

PRAIRIE 101

GRADE LEVEL

2-5

SUBJECT AREAS

Science, Social Studies

DURATION

Allow approximately two class periods for this activity. The initial ecosystem drawing will take from 15-30 minutes depending on the grade level.

SETTING

Indoors

CORRELATIONS

See page 8

LESSON DONATED BY

Katy Prairie Conservancy

DEEP IN OUR HEARTS

Exploring connections between the prairie ecosystem and Texas



Introduction

The prairie ecosystem has shaped the economic and cultural development of Texas since it's founding. Many of the cultural icons that we think of as being quintessentially Texan - like cowboys, barbecue, bluebonnets, longhorns, rodeos and western music - stem from the fact that most of Texas was once a prairie grassland perfect for raising cattle on lush grasses and wildflowers. Rich prairie soils also made Texas agriculture a mainstay of our economy with cotton, rice, sugarcane, soybeans, and other crops fueling the Lone Star economy and giving rise to countless fairs, rodeos, and festivals. Today, while much of the wild prairie is gone, the many cultural and economic touchstones that it gave us are very much alive.

The remaining prairies in Texas support a rich mosaic of uses, fascinating wild animals, and vivid human characters. While we usually teach ecosystems and habitats separately from human history and culture, the simple truth is that they are, and always have been, intricately intertwined and interdependent. Sometimes this complex dance between wild ecosystems and human uses and culture are vividly described in our popular music. This lesson uses the much beloved tune Deep in the Heart of Texas to help students make sense of the connection between the prairie ecosystem and the humans who shaped it and in turn were shaped by it.

Grade Levels: 2nd–5th

Objectives (TEKS in resource section)

Students will:

- Describe and depict a prairie landscape using both explicit and contextual clues given in the song ***Deep in the Heart of Texas***.
- Discuss the organisms that live in the ecosystem and how they are adapted to survive.
- Describe how organisms interact in the ecosystem,
- Interpret maps and discuss how ecosystems in the Great Plains and in Texas are related.
- Discuss how landforms and climate in ecosystems influence where people settle and what they do for a living.
- Describe some natural resources found in the ecosystem. Indicate if they are renewable or non-renewable resources.
- Discuss how ecosystems impact human culture and economies.
- Describe how human beings modified or adapted to prairie, ocean, an local ecosystems in positive and negative ways.
- Create a representation (diagram or model) of a prairie food chain, including the human beings that reside and work in the ecosystem.
- Predict how changes in the ecosystem could affect the organisms that live there.
- Describe how these changes affect natural resources such as habitat, wildlife,

[illegible]

- Identify ways that we can conserve, and replenish these natural resources
- Create a song about your ecosystem and how it functions.
- Evaluate class members' songs by conducting a Song Writers' Talent Show.

Note: Because this lesson has music and art included in it, you may wish to ask the music and art teachers to plan with you to use the song in their classes or work with students on singing and on their drawings to provide an opportunity to build art and music skills in a science context.

For the bulletin board: display photos of the plants, animals, and people mentioned in the song, *Deep in the Heart of Texas*

- Computer speakers
- Access to a recording of the Gene Autry version of Deep in the Heart of Texas. This version can be found on YouTube.com by searching “Gene Autry Deep Texas”
- One class set of blank paper or student journals
- Crayons, map pencils, or markers
- Chart paper
- Photographs of at least 3 different ecosystems including a prairie, ocean, and an ecosystem that represents the place where you live
- Internet access to US and Texas maps showing prairie ecosystems. There is a US map on this website:

Check the Texas Parks and Wildlife website for a map of ecoregions of Texas at: <https://tpwd.texas.gov/education/hunter-education/online-course/wildlife-conservation/texas-ecoregions>

- A poster with the words to Deep in the Heart of Texas or
- Individual sheets with the words to Deep in the Heart of Texas
- Construction paper strips to make paper chain food chains. (yellow for the Sun, green for plants/producers, orange for primary consumers/herbivores, brown for secondary consumers carnivores, red for top predators, blue paper for omnivores including humans, black for scavengers and decomposers) Example: Sun, plant, insect, lizard, hawk, worms

Time Considerations

Allow approximately two class periods for this activity. The initial ecosystem drawing will take from 15-30 minutes depending on the grade level.

