



GEORGIA MIDDLE SCHOOL

Instructional Resources
CAREER, TECHNICAL, & AGRICULTURAL EDUCATION

AGRICULTURE

COURSE: Agriculture Education

UNIT 5: Animal Science Applications

INTRODUCTION

Annotation:

This lesson identifies the importance of animal agriculture. Students will learn about the importance of meat industry to people. They will also learn proper care and nutrition of animals and the importance of a providing a proper environment for animals.

Grade(s):

<input type="checkbox"/>	6 th
<input type="checkbox"/>	7 th
<input checked="" type="checkbox"/>	8 th

Time:

Five 50 minute class periods

Author:

Todd Dobson

Students with Disabilities:

For students with disabilities, the instructor should refer to the student's IEP to be sure that the accommodations specified are being provided appropriately. Instructors should also familiarize themselves with the provisions of Behavior Intervention Plans that may be part of a student's IEP. Frequent consultation with a student's special education instructor will be beneficial in providing appropriate differentiation. Many students (both with and without disabilities) who struggle with reading may benefit from the use of text reading software or other technological aids to provide access to printed materials. Many of these are available at little or no cost on the internet.

FOCUS STANDARDS

GPS Focus Standards:

- MSAGED8-17**- The student will demonstrate the application of agriscience in agricultural animal research and production.
- Analyze how animal research has benefited the consumer.
 - Explain how genetic characteristics are passed through generations.
 - List products and byproducts that are derived from animals and their uses.
 - Discuss current animal biotechnology research, practices, and issues.

GPS Academic Standards:

- M8D2** Students will determine the number of outcomes related to a given event.
- M8D3** Students will use the basic laws of probability.
- M8P1** Students will solve problems (using appropriate technology).
- M8P4** Students will make connections among mathematical ideas and to other disciplines.
- M8P5** Students will represent mathematics in multiple ways.
- S8CS2** Students will use standard safety practices for all classroom laboratory and field investigations.
- S8CS4** Students will use tools and instruments for observing, measuring, and manipulating equipment and materials in scientific activities utilizing safe laboratory procedures.
- S8CS9** Students will understand the features of the process of scientific inquiry.

UNDERSTANDINGS & GOALS

Enduring Understandings:

Animal agriculture is vitally important to people and the economy. They contribute many products for the benefit of man. Producers must use proper nutrition and care to produce the best environment for the humane and economic production of animals.

Essential Questions:

- What is animal science?
- Why are animals important to agriculture?
- What are some products provided by animals?
- What are the main purposes of the meat animal industry?
- Which animals are considered meat animals?
- Why is the meat industry important?
- How is the meat industry important to Georgia?
- What are the steps in getting meat from the farm to the table?
- What are key scientific terms in the animal industry?
- What is growth of animals and why is it important to producers?
- How do animals grow?
- What is animal nutrition?
- What is a nutrient?
- What is meant by "a good environment" for animals?

Knowledge from this Unit:

- Students will be able to define animal science and its importance to the agriculture industry. Students will also be able to discuss the importance of the meat industry not only to Georgia but also to the world. They will understand the proper nutrition and environment for animals.

Skills from this Unit:

Students will be able to:

- Evaluate livestock.
- Provide proper nutrition for animals.
- Provide the proper environment for animals.

ASSESSMENTS

Assessment Method Type:

- ☐ Pre-test
- ☒ Objective assessment - multiple-choice, true- false, etc.
 - ☒ Quizzes/Tests
 - ☐ Unit test
- ☐ Group project
- ☒ Individual project
- ☐ Self-assessment - May include practice quizzes, games, simulations, checklists, etc.
 - ☐ Self-check rubrics
 - ☐ Self-check during writing/planning process
 - ☐ Journal reflections on concepts, personal experiences and impact on one's life
 - ☐ Reflect on evaluations of work from teachers, business partners, and competition judges
 - ☐ Academic prompts
 - ☐ Practice quizzes/tests
- ☒ Subjective assessment/Informal observations
 - ☐ Essay tests
 - ☐ Observe students working with partners
 - ☐ Observe students role playing
- ☐ Peer-assessment
 - ☐ Peer editing & commentary of products/projects/presentations using rubrics
 - ☐ Peer editing and/or critiquing
- ☒ Dialogue and Discussion
 - ☐ Student/teacher conferences
 - ☐ Partner and small group discussions
 - ☐ Whole group discussions
 - ☐ Interaction with/feedback from community members/speakers and business partners
- ☒ Constructed Responses
 - ☐ Chart good reading/writing/listening/speaking habits
 - ☐ Application of skills to real-life situations/scenarios
- ☐ Post-test

