



Lesson Plan

Irrigation

Created: 03/2019 by the National FFA Organization

Tyler's supervised agricultural experience (SAE) program is turfgrass management, specifically the installing, maintaining and repairing of irrigation systems. Follow along as he shares what he has learned about technology and water conservation.

STUDENT LEARNING OBJECTIVES:

After completing these activities, students will ...

1. Explain the responsibilities of irrigation technicians.
2. Examine the topic of water scarcity and agriculture.
3. Create an infographic that shows the relationship between water conservation and technology.

TIME REQUIRED: 120 minutes

RESOURCES/REFERENCES:

1. Video: "Turfgrass Management-Irrigation SAE | Tyler Hewitt," <https://vimeo.com/368438143>
2. Website: "Water Topics," <https://www.epa.gov/environmental-topics/water-topics>
3. Website: "Water Availability," <https://www.ars.usda.gov/natural-resources-and-sustainable-agricultural-systems/water-availability-and-watershed-management/>
4. Website: "Water Conservation," <https://www.nal.usda.gov/waic/water-conservation>
5. Article: "Coping with Water Scarcity in Agriculture," <http://www.fao.org/3/a-i6459e.pdf>

EQUIPMENT AND SUPPLIES NEEDED:

1. A copy of the "Smart Irrigation" worksheet for each student
2. A copy of the "Water Conservation Through Technology" worksheet for each student
3. A copy of the "Infographic Rubric" for each student or group of students
4. Internet access to play the video in real time or embed it in a PowerPoint ahead of time
5. Internet and device access for students to conduct research
6. Colored pens/pencils or technology access to create digital infographics

STUDENT ACTIVITY SHEETS:

Direct access to student activity sheets without lesson plan or answer key for easy upload to learning management systems or printing for classwork.

<https://ffa.box.com/s/zs0opfooivkn9nmpee45m5sbzy0uzax7> (Word)

<https://ffa.box.com/s/omy2bpf41lx3ypryjn8r515gs2rvzp> (PDF)

CROSS-CURRICULAR CONNECTIONS:

Science	English/Language Arts
Research the relationship between water conservation and technology	Create infographic outlining facts discovered during research

THESE ACTIVITIES ARE ALIGNED TO THE FOLLOWING STANDARDS:

AFNR Performance Element

- NRS.02. Analyze the interrelationships between natural resources and humans.

FFA Precept

- FFA.PL-A.Action: Assume responsibility and take the necessary steps to achieve the desired results, no matter what the goal or task at hand.
- FFA.PG-J.Mental Growth: Embrace cognitive and intellectual development relative to reasoning, thinking and coping.

Common Career Technical Core

- AG-NR2 Analyze the interrelationships between natural resources and humans.

NASDCTEc

- AGPE01.03 Apply scientific principles and processes when planning and conducting natural resource management activities to determine the need, feasibility and application of logical, reasoned solutions to natural resource system problems and issues.

AFNR Cluster Skills

- CS.06. Analyze the interaction among AFNR system in the production, processing and management of food, fiber and fuel and the sustainable use of natural resources.

Common Core – Reading: Informational Text

- CCSS.ELA-Literacy.RI.9-10.3 Analyze how the author unfolds an analysis or series of ideas or events, including the order in which the points are made, how they are introduced and developed, and the connections that are drawn between them.

Common Core – Science & Technical Subjects

- CCSS.ELA-Literacy.RST.9.10.1 Cite specific textual evidence to support analysis of science and technical texts, attending to the precise details of explanations or descriptions.
- CCSS.ELA-Literacy.RST.9.10.2 Determine the central ideas or conclusions of a text; trace the text's explanation or depiction of a complex process, phenomenon, or concept; provide an accurate summary of the text.
- CCSS.ELA-Literacy.RST.9.10.5 Analyze the structure of the relationships among concepts in a text, including relationships among key terms (e.g., force, friction, reaction force, energy).
- CCSS.ELA-Literacy.RST.9.10.8 Assess the extent to which the reasoning and evidence in a text support the author's claim or a recommendation for solving a scientific or technical problem.

Common Core – Literacy in Science & Technical Subjects: Writing

- CCSS.ELA-Literacy.WHST.9.10.4 Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience.
- CCSS.ELA-Literacy.WHST.9.10.7 Conduct short as well as more sustained research projects to answer a question (including a self-generated question) or solve a problem; narrow or broaden the inquiry when appropriate; synthesize multiple sources on the subject, demonstrating understanding of the subject under investigation.
- CCSS.ELA-Literacy.WHST.9-10.8 Gather relevant information from multiple authoritative print and digital sources, using advanced searches effectively; assess the usefulness of each source in answering the research question; integrate information into the text selectively to maintain the flow of ideas, avoiding plagiarism and following a standard format for citation.
- CCSS.ELA-Literacy.WHST.9.10.9 Draw evidence from informational texts to support analysis, reflection, and research.