Hand out materials - Give each student a blank piece of paper and their choice of crayons, map pencils, or markers. For younger students provide the song sheets or a class chart posted with the song lyrics to help them remember the various characteristics of the prairie.

For older students

Ask Students:

1. Why do people create songs? (Answers will vary.)
2. Can you think of any songs where the singer or rapper describes their daily life or surroundings? Give examples. (Insist, of course, on clean lyrics!).

(Note: accept all answers and then expand on the idea that people sometimes create songs to express how they live and/or what they see in their daily lives.)

Instructions

Explain that you are about to play a song created by a person who lived in a particular place and time and who wanted to tell others about the place they lived and what they saw and valued.

Every time the singer mentions something that you can draw (a noun) . We'll pause the song and you will draw that object. At the end of the process we will have a picture of the place that is in the song. (Don't tell students that it's a prairie - keep the suspense!).

Play the song

Play the song through once for students to become familiar with it. Encourage students to sing and clap along with the song.

1. How does the song make you feel about Texas?
2. What kind of ecosystem do you think this song is about?

Play the song again and pause each time Gene Autry mentions something new like a 'coyote', 'brush', 'rabbit', or 'sky'. Ask student to draw each of these things and show how they all fit in the environment. Make sure that students are creating a picture that shows the total landscape of the prairie and not just isolated objects. You may wish to discuss landscapes so students understand that they are drawing the related things in the landscape of the prairie ecosystem.

Vocabulary

Note: Make sure that the students understand what the object mentioned is. Some or all of the following vocabulary words may be used during this section and during the explanatory period. Make sure that students are familiar with the vocabulary as you go along. Ask questions to increase thinking and understanding.

- Brush - low, shrubby plants. (Exmples: Mesquite, sage, black brush, prickly pear cactus)
- Cactus – a succulent, spiny plant, ex. prickly pear cactus
 - How do these pads of the prickly pear cactus help them to survive in places with little rainfall? (They hold water to help the plant survive and they have a waxy covering to hold water inside.)
- Chaps (pronounced “shaps”) - leather covering for legs worn by a cowboy over ordinary pants to protect the legs from spiny or thorny plants, wild animals, etc.
- Chicken Hawk - refers to any hunting bird that preys on domesticated chickens. An example of a ‘chicken hawk’ is a red-tailed hawk
 - What adaptations make a hawk a good hunter?
 - What do we call an animal that hunts other animals for food?
- Coyotes (pronounce Kigh-yotes) – a carnivore, doglike canine mammal, similar to, but smaller than a wolf.
 - What part of the food chain are coyotes? (consumers, predators)
 - What are the food sources for coyotes? (mice, lizards, rabbits, etc.)
- Doggies - a motherless or neglected calf.
- Oil Wells - a place where a hole is drilled in the Earth to bring petroleum or oil, made up of hydrocarbons, to the surface, often characterized by oil derricks or pump jacks.
 - What do we call components of the environment that are used by humans? (Natural resources)
 - Some natural resources are able to be replenished and some are not. We call these renewable resources and non-renewable resources. Is oil a renewable or non-renewable natural resource? (Oil is a non-renewable resource.)
 - Why is oil considered non-renewable?
 - Name other resources and classify them as renewable or non-renewable.
 - Tell why they are considered renewable or non-renewable. (Coal is non-renewable-no more will be created for us to

use, water is renewable through the water cycle, soil is renewable through weathering and decomposition, plants and animals are renewable through reproduction, etc.)

- Prairie - a large, mostly flat area of land in North America or other parts of the world that has few trees, sometimes has brush, and is covered in mostly grasses.
 - What part of this ecosystem provides the producers in the prairie ecosystem? (Grasses, brush, and other plants.)
- Sage – a type of bush with silvery wedge-shaped leaves and small purple, white, or blue flowers
- What part of the food chain does sage occupy? (Producers)
- Squawks - loud, harsh noises.

Use inferences

For instance, the line “chicken hawks are full of squawks” introduces several layers of inference. Chicken hawks require not only hawks, but also chickens. Chickens require chicken coops. Chicken coops require farmers. Farmers also grow crops. By using inferences the pictures that you draw will become more realistic in terms of human impacts and uses of the prairie. The richer your picture, the more likely you are to be able to use your drawing to discuss prairie food chains or a prairie food web. An important idea here is that humans are a part of the food web and have been a keystone species in our local grasslands for at least 12,000 years!