Assessment for Attachment(s):

LESSON PLANS

• LESSON 1: THE IMPORTANCE OF ANIMALS TO HUMANS

1. Identify the standards. Standards should be posted in the classroom.

MSAGED8-17- The student will demonstrate the application of agriscience in agricultural animal research and production.

- a) Analyze how animal research has benefited the consumer.

M8D2 Students will determine the number of outcomes related to a given event.

M8D3 Students will use the basic laws of probability.

M8P1 Students will solve problems (using appropriate technology).

2. Review Essential Questions. Post Essential Questions in the classroom.
 - What is the definition of animal science?
 - How are animals important to agriculture?
 - What are some products provided by animals?
3. Introduction and Mental Set
 - Animals meet important needs in our daily lives. They provide us with food, clothing, companionship, recreation, and income. They are used in research and education. This lesson explores the role of animals in agriculture and in society.
 - Start the classes by giving each student Skittles candy and ask them to name the ingredients. Ask students if they know that Skittles contain gelatin made from horse/cow hooves. This illustrates the multiple uses of animal by-products.
 - Have students bring in a variety of animal products, then hold a contest to see which student can correctly name the source of each product.
4. Assignment
 - Have students design a chart to illustrate the products of a specific animal species.

5. Discussion

- Question: What is the definition of animal science? Allow students to develop a definition that they understand before providing them with a definition.
- Answer: It is the study of animals and all that relates to animals.
- Question: How are animals important to agriculture? Display and discuss transparency 7GA 10.1.1.
- Answer: Animals are important to agriculture because they are a source for:
 - Clothing: animal skins, hair, and furs
 - Power: as a means of transportation and a means of pulling heavy loads
 - Food: grasses and other fiber feeds eaten by animals are then passed along to meat-eating humans
 - By-products: products other than meat that come from an animal carcass such as the hide, hair, etc.
 - Recreation: pleasure and companionship
 - Money: income for the person who raises animals for products such milk, wool, eggs, or the animal itself
 - Work: some dogs may herd sheep, guard property, lead the blind, or help police
 - Technology: animals play roles in developing vaccines and cures for diseases, and also provide organs or tissues when those of humans fail
- Question: What are some products provided by animals?
- Answer:

Cows/Bulls

meat: steaks, hamburger, roasts

leather: belts, coats, shoes

animal fats: cosmetics

medicines: insulin, thyroid extract

dairy cattle: cheese, ice cream, cottage cheese, butter

Pigs

meat: bacon, ham, pork chops

medicines: insulin, replacement heart valves

fats: crayons, candles

Sheep

meat: tripe, lamb chops

wool: coats, sweaters, lanolin hand lotion

medicine: adrenalin

Poultry

eggs

feathers: pillow stuffings, jacket insulation

meat

game birds: quail, pheasant

Horses

pleasure

glue

Fish

animal feed

meat

sport

Rabbits

meat
fur: coats, hats, gloves, toys
Medical research
cosmetics testing

Llamas

hair: rope, crafts
work: carry packs

Ostriches

meat
leather
feathers

Laboratory Animals

medical research

Honeybees

pollination
honey

Many by-products can come from more than one species of animal. This list is not comprehensive.

6. Other Activities

- Have students participate in the Middle School Meats Contest at the local and state level. See rules in Career Development Guide (CDE).
- Have students prepare a product derived from an animal, such as ice cream or yogurt.
- Work with other school departments so students can expand their animal product study.
- Agriculture: Have students describe how milk is produced.
- Home economics: Have students prepare a food with milk as main ingredient.
- Technology: Have students explain the use of electric milkers.
- Art: Have students make "milk prints," substituting milk for ink.
- Use Georgia Agriculture facts to determine the percentage of each product in Georgia.

