DIVERSITY IN FARMING

Educator Lesson Plan

BACKGROUND

Farms are diverse in size and in product. Farms may be owned by companies, nonprofit organizations, family-owned, large-scale or hobby-sized. Farm size depends on the availability of land and resources such as money and workers to manage the farm. Some farmers use conventional agriculture methods including heavy machinery and chemicals while others use regenerative agricultural practices learned from our indigenous ancestors. Farms may raise animals such as poultry, livestock, fish, or insects or they may grow crops such as fruits, vegetables, and grains. Some farmers sell their products locally. Other farmers sell their products to large companies to process into other goods such as food, clothing, craft items, or medicine. Knowledge of the different kinds of farms present in today's world increases awareness that all of the products we utilize have to come from somewhere. Understanding how agriculture affects daily life often means that the process is not taken for granted.

Dairy Farms

Dairy farming is an agriculture enterprise raising female cattle, goats, or other milk-producing livestock for long-term milk production. All female dairy animals begin lactating after giving birth. The milk may be either processed on site or transported to a dairy for processing and eventual retail sale. Many dairy farms also grow their own feed, including corn, alfalfa, and hay. This is fed directly to the cows or stored as silage for use during the winter season.

Livestock Farms

Livestock refers to a domesticated animal intentionally reared in an agricultural setting to make products such as food or fiber or to be used for its labor. Livestock may be raised for subsistence or for profit. Raising animals (animal husbandry) is an important component of modern agriculture. Livestock are generally kept in an enclosure, fed by human-provided food, and intentionally bred. The type of feed varies from natural grass to highly sophisticated processed feed.

Ranches

Ranching is the practice of raising grazing livestock, such as cattle or sheep, for meat or wool. Ranching is also a method used to raise less common livestock such as elk, alpacas, American bison, or even ostrich or emu.

Poultry Farms

Poultry is a class of domesticated birds, such as chickens, turkeys, and ducks, used for meat, eggs, or feathers. Chickens, turkeys, ducks, and geese are the most

common birds raised on poultry farms. Chickens are raised for their eggs (layers) or meat (broilers). Turkeys are primarily raised for their meat.

Aquaculture

Aquaculture is the cultivation of fish, shellfish, algae, or other aquatic organisms. Aquaculture is different from fishing in that active human effort is used to maintain or increase the animal population as opposed to taking them from the wild. Fish farming is the principal form of aquaculture. Fish species raised by fish farms include salmon, catfish, tilapia, and cod. The fish are generally raised in large tanks or ponds, although some fish farms use synthetic fiber cages in existing water resources.

Apiculture

Beekeeping (apiculture) is the practice of intentional maintenance of honey bee colonies, commonly in hives, by humans. A beekeeper may keep bees to collect honey and beeswax, to pollinate crops, or to produce bees for sale to other beekeepers. A colony of bees is composed of a single queen, many workers (infertile females), drones (males), and a brood (eggs, larvae, and pupae). A hive is the box used by beekeepers to house a colony.

Grain Farms

While each individual species has its own peculiarities, the cultivation of all grain crops is similar. All are annual plants, meaning that one planting yields one harvest. Wheat, rye, oats, and barley are the cool-season cereals. These are hardy plants that grow well in moderate weather and cease to grow in hot weather. Barley and rye are the hardiest cereals, able to survive in cold weather (overwinter). Wheat is the most popular. Once the cereal plants have grown their seeds, they have completed their life cycle. The plants die and become brown and dry. As soon as the parent plants and their seed kernels are reasonably dry, harvest can begin. Cereal crops are machine-harvested, typically using a combine harvester which cuts, threshes, and separates the grain from the husk. Farmers commonly deliver their newly harvested grain to a grain elevator, a large storage facility that consolidates the crops of many farmers. The farmer may sell the grain at the time of delivery or maintain ownership of a share of grain in the pool for later sale.

Vegetable Farms

Traditionally, vegetables were farmed in the soil in small rows or blocks, often primarily for consumption by the grower's family, with the excess sold in nearby towns. Later, farms on the edge of large communities began specializing in vegetable production, with the short distance allowing the farmer to get the produce to market while still fresh. Raised bed gardening has increased yields from small plots of soil without the need for commercial, energy-intensive fertilizers. Modern hydroponic farming produces high yields in greenhouses without using any soil, but expends more energy. Farms may grow large quantities of a few types

of vegetables and sell them in bulk to major markets or middlemen; this requires large growing operations. They may produce for local customers or sell through farm stands and local farmer's markets. Large cities often have a central produce market which handles vegetables and manages distribution to supermarkets and restaurants but food hubs are becoming more popular in cities across the globe to move food from the producers to consumers more easily.