For younger students

Play the song, have students listen carefully and discuss the various things that live in the ecosystem described in the song. Write students’ contributions on chart paper and post it in the room for children to read and review. Ask questions to help students remember as many parts of the ecosystem as possible.

Show pictures (or use the bulletin board) and have students describe any objects that may not be familiar.

1. How does the song make you feel about Texas?
2. What kind of ecosystem is the singer describing?

Play the song again and encourage students to sing along and clap with the song.

Have students draw a picture of the ecosystem based on what they learned in the song. Students may use their list of organisms and the lyrics to the song to help them.

Results for All Students

At the end of this procedure students will have drawn a fairly complex prairie ecosystem, which shows both natural features and man-made structures.

1. How does your drawing help you to understand what it was like on a prairie when this song was written?
2. Can you think of other things to add to your drawing to make it more accurate.

EXPLORE

People and Nature

Class Discussion

Show pictures of at least 3 types of ecosystems such as beaches, prairies, woodlands, deserts, and oceans. Be sure to include prairies and a photo to represent the ecosystem in which you live.

Have students describe each ecosystem.

Use questions such as these to guide student discussion:

For older students

1. What are the names of these ecosystems?
2. How are they alike and how are they different?
3. Which ecosystem is most like where we live?
4. Do you believe that people are part of nature or separate from nature?
5. How do people affect natural ecosystems?
6. How have people affected the ecosystem where we live?
7. What are some interactions that happen in an ecosystem among the organisms that live there?
8. What kinds of adaptations would be useful to plants and animals that live in our ecosystem?

9. How do changes in the ecosystem such as floods or droughts affect the ecosystem?
10. How do these changes affect the organisms, including humans that live in the ecosystem?

Record students' ideas on chart paper.

Extension

The Bureau of Economic Geology website at: http://www.lib.utexas.edu/geo/geologic_maps.html has maps for geology, soils, ecoregions, aquifers, oil and gas, vegetations, river basin (including average rainfall and other maps with information about Texas.

For younger students

1. What are the names of these ecosystems? (Teacher can fill in names that students can not generate)
2. What kinds of plants and animals live in each ecosystem?
3. How do these plants and animals survive in this ecosystem? (Review the needs of living things.)
4. What special characteristics help plants and animals live in the ecosystem? (Review adaptations.)
5. What kind of ecosystem do we have where we live?
6. How do people use our ecosystem?
7. How has our ecosystems affected the things that we do in our lives each day?
8. How have people changed the ecosystem where we live?

Write students' ideas on chart paper.

Explain

Humans and the Environment Interact

Student Drawings

Use student drawings, chart information, and song lyrics to introduce the discussion of ecosystems

1. What type of ecosystem did you draw?

Teacher's note: Students will often report that their drawing is a farm or ranch. This is not incorrect. Many prairies are farmed or ranched, but they are still prairies. Explain that before there were farms or ranches in the region, the areas were prairies and while they may look different now, the basic type of ecosystem remains a prairie or grassland. Even if the grass has been plowed under the basic structure of soil, water, and climate remain the same.

2. What are some of the characteristics of the ecosystem that you think influences what can live there? (soil types, amount of water available, slope, etc.)
3. What kinds of plants and animals live in this ecosystem?
4. Where in Texas do you think that this ecosystem occurred?

Note: Most parts of Texas have been, or still are, in a prairie ecosystem, although they are no longer obvious in major cities or big farming areas. In addition, places like the Big Thicket or bays and estuaries are not themselves prairies, although they may be near a prairie.

Connecting our Learning to Maps

Find the Great Plains on a US map showing the ecosystems. (See websites listed with materials.)

Use this website to explore information about the Great Plains. https://en.wikipedia.org/wiki/Great_Plains

1. Where are the Great Plains? What types of ecosystems are found in the Great Plains? (The Wikipedia map shows short, mid, and tall grass prairies.)
2. What states are part of the Great Plains?
3. What is the relationship between Texas' ecosystems and the Great Plains? (The Great Plains extends into Texas.)
4. Use the map scale to learn how big the original prairies in the Great Plains were.
5. How big are the plains of Texas indicated on the map? Estimate using the US map scale.