References

Cooper, Elmer L. Agriscience: Fundamentals and Applications. Albany, NY: Delmar Publishers, Inc.
Gillispie, James R. and Frank B. Flanders, Modern Livestock and Poultry Production. Albany, NY: Delmar Publishers, Inc.
Griffin, Margaret and Deborah Seed. The Amazing Egg Book. Reading, MS: Addison Wesley Publishing, Co, Inc.
Herren, Ray. The Science of Animal Agriculture. Albany, NY: Delmar Publishers.
Krebs, Alfred H. and Michael E. Newman. Agriscience In Our Lives. 6th ed. Danville, IL: Interstate Publishers, Inc.
Lee, Jasper S., Patrick Amanda R., Vaughn, Rosco, Vaughn-Randel, Shelly, and Murphy, Erin. Agriscience Discovery. Danville, IL: Interstate Publishers, Inc.
Ross, Catherine and Susan Wallace. The Amazing Milk Book. Reading, MS: Addison Wesley Publishing, Co, Inc.

Equipment, Supplies, Materials

At least 20 animal products (candles, candy, cosmetics, leather shoes, heart valves, etc.)
Overhead projector
Transparency 7GA 10.1.1
Handouts 7GA 10.1.2, 7GA 10.1.3

• LESSON 2: EXPLORING THE MEAT ANIMAL INDUSTRY

1. Identify the Standards.

MSAGED8-17- The student will demonstrate the application of agriscience in agricultural animal research and production.

- a) Analyze how animal research has benefited the consumer.
- b) Explain how genetic characteristics are passed through generations.
- c) List products and byproducts that are derived from animals and their uses.
- d) Discuss current animal biotechnology research, practices, and issues.

2. Review Essential Questions. Post Essential Questions in the classroom.

- What is the main purpose of the meat animal industry?
- Which animals are considered meat animals?
- Why is the meat industry important?
- How is the meat industry important to Georgia?
- What are the steps in getting meat from the farm to the table?

3. Introduction and Mental Set

The lesson entitled, "The Importance of Animals to Agriculture," explained that animals provide people with many products. The most well known product is meat. This lesson explores the meat animal industry.

- Start the class by asking students, "Who are the Green Bay Packers?" Follow up by explaining to students that the team's name comes from the meat packers, which were prevalent in the area. Explain that a meat packer is someone that works in a meat processing plant.
- Take students on a tour of a local slaughter house, meat processing plant, or meat department of a grocery store.
- View the video **Packer to Consumer.**

4. Discussion

- Question: What is the main purpose of the meat animal industry?
- Answer: The main purpose of the meat animal industry is to raise quality animals to provide humans with essential nutrients for a good diet.

- Question: Which animals are considered meat animals? Display and discuss Transparency 7GA 5.4.1.
- Answer:
 - beef cattle
 - sheep
 - hogs
 - poultry
 - fish
 - game animals: rabbits, doves, etc.

- Question: Why is the meat industry important?
- Answer: Most Americans eat meat. An average person can eat 97 pounds of beef, 64 pounds of pork, and 90 pounds of poultry in a year. This does not include the 12 million pounds of seafood and 10 to 12 million pounds of rabbit meat eaten each year by Americans. The United States consumes 11.4 percent of the total world production of meat.

- Question: How is the meat industry important to Georgia?
- Answer: The meat industry in Georgia provides meat and poultry to people all over the country and the world. In addition, this industry provides jobs for thousands of people in Georgia. From the farm, to the processing plant, to the grocery store; there are a variety of jobs available in the meat industry. The major meat producing industries in Georgia are: beef cattle, poultry, swine, and goats.
- Question: What are the steps in getting meat from the farm to the table?
- Answer:
 - producing
 - transporting
 - processing
 - packaging
 - distributing
 - marketing

5. Other Activities

- Have students prepare an ad campaign to sell a meat product. Discourage students from using slogans already developed such as "Beef-Real Food for Real People" or "Pork, the Other White Meat." Encourage students to be creative using any available resources.

References

Ensminger, M. E. Animal Science Digest. Danville, IL: Interstate Publishers, Inc.

