussion. The campaign's website, FarmTownStrong.org, offers resources for opioid abuse prevention, treatment, hotlines, drug disposal tips and ways to encourage communication to help solve the problem. Check it out for ideas on activating the #FarmTownStrong movement in your community.

— By Karen Bernick

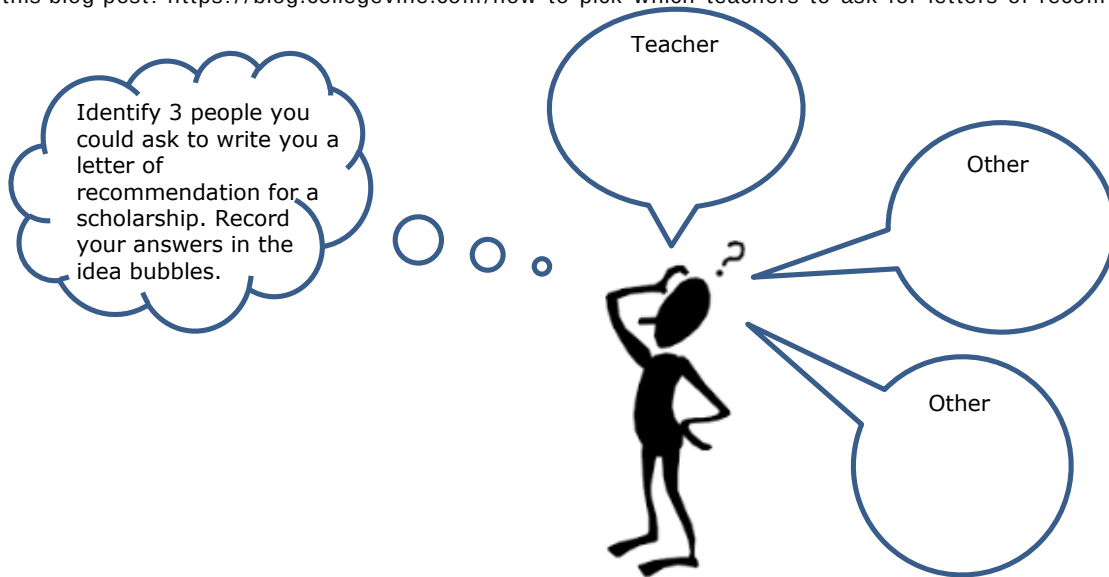
Aligned to the following standards:
CS.05; AG5; FFA.PL-A; FFA.PL-C; FFA.PL-E; FFA.PL-F; FFA.CS-M;
FFA.CS-N; CCSS.SL.9-10.2; CCSS.WHST.9.10.4; MP5; MP6

Aligned to the following standards:
CS.05; AG5; FFA.PL-A; FFA.PL-C; FFA.PL-E; FFA.PL-F; FFA.CS-M;
FFA.CS-N; CCSS.SL.9-10.2; CCSS.WHST.9.10.4; MP5; MP6

Created: Winter 2018 by the National FFA Organization

DIRECTIONS:

Once you find a scholarship, you need to ask for recommendation letters. Where do you start? Watch the video “How to ask for a letter of recommendation,” available at <https://youtu.be/7ZVbFlvhk8?si=mrA0n9wapFyXKJgn>, to learn more. You can also read this blog post: <https://blog.collegevine.com/how-to-pick-which-teachers-to-ask-for-letters-of-recommendation>.



How do you go about asking for a letter of recommendation? IN PERSON! In the box, write down exactly what you are going to say to ask for a letter of recommendation.

Name of the person from above
you are going to ask.

How will you ask your selected individual for a letter of recommendation? Write it out here to practice. Don't forget to mention your "Brag Sheet"!

This image shows a blank sheet of white paper with horizontal ruling lines. The lines are evenly spaced and extend across the width of the page. There are no margins, text, or other markings on the paper.

Aligned to the following standards:
CS.05; AG5; FFA.PL-A; FFA.PL-C; FFA.PL-E; FFA.PL-F; FFA.CS-M;
FFA.CS-N; CCSS.SL.9-10.2; CCSS.WHST.9.10.4; MP5; MP6

1. _____
2. _____
3. _____
4. _____
5. _____
6. _____

Why are thank you notes important? Give two reasons.

To _____

This image shows a single sheet of white paper with horizontal ruling lines. The lines are evenly spaced and run across the width of the page. There are no margins, text, or other markings on the paper.

Sincerely, _____

NAME: _____

Aligned to the following standards:
CS.05; AG5; FFA.PL-A; FFA.PL-C; FFA.PL-E; FFA.PL-F; FFA.CS-M;
FFA.CS-N; CCSS.SL.9-10.2; CCSS.WHST.9.10.4; MP5; MP6

Thank You Letter Rubric

Indicator	Very Strong Evidence of Skill (5–4 points)	Moderate Evidence of Skill (3–2 points)	Weak Evidence of Skill (1–0 points)	Points Earned
Format	The document was directed to the appropriate person with an appropriate address and salutation. The level of formality was appropriate for the type of correspondence.	The document was directed to the appropriate person with an appropriate address and salutation with minor errors. The level of formality was generally appropriate for the type of correspondence.	The document was not directed to the appropriate person. No address or salutation was included. The level of formality was not appropriate.	
Content	Effectively expressed appreciation and appropriately reiterated their qualities; expressed interest and appropriately stated provisions for follow-up	Attempted to express appreciation and generally reiterated their qualities; generally expressed interest and attempted to state provisions for follow-up	Did not attempt to express appreciation; did not attempt to reiterate their qualities; did not attempt to express interest or state provisions for follow-up	
Grammar/ Punctuation/ Spelling	Spelling, grammar and punctuation are extremely high quality with two or less errors in the document.	Spelling, grammar and punctuation are adequate with three to five errors in the document.	Spelling, grammar and punctuation are less than adequate with six or more errors in the document.	
Overall Impression	Writing was legible, and length was appropriate.	Writing was difficult to read, and length was generally appropriate.	Writing was illegible, and length was inappropriate.	



NEW HORIZONS



ARTICLE SUMMARY

Out-of-the-Box Agriculture

Hydroponics is the ancient art of growing food utilizing a medium other than soil. A school in Nebraska is turning this technology into a learning experience so that students can see the “farm-to-fork” experience. Students in the academy care for plants grown hydroponically in a shipping container.

BELL RINGER:

What is hydroponics?

DISCUSSION QUESTIONS

1. What is hydroponics?
2. How can hydroponics help feed the growing population?
3. How does hydroponics compare to conventional farming practices?
4. How can you implement hydroponics in your agriculture class?

ACTIVITY

On their own paper, students should complete the bell ringer activity listed above. Once all students have written down an answer, have them discuss and explain their answers with their neighbors. After five minutes, call on a few students to share their answers. Generate a list as a class.

Have students watch a short introductory video about hydroponics and complete the worksheet “I Can Grow Food Without Soil?” (Appendix 5). After students have learned the basics, hand out the worksheet “Climb out of the Box ... or Is It In?” (Appendix 6). Have students read the article “Out-of-the-Box Agriculture” to learn about a unique hydroponic experience happening in Nebraska. Then they will use <https://www.greenandvibrant.com/hydroponic-gardening> to design their own systems. Internet access is required for these activities.

Students will create their own hydroponic system for the classroom by following the directions in the worksheet “Putting Our Knowledge to Work” (Appendix 7). Internet access is not required for this activity.

Have students complete the exit ticket.

FFA TIP

Visit AgExplorer, at AgExplorer.FFA.org to research careers within the Environmental Service Systems and the Natural Resource Systems career focus areas.

Create a team for the environmental and natural resources career development event. Visit the environmental and natural resources CDE page on FFA.org to learn more about it.

SAE TIP

How many students could you involve in a school-based enterprise SAE with a single one-acre-equivalent grow box?

Learn more about the school-based enterprise SAE type in the “[SAE for All](#)” guide. Click [HERE](#) to go directly to the school-based enterprise section.

VOCABULARY

Growing medium
Hydro
Hydroponics
Nutrition
Ponos

EXIT TICKET

What is hydroponics? How can hydroponics help solve the growing need for food in our world?

