



— WYOMING —
STEWARDSHIP
PROJECT

5th Grade

Outdoor Recreation & Tourism Unit



5th Grade Outdoor Recreation & Tourism

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5th Grade Outdoor Recreation & Tourism Standards

Day	Lesson Title	Science		Social Studies	
		Explicitly Taught	Practiced/ Encountered	Explicitly Taught	Practiced/ Encountered
1	Lesson 1: Who are Stewards?				
2	Lesson 2: Owning Wyoming			SS5.6.1	
3,4	Lesson 3: School Supplies			SS5.3.1, SS5.4.5	
5,6	Lesson 4: Who's in Charge?	5-ESS3-1			
7,8	Lesson 5: Geyser Gazer			SS5.1.1	
9	Lesson 6: The Science of Stewardship	5-ESS3-1			
10	Lesson 7: You: The Mystery Steward			SS5.1.1	



5th Grade Outdoor Recreation & Tourism Standards

Day	Lesson Title	ELA		Math	
		Explicitly Taught	Practiced/ Encountered	Explicitly Taught	Practiced/ Encountered
1	Lesson 1: Who are Stewards?	5.L.6	5.RI.2, 5.SL.1		
2	Lesson 2: Owning Wyoming				MP4, 5.NBT.3.B
3,4	Lesson 3: School Supplies		5.RI.2		
5,6	Lesson 4: Who's in Charge?		5.RI.2, 5.RI.5		
7,8	Lesson 5: Geyser Gazer		5.RI.2		5.NBT.5
9	Lesson 6: The Science of Stewardship		5.RI.2, 5.RI.5		
10	Lesson 7: You: The Mystery Steward		5.W.4		



5th Grade Outdoor Recreation & Tourism Standards

Day	Lesson Title	CVE		Health	
		Explicitly Taught	Practiced/ Encountered	Explicitly Taught	Practiced/ Encountered
1	Lesson 1: Who are Stewards?				
2	Lesson 2: Owning Wyoming				
3,4	Lesson 3: School Supplies				
5,6	Lesson 4: Who's in Charge?				
7,8	Lesson 5: Geyser Gazer				
9	Lesson 6: The Science of Stewardship				
10	Lesson 7: You: The Mystery Steward				



Dear Educator,

I am honored to introduce you to the Wyoming Stewardship Project. I want you to know, this unit was written with you and your students in mind. Developing this project has been a thoughtful process and multi-year commitment to offer lessons for classrooms across the state.

Wyoming educators, in collaboration with field experts and the Wyoming Department of Education, wrote, piloted, and revised the unit you are about to teach in your classroom. We are tremendously grateful for their efforts. These units are not intended to be a burden, but were created purposefully to be easy-to-use, cross-curricular, and comprehensive. Units build on each other throughout the grades, however they can be used independently without loss of integrity.

Found in the Educator Essentials document is everything needed to be prepared to teach this unit. We outline the Higher Order Thinking Skills and how to identify them throughout the units. We have compiled a material list of everything you need to complete all lessons; worksheets, PowerPoints, and video links are included in individual lessons. Additionally, a '101' sheet has been included to give you background information for the highlighted industry in Wyoming.

Our hope for the Wyoming Stewardship Project is to empower students to be our critical thinkers and problem solvers of tomorrow. We believe the stewardship definition captures the overall intent: As Wyoming citizens, we are stewards entrusted with the responsible development, care, and use of our resources to benefit current and future generations.

Thank you again for your effort in the classroom, presenting these lessons to your students, and helping advance this pivotal project for our state. Please don't hesitate to contact us with questions!





Jessie Dafoe

Executive Director
Wyoming Agriculture in the Classroom



Teacher Preparation and Materials

The critical work of Higher Order Thinking Skills (HOTS) involves breaking down complex material into parts, detecting relationships, combining new and familiar information creatively within limits set by the context, and combining and using all previous levels in evaluating or making judgments. Within each lesson you'll find reference to the Higher Order Thinking Skills that are part of the work students will be doing using language from Bloom's Taxonomy: Analysis, Synthesis, Application, and Evaluation.

- Analysis skills are used in areas with this symbol: 
- Synthesis skills are used in areas with this symbol: 
- Application skills are used in areas with this symbol: 
- Evaluation skills are used in areas with this symbol: 

The following ideas and content will be important to know for this unit:

- Federal agencies that manage public lands:
 - Bureau of Land Management
 - Forest Service
 - National Park Service
 - Bureau of Indian Affairs
- State agencies that manage public lands:
 - Wyoming Board of Land Commissioners
 - State Parks
- Difference between public and private lands
- Importance of tourism to Wyoming

- An understanding of invasive species specifically Cheatgrass

The following materials will be needed for this unit:

- Wyoming Highway Maps
- Construction paper
 - 9 pieces of different colors for portrait gallery
 - 3 pieces per student
- 2-3 decks of cards
- 24 spoons (can be plastic)
- Bags or envelopes
- Post-it notes
- Highlighters
- Tape
 - Scotch Tape
 - Masking Tape
- Colored pencils/markers: yellow, green, light blue, purple, orange, pink, dark blue (one set per group)
- Whiteboards
- Index cards
- Tokens of some sort (five per student)
- Collection bin for tokens
- Pencil sharpener
- Music
- Some type of school supply or item: eraser, pencil, ten minutes of free time, etc. (one per student)
- Official State Highway Map of Wyoming (one per student) - see Lesson 3: Suggested Teacher Preparation for how to acquire these.
- White paper
- Markers/colored pencils/crayons
- Scissors
- Stapler
- Diet Coke (one two-liter bottle)
- Mentos mints (one package)
- Scratch paper
- Chart paper (multiple pieces)
- Lined paper



Outdoor Recreation & Tourism 101

Wyoming Outdoor Recreation & Tourism at a glance:

The below bullet points are taken directly from the *Wyoming Travel Impacts, 2000 - 2016 Report* prepared by Dean Runyan Associates. This addresses overall travel and tourism but gives a good indication of the importance of this industry

STATE SUMMARY: DIRECT IMPACTS OF TRAVEL IN WYOMING

- Travel spending by all domestic and international visitors in Wyoming was approximately \$3.2 billion in 2016. This is equivalent to approximately \$8.9 million dollars per day.
- Overall, travel spending in Wyoming has increased 4.3 percent per year since 2000. In constant dollars (adjusted for inflation), travel spending has increased by about 2.7 percent per year over the same period.
- Visitors who stayed overnight in commercial lodging facilities spent \$1.8 billion in 2016 - more than half (58%) of all visitor spending in the state. Visitors who stayed in public and private campgrounds spent \$563 million, or about 18 percent of all visitor spending.
- During 2016, travel spending in Wyoming directly supported approximately 32,000 jobs with travel-generated earnings of \$894 million. Travel spending generated the greatest number of jobs in accommodations, recreation, and food service industries.
- Local and state tax revenues generated by travel spending were about \$171 million in 2016 (property taxes not included). Without these travel generated tax revenues, each household in Wyoming would have had to pay an additional \$730 in taxes per year to maintain these current state and local tax revenues.

Wyoming Outdoor Recreation & Tourism Overview

Below this overview is a table that displays land ownership and who owns/manages the land. We encourage every teacher to review this before teaching this unit. While many of these lessons focus on public land, it is important to recognize that private land also plays an important role in recreation and tourism. Private landowners grant access for hunting and fishing, establish hunting and dude ranches, and contribute to the open spaces and wildlife habitat that make Wyoming so desirable for recreation and tourism.

The beautiful landscape of northwest Wyoming attracted the attention of settlers, and scientists alike. Wyoming pioneered the first national park, first national monument, and first national forest; making this unique land a hot spot for early tourists.

In 1872, before Wyoming was even a state, President Ulysses S. Grant designated Yellowstone as the nation's first national park. Yellowstone is home to remarkable hot springs, geysers, and wildlife. Its fame draws people worldwide to experience the breathtaking sights and natural beauty.

In 1906, the northeastern side of Wyoming became home to the first national monument. Devils Tower, a geological wonder, was handed this designation by President Theodore Roosevelt. This volcanic tower rises 867 feet from summit to base. On average over 400,000 visitors come to hike around its base or climb its columns. Another outdoor first for Wyoming was the Shoshone National forest. Created in 1891, it remains one of the wildest parts of the continental United States. This forest provides chances for people to hunt, hike, camp, and fish.

Wyoming became known world-wide through Buffalo Bill Cody's Wild West Show, which sensationalized the wild west. Wyoming continues to welcome tourists who are seeking a taste of the west and take pleasure in Wyoming's extraordinary lands. The state hosts an average of 8.5 million overnight visitors a year. These travelers and the people in Wyoming have the chance to enjoy the diverse landscape from mountains to vast grasslands.

Nearly half (48%) of Wyoming is federal public land and the State of Wyoming owns another 5.6%. Not only does Wyoming have beautiful scenery, it offers history in various forms. In addition to the Ft. Laramie National Historic Site, there are twenty-five Natural Historic Landmarks and two national monuments, Devils Tower and Fossil Butte. To keep these destinations accessible, private land owners, along with state and federal agencies, such as the Wyoming Game and Fish Department, National Forest Service, and Bureau of Land Management work to provide balance in conserving these resources for future generations.

Wyoming Lands

LANDOWNERS	Acres	Sq Miles	%
United States Government			
National Park Service	2,223,083	3472	3.50
Forest Service	9,166,805	14324	14.62
Fish and Wildlife	72,449	112	0.12
Bureau of Land Mgt.	17,508,808	27359	27.92
Bureau of Indian Affairs	1,540,133	2407	2.46
Bureau of Reclamation	411,985	644	0.66
Other Federal Managed Lands	78,054	121	0.12
Wyoming			
State Lands	3,612,571	5642	5.76
State (State Parks & Hist Sites)	61,319	96	0.10
State (Wyoming Game and Fish)	187,747	294	0.30
Local Government	9,701	15	0.02
Surface Water	435,596	681	0.69
Total Private	27,406,262	42820	43.70
Total Public	35,308,251	55169	56.30
TOTAL AREA	62,714,513	97,987	

Source: Information compiled by Wyoming Association of Conservation Districts - 2017. Statistical information obtained from 2014 Bureau of Land Management dataset.

Land Ownership

Private Property

Private property rights are fundamental to Wyoming. Private property includes land owned by a person or group and kept for their exclusive use. Every person has the right to own private property and enjoy using it. This also includes the right to prohibit other people from using it. The Wyoming Constitution protects private property rights from the government taking ownership of the land (eminent domain) or by other people taking ownership of the land by stating: Private property shall not be taken for private use unless by consent of the owner, except for private ways of necessity, and for reservoirs, drains, flumes or ditches on or across the lands of others for agricultural, mining, milling, domestic or sanitary purposes, nor in any case without due compensation.

Furthermore, “private property shall not be taken or damaged for public or private use without just compensation.”

Students should be aware of the importance of private property in Wyoming and the understanding that someone who does not own a certain parcel of private land cannot cross or be on that land for recreation or tourism use without permission from the owner. Private property use is respected under the law. Many private landowners do create access for recreation in providing hunting and fishing opportunities as well as development access. However, if someone wants to cross land they do not own, they must acquire permission, generally by purchasing certain rights to use the land from the person who owns the land.

State Lands

State lands include land granted to the state of Wyoming by the United States upon the admission of Wyoming to the Union; these lands are commonly known as State Trust Lands. According to the Office of State Lands and Investments, “When Wyoming became a state on July 10, 1890, the federal government granted approximately 4.2 million acres of land (known as State Trust Lands) to the State of Wyoming. The law requires state land to be held in trust to produce income to support public schools and other state institutions named in the original grants.” These lands held by the State of Wyoming provide a huge benefit for our youth and their education by generating income from leasing land for livestock grazing, outfitting, energy production and mineral production. Students should understand the importance of stewardship of this land to be managed in a ways that promotes sustainable multiple use while providing income to the institutions which the land was granted to benefit.

For example, there are other state lands such as the University of Wyoming land that is owned by the University and used for its research and other purposes. Another category of State land includes State Parks. State Parks, much like National Parks, are reserved to be enjoyed by the public for recreation and tourism and do not generate income through development. Additionally, there is specific Wyoming land managed by the Wyoming Game & Fish Department.

Federal Lands

Federal lands have six primary administering agencies: Bureau of Land Management (BLM), Forest Service (FS), Fish and Wildlife Service (FWS), National Park Service (NPS), the Department of Defense (DOD), and the Bureau of Reclamation (BOR). The BLM, FS, FWS, and NPS lands are the primary agencies/federal land focused on by the Wyoming Stewardship Project.

The DOD lands consists primarily of military bases and training ranges. The BOR has projects in 17 western states including Wyoming. The Wyoming Stewardship Project does not focus specifically on these projects/land areas.

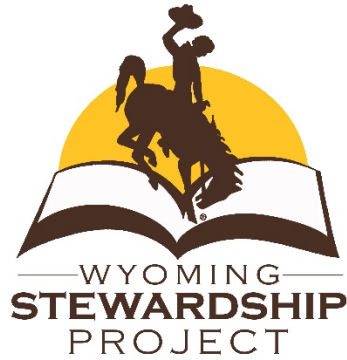
The BLM, FS, NPS, and FWS have unique missions for each agency. BLM and FS lands are managed under the principles of multiple use and sustained yields. For other lands, such as wildlife refuges managed by FWS, the land is managed for wildlife with only limited private economic uses. By and large, the other federal land is managed for a wide range of multiple uses including the timber harvest, mining and oil and gas development, grazing, outfitting, recreation, wildlife habitat, water supply protection and other productive uses of the land.

National Parks, on the other hand, are set aside primarily for site preservation and used primarily for recreation and tourism purposes. In addition to the national parks are monuments and trails. Wyoming has a rich resource within these lands for Wyomingites to enjoy and steward for many to benefit from these lands for time to come.

Stewardship

As Wyoming citizens, we are entrusted with the responsible development, care, and use of our resources to benefit current and future generations.





Lesson One: Who Are Stewards?

Grade Level: 5th Grade

Time: 45 minutes

Essential Question: How can we be stewards of Wyoming's public and private lands to benefit current and future generations?

Objective: Students will:

- Be introduced to vocabulary important to understanding the unit.
- Practice a reading strategy that will be used throughout the unit.

Purpose: Students learn vocabulary and reading strategy to help identify characteristics of good stewards throughout the rest of the unit. These will later help students identify a Mystery Steward who they will eventually recognize as themselves.

