

OAKLAND CUSD #5

AG SCIENCE

MAY 4 - 8, 2020

JEFF COON

Week of May 4-10, 2020

All of these assignments are on google classroom. You must pick one of the 3 listed and complete by next Monday May 16th for credit. If you would like to use google docs to complete the work that would be most efficient, just remember to start a new copy with your own work please. Paper copies can be returned to the school.

Class	Choice 1	Choice 2	Choice 3
Ag Science	CDE	DNA	Ag and Environment
Ag Business Mang	Investments	Life Insurance	Bus. Plan
BSAA	Seed Germination	Animal Diseases	Ag and Environment
Landscape Design	Soil Erosion	Annuals and perennials	Building walls and decks
Intro To Ag	FFA Meetings	FFA opportunities	Role of Agriculture
Ag Mech.	Concrete	Hydraulics	GSI

Checking Your Knowledge:

1. During the Livestock Evaluation CDE, for what do students evaluate various species of livestock?

2. Explain the difference between the Farm Business Management CDE and the Marketing Plan CDE.

3. What is the purpose of Career Development Events?

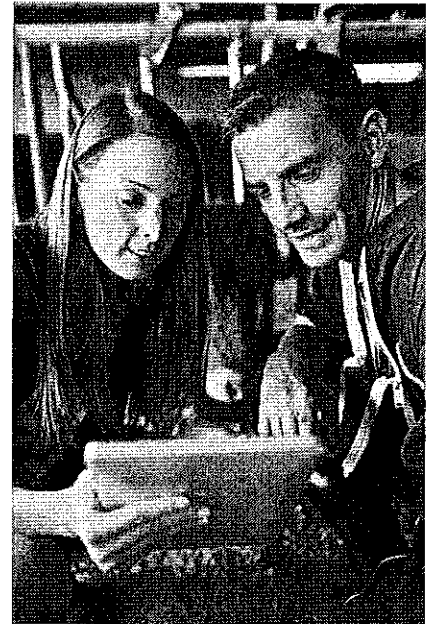
4. How can the Creed Speaking, Extemporaneous Public Speaking, and Prepared Public Speaking CDEs help you in your future?

5. Describe in detail the Agricultural Communications CDE

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FFA Career Development Events

CAREER...everyone will eventually have one. What will yours be? What skills do you have that make you suitable for that career? How do you know that it is the career for you? As a high school student, you have so many careers to choose from, and you have very little time to explore what your future career may be. By participating in Career Development Events through the National FFA Organization, you have the opportunity to explore career opportunities while developing your skill set.



Objective:



Identify and describe the FFA Career Development Events.

Key Terms:



Career Development Events

- Agricultural Communications
- Agricultural Issues Forum
- Agricultural Sales
- Agricultural Technology & Mechanical Systems
- Agronomy
- Creed Speaking
- Dairy Cattle Evaluation & Management
- Dairy Cattle Handlers Activity
- Environmental & Natural Resources
- Extemporaneous Public Speaking
- Farm Business Management
- Floriculture
- Food Science & Technology
- Forestry
- Horse Evaluation
- Job Interview
- Livestock Evaluation
- Marketing Plan
- Meat Evaluation & Technology
- Milk Quality & Products
- Nursery/Landscape
- Parliamentary Procedure
- Poultry Evaluation
- Prepared Public Speaking
- Veterinary Science

The Value of Career Development Events

The mission of the National FFA Organization explains that “FFA makes a positive difference in the lives of students by developing their potential for premier leadership, personal growth and career success through agricultural education.” To fulfill the mission of FFA, Career Development Events (CDEs) were created. These events provide you, as an FFA mem-

ber, with opportunities to practice and develop skills in given areas of the agriculture industry. In many situations, these skills can't be developed in any other way except by actually working for an agricultural company. Career Development Events can be priceless if they help you obtain a job that fits your aspirations and abilities.

CAREER DEVELOPMENT EVENTS

Career Development Events are competitions for enhancing FFA members' career skills in a variety of areas, ranging from food science to mechanics. There are 24 CDEs and one activity at the national level. To compete in any CDE, you must be a high school (grades 9 through 12) student and a dues-paying FFA member in good standing. Your state FFA association may have additional qualifications that you must meet. Let's take a closer look at each Career Development Event.

Agricultural Communications CDE

Agricultural Communications is the CDE with the purpose of teaching FFA members skills that will benefit them when pursuing careers in agricultural communications. Without publicity through communications, such as advertising, broadcasting, and publications, agriculture would be even more foreign to the general public than it is already. The truth about agriculture must be heard so that the public isn't afraid of the technology being used.

The Agricultural Communications CDE has one team activity and three individual practicums. The team activity consists of creating a media plan to be prepared ahead of time and presented at the contest. During the contest, each individual will complete a written exam and one of the individual practicums. The practicums are creating a written communication, creating an electronic communication, and creating a visual design.

Agricultural Issues Forum CDE

The **Agricultural Issues Forum** is the CDE that investigates various agricultural issues affecting the public at local, state, and national levels. The purpose of this event is to bring awareness to issues affecting agriculture at the present time. Issues should be focused on the environment, agricultural technology, animals, agricultural careers, the economy and trade, agricultural policy, food safety, or biotechnology.