CAREER FOCUS AREAS

Biotechnology Systems
Natural Resource Systems
Plant Systems

RESOURCE HIGHLIGHT

Visit AgExplorer.FFA.org to learn about careers associated with hydroponics.

APPENDICES

Appendix 5: I Can Grow Food Without Soil?

Appendix 6: Climb out of the Box ... or Is It In?

Appendix 7: Putting Our Knowledge to Work

REFERENCES

Hydroponic Gardening: <https://www.greenandvibrant.com/hydroponic-gardening>

STANDARDS ALIGNMENT

• **AFNR Performance Element:** CS.02, CS.04 • **FFA Precept:** FFA.PL-A.ACTION, FFA.PG-J.MENTAL GROWTH, FFA.PL-C.VISION, FFA.PL-F.CONTINUOUS IMPROVEMENT • **Common Career Technical Core:** AG2 • **NASDCTEc-State Directors (Career Clusters):** AGC10.04 • **Common Core-Reading: Informational Text:** CCSS.ELA-LITERACY.RI.9-10.4 • **Common Core-Speaking and Listening:** CCSS.ELA-SL.9-10.2 • **Common Core-Math Practices:** MP2, MP5, MP6 • **AFNR Career Ready Practices:** CRP02, CRP04, CRP05, CRP06, CRP07, CRP08 • **P21 Skills:** Communication, Critical Thinking and Problem Solving, Environmental Literacy, Global Awareness, Initiative and Self-direction, Think Creatively

The mural on the Bryan High School agrobox, pictured here, was painted by former student Hugo Zamorano.



OUT-OF-THE-BOX

IN ORDER TO FEED A HUNGRY PLANET, FUTURE AGRICULTURISTS HAVE TO THINK OUTSIDE THE BOX. FOR SOME STUDENTS, THIS MEANS WORKING INSIDE THE AGROBOX.

**STORY BY BEV FLATT
PHOTOGRAPHY BY CORY HALL**



Samantha Hernandez inspects lettuce grown in the nutrient film technique (NFT) hydroponic system.

When you walk into a classroom at Bryan High School's Urban Agriculture Academy, you see a typical teacher's room. A bulletin board holds announcements and school notices. Bookcases are scattered around the room with resources and references for research papers. The loud sounds of lockers opening and closing fill the hallways between classes. It isn't until you walk behind the school, in the middle of Omaha, Neb., that you see what turns a great agricultural

education program into an innovative high school experience.

Turning the corner around the back of the building, you are greeted by an imposing 40-foot-long shipping container with murals painted on the sides. Once you pull open the doors of the container, you find it's been completely refurbished to contain state-of-the-art equipment for growing lettuce, tomatoes and various herbs using hydroponics. This facility is known as the AgroBox, and it can produce up to 1 acre of fruits and vegetables



AGRICULTURE

in the space of six standard parking spaces.

“A few years ago, our school was looking to expand the agricultural program and career academies,” says Tyler Schindler, Bryan High School FFA advisor and agricultural education teacher. “We initially wanted to build a greenhouse, but we didn’t have the money or space needed for that type of project. Given those obstacles, the AgroBox became the perfect solution.”

The AgroBox won favor over a greenhouse, as it is a nonpermanent, modular

structure. The building can be loaded up and moved to a different location if needed. Once the idea for the agricultural education shipping container was formed, the school contacted Rubicon Agriculture, a manufacturing company based in Indiana, to make a game plan for creating the facility. Chris Moorman, an owner of Rubicon Agriculture, was a former FFA member and saw incredible potential in the project. After building plans were in place, the school secured funding from the Omaha School Foundation, its Perkins

“WE INITIALLY WANTED TO BUILD A GREENHOUSE, BUT WE DIDN’T HAVE THE MONEY OR SPACE NEEDED FOR THAT TYPE OF PROJECT. GIVEN THOSE OBSTACLES, THE AGROBOX BECAME THE PERFECT SOLUTION.” – TYLER SCHINDLER

budget (which provides funding for career and technical education), Farm Credit Services, and the Buffett Foundation to make this dream come alive.

“Our focus has been to give students the experience of working in a greenhouse setting and also to learn what urban agriculture is all about,” Schindler says. “There aren’t many opportunities to work in the greenhouse industry in the middle of Omaha, but there is a growing demand for urban agriculture, community gardens, and locally grown food. There has been a lot of focus



The vertical-grow hydroponic system is one of three systems utilized in the Bryan High School AgroBox.



Joslyn Wildrick inspects herbs that were planted in the ebb and flow hydroponic system.



Kevin Salazar refills a nutrient tank, which can be programmed to dispense nutrient solutions in select quantities.

on how to grow your own food in your house or in your yard. This is what we focused on rather than bedding plants and flowers. What we try to do in the AgroBox is really about the research experience and the different things that impact growing.”

THE SCIENCE BEHIND THE FOOD

When working in the hydroponics facility, students control the lighting, temperature, humidity and more. Making small changes allows the students to measure the impact that each of the variables has on the growth rates of plants. The school is set up in the

career academy model, so students can then take this data into their science and math classes to measure and plot the data to make informed, science-based decisions for their projects.

“The success of the AgroBox is a collaborative group effort rather than the work of one single teacher or one single person,” Schindler says. “I work with a history teacher, a science teacher, a math teacher, an English teacher, and a special education teacher every week to talk about our students and the work that is coming up. We also work with a curriculum director and a

“THE SUCCESS OF THE AGROBOX IS A COLLABORATIVE GROUP EFFORT RATHER THAN THE WORK OF ONE SINGLE TEACHER OR ONE SINGLE PERSON,” SCHINDLER SAYS.

counselor to make sure all of our students’ needs are met. Our principal is also a big driver of getting kids real-world experiences. I rarely have a student ask me, ‘When am I ever going to use this?’ They can immediately see how it connects to their future.”

The program has become increasingly popular. In the first year, 90 students were able to work in the AgroBox. Today, the Urban Agriculture and Natural Resources Career Academy enrolls 170 students. The program is highly selective and has to turn away nearly 40 percent of students who apply to be in the academy.

CURRICULUM ACROSS CLASSROOMS



Above: Schindler shows Kevin Salazar how to use a donated growing chamber in order to start plugs and plants for the hydroponic systems.

Below: Kassie Ronnei and Joslyn Wildrick check on their cuttings. The students use the wall aeroponics system to clone and root plants.



When an agricultural education program is structured in the career academy model, students learn how foundational courses, such as algebra, biology and English, are used in the agriculture industry. From calculating feed ratios for cattle to developing agritourism business plans, all careers in agriculture require proficiency in reading, writing and arithmetic. At Bryan High School, freshman students make a career academy choice and take classes such as agricultural biology, agricultural economics, agricultural English, food science, agribusiness and agricultural American government during their sophomore, junior and senior years.

This allows students and FFA members to see the connection between classes in a field they are

interested in. Students working on a prepared public speaking leadership development event can receive support from their English teachers. Students studying for the farm business management contest can immediately use the skills learned in agricultural economics and American government when preparing for exams. In algebra classes, they can calculate parts-per-million formulas for various concentration and dilution ratios of plant products. Students who are putting together an agriscience fair presentation can gather feedback and advice from science teachers. Career academy models have shown an increase in student engagement, graduation rates and attendance across the country, according to the National Career Academy Coalition.



Learn more about how Bryan High School uses the career academy model in our video at FFA.org/AgroBox.

Even still, Bryan High School supports one of the largest FFA chapters in the state of Nebraska with more than 100 active members.

As agricultural education programs continue to expand and thrive in urban areas, it is becoming increasingly important for students to understand where their food comes from and how the entire food chain works. For many students in the Omaha school district, basic literacy on what food is and how it is grown may not always be available.

"We have a lot of food-processing companies in and around Omaha," Schindler

says. "These companies make and produce a huge amount of the food in our grocery stores, but our students didn't even know that. Now, every incoming student in our academy takes part in a rural immersion field trip."

As a part of this field trip, each student is required to select a favorite food and trace its path from the farm to the dinner table. For example, if a student chooses to study popcorn, he or she may visit a popcorn grower to see the crop in the field and learn how popcorn is harvested, processed, transported, and eventually how it ends up as

a bag of kernels that can be cooked in the microwave.

THE FUTURE OF FOOD PRODUCTION

The AgroBox is just one example of innovative food-production facilities that can be used in urban communities to save resources and space and to provide locally grown produce.

