



Lesson Plan

Drones in Agriculture

Created: 03/2019 by the National FFA Organization

Jacob's supervised agricultural experience (SAE) program involves the use of drones to assist agricultural producers. Learn how Jacob turned his passion for radio control technology and helping people into a productive SAE.

STUDENT LEARNING OBJECTIVES:

After completing these activities, students will ...

1. List the uses for drones in agriculture.
2. Identify their career goals and interests.
3. Set goals for their SAEs.

TIME REQUIRED: 120 minutes

RESOURCES/REFERENCES:

1. Video: "Drones in Agriculture SAE | Jacob Reed," available at <https://vimeo.com/342503497>
2. Article: "Agricultural Drones: How Drones Are Revolutionizing Agriculture," <https://digitalagrevolution.wordpress.com/2019/11/12/drones-are-they-revolutionizing-agriculture-for-good/>
3. SAE Idea Cards, <https://FFA.box.com/v/saeideacards>

EQUIPMENT AND SUPPLIES NEEDED:

1. A copy of the "Eye in the Sky" worksheet for each student
2. A copy of the "Interest and Purpose Combined" worksheet for each student
3. Internet access to play the video in real time or embed it in a PowerPoint ahead of time

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/49rz0no159azql56gfc8p6o68w0x7jd> (Word)

<https://ffa.box.com/s/g9xrpqwhvirmqt3p9x6t4x9zcxuztey> (PDF)

CROSS-CURRICULAR CONNECTIONS:

English/Language Arts
Create written reflection of life goals

THESE ACTIVITIES ARE ALIGNED TO THE FOLLOWING STANDARDS:

AFNR Performance Element

- CS.05. Describe career opportunities and means to achieve those opportunities in each of the Agriculture, Food & Natural Resources career pathways.

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.PL-C.Vision: Visualize the future and how to get there.
- FFA.PL-E.Awareness: Understand personal vision, mission and goals.
- FFA.PL-F.Continuous Improvement: Accept responsibility for learning and personal growth.
- FFA.PG-I.Professional Growth: Assume responsibility for attaining and improving upon the skills needed for career success.
- 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

- AG5 Describe career opportunities and means to achieve those opportunities in each of the Agriculture, Food & Natural Resources Career Pathways.

NASDCTec

- AGC09.02 Select, research and examine critical aspects of career opportunities in one or more AFNR career pathways in order to gain an understanding of the breadth of occupations within this cluster.

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).

Common Core – Speaking and Listening

- CCSS.ELA-Literacy.SL.9-10.1 Initiate and participate effectively in a range of collaborative discussions (one-on-one, in groups, and teacher-led) with diverse partners on grades 9-10 topics, texts, and issues, building on others' ideas and expressing their own clearly and persuasively.

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.

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.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.10. Plan education and career path aligned to personal goals. Career-ready individuals take personal ownership of their own educational and career goals, and the regularly act on a plan to attain these goals.
- 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

- Communication
- Critical Thinking and Problem Solving
- Flexibility and Adaptability
- Initiative and Self-Direction

LESSON PLAN:

1. *Bell Ringer:* Have students answer this question on their own paper: When you hear the word “drones,” what comes to mind first?
2. *Introduction:* We know that technology and agriculture go hand-in-hand, and to continue feeding the population, we need to use this combo to be as efficient as possible. Today, we will learn about a student who combined his love of remote-controlled devices and his desire to help people to create his ideal SAE.
3. *Activity:*
 - a. Each student needs a copy of the worksheet “Eye in the Sky.” Have students watch the video “Drones in Agriculture SAE | Jacob Reed,” available at <https://vimeo.com/342503497>, as they complete the worksheet. There are two questions on the worksheet that requires them to go to a website (<https://digitalagrevolution.wordpress.com/2019/11/12/drones-are-they-revolutionizing-agriculture-for-good/>) to answer. You could also project this so all students could see it.
 - b. Give each student a copy of the “Interests and Purpose Combined” worksheet. Students will reflect on their career interests and future goals. They will then find an SAE that allows them to combine their interests and purpose. Once they’ve identified an SAE idea, they will evaluate what resources they need to get started and set goals for their SAE.
 - i. Note: If students already have an SAE that they enjoy, then the worksheet includes tasks related to their current SAE.
4. *Follow-up:* Have students share with the class their SAE idea and one goal they set.
5. *Optional – Extended Learning Opportunities (Not factored into time requirement):*
 - a. If you have not already had students explore the SAE for All student resources, then this would be a good opportunity to do so. In fact, you might want to consider doing this before having students complete Part B

of the lesson plan activity. Have students go to <https://saeforall.org/> and click on "I'm a Student — Access Student Resources."

6. *Exit Ticket:* What most excites you about starting an SAE or expanding your current SAE?