Use the following website to examine a map that shows the ecoregions of Texas.

<https://tpwd.texas.gov/education/hunter-education/online-course/wildlife-conservation/texas-ecoregions>

6. How much of the state is still classified as prairie, savannah, or plains? How are these words related
7. Can you tell by visiting these regions that they are still prairie? What characteristics do they retain that show that they are prairie? (Example: The Austin area, which is in the Blackland Prairie, is now covered with cities and towns. Very little area looks like prairie, but if you drive out of the city to the east you can still see rich farmland that was once prairie.

The Coastal Plains also has a great deal of farm and ranch land, which was once open prairie. Examples can be found in other ecoregions as well.)

Extension for Gifted and Talented

Note: If you have students who are gifted, or others who are interested, ask them to research information about landforms, climate, and vegetation regions that result from physical characteristics and report to the class on what they learn. They can use the information on the websites with the US and Texas ecoregion maps. Alternatively, each student or groups of 2-3 students can be assigned a part of each website to read and report information to the class.

Food Webs and Ecosystems

For older students

Identify a four-step food chain using your drawing.

1. Are humans part of any food chain that you can identify in your drawing?
2. What part do humans play in the food web in your picture?
3. How would changes in the environment affect the food chain or food web?
4. What are producers in your drawing?
5. What are the consumers in your drawing?
6. What are the predators?
7. Do you have any decomposers or scavengers? If not, add some.
8. Where does the initial energy come from for the food chain?

Draw a diagram of your food chain or food web.

Label producers, consumers, decomposers, predators and prey. (If you need to add something to your drawing to make your food web complete, please do so.)

Use arrows to show the flow of energy from the Sun through all the members of the community.

For younger students

Provide strips of various colors of construction paper for students to make a representation of your food chain or food web. Don't forget the Sun is the beginning of all food chains.

Ask students to draw a picture for each part of the prairie food chain with one picture on each link in their food chains. Be sure students draw the pictures before they assemble the chain.

Example: yellow paper for the Sun, green paper for plants (producers), orange paper for plant eaters (herbivores), brown paper for primary consumers, red paper for meat eaters (carnivores), blue paper for animals that eat everything (omnivores including humans, black paper for decomposers or scavengers)

Human Impact on the Environment

1. How have humans impacted the prairie ecosystem in your drawing?
Teacher's note: Examples include trails and roads, extraction of oil, farming, building on the ecosystem, using resources like water, grass, introducing plant species.)
2. What other changes have been made to the environment since this song was written? (building cities and town including stores and other businesses, digging trash dumps, drilling water wells, fencing, irrigation, plowing up grasslands to plant crops, etc.
3. How are these human changes in the environment positive changes in our lives?
4. How are these human changes negative?
5. What effects have human changes had on natural resources?
6. How could we conserve and replenish these natural resources?

The Environment's Impact on Culture

1. Do people still sing about living in specific places? If so, can you think of a song that is about a specific place? (God Bless America, Oklahoma, etc.)
2. Why do you believe the songwriter (Don Swander) of Deep in the Heart of Texas decided to sing about this place? What did the songwriter want his listener to know about this place?
3. How has the ecosystem influenced humans who live there?
4. How do landforms and climate influence where people live and what they do for a living?
5. How have people in different environments such as prairies and oceans been affected by their environments?
6. What pieces of our culture did we get from the prairie ecosystem? (jobs, western dress, fairs, rodeos, art, stories, music, etc.)
7. Which types of foods do we get from the prairie? (beef, dairy, grains, vegetables, chicken, eggs, etc.)
8. Which types of sports or activities are found in the prairie? (horseback riding, rodeos, hunting, fishing, hiking, photography, birding, etc.)
9. What festivals or fairs originated from people living on prairies? (County and state fairs, rodeos, Charro Days, vegetable or other crop festivals)
10. What type of music describes living in places that are prairie-like?

ELABORATE

Create a Song

Assign students the task of creating a song about their area, school, or town using the melody of Deep in the Heart of Texas.