At the local level, a team will conduct research and develop a portfolio on a chosen topic before reaching the sectional competition. The topic will not change as the team advances through the levels of competition. During the contest, the team will be asked to present the issue and will then be subject to questioning from the judges. This contest applies teamwork, leadership, and communication skills for career success.

Agricultural Sales CDE

Agricultural Sales is the CDE meant to refine the skills associated with selling a product in various formats. The FFA member will have to identify potential customers, create a sales



ON THE JOB...

CAREER CONNECTION: Agricultural Sales Representative

An agricultural sales representative plays an important role in the agriculture industry. He or she markets agricultural products to potential customers in a given area. These products could be anything from the seed and fertilizer needed to grow a crop to the equipment needed to harvest it. An agricultural sales representative may also market technology, such as GPS devices and computer systems that allow farmers to keep accurate and reliable records of their work. Sales representatives are needed in every area of agriculture. Explore your options, and decide what area of agriculture suits you best.

pitch for the product, and sell the product to a customer. This is done by getting to know the customer and making the product a “must have” in the customer’s eyes. To succeed in the Agricultural Sales CDE, the member must attempt to close the deal with a purchase of the product.

Agricultural Technology & Mechanical Systems CDE

Agricultural Technology & Mechanical Systems is the CDE that showcases the skills and the implementation of practical knowledge in five systems of agricultural mechanics—agricultural power, welding, electrical wiring, carpentry, and surveying of land. Each of the five systems tests the skills of the FFA member through a written exam and hands-on practicum. The member demonstrates his or her skills in a simulated workforce situation. The CDE focuses on problem solving, working both individually and in a team setting.

Agronomy CDE

Agronomy is the CDE in which FFA members identify various crops, weeds, seeds, insects, diseases, and nutrient deficiencies. Members also evaluate a crops scenario and develop a management plan that includes all decisions from planning the field to determining how the crop will be marketed after harvest. The CDE focuses on using environmental stewardship and integrated pest management practices to better the crop.

Creed Speaking CDE

Creed Speaking is the CDE that evaluates a first-year FFA member’s ability to express the passion and meaning behind the FFA Creed. The member should recite the Creed with fluency, enunciation, and clarity, as well as answer questions concerning the meaning of the Creed.

Dairy Cattle Evaluation & Management CDE

Dairy Cattle Evaluation & Management is the CDE that provides the opportunity for FFA members to evaluate live dairy cattle based on the most current trends in the dairy industry. Students should focus on the ability of animals to produce milk and on their structure, body capacity, and udder quality. Heifers should be evaluated on their potential to be excellent milk producers and on their calving abilities. Current trends can be found on dairy breed registry websites. Students will also focus on herd production and analyze herd data.



FIGURE 1. FFA members evaluate the overall confirmation and milking ability of Holstein cows as part of the Dairy Cattle Evaluation & Management CDE.

Dairy Cattle Handlers Activity

The **Dairy Cattle Handlers Activity** is the CDE activity that recognizes the skill of handlers in effectively presenting animals in the Dairy Cattle Evaluation & Management CDE.

Environmental & Natural Resources CDE

Environmental & Natural Resources is the CDE that focuses on environmental issues occurring in the United States and how those issues can be corrected in a responsible way. During the contest, FFA members will work both as a team and individually. The team event consists of solving the provided scenario in the most environmentally responsible way while providing research and factual solutions. The team will create a written report as well as give a short oral presentation defending its solution. A short period of questioning will follow the oral presentation. Other areas of the event include writing a news article or other form of press release concerning the given topic and identifying 50 items of equipment, native species, or invasive/non-native species.

Extemporaneous Public Speaking CDE

Extemporaneous Public Speaking is the CDE designed to develop the ability of all FFA members to express themselves on a given subject without having prepared or rehearsed the content of a speech in advance. This gives FFA members an opportunity to formulate their remarks for presentation in a very limited time. Topics include most areas of agriculture, such as animal and plant science, horticulture, aquaculture, environmental science, agricultural business, and many more.

Farm Business Management CDE

Farm Business Management is the CDE that simulates managing a farm or agricultural business in the most economical way possible. FFA members will work as a team for most of the contest to create the most profitable and economically feasible scenario for their business situation. To do this, they must use the business and economic principles taught in their agricultural business class, along with problem-solving skills. Each individual on the team will also complete a written exam over economic principles related to business management, record analysis, and risk management.

Floriculture CDE

Floriculture is the CDE that puts FFA members in real-world situations that can be found in the floriculture industry. Participants will compete in a team activity, a written exam, identification of plant materials and equipment, and problem-solving scenarios. During the team activity, FFA members will work together to design decorations for an event; perform packing, shipping, and inventory procedures; or fill customer orders. The final aspect of the contest is for each member of the team to individually complete three practicums. These practicums consist of creating a floral arrangement, interviewing for a job in the floriculture industry, and conducting a sales pitch.

Food Science & Technology CDE

Food Science & Technology is the CDE in which FFA members will evaluate food products for overall quality, safety, and marketing techniques. Activities include identifying similarities in shape, looks, and taste using the triangle test, as well as identifying various aromas commonly found in the food supply. As a team, members will create a product based on a given scenario. The team should focus on marketing the product and creating packaging for the food. Other practicums include identifying various food handling and safety violations, formulating a consumer complaint letter, and taking a written exam.

