Agricultural Lesson Plan

LESSON PLAN :	AGRICULTURAL CAREERS

Lesson Title:			
Grades:	6-8	Lesson Duration:	Two 45-minute sessions

Lesson Objectives:
Students will discover the variety of agricultural careers available and consider their career paths in terms of economics, interests, and suitability to their personal talents and characteristics.

Standards:

Materials / Equipment:
Activity 1: □ Living Science Career Cards (https://www.agclassroom.org/teacher/matrix/resources.cfm?rid=93&search_term_cr_cr_lp=living%20science) □ Emerging Agricultural Technologies handout □ Career Activity Scenario sheet Activity 2: □ 7 large resealable bags that contain equipment as listed on attached Living Science Careers Equipment Bags List* □ 4, 15-foot pieces of yarn; each a different color; ends tied together* □ 4 signs printed on card stock (approximately 8 1/2" x 5 1/2"); labeled PLANT, SOIL, WATER, ANIMAL* *These items are included in the Living Science Careers Equipment Bags, which is available for purchase from agclassroomstore.com. Concept Elaboration and Evaluation: □ Career Matching Activity sheet, 1 per student □ Agricultural Career Cluster Investigation activity sheet, 1 per student (optional) Essential Files (maps, charts, pictures, or documents) □ Agricultural Career Cluster Investigation Activity Sheet (https://naitc-api.usu.edu/media/uploads/2018/11/07/ag_careercluster_investigation.pdf)

Agricultural Lesson Plan

- Consider This Background Information (https://naitc-api.usu.edu/media/uploads/2016/07/27/ConsiderThis_BackgroundInfo.pdf)
- Emerging Agricultural Technologies Handout(https://naitc-api.usu.edu/media/uploads/2016/07/27/emerging_ag_technologies.pdf)
- Career Activity Scenario Sheet (https://naitc-api.usu.edu/media/uploads/2016/07/27/career_activity_scenario.pdf)
- Living Science Careers Equipment Bags List (https://naitc-api.usu.edu/media/uploads/2016/07/27/livingscience_careers_equipmentbags_list.pdf)
- Career Matching Activity and Key(https://naitc-api.usu.edu/media/uploads/2016/07/27/career_matching_activity_and_key.pdf)

Summary of Tasks / Actions:

Did you know? (Ag Facts)

- Between 2015 and 2020, there are expected to be 57,900 average annual openings for graduates with bachelor's or higher degrees in the areas of food, agriculture, renewable natural resources, and the environment.1
- Almost half of the opportunities will be in management and business.1
- Another 27% will be in science, technology, engineering, and mathematics (STEM).1
- Jobs in sustainable food and biomaterials production will make up 15%, while 12% of the openings will be in education, communication, and governmental services.

Background Agricultural Connections

Explore agricultural and natural resources careers that go beyond the stereotypical farmer and rancher occupations. These careers focus on food, land, and people and significantly affect our quality of life and our environment. To assess student knowledge about agriculture and its impact on their lives, do the Source Search activity prior to this lesson. After the students complete this activity, it becomes obvious to them that there must be numerous careers in agriculture and natural resources because they learn that all the things we use every day (with the exception of services) are either grown or extracted from the natural world.

The careers highlighted in this lesson require post-high school training; many require bachelor of science degrees. The most important point to make with students concerning career education is that every industry or occupational endeavor has entry-level positions, mid-level positions, and highly skilled/educated positions. For example, most students can relate to cars. In the automotive industry you can be a car detailer (entry-level), sales person, auto plant worker, or mechanic (mid-level), or an automotive engineer who designs cars. What is the difference between these positions? Salary, yes, but what is the main factor that contributes to the differences in salary? Education! For the most part, you are paid for what you know. This isn't always the case, but training or education usually pays off. The other part of your salary may be determined by how much or how hard you work. Here is a table to compare entry-level wages with higher paying wages:

$7/hour $14,560 per year

$10/hour $20,800

$12/hour $24,960

$22.50/hour $45,000

$23,624 current poverty level in America

(family of 4 with two children, 2013)

$53,046 median US household income

(could be two wage earners, 2009–2013)

What is the median household income in your state?