Next Generation Science

- HS-ESS3-1 Construct an explanation based on evidence for how the availability of natural resources, occurrence of natural hazards, and changes in climate have influenced human activity.

Green/Sustainability Knowledge and Skill Statements

- AFNR Career Cluster, Statement 7 Demonstrate an understanding of green and sustainability trends that are impacting processes and markets in AFNR.

AFNR Career Ready Practices

- CRP.02. Apply appropriate academic and technical skills. Career-ready individuals readily access and use the knowledge and skills acquired through experience and education to be more productive.
- CRP.05. Consider the environmental, social and economic impact of decisions. Career-ready individuals understand the interrelated nature of their actions and regularly make decisions that positively impact and/or mitigate negative impact on other people, organizations and the environment.
- CRP.07. Employ valid and reliable research strategies. Career-ready individuals are discerning in accepting and using new information to make decisions, change practices or inform strategies.
- CRP.08. Utilize critical thinking to make sense of problems and persevere in solving them. Career-ready individuals readily recognize problems in the workplace, understand the nature of the problem, and devise effective plans to solve the problem.

Partnership for 21st Century Skills

- Environmental Literacy
- Information Literacy
- Initiative and Self-Direction
- Productivity and Accountability

LESSON PLAN:

1. *Bell Ringer:* Write this statement on the board: Explain the term "water conservation." Have students answer the prompt on their own paper.
2. *Introduction:* Irrigation technicians play an important role not only in turfgrass management but also water conservation. Today, we'll learn how an FFA member became an irrigation technician and how he works to improve water conservation through his job.

3. *Activity:*
 - a. Each student needs a copy of the worksheet "Smart Irrigation." Have students complete the questions as they watch the video "Turfgrass Management-Irrigation SAE | Tyler Hewitt," available at <https://vimeo.com/368438143>.
 - b. After students have watched the video, hand out the worksheet "Water Conservation Through Technology." Have students conduct research and complete the worksheet individually. Once students have completed the worksheet, divide them into small groups and have them create an infographic that shows how technology can assist with water conservation efforts. Students can create the infographics using paper and colored pencils or pens. If you have the time and technology resources, you can have students create digital infographics using an online infographic generator. Please note, to use the tools students would need to create a free account.
 - i. Piktochart — <https://piktochart.com/formats/infographics/>
 - ii. Canva — <https://www.canva.com>
4. *Follow-up:* After students have finished, have groups share their infographics with the class. Then, have a class discussion about how technology impacts water conservation.
5. *Optional — Extended Learning Opportunities (Not factored into time requirement):*
 - a. This should take 30 minutes.
 - b. Have students use [AgExplorer.ffa.org](https://www.agexplorer.org) to research three other careers that require knowledge of irrigation systems. Have students compare and contrast the job responsibilities of the three careers using the worksheet "Irrigation-Related Careers."
6. *Exit Ticket:* 3-2-1: Have students write three things they learned from the lesson, two things they found interesting and one question they still have from the lesson.

NAME: _____

Aligned to the following standards:

NRS.02; FFA.PL-A; FFA.PG-J; AG-NR2; AGPE01.03; CS.06; CCSS.RI.9-10.3; CCSS.RST.9.10.1; CCSS.RST.9.10.2; CCSS.RST.9.10.5; CCSS.RST.9.10.8; CCSS.WHST.9.10.4; CCSS.WHST.9.10.7; CCSS.WHST.9.10.8; CCSS.WHST.9.10.9; MP3; MP6; AFNR Career Cluster, Statement 7; CRP.02; CRP.05; CRP.07; CRP.08

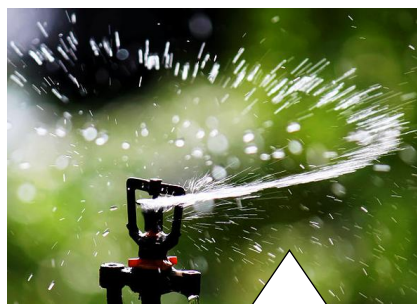
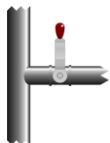
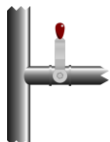
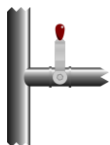
Smart Irrigation

DIRECTIONS:

Read over and answer the questions below while you watch the video "Turfgrass Management-Irrigation SAE | Tyler Hewitt," available at <https://vimeo.com/368438143>.