Required Materials/Resources:

- Construction paper (9 pieces of different colors)
- 2 decks of playing cards (If your class is larger than 28 students, a third deck of cards is needed.)
- Three spoons for every four students (can be plastic)
- Directions for How to Play Spoons (one copy per group or a teacher copy to display)
- Video: <https://www.youtube.com/watch?v=bkDC3JoRjSk> *How to Play: Spoons (source 2) Video length: 1 minute 26 seconds*
- Spoons Vocabulary cards (One set for every group printed front to back. Make sure the term on the front has its correct definition on its back.) - (source 1)
- Bags or envelopes to hold vocabulary cards
- Vocabulary table (one per student)
- Mystery Steward Portrait for Portrait Gallery
- Stewardship definition poster

- Practice text: Girls' decoy grouse lure birds from drill-rig noise (one per student) - (source 3)
- Post-it notes (4-5 per student)
- Highlighters

Suggested Teacher Preparation:

- Make card decks for small groups to play Spoons. You need four cards of the same rank for each group deck. For example, with 4 players, you could use the Aces, 2s, 3s, and 4s. Therefore, one complete card deck of 52 cards should be enough to make 3 small group decks. 2 decks should be enough for six groups.
- Review how to play Spoons.
- Prepare vocabulary cards and place in bags or envelopes.
- Prepare a space for the "Portrait Gallery" in your classroom. Post 9 pieces of different colored construction paper. The construction paper will be used as background for the portraits that you hang up throughout the unit. Make a copy of each of the nine portraits contained in the unit.



- As you come across a part of a lesson that has a portrait listed, you will see the camera icon. When you see this icon, please attach that portrait to a piece of construction paper. Place portraits in order of the lessons they appear.
- Place the Mystery Steward Portrait on the last piece of construction paper in your gallery.
- Preview the Practice text and find parts that students should highlight when practicing the reading strategy (see step 4). Save these at the end of the lesson because they will be used again in lesson 4.

Standards:


ELA: 5.L.6 (Explicit), 5.RI.2, 5.SL.1 (Practiced/Encountered)

Vocabulary:

- **Care** - providing for something in a positive way
- **Develop** - to aid in growth, maturation, or expansion
- **Manage** - be in charge of, run, be head of, head, direct, control, preside over, lead, govern, rule, command, supervise, oversee, administer, organize, conduct, handle, guide
- **Natural resource** - sources of life, materials, or energy that we are able to get naturally from the earth
- **Property** - land mass of varying size

- **Resource** - a place or thing that provides something useful
- **Stewardship** - As Wyoming citizens, we are stewards entrusted with the responsible development, care, and use of our resources to benefit current and future generations.
- **Use** - the way in which land can be interacted with based on regulations

Instructional Procedure/Steps:

1.  Direct students' attention to your empty Portrait Gallery. Say: **that they are empty except for the last one. As we complete each lesson, we will add a portrait to the gallery. There will be portraits of several stewards, but this last portrait is our Mystery Portrait. Together, we will begin by discovering what it means to be a steward. We will study each of these portraits as they are added to see how the individuals are stewards of Wyoming's lands. By the time we are finished filling our gallery, we will have learned about each of the people in these portraits. You will also be able to help me figure out who the Mystery Portrait belongs to."**
2. To introduce lesson vocabulary, students will play the card game Spoons with a twist. Either play the video with the game directions or use the written direction sheet to teach the Spoons game. Place students into groups, and pass out card decks, spoons, vocabulary cards, and Vocabulary tables. Have students complete the Vocabulary table as they play Spoons. The table has 3 columns: word, definition, and a picture. Students will draw a picture to help them remember the definition of the word. Each student who loses a round of the game has to draw a vocabulary card from the top of the word pile and read it out loud to the group. Group members need to continue playing the game until they have completed their Vocabulary table with all 8 vocabulary terms. Be sure to monitor where groups are during the game, so when all groups are finished, the class can move on to step 3.
3. When students finish, have them place their Vocabulary tables on their desks. Say: **"We are now going to complete a silent walk about. Look but do not touch all of your classmates' Vocabulary tables. Focus on the different ways other students 'pictured' their words. Questions?"** The teacher should also walk around to note any students' misconceptions of the words.

4. Collect game materials, and pass out the practice texts, highlighters, and Post-it notes to each student. Say: **“Today we are going to set up our reading strategy for how we will do the work in each of our lessons. The article you are about to read was adapted from *The Casper Star Tribune*. We are using this text to practice our strategy. I will read the passage to you first, and you will follow along with your highlighter ready to highlight what I emphasize. I will tell you something specific to look for in the text, and you will highlight it when you find it. When I am finished reading the text aloud, you will work with your elbow partner to read the text again and discuss what you highlighted from the text. You can use your Post-it notes to jot down any questions you have from the reading and stick it on the text for later discussion. We are going to practice this strategy now.”**

TEACHER NOTE:
The practice text
will be used again
in lesson 4.

5. As the article is being read, have students actively highlight by following the strategy described in step 4. Say: **“Look for and highlight ways that the girls and the scientists worked together to solve the sage grouse problem.”** When finished reading, have students work with a partner to discuss what they highlighted. Listen in on students’ conversations to see if they identified the look-fors listed below. Some might include:
 - *mowed down sagebrush*
 - *played the sounds of local grouse*
 - *made paper-mâché look-alikes*
 - *got up early to count birds*
6. Close lesson by saying: **“The purpose of today’s lesson was to learn important vocabulary and a reading strategy to help us identify stewardship examples and stewards of Wyoming’s public and private lands. We are not identifying any of our stewards at this time, but we will use this strategy throughout the rest of the unit to identify a steward from every lesson.”**

Assessment: Collect students’ Vocabulary tables and highlighted Practice texts to assess students’ understanding of vocabulary terms and ability to practice the highlighting strategy.

Credits/Sources:

1. the spruce. (n.d.). *How to Play Spoons*. Retrieved August 17, 2017, from <https://www.thespruce.com/spoons-card-game-rules-411144>
2. Triple S Games. (2015, October 22). *How to Play: Spoons*. Retrieved October 7, 2018, from <https://www.youtube.com/watch?v=bkDC3JoRjSk>
3. Wyofile. (2015, July 28). Girls' decoy grouse lure birds from drilling-rig noise. Retrieved November 9, 2018 from <https://www.wyofile.com/girls-decoy-grouse-lure-birds-from-drilling-rig-noise/>

Spoons Game

How to Play Spoons

Spoons (adapted from source 1) is a clever card game that can be played by children and adults. This card game also goes by the names **Pig** and **Tongue**. Despite the name, spoons are not necessary to play those versions of the game. This fun family game can accommodate a large number of players.

Players - Four on each team

Cards - A standard 52-card deck - for this version, one deck is enough cards for 12 students.

Setup: For each player in the game, you need four cards of the same rank from the deck. For example, with 4 players, you could use the Aces, 2s, 3s, and 4s.

To play the Spoons version, you also need one spoon for each player except one.

Example: With 4 players, you need 3 spoons. For **Pig** and **Tongue**, no extra equipment is needed.

Goal: The goal of the game is to be the first to collect four cards of the same rank. If an opponent beats you to that goal, try not to be the last to realize it.

*Shuffle the cards, and deal them to the players. Each player will have four cards. If you're playing **Spoons**, put the spoons in the middle of the table, so every player can reach them.*

Gameplay: Players simultaneously choose one card from their hands, pass that card to the opponent on their left, and pick up the card they've received from the opponent on their right. No player can have more than four cards in his hand, so it's illegal for a player to pick up a new card before passing one to the left. When a player collects four of a kind, he/she does one of the following actions, depending on which version of the game is being played:

Spoons: As subtly as possible, take a spoon and place it in front of yourself.

Pig: Quietly place a finger on the tip of your nose.

Tongue: Quietly, but visibly, stick out your tongue.

When one player does this, every other player must do likewise as quickly as possible. The last player to grab a spoon, touch his nose, or stick out his tongue is the loser.

Optional: While playing **Spoons** or **Tongue**, players who either take a spoon or stick out their tongue can continue to pick up and pass cards, making it more difficult for other players to realize what has happened. The player who collects four cards of the same rank must always pass the card they just picked up because passing any other card would break up their four-of-a-kind. This option is not available when playing **Pig** since one of your hands will be occupied with touching your nose.

Winning the Round: The last player to grab a spoon, touch their nose, or stick out their tongue is the person to take a card from the vocabulary pile. Once the card is read and repeated by the rest of the students, shuffle the deck of cards, and play again. Continue playing until you have been through all eight of the vocabulary cards.



Vocabulary Cards

Natural Resources	Resource
Use	Manage
Develop	Care
Property	Stewardship



Vocabulary Cards

<p>a place or thing that provides something useful</p>	<p>sources of life, materials, or energy that we are able to get naturally from the earth</p>
<p>be in charge of, run, be head of, head, direct, control, preside over, lead, govern, rule, command, supervise, oversee, administer, organize, conduct, handle, guide</p>	<p>the way in which land can be interacted with based on regulations</p>
<p>providing for something in a positive way</p>	<p>to aid in growth, maturation, or expansion</p>
<p>As Wyoming citizens, we are stewards entrusted with the responsible development, care, and use of our resources to benefit current and future generations.</p>	<p>land mass of varying size</p>





?????

Mystery Steward



Practice Text

Girls' decoy grouse lure birds from drilling-rig noise

· July 28, 2015
Angus M. Thuermer Jr.

PINEDALE – Two 8th-grade students advanced greater sage grouse science this spring by making dummy strutting males to lure birds from a nearby drilling rig so they could better hear mating calls.

Under the guidance of Wyoming Game and Fish Department biologist Therese Hartman, Maggie Majhanovich and Nora Legerski made 16 paper mache decoys, resplendent in their puffed-up strutting glory with white chests and splayed tail feathers.



Five grouse strut around two paper mache decoys (center) made by Pinedale Middle School students Nora Legerski and Maggie Majhanovich. Trail-cam photographs and observations show that, for the first time, biologists have been able to coax grouse from a real to an artificial lek. (courtesy Wyoming Game and Fish Department)

In the spring, they took the decoys to a lek, a clearing in the sagebrush where greater sage grouse strut, court, cluck and mate. A drilling rig had moved into the neighborhood and its noise was overwhelming the low-volume courtship calls and noises.

“The oilfield is real loud and it’s hard for them to hear,” Nora said. If they could make a fake lek, Maggie said, maybe the grouse would move their breeding ceremony farther from the rig where they could hear better.

The goal is to bolster the population that’s dwindling around the Pinedale Anticline gas field. The species is in trouble nationwide and warrants protection under the Endangered Species Act.

“The grouse had been leaving because they can’t hear,” Nora said. “By moving the lek ... it would help.”

Without a lek, “they won’t reproduce,” Maggie said. “Then they’ll go extinct.”

“All our studies indicate the leks within a mile of the drilling activity are declining,” biologist Hartman said. “One lek we’re trying to salvage had over 200 birds on it. It’s down in the 40s now. To respond to that, in order to try to keep the birds on the



Practice Text

landscape, we're coming up with any kind of crazy idea we can." "We always like to include students when we can," Hartman said of Game and Fish work. She went to Pinedale Middle School science teacher Aretta Hudlow who nominated the pair. An art teacher helped with supplies and techniques.

Two peas in a pod, the 13-year-old eighth-grade neighbors have been buddies since kindergarten. They've worked on their project since February. They're such close friends they sometimes finish one another's sentences.

Although they worked with chicken wire, paper mache, paint and other arts-and-crafts supplies from an eighth-grade classroom, the girls' work is groundbreaking.



Creating fake grouse (courtesy of the Wyoming Game and Fish)

"The idea is to get [grouse] to stay in the gas field until the drilling is done," Hartman said. When noisy drilling is replaced with quieter, less intrusive production pumps and tanks, the hope is grouse will "go back to business as usual."

"It's a lot of hard work," Nora said. "You had to be organized. You had to be done with paper mache by this date, paint by this time, get them out there."

Finally, they went out to the artificial clearings, drove stakes into the ground and wired the grouse down. Hartman and her colleagues set up the sound systems and programmed them to play for a couple of hours at dawn.

"We'd go out early in the morning before school or on Sundays," Maggie said. "We'd watch from the cars with the binoculars, spotting scopes."

The scientists began to record their observations.

"You start on one end and count and then go back the other way," Maggie said. "You'd see some of them running, some of them hanging out."

Nora marveled at the males' displays. "You could see them puff up," she said. "It was fun to see them strutting around."

The decoys worked. During the four or five early morning visits to the Lower Sand Springs leks, Maggie and Nora saw eight males on each of the artificial clearings.

Article adapted and reprinted from WyoFile

<https://www.wyofile.com/girls-decoy-grouse-lure-birds-from-drilling-rig-noise/>

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Lesson Two: Owning Wyoming

Grade Level: 5th Grade

Time: 45 minutes

Essential Question: How can we be stewards of Wyoming's public and private lands to benefit current and future generations?

Objective: Students will:

- Identify the many uses of Wyoming's public lands.
- Graph the different use percentages of Wyoming's public lands.

Purpose: Students learn that Wyoming's public lands offer diversity and are used in multiple ways.

Required Materials/Resources:

- Masking tape
- Land Ownership map PDF or <http://uwmaps.wygisc.org/studentAtlas/index.html?page=37> (sources 1-2)
- Wyoming Public Lands 10" x 10" Grid (one per every group of four)
- Wyoming Public Lands 10" x 10" Grid Answer Key (copy for teacher)
- Colored pencils/markers: yellow, green, light blue, purple, orange, pink, dark blue (one set per group)
- Whiteboards/Post-it notes
- Public Land Sort (one per pair of students and a copy not cut for teacher to display as a key)
- Bags or envelopes for the Public Land Sort
- Eaton Ranch Portrait for Portrait Gallery
- Video: <https://www.youtube.com/watch?v=yghUWugScJE> *Eaton Ranch - That's WY* (source 3) Video length: 2 minutes 25 seconds
- Index cards

Suggested Teacher Preparation:

- Divide the room in half with masking tape on the floor.
- Print the Wyoming Public Lands 10" x 10" Grid Answer Key in color.
- Decide if you want students to respond using whiteboards or Post-it notes in step 6.
- Prepare the Public Land Sorts by cutting the activities into strips and placing them in bags or envelopes. Keep one copy uncut as a key to display in step 7.