Ga. Department of Agricultural and Consumer Services. Facts About... Georgia's Agriculture. Atlanta, GA: Georgia Agricultural Statistics

Ga. Department of Agricultural and Consumer Services. Georgia Agricultural Statistics. Atlanta, GA: Georgia Agricultural Statistics, latest edition.

Gillispie, James R. and Frank B. Flanders, Modern Livestock and Poultry Production. Albany, NY: Delmar Publishers, Inc.

Herren, Ray. Exploring Agriscience 2nd Edition.. Albany, NY: Delmar Publishers, Inc.

Herren, Ray. The Science of Animal Agriculture. Albany, NY: Delmar Publishers, Inc.

Krebs, Alfred H. and Michael E. Newman. Agriscience In Our Lives. 6th ed. Danville, IL: Interstate Publishers, Inc.

Packer to Consumer (Video). Winterville, GA: American Association for Vocational Instructional Materials.

Equipment, Supplies, Materials

TV/VCR
Overhead projector
Transparency 7GA 5.4.1

• LESSON 3: BASIC REQUIREMENTS FOR ANIMAL GROWTH AND DEVELOPMENT

1. Identify the Standards. Standards Should be posted in the classroom for each lesson.

MSAGED8-17- The student will demonstrate the application of agriscience in agricultural animal research and production.

- a) Analyze how animal research has benefited the consumer.
- b) Explain how genetic characteristics are passed through generations.
- c) List products and byproducts that are derived from animals and their uses.
- d) Discuss current animal biotechnology research, practices, and issues.

2. Review Essential Questions. Post Essential Questions in the classroom.

- What is growth and why is it important to producers?
- How do animals grow?
- What is animal nutrition?
- What is a nutrient?
- What is meant by "a good environment" for animals?

3. Introduction and Mental Set

All animals require certain things to grow and develop. Animals must have food, water, shelter, vaccinations, a good environment, and exercise to live healthy lives. Have students divide into groups and assign each group a particular animal. Instruct students to list everything their animal would need to survive.

4. Discussion

- Question: What is growth and why is it important to producers?
- Answer: Growth is an increase in the size of muscles, bones, and organs of the body. Growth is important to producers because animals can only be sold when they reach a certain size. Producers want to make a profit from the animals they sell, so they want their animals to grow quickly.

- Question: How do animals grow?
- Answer: Life begins with a cell. A group of cells forms a tissue. A group of tissues form organs and organs work together within organ systems to carry specific functions.
Cell: the basic structure of life

Tissue: a group of cells

Organ System: a group of organs working together to carry out a specific activity

- Question: What is animal nutrition?
- Answer: Animal nutrition is the process by which animals eat and use food to live, work, grow, and reproduce.
- Question: What is a nutrient?
- Answer: A nutrient is any substance required for life.
Optional: Animals need six types of nutrients to survive: water, protein, carbohydrates, fats, vitamins, and minerals.
- Question: What is meant by "a good environment" for animals?
- Answer:
Shelter or Housing: depends on animal or type of operation (barns, chicken houses, etc.)
Sanitation: a clean environment free of animal wastes and parasites

5. Other Activities

- Have students do research to find out what type of feed dogs, cats, cattle, horses, sheep, fish, hogs, llama, chickens, gerbils, and birds eat. Then have students complete the matching exercise at the end of the lesson.
- Provide students with a class pet such as a hamster or guinea pig and let the class be responsible for caring for the pet, thus illustrating the basic requirements of animals.

References

Lee, Jasper S.; Patrick, Amanda R.; Vaughn, Rosco; Vaughn-Randel, Shelly; Murphy, Erin. Agriscience Discovery. Danville, IL: Interstate

Publishers, Inc.
Morgan, Elizabeth M., Lee, Jasper S., and Wilson, Elizabeth. Agriscience
Explorations 3rd Edition. Upper Saddle River, NJ: Prentice Hall Interstate.

• **LESSON 4: TERMINOLOGY USED IN THE ANIMAL INDUSTRY**

1. Identify the Standards. Standards should be posted in the classroom for each lesson.

MSAGED8-17- The student will demonstrate the application of agriscience in agricultural animal research and production.