Survey the Neighborhood

Students should survey their area. You may want to take the class on a walk around the school and note the following:

1. What is the name of their area, town, or school?
2. What types of trees, flowers, birds, mammals, bayous, waterways, or other wildlife or natural landscapes are located in their area?
3. What types of human impact are in the area? Is the area purely residential or does it incorporate businesses, parks, sports fields, or other amenities or is it farm or ranch land?
4. What types of activities were people engaged in when they surveyed the area? Playing outside, doing yard work, walking, biking, driving, and caring for farms or livestock?

Compose the Song

Students should be asked to compose a song about their area, school, or town, using the melody and structure of Deep in the Heart of Texas.

Provide the rubric so that students know your expectations. If some students want to work together in a small group, that should be acceptable. This song should have a minimum of four verses.

For younger students

Have the class work as a group writing a class song about their town, area, or school, using the melody of Deep in the Heart of Texas, or allow each small group to write 2 lines of the song. If students have problems, the teacher may provide a category for each group to write about based on the previous class discussion. (landscape, plants, animals, water sources, jobs, beauty, etc.)

Bonus Song

For those students who are already involved in music, allow original music and rhyming schemes for an original song of their own. You may wish to have this as a separate column on the rubric or as an extra instruction as shown below the rubric.

Song Evaluation Rubric				
Criteria	100 points	90 points	80 Points	70 Points
Human Elements (types of people, types of human activities and/or ecosystem uses) 25 Points	Song contains at least three impacts of humans on the ecosystem	Song contains at least two human impacts on the ecosystem	Song contains one Human impact on the ecosystem	Song contain no human impacts on the ecosystem
Ecosystem Elements (trees, bayous, birds, yards, flowers, etc.) 25 points	Song provides vivid and highly specific references to ecosystem elements	Song provides basic, accurate references to ecosystem elements	Song provides few or inaccurate references to ecosystem elements	Song does not include descriptions of local ecosystem elements
Rhyming and Structure 25 points	Song follows the basic rhyming meter and verse structure of Deep in the Heart of Texas and is very creative, with vivid detail, and/or poetic elements.	Song follows the basic rhyming meter and verse structure of Deep in the Heart of Texas. Is creative with adequate detail and/or poetic elements	Some parts of song, but not all parts, follow the basic rhyming meter and verse structure of Deep in the Heart of Texas. Has some detail and/or poetic elements	Song does not follow the basic rhyming meter and verse structure of Deep in the Heart of Texas. Has little Detail and/or poetic elements
Completion of Lyrics 25 points	Song contains more than five verses	Song contains at least five song verses	Song contains at least four song verses	Song contains three or fewer song verses

Bonus Level

Students receive an extra 10 points for trying something original.

Students write an original song with their own lyrics and musical patterns. 25 points.

Song contains at least 5 verses and shows exceptional creativity, vivid detail, and poetic elements. 25 points.

The song contains specific references to ecosystem elements. 25 points

At least three impacts of humans on the ecosystem are included 25 points.

EVALUATE

Song Writer's Talent Show

Name the Talent Show

Choose a name for the Talent Show (work together, as a class)

Auditions

Have each small group meet and sing their songs for another small group who will use the rubric to be the judges.

The groups will use the rubric to evaluate each song and choose one song to go to the contest then switch group roles, allowing the second group to sing and the first group to judge.

The Final Round of the Talent Show

After the Auditions in groups is over, have all winning songwriters sing their songs to the class.

The class will evaluate each song using the rubric and personal choice to choose the Top Song.

Texas Essential Knowledge and Skills

Grade 2 Science

2.9 Organisms and environments. The student knows that living organisms have basic needs that must be met for them to survive within their environment.

The student is expected to:

2.9 (A) identify the basic needs of plants and animals;

2.9 (C) compare and give examples of the ways living organisms depend on each other and on their environments such as food chains within a garden, park, beach lake, and wooded area.

Grade 2 Social Studies

2.6 Geography. The student understands the locations and characteristics of places and regions in the community, state, and nation.

The student is expected to:

2.6 (B) Locate places of significance, including the local community, Texas, the state capital, the U. S. capital, major cities in Texas, the coast of Texas, Canada, Mexico, and the United States on maps and globes;

2.7 Geography. The student understands how physical characteristics of places and regions affect people's activities and settlement patterns.