Describe Tyler's SAE.

List the tasks Tyler does at work on a typical day.



What did Tyler do to become a certified irrigation expert?



What is Tyler's claim to fame? (Hint: It's related to his certification.)

How does his SAE help his community?



NAME: _____

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CCSS.RST.9.10.1; CCSS.RST.9.10.2; CCSS.RST.9.10.5; CCSS.RST.9.10.8;
CCSS.WHST.9.10.4; CCSS.WHST.9.10.7; CCSS.WHST.9.10.8; CCSS.WHST.9.10.9; MP3;
MP6; AFNR Career Cluster, Statement 7; CRP.02; CRP.05; CRP.07; CRP.08

Water Conservation Through Technology

DIRECTIONS:

Through Tyler Hewitt's work in his SAE, he has learned that water conservation and technology are closely linked. Answer the questions below by researching water conservation and technology. Then, create an infographic that shows how technology can assist with water conservation efforts. Create your infographic using paper and colored pencils or pens. If your teacher approves, you can also use digital resources to create your infographic.

Suggested Resources:

Water Conservation: <https://www.epa.gov/environmental-topics/water-topics>

Water Availability: <https://www.ars.usda.gov/natural-resources-and-sustainable-agricultural-systems/water-availability-and-watershed-management/>

Water Conservation: <https://www.nal.usda.gov/waic/water-conservation>

Water Scarcity: <http://www.fao.org/3/a-i6459e.pdf>

Find four facts about the importance of water conservation.



Research water scarcity and agriculture, and list three things you learned.



Describe three technologies that could help with water conservation.

Technology 1

Technology 2

Technology 3

What are steps you can take each day to practice water conservation?

NAME: _____

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KEY: Smart Irrigation

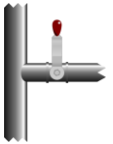
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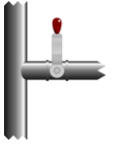
Describe Tyler's SAE.

His SAE is turfgrass management, and he specifically focuses on irrigation. He upgrades existing irrigation systems and fixes problems that arise. He does a lot of "smart" irrigation so that technology can control the system from anywhere in the world.

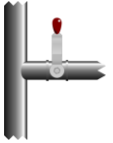
List the tasks Tyler does at work on a typical day.



Troubleshoots what's wrong with a system



Tracks broken wires in the field with a wire tracker



Uses GPS mapping to show how all the components fit together



What did Tyler do to become a certified irrigation expert?



Two months of training



30 to 40 hours of online courses



Completed a three-day class in California to complete his certification

What is Tyler's claim to fame? (Hint: It's related to his certification.)

He is the youngest certified expert from Hunter Industries.



How does his SAE help his community?

He keeps the area's turf healthy and attractive, which draws in visitors and grows businesses in the area.