(Check the US Department of Commerce website)

Employment Opportunities (2015–2020)

Your students are probably unaware of the career opportunities that make American agricultural and natural resource management systems work. Farmers and ranchers account for less than one percent of the US workforce, but the professionals supporting this industry increase that number to about nine percent, and if you count transportation and distribution, the number employed as a result of agriculture is about 20 percent. Think about a career in agriculture and natural resources.

Opportunities in jobs related to food, agriculture, renewable natural resources, and the environment are expected to grow more than five percent between 2015 and 2020 for college graduates. These occupations include agricultural inspector, food scientist and technologist, soil and plant scientist, and irrigation engineer (more information at https://www.purdue.edu/usda/employment/).

Interest Approach – Engagement

Ask your students the following questions:

- What do you see yourself doing in the future?
- What are the possibilities?
- How much do you want to earn?
- How much training or school do you think you will need to achieve your career goals?

Procedures

Preparation:

Obtain the Living Science Career Cards (see Materials). Laminate the cards, punch a hole in the upper left corner, and organize them into 14 groups as suggested below. Not all the cards will be used in this activity. Use small book rings to keep the following groups together:

Group 1: Soil Scientist, Forester

Group 2: Hydrologist, Renewable Energy Specialist

Group 3: Virologist, Plant Geneticist, Fisheries Scientist

Group 4: Biotechnologist, Environmental Scientist

Group 5: Toxicologist, Forest Engineer, Food Safety Specialist

Group 6: Entomologist, Wildlife Biologist

Group 7: Food Process Engineer, Nematologist

Group 8: Weed Scientist, Plant Pathologist

Group 9: Plant Physiologist, Aquaculturist

Group 10: Remote Sensing Specialist, Horticulturist, Range Manager

Group 11: Food Scientist, Turf Scientist

Group 12: Nutritionist/Dietitian, Florist, Conservation Biologist

Group 13: Animal Nutritionist, Wood Scientist

Group 14: Veterinarian, Agronomist

Activity 1: Agricultural Career Scenario

1. Use a concept web to define agriculture and natural resources with your students. In preparation, you may wish to familiarize yourself with concept webs.

2. Ask students to create a list of agricultural and/or natural resource careers on the board or add them to the previously created concept webs.

3. After students have made a list on the board or on the concept webs, add the careers cited on the career cards to display the science-related careers in agriculture and natural resources you will be discussing. The careers are integral to modern agriculture and well-maintained natural resources, yet most students will not be familiar with the job titles.

4. Divide the class into 14 groups; give each a set of the ringed career cards. Ask the students to take five minutes to read the backs of the cards they have received to familiarize themselves with the careers, what roles they play in the agricultural community, and what education is necessary for each profession. (Note: Teachers may wish to highlight or underline key points to assist students in synthesizing this information.) The education required for each career is listed on the backs of the cards, and the explanation emphasizes that students should study science, math, and English in high school in order to prepare themselves for similar subjects at the university level. Remind students that there will be entry- and mid-level occupations that support the highly skilled occupations.

5. Read the Career Activity Scenario sheet and ask students to raise their hands if they think they have the career that correctly fills the blank. After each profession is answered correctly, ask, “What other cards are in your group? What courses do they need to complete to get their degrees?”

6. Share with students the Emerging Agricultural Technologies handout.

Activity 2: Where do I stand? What tools do I use?

1. Place the seven equipment bags around the classroom. Using the four pieces of yarn, arrange the pieces on the floor as intersecting circles (similar to a Venn diagram). Place one sign in the center of each of the circles.

