Lesson Plan

Composting Research

Created: 03/2019 by the National FFA Organization

Jordan and Amari's supervised agricultural experience (SAE) program involves researching the barriers to urban composting. Follow along as they describe how they became interested in the topic, the steps they followed in their research and the help they got along the way.

STUDENT LEARNING OBJECTIVES:

After completing these activities, students will …

1. Create survey questions to determine what community members know about composting.
2. Identify research topics that interest them.
3. Formulate questions they can solve through research.

TIME REQUIRED: 120 minutes

RESOURCES/REFERENCES:

1. Video: "Research-Composting SAE | Jordan Butler and Amari Manago," https://vimeo.com/349686476
2. Website: USDA Agricultural Research Service (ARS), https://www.ars.usda.gov/
3. PDF: Research Independent Learning Guide — Student Edition, https://FFA.box.com/s/01ua7f36j6ky11r5b3awuq3ipqp8vz6v

EQUIPMENT AND SUPPLIES NEEDED:

1. A copy of the "Asking Questions" worksheet for each student
2. A copy of the "Research It!" worksheet for each student
3. Internet access to play the video in real time or embed it in a PowerPoint ahead of time
4. Technology access for students to explore research topics

STUDENT ACTIVITY SHEETS:

Direct access to student activity sheets without lesson plan or answer key for easy upload to learning management system or printing for classwork.
https://ffa.box.com/s/vzfya6vtt22xqy3o90habetsf4xxdty2 (Word)
https://ffa.box.com/s/x6hhrh4etjltk38eq3htdjerpjc1je6s (PDF)

CROSS-CURRICULAR CONNECTIONS:

Science	English/Language Arts
Brainstorm research questions and methods to answer those questions	Peruse information from multiple places to identify research topics of interest

THESE ACTIVITIES ARE ALIGNED TO THE FOLLOWING STANDARDS:

AFNR Performance Element

- CS.01. Analyze how issues, trends, technologies and public policies impact systems in the Agriculture, Food & Natural Resources Career Cluster

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.
- FFA.CS-N.Decision Making: Analyze a situation and execute an appropriate course of action.

Common Career Technical Core

- AG1 Analyze how issues, trends, technologies and public policies impact systems in the Agriculture, Food & Natural Resources Career Cluster.

NASDCTEc

- AGC10.04 Envision emerging technology and globalization and project its influence on widespread markets to demonstrate an understanding of technologies and trends that will impact the AFNR industry.

Common Core – Reading: Informational Text

- CCSS.ELA-Literacy.RI.9-10.4 Determine the meaning of words and phrases as they are used in a text, including figurative, connotative, and technical meanings; analyze the cumulative impact of specific word choices on meaning and tone (e.g., how the language of a court opinion differs from that of a newspaper).
- CCSS.ELA-Literacy.RI.9-10.8 Delineate and evaluate the argument and specific claims in a text, assessing whether the reasoning is valid and the evidence is relevant and sufficient; identify false statements and fallacious reasoning.

Common Core – Science & Technical Subjects

- CCSS.ELA-Literacy.RST.9-10.7 Translate quantitative or technical information expressed in words in a text into visual form (e.g., a table or chart) and translate information expressed visually or mathematically (e.g., in an equation) into words.
- CCSS.ELA-Literacy.RST.9-10.9 Compare and contrast findings presented in a text to those from other sources (including their own experiments), noting when the findings support or contradict previous explanations or accounts.

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.04. Communicate clearly, effectively, and with reason. Career-ready individuals communicate thoughts, ideas and action plans with clarity, whether using written, verbal and/or visual methods.
- 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.06. Demonstrate creativity and innovation. Career-ready individuals regularly think of ideas that solve problems in new and different ways, and they contribute those ideas in a useful and productive manner to improve their organization.
- 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.
- CRP.11. Use technology to enhance productivity. Career-ready individuals find and maximize the productive value of existing and new technology to accomplish workplace tasks and solve workplace problems.

Partnership for 21st Century Skills

- Information, Communications, and Technology Literacy
- Global Awareness
- Think Creatively

LESSON PLAN:

1. *Bell Ringer:* Students should answer this question on their own paper: What agricultural topic do you want to know more about?

2. *Introduction:* Agriculture is a science, and without research, agriculturists would not be able to feed the world population. Today, we'll learn about two students who started asking questions and discovered an SAE that was perfect for them.

3. *Activity:*
    a. Each student needs a copy of the worksheet "Asking Questions." Have students watch the video "Research-Composting SAE | Jordan Butler and Amari Manago," available at https://vimeo.com/349686476, and then complete the worksheet. After students are done, have them share some of the survey questions they developed. Discuss ways they could improve their questions to get more specific information.
    b. Give each student a copy of the "Research It!" worksheet. This worksheet has two parts. In the first part, students will look for research topics that interest them using the USDA Agricultural Research Service website (https://www.ars.usda.gov/). In the second part, students will take two topics they are interested in and come up with a question about the topic that they want to answer through research.
        i. Note: The "Research It!" worksheet was based on the "Research Independent Learning Guide — Student Edition" (https://FFA.box.com/s/01ua7f36j6ky11r5b3awuq3ipqp8vz6v). To learn more about SAE for All and to access all the available resources, visit https://saeforall.org/. The worksheet for this activity is shorter and simpler, but if you have a student who is seriously interested in a Research SAE or you want your students to pursue Research SAEs, then it is suggested that instead of using the "Research It!" worksheet, give students the complete "Research Independent Learning Guide — Student Edition," available at https://saeforall.org/.