- a) Analyze how animal research has benefited the consumer.
 - b) Explain how genetic characteristics are passed through generations.
 - c) List products and byproducts that are derived from animals and their uses.
 - d) Discuss current animal biotechnology research, practices, and issues.
2. Review Essential Questions. Post Essential Questions in the classroom.
 - What are key scientific terms in the animal industry?
 3. Introduction and Mental Set
 - To better understand new trends in the animal industry, this lesson examines scientific terms that are related to the animal industry.
 - Have students read articles related to the animal science industry. Include articles about bees, rabbits, game birds, and other nontraditional farm animals. Have the students list unfamiliar words to define.
 4. Assignment
 - Have students work in groups of four to write definitions (in words they can understand), and study the words.

5. Discussion

- Question: What are key scientific terms in the animal industry? Display and discuss transparency 7GA 5.3.1.
- Answer:
 - **Aerobic organisms**- grow in the presence of oxygen
 - **Alternative animal agriculture**- production of nontraditional farm animals might include rabbits, fish, game birds, and bees
 - **Anaerobic organisms**- grow without the presence of oxygen
 - **Animal science technology**- using modern practices and principles in the animal industry
 - **Aquaculture** -production of animals that live in water
 - **Artificial insemination**- breeding animals other than by natural mating
 - **Biotechnology**- using science to change organisms or their environment or to get products from organisms
 - **Clone**- an exact duplicate of the parent
 - **Confinement operation**- system of raising animals in a relatively small space
 - **Control group**- group of animals in an experiment that does not receive the experimental variable or treatment
 - **Crossbreeding** -animals with parents of two different breeds
 - **Embryo**- an animal in its first stage of growth
 - **Embryo transfer**- removing an embryo from one female and placing it in another female
 - **Estrus synchronization**- using synthetic hormones to make a group of females come into heat at the same time
 - **Feed conversion ratio**- the rate at which an animal converts feed to meat
 - **Fry**- a small, newly hatched fish
 - **Gene**- a single unit containing hereditary material
 - **Genetic engineering**- artificially changing the genetic makeup of an organism
 - **Grease wool**- wool directly from the sheep
 - **Hive**- structure used to house bees
 - **Hybrid**- an animal produced from the mating of parents of different breeds
 - **Implant**- a substance placed under the skin of animals to help them grow
 - **Incubation**- process of providing fertilized eggs with the right amount of heat, humidity, and time to hatch
 - **Lactation**- milk production by female animals
 - **Pedigree**- a record of an animal's ancestors
 - **Progeny**- the offspring of an animal
 - **Progeny testing**- system used to determine the value of an animal based on the offspring's performances
 - **Selective breeding**- selection of parents in order to get better offspring
 - **Spawning**- process used by fish for laying eggs
 - **Super ovulation**- injecting hormones to cause a higher than usual number of ovulations during the heat period
 - **Vacuum packaging**- packaging meat in plastic and then removing the air

This list is only a partial compilation of scientific terms. Terms are to be used at the teacher's discretion.

6. Other Activities

1. Play animal science jeopardy with the terms.
2. Work with the science and English teachers to increase exposure to the words.
3. Have students derive a list of words from agricultural magazines to use for defining.
4. "Who's The Daddy" group activity located in Class Starters on disc 2 of the Ag Ed CD. Divide the students into groups. Take turns asking the groups: "who is the daddy", "who is the mommy", or "who is the juvenile of each of the species of animals". An alternative is to make the activity like a quiz bowl.

• LESSON 5: IMPORTANCE OF ANIMAL EVALUATION

1. Identify the Standards. Standards should be posted in the classroom for each lesson.

MSAGED8-17- The student will demonstrate the application of agriscience in agricultural animal research and production.