"It is amazing how this one shipping container has had such an immense impact on our students, our school and the communities in which we work," Schindler says. "This is my third year as a teacher at Bryan High School, and I know it will only continue to grow. This

year, we have a chapter officer team that is going full force. Our teachers are focused on providing even more programming to keep the students engaged. We have a state officer from our chapter this year, which has had a huge impact on our chapter, school and city. And this year, we have added a second agricultural education teacher to the program to keep up with the demand. We have truly transformed the lives of our students."

To learn more about Bryan High School, the Urban Agriculture and Natural Resources Career Academy and the AgroBox, visit bryan.ops.org. •

NAME: _____

Aligned to the following standards:
CS.02; CS.04; FFA.PL-A; FFA.PL-F; FFA.PG-J; AG2; AGC10.04; CCSS.RI.9-10.4; CCSS.SL.9-10.2; MP2; MP5; MP6; CRP.02; CRP.04; CRP.05; CRP.06; CRP.07; CRP.08

Appendix 5: I Can Grow Food Without Soil?

Created: Winter 2018 by the National FFA Organization

DIRECTIONS:

Watch the video "Hydroponics—A Short Introduction" and complete the following activities. The video is available at <https://youtu.be/Y7cGd0JHrs4>.



Hydro



Ponos



HYDROPONICS

(Draw a picture)

What do plants rely on instead of soil?
(Hint: It is found in the water.)



What are the benefits of replacing soil? Circle all that apply.



What is conventional farming?



Compare and contrast hydroponics and conventional farming in three sentences or more.

Describe why hydroponics can be such a powerful resource for food production.

NAME: _____

Aligned to the following standards:

CS.02; CS.04; FFA.PL-A; FFA.PL-F; FFA.PG-J; AG2; AGC10.04; CCSS.RI.9-10.4; CCSS.SL.9-10.2; MP2; MP5; MP6; CRP.02; CRP.04; CRP.05; CRP.06; CRP.07; CRP.08

Appendix 6: Climb out of the Box ... or Is It In?

DIRECTIONS:

Read the article "Out-of-the-Box Agriculture" in the Winter 2018 issue of *FFA New Horizons*. Once finished, complete the following activities.

Bryan High School took advantage of the materials and resources they had to create and develop a hydroponic system that works for them. Utilizing the website <https://www.greenandvibrant.com/hydroponic-gardening>, design a hydroponic system that would work at your school.

1. Type of system: _____
 - a. Why?

2. Where will this system be housed at your school? _____

3. Growing media selected: _____
 - a. Why?

4. pH needed: _____

5. Grow light selected: _____
 - a. Why?

6. Select two types of plants to produce: (1) _____ and (2) _____
 - a. Why did you select these plants?

7. Draw your finished hydroponic system. Include colors and labels.

NAME: _____

Aligned to the following standards:
CS.02; CS.04; FFA.PL-A; FFA.PL-F; FFA.PG-J; AG2; AGC10.04; CCSS.RI.9-10.4; CCSS.SL.9-10.2; MP2; MP5; MP6; CRP.02; CRP.04; CRP.05; CRP.06; CRP.07; CRP.08

Appendix 7: Putting Our Knowledge to Work

DIRECTIONS:

Create your own hydroponic system in a two-liter bottle by following these instructions. You will use the table below to keep track of your plant's growth.

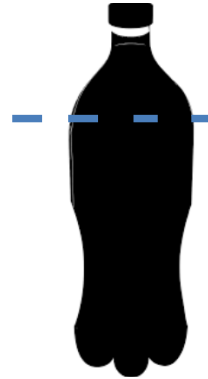
Materials Needed:

- Clean 2-liter bottle
- Growing medium (Ex: perlite)
- Wicking material (felt or cotton material)
- Drill with bit
- Box cutter
- Duct tape
- Seeds (lettuce and herbs do well)
- Aluminum foil
- Warm, sunny environment



Directions:

1. Clean your bottle and remove label.
2. Drill a hole in the center of the cap.
3. Cut the plastic bottle at the "shoulder."
4. Thread your wick through the cap so that it can reach into the top as well as reach the nutrient solution.
5. Mix your nutrient solution, and place it in the bottom of the bottle.
6. Flip the top portion of the bottle over and set it in the bottom portion with the cap inside the lower part (see picture above, next to the materials).
7. Add two pieces of duct tape to hold the top and outer wall together if the plastic is flimsy. You do not want the top to fall into the water below!
8. Place growing medium in the top half of the bottle, making sure the wick is stretched throughout,
9. Plant your selected plants in the growing media,
10. Wrap aluminum foil around the bottle.



**Original concept adapted from Bottle Biology.

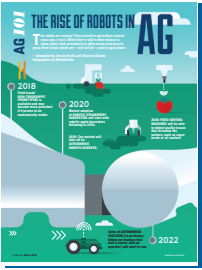
Date	Plant Height	Additional Notes:

What conclusions can you draw about hydroponics after completing this activity?



NEW HORIZONS

WINTER 2018 TEACHING GUIDE



ARTICLE SUMMARY

The Rise of Robots in Ag

Technology continues to improve, and as a society, we find that the agriculture industry is no different. Robots have become a common technology in agriculture today and will continue to increase. Read this article to see where robotics in agriculture is headed.

BELL RINGER:

What role do robots play in our society? What about in the agriculture industry?

DISCUSSION QUESTIONS

1. What role do robots play in society?
2. How will robotics in agriculture change in the future?
3. What does a rise in robotics mean for employment opportunities in the future?
4. Why are many apprehensive about robotics?

ACTIVITY

On their own paper, have students complete the bell ringer activity listed above. Once all students have written down an answer, have them discuss and explain their answers with their neighbors. After five minutes, call on a few students to share their answers.

Hand out the "Rise of the Robots" worksheet (Appendix 8). Explain to students that technology has changed over time and continues to be a topic of discussion, especially in agriculture. Have students watch two short video clips, The Flintstones and The Jetsons, and students should write down the differences in technology that they see between the two. Next, have students complete the application questions to help set them up for the next activity. Have students read the article "Rise of Robots in Ag." After students understand the predicted progression of robotics in agriculture, have students research and answer eight questions about robotics in agriculture. Once they have completed their research, students will create a paper slideshow video about robotics in agriculture. Internet access is required for these activities.

Finally, have students share their presentations and then complete the exit ticket.

FFA TIP

Have students visit a local manufacturer (Ex. car manufacturer) or farmer that currently utilizes robots to aid in production.

SAE TIP

Questions for students:

- What agricultural knowledge and/or skills would be required to program or build these type of machines?
- What type of data points does a farm generate?
- What other type of agricultural tasks can you imagine being automated?

VOCABULARY

Autonomous
Phenotyping
Robot

EXIT TICKET

What impact will robots have on the agriculture industry in the coming years? How will robots impact you and your future?

CAREER FOCUS AREA

All

RELATABLE ARTICLE

Zoetis Virtual Field Trip: AgExplorer.FFA.org

RESOURCE HIGHLIGHT

National FFA Agricultural Issues Forum Leadership Development Event: FFA.org/participate/cde-lde/agricultural-issues-forum/

APPENDICIES

Appendix 8 – Rise of the Robots

REFERENCES

National FFA Agricultural Issues Forum LDE: FFA.org/participate/cde-lde/agricultural-issues-forum/
AgExplorer.FFA.org

STANDARDS ALIGNMENT

• **FFA Precept:** FFA.PL-A, FFA.PL-C, FFA.PL-F, FFA.PG-I, FFA.PG-J, FFA.CS-N • **Standards Alignment AFNR Performance Element:** CS.01, CS.02. • **Common Career Technical Core:** AG1, AG2. • **NASDCTEc-State Directors (Career Clusters):** AGC10.03, AGC10.04 • **Common Core-Speaking and Listening:** CCSS.ELA-Literacy.SL.9-10.2, CCSS.ELA-Literacy.SL.9-10.4 • **Common Core-Literacy in Science & Technical Subjects: Writing:** CCSS.ELA-Literacy.WHST.9.10.1, CCSS.ELA-Literacy.WHST.9.10.4 • **Common Core-Math Practices:** MP3 • **AFNR Career Ready Practices:** CRP02, CRP04, CRP05, CRP06, CRP07, CRP08 • **P21 Skills:** Communication, Critical Thinking and Problem Solving, Global Awareness, Initiative and Self-direction, Think Creatively

THE RISE OF ROBOTS IN AG

The robots are coming! They arrived in agriculture several years ago, in fact. While they're still in their infancy in some areas, their prevalence in other areas continues to grow. Here's how robots are – and will be – used in agriculture.