Forestry CDE

Forestry is the CDE that introduces FFA members to the forestry industry and allows them to demonstrate their knowledge and skill in the industry. The contest consists of a written exam, tree identification, an issues interview, timber cruising, two practicums, and a team activity. During the issues interview, individuals will communicate to the judges their knowledge of the forestry industry and their opinions on national or regional forestry issues. The timber cruising activity is simply measuring 10 boards for board-foot volume, diameter breast height, and merchantable height. The individual practicums could be any of the following: forest management evaluation, equipment identification, map interpretation, use of a compass, chainsaw part identification, tree/forest disorders, forest products, or problem solving in forest business management.

Ag Sci 5# #/



FURTHER EXPLORATION...

ONLINE CONNECTION: Horse Evaluation

Horse evaluation isn't something that most people do every day. Take some time to practice your skills! Use the following website to evaluate horses in three halter classes. This will give you an idea of what the Horse Evaluation CDE is really like.

http://www.gaaged.org/Games/horse_judging.htm

Horse Evaluation CDE

Horse Evaluation is the CDE in which FFA members evaluate horses based on breed characteristics, conformation and soundness, and overall performance. Identification and selection classes will be evaluated on an individual basis. Each FFA member will identify 10 breeds or colors/markings of horses, as well as 10 tack items. The selection classes will consist of four halter and four performance classes. As a team, FFA members will choose the correct feed, determine how to properly shoe a horse, and participate in a problem-solving scenario based on animal nutrition, management, anatomy, and marketing.

Job Interview CDE

Job Interview is the CDE designed for FFA members to develop the skill set needed to seek employment. During this contest, each student will create a résumé and cover letter, participate in various interviews, and formulate a follow-up letter. He or she may also fill out an employment application as a part of the contest.

Livestock Evaluation CDE

Livestock Evaluation is the CDE that provides students the opportunity to evaluate various species of livestock for breed characteristics and for meat and breeding quality. Students will face rings that include marketing scenarios and must make keep/cull decisions based on their scenario goals and acquired knowledge. They must be able to explain, with fluency and accuracy, why they placed a class a certain way.

Marketing Plan CDE

Marketing Plan is the CDE that focuses on creating a plan to publicly market an agricultural product. The product is chosen by FFA each year.

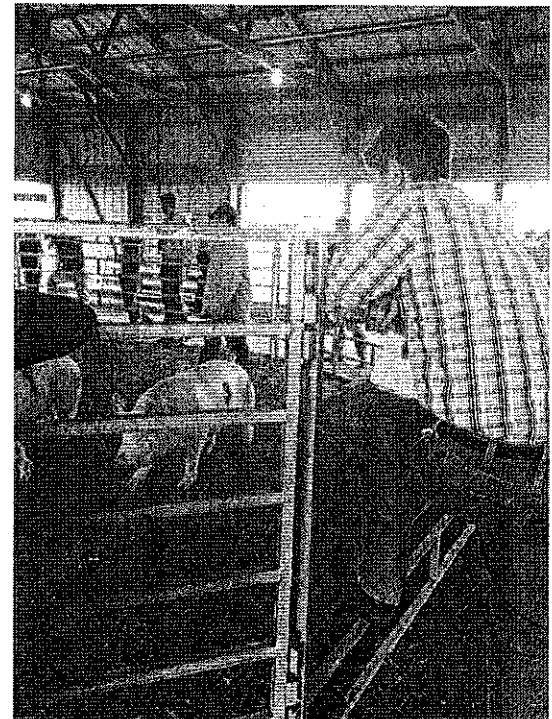


FIGURE 2. FFA members evaluate this swine class as a part of the Livestock Evaluation CDE. The animals are judged on breed characteristics as well as meat and breeding qualities.

Each team must submit a written marketing plan that includes a brief description, market analysis, business proposition, strategies-and-action plan, projected budget, and evaluation of the marketing plan and its goals. This plan will be judged prior to the live presentation. The live presentation should be viewed as a pitch to the judges for them to approve the proposed plan. Following the live presentation, each team member should participate in a question-and-answer session.

Meat Evaluation & Technology CDE

Meat Evaluation & Technology is the CDE that focuses on judging beef, pork, and lamb for meat quality and customer satisfaction. Areas of the contest include a written exam, retail meat cut identification, beef quality and yield grading, and the placing of classes. The contest may provide information sheets that detail various carcass qualities. If so, FFA members will have to determine the best placing for those carcasses or place them in a keep/cull format.

Milk Quality & Products CDE

Milk Quality & Products is the CDE that highlights the dairy industry, dairy products, and farm practices that contribute to the dairy supply in the United States. The event consists of a milk flavor identification and evaluation class, fat content identification, cheese identification, evaluation of California Mastitis Test results, a problem-solving scenario, a written exam, and team activity. The problem-solving activity will be focused on the quality and acceptability of milk, calculations of the value of milk and milk components, processing procedures, and cleaning and sanitizing operations.

Nursery/Landscape CDE

Nursery/Landscape is the CDE that focuses on the skills in all aspects of maintaining landscape plants, equipment, and products, as well as formulating landscape designs. The contest format consists of two team events; a written exam; identification of plants, pests, and disorders; identification of equipment and supplies; estimation of landscaping costs; customer assistance, both oral and written; and nursery propagation or potting. The team activities involve evaluating a landscape or nursery business issue and performing a variety of tasks that are common in the landscaping industry, such as the repair of equipment and the preparation of business reports.