NAME: _____

Aligned to the following standards:

CS.05; FFA.PL-A; FFA.PL-C; FFA.PL-E; FFA.PL-F; FFA.PG-I; FFA.PG-J; FFA.CS-N;
AG5; AGC08.01; AGC09.02; CCSS.RI.9-10.4; CCSS.SL.9-10.1;
CCSS.WHST.9.10.4; CRP.02; CRP.04; CRP.07; CRP.08; CRP.10; CRP.11

Eye in the Sky

DIRECTIONS:

After watching the video "Drones in Agriculture SAE | Jacob Reed," available at <https://vimeo.com/342503497>, answer the questions below.

How does Jacob use drones to help growers?



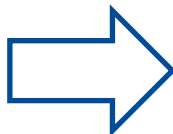
What does "flushed out" mean?

How have Jacob's agriculture classes helped him in his SAE?

What is Jacob's advice to someone starting an SAE?

Skim the article available at <https://digitalagrevolution.wordpress.com/2019/11/12/drones-are-they-revolutionizing-agriculture-for-good/>, and list three uses for drones in agriculture.

- 1.
- 2.
- 3.



By what percentage is the agricultural drone market expected to grow in the coming years? Why is this growth expected?

NAME: _____

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AG5; AGC08.01; AGC09.02; CCSS.RI.9-10.4; CCSS.SL.9-10.1;
CCSS.WHST.9.10.4; CRP.02; CRP.04; CRP.07; CRP.08; CRP.10; CRP.11

Interest and Purpose Combined

Jacob was able to combine something he had always been interested in with his desire to help people. SAEs are a great place to start determining how you can combine your interests and purpose.

Part 1

DIRECTIONS:

- If you do **not** already have an SAE (or you don't have an SAE that combines your interests and purpose), then complete the following tasks.
- If you **do** have an SAE that combines your interests and purpose, then on the back of this page write two paragraphs about why your SAE is such a good fit for you. Be sure to include what you've learned and skills you've gained through your SAE. When you've finished writing, continue to Part 2.



- If you could create your ideal career, what would it be? What would you do on a daily basis? (This ideal career doesn't have to be in agriculture.)

- When you think about your "purpose," what comes to mind? Some people believe their purpose in life is to help others or to entertain others or to make a lot of money. Sometimes our purpose changes as we grow older, so don't overthink this. What appeals to you *now*?

- Now that you've identified the tasks you would enjoy doing frequently and your purpose, it's time to look at some SAE ideas. Go to the SAE Idea Cards (<https://FFA.box.com/v/saeideacards>). There are cards for each career focus area. If your ideal career fits into a specific area, then you can go straight to those cards. If your ideal career could potentially fall into any area, then open the file that has all the cards combined. Pick **three** SAE ideas that appeal to you the most and fill out the boxes below.
 - If your interests don't seem to have any connection with agriculture, still look through the cards. It is very likely that you will find something that matches at least some of your interests.

SAE Idea 1	SAE Idea 2	SAE Idea 3
What is the idea?	What is the idea?	What is the idea?
What career focus area is it in?	What career focus area is it in?	What career focus area is it in?
What type of SAE is it?	What type of SAE is it?	What type of SAE is it?
What is a career that this SAE could lead to?	What is a career that this SAE could lead to?	What is a career that this SAE could lead to?
Does this career interest you? Yes/No	Does this career interest you? Yes/No	Does this career interest you? Yes/No