– Compiled by Jessie Scott and Tharran Gaines
Infographic by BlindSalida



2018

Field-based **HIGH-THROUGHPUT PHENOTYPING** is available and may become more prevalent if it proves to be economically viable.

2020

Market adoption of **ROBOTIC STRAWBERRY HARVESTING** will start with robotic apple harvesters following in 2022.

2020: The market will take off for **AUTONOMOUS ROBOTIC WEEDERS**.

2020: **FOOD-SORTING MACHINES** will be able to detect quality issues that lie below the surface, such as sugar levels or oil content.

2022

Sales of **AUTONOMOUS TRACTORS** (in particular, follow-me tractors that trail a tractor with an operator) will start to rise.

2023

Robotics in dairy farms will be an **\$8 BILLION** industry.

2027

The agricultural **DRONE MARKET** will be worth more than **\$480 MILLION**.

More than **660,000 TRACTORS** with autosteer or tractor guidance will be sold each year.

Autonomous robotic weeders combined with manned robotic weeding implements will be a **\$400 MILLION** industry.

2025

The average farm will generate **4.1 MILLION DATA POINTS** per day compared with **190,000** today.

FARM YIELDS could rise by more than **70 percent** with advances in ag technology.

2050

NAME: _____

Appendix 8: Rise of the Robots

Created: Winter 2018 by the National FFA Organization

DIRECTIONS:

There have been many changes in technology throughout history. Watch the following two cartoon video clips from *The Flintstones* and *The Jetsons*, and identify five technology differences.

The Flintstones Clip: <https://youtu.be/uq7noaMwLfQ>. *The Jetsons* Clip: <https://youtu.be/0JQbeCAIF6s>.

Identify five technology differences between the two videos.

1. _____

2. _____

3. _____

4. _____

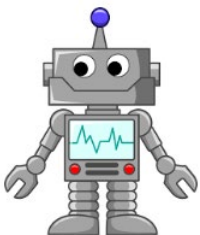
5. _____



Which video are we more like today?



How do you think technology will change over the next 50 years?



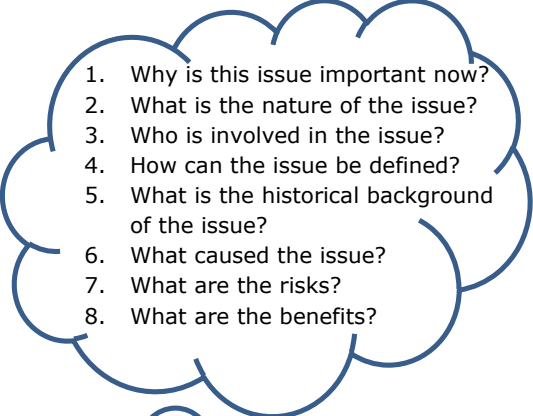
Watch the video available here:
<https://www.youtube.com/watch?v=4qrlFse5I1U>.
Why might the use of technology such as robots be controversial in the agriculture industry?

NAME: _____

Aligned to the following standards:
CS.01; CS.02; FFA.PL-A; FFA.PL-C; FFA.PL-F; FFA.PG-I; FFA.PG-J; FFA.CS-N; AG1; AG2;
AGC10.03; AGC10.04; CCSS.SL.9-10.2; CCSS.SL.9-10.4; CCSS.WHST.9.10.1;
CCSS.WHST.9.10.4; CCSS.MP3; CRP.02; CRP.04; CRP.05; CRP.06; CRP.07; CRP.08

DIRECTIONS:

Currently, the way robots are used in agriculture is a "hot-button" topic. In FFA, the agricultural issues forum leadership development event gives students the opportunity to show both sides of an issue through research and presentations. Below, answer the questions about how robots are being used in agriculture. Use the empty space to record your notes.

- 
1. Why is this issue important now?
 2. What is the nature of the issue?
 3. Who is involved in the issue?
 4. How can the issue be defined?
 5. What is the historical background of the issue?
 6. What caused the issue?
 7. What are the risks?
 8. What are the benefits?



NAME: _____

Aligned to the following standards:
CS.01; CS.02; FFA.PL-A; FFA.PL-C; FFA.PL-F; FFA.PG-I; FFA.PG-J; FFA.CS-N; AG1; AG2;
AGC10.03; AGC10.04; CCSS.SL.9-10.2; CCSS.SL.9-10.4; CCSS.WHST.9.10.1;
CCSS.WHST.9.10.4; CCSS.MP3; CRP.02; CRP.04; CRP.05; CRP.06; CRP.07; CRP.08

DIRECTIONS:

Watch the video "How to Make a Paper Slideshow," available at https://youtu.be/E5RXynA_D3I. Create a paper slideshow video that details the agricultural issue of robotics in agriculture. Videos should last a minimum of 60 to 90 seconds. If you do not have access to technology to film this, then complete the paper portion only. Use the questions from above and information from the article to help you develop your paper slideshow. Use the template below to plan your paper slideshow. You can have as many or as few paper slides as you like as long as all questions from above are covered and you meet the requirements outlined on the attached rubric. (Illustrations go in the boxes and your narration on the lines.)

Robotics in Agriculture

Slide One:

Narration:

Slide Two:

Narration:

NAME: _____

Slide Three:

Narration:

Slide Four:

Narration:

Slide Five:

Narration:

NAME: _____

Slide Six:

Narration:

Slide Seven:

Narration:

Slide Eight:

Narration:

NAME: _____

Aligned to the following standards:
 CS.01; CS.02; FFA.PL-A; FFA.PL-C; FFA.PL-F; FFA.PG-I; FFA.PG-J; FFA.CS-N; AG1; AG2;
 AGC10.03; AGC10.04; CCSS.SL.9-10.2; CCSS.SL.9-10.4; CCSS.WHST.9.10.1;
 CCSS.WHST.9.10.4; CCSS.MP3; CRP.02; CRP.04; CRP.05; CRP.06; CRP.07; CRP.08

Paper Slideshow Video Rubric

Area	4 Points	3 Points	2 Points	1 Point
Content	All content is accurate. There are no factual errors.	Most of the content is accurate, but there is one piece of information that seems inaccurate.	The content is generally accurate, but one piece of information is clearly inaccurate.	Content is confusing or contains more than one factual error.
Clarity and Neatness	The paper slideshow is easy to read, and all elements are clearly written, labeled and drawn. Creativity was used.	The paper slideshow is easy to read, and most elements are clearly written, labeled and drawn. Some creativity was used.	The paper slideshow is hard to read with rough drawings, labels and color. Little creativity was used.	The paper slideshow is hard to read, and one cannot tell what goes where or what the illustrations represent. No creativity was used.
Narration and Preparedness	The paper slideshow is clearly rehearsed and narrated with no mistakes. Student spoke slowly and clear.	One mistake is heard in the paper slideshow video.	Two mistakes are heard in the paper slideshow video.	Three or more mistakes are heard in the paper slideshow video. Student spoke very fast and was unclear.
Time	Student met or exceeded the 60- to 90-second timeframe.			Student was under the allotted time frame.
				Total: _____

Comments:



NEW HORIZONS

WINTER 2018 TEACHING GUIDE



ARTICLE SUMMARY

From the Ground Up

What is regenerative agriculture? Kate Indreland is exploring this topic and recently won a \$10,000 prize as a finalist in the General Mills Feeding Better Futures Scholars Program. Read this article to learn how her interest in this topic has allowed her to travel around the world and led to her career interests.

BELL RINGER:

How many different layers are in a soil profile?

DISCUSSION QUESTIONS

1. What is soil health?
2. Is soil health important? Why or why not? Explain your answer.
3. What is a soil horizon?
4. Why is knowledge of the soil and soil health important to the agriculture industry and our everyday lives?