Parliamentary Procedure CDE

Parliamentary Procedure is the CDE whose purpose is to teach FFA members the proper way to conduct a business meeting. This activity will benefit them for years to come, as parliamentary procedure is used in many organizations and settings. During this CDE, a mock meeting will be conducted. Members of the team will be given roles and specific motions to deal with. Floor members, chairpersons, and secretaries will be judged on an individual and team basis. *Robert's Rules of Order* will be followed during this contest.

Ag Science 54 #1



FURTHER EXPLORATION...

ONLINE CONNECTION: Parliamentary Procedure Flashcards

Think you rock at parliamentary procedure? Test your knowledge using this set of online flashcards! Follow the link to practice.

<https://quizlet.com/4198495/flashcards>

Poultry Evaluation CDE

Poultry Evaluation is the CDE that tests FFA members' skills in the production, processing, and marketing of poultry, meat, and eggs. Activities during the contest include judging of carcasses, judging of live birds, identification of anatomy, judging of further-processed poultry products, interior and exterior egg grading, and a written exam. Processed products are judged on their similarities and customer preferences. Egg exteriors are graded on cleanliness, shell strength, and customer preferences. All these activities will be scored on an individual basis. The team portion of the contest involves answering questions on a problem scenario provided and determining the best solution for the scenario.

Prepared Public Speaking CDE

Prepared Public Speaking is the CDE that teaches FFA members to be confident and knowledgeable whenever they are speaking. The contest consists of presenting a prepared speech and answering questions following the speech to demonstrate knowledge of the topic. The skills learned from this Career Development Event will benefit students in future job interviews, public forums, and whatever other public speaking situations they may participate in.

Veterinary Science CDE

Veterinary Science is the CDE that allows students the opportunity to practice and demonstrate skills needed to perform veterinary medicine on both large and small animals. The contest consists of a written exam, scenario questions, identification of equipment, identification of breeds, identification of parasites, math applications, handling and restraining practicums, performance of a clinical procedure, and a team activity. During the team activity,

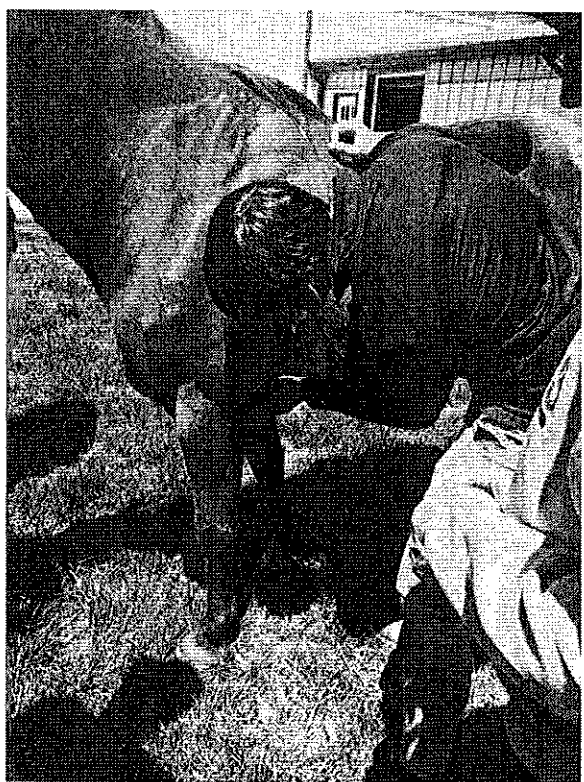


FIGURE 3. This FFA member is listening to a horse breathe and checking for any heart or lung problems. This is an example of a clinical practicum that could be given during the Veterinary Science CDE.

Az Science 5-9 #1

FFA members will be assigned roles on a veterinary team, and each will be expected to explain the process of professionally completing his or her role on the team. The scenario activity provides members with real-world issues in veterinary medicine and asks them to make educated and ethical suggestions to solve the problem. The CDE overall simulates for students what can be expected during a typical day on a veterinary team.

Summary:



You will discover many different Career Development Events that you can participate in. Many of these are focused on skills that you can use for the rest of your life. The mission of the National FFA Organization explains that “FFA makes a positive difference in the lives of students by developing their potential for premier leadership, personal growth and career success through agricultural education.” Career Development Events are an example of how FFA goes about achieving this mission.

Checking Your Knowledge:



1. During the Livestock Evaluation CDE, for what do students evaluate various species of livestock?
2. Explain the difference between the Farm Business Management CDE and the Marketing Plan CDE.
3. What is the purpose of Career Development Events?
4. How can the Creed Speaking, Extemporaneous Public Speaking, and Prepared Public Speaking CDEs help you in your future?
5. Describe in detail the Agricultural Communications CDE.

Expanding Your Knowledge:



Ask your agriculture teacher when the next CDE is in your area. Join the CDE team; participate in practices, and show off your skills during the contest. Participating in a CDE will teach you skills that you may use the rest of your life.