- a) Analyze how animal research has benefited the consumer.
 - b) Explain how genetic characteristics are passed through generations.
 - c) List products and byproducts that are derived from animals and their uses.
 - d) Discuss current animal biotechnology research, practices, and issues.
2. Introduction and Mental Approach
 - Print the pictures of the swine class from 1954 and the current pictures located at the end of the lesson and have students compare them. Have a class discussion about the differences and how they were achieved. Now, we want swine to be lean and have more meat than fat because we know the dangers of fat to our health. However, swine used to be selected for large amounts of fat and were larger, as students will be able to tell from the pictures.
 - Animal evaluation involves more than placing a class of four animals from best to worst. It involves making decisions about the quality of an animal based upon scientific knowledge. Many in the industry use evaluation to continually improve their herds. This lesson examines the importance of animal evaluation.
 3. Discussion
 - Question: Why is animal evaluation important?
 - Answer: Animal evaluation is used to continually improve the animal industry. Through selection of certain traits and characteristics, animals have evolved to the type of animals found in the industry today.
 - Question: What are the two main functions of animal selection?
 - Answer: The two main functions of animal selection are to improve the quality of the offspring and to provide better quality animal products.
 - Question: What qualities are sought when selecting animals?
 - Answer:
 - Reproduction ability: the ability to continually produce an offspring
 - Growth capabilities: the ability of the animal to grow rapidly
 - Efficiency: growing rapidly without wasting feed or other necessities
 - Question: How are animals evaluated?
 - Answer:
 - Pedigree: Look at performance of ancestors to help determine its performance.
 - Production testing: Look at evaluation of the animal based upon its own records. Each species of animal has various criteria that must be met.
 - Type and individuality: Look at selection based on the ideal animal (also called conformation).

Choose several species of animals and discuss selection methods, if time permits.

- Question: How is selection different for market animals and breeding animals?
- Answer: When selecting market animals a person looks at how well the animal can convert food to muscle. Animals that are too fat will not produce quality meat. Breeding animals are used to reproduce and improve the herd. Traits selected for breeding are ones that will produce a better offspring.

4. Other Activities

- Provide students an opportunity to participate in the Livestock Evaluation Career Development Event.
- Take students on a field trip to a performance testing station.

References

Boggs, Donald L., Merkel, Robert A., and Doumit, Matthew E. Livestock and Carcasses: An Integrated Approach to Evaluation, Grading, and Selection. Dubuque, IA. Kendall/Hunt Publishing Company. (this manual is available at www.amazon.com)

Cooper, Elmer L. Agriscience: Fundamentals and Applications. Albany, NY. Delmar Publishers, Inc.

Ensminger, M. E. Animal Science Digest. Danville, IL: Interstate Printers, Inc.

Gillispie, James R. and Frank B. Flanders, Modern Livestock and Poultry Production. Albany, NY. Delmar Publishers, Inc.

Herren, Ray. The Science of Animal Agriculture. Albany, NY. Delmar Publishers, Inc.

Equipment, Supplies, Materials

Overhead projector
Transparency 7GA 5.2.1

• NOTES & REFLECTION:

CULMINATING PERFORMANCE TASK

Culminating Unit Performance Task Title:

Culminating Unit Performance Task Description/Directions/Differentiated Instruction:

Attachments for Culminating Performance Task:

UNIT RESOURCES

Web Resources:

Materials & Equipment:

At least 20 animal products (candles, candy, cosmetics, leather shoes, heart valves, etc.)

Overhead projector

Transparency 7GA 10.1.1

Handouts 7GA 10.1.2, 7GA 10.1.3

TV/VCR

Overhead projector

Transparency 7GA 5.4.1

Overhead projector

Transparency 7GA 5.2.1

21st Century Technology Used:

<input type="checkbox"/>	Slide Show Software	<input type="checkbox"/>	Graphing Software	<input type="checkbox"/>	Audio File(s)
<input type="checkbox"/>	Interactive Whiteboard	<input checked="" type="checkbox"/>	Calculator	<input type="checkbox"/>	Graphic Organizer
<input type="checkbox"/>	Student Response System	<input checked="" type="checkbox"/>	Desktop Publishing	<input type="checkbox"/>	Image File(s)
<input type="checkbox"/>	Web Design Software	<input type="checkbox"/>	Blog	<input checked="" type="checkbox"/>	Video
<input type="checkbox"/>	Animation Software	<input type="checkbox"/>	Wiki	<input type="checkbox"/>	Electronic Game or Puzzle Maker
<input type="checkbox"/>	Email	<input checked="" type="checkbox"/>	Website		