ACTIVITY

Students should complete the bell ringer activity listed above. Once all students have written down an answer on their own paper, have them discuss and explain their answers with their neighbors. After five minutes, call on a few students to share their answers.

Have students read the article "From the Ground Up." First, have students complete the "From the Ground Up" worksheet (Appendix 9). This worksheet has three parts: (1) Students will draw a soil profile and explain each layer, (2) students will create and design a soil fact sheet geared toward elementary-aged students and (3) students will create a soil profile using either food (making an edible soil profile) or craft supplies. Internet access is required for this activity.

Have students complete the exit ticket on their own paper. If there is time, allow students to share what they learned with the class.

FFA TIP

Invite a representative from the Natural Resource Conservation Service (NRCS) to speak to your agriculture class and/or at an FFA chapter meeting.

SAE TIP

How does soil impact the SAEs of your students?

What soil health, preservation or regeneration school-based enterprise SAE programs could be established using your school facilities?

Who are the soil experts in your community that could serve as SAE mentors or employers for students?

VOCABULARY

Regenerative agriculture
Practitioners
Ecology

EXIT TICKET

What are three facts you learned from the lesson? What is one question you have?

CAREER FOCUS AREA

Natural Resource Systems
Environmental Service Systems

RELATABLE WEBSITE

Check out AgExplorer to learn more about careers related to soil science such as soil scientist, agronomist, conservationist and many, many more!

REFERENCES

USDA Natural Resources Conservation Service Soils: https://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/edu/?cid=nrc-s142p2_054308

APPENDICES

Appendix 9: From the Ground Up

STANDARDS ALIGNMENT

• **FFA Precept:** FFA.PL-C, FFA.PL-D, FFA.PL-F, FFA.PG-J, FFA.CS-M, FFA.CS-N, FFA.CS-O • **Common Core - Reading: Informational Text:** CCSS.ELA-LITERACY.RI.9-10.4 • **Common Core - Writing:** CCSS.ELA-LITERACY.W.9-10.2, CCSS.ELA-LITERACY.W.9-10.4 • **Common Core - Speaking and Listening:** CCSS.ELA-LITERACY.SL.9-10.4 • **AFNR Career Ready Practices:** CRP04, CRP06 • **P21 Skills:** Communication, Critical Thinking and Problem Solving, Initiative and Self-direction, Leadership and Responsibility

From the GROUND UP *Kate Indreland sees soil health as the path to a better world.*



Who can imagine an exciting career based on the ground beneath your feet? For Kate Indreland, that's the case. The life of the soil on which all life depends is a passion she's taking forward in her own life.

Her exploration of regenerative agriculture recently won her a \$10,000 prize as a finalist in the General Mills Feeding Better Futures Scholars Program.

Her interest in regenerative ag has taken her to farms and ranches in New Zealand and Western Australia. But her schooling began right at home on her parents' purebred Angus ranch near Big Timber, Mont. What she's discovered is that farmers and ranchers the world over are dealing with the same issue: how to improve soil health.

Practitioners of regenerative ag seek to address that challenge by incorporating more natural processes into food production while improving profitability for farmers and ranchers.

It's a noble goal, but how glamorous is a career rooted in the soil?

"Come on! Being 4 feet deep in a soil pit doesn't sound glamorous?" Indreland asks with a smile. "It is! To me, a lifestyle where I'm making a difference in people's lives that will benefit them and their operations is, in a sense, as glamorous as it gets."

EVERYTHING IS SOIL

Indreland's experiences have led her to a firm belief that she's on the right track with a commitment to regenerative ag.

"There was a day when I realized that everything is soil," she says. "Want to feed the world? Soil. Want to have a farm or ranch for our kids to come back to? Soil. Want to have clean air and water? Soil. But if we keep treating soil like dirt, we will not be fulfilling these things."

In her young life, Indreland has already seen success in regenerative ag practices. "I am seeing immensely improved soil, plant and animal health on our ranch and on other operations that are using these practices," she says. "On our ranch, we have seen protein

and crucial nutrients increase in the plant by 30 percent!"

Her next step is enrollment at the University of Montana to study ecology and business.

At first glance, Indreland's career path may seem to be an idealistic one, but her hard work to date provides another impression to those who know her.

"I'd call her a realist," says Nicole Masters, a soils expert who has mentored Indreland in her study of regenerative ag. "Kate's seen operations around North America, Australia and New Zealand that are profitably improving their soil and water. I'm excited about the young people like Kate who are interested in regenerative ag."

— By John Walter

Check out Indreland's General Mills Feeding Better Futures Scholars Program highlight video at FFA.org/KateIndreland.

NAME: _____

Aligned to the following standards:
FFA.PL-C.; FFA.PL-D.; FFA.PL-F.; FFA.PG-J.; FFA.CS-M.; FFA.CS-N.;
FFA.CS-O.; CCSS.RI.9-10.4; CCSS.W.9-10.2; CCSS.W.9-10.4;
CCSS.SL.9-10.4; CRP.04; CRP.06

Appendix 9: From the Ground Up

Created: Winter 2018 by the National FFA Organization

DIRECTIONS:

Read the article "From the Ground Up" in the Winter 2018 issue of *FFA New Horizons*. After reading the article, complete the activities below.

Part 1

Go to the USDA Natural Resources Conservation Service Soils webpage and answer the questions below.

(<https://www.nrcs.usda.gov/resources/education-and-teaching-materials/a-soil-profile>)



Draw and label a soil profile in the space to the left.



Why do you think it is important to know the soil horizons within the soil profile?



Define the term "soil horizon":

NAME: _____

Aligned to the following standards:
FFA.PL-C.; FFA.PL-D.; FFA.PL-F.; FFA.PG-J.; FFA.CS-M.; FFA.CS-N.;
FFA.CS-O.; CCSS.RI.9-10.4; CCSS.W.9-10.2; CCSS.W.9-10.4;
CCSS.SL.9-10.4; CRP.04; CRP.06

Part 2

Create and design a fact sheet for elementary students (see example page) about a soil profile. Information that should be included on the fact sheet: explanation of soil profile and soil horizons, explanation of each soil horizon and seven other facts about soil.

See grading rubric below:

Explanation of soil horizons	4 points
Explanation of each soil horizon	4 points
Explanation of soil profile	4 points
Seven facts about soil	7 facts x 2 points each = 14 points
Creative and colorful	4 points
Includes websites used for research	5 points
Total points	35 points

NAME: _____

Aligned to the following standards:
FFA.PL-C.; FFA.PL-D.; FFA.PL-F.; FFA.PG-J.; FFA.CS-M.; FFA.CS-N.;
FFA.CS-O.; CCSS.RI.9-10.4; CCSS.W.9-10.2; CCSS.W.9-10.4;
CCSS.SL.9-10.4; CRP.04; CRP.06

Example: Fact Sheet

This is an example of how to set up your fact sheet. Please be as creative as possible when designing your own fact sheet.

What is a soil horizon?

What is a soil profile?

Information About Each Soil Horizon:

NAME: _____

Aligned to the following standards:

FFA.PL-C.; FFA.PL-D.; FFA.PL-F.; FFA.PG-J.; FFA.CS-M.; FFA.CS-N.;
FFA.CS-O.; CCSS.RI.9-10.4; CCSS.W.9-10.2; CCSS.W.9-10.4;
CCSS.SL.9-10.4; CRP.04; CRP.06

7 Facts About Soil

A graphic organizer for facts about soil, consisting of seven rounded rectangular boxes. Five boxes are arranged in a top row, and two boxes are arranged in a bottom row, centered under the first two boxes of the top row.

Websites used:

Four horizontal lines for writing websites used.

NAME: _____

Part 3

Create your own soil profile! Bring in and use different materials such as food (candy, etc.), craft supplies, etc. to make a soil profile. The soil profile can be an edible profile (made entirely of food) or can be made of craft supplies. See the grading rubric below:

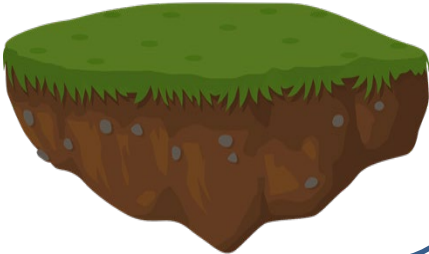
Soil horizons are clearly defined and labeled.	5 points
Each soil horizon is present.	5 points
Creative	10 points
Total points	20 points

Answer the following questions in the section below:

What items are you bringing in to use for your soil profile?