Web Links:



National FFA Organization

<https://www.ffa.org/>

Career Development Events

<https://www.ffa.org/participate/cdes>

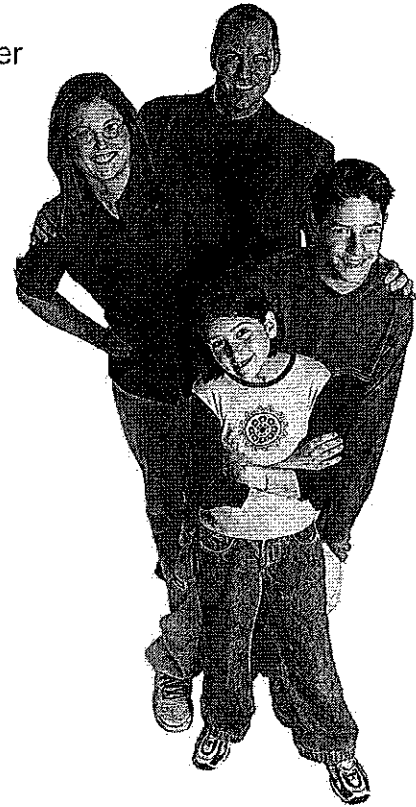
MyCaert.com Career Profiles

<http://www.mycart.com/career-profiles/>

Az Sci 54 #7

Heredity and DNA

DO YOU look like anyone else in your family? Your mother or father? Your brother or sister? Chances are that a lot of qualities from both your mother and father can be seen in you and your siblings! That is because offspring inherit many characteristics from their parents. Let's explore heredity and the role DNA plays in it.



Objective:



Determine the role of DNA in heredity.

Key Terms:



adenine
chromosomes
cytosine
DNA
fertilization
genes
genetic code
guanine
heredity
homologous chromosomes
locus
ovum
sperm
thymine
zygote

Heredity

Heredity is the passing of traits from one generation to the next. Unlike heredity in plants, all heredity in animals occurs through sexual reproduction. This means that the **sperm** (male sex cell, or gamete) must join with the **ovum** (female sex cell, or gamete) during the process of **fertilization**. This union of sperm and ovum creates a **zygote**.

The sperm cell carries genetic material from the father, one-half the chromosomes of the offspring, while the ovum carries genetic material from the mother, again one-half the chromosomes of the offspring. These chromosomes join to create a "blueprint" of a new animal—the offspring of the two parents. Although each parent contributes half the chromosomes, the resulting offspring may have traits that more closely resemble one parent than the other.

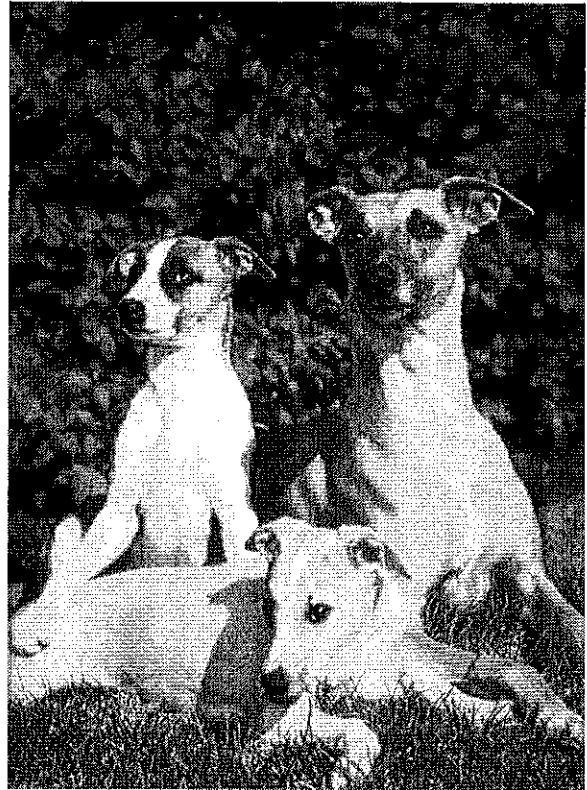


FIGURE 1. These Whippet puppies received half their chromosomes from their mother and half from their father.

DNA

The nucleus of nearly every animal cell contains **DNA** (deoxyribonucleic acid), along with other protein, within **chromosomes**. Each animal has a set number of chromosomes, which varies by species. For instance, the domestic cat has 38 chromosomes, 19 from the father and 19 from the mother. A chicken has 78 chromosomes (39 pairs); a human has 46 chromosomes (23 pairs). The DNA consists of the basic genetic material, **genes**.

The genes are the segments of chromosomes that contain heredity traits and are transmitted from the parents to form the genetic

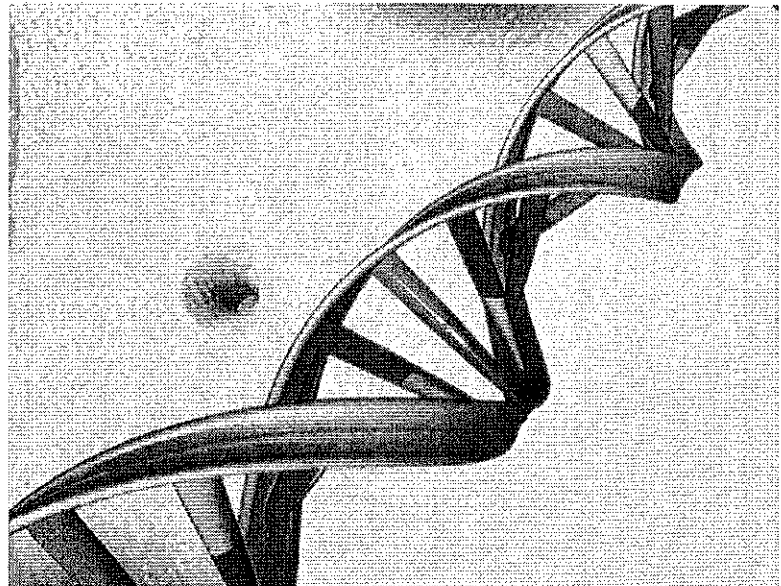


FIGURE 2. A DNA molecule is a twisted double-helix structure with nitrogen bases holding the strands together. (Courtesy, Agricultural Research Service, USDA)