Standards:

Social Studies: SS5.6.1 (Explicit)

Math: MP4, 5.NBT.3.B (Practiced/Encountered)

Vocabulary:

- **Private Land** - land owned by a person or group and kept for their exclusive use; permission and access for any purpose must be granted by the owner
- **Public Land** - land owned by a government (may or may not be accessible to the public)

Instructional Procedure/Steps:


1. Instruct students that they need to stay on one side of the taped line. This side should be the public side of the land, but do not tell them this right away. Gather students into one area of the public side of the room for a discussion. Say: **“In the last lesson, we talked about what it means to be a good steward of Wyoming’s lands. Imagine that the floor of this classroom represents the land of Wyoming. As you walked into the room today, I’m sure you noticed that there is tape on the floor that divides the room. Are you curious as to why there is tape on the floor? We’ll discuss that in a minute, but first we need to talk about the word public.”** Ask students leading questions to see if students understand what “public” means: **“What is a public restroom? What does it mean to go to a public library?”** Let students respond. Say: **“Public means somewhere that anyone can visit as long as they follow the guidelines of the place. The tape line represents how much land in Wyoming is public land. You will notice that it is about half. This does not mean that the western half of Wyoming is exclusively public land; it is meant to be a representation of the portion of overall land that is public. If this is the public land side that you’re sitting on, does anybody know what the other side would be called?”**

TEACHER NOTE:
Keep the tape on your floor. It will be needed for the next lesson.

2. Give students a couple of minutes to Think-Pair-Share their ideas of what the other side of the room could be named. Call on a few students to share out and guide them to the correct answer of private land. Again, clarify for students that the private land doesn't just exist on the eastern side of the state. This is just a representation.



In this task, students will be engaged in the higher order thinking skill of analysis by noticing and identifying map information.

3.  Display the Land Ownership map. Number students 1-4, and have all the ones sit together, twos sit together, and so on. Have students turn and talk with their group the following questions.
 - **“What do you notice about this map?”**
 - **“What do you think the colors represent?”**
 - **“Which color seems to have the greatest representation on the map?”**

Teacher look-fors might include: *colors, counties, railroads, Yellowstone National Park, water, etc.* Students may say color represents various things. They will probably say yellow is the predominant color.

4. When groups are finished discussing, say: **“You will notice that there is a legend on the right side of the map. It tells us what the colors actually mean. This map is showing us how land is distributed in Wyoming. You see that private land is colored in white. Public lands are broken down into all of the other colors. State lands are light blue; Bureau of Land Management is yellow; U.S. Forest Service is green; National Park Service is purple; Bureau of Indian Affairs is orange; Other federal lands are pink; and water is dark blue.”** Pass out the Wyoming Public Lands 10 x 10 grids and sets of colored pencils/markers. Say: **“We are going to create a model of the different types of land ownership using decimals. This will allow us to get a better comparison of the public lands/private land ownership in Wyoming. We will keep the numbers lumped together for the purpose of viewing the map through a different lens. Understand that our public lands are really not organized like this. Please graph the numbers in the order they are listed. Have discussions with members of your group if you have questions. Mark the colors for each category as I say them.”** Read the colors for the categories listed below. When finished, say: **“Put on your math caps, and let's get to work. You will have 10 minutes.”** Monitor groups while they are working for the 10 minutes. Have students graph the numbers in the order

they are given, so they can get a better view of the amount of each type of land that make up our public lands.

- **“BLM lands are yellow.”**
- **“U.S. Forest Service is green.”**
- **“State lands are light blue.”**
- **“National Park Service is purple.”**
- **“Bureau of Indian Affairs is orange.”**
- **“Other federal lands are pink.”**
- **“Water is dark blue.”** *This value is .004 of the state’s area which will not be representable to the students because it is less than 1%.*



In this task, students will be engaged in the higher order thinking skill of analysis by noticing and identifying map information.



5. When the ten minutes are up, display the Grid Answer Key for students to view. Say: **“Compare your group’s grid to the answer key.”** Give students a few moments to adjust their grids if needed. Ask: **“What does our mathematical model show us about Wyoming’s land? Turn and talk to a neighbor then share out your ideas with the group.”** When small groups are finished discussing, reconvene the whole group and ask the following questions.

- **“What do you notice?”**
- **“How many total squares are colored?”** 56
- **“What does the colored land represent?”** *public land*
- **“What do the white squares on your map represent?”** *private land*




In this task, students will be engaged in the higher order thinking skill of synthesis.




6. Pass out either whiteboards or Post-it notes, say: **“Our Wyoming’s Public Lands grid will be a good resource for us to refer to as we continue to talk about Wyoming’s lands. On your own, write a response to this question: Whose responsibility is it to take care of these lands that are public?”** Students will share their ideas by finding a partner and then forming two equal lines. Have students in the line on the left stay in their spot, and have students in the right line move three people down. The three students at the top of the line walk down the middle and line up with their new partners at the back of the line. Students share their ideas again with their new partners. This process can be repeated one more time.

7. Say: **“Our next activity will explore some uses of public lands.”** Break the groups of four into pairs. Give each pair a bag or envelope with the Public Land Sort activity inside. Pairs sort their activity strips and place them under the correct heading. Pairs should raise their hands when finished to trade places with another pair that is finished. They will check each other’s work. When all pairs have had a chance to check their work, have students return to their home seats and check the work as a whole group using an uncut copy of the sort.

8.  After all students have checked their sorts, discuss the questions below. Allow students to respond before moving on to the next one:

- **“Why do rules and regulations exist for public lands?”**
- **“How do rules and regulations relate to the importance of stewardship of public lands for the next generation?”** If students have trouble answering this question, reframe the question in this way: **“In our sort, we said that we can’t start a fire in a place that is not designated for one. Why is following this rule important to being stewards?”** Repeat the question with other activities not allowed on public lands.

9.  Play the *Eaton Ranch – That’s WY* video. When the video is finished, ask the questions below. Allow students to respond before moving on to the next one:

- **“Do rules and regulations apply to private land?”**
- **“How or why would you need to gain access to private land?”**

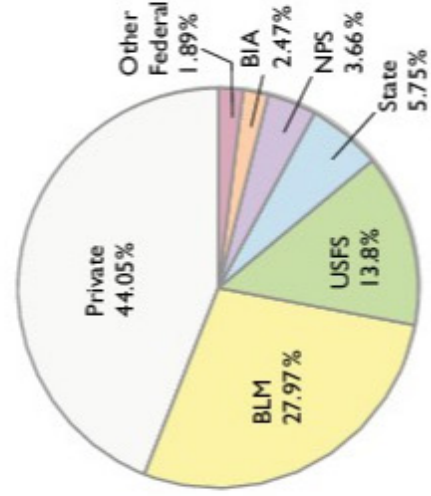
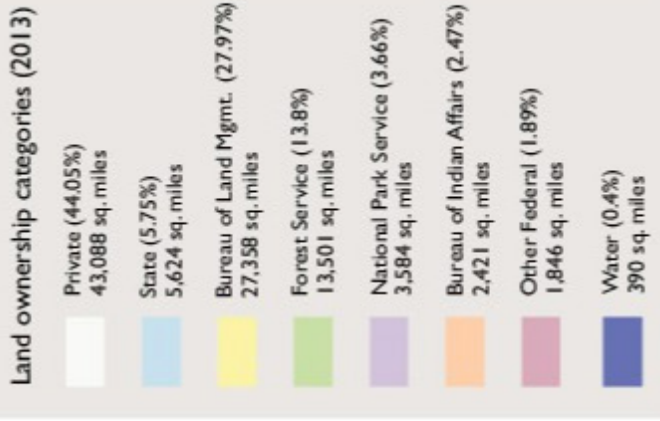
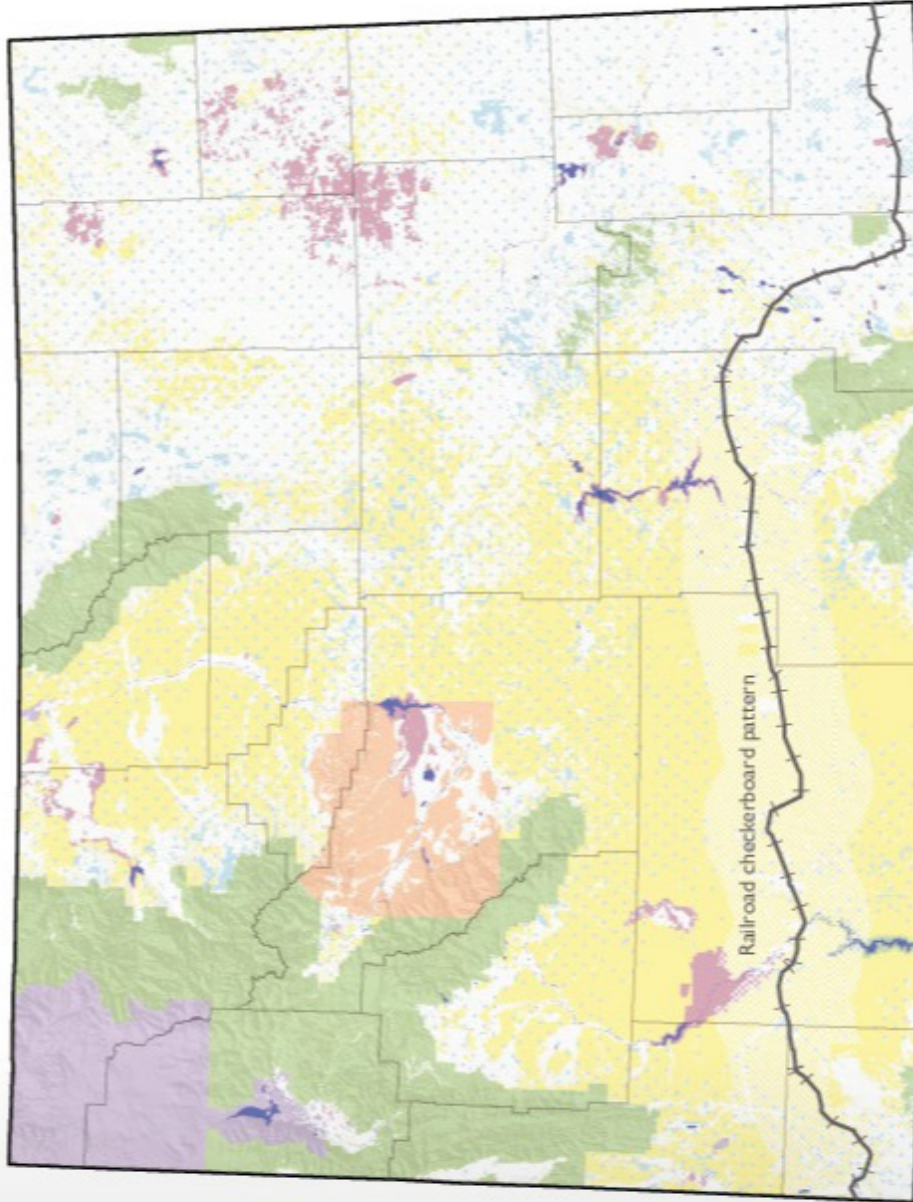


Add the Eaton Ranch Portrait to the Portrait Gallery.

Assessment: Pass out index cards as a Check for Understanding. Say: **“On one side of your index card, label and sketch two different uses of public lands. On the other side of your index card, write a complete sentence in response to this question: When individuals are participating in different uses of public land, what can they do to be a good steward of the land? When you are finished, place your index card on the floor on the correct side of the room.”** First check that students place cards on the Public side of the floor. Check that students put correct uses for public lands: *hunting, fishing, camping, hiking, going to a public park, etc.* on one side of their cards and list an example of being a steward on the other.

Credits/Sources:

1. Hammerlink, J.D., Webster, G.R., & Berendsen, M.E. (2014). *Wyoming Student Atlas: Exploring our Geography*. Laramie:Wyoming: University of Wyoming.
<http://uwmaps.wygisc.org/studentAtlas/index.html?page=1>
2. University of Wyoming. (n.d.). *Land Ownership map*. Retrieved August 18, 2017, from
<http://uwmaps.wygisc.org/studentAtlas/index.html?page=37>
3. Wyoming Business Council. (2017, February 23). *Eaton Ranch - That's WY* Retrieved July 18, 2017, from
<https://www.youtube.com/watch?v=yghUWugScJE>



More than 48% of the land in Wyoming is owned by the federal government, placing Wyoming sixth among states in total acres and fifth in percentage of land owned by the federal government.

The First Transcontinental Railroad, completed in 1869, was financed in part by land grants to the railroad. Every other section (one square mile) of land within twenty miles of the railroad was granted to the Union Pacific, which tried to sell the land to raise capital for the venture. The sale of these sections to private land owners resulted in a permanent checkerboard pattern of alternating federal and private land in southwestern Wyoming.

Wyoming Public Lands

Key

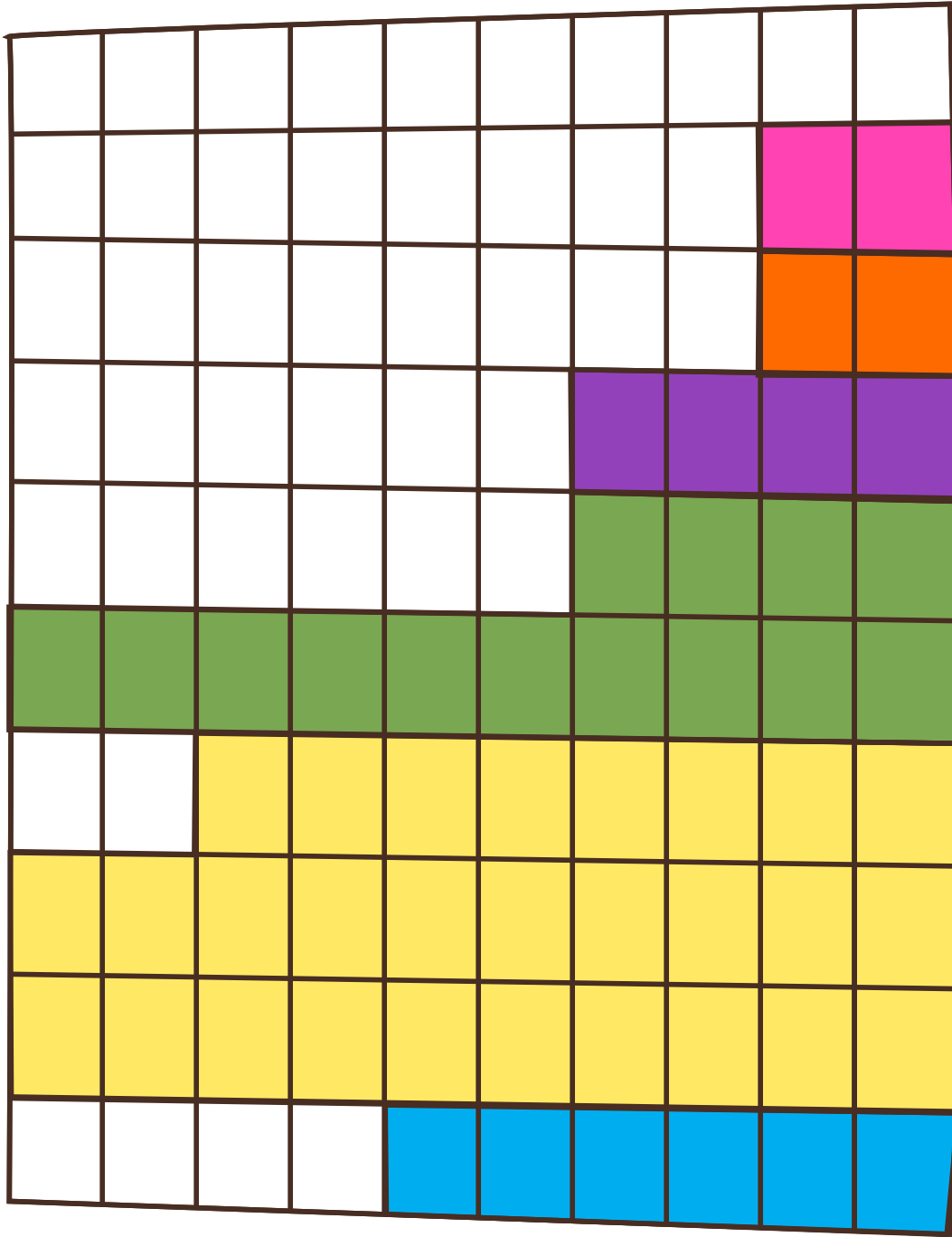
Values as a percentage of Wyoming's total area