Which layer does it represent?

Why did you choose that material to represent that particular layer of soil?



What are 2 facts you learned about soil profiles?

How can you use the information you learned about soil in the future?

Aligned to the following standards:
FFA.PL-C.; FFA.PL-D.; FFA.PL-F.; FFA.PG-J.; FFA.CS-M.; FFA.CS-N.; FFA.CS-O.; CCSS.RI.9-10.4;
CCSS.W.9-10.2; CCSS.W.9-10.4; CCSS.SL.9-10.4; CRP.04; CRP.06



NEW HORIZONS

WINTER 2018 TEACHING GUIDE



ARTICLE SUMMARY

The Future of Forestry

Hendrix Paterson knew early on that a career in forestry was for him. He first became interested when he participated in a forestry competition in middle school, and his passion for it grew as he got older. Check this article out to learn more about how Hendrix got involved with activities related to forestry and how his forestry-related SAE was developed with support and assistance from a community member.

BELL RINGER:

What are two careers related to the forestry industry?
What might be the educational requirements for those careers?

DISCUSSION QUESTIONS

1. Why is the forestry industry important?
2. How does the forestry industry have an impact on you each day?

ACTIVITY

Students should complete the bell ringer activity listed above. Once all students have written down an answer on their own paper, have them discuss and explain their answers with their neighbors. After five minutes, call on a few students to share their answers.

Have students read the article "The Future of Forestry" and complete the worksheet (Appendix 10). Internet access is required for this activity. This worksheet has three parts: (1) Students will answer questions about the benefits and anatomy of trees using the US Forest Service website (<https://www.fs.fed.us/learn/trees>), (2) students will research two careers on AgExplorer related to the forestry industry and (3) students will create SAE idea cards related to the forestry industry. Internet access is required to access the SAE idea card template, but students can create their own template if internet access is unavailable.

Have students complete the exit ticket on their own paper. If there is time, allow students to share what they learned with the class.

FFA TIP

Train a team for the forestry career development event. For more information, visit the National FFA Forestry Career Development Event page at FFA.org/participate/cdes/forestry/

SAE TIP

Check out the [SAE for All](#) student and teacher guides from the National Council for Agricultural Education to learn more about how to help every student explore future careers and start an SAE that will give them practical experiences.

VOCABULARY

Nurture
Map interpretation
Timber estimation
Consecutive
Evaluation
Native
Incorporate
Devote

EXIT TICKET

What are two facts you learned about careers related to the forestry industry?

CAREER FOCUS AREA

Natural Resource Systems
Environmental Service Systems

RESOURCE HIGHLIGHTS

National FFA Forestry Career Development Event: FFA.org/participate/cdes/forestry/

SAE Idea Cards: FFA.org/educator_resources/sae-idea-cards-create-your-own/

APPENDICIES

Appendix 10: The Future of Forestry

REFERENCES

US Forest Service
<https://www.fs.fed.us/learn/trees>
<https://www.fs.fed.us/learn/trees/anatomy-of-tree>

STANDARDS ALIGNMENT

• **FFA Precept:** FFA.PL-C, FFA.PL-D, FFA.PL-F, FFA.PG-J, FFA.CS-M, FFA.CS-N, FFA.CS-O • **Common Core - Reading: Informational Text:** CCSS.ELA-LITERACY.RI.9-10.4 • **Common Core - Writing:** CCSS.ELA-LITERACY.W.9-10.2, CCSS.ELA-LITERACY.W.9-10.4 • **Common Core - Speaking and Listening:** CCSS.ELA-LITERACY.SL.9-10.4 • **AFNR Career Ready Practices:** CRP.04, CRP.06 • **P21 Skills:** Communication, Critical Thinking and Problem Solving, Initiative and Self-direction, Leadership and Responsibility



Windermere FFA member Hendrix Paterson nurtures a passion for forestry, an industry he plans to work in after college.

THE FUTURE OF FORESTRY

**THIS MEMBER
GROWS A
SUCCESSFUL
SAE TO SERVE
HIS CHAPTER,
SCHOOL AND
COMMUNITY.**

**STORY BY JESSICA
WALKER BOEHM
PHOTOGRAPHY BY
JEFF NOBLE**

It was in his middle school FFA program that Hendrix Paterson first knew he wanted to pursue a career in forestry.

"I remember participating in a forestry competition when I was in the SunRidge Middle School FFA in Winter Garden, Fla.," says Paterson, now a sophomore at Windermere High School in Windermere, just outside of Orlando. "I fell in love with every part of it."

Today, the 15-year-old is using his experiences to nurture the interest that has taken root within him and to prepare for a career as a forest ranger.

Paterson's interest in forestry led him to Forestry Training Camp as both an eighth- and ninth-grader (in 2017 and 2018, respectively) where he learned

about soil, tree diseases and disorders, wildfire protection, job opportunities in the forestry field and more.

Sponsored by the Florida Forest Service and open to FFA members across the state, each weeklong camp is held at O'Leno State Park in northern Florida and ends with a competition in which campers are tested on what they've learned. During both years of attendance, Paterson scored well enough to be named among the top 10 of about 65 campers.

"We're tested on things like map interpretation, timber estimation, tree identification, tool identification and general forestry knowledge," Paterson says. "I've been excited for my hard work to pay off, and it's been an honor to be a top camper for two consecutive years."

“It was at a forestry camp where I realized I wanted to be a forest ranger one day, and I know FFA is going to help me get there,” he adds.

Paterson has been a longtime FFA member, first joining the organization in 2013 as a sixth-grader. He competed in several career development events (CDEs) in areas such as forestry, land judging and livestock evaluation at the state level. During his eighth-grade year, he served as the chapter’s president.

Today, Paterson is an active member and leader in the Windermere FFA, a new chapter that began at Windermere High School in 2017 and has grown to nearly 50 members.

“Our chapter is filled with amazing people who have a lot to offer, and we’re doing great things to help our community,” Paterson says. “Through our hard work, I think we’ve shown that Windermere FFA is something special to be part of. We’re one big family, and there’s a place for everyone; I think that draws people in. We now have 400 agriscience students in our school — chances are, many

of them will join FFA, too.”

As a freshman, Paterson served as the student advisor for Windermere FFA, and he’s currently the treasurer. He has continued his participation in CDEs, most recently competing in land judging, meat evaluation and agricultural sales at the state level, and he mentors the SunRidge Middle School FFA forestry CDE team. However, his biggest contribution to date is the supervised agricultural experience (SAE) project he broke ground on in 2018.

A NEW SPECIES OF SAE

Paterson channeled his passion for forestry into an SAE with the assistance of Dana Sussmann, a senior forester with the Florida Forest Service. Sussmann helped Paterson secure a \$400 grant to purchase trees for his project — creating a native tree forest on the Windermere High School campus.

“I wouldn’t have been able to do this without Dana, and I can’t thank her enough,” Paterson says. “She took a big interest in my SAE and helped me make my dream a reality.”

“IT WAS AT A FORESTRY CAMP WHERE I REALIZED I WANTED TO BE A FOREST RANGER ONE DAY, AND I KNOW FFA IS GOING TO HELP ME GET THERE.”

- HENDRIX PATERSON



Paterson's trees include a wide range of native species such as American elm, red cedar, magnolia, bald cypress, pine and oak. His high school campus is now home to approximately 40 trees, and he plans to plant at least 60 more during the 2018-19 school year.

"Hendrix's SAE is a perfect fit for him because he truly loves forestry, but it's also important because there really weren't many trees on the Windermere High School campus," says Amy Paterson, Windermere FFA advisor and Paterson's mother. "There certainly wasn't the variety of different species that students needed to see. He has made it possible for other students interested in forestry to easily access timber directly outside their classrooms. They no longer have to travel to other places to find native trees. Hendrix essentially helped create a forestry land lab on our campus."

That quick timber access has proven useful since Paterson and his fellow Windermere FFA forestry CDE team members often head outside to examine

and study the trees as they prepare for competitions.