The student is expected to:

2.7 (C) explain how people depend on the physical environment and natural resources to meet basic needs.

2.8 Geography. The student understands how humans use and modify the physical environment.

The student is expected to:

2.8 (A) identify ways in which people have modified the physical environment such as building roads, clearing land for urban development and agricultural use, and drilling for oil;

2.8 (B) identify positive and negative consequences of human modification of the physical environment such as the use of irrigation to improve crop yields;

2.8 (C) identify ways people can conserve and replenish natural resources.

Grade 3 Science

3.7 Earth and space. The student knows that Earth consists of natural resources and its surface is constantly changing.

The student is expected to:

3.7 (C) identify and compare different landforms, including mountains, hills, valleys and plains;

3.7 (D) explore the characteristics of natural resources that make them useful in products and materials, such as clothing and furniture, and how resources may be conserved.

3.9 Organisms and environments. The student knows that organism have characteristics that help them survive and can describe patterns, cycles, systems, and relationships within the environments.

The student is expected to:

3.9 (A) observe and describe the physical characteristics of environments and how they support populations and communities within an ecosystem;

3.9 (B) identify and describe the flow of energy in a food chain and predict how changes in a food chain affect the ecosystem such as removal of frogs from a pond or bees from a field;

3.9 (C) describe environmental changes such as floods and droughts where some organisms thrive and others perish or move to new locations.

3.10 Organisms and environments. The student knows that organisms undergo similar life processes and have structures that help them survive within their environments.

The student is expected to:

3.10 (A) explore how structures and functions of plants and animals allow them to survive in a particular environment.

Grade 3 Social Studies

3.4 Geography. The student understands how humans adapt to variations in the physical environment.

The student is expected to:

3.4 (B) identify and compare how people in different communities adapt to or modify the physical environment in which they live such as deserts, mountains, wetlands, and plains;

3.4 (D) describe the effects of human processes such as building new homes, conservation, and pollution in shaping the landscape;

3.5 Geography. The student understands the concepts of location, distance, and direction on maps and globes.

The student is expected to:

3.5 (A) use cardinal and intermediate directions to locate places on maps and globes such as the Rocky Mountains, the Mississippi River, and Austin, Texas, in relation to the local community;

3.5 (B) use a scale to determine the distance between places on maps and globes;

Grade 4 Science

4.2 The student uses scientific inquiry methods during laboratory and outdoor investigations.

The student is expected to:

4.2 (B) collect and record data by observing and measuring, using the metric system, and using descriptive words and numerals such as labeled drawings, writing, and concept maps.

4.7 Earth and space. The student knows that the Earth consists of useful resources and its surface is constantly changing.

The student is expected to:

4.7 (C) identify and classify Earth's renewable resources including air, plants, water, and animals; and nonrenewable resources including coal, oil, and natural gas; and the importance of conservation.

4.9 Organisms and environments. The student knows and understands that living organisms within an ecosystem interact with one another and with their environment.

The student is expected to:

4.9 (A) investigate that most producers need sunlight, water, and carbon dioxide to make their own food, while consumers are dependent on other organisms for food;

4.9 (B) describe the flow of energy through food webs, beginning with the Sun, and predict how changes in the ecosystem affect the food web such as a fire in a forest.

4.10 Organisms and environments. The student knows that organisms undergo similar life processes and have structures that help them survive within their environment.

The student is expected to:

4.10 (A) explore how adaptations enable organisms to survive in their environment such as comparing birds' beaks and leaves on plants;

Grade 4 Social Studies

4.6 Geography. The student uses geographic tools to collect, analyze, and interpret data.

The student is expected to:

4.6 (A) apply geographic tools, including grid systems, legends, symbols, scales, and compass roses, to construct and interpret maps;

4.7 Geography. The student understands the concept of regions.

The student is expected to:

4.7 (A) describe a variety of regions in Texas and the United States such as political, population, and economic regions that result from patterns of human activity;

4.7 (C) compare the geographic regions of Texas (Mountains and Basins, Great Plains, North Central Plains, Coastal Plains) with regions of the United States and other parts of the world.

4.8 Geography. The student understands the location and patterns of settlement and the geographic factors that influence where people live.