Orchards

An orchard is a planting of trees or shrubs maintained for fruit production. Most orchards contain either fruit or nut-producing trees for commercial production. Most temperate-zone orchards are laid out in a regular grid, with a base of grazed or mown grass or bare soil for maintenance and fruit gathering.

Vineyards

Grapes for wine, raisins, or table grapes are grown in vineyards. Vineyards are often located on hillsides with soil of marginal value for other types of plants. Planting on hillsides maximizes the amount of sunlight that falls on the vineyard.

Cranberry Bogs

Cranberries are a group of evergreen dwarf shrubs or trailing vines found in acidic bogs throughout the cooler parts of the Northern Hemisphere. The fruit is a berry that is larger than the leaves of the plant. It is initially white, but turns a deep red when fully ripe. Most cranberries are processed into products such as juice, sauce, and sweetened dried cranberries. Historically, cranberry beds were constructed in wetlands. Currently, cranberry beds are constructed in upland areas that have a shallow water table. The topsoil is scraped off to form dikes around the bed perimeter. Clean sand is hauled in to a depth of four to eight inches. A common misconception about cranberry production is that the beds remain flooded throughout the year. During the growing season, cranberry beds are not flooded. They are irrigated regularly to maintain soil moisture. Cranberries are harvested in the fall when the fruit takes on a distinctive deep red color. Beds are flooded with 6"-8" of water to facilitate the harvest. A harvester is driven through the beds to remove the fruit from the vines. Cranberry beds are flooded again during the winter to protect against low temperatures.

Source: https://agclassroom.org/matrix/lesson/711/

Standards Addressed:

CTE: Agriculture, Food and Natural Resources Career Cluster
KS Health Standard #3: Students will demonstrate the ability to access and analyze valid information and products and services to enhance health.
NGSS ESS3-4: Evaluate or refine a technological solution that reduces impacts of human activities on natural systems.
ELA Foundational Practice: Write, speak, read, and listen appropriately in all

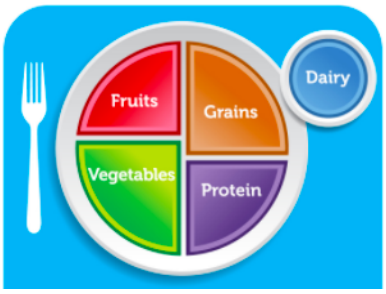
disciplines.

ENGAGE	
CLASSROOM ACTIVITIES	ON-FARM ACTIVITIES
Farm Tour 1. Ask students to brainstorm a list of the types of farms that exist in the world. Jot down their ideas somewhere visible. 2. Next, ask students to think of the most interesting thing that a farmer could farm. Jot down their ideas. 3. Show students this link and ask them to pick the one they find most interesting. 4. Lead a discussion about how all of the things we use and eat originally came from a farm!	**Farm WalkAbout** Tour students on a walkabout of the farm pointing out: ● Primary crop production= specialty crops ● Orchard with herb intercropping ● Perennial plantings for beneficial insects and pollinators ● Bees for honey production + pollination ● Chickens for eggs + compost poo ● Wildland Playground + mushrooms Discuss: ● Regenerative ag practices used with examples of conventional vs. what we do ● Land ownership + honoring those whose land it really is ● Agriculture as a viable career option and apprenticeship opportunities
EXPLORE	
CLASSROOM ACTIVITIES	ON-FARM ACTIVITIES
Fill my plate Activity 1. Project this image on a screen or draw it on the whiteboard (MyPlate.gov). Explain that this plate represents the diversity of food you should consume for optimal health BUT where that food comes from is important too 2. Divide the class into teams and assign each team one of the MyPlate food groups—fruits, vegetables, grains, protein, and	**Fill my plate Activity- Farm Style** **1.** Replicate this image on the chalkboard or discuss the components of a healthy meal with the group

dairy. Give them 10 minutes to brainstorm a food type that is grown locally to fill that category. They should use a computer for research if available.

3. After 10 minutes, have each group present their findings to the class.
4. Lead a discussion about the food items they chose, pointing out inaccuracies in seasonality or locality. For example, if the 'fruit' group chooses bananas, challenge them to consider if bananas can be grown in Kansas.
5. Discuss how important it is to eat seasonally and locally to improve health and the economy. Point out that when we go to the grocery store, we are often eating unseasonal and not local food but if we go to a farm or farmers market, the food is fresher and the money stays in the community to support farmers.
6. At the conclusion of the discussion, show these maps to the class and point out where most food and animal products are produced in the US.