"I've been able to take my team right outside and teach them different ways to identify trees and diseases. We can look at how soil type and ground slope affect tree growth," Paterson says. "My SAE project has helped me become more of a leader in my chapter because it's opened up new opportunities, and spending so much time with the trees has only increased my knowledge base."

In addition, Paterson says he's proud to have created something that future forestry teams and agri-science students will also be able to use, leaving a legacy that will serve others for many years to come.

"In FFA, it's not just about you as an individual member," Paterson says. "It's about your chapter and the members who will come after you. I'll always feel honored that I was able to contribute to my chapter and school in this way."

A GROWING FUTURE

During his sophomore year at Windermere High School, Paterson aims

to become a district or federation officer for the Florida FFA Association. He also hopes to see his CDE teams prosper and earn top spots at the Florida FFA State Convention & Expo.

While he adds trees to his on-campus forest, Paterson plans to create a sitting area where his classmates and others in the community can relax and enjoy his handiwork.

After graduating from high school, Paterson plans to attend the University of Florida and earn a bachelor's degree in forestry management. He'd like to put his knowledge and passion to work as a forest ranger for the Florida Forest Service, which manages more than 1 million acres of public forestland and protects 26 million acres of homes, businesses, private lands and natural resources from wildfires.

"FFA has helped me discover so many things, and I can't imagine my life without it," he says. "There's a competitive atmosphere that propels me forward, and it's helped me find what I want to pursue in college and beyond. Plus, FFA has given me opportunities to serve my community, which is a big part of the organization; we live to serve. There's no doubt that I owe a lot of my success and personal growth to FFA, and I wouldn't be here with my amazing advisors: Mrs. Katrina Alford, the SunRidge Middle School FFA advisor, and my mother." •

Far left: Paterson with his FFA advisor and mother, Amy. Middle: Paterson with fellow Windermere FFA members. Left: Senior forester Dana Sussman helped Paterson secure a grant.

DISCOVER YOUR PERFECT SAE

With so many supervised agricultural experience (SAE) project

opportunities available in areas like entrepreneurship, service-learning, research and more, it can feel challenging and overwhelming to pick the one that's right for you. If you're not sure where to start, don't worry. Your perfect SAE may be right in front of you.

For example, look around your school and community and see what's missing. Can you fill a need that's not being met, like Hendrix Paterson did with his on-campus forest? In other words, consider how you can use your SAE to make an impact that will benefit others, and don't be afraid to think outside the box.

In addition, Windermere FFA advisor Amy Paterson recommends finding a way to incorporate your unique passions and interests into your SAE. That way, she says, you can ensure you're excited about your project and you're truly invested in it. After all, you're going to devote a lot of time to it. Why not love what you're doing?

"It's important to have a personal connection to your SAE," she says. "Choose something that you believe in and you're passionate about. Your SAE can also be related to what you're planning to pursue as a career. Your options are practically limitless, so make the most of the opportunity."

For more FFA SAE information and inspiration, visit **FFA.org/SAE**. Also check out the SAE idea cards and SAE videos on **FFA.org**. Need a way to fund your SAE? Don't forget to look into an SAE grant on **FFA.org**.



NAME: _____

Appendix 10: The Future of Forestry

Created: Winter 2018 by the National FFA Organization

DIRECTIONS:

Read the article "The Future of Forestry" in the Winter 2018 issue of *FFA New Horizons*. After reading the article, complete the activities below.

Part 1

Go to the US Forest Service website (<https://www.fs.usda.gov/learn/trees>) and answer the questions below to learn more about forestry.

1. What are 4 benefits of trees?

2. Anatomy of a tree: <https://www.fs.usda.gov/learn/trees/anatomy-of-tree>

Draw, label and explain the various functions of each part of a tree in the space below.

--

NAME: _____

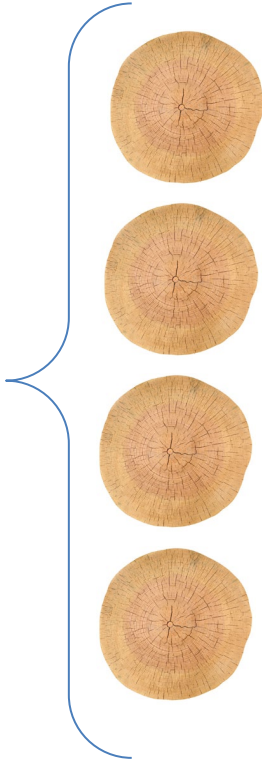
Part 2

Use AgExplorer (AgExplorer.FFA.org) to search for two careers related to the forestry industry. (The search feature is located at the top of the page.) Answer the questions below to learn more about the two careers you identified.



Career One: _____

What are 4 responsibilities/duties of this career?



What educational requirements are needed for this career?



What is the future job market outlook for this career?

Aligned to the following standards:
FFA.PL-C.; FFA.PL-D.; FFA.PL-F.; FFA.PG-J.; FFA.CS-M.; FFA.CS-N.;
FFA.CS-O.; CCSS.RI.9-10.4; CCSS.W.9-10.2; CCSS.W.9-10.4;
CCSS.SL.9-10.4; CRP.04; CRP.06

NAME: _____

Part 2, continued

Use AgExplorer (AgExplorer.FFA.org) to search for two careers related to the forestry industry. (The search feature is located at the top of the page.) Answer the questions below to learn more about the two careers you identified.



Career Two: _____

What are 4 responsibilities/duties of this career?



What educational requirements are needed for this career?



What is the future job market outlook for this career?

Aligned to the following standards:
FFA.PL-C.; FFA.PL-D.; FFA.PL-F.; FFA.PG-J.; FFA.CS-M.; FFA.CS-N.;
FFA.CS-O.; CCSS.RI.9-10.4; CCSS.W.9-10.2; CCSS.W.9-10.4;
CCSS.SL.9-10.4; CRP.04; CRP.06

NAME: _____

Part 3

Create forestry-related SAE idea cards! Using the template found on the FFA website (<https://ffa.box.com/v/saeideacards>), create 4 SAE idea cards in the Natural Resource Systems or Environmental Service Systems pathways related to the forestry industry. If you do not have access to the internet, create your own SAE idea card template and answer the following questions:

- Would I enjoy working with this project?
- Do I currently have, or have access to, the needed resources for this project?
- Where could I take this project?
- Future careers
- Draw a picture to relate to this specific SAE topic.



Is this right for me?

- » Would I enjoy working with this project?
- » Do I currently have, or have access to, needed resources for this project?

Where could I take this project?

»

Future Careers (visit AgExplorer.com):



RESEARCH

ENVIRONMENTAL SERVICE SYSTEMS



Is this right for me?

- » Would I enjoy working with this project?
- » Do I currently have, or have access to, needed resources for this project?

Where could I take this project?

»

Future Careers (visit AgExplorer.com):



EXPLORATORY

ENVIRONMENTAL SERVICE SYSTEMS

Aligned to the following standards:

FFA.PL-C.; FFA.PL-D.; FFA.PL-F.; FFA.PG-J.; FFA.CS-M.; FFA.CS-N.;
FFA.CS-O.; CCSS.RI.9-10.4; CCSS.W.9-10.2; CCSS.W.9-10.4;
CCSS.SL.9-10.4; CRP.04; CRP.06

NAME: _____



OWNERSHIP/ENTREPRENEURSHIP

Is this right for me?

- » Would I enjoy working with this project?
- » Do I currently have, or have access to, needed resources for this project?

Where could I take this project?

»

Future Careers (visit AgExplorer.com):



NATURAL RESOURCES SYSTEMS



PLACEMENT/INTERNSHIP

Is this right for me?

- » Would I enjoy working with this project?
- » Do I currently have, or have access to, needed resources for this project?

Where could I take this project?

»

Future Careers (visit AgExplorer.com):



NATURAL RESOURCES SYSTEMS

Aligned to the following standards:
FFA.PL-C.; FFA.PL-D.; FFA.PL-F.; FFA.PG-J.; FFA.CS-M.; FFA.CS-N.;
FFA.CS-O.; CCSS.RI.9-10.4; CCSS.W.9-10.2; CCSS.W.9-10.4;
CCSS.SL.9-10.4; CRP.04; CRP.06

NAME: _____

Aligned to the following standards:
CS.05; AG5; FFA.PL-A; FFA.PL-C; FFA.PL-E; FFA.PL-F; FFA.CS-M;
FFA.CS-N; CCSS.SL.9-10.2; CCSS.WHST.9.10.4; MP5; MP6

KEY — Appendix 4: Thank You

Created: Winter 2018 by the National FFA Organization

DIRECTIONS:

It is always important to thank a person who has assisted you by providing a recommendation letter. Visit <https://www.aresearchguide.com/professional-thank-you-letter.html> to learn the important components of a thank you letter.