2. Using the groups established in Activity 1, Step #4, ask the students to think about the tools and equipment they would need to perform the jobs as described on their assigned career cards.

3. Direct each group of students to find the bags that contain the equipment most likely to be used in their careers. (Note: students will have to break from their groups and several students will “share” each bag.)

4. Once students have correctly identified their equipment bags, ask them to talk within their group and describe the work environment for their identified career. The teacher can perform an assessment of understanding by talking with each group of students.

5. Following the above discussion, ask students to stand on the circle that indicates the resource(s) with which they would most likely work. For example, a student holding the “veterinarian” card would stand in the “animal” circle. However, a student holding an “aquaculturist” card may stand in the intersection of the “plant,” “animal,” and “water” circles.

6. Ask each group to explain their career role in interacting with the circles identified above. Also ask students to explain how these careers might interact with each other.

Concept Elaboration and Evaluation

1. Use the Career Matching activity sheet to check student understanding. Note: You may wish to divide these careers among students.

KEY:

3	4	16	11
13	9	21	7
6	5	28	25
1	15	20	29
19	32	23	8
10	18	31	30
27	17	2	24
12	14	22	26

2. Using the National FFA Ag Explorer, ask students to select a career cluster and then complete the Agricultural Career Cluster Investigation activity sheet.

3. After conducting these activities, review and summarize the following key concepts as an evaluation:

- There are many careers in the areas of agriculture and natural resources. Students may evaluate their knowledge of agricultural careers by adding on to their concept maps with careers they have learned about. Teachers can also use the Career Matching Activity in the lesson plan to check students' understanding of agriculture and natural resources careers. Teachers might also use a "final pause," e.g., an exit ticket, at the end of class for students to recap the description, education requirements, and working environment required of a particular career.
- There are numerous agriculture and natural resource careers related to science, engineering, and business. Some careers require a four year degree while others require a certificate or work experience. While more education and higher salaries are often linked student should be able to evaluate careers that may not have this relationship.

Enriching Activities

- Create your own "Career Activity Scenario" using the remaining Living Science Career Cards
- Ask the students to brainstorm other agricultural careers that have been left out of the activity. Popular ones include mid-level jobs in processing, marketing, and distribution. Ask each student to create his or her own agricultural or natural resource career card.

Follow up /References

https://www.agclassroom.org/teacher/matrix/lessonplan.cfm?lpid=59

Agricultural Lesson Plan

LESSON PLAN :	AGRICULTURAL CAREERS

Lesson Title:	SOURCING AG CAREERS		
Grades:	6-8	Lesson Duration:	Two 45-minute sessions

Lesson Objectives:

Students consider the scope of agriculture and how it is the source of most of our day-to-day necessities in preparation to explore the five agricultural career pathways.

Standards:

Materials / Equipment:

-Pictures of Common Products, printed, cut apart, and laminated*

-Four containers (e.g., tubs, boxes, or bags) labeled “Store,” “Factory,” “Farm,” and “Natural Resources”*

-Source Search Item Reference List (https://naitc-api.usu.edu/media/uploads/2017/10/17/Source_Search_Item_Reference_List_1.pdf)

Agriculture, Food, and Natural Resources Pathway cards, 1 set printed

*Prepared cards, containers, and labels are included in the Source Search kit, which is available for purchase from agclassroomstore.com

Summary of Tasks / Actions:

Did you know? (Ag Facts)

- Between 2015 and 2020, there are expected to be 57,900 average annual openings for graduates with bachelor’s or higher degrees in the areas of food, agriculture, renewable natural resources, and the environment.1
- It is projected that almost half of the career opportunities will be in management and business.1
- 27% of careers will be in science, technology, engineering, and mathematics (STEM).1
- Jobs in sustainable food and biomaterials production will make up 15%, while 12% of the openings will be in education, communication, and governmental services.1

Background Agricultural Connections

Many people have the misconception that farms simply provide us with raw produce and other foods. In reality, agriculture also provides us with a wide variety of raw materials from which we are able to make

clothes, books, cosmetics, medicines, sports equipment, and much more. Students may not realize that the items they use every day come from resources that are found in the environment. These resources are either extracted from the natural world through industries such as mining, or they are used in agricultural production. Most students don't recognize the origins of the products, and they think of the sources of these products as factories or stores. It is important for students to understand that before an item ever enters a factory or store, it began as a resource or product of the natural world.