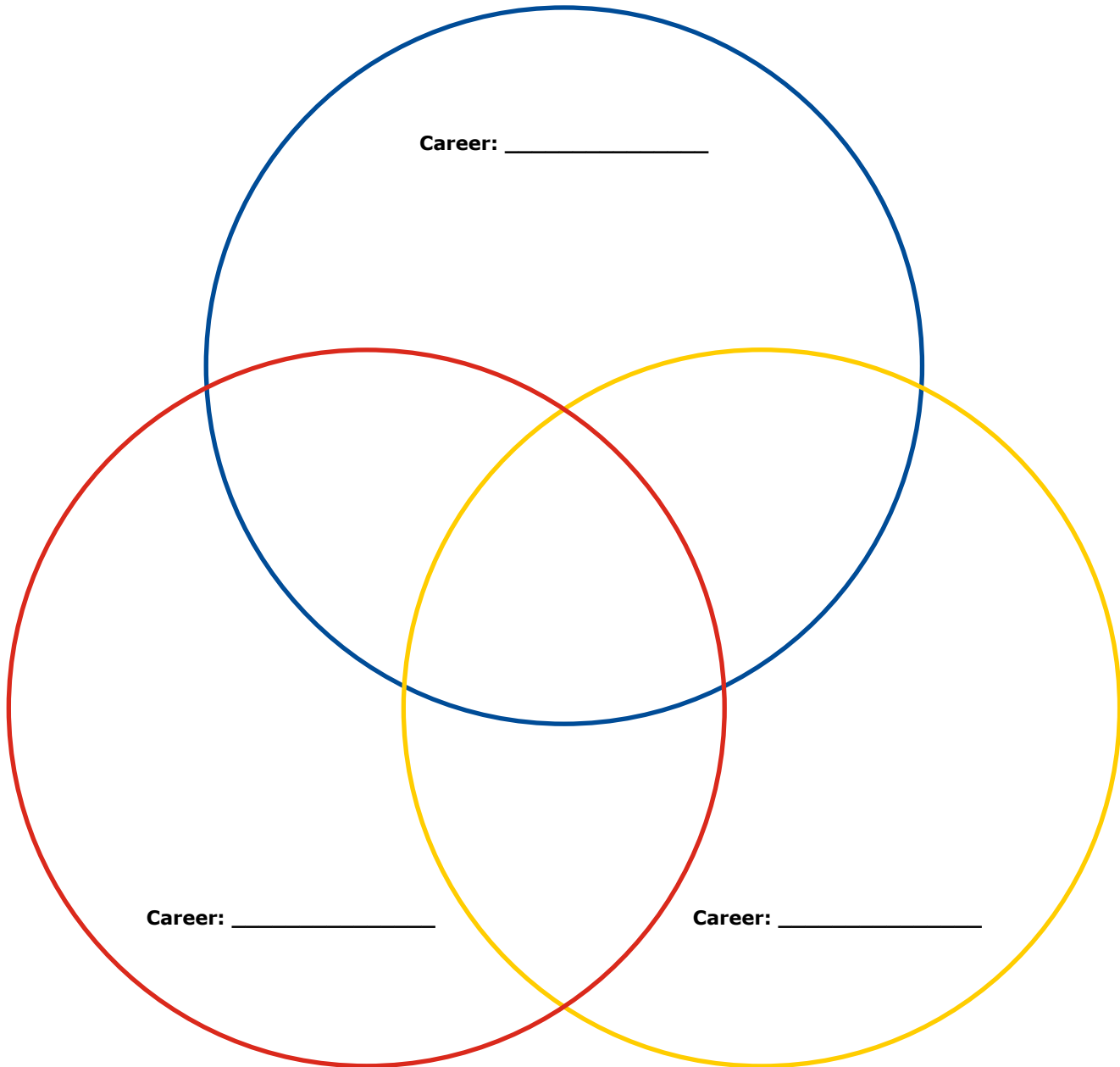
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MP6; AFNR Career Cluster, Statement 7; CRP.02; CRP.05; CRP.07; CRP.08

Irrigation-Related Careers

1. Using AgExplorer.ffa.org, research three careers that require knowledge of irrigation systems. Compare and contrast the job responsibilities of the three careers in this Venn diagram.



2. Summarize what you learned about the similarities and differences between job responsibilities in careers that require knowledge of irrigation systems.

NAME: _____

Infographic Rubric

	25–21 Points	20–16 Points	15–11 Points	10–6 Points	5–0 Points
Design Layout Color Scheme Fonts	Layout is organized and uses consistent style. Color scheme has visual appeal and works with content. Fonts are legible and consistent.	Generally good layout Has minor inconsistency or one distracting element Color scheme clashes	Layout could use improvement Two or more inconsistent elements Hard to read fonts Layout distracts from content	Layout is disorganized, no obvious organization Layout distracts from content Color scheme is confusing.	No layout or scheme—just random elements, colors and fonts
Content Terms, Facts Quantity of data Quality of data	Appropriate terms, vocab, jargon defined and used More than enough data to make claims Data clearly demonstrate trend, claim, etc. Data from good source	One or two terms or jargon used incorrectly or without explanation. Adequate amount of data Data demonstrate trend, claim, etc. Data from good source	Not enough terms, vocab, jargon Data is sparse. Data might not demonstrate the trend or claim. Data from good source	Lacking in appropriate terminology Not enough facts or data Data is from poor or questionable source.	No real data or facts are present.
Clarity Makes a claim Efficiency Makes clear impression	Claim or main idea is obvious and easy to understand. No unnecessary graphics or visuals Infographic makes a good initial impression.	Claim or main idea is understandable. No unnecessary graphics or visuals	Claim or main idea is made. Some graphics or visuals are unneeded.	Infographic makes a poor initial impression. Confusing	Claim or main idea is missing.
Representation Design complements content Careful choice of visuals Data visualization matches content and claim	Design elements are clearly informed by content. Visuals show connection to content and create a visual flow. Visualizations fit the data and the claim.	Design elements are clearly informed by content. Visualizations fit the data and the claim.	Visualizations fit the data and the claim.	Design and visuals are at odds with the content or claims being made.	Design elements and visuals convey a meaning contrary to the intent.

Modified from “General Infographic” created by Jim White and available at <http://science-infographics.org/general-infographic-rubric/>.