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Grade Level: 4th (with modifications)/7th (as written)

Time Frame: One 45 minute period

Learning Outcomes:

Upon completion of this lesson, students will be able to:

1. Analyze a satellite image,
2. Identify and describe ways people have altered the environment of the Panhandle,
3. Identify why people have adapted the environment, and
4. Compare the positive and negative consequences of modifying the environment in the Panhandle.

Connection to the Curriculum:

This lesson is intended to be used in a 4th grade or 7th grade Texas History class. The teacher can adjust the difficulty of the grading to account for differing abilities between grade levels. The lesson can be used to teach about modifying the environment, agriculture, climate, or the Panhandle. Students should have some understanding of the general climate of the Panhandle – regarding rainfall and vegetation, and the most common economic activities found there, otherwise no prior knowledge or instruction is necessary. Some additional time may be needed for younger students to go over the OPTIC strategy. Alternatively, the teacher may opt to use simpler questions for younger students.

TEKS Strand(s) Objective(s):

4th Grade

9. understands how people adapt to and modify their environment [GS14]

9a. describe ways people have adapted to and modified their environment in Texas, past and present, such as timber clearing, agricultural production, wetlands drainage, energy production, and construction of dams [GS14-1]

9b. 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 transportation, and enhance recreational activities [GS14-2]

9c. compare the positive and negative consequences of human modification 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 [GS14-3]

7th Grade

10. understands the effects of the interaction between humans and the environment in Texas during the 19th, 20th, and 21st centuries [GS14,GS15,GS16]

10a. identify ways in which Texans have adapted to and modified the environment and analyze the positive and negative consequences of the modifications [GS14-1,3]

Materials:

For Student Use:	
OPTIC Organizer Handout	One per pair of students (7 th grade students may be allowed to work alone) – this may be printed or distributed electronically
Computer lab with Internet access	If lab is not available, the teacher can project the image in the classroom or print color copies of the image.

Landscape Change, Texas PDF	Print this document if the computer lab is not available.
For Teacher Use:	
Computer with projector	

References:

NASA. (2014). *Images of Change: Landscape Change, Texas*. Retrieved July 27, 2014, from Global Climate Change:
http://climate.nasa.gov/state_of_flux#Texas_Landscape_930x249.jpg
 Texas Education Agency. (2006). *Social Studies*. Retrieved July 14, 2014, from Lighthouse Initiative for Texas Classrooms: <http://www.tealighthouse.org/socialstudies/index.php>

Strategies: The students will use the OPTIC strategy to analyze a satellite image showing change over time. OPTIC is an acronym which stands for “Overview”, “Parts”, “Title”, “Interrelationships” and “Conclusion”. For a more thorough explanation of the OPTIC strategy, see the Strategy section of the Environment and Society module or visit the [TEA Lighthouse Social Studies Skills and Strategies](#) publication.

Questions: Below are some examples of higher order thinking questions which can be used with this lesson. They can be used per teacher discretion at various times in the lesson – as pre and post checks or as formative assessment during the lesson. In this case, these questions are to be answered on the student handout and discussed during the closing activity.

Describe ways humans have modified the environment of the Panhandle.

Drilling for oil and natural gas, center pivot irrigation for farming, reduced natural vegetation,

Explain the positive consequences of these modifications.

Irrigation allows for farming, which reduces natural vegetation but provides crops for food and money. Oil and natural gas provide money for the area and are local sources of energy which is more cost efficient than shipping energy resources from overseas.

Explain the negative consequences of these modifications.

Loss of vegetation can lead to desertification like during the Dust Bowl. Drilling for natural gas and oil has negative impacts on the environment and can possibly have negative impacts on the health of the residents.

Procedures to conduct the lesson:

Starting the Lesson: 5 minutes

NOTE: Before class, the teacher should locate the map showing the location of the image the students will study in the lesson. The map can be found toward the bottom right of the NASA [webpage](#) where the image is found (see Resources). Once the teacher clicks on the map, a map showing all the image locations will appear. The location for the “Landscape Change, Texas” image will be flashing. It is difficult to see, so the teacher will need to zoom in as much as possible. Once zoomed in, the teacher should display this map for students to see as they enter the room.

Post the following instructions on the board for students to follow while they study the map:

Look at the flashing location on the map. Where is this located? What do you

know about the climate, vegetation, and economic activities in the Panhandle. Describe what you think the Panhandle is like based upon what you already know.

Asking Geographic Questions: 5 minutes

Once the students have completed their writing, discuss their answers. Explain to them that they will be analyzing a satellite photo of this location in order to answer the question:

How have people changed the environment of the Panhandle?

The Lesson:

Acquiring & Organizing Geographic Information: 20 minutes

Divide the students into pairs. Handout the OPTIC sheet to each pair. If the computer lab is not available, project the satellite image or pass out the Landscape Change, Texas PDF to each pair. Have the students complete the OPTIC handout.

Analyzing & Answering Geographic Questions: Remaining class period

Have students answer the questions at the bottom of their OPTIC handout on their handout. They will construct and write their answer together.

Evaluation/Assessment: Include your assessment product or idea with the lesson plan.

Note, you want your assessment to measure your students understanding of the objectives (listed above).

	Not There Yet	Satisfactory	Clearly Outstanding
Content	<p>1 Point</p> <ul style="list-style-type: none"> ▪ OPTIC organizer is not complete. ▪ Photo parts are merely listed, no attempt at analysis. ▪ Written answer is difficult to read due to spelling and/or grammar errors. 	<p>2 Points</p> <ul style="list-style-type: none"> ▪ OPTIC organizer is somewhat complete. ▪ Analysis of photo is attempted and largely accurate. ▪ Written answer is generally free from spelling or grammar errors. 	<p>3 Points</p> <ul style="list-style-type: none"> ▪ OPTIC organizer is complete. ▪ Analysis of photo is thorough. ▪ Written answer is largely free from spelling or grammar errors.
Appearance	<p>0.75 Points</p> <ul style="list-style-type: none"> ▪ Answers are not legible. 	<p>1.25 Points</p> <ul style="list-style-type: none"> ▪ Answers are legible. 	<p>2 Points</p> <ul style="list-style-type: none"> ▪ Organizer and paragraph are neat and easy to read.

Name: _____ Name: _____

OPTIC Organizer

You will use the following organizer to analyze the satellite image "[Landscape Change, Texas](#)"
Complete each of the steps and then answer the questions.

Step	Explanation	Answer
O	Overview – What is the main subject of the photo?	
P	Parts – What details do you see that seem important?	
T	Title – What is the title of the photo? What does the caption tell you?	
I	Interrelationships – How do the two photos relate to each other?	
C	Conclusion – What can you tell has happened between these two photos?	

Answer these questions on the back of this paper:

1. How have people changed the environment in the Panhandle?
2. What are the positive consequences of these changes?
3. What are the negative consequences of these changes?

Landscape Change, Texas

These images show a portion of the Texas Panhandle, bordering Oklahoma. The area contains more than 3,600 oil and natural-gas wells, seen here as white spots. The reduced vegetation (green) in the 2014 image was caused by several recent years of drought. Other visible changes include additional center-pivot irrigation systems (dark circles) and several new burn scars from wildfires in March 2014.

May 6, 1986

May 3, 2014