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Interest Approach – Engagement

1. Begin a discussion with your students to evaluate their prior knowledge of agriculture and its role in their life. Ask students questions such as:

- "What is the impact of agriculture on your everyday life?"
- "What would happen if there were no farmers or ranchers?"
- "What careers do you think support the ability of farmers and ranchers to produce food, clothing, and shelter?"

Procedures

Preparation

1. Cut out the Pictures of Common Products (there are 40). Randomly divide the pictures into two groups. Use two colors of poster board (or card stock) and glue the pictures onto the poster board. Cut out the poster board around the pictures leaving a ¼ - ½ inch border. Laminate the pictures for future use.

2. Obtain four containers (boxes, plastic tubs or paper grocery bags) and label each with one of the following: "Store," "Factory," "Farms" and "Natural Resources."

3. Identify a location for a relay race outside, in a wide hallway, or in a gymnasium.

Activity 1: Source Search

1. Inform students that they will be participating in an activity to learn about the sources of many day-to-day items. This activity will help answer the questions posed in the Interest Approach.

2. Divide the class into two teams. Divide the laminated pictures by color. You should have 20 pictures in each pile. If you are using red and blue index cards, you will have a red and blue team.

3. Take the students to the location of the relay race and place each team in a single file line. Be sure to have all the pictures face down in front of the first person in each line. Locate the tubs 20-50 feet away from the lines.

4. Give students the following instructions: "This is the source relay. Your job is to place each card in the tub representing the original source of the everyday item that is pictured. When you are at the front of the line, pick up a card, look at the picture, then run to and place the picture in the correct tub based on the product's "source"– either "Stores," "Factories," "Natural Resources," or "Farms." Keep in mind that you are looking at the product, not the packaging. The next person in line goes when the person in front of them returns and crosses over the start line or hand-tags them. The returning player should go to the end of the line."

5. Ask students if they have any questions and clarify as needed. Begin the relay race and continue until all of the pictures have been sorted. The first team to finish the sort wins temporarily, but the ultimate winner will be determined by accuracy.

6. After the relay is over and the pictures are sorted, return to the classroom or have the students gather around you in a suitable location to go through the cards and discuss the correct answers. As you hold up each picture, the students can show whether they agree or disagree with the sort using the "thumbs up" or "thumbs down" signal, or another response as chosen. Use the attached Source Search Items Reference List for the correct answers and explanations for each card. If you choose to keep score to identify a winner, have a student keep a tally for each team of the cards placed in the correct box.

- Farms: Explain that if the item contains ingredients or raw products from a farm, the item is in the correct box. Examples would be any food items such as cereal, cookies, and milk, or any clothing item made from a natural fiber such as cotton (jeans) or wool (coat). Some items from a farm that are not eaten or worn include paint (this contains linseed or soybean oil) or fuel such as ethanol.

o Note: After most relays, the "Farms" container will typically have only a few items in it.

- Natural Resources: Explain that items in this tub should be products we get from the ocean, from plants or animals that occur naturally without management from humans, or from mining. Examples of items that should be in this box are: fish or shrimp (wild; however, note that fish and shrimp can also be farmed), cars, salt, water, plastic (plastic starts as oil, which is mined), synthetic fabrics (polyester, petroleum or oil products), computers, cell phones, and any metallic items. Wood products may be in this box, but many wood products come from timber grown on farms. Let the class decide how to divide these. You might decide to “split the difference;” put one (the fish) into the “Farms” box and the wood into the “Natural Resources” box. Remind your students that this is the “source” search. What is the “real” source of the things we use every day? Nearly all are grown or mined – farmed or extracted from the natural world.

o Note: This tub is also likely to only have a few items inside.