material of the offspring. Each DNA molecule consists of two strands twisted into a double helix. These strands consist of nucleotide bases, made of sugar molecules connected by phosphates, held together by nitrogen bases. The four nitrogen bases found in DNA are **adenine**, **thymine**, **cytosine**, and **guanine**. The sequence of the bases along a DNA molecule determines the **genetic code** of the organism.

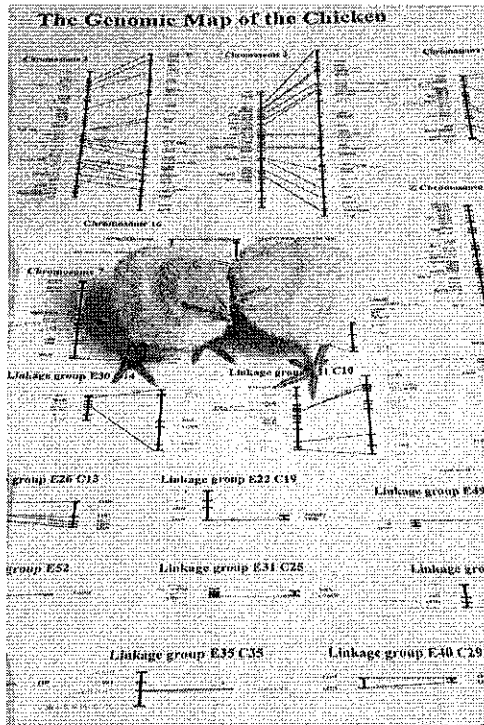


FIGURE 3. Each of these chicks has 78 chromosomes that make up its genome. (Courtesy, Agricultural Research Service, USDA)

The **locus**, or location of the gene on the chromosome, helps determine the genetic information being passed to the offspring. When two genes for the same characteristic have the same locus on two chromosomes that are the same size, they are called **homologous chromosomes**. One of the chromosomes is from the male parent, the other from the female parent.

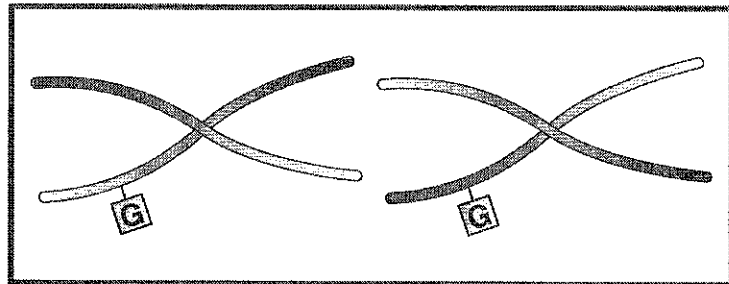


FIGURE 4. When two chromosomes have genes for the same characteristic at the same location on the chromosomes, they are considered homologous chromosomes.



UNDER INVESTIGATION...

LAB CONNECTION: DNA Extraction—Calf Thymus

Deoxyribonucleic acid (DNA) is the basis for transmitting traits from one generation to the next. However, removing DNA from one organism and inserting it into another has created advancements in medicine. For example, specific bacteria given human DNA are now producing insulin needed by diabetics.

A way to gain greater understanding of the structure of DNA is by extracting a mass of DNA molecules from animal cells. Use a material such as the thymus gland of a calf, which has large nuclei. In the first step, crush the thymus to break open cell membranes. Add a soapy solution to break down the nuclear membrane and release the DNA. Then, strain the solution through cheesecloth to separate the nuclear materials from large “chunks” of thymus. Then, transfer a portion to a test tube. Add a salt solution to promote bonding of the ends of DNA molecules to one another. After a few moments, trickle ice-cold 95 percent ethanol into the test tube. The ethanol causes DNA to precipitate from solution and form a cloudy mass. Collect the DNA by twirling a clean glass rod or pipette in the solution.

Summary:



Heredity of traits is dependent upon the DNA transferred from the parents to the offspring during fertilization. Each parent provides half the offspring's genetic material. Genes are the basic units of heredity.

Checking Your Knowledge:



1. What is heredity, and what role does DNA play?
2. Differentiate between genes, DNA, and chromosomes.
3. Why do chromosomes occur in pairs?

Expanding Your Knowledge:



Using paper or some other material, construct a model of a DNA molecule.