4. *Follow-up:* Have students share one question they want to answer through research. If students have similar questions, then have them pair up to discuss ways they could work together to conduct the research.

5. *Optional — Extended Learning Opportunities (Not factored into time requirement):*
    a. If doing individual research and agriscience fair projects is not feasible for your class, then consider choosing a topic to research as a class. Conduct the research project in its entirety as a class. Divide students into groups and rotate the groups through different duties so they get to experience each part of a research project.

6. *Exit Ticket:* Are you interested in conducting a research project? Why or why not?

NAME: _____

Aligned to the following standards:
CS.01; FFA.PL-A; FFA.PG-J; FFA.CS-N; AG1; AGC10.04; CCSS.RI.9-10.4; CCSS.RI.9-10.8; CCSS.RST.9-10.7; CCSS.RST.9-10.9; MP2; MP3; MP5; MP6; CRP.02; CRP.04; CRP.05; CRP.06; CRP.07; CRP.08; CRP.11

Asking Questions

DIRECTIONS:

Answer the questions below as you watch the video "Research-Composting SAE | Jordan Butler and Amari Manago," available at https://vimeo.com/349686476.

1. **What is Jordan and Amari's SAE?**

2. **What is the topic of their research project?**

What motivated them to do this research SAE?

3. **What steps did they take to get started?**

Step 1

Step 2

Step 3

4. **Who helped them to complete their project?**

Person 1:	How did this person help Amari and Jordan?
Person 2:	How did this person help them?
Person 3:	How did this person help them?

5. **Jordan and Amari had to write survey questions to find out what people knew about composting. In the space below, create two multiple choice survey questions to find out what people know about composting in your community.** (Tip: Make the questions specific, and make sure there is an option for everyone, such as "other.")

NAME: _____

Aligned to the following standards:
CS.01; FFA.PL-A; FFA.PG-J; FFA.CS-N; AG1; AGC10.04; CCSS.RI.9-10.4; CCSS.RI.9-10.8; CCSS.RST.9-10.7; CCSS.RST.9-10.9; MP2; MP3; MP5; MP6; CRP.02; CRP.04; CRP.05; CRP.06; CRP.07; CRP.08; CRP.11

Research It!

Part 1

DIRECTIONS:

Jordan and Amari encouraged us to look beyond the typical SAEs and find a topic we wanted to know more about. Complete the following activities to discover **four** areas of research/research topics that appeal to you.

Go to the United States Department of Agriculture (USDA) Agricultural Research Service (ARS) website (https://www.ars.usda.gov/).

Explore the website. You can use any of the following options to explore USDA ARS research and complete the chart.

- Search the site by using key words in the standard search tool
- Search through the "I Want To" tool
- Search through the "Trending Topics" tool
- Search through the "ARS in Your State" tool

Research Topics of Interest (one per row)	Two Facts You Learned About This Topic	Two Questions You Would Ask the Person Doing the Research
	1. 2.	1. 2.
	1. 2.	1. 2.
	1. 2.	1. 2.
	1. 2.	1. 2.

NAME: _____

Part 2

DIRECTIONS:

Now that you've identified some areas you would like to explore, choose two. Complete the table below to brainstorm questions you want to investigate and how you might carry out that research.

Research Topic	Question About This Topic You Want to Answer Through Research	Process to Answer the Question What would you need to do to answer this question? (conduct an experiment, survey the community, etc.)	What do you need to know before you can begin the process of answering this question?

Aligned to the following standards:
CS.01; FFA.PL-A; FFA.PG-J; FFA.CS-N; AG1; AGC10.04; CCSS.RI.9-10.4; CCSS.RI.9-10.8; CCSS.RST.9-10.7; CCSS.RST.9-10.9; MP2; MP3; MP5; MP6; CRP.02; CRP.04; CRP.05; CRP.06; CRP.07; CRP.08; CRP.11

NAME: _____

Aligned to the following standards:
CS.01; FFA.PL-A; FFA.PG-J; FFA.CS-N; AG1; AGC10.04; CCSS.RI.9-10.4; CCSS.RI.9-10.8; CCSS.RST.9-10.7; CCSS.RST.9-10.9; MP2; MP3; MP5; MP6; CRP.02; CRP.04; CRP.05; CRP.06; CRP.07; CRP.08; CRP.11

KEY: Asking Questions

DIRECTIONS:

Answer the questions below as you watch the video "Research-Composting SAE | Jordan Butler and Amari Manago," available at https://vimeo.com/349686476.

1. **What is Jordan and Amari's SAE?**
   A research-based SAE studying the barriers to urban composting

What motivated them to do this research SAE?

They wanted to figure out ways to reduce solid waste and help others learn to compost.

2. **What steps did they take to get started?**

Step 1
Created the written report

Step 2
Created the visual representation

Step 3
Prepared for their interview with a mock interview

3. **Who helped them to complete their project?**

Person 1: Agriculture teacher	How did this person help Amari and Jordan? She helped them make non-biased questions and distribute the surveys to different areas.
Person 2: School garden coordinator	How did this person help them? He helped them get the research project started. They researched the perceived difficulties of composting so they could try to find ways to make it easier for people.
Person 3: Graphic design teacher	How did this person help them? The teacher and her class helped them determine how their display poster should be organized and what content it should have.

4. **Jordan and Amari had to write survey questions to find out what people knew about composting. In the space below, create two multiple choice survey questions to find out what people know about composting in your community.** (Tip: Make the questions specific, and make sure there is an option for everyone, such as "other.")

   Answers will vary. Unless students have done this before, the question quality will not be that high, but the goal is to get them thinking about what goes into a research survey.