- Factories: Explain that a factory is a place where raw ingredients are changed into the useful items we need or want; wood into furniture, ore into steel for cars, wheat into bread, and potatoes into chips. A factory assembles items to later be sold in a distribution center or store. With this information ask students, "Are there any items that can originally be sourced to a factory?" (No.) Proceed by sorting every card in the “Factories” box into either the “Farms” or “Natural Resources” container. After doing this, your students should understand that all originally sourced products have either been grown or mined.

- Stores: Move to the box labeled "Stores." After receiving the explanation about factories, check for understanding by asking, "What type of things can be sourced to a store?" Students should realize that, like the “Factories” container, nothing should be in the “Stores” container; this is just where we purchase the items, it is not their original source. Clarify that factories and stores rely on raw ingredients from the farm and natural world. Every picture or product should now be in either the “Farms” or “Natural Resources” container.

7. To increase the level of understanding, ask students, "What natural resources do farms need in order to produce the products used to make all of these items?" (Soil, water, light, and air are natural resources that farmers rely on.) To illustrate, place the “Farms” box inside the “Natural Resources” box.

1. Hang up the set of Agriculture, Food, and Natural Resources Pathway cards on the board.

2. Explain to students that there are various "career clusters" including Agriculture, Food, and Natural Resources. This career cluster focuses on preparing students for employment in careers that relate to the production, processing, marketing, distribution, financing, and development of agricultural commodities and resources. Just like the products from Source Search in Activity 1, these commodities and resources include food, fiber, wood products, natural resources, horticulture, and other plant and animal products/resources.

3. Refer to each of the Agriculture, Food, and Natural Resources Pathway cards hanging on the board and discuss each pathway with students.

- Agricultural Mechanics Systems
- Agricultural Production Systems
- Animal and Veterinary Science
- Food Science, Dietetics, and Nutrition
- Natural Resource Science
- Plant Science

4. Ask each of the groups to refer back to their Ag Career Graphic Organizer. What product did they highlight from Source Search and what careers did they come up with?

5. Instruct the groups to look at each of the careers they came up with and determine which pathway that career belongs in.

6. Allow one person from each group to write their careers on the board below the correct pathway card.

- Note: You may want to assign each group a different colored marker so each of the careers can be differentiated.

7. Ask each group to share their completed graphic organizer and careers with the rest of the class. Discuss at least three of the careers they added to the board and why.

8. Discuss each of the pathways with students and careers. Consider asking the following questions to lead a class discussion:

- Ask students to reflect on the Get Your Money Where Your Mouth Is Prezi presentation. Why are so many careers tied to agriculture, food, and natural resources?
- Which careers are directly related to science?
- Which careers are related to business and marketing?
- Which careers involve knowledge and skills related to nutrition?
- What would happen if there was a shortage of workers in a specific career?

9. Wrap up the lesson by asking students to reflect back on each of the activities. (Source Search, Ag Careers Graphic Organizer, and the Agriculture, Food, and Natural Resources Pathways.)

- How do each of these activities relate?
- Why are each of the pathways in Agriculture, Food, and Natural Resources so important?
- Have any students realized that their "dream job" or career choice is tied to agriculture?

Concept Elaboration and Evaluation

After conducting these activities, review and summarize the following key concepts:

- Natural resources and farms (which also rely on natural resources) are the source for everything that we use and eat.
- Careers in production agriculture include farmers and ranchers. Typically these careers are directly involved with the growing of crops or the raising of animals.
- In addition to production agriculture there are many careers in fields related to agriculture such as business, science, nutrition, and more.

Follow up /References

https://www.agclassroom.org/teacher/matrix/lessonplan.cfm?lpid=489