Web Links:



Genetic Science Learning Center

<http://gslc.genetics.utah.edu/units/disorders/karyotype/>

<http://gslc.genetics.utah.edu/units/basics/tour/>

Agricultural Career Profiles

<http://www.myaert.com/career-profiles>

Checking Your Knowledge:

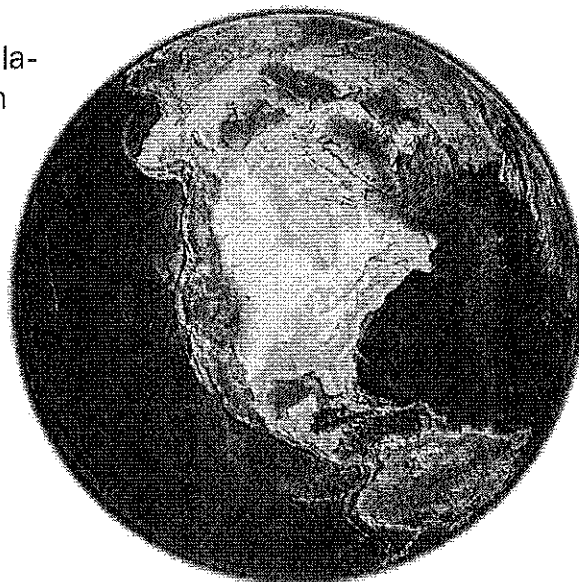
1. Define ecology.

2. How are environment, ecosystem, biome, and biosphere related?

3. What is the difference between renewable natural resources and nonrenewable natural resources?

Agriculture and the Environment

THE United Nations projects the world population to increase from its current 6.5 billion to 9.4 billion by 2050 and to continue growing until it reaches 11 billion around 2200. How is the world population to feed, clothe, and shelter itself? How can agricultural production be increased to meet the demands of a growing population? How can the earth's natural resources be managed so that agriculture can be sustained into the distant future?



Objective:



Discuss agriculture and the environment.

Key Terms:



biome
biosphere
community
ecology
ecosystem
environment
nonrenewable natural resource
population
renewable natural resource

Important Concepts Relating to Agriculture and the Environment

Many people associated with the agriculture industry pride themselves with being good stewards or caretakers of the land. They are concerned about the health of the land and the environment. The **environment** is the nonliving, or abiotic, aspect of an organism's immediate habitat. It includes both physical and chemical features, such as rocks, minerals, water, and air.

People involved with the production of crops and livestock and the management of wildlife must have an understanding of ecology. **Ecology** is the study of the interrelationships between living things and their environment. The field is very broad and includes both the nonliving and living aspects. It involves many other disciplines of study besides biology, such as geology, chemistry, and earth science.

Ecology involves the study of populations, communities, and ecosystems. A **population** is a group of individuals of the same species sharing the same area. A population could be one of pheasants or one of milkweed plants. A **community** is all the species or populations living in a given area. All the communities of living things on Earth compose the **biosphere**. An **ecosystem** is a community of organisms (biota) and its nonliving environment. Ecosystems vary from place to place.

Large ecological communities are known as biomes. **Biomes** are a result of complex interactions, climate, soil, and life factors. Wetland, temperate forest, tundra, and prairie are examples of biomes. Some of the most productive farmland in the world is found in prairie or temperate

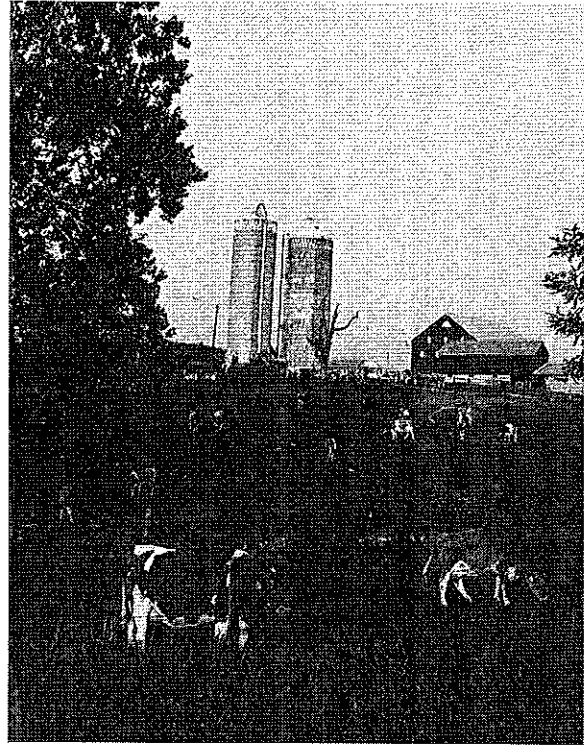


FIGURE 1. Ecology is the study of the interrelationships between living things and their environment. (Courtesy, Agricultural Research Service, USDA)

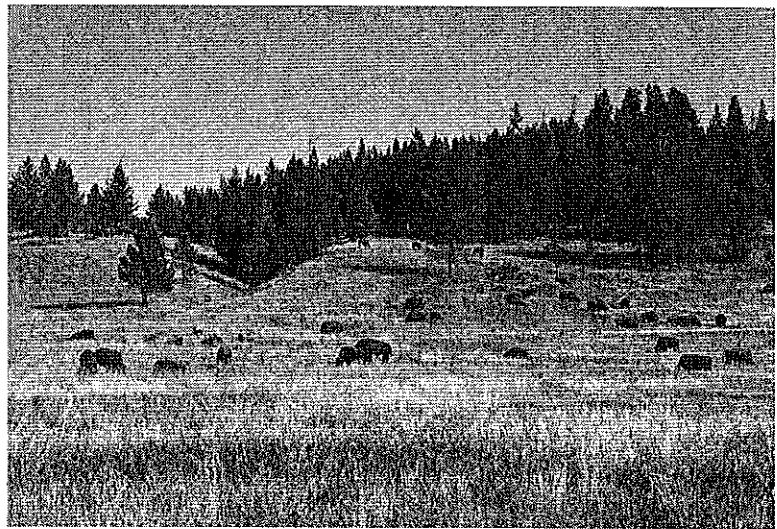


FIGURE 2. A community is all the species or populations living in a given area.