- State lands .06
- BLM lands .28
- Forest Service .14
- National Park Service .04
- Bureau of Indian Affairs .02
- Other Federal Lands .02
- Water 0



Wyoming Public Lands

Answer Key



Key

Values as a percentage of Wyoming's total area

- State lands .06
- BLM lands .28
- Forest Service .14
- National Park Service .04
- Bureau of Indian Affairs .02
- Other Federal Lands .02
- Water 0

Public Land Sort

What is allowed on public lands:	What is not allowed on public lands:
Hunting	Dumping trash
Fishing	Littering
Camping	Taking down fences
Hiking	Abandoning campsites
Archery and shooting	Hiking off marked trails
4-wheeling	Hunting illegally
Snowmobiling, snowshoeing, skiing	Trespassing
Energy development	Vandalism and defacing property
Livestock Grazing	Starting a fire in an unmarked area



Public Land Sort

What is allowed on public lands:	What is not allowed on public lands:





Eaton's Ranch



Lesson Three: School Supplies

Grade Level: 5th Grade

Time: 2 Days: 45 to 60 minutes per day

Essential Question: How can we be stewards of Wyoming's public and private lands to benefit current and future generations?

Objective: Students will:

- Identify how Wyoming's State Trust Lands are used in multiple ways to generate revenue for current and future students.
- Study primary source documents to obtain information about state lands.

Purpose: Students learn the difference between Wyoming's State Trust Lands and state parks, how both are used, and how to be stewards of them.

Required Materials/Resources:

- Wyoming State Trust Lands Story - Jillian Balow Interview text (one per student and a copy for the teacher) - (source 1)
- Highlighters
- Post-it notes
- Masking tape
- Tokens of some kind (five per student)
- Collection bin for tokens
- Pencil sharpener
- State Trust Land sign
- Portraits of Jillian Balow and Darin Westby for the Portrait Gallery
- Some type of school supply or item: eraser, pencil, ten minutes of free time, etc. (one per student) - This is the item that is "bought" in Part 1: step 3 with the "state trust land" tokens.
- Land Ownership map PDF or <http://uwmaps.wygisc.org/studentAtlas/index.html?page=37> from lesson 2 (source 8)

TEACHER NOTE:
The pencil sharpener is one suggestion of a tool that students will have to "pay" to use. A teacher could also select other things like getting a drink, already sharpened pencils, etc.

- Music
- Official State Highway Map of Wyoming (one per student)
- State Park Location Clues (one per student) - (source 5)
- Glendo State Park Story text (one per student and a copy for the teacher) - (source 9)
- White paper (two pieces per student)

Suggested Teacher Preparation:

- Read the Required Materials/Resources list, and gather any items that are not readily available in your classroom.
- Collect the State Highway Maps. They are free from any Chamber of Commerce or state rest stop, or you can contact the Wyoming Office of Tourism for some. 1-800-225-5996 or <https://www.travelwyoming.com/map>. (source 10)
- Choose and gather the school supply or item for each student in class (eraser, pencil, ten minutes of free time, etc.)
- Review the following website for more information on State Trust Lands. <http://slf-web.state.wy.us/ForestryDivision/WildlandFire/StateTL.pdf> (source 6)
- Review the Outdoor Recreation & Tourism 101 document (It is located in the Educator Essentials - sources 2 - 4) and the Wyoming State Parks website <http://wyoparks.state.wy.us/index.php/places-to-go/view-full-list-of-wyoming-state-parks> (source 5) There is a small video of each state park on their website that may be a great resource for the teacher.
- Partition a small part of the public lands part of the floor for State Trust Lands. In the space, place the State Trust Lands sign, the collection bin, and the pencil sharpener or whatever item students are “paying” to use. It only needs to be big enough to fit these three items.
- Post the sentence starters for students to use in Part 1: step 5.

Standards:

Social Studies: SS5.3.1, SS5.4.5 (Explicit)


ELA: 5.RI.2 (Practiced/Encountered)

Vocabulary:

- **State Parks** - State lands reserved to be enjoyed by the public for recreation and tourism and do not generate income through development
- **State Trust Lands** - lands that were granted to Wyoming and designated to generate revenue for public schools and other state institutions

Instructional Procedure/Steps:

Part 1:

-  1. Pass out the Wyoming State Trust Lands Story - Jillian Balow Interview texts and highlighters. Show students the picture of Superintendent Balow and add her picture to the Portrait Gallery. Say: **“Two 5th grade students, Jane and William, are having a discussion about how State Trust Lands are important for education. Jane says they are not important, and William claims that State Trust Lands help their school. You and an elbow partner are going to read an interview with Jillian Balow. While you are reading, highlight or underline information that would support Jane or William’s position on State Trust Land. We will share this information as a whole group when we are done reading. Before we start, please highlight the following words: State Trust Lands, schools, benefits, grazing, energy, mineral, and timber leases.”**
2. When all students have finished, have students share out with the whole group some of the evidence they found. At the end of the discussion, ask: **“Who was correct, Jane or William?”** Below are some ideas that should be brought out:
 - *Students should be able to say that these lands are held in trust to produce income to support public schools.*
 - *These lands benefit youth in our state by generating income from livestock grazing, outfitting, energy and mineral production, and timber leases.*
 - *These lands are managed by the Wyoming Board of Land Commissioners which is made up of a board of five state elected officials.*
 - *The State Trust Lands board uses stewardship principles to manage the land and make sure it brings the best investment possible.*
 - *Students correctly identify William as being correct about State Trust Lands.*
3. When students are finished discussing, say, **“Please put your materials away as we start our next activity. It will help you understand what a challenge it is to manage State Trust Lands.”** The masking tape line should still be on the floor. Remind students which side represents public land. Show students the new section

that is labeled State Trust Land which contains the container to hold the tokens. Pass out 5 tokens to each student. Say: **“Just like ranchers, industry people, and other individual citizens must pay to use State Trust Land, you will have to “pay” to use the pencil sharpener (or other item) in our State Trust Land. You will each have five tokens to use. When you need to sharpen your pencil (or use other item), you will have to put a token in the token container located in our State Trust Land. When there are 40 tokens in our fund, we will purchase an item for our classroom that will benefit your needs as students. This is similar to the way that funds from State Trust Lands are given to support public education. We will make a group decision to earn something that will benefit everyone: a/an _____. Say the item that you have selected. We will take time to look at our fund in the token container at the end of the day today to see how we are doing. Make sure to put your tokens in a safe place, so you can use them each time you need to sharpen your pencil (or whatever the teacher decides)!”**

4. Display the Land Ownership map from lesson 2. Say: **“Let’s look back at the Land Ownership map from the previous lesson and find the State Trust Lands. Find the light blue area on the map. You should notice 5.75% is State Trust Land. Our public schools are not built on this land. It is land to be managed by certain people, Board of Commissioners, to get the most use out of the land that would financially benefit our schools and you as students. The State Land Trust generates income from leasing for livestock grazing, outfitting, energy, timber, and mineral production. Think about our pencil sharpener and how we are going to charge a fee to use it. Eventually, we are going to benefit from the use because we get something for our classroom from the tokens we have collected. Citizens may enter State Trust Land for very specific reasons, but some activities are restricted. According to the Wyoming Game and Fish: ‘The Board of Land Commissioners extends to the public the privilege of hunting and fishing on legally accessible State Trust Lands, unless otherwise closed by direction of the Board. Anyone crossing private land to reach state land must have the permission of the private landowner. Off-road vehicle use, overnight camping, and open fires are prohibited on State Trust Lands. This privilege is for the public to fish in any streams, lakes, or ponds, and to hunt, pursue, and harvest game animals**

and game birds in accordance with applicable state and federal hunting and fishing laws and regulations. Activities that would damage state lands, roads, improvements, or lease property interests are also prohibited.’ (source 7) State Trust Lands can be tricky to understand, but it should make you feel good as students that land has been set aside to raise money for your schools.”

5. As a check for understanding, use the 3-minute Walk and Stop and Talk strategy. Students will reflect on the concepts that have just been introduced about the School Trust Land. Play some energizing music while the students are moving. When the music stops, they talk to the closest student using these sentence starters:

- **“State Trust Lands are important because. . .”**
- **“If someone had never heard of state trust lands one thing I would teach them is. . .”**
- **“State Trust Lands can be used for. . .”**
- **“ _____ was correct because State Trust Lands. . .”**


At the end of the day, please count how many tokens have been collected this far!

Part 2:

6. Say: **“Today, we are going to talk about another kind of state land: state parks. Some of our state lands are state parks. Does anyone know of a state park in Wyoming?”** Let students respond. Pass out the State Highway Maps of Wyoming, State Park Location Clues, and Post-it notes. **“Let’s find out where our state parks are located on a Wyoming highway map. Look carefully in all parts of the map for State Parks. When you find one, place a sticky note on the map near the location of the park. I have also given you a paper with some clues to help find the parks. Have fun learning some State Park facts. You will have 10 minutes. Begin.”**
7. Once students have found the parks on the map, check for understanding by asking the questions below. Have students respond in pairs. Allow students to respond to the first set before moving on to the next one. Change up pairs for each question set by first asking students to find a partner with similar shoes. For the second set, students discuss the questions with a classmate that has a birthday

close to his/her own. The teacher should listen to students' responses while they are discussing. The first set of questions is intended to reinforce map skills, and the second set is to highlight aspects of the parks.

- Question set 1: **“How did you find the parks?” “What information on the map was helpful in locating the parks?”** *References to the map key, geographic features, and narratives.* This is a nice opportunity to encourage students to use directional language: name counties and geographic features, etc.
- Question set 2: **“What do you notice about where the parks are located? What geographic features are in those areas? What types of recreation do you think visitors would be participating in when they visit these parks?”** *Students should respond with a general sense of the State Parks, their locations, and the uses of the park.*

8.  Pass out the Glendo State Park Story Project text. Post the portrait of Darin Westby in the Portrait Gallery. Students will read and discuss the text using the protocol from lesson 1. First, read the text aloud.

Next, say: **“Now, read the article on your own making sure to highlight information about State Parks and challenges that occurred at Glendo State Park. Remember, you will be sharing your findings with the whole class.”** When students are finished reading, have students share out with the whole group some of their new learning. Below are some ideas that should be brought out:

- *People could camp where they wanted.*
 - *Littering occurred along the beach.*
 - *High congestion affected the natural resources.*
 - *No specific campsites were marked.*
9. When students have finished sharing, discuss the multiple uses of this state park by asking, **“What are ways people use Glendo State Park?”** Let students respond. Pass out one sheet of white paper to each student. Say: **“On your paper, write one way that Glendo State Park practiced good stewardship principles.”** As an optional activity, have students ball up their paper and have a

“snowball fight” for 5-10 seconds. When the “fight” is over, students choose a “snowball,” and add another aspect of stewardship for our state parks to the paper. Have two or three students summarize what were good stewardship practices at Glendo State Park.



In this task, students will be engaged in the higher order thinking skill of synthesis by imagining and composing.



Assessment: Pass out a second white piece of paper to each student. Have students create a mini-poster of 15 words or less that encourages the children of Wyoming to be good stewards of state lands. Say: **“Using 15 words or fewer, create a mini-poster that answers this question: How can we be good stewards of our state lands?”** When students are finished, collect the posters and hang them around the room. Check that posters encourage others to be good stewards of state lands. At the end of this lesson (or day), count collected tokens to see if the class has earned what it was working towards that benefits ALL students.

Credits/Sources:

1. Wyoming Department of Education, Jillian Balow, Wyoming State Superintendent of Public Instruction.
2. State of Wyoming. Economic Analysis Division. (2010). *Equality State Almanac*. Retrieved August 18, 2017, from <http://eadiv.state.wy.us/almanac/ESA2010.pdf>
3. Jolly, Dave. The Constitution. (2015, February 8). *Wyoming State Constitution, 1890, as Amended*. Retrieved August 18, 2017, from <http://constitution.com/wyoming-state-constitution-1890-as-amended/>
4. State of Wyoming. (2013). *State Trust Land Restrictions Under Consideration*. Retrieved October 10, 2018, from <http://lands.wyo.gov/resources/restrictions-under-consideration>
5. Wyoming State Parks, Historic Sites, & Trails. (2017). *Wyoming State Parks*. Retrieved August 19, 2017, from <http://wyoparks.state.wy.us/index.php/places-to-go/view-full-list-of-wyoming-state-parks>
6. Wyoming Office of State Lands & Investments. (n.d.) *State Trust Lands*. Retrieved August 19, 2017, from <http://slf-web.state.wy.us/ForestryDivision/WildlandFire/StateTL.pdf>
7. Wyoming Office of State Lands & Investments. (2013). *Public Access Rules*. Retrieved August 19, 2017, from <http://lands.wyo.gov/resources/recreation>

8. University of Wyoming. (n.d.). *Land Ownership map*. Retrieved August 18, 2017, from <http://uwmaps.wygisc.org/studentAtlas/index.html?page=37>
9. Wyoming State Parks, Glendo State Park Stewardship Project, Darin Westby, Director of Wyoming Department of State Parks and Cultural Resources.
10. Wyoming Office of Tourism. (2018). *Boldly Venture Forth*. Retrieved October 10, 2018, from <https://www.travelwyoming.com/map>

Wyoming State Trust Lands

Story

Interview with Jillian Balow, Wyoming State Superintendent of Public Instruction

1-What makes State Trust Lands unique?