Optional Activity:
Local snack vs. store bought snack. Notice the differences in freshness, flavor, texture, etc.



2. Since the group just went on a farm tour, have them brainstorm items available on the farm today to fill their plate with. Give them 5 minutes to brainstorm.
3. Lead a discussion with each group sharing their thoughts. Point out:
    a. Protein- eggs
    b. Fruits- orchard (apples, peaches, figs, jujubes, maypops, etc.)
    c. Vegetables- abundant!
    d. Grain- We source from local bakeries, Name the bakeries and how they source their grains (Au Contraire)
    e. Dairy-We source from local creameries and dairy farms. Name the farms and discuss how they raise their animals (Skyview)
4. Make a local snack trying to 'Fill the Plate"
    a. Model and teach:
        i. Proper handwashing, food safety and knife skills
    b. Supervise as group prepares the snack

EXPLAIN

The Diversity of Farms in the World

1. Lead students through a discussion of the diversity of farms in the world and how all the things we eat and most of the products we use daily originated on a farm. Students should create a concept map of the information they gather as appropriate.
2. Show this video of Mike Pearl, a Kansas City farmer whose family has been in farming centuries: https://youtu.be/nGWSf5-FIGE
3. Focus on some main points:
    a. Commodities are grown in particular areas based on the climate, the soil of the region, the amount of land available, the amount of money to pay farmers and the local economy.
    b. Farm management: Family farms, Corporate owned farms, Community farms, Backyard farms, Nonprofit farms all exist
    c. Ag Practices: Conventional vs. Sustainable vs. Regenerative
    d. Ag Career Options
4. Use the information in one of the following areas to build out the explanation for students:
    a. The Background section of this lesson plan
    b. This Powerpoint from National Ag in the classroom
    c. This encyclopedic article from National Geographic with varied text levels for students to read
    d. This comparison of Conventional vs. Sustainable Agricultural Practices
    e. Regenerative Agriculture Practices
    f. Agriculture as a Career

ELABORATE	
CLASSROOM ACTIVITIES	ON-FARM ACTIVITIES
Option 1: Grow Common Ground: The Challenge Spilt the class into teams and have them design a farm on the land we call Common Ground. Note: This should be a long-term project including a field trip to the farm, interviews with the farm team and a final presentation. The link to the challenge is here. **Option 2: Kansas Ag Research Project** 1. Split the class into teams and have them create a product for public display about a farm found in Kansas. The product could be a poster, diorama, video or other	**Option 1: Grow Common Ground: The Challenge** 1. Introduce the challenge to students (To create a land use plan/ farm on Common Ground) 2. Tour Common Ground while pointing out notable features 3. Facilitate farmer and staff interviews so students can ascertain the needs and wants of the staff to integrate into their plan as appropriate **Option 2: Diversify the farm** 1. Have students brainstorm a list of commodities that could be

choice project.
2. Students should follow the following steps:

Research KS Ag overall using resources like this or this to find a farm or commodity they're interested in researching.

- Try to set up an interview with the farmers!
- They should research:
    - The primary crop or product grown on the farm
    - Type of farm (corporate, family owned, nonprofit, urban, rural)
    - Ag practices used (conventional, regenerative, permaculture, organic, etc.)
    - Challenges the farm faces
    - Obstacles the farm has overcome

Gather all information and compile it into the final product.

Culminate the activity with a gallery walk in which students learn about the diversity of farms found in Kansas.

integrated into the farm based on the "Explore" section of this lesson. Primarily focus on dairy and grain. They should then generate a list of considerations based on climate, soil, cost of upkeep, etc. For example, if they suggest we integrate cows, they need to generate a list of all of the needs that raising cattle presents.

2. Discuss the cost-benefit ratios that farmers must consider before incorporating new animals or commodities.
3. As appropriate and based on season, lead students through an on-farm, hands-on activity to:
    a. Plant seeds
    b. Plant trees
    c. Integrate a regenerative practice on the farm (hugel, create a new no-till bed, inoculate the field with Johnson-Su byproduct or biochar)
    d. Build a new Johnson-Su
    e. Harvest, handle and store a crop for market
    f. Harvest honey

EVALUATE

Have students complete the Education Survey found here or via QR code

This material is based upon work that is supported by the National Institute of Food and Agriculture, U.S. Department of Agriculture, under agreement number

2020-38640-31522 through the North Central Region SARE program under project number YENC21-169. USDA is an equal opportunity employer and service provider. Any opinions, findings, conclusions, or recommendations expressed in this publication are those of the author(s) and do not necessarily reflect the view of the U.S. Department of Agriculture.