Ag Sci 5-4 #3

deciduous forest biomes. Some biomes, such as desert and tundra, do not support agricultural production.

RENEWABLE AND NONRENEWABLE RESOURCES

Human survival is dependent on natural resources found in the ecosystem. Resources used by people may be renewable or nonrenewable. A **renewable natural resource** is one that can be replaced. A **nonrenewable natural resource** is one that can never be replaced.

Renewable natural resources are air, water, and wildlife. Sometimes soil is also included as a renewable resource. Of course, the speed at which some of these resources can be renewed is quite

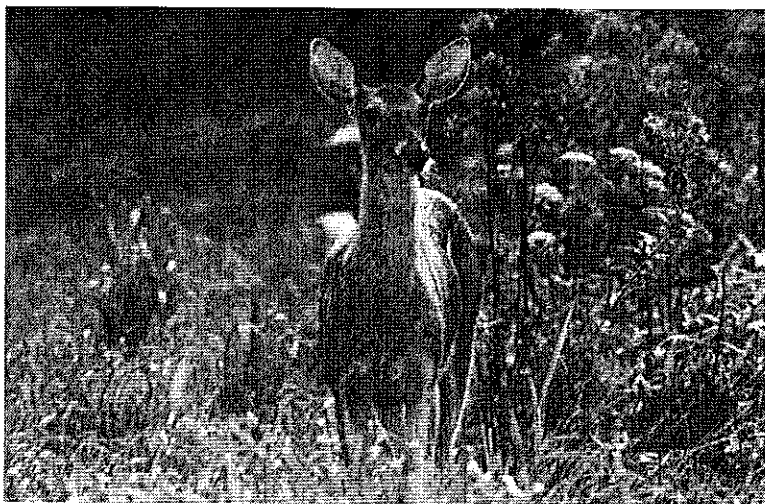


FIGURE 3. Wildlife is considered a renewable natural resource. (Courtesy, Natural Resources Conservation Service)



ON THE JOB...

CAREER CONNECTION: Environmental Scientist

Environmental scientists conduct work to protect the environment. Maintaining a healthy environment involves protecting the land, air, and water resources from wastes and pollution.

Someone with an interest in becoming an environmental scientist should plan to earn at least a bachelor's degree. Completion of a master's or doctoral degree opens additional career opportunities. An environmental scientist must have a strong understanding of biology, chemistry, and physics.

Environmental scientists might work for government agencies or private industry. Some government employers include departments of natural resources, departments of environmental protection, and the U.S. Environmental Protection Agency. Private environmental consulting firms and industries that produce waste hire environmental scientists.



This environmental scientist is inspecting wildlife habitat. (Courtesy, Natural Resources Conservation Service)

slow. Soil lost from fields can take hundreds of years to be replaced. Soil contaminated with a heavy metal, such as mercury or cadmium, is not easily cleaned, and to do so is costly. Severely polluted lakes and rivers can take years to clean. Also, wildlife is renewable only if the plants or animals have not become extinct. For instance, the passenger pigeon and the woolly mammoth are extinct and cannot be renewed.

Fossil fuels, including coal, oil, and natural gas, are examples of nonrenewable natural resources. Each of these resources has a limit. Once that limit is reached, there is no more of that resource for human use.

There is no question that humans have had a great impact on the environment. Ecosystems have been transformed, and species have become extinct. Fortunately, research based on science has revealed ways in which the negative impact of humans on the environment can be lessened.

Summary:



The environment is the nonliving aspect of an organism's immediate habitat. It includes both physical and chemical features. Ecology is the study of the interrelationships between living things and their environment. Ecology involves the study of populations, communities, and ecosystems. A population is a group of individuals of the same species sharing the same area. A community is all the species or populations living in a given area. All the communities of living things on Earth compose the biosphere. An ecosystem is a community of organisms and its nonliving environment. Large ecological communities are known as biomes. Wetland, temperate forest, tundra, and prairie are examples of biomes.

Resources used by people may be renewable or nonrenewable. A renewable natural resource is one that can be replaced. A nonrenewable natural resource is one that can never be replaced. Fossil fuels, including coal, oil, and natural gas, are examples of nonrenewable natural resources.

Checking Your Knowledge:



1. Define *ecology*.
2. How are environment, ecosystem, biome, and biosphere related?
3. What is the difference between renewable natural resources and nonrenewable natural resources?

Expanding Your Knowledge:



Using the Internet or other sources, identify the fastest growing countries in the world. Next, try to find trends in food production for those countries. Will the food

J. Scans 5-4 # 3

production be able to keep pace with the growth of those countries? If not, how will all the people be able to eat? Write a report on your findings, and include your ideas on what must happen for all the people to be adequately fed.

Web Links:



Renewable Resources Data Center

<http://rredc.nrel.gov/>

High School Environmental Center

<http://www.epa.gov/highschool/>

Agricultural Career Profiles

<http://www.myaert.com/career-profiles>