The student is expected to:

4.8 (C) explain the geographic factors such as landforms, and climate that influence patterns of settlement and the distribution of population in Texas, past and present

4.9 Geography. The student understands how people adapt to and modify their environment.

The student is expected to:

4.9 (B) identify reasons why people have adapted to and modified their environment in Texas, past and present, such as the use of natural resources to meet basic needs, facilitate transportations, and enhance recreational activities;

4.9 (C) compare the positive and negative consequences of human modifications of the environment in Texas, past and present, both governmental and private, such as economic development and the impact on habitats and wildlife as well as air and water quality.

Grade 5 Science

5.2 The student uses scientific methods during laboratory and outdoor investigations.

The student is expected to:

5.2 (G) construct appropriate simple graphs, tables, maps, and charts using technology, including computers, to organize, examine, and evaluate information.

5.9 Organisms and environments. The student knows that there are relationships, systems, and cycles within environments.

The student is expected to:

5.9 (A) observe the way organisms live and survive in their ecosystem by interacting with the living and non-living elements;

5.9 (B) describe how the flow of energy derived from the Sun, used by producers to create their own food, is transferred through a food chain and food web to consumers and decomposers;

5.9 (C) predict the effects of changes in ecosystems caused by living organisms, including humans, such as the overpopulation of grazers or the building of highways;

5.10 Organisms and environments. The student knows that organisms undergo similar life processes and have structures that help them survive within their environments.

The student is expected to:

5.10 (A) compare the structures and functions of different species that help them live and survive such as hooves on prairie animals or webbed feet in aquatic animals;

Grade 5 Social Studies

5.6 Geography. The student uses geographic tools to collect, analyze, and interpret data.

The student is expected to:

5.6 (A) apply geographic tools, including grid systems, legends, symbols, scales, and compass roses, to construct and interpret maps;

5.7 Geography. The student understands the concept of regions in the United States.

The student is expected to:

5.7 (B) describe a variety of regions in the United States such as landform, climate, and vegetation regions that result from physical characteristics such as the Great Plains, Rocky Mountains, and Coastal Plains;

5.8 Geography. The student understands the location and patterns of settlement and the geographic factors that influence where people live.

The student is expected to:

5.8 (A) identify and describe the types of settlement and patterns of land use in the United States

5.9 Geography. The student understands how people adapt to and modify their environment.

The student is expected to:

5.9 (A) describe how and why people have adapted to and modified their environment in the United States, past and present,

such as the use of natural resources to meet basic needs;

5.9 (B) analyze the positive and negative consequences of human modification of the environment in the United States, past and present.

North American Association for Environmental Education

Kindergarten through Fourth Grade

Strand 1

1.1 C Collecting information–Learners are able to locate and collect information about the environment and environmental topics

Strand 2

2.2 C Systems and connections–Learners understand basic ways in which organisms are related to their environments and to other organisms

2.2 D Flow of matter and energy–Learners know that living things need some source of energy to live and grow.

2.3 B Culture–Learners understand that experiences and places may be interpreted differently by people with different cultural backgrounds, at different times, or with other frames of reference.

2.4 A Human/environment interactions–Learners understand that people depend on, change, and are affected by the environment.

2.4 B Places–Learners understand that places differ in their physical and human characteristics.

2.4 C Resources–Learners understand the basic concepts of resource and resource distribution.

Fifth through Eighth Grades

Strand 1

1.1 C Collecting information–Learners are able to locate and collect reliable information about the environment or environmental topics using a variety of methods and sources.

Strand 2

2.2 A Organisms , populations, and communities–Learners understand that biotic communities are made up of plants and animals that are adapted to live in particular environments.

2.2 C Systems and connections–Learners understand major kinds of interactions among organism or populations of organisms.

2.2 D Flow of matter and energy–Learners understand how energy and matter flow among the abiotic and biotic components of the environment.

2.3 A Culture–As they become familiar with a wider range of cultures and subcultures, learners gain an understanding of cultural perspectives on the environment and how the environment may, in turn, influence culture.

2.4 A Human/environment interactions–Learners understand that human-caused changes have consequences for the immediate environment as well as for other places and future times.

2.4 B Places–Learners begin to explore the meaning of places both close to home and round the world.

2.4 C Resources–Learners understand that uneven distribution of resources influences their use and perceived value.