Only 23 states have State Trust Lands. Wyoming was granted 4.2 million acres when we became a state in 1890. The lands are scattered throughout the state in large and small parcels that can be sold, traded, or leased. Wyoming, and all states with State Trust Lands, use the income to help fund education. While the income is not enough to entirely fund our schools, it definitely helps.

2-What are the challenges/issues you feel face our State Trust Lands?

1. Some state trust land parcels are more valuable than others so trades, purchases, and leases must be considered case by case. This sometimes takes years and many hours of research and negotiating.
2. Some land parcels have been abused by citizens, and the land managers have to make difficult decisions to not let people use the land any longer. This is especially difficult because the land belongs to all of us and we want everyone to be good stewards.
3. Many parcels of State Trust Land can be used for more than one reason. For example, a parcel that is leased by a rancher for grazing may also be used by citizens for hiking or camping. Balancing multiple use of the land takes a lot of work and cooperation.

3-What would you want 5th graders to know about State Trust Lands?

You own Wyoming's State Trust Lands. When you are 18 years old, you will have a say in who manages the lands by voting in your local and statewide elections. Every four years, Wyoming voters elect five statewide officials: the governor, secretary of state, auditor, treasurer, and state superintendent. We are the managers for our State Trust Lands. When a citizen or company wants to lease, purchase, or trade State Trust Land, they make their case to the managers. The five elected officials love working with Wyoming citizens on land challenges that allow more animals, people, and businesses to enjoy the land.

4-How can our schools be good stewards of the State Trust Lands?

All public lands, parks, forests, etc., are special, but State Trust Lands are truly ours; we can use them and make extra money to help pay for education. We all must be responsible landowners, and we can do that by understanding more about trust lands, using the lands with friends and family, and taking care of them as we would our own land.



Wyoming State Trust Lands

Story

5-What is the most challenging decision you have had to make as our current superintendent of schools with our State Trust Lands?

The land managers have a responsibility to maximize revenue on State Trust Lands. In other words, we must make money for schools. Sometimes, however, we must weigh Wyoming's beauty, our sense of stewardship, and multiple use opportunities with making money. All land sales, trades, and leases are challenging for this reason. In Wyoming though, we work together to reach solutions.

6-What does it mean to you to be a good steward of Wyoming's lands?

Stewardship of Wyoming's State Trust Lands goes beyond using the land. Many of us use the land for hunting, fishing, camping, grazing, drilling for oil, and more. We are good stewards of the land through our responsible use, but you don't have to step foot on State Trust Land to be a good steward. Do you have a better understanding of State Trust Lands now? If yes, you are a good steward. Will you pay your taxes as an adult? If yes, you are a good steward. Will you vote as an adult for the person you think is best for the job they are seeking? If yes, you are a good steward.



Wyoming State Trust Lands





Jillian Balow

Wyoming State Superintendent of Public Instruction



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Darin Westby

Director of Wyoming Department of State Parks and Cultural Resources



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State Park Location Clues

<p style="text-align: center;">State Park #1</p> <p>This state park is home to small herds of bison and elk and offers several miles of paved trails along the beautiful Bear River on the east side of the city of Evanston, Wyoming.</p>	<p style="text-align: center;">State Park #2</p> <p>This state park and its reservoir are named after Asmus Boysen who built the first dam between Riverton & Shoshone in 1908.</p>	<p style="text-align: center;">State Park #3</p> <p>This park found near Cody, Wyoming, is named after the famous showman, Buffalo Bill Cody. It has a 350 ft. dam providing irrigation and recreation water to its citizens.</p>
<p style="text-align: center;">State Park #4</p> <p>This state park is found in both Laramie and Albany Counties. It has three reservoirs that offer excellent fishing and boating and is named after the famous sportscaster, Curt Gowdy.</p>	<p style="text-align: center;">State Park #5</p> <p>This state park, located east of Casper on the North Platte River, boasts the perfect picnic place and is designated as a bird watcher's paradise. It is named after Edness Kimball Wilkins, a state legislator for 25 years.</p>	<p style="text-align: center;">State Park #6</p> <p>This park is best known for its excellent boat opportunities and camping areas around the Glendo Dam.</p>
<p style="text-align: center;">State Park #7</p> <p>Visitors use this state park as a base camp to visit the famous Oregon Trail ruts. This park is near the town of Guernsey with 13 miles of historic trails.</p>	<p style="text-align: center;">State Park #8</p> <p>Boating, fishing, and swimming opportunities are the primary activities that bring visitors to this state park. Perhaps you can spot a hawk nesting in a the giant cottonwoods near La Grange, WY.</p>	<p style="text-align: center;">State Park #9</p> <p>This park has a free bath house where the water is maintained at 104 degrees for therapeutic bathing in Thermopolis, WY. More than 8,000 gallons of water flow over the mineral terrace every 24 hours.</p>
<p style="text-align: center;">State Park #10</p> <p>Some of the largest fish in our state have been caught at this state park. The key to finding this state park is to know where the Black Hills are located.</p>	<p style="text-align: center;">State Park #11</p> <p>The Seminoe Mountains surrounding this state park were once the site for gold prospecting during the late 1800s.</p>	<p style="text-align: center;">State Park #12</p> <p>This state park is named after a distinct geological phenomena in which the Popo Agie river sinks into a limestone cavern and reappears in a pool filled with 8-12 lb. rainbow trout.</p>



Glendo State Park

Story

Until 2005, camping at Glendo State Park was allowed in various campgrounds, however there were not specific campsites.

People were allowed to camp wherever they could find a spot to pitch a tent or park their camping unit, including right on Sandy Beach.

On especially busy weekends or on some of the more popular summer holidays at Glendo, this congested camping plan made things difficult for law enforcement to find problem areas when called especially at night.

Additionally, high congestion in a small areas of land began to adversely affect the park's natural resources, especially on Sandy Beach where parked vehicles sometimes leaked engine oil or got stuck in the sand.

During 2005, the first phase of improvements were completed at Sandy Beach involving designated single and circle campsites and the addition of shade trees and a picnic shelter area located south of the main entrance road. Additionally, a post-and-cable fence restricting vehicle access along the beach was erected on the entire Sandy Beach area.

In 2007, a second phase of improvements began with the addition of designated campgrounds, ADA campgrounds, parking areas, and new restrooms north of the main entrance road. Also, improvements to the south side of the entrance road - the Dunes Campground -- included the addition of a day use only beach area (open only from 6 a.m. to 10 p.m.) and a tent only camping area further to the south. In the shelter area, plans call for additional parking areas, additional trees, a turf area, and new sand volleyball and horseshoe pits.



Biking at Glendo Lake. Photo credit: Wyoming State Parks

An entrance station is also scheduled along the main road allowing Division of State Parks and Historic Sites personnel to restrict access to the area when a predetermined visitor capacity has been reached.

Other plans during the 2007 season at Sandy Beach included an increased law enforcement emphasis throughout the summer and increased law enforcement personnel on the Memorial Day, Fourth of July, and Labor Day weekends.





Lesson Four: Who's In Charge?

Grade Level: 5th Grade

Time: 2 days: 45 minutes per day

Essential Question: How can we be stewards of Wyoming's public and private lands to benefit current and future generations?

Objective: Students will identify how federally run agencies practice stewardship.

Purpose: Students learn that the majority of public land is held in trust for the American people by the Federal government and managed by agencies such as the Bureau of Land Management, Forest Service, Fish and Wildlife Services, and the National Park Services.

Required Materials/Resources:

- Four corners signs
- Information cards to go with the four corners signs - (sources 3 - 8)
- White paper
- Markers/colored pencils
- Scissors
- Practice text from lesson 1: Middle-Schoolers Help Scientists Test Grouse's Ability to Succeed on Manmade Leaks (source 10)
- Portraits of the Middle Schoolers and Cloud Peak Energy Mine for Portrait Gallery
- Cloud Peak Energy Story text (one per student and a copy for the teacher) - (source 1)
- Highlighters (one per student)
- Post-it notes (three to four per student)
- Construction paper (three pieces per student)
- Stapler
- How Do the Federal Land Management Agencies Differ? (source 9) <https://www.fws.gov/invasives/volunteersTrainingModule/nwrsystem/agencies.html> (source 9)
- Blank emblem for check for understanding - (one per student)

Suggested Teacher Preparation:

- Hang/place 4 Corners activity materials (posters, information cards, white paper, markers/colored pencils, scissors) in four different locations of your classroom. Do not take them down before Day 2 of the lesson.
- Review the two texts and the 4 Corners information cards.

Standards:

Science: 5-ESS3-1 (Explicit)

ELA: 5.RI.2, 5.RI.5 (Practiced/Encountered)

Vocabulary:

- **Agency** - a business or organization established to provide a particular service
- **Bureau of Land Management (BLM)** - an agency within the United States government that administers more than 247.3 million acres of public lands mainly located in twelve western states of the United States
- **Federal Land** - Lands owned by the government and managed through a federal agency
- **Fish and Wildlife Service** - the United States Fish and Wildlife Service (USFWS or FWS) is an agency of the federal government within the U.S. Department of the Interior dedicated to the management of fish, wildlife, and natural habitats
- **Forest Service** - the United States Forest Service (USFS) is an agency of the U.S. Department of Agriculture that administers the nation's 154 national forests and 20 national grasslands, which encompass 193 million acres
- **Held in Trust** - principle that the governing body holds certain lands in trust for public use in some way
- **National Park Service** - the National Park Service is an agency of the United States federal government that manages all national parks, many national monuments, and other conservation and historical properties with various title designations

Instructional Procedure/Steps:

Day 1:

1. Say: **“In our previous lessons, we have been learning about public lands. We have talked about State Trust Lands and State Parks. Today, we are going to talk about the biggest portion of our public lands which are federal public lands. These lands are held in trust for the American people by the federal government through agencies such as the Bureau of Land Management, Forest Service, Fish and Wildlife Services,**

and the National Park Services. We have learned that citizens of Wyoming can use public lands as long as we follow the rules and regulations for use of the land. Federal lands are a bit different. 'Held in trust' is a phrase that means the federal government has been trusted to care for and regulate the use of land, so it has the biggest benefit for the public. Today, we are going to learn about the agencies who collaborate to be good stewards of our federal public lands."

2. Say: **"First, we need to figure out what each of the agencies does. We are going to play 4 Corners. In each corner of the room, there is a sign with one of the agency names on it and an information card telling about the agency. I am going to number you all from 1-4."** Number the students now, so they will be ready to move when you give the release word. Say: **"When I give the release word 'Multiple Use,' you will find the corner that matches your number and meet the rest of your team there. You will read the information on the card and decide how you want to be responsible for sharing it with the rest of the class. You must make visual aids to help with your presentation using the materials in your area. For example, if you need a fish, make one with paper, markers, and cut it out. The only thing you can't do is just read the information card. Make sure that everyone is involved and can give a brief summary of the information. Ready? 'Multiple Use.'"**





3. Allow students time to read their information cards in their corner. Circulate around the room checking that all students are participating and that they are brainstorming ways their group might share the information. Look-fors include the following: *each member taking responsibility for one idea in the information card, one student giving a brief summary while the rest act it out, students giving a summary and drawing representation of main points, etc.*
4. When groups have had enough time to internalize their information and decide on a presentation, reconvene the whole class, and have all groups share one at a time starting with corner one.



In this task, students will be engaged in the higher order thinking skill of synthesis by creating and imagining.

Day 2:

5.  **“The other day, you learned about four federal agencies. Today, we are going to read texts that will help us understand how agency teams collaborate for the purpose of good stewardship. In lesson 1, we practiced a reading protocol using the text: Middle-Schoolers Help Scientists Test Grouse's Ability to Succeed on Manmade Leks. In the article, students were working with the BLM and Wyoming Game and Fish. This is a good example of different groups working together to be good stewards of Wyoming lands.”** Pass out the text, and have students reread and discuss it. When finished discussing, post the Middle Schoolers Portrait in the Portrait Gallery. Say: **“We will now read a new text that is another example of groups working together to manage wildlife in the state of Wyoming.”**

6.  Pass out the Cloud Peak Energy Story texts, highlighters, and Post-it notes to each student. Say: **“While I am reading the text out loud, you should be listening for how an energy company worked with the Fish and Wildlife Service to show good stewardship and highlight it in the article.”** After reading the text aloud, have students get together with an elbow partner and read the article again comparing the information they highlighted. Say: **“If you have any questions, write them on your Post-it notes and attach them to your text.”** When pairs are finished, have them share out their findings with the whole group. Ideas that should be brought forth include the following: *Students should note that the energy company was concerned with wildlife being affected by the operation of the mine. It is important to realize that Wyoming Game and Fish collaborated with staff at the mine to solve a stewardship problem involving wildlife in the area (golden eagle). Both groups realized how important it was to the area to manage the land for local wildlife.* When finished discussing, post the Cloud Peak Energy Mine Portrait in the Portrait Gallery.



In this task, students will be engaged in the higher order thinking skill of synthesizing and evaluating by composing and judging.



Assessment: Say: **“Since we now have an understanding of how agencies work together to take care of our Federal Public Lands through good stewardship practices, and we learned about each of the agencies from your peers during the 4 Corners activity, you are now going to decide which agency is the most interesting. If you need to go look at the information cards again, you will be able to do that when we start our Check for Understanding.”**

Display the photos of the different agency emblems from the How Do the Federal Land Management Agencies Differ? Website. Say: **“I am going to give you a blank emblem like the ones you see on the website. First, you will write the name of the agency you chose at the top of the emblem. Below that, write one sentence about the purpose of the agency. Under that sentence, write at least three more sentences that talk about why it is important for the staff members of the agency to participate in good stewardship practices.”** When students are finished, collect the emblems. Check that students matched the agency they chose with its correct purpose and that good stewardship practices are listed.