1. Start by greeting the recipient.
2. Express your thanks.
3. Add the reason.
4. Include Looking forward statement.
5. Restate your thanks.
6. End with your regards.



RUBRIC: Craft your own thank you letter in the space below. Be sure to include the 6 important components learned.

Indicator	Very Strong Evidence of Skill (5–4 points)	Moderate Evidence of Skill (3–2 points)	Weak Evidence of Skill (1–0 points)	Points Earned
Format	The document was directed to the appropriate person with an appropriate address and salutation. The level of formality was appropriate for the type of correspondence.	The document was directed to the appropriate person with an appropriate address and salutation with minor errors. The level of formality was generally appropriate for the type of correspondence.	The document was not directed to the appropriate person. No address or salutation was included. The level of formality was not appropriate.	
Content	Effectively expressed appreciation and appropriately reiterated their qualities; expressed interest and appropriately stated provisions for follow-up	Attempted to express appreciation and generally reiterated their qualities; generally expressed interest and attempted to state provisions for follow-up	Did not attempt to express appreciation; did not attempt to reiterate their qualities; did not attempt to express interest or state provisions for follow-up	
Grammar/ Punctuation/ Spelling	Spelling, grammar and punctuation are extremely high quality with two or less errors in the document.	Spelling, grammar and punctuation are adequate with three to five errors in the document.	Spelling, grammar and punctuation are less than adequate with six or more errors in the document.	
Overall Impression	Writing was legible, and length was appropriate.	Writing was difficult to read, and length was generally appropriate.	Writing was illegible, and length was inappropriate.	

NAME: _____

Aligned to the following standards:
CS.02; CS.04; FFA.PL-A; FFA.PL-F; FFA.PG-J; AG2; AGC10.04; CCSS.RI.9-10.4; CCSS.SL.9-10.2; MP2; MP5; MP6; CRP.02; CRP.04; CRP.05; CRP.06; CRP.07; CRP.08

KEY — Appendix 5: I Can Grow Food Without Soil?

Created: Winter 2018 by the National FFA Organization

DIRECTIONS:

Watch the video "Hydroponics—A Short Introduction" and complete the following activities. The video is available at <https://youtu.be/Y7cGd0JHrs4>.



Hydro



Water

Ponos



Work



HYDROPONICS

The process of growing plants with a medium other than soil.

What do plants rely on instead of soil?
(Hint: It is found in the water.)

Nutrient Solution



(Draw a picture)

What are the benefits of replacing soil? Circle all that apply.



What is conventional farming? Considered to be "traditional" farming that utilizes pesticides, GMOs, etc.



Compare and contrast hydroponics and conventional farming in three sentences or more.

Describe why hydroponics can be such a powerful resource for food production.

Hydroponics can be utilized in places where conventional/traditional farming cannot take place. Additionally, less pests and weeds are found, and less water is utilized in this type of plant production.

NAME: _____

Aligned to the following standards:
CS.01; CS.02; FFA.PL-A; FFA.PL-C; FFA.PL-F; FFA.PG-I; FFA.PG-J; FFA.CS-N; AG1; AG2;
AGC10.03; AGC10.04; CCSS.SL.9-10.2; CCSS.SL.9-10.4; CCSS.WHST.9.10.1;
CCSS.WHST.9.10.4; CCSS.MP3; CRP.02; CRP.04; CRP.05; CRP.06; CRP.07; CRP.08

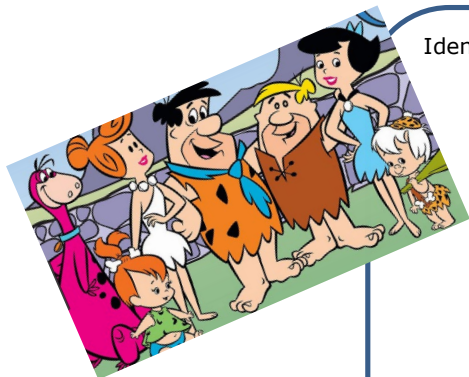
KEY — Appendix 8: Rise of the Robots

Created: Winter 2018 by the National FFA Organization

DIRECTIONS:

There have been many changes in technology throughout history. Watch the following two cartoon video clips from *The Flintstones* and *The Jetsons*, and identify five technology differences.

The Flintstones Clip: <https://youtu.be/uq7noaMwLfq>. *The Jetsons* Clip: <https://youtu.be/0JQbeCAIF6s>.



Identify five technology differences between the two videos.

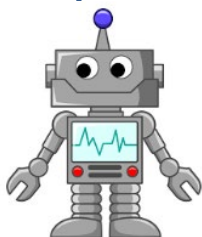
1. Answers will vary.
2. _____
3. _____
4. _____
5. _____



Which video are we more like today?



How do you think technology will change over the next 50 years? **Answers will vary.**



Watch the video available here:
<https://www.youtube.com/watch?v=4qrlFse5I1U>.
Why might the use of technology such as robots be controversial in the agriculture industry?
Answers will vary.

NAME: _____

KEY — Appendix 9: From the Ground Up

Created: Winter 2018 by the National FFA Organization

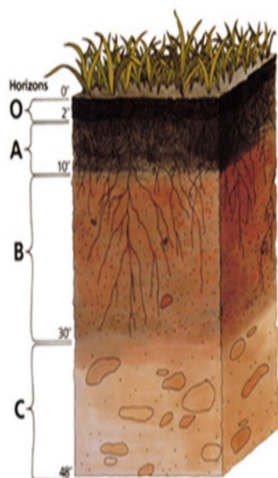
DIRECTIONS:

Read the article "From the Ground Up" in the Winter 2018 issue of *FFA New Horizons*. After reading the article, complete the activities below.

Part 1

Go to the USDA Natural Resources Conservation Service Soils webpage and answer the questions below.

(https://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/edu/?cid=nrcs142p2_054308)



Draw and label a soil profile in the space to the left.



Why do you think it is important to know the soil horizons within the soil profile?

Answers could vary: It is important to know what nutrients are present within the soil to know what will grow.

Define the term "soil horizon":

The various layers within the soil



Aligned to the following standards:

FFA.PL-C.; FFA.PL-D.; FFA.PL-F.; FFA.PG-J.; FFA.CS-M.; FFA.CS-N.; FFA.CS-O.; CCSS.RI.9-10.4; CCSS.W.9-10.2; CCSS.W.9-10.4; CCSS.SL.9-10.4; CRP.04; CRP.06

NAME: _____

Aligned to the following standards:
FFA.PL-C.; FFA.PL-D.; FFA.PL-F.; FFA.PG-J.; FFA.CS-M.; FFA.CS-N.;
FFA.CS-O.; CCSS.RI.9-10.4; CCSS.W.9-10.2; CCSS.W.9-10.4;
CCSS.SL.9-10.4; CRP.04; CRP.06

KEY — Appendix 10: The Future of Forestry

Created: Winter 2018 by the National FFA Organization

DIRECTIONS:

Read the article "The Future of Forestry" in the Winter 2018 issue of *FFA New Horizons*. After reading the article, complete the activities below.

Part 1

Go the US Forest Service website(<https://www.fs.fed.us/learn/trees>) and answer the questions below to learn more about forestry.

1. What are 4 benefits of trees?

Trees remove 53 tons of carbon dioxide and 430 pounds of other air pollutants per year.

Tree-filled neighborhoods lower levels of domestic violence and are safer and more sociable.

One hundred mature trees catch about 139,000 gallons of rainwater per year.

Strategically placed trees save up to 56 percent on annual air-conditioning costs.

Consumers shop more frequently and longer in tree-lined commercial areas and are willing to spend more.

Each large front yard tree adds to a home's sale price.

2. Anatomy of a tree: <https://www.fs.fed.us/learn/trees/anatomy-of-tree>

Draw, label and explain the various functions of each part of a tree in the space below.