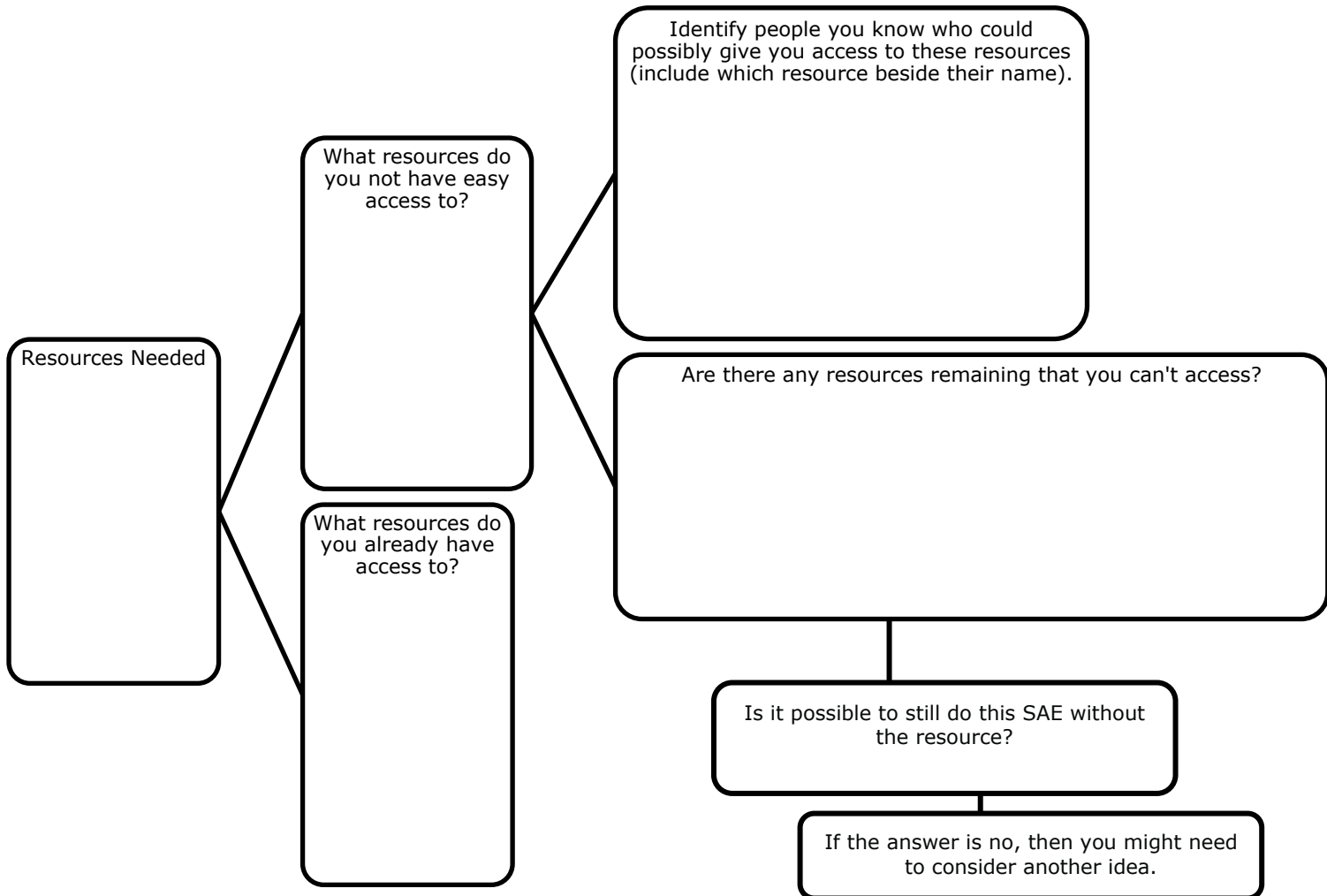
NAME: _____

Part 2

DIRECTIONS:

- If you do **not** already have an SAE (or you don't have an SAE that combines your interests and purpose), then complete the following tasks.
- If you **do** have an SAE that combines your interests and purpose, then approach these questions as if you were planning to expand your SAE.

- What resources do you need to make this SAE a reality (or to expand your SAE)?



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AG5; AGC08.01; AGC09.02; CCSS.RI.9-10.4; CCSS.SL.9-10.1;
CCSS.WHST.9.10.4; CRP.02; CRP.04; CRP.07; CRP.08; CRP.10; CRP.11

NAME: _____

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CS.05; FFA.PL-A; FFA.PL-C; FFA.PL-E; FFA.PL-F; FFA.PG-I; FFA.PG-J; FFA.CS-N;
AG5; AGC08.01; AGC09.02; CCSS.RI.9-10.4; CCSS.SL.9-10.1;
CCSS.WHST.9.10.4; CRP.02; CRP.04; CRP.07; CRP.08; CRP.10; CRP.11

2. Create three SMART goals for your SAE (to either start it or expand it). Remember, SMART goals are Specific, Measurable, Attainable/Achievable, Relevant and Time-bound.

SMART Goal	How will achieving this move your plan forward?

How will this SAE prepare you for your career?

What skills will you gain from this SAE?

Why did this SAE interest you the most?

NAME: _____

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CS.05; FFA.PL-A; FFA.PL-C; FFA.PL-E; FFA.PL-F; FFA.PG-I; FFA.PG-J; FFA.CS-N;
AG5; AGC08.01; AGC09.02; CCSS.RI.9-10.4; CCSS.SL.9-10.1;
CCSS.WHST.9.10.4; CRP.02; CRP.04; CRP.07; CRP.08; CRP.10; CRP.11

KEY: Eye in the Sky

DIRECTIONS:

After watching the video "Drones in Agriculture SAE | Jacob Reed," available at <https://vimeo.com/342503497>, answer the questions below.

How does Jacob use drones to help growers?



Check for diseases and disorders



Determine if the trees have flushed out



Get a new video of the trees if leaf flush has occurred



What does "flushed out" mean?
When a tree has gone from minimum leaves to maximum leaves

How have Jacob's agriculture classes and family helped him in his SAE?

In horticulture, he studied plant diseases and disorders, which has helped him to better diagnose what is wrong with the trees he videos with the drone.

His parents and advisor have helped him understand what a customer wants in a drone video.

What is Jacob's advice to someone starting an SAE?

Find something that is extraordinary, stick with it and don't give up

Skim the article available at <https://digitalagrevolution.wordpress.com/2019/11/12/drones-are-they-revolutionizing-agriculture-for-good/>, and list three uses for drones in agriculture.

Soil and field analysis

Seed planting

Crop spraying and spot spraying

Crop mapping and surveying

Irrigation monitoring and management

By what percentage is the agricultural drone market expected to grow in the coming years? Why is this growth expected?

38%

The reasons will vary but should include something similar to this: The growing population and changing climate patterns have increased the need for efficient agriculture. High-tech drones allow agriculturists to increase efficiency, and the cost of agriculture drones has rapidly declined.