Credits/Sources:

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10. Casper Star Tribune. (May 2, 2016). *Middle-schoolers Help Scientists Test Grouse's Ability to Succeed on Manmade Leks*. Retrieved August 17, 2017, from https://trib.com/news/local/education/middle-schoolers-help-scientists-test-grouse-s-ability-to-succeed/article_e630af2b-3690-5ae9-aef3-d985138b7fd3.html

Corner #1

Bureau of Land Management



Four Corners

Bureau of Land Management

The Bureau of Land Management (BLM) is an agency within the United States Department of the Interior that administers more than 247.3 million acres of public lands in the United States which constitutes one-eighth of the landmass of the country. President Harry S. Truman created the BLM in 1946 by combining two existing agencies: the General Land Office and the Grazing Services. The agency manages the federal government's nearly 700 million acres of subsurface mineral estate. Most BLM public lands are located in these 12 western states: Alaska, Arizona, California, Colorado, Idaho, Montana, Nevada, New Mexico, Oregon, Utah, Washington, and Wyoming

The mission of the BLM is "to sustain the health, diversity, and productivity of the public lands for the use and enjoyment of present and future generations." Originally BLM holdings were described as "land nobody wanted" because homesteaders had passed them by. All the same, ranchers hold nearly 18,000 permits and leases for livestock grazing on 155 million acres of BLM public lands. The agency manages 221 wilderness areas, 23 national monuments, and some 636 other protected areas as part of the National Landscape Conservation System totaling about 30 million acres. There are more than 63,000 oil and gas wells on BLM public lands. Total energy leases generated approximately \$5.4 billion in 2013, an amount divided among the Treasury, the states, and Native American Groups.



Corner #2

U.S. Forest Service



Four Corners

U.S. Forest Service

Multi-faceted agency that manages 154 national forests and 20 grasslands in 43 states and Puerto Rico. The agency's mission is to sustain the health, diversity, and productivity of the nation's forests and grasslands to meet the needs of present and future generations.

The U.S. Forest Service (USFS) has an elite wildland firefighting team and the world's largest forestry research organization. Experts provide technical and financial help to state and local government agencies, businesses, private landowners and work government-to-government with tribes to help protect and manage non-federal forest and associated range and watershed lands.

Work through partnerships with public and private agencies help plant trees, improve trails, educate the public, and improve conditions in wildland/urban interfaces and rural areas. USFS also promotes sustainable forest management and biodiversity conservation internationally.

Gifford Pinchot, first Chief of the Forest Service, summed up the mission of the Forest Service: "to provide the greatest amount of good for the greatest amount of people in the long run."



Corner #3

U.S. Fish and Wildlife Service



Four Corners

U.S. Fish and Wildlife Service

Our Mission is to work with others to conserve, protect, and enhance fish, wildlife, and plants and their habitats for the continuing benefit of the American people.

We are a bureau within the Department of the Interior.

Our Objectives:

Assist in the development and application of an environmental stewardship ethic for our society, based on ecological principles, scientific knowledge of fish and wildlife, and a sense of moral responsibility.

Guide the conservation, development, and management of the Nation's fish and wildlife resources.

Administer a national program to provide the public opportunities to understand, appreciate, and wisely use fish and wildlife resources.

Functions: Here are a few of the ways we try to meet our mission: Enforce federal wildlife laws, protect endangered species, manage migratory birds, restore nationally significant fisheries, conserve and restore wildlife habitats such as wetlands, help foreign governments with their international conservation efforts, and distribute hundreds of millions of dollars through our Wildlife Sport Fish and Restoration program in excise taxes on fishing and hunting equipment to State fish and wildlife agencies.

Resources: We manage the 150 million-acre National Wildlife Refuge System of more than 560 National Wildlife Refuges and thousands of small wetlands and other special management areas. Under the Fisheries program, we also operate 70 National Fish Hatcheries, 65 fishery resource offices, and 86 ecological services field stations.

The vast majority of fish and wildlife habitat is on non-Federal lands. Voluntary habitat protection and restoration programs like the Partners for Fish and Wildlife Program and the Coastal Program and other Partnership programs are the primary ways we deliver habitat conservation on public and private lands.

The Service employs approximately 9,000 people at facilities across the U.S. The Service is a decentralized organization with a headquarters office in Washington, D.C., with regional and field offices across the country.



Corner #4

National Park Service



Four Corners

National Park Service

Since 1916, the National Park Service has been entrusted with the care of our national parks. With the help of volunteers and partners, we safeguard these special places and share their stories with more than 275 million visitors every year, but our work doesn't stop there.

We are proud that tribes, local governments, nonprofit organizations, businesses, and individual citizens ask for our help in revitalizing their communities, preserving local history, celebrating local heritage, and creating close to home opportunities for kids and families to get outside, be active, and have fun.

Taking care of the national parks and helping Americans take care of their communities is a job we love, and we need—and welcome—your help and support.

Our Mission

The National Park Service preserves the natural and cultural resources and values of the National Park System for the enjoyment, education, and inspiration of this and future generations. The Park Service cooperates with partners to extend the benefits of natural and cultural resource conservation and outdoor recreation throughout this country and the world.

Our Employees

More than 20,000 strong, the uncommon men and women of the National Park Service share a common trait: a passion for caring for the nation's special places and sharing their stories.





Cloud Peak Energy

Stewardship Award Recipients



© 2017 Wyoming Agriculture in the Classroom Materials



Middle School Students

Maggie and Nora



© 2017 Wyoming Agriculture in the Classroom Materials

Cloud Peak Energy Story

Cloud Peak Energy Mine Receives Wildlife Stewardship Award for Eagle Protection from Wyoming Game and Fish Department

GILLETTE, Wyo.--(BUSINESS WIRE)--Cloud Peak Energy Inc. (NYSE:CLD), one of the largest U.S. coal producers and the only pure-play Powder River Basin ("PRB") coal company, today announced its Antelope Mine received the Wyoming Game and Fish Department's Industry Reclamation Wildlife Stewardship Award. The mine, located in Northeastern Wyoming, was recognized for its successful efforts to promote population numbers of Golden Eagles and other raptors through habitat enhancement and use of effective protection measures, including rescuing a young eaglet that was later released at the mine following rehabilitation.

"Environmental safeguards and restoration at Antelope Mine are a key priority for us," said Steve Cowan, General Manager of the Antelope Mine. "The Powder River Basin provides natural habitat for a wide variety of birds and animals. Working with a broad team across the company and outside experts, we've been able to mitigate potential impacts while mining activity proceeds. We are demonstrating the ability to produce coal that provides safe, affordable, and reliable electricity while at the same time being responsible stewards of the environment."

Antelope Mine implemented a unique and intensive monitoring program for the Golden Eagle territories located within the mine permit area. Since 2011, the mine has worked closely with the U.S. Fish and Wildlife Service Ecological Service Office and Migratory Bird Permit Office to ensure that mine operations do not negatively impact local Golden Eagle pairs.

Antelope Mine's intensive monitoring program, coupled with rapid operational adjustments, allows the mine to operate in proximity to eagle pairs and at the same time, fosters successful nesting of the area's Golden Eagle pairs. In the spring of 2015, as a result of Antelope Mine's monitoring program, it was found that a Golden Eagle nest, previously near the top of the highwall, had fallen during an extreme storm. "Tumbler," the young eaglet, had fallen to the bottom of the highwall. With the help of the Antelope Mine personnel and the visiting biologist, Tumbler was rescued and temporarily relocated to the Ironside Bird Rescue facility in Cody, Wyoming. A transitory home was created where he was trained to hunt for himself, provided visual images of other Golden Eagles, and received only limited human contact to help keep him wild.

After a short stay at the bird rescue facility, the Antelope Mine readily agreed to return Tumbler to his original nesting area as this would provide the best habitat for his long-term survival. In August 2015, Tumbler and his companion from the bird rescue facility, Hobbit, were released into their new habitat on land adjacent to the mine.



Cloud Peak Energy Story

Both young eagles have been observed in the vicinity of the mine, providing confidence that they have returned safely to the wild. The Antelope Mine is an ideal home for eagles and other raptors due to its high-quality reclamation, ongoing wildlife studies, protection plans, and a demonstrated commitment to care for wildlife and the land.

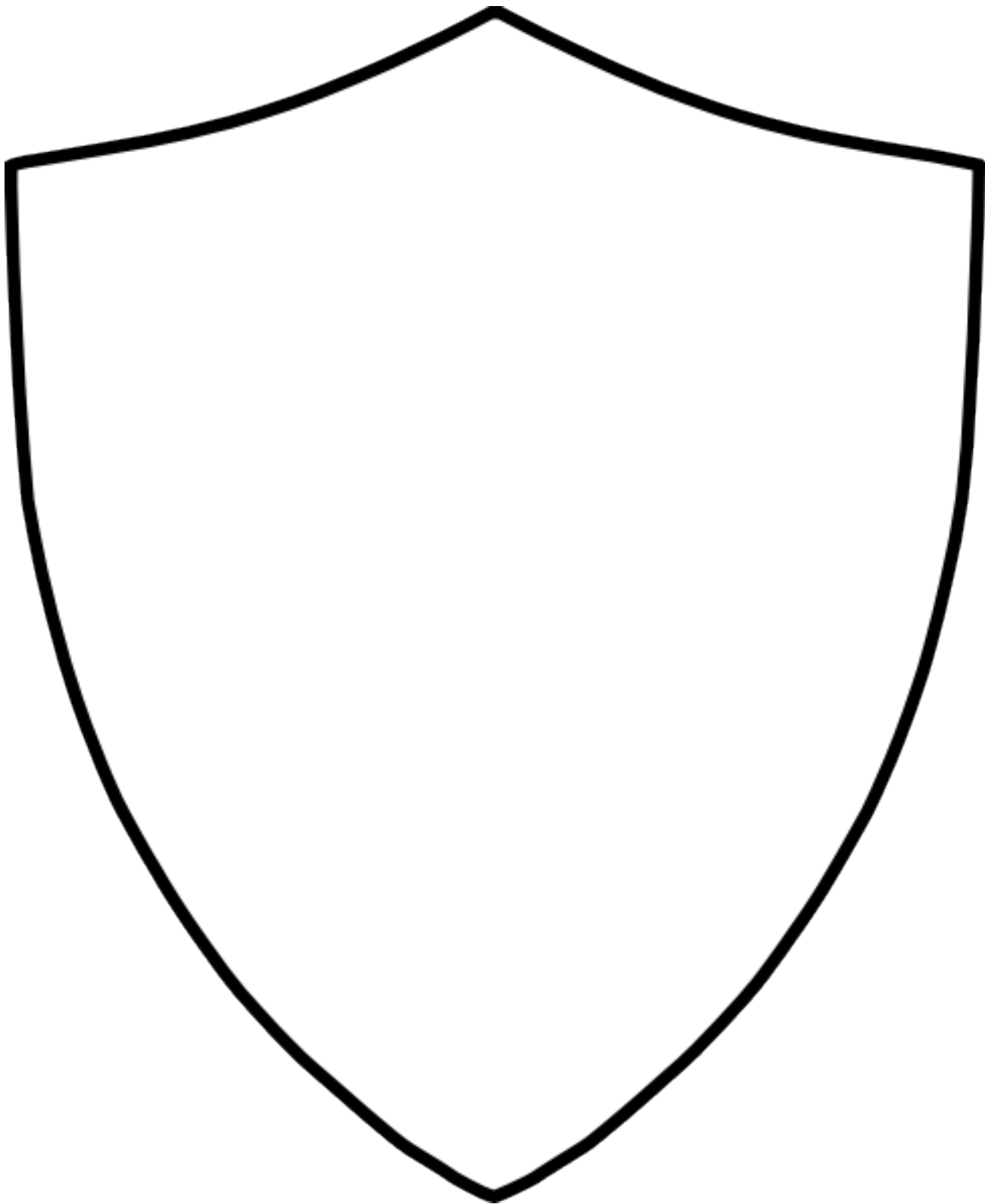
In addition to this award, Antelope Mine has been honored with other recognitions including the nation's most prestigious reclamation award, the Office of Surface Mining Reclamation and Enforcement's Excellence in Surface Coal Mining Reclamation Award twice, once in 2010 and again in 2014.

About Cloud Peak Energy ®

Cloud Peak Energy Inc. (NYSE:CLD) is headquartered in Wyoming and is one of the largest U.S. coal producers and the only pure-play Powder River Basin coal company. As one of the safest coal producers in the nation, Cloud Peak Energy mines low sulfur, subbituminous coal and provides logistics supply services. The Company owns and operates three surface coal mines in the PRB, the lowest cost major coal producing region in the nation. The Antelope and Cordero Rojo mines are located in Wyoming, and the Spring Creek Mine is located in Montana. In 2015, Cloud Peak Energy shipped approximately 75 million tons from its three mines to customers located throughout the U.S. and around the world. Cloud Peak Energy also owns rights to substantial undeveloped coal and complementary surface assets in the Northern PRB, further building the Company's long-term position to serve Asian export and domestic customers. With approximately 1,300 total employees, the Company is widely recognized for its exemplary performance in its safety and environmental programs. Cloud Peak Energy is a sustainable fuel supplier for approximately three percent of the nation's electricity.



Check for Understanding
Blank Emblem





Lesson Five: Geyser Gazer

Grade Level: 5th Grade

Time: 2 days: 45 minutes per day

Essential Question: How can we be stewards of Wyoming's public and private lands to benefit current and future generations?

Objective: Students will:

- Calculate on average how many people visit Yellowstone National Park.
- Describe a geyser.
- Identify how campers and visitors can be good stewards.

Purpose: Students learn that tourists who visit Wyoming contribute in a major way to our economy and are expected to be responsible stewards while visiting our state.

Required Materials/Resources:

- Diet Coke (one two-liter bottle) - (This brand works best, however, use whatever brand you have available.)
- Mentos mints (one package)
- Video: <https://www.youtube.com/watch?v=wE8NDuzt8eg> *Old Faithful Geyser eruption Yellowstone NP* (source 7) *Video length: 1 minute 44 seconds*
- Will Boekel Geyser Gazer Story text (one per student and teacher) - (source 1)
- Portrait of Will Boekel for Portrait Gallery
- Highlighters (one per student)
- Month/Visitors sort (one per pair of students)
- Yellowstone Visitation Statistics (one per student) - (source 2)
- Campsites Stewardship PowerPoint presentation
- Video: https://www.youtube.com/watch?time_continue=7&v=Pk_Cnf6YVX *Camping When Hunting: What Not to Do* (source 3) *Video length: 6 minutes 42 seconds*

- Video https://www.youtube.com/watch?v=L4_oq7aaaDo Play Clean Go Mountain Biking (source 4) Video length: 1 minute 6 seconds
- Scratch paper
- *Travel and Tourism (statistics) by County* (source 6)
- Stewardship postcard (one per student)

Suggested Teacher Preparation:

- Decide where outside you will do the geyser demonstration.
- Purchase a bottle of Diet Coke and package of Mentos.
- Run the Stewardship postcards back to back.
- Review the Will Boekel Geyser Gazer story, videos, and the *Travel and Tourism (statistics) by County* for your county.
<https://drive.google.com/drive/folders/OBzM0W00Ko4kxV252ZjdoMWFrLUE>

Standards:

Social Studies: SS5.1.1 (Explicit)

ELA: 5.RI.2 (Practiced/Encountered)

Math: 5.NBT.5 (Practiced/Encountered)

Vocabulary:

- **Economy** - financial system of interaction and exchange
- **Industry** - a group of businesses that provide a particular product or service
- **Tourism** - the activity of traveling to a place for pleasure that can generate revenue from the enjoyment of Wyoming's land and/or resources
- **Tourist** - vacationer, traveler, sightseer, visitor

Instructional Procedure/Steps:

Day 1:

1. This activity should only take about 5 minutes. Take students outside to demonstrate what a geyser looks like. Bring the two-liter bottle of Diet Coke and the Mentos package with you. Say: **“Yellowstone National Park is home to a certain famous, regular geological feature that millions of tourists visit each year. We will use the soda and Mentos to demonstrate that geological feature. Turn to a partner to see if you can come up with the type of geological feature I am going to demonstrate and the name of the specific, famous one that tourists come from all over to visit.”** *Geyser and Old Faithful*. Have pairs share out. If no students provide the answers, tell students what they are. Next,

have students stand back to watch the soda/Mentos representation of a geyser. Say: **“Since you will be gazing at this homemade geyser, the job I have for you is to be a ‘geyser gazer.’ Look carefully to see what is happening with this geyser.”** Remove the lid of the soda bottle, put in two or three Mentos at the same time, step back, and watch the “geyser” erupt. When the “geyser” is finished, clean up, and return to the classroom.

2. Back in the classroom, play the *Old Faithful Geyser eruption Yellowstone NP* video. When finished watching the video, have students respond to what they saw.



3. Pass out the Geyser Gazer Story texts and highlighters. Say: **“In today’s text, you will learn about a college student who is drawn to Yellowstone National Park because of geysers. He, and his fellow enthusiasts, are known as ‘Geyser Gazers.’ Follow along as I read the story of Will Boekel. Listen intently for information about how Will handles himself as a tourist in Yellowstone National Park. Make sure to highlight anything you think is important about tourism in the story. Now, follow our text protocol, and listen as I read the story about Will Boekel.”** Read the text aloud to students. Next, have students read the text with a partner, and compare the parts that each person highlighted from when the teacher read the article.
4. When pairs are finished, have students share out their findings with the whole group. Ideas that should be brought forth include the following: *Students should be able to say that people have been gathering to watch Old Faithful erupt since 1870. Its water can shoot up to 184 feet in the air. People from around the world visit Yellowstone to watch Old Faithful erupt.* When finished discussing, post Will Boekel’s portrait to the Portrait Gallery. Say: **“We are going to put our materials away, and discuss how many people actually come to Yellowstone per year.”**
5. Pass out the Month/Visitors sort to each pair of students. Have students pair the numbers with the months to make a prediction about the amount of visitors to the park each month. Collect sorts when students are finished for Day 1.

Day 2:

6. Pass out students' Month/Visitors sorts from yesterday and the Yellowstone Visitation Statistics to students. Have students compare the statistics from this document to their sorting predictions from step 5. Have pairs share out the accuracy of their predictions with the whole class.

7. Say: **"Thinking of all of those people visiting Yellowstone National Park at the same time, I want you to visualize in your mind a picture of a campsite that good stewards have visited. Close your eyes and think about what that site looks like."**

Display the Campsites Stewardship PowerPoint presentation for students to compare their visualizations with actual examples.

Say: **"Now that you've seen an image of a campsite visited by tourists who demonstrated good stewardship, I want you to close your eyes and visualize a campsite that features poor stewardship."**

Play the *Camping When Hunting: What Not to Do* video. Ask students to discuss with a partner this question:

"Which campsite do you think Will Boekel would have left for others?" Allow students to respond. When finished, say: **"That video was made by a group called Tread Lightly! and was created to demonstrate what poor stewardship looks like.**

Tread Lightly! is a slogan that highlights good stewardship on Wyoming's lands. Another slogan for good stewardship is Play, Clean, Go." Play the *Play Clean Go Mountain Biking*

video.

8. Say: **"We obviously want all tourists to be good stewards. Now we are going to calculate on average how many visitors come to Yellowstone and figure out potentially how much money that they can make for Wyoming."** Have the students complete a multi-step word problem using the numbers from their Yellowstone Visitation Statistics sheet. Pass out scratch paper. Give students time to complete step one before moving on to step two. Say:

- **"Step one: Find the sum of the average number of visitors for all twelve months." 3,834,585 visitors**

- **“Step two: Let me hypothetically say that each visitor has to pay \$8 to enter the park. Using your sum from step one, multiply it by eight to see what money could be made from only visitors’ entrance fees to the park.”**

$$3,834,585 \times 8 = \$30,676,680$$

Provide students with correct numbers before moving on to the next lesson step.



In this task, students will be engaged in the higher order thinking skill of analysis.



9. When finished, lead the students in a discussion about the total revenue generated just from Yellowstone alone in an average year. Have students respond to a question before moving on to the next one. Ask:

- **“When the state earns tens of millions of dollars per year, like in Yellowstone, what does that do for the state?”**
- **“How does this money effect Wyoming’s economy?”**
- **“How does this money create jobs for Wyoming citizens?”**
- Say: **“People like Will Boekel, who works at the front desk of the Old Faithful Inn, are able to find employment due to the tourism industry. He is one of many people who are employed because of this industry.”** Display the Travel and Tourism Statistics for your county.

<https://www.dropbox.com/sh/rttnhfbxcmq8986/AABtZNF BfC6UyXRDFmrREYtOa?dl=0> Say: **“Tourists supported**

32,120 jobs in Wyoming in 2017, (source 5) and that some of the people in these jobs might be your parents, friends, families, etc. Tourists are extremely important to Wyoming’s economy. If we are not stewards of Wyoming’s public lands, tourists will not generate as much money for Wyoming.”

Assessment: When finished with the discussion, pass out the Stewardship postcards. Students create a stewardship postcard that they could send to a friend or family member. On the back of the postcard, students need to describe a geyser and state two ways that tourists can be stewards of Wyoming’s lands. Collect postcards when students are finished. Check postcards for a correct description of a geyser and stewardship examples from the lesson: *Tread Lightly! (including camp in a designated*

campsite, staying on the road, dispose of trash in a trash can, clean up your camping spot before leaving); Play, Clean, Go (enjoy the great outdoors, remove mud, dirt, plants, and seeds, plan your next adventure)

Credits/Sources:

1. Crocker, Ruth W. (2017). *People of Yellowstone: Will Boekel*. Mystic, CT: Elm Grove Press.
2. National Park Service. (2013-2017). *Visitation Statistics*. Retrieved October 13, 2018, from <https://www.nps.gov/yell/planyourvisit/visitationstats.htm>
3. Tread Lightly! On Land and Water. (n.d.). *Camping When Hunting: What Not to Do*. Retrieved November 13, 2017, from https://www.youtube.com/watch?time_continue=7&v=Pk_Cnf6YVX
4. Play Clean Go. (2016, December 7). *Play Clean Go Mountain Biking*. Retrieved August 20, 2017, from https://www.youtube.com/watch?v=L4_oq7aaaDo
5. Wyoming Office of Tourism. (2017 April). *2017 WY Travel Generated Impacts*. Retrieved October 13, 2018, from <https://www.travelwyoming.com/industry>
6. Wyoming Office of Tourism, Cameron Ross, Strategic Partnerships Senior Manager. (n.d.) *Travel and Tourism by County*. Retrieved October 13, 2018, from <https://www.dropbox.com/sh/rttnhfbxcmq8986/AABtZNFbfc6UyXRDFmrREYtOa?dl=0>
7. Beach, Rick. (2013, July 24). *Old Faithful Geyser eruption Yellowstone NP*. Retrieved October 13, 2018, from <https://www.youtube.com/watch?v=wE8NDuzt8eg>
8. Photo credits are listed in the Power Point presentation.

Will Boekel, Geyser Gazer Story

It's 12:10 P.M., and the placard next to the reception desk in the Old Faithful Inn says that the next eruption of its namesake geyser will occur in five minutes. The crowd has moved out to the boardwalks behind the inn in front of a steaming, burbling, mostly flat area that looks like the surface of a planet far out in space, except for the grove of lodgepole pine in the background. Visitors have gathered on this spot since at least 1870 when the Washburn expedition noted the size, frequency, and regularity of this spurt of steam and water shooting as high as 184 feet in the air from a cone-shaped mound of earth and decided it was worthy of the name Old Faithful.

Close to 12:15 P.M., the crowd buzzes as the first sign of life from below the earth appears. After five minutes of 10-foot spurts and steam, an onlooker asks with disappointment, "Is that it?" Fortunately Will Boekel, geyser expert, is standing nearby. Just as he says, "Give her another minute." Whoosh! A column of white, frothy, hot water shoots up, climbing first 50 feet and then on up to what Will estimates to be about 150 feet for two and a half minutes. The crowd goes wild. Just as quickly, the geyser retreats back to bubbles on the surface of the earth, and most viewers head back to the gift shop—except for Will. He has work to do. He's entering all that he has observed into his smart phone for transmission to the Geyser Observation and Study Association, a nonprofit organization that serves as a repository for the many avid volunteer observers to record their observations of geysers and other geothermal phenomena.

Will, who also works at the front desk of the inn, comes prepared for long hours of observation with a backpack containing water and food, a jacket in case of rain, watches, a two-way radio to communicate with other "geyser gazers," and a smart phone to post eruptions to the online data base. He discovered geyser gazing and the organization in 2011 and has been hooked ever since.

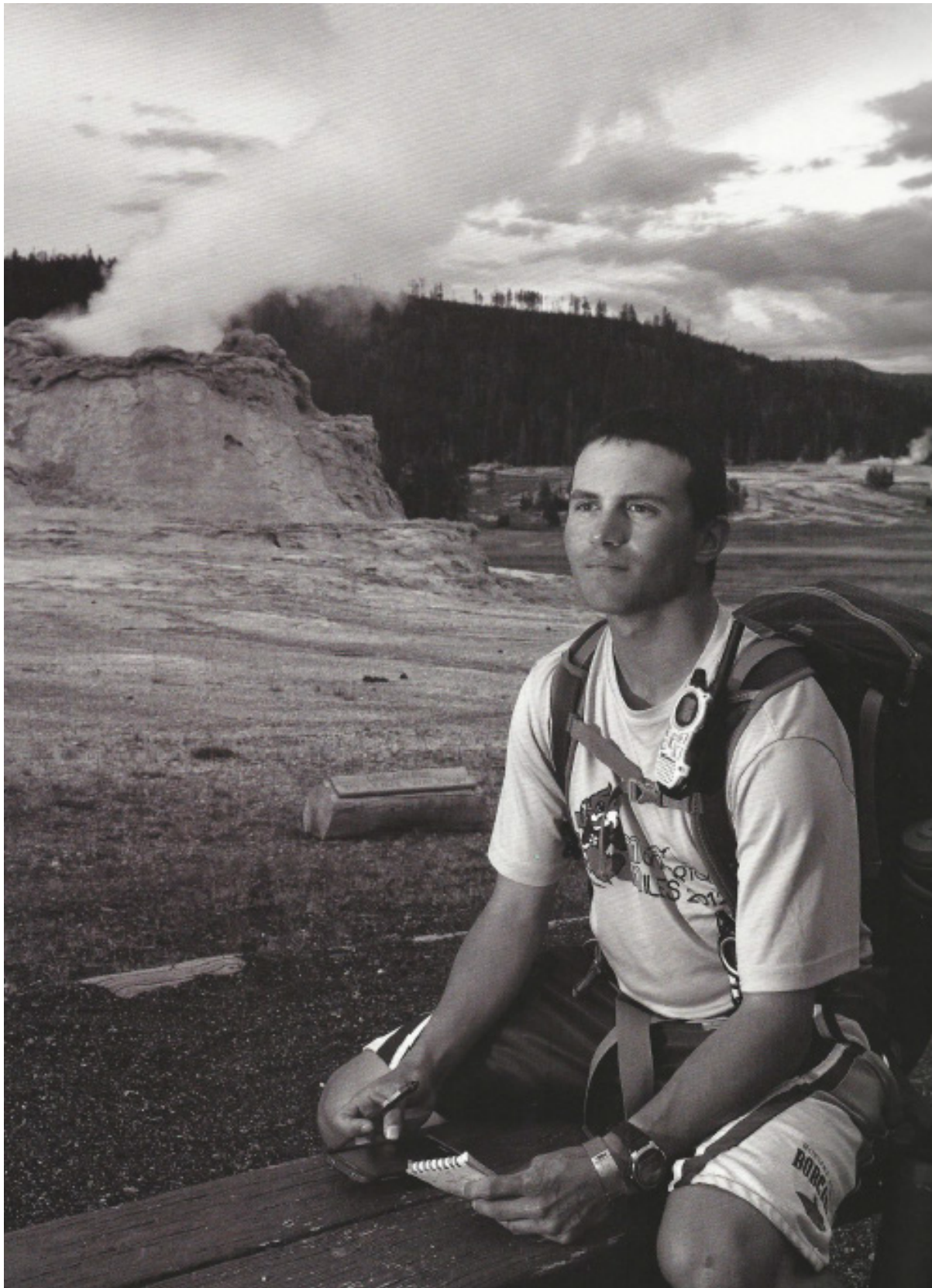
"I've met fascinating people from around the world, and we are like a family."

Originally, gazers wrote their observations in private logs and shared as much as they could. Today, they report over radio networks and write in a public online notebook. Will, a student in mechanical engineering, hopes that someday he will find work related to geysers. For now, he is just happy waiting and watching.



*reprinted from People of Yellowstone, by Ruth Crocker.

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Will Boekel

Geyser gazer, student



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Month/Visitors Sort

Draw a line to match the month with the number of visitors to Yellowstone National Park.

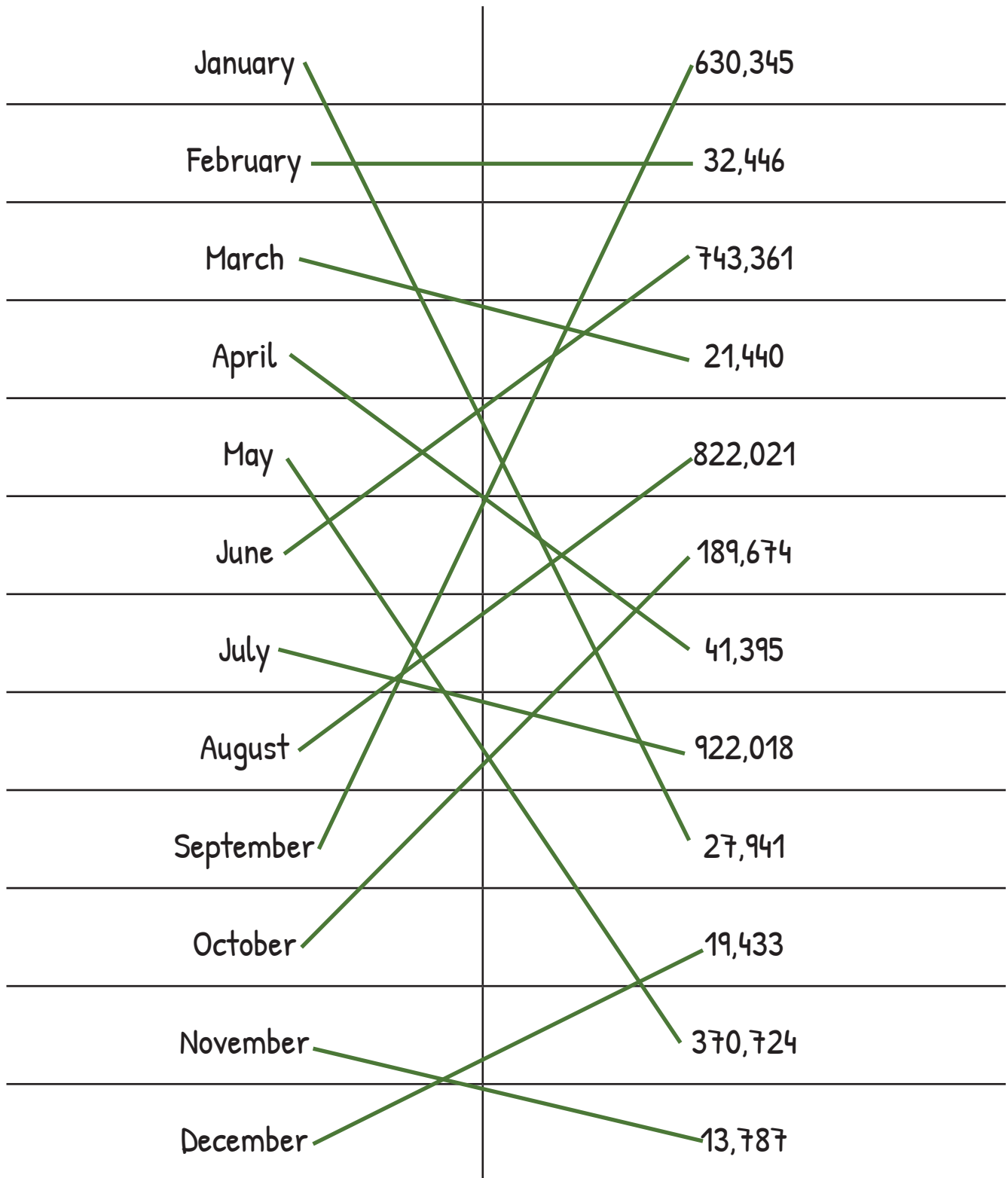
January	630,345
February	32,446
March	743,361
April	21,440
May	822,021
June	189,674
July	41,395
August	922,018
September	27,941
October	19,433
November	370,724
December	13,787



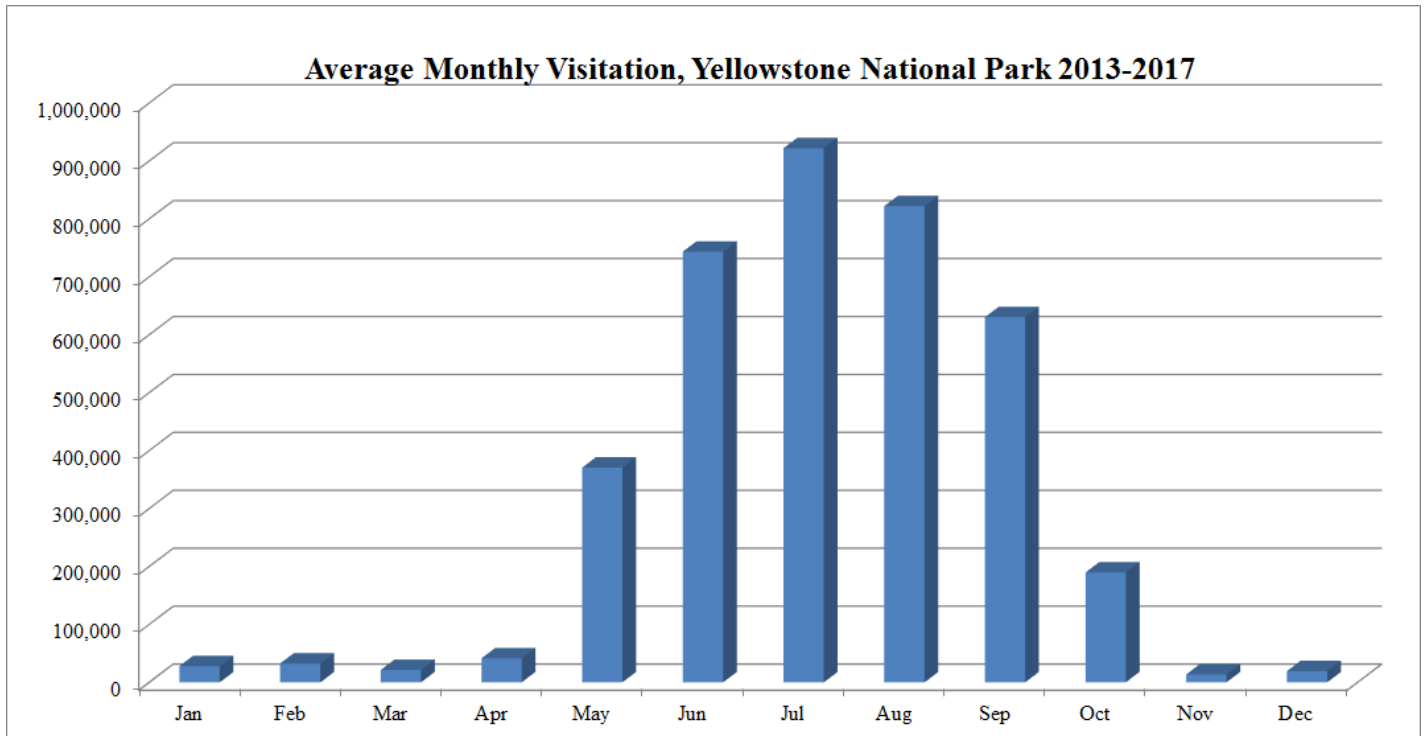
Month/Visitors Sort

Key

Draw a line to match the month with the number of visitors to Yellowstone National Park.



Yellowstone Visitation Statistics



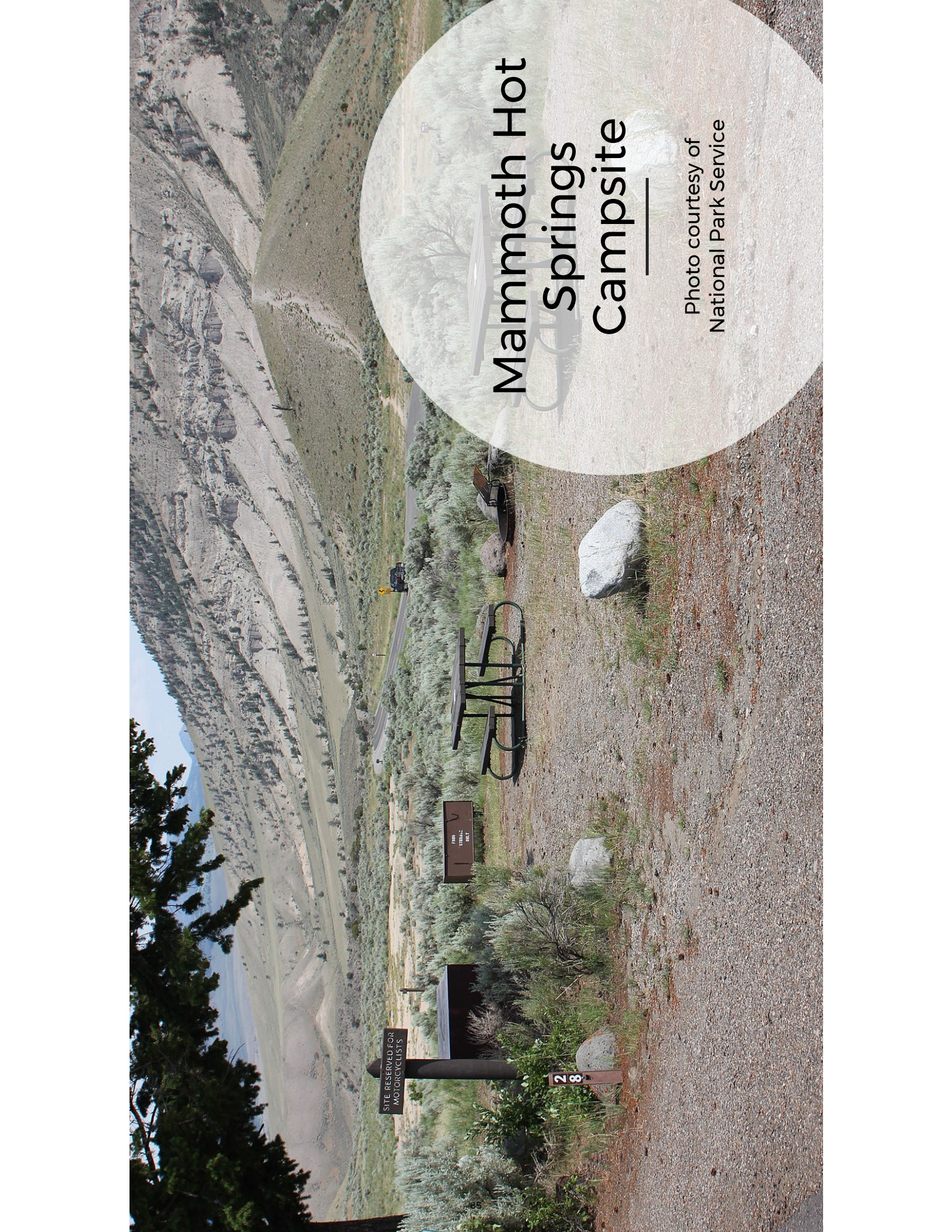
The average visitation to Yellowstone per month from 2012-2017. Raw numbers are included in the table below. NPS / Peggy Olliff

Month	Average # of Visits (2012-2017)	% of Average Annual Visits
January	27,941	0.73%
February	32,446	0.85%
March	21,440	0.56%
April	41,395	1.08%
May	370,724	9.67%
June	743,361	19.39%
July	922,018	24.04%
August	822,021	21.44%
September	630,345	16.44%
October	189,674	4.95%
November	13,787	0.36%
December	19,433	0.51%



Campsite Stewardship





Mammoth Hot Springs Campsite

Photo courtesy of
National Park Service

SITE RESERVED FOR
MOTORCYCLISTS

FISH
STERILIZ
BKT

28



Campsite on Yellowstone Lake

Photo courtesy of
National Park Service



Hanging Food at campsite

Photo courtesy of
National Park
Service/Neal Herbert



Indian Creek Campground, tent site

Photo courtesy of
National Park Service

Stewardship Postcard



photo by: Stephanie Russell

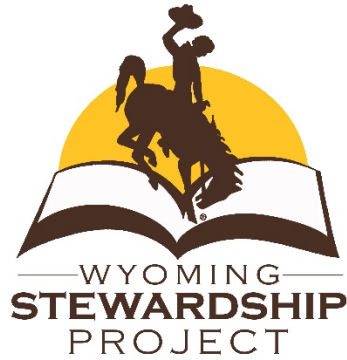


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Stewardship Postcard

A large rectangular box for drawing a scene. Inside the box, there is a horizontal line near the top, a small square in the top-left corner, and three vertical lines on the right side.





Lesson Six: The Science of Stewardship

Grade Level: 5th Grade

Time: 45 minutes

Essential Question: How can we be stewards of Wyoming's public and private lands to benefit current and future generations?

Objectives: Students will:

- Recognize that some plants not native to the area negatively impact the environment and require management.
- Recognize that invasive species affect all of Wyoming's lands and are an ongoing challenge to our state.
- Identify ways in which science ideas are used to make stewardship decisions.

Purpose: Students learn about invasive species, the affect they have on both public and private lands, and the challenges involved with managing them. They also learn that there are stewardship jobs where professionals manage invasive species in a variety of ways using science and other considerations to make the best stewardship decisions.

Required Materials/Resources:

- Margie Fey Story text (one per student and teacher) - (source 1)
- Video:
https://www.youtube.com/watch?time_continue=212&v=wuQ5O76e8IE *Combatting Cheatgrass On Private Ranchland in Wyoming Benefits Sage Grouse* (source 2) *Video length: 3 minutes 37 seconds*
- Highlighters (one per student)
- Chart Paper (one piece per group and one for the teacher)
- Cheatgrass Proposed Solution cards (one set per group) - (sources 3 - 7)
- Evidence Bag exit tickets (one per student printed front-to-back)
- Portraits of Margie Fey and DeWitt Morris for Portrait Gallery

- Tape
- State Designated Noxious Weeds (source 8)
<https://wyoweed.org/noxious-species/listed-species/state-designated-noxious-weeds/>
- State Designated Noxious Pests (source 9)
<https://wyoweed.org/noxious-species/listed-species/state-designated-noxious-pests/>

Suggested Teacher Preparation:

- Review the State Designated Noxious Weeds and State Designated Noxious Pests websites listed in Required Materials and Resources.
- Review sources 3, 4, 5, and 6 for specific information about cheatgrass.
- Label a piece of chart paper: *What we know about the problem* for step 2.
- Develop task parameters for student-generated constraints in step 4.
- Decide whether students will be grouped as pairs or groups of three for step 5.
- Post closing statement for step 5 where all students can see it.

Standards:



Science: 5-ESS3-1 (Explicit)

ELA: 5.RI.2, 5.RI.5 (Practiced/Encountered)


Vocabulary:


- **Invasive** (species) - growing and dispersing easily, usually to the detriment of native species and ecosystems
- **Native** - found originally in a place, not introduced from another place
- **Noxious Weeds** - plant that has been introduced, accidentally or intentionally, into an environment and causes or is likely to cause environmental or economic harm; plants that have been declared by a legislative body as worthy of regulation and management


Instructional Procedure/Steps:

-  1. Draw students' attention to the Portrait Gallery on the wall. Say: **“Turn and talk with an elbow partner about one thing you remember learning from any of our texts so far.”** When finished, pass out the Margie Fey texts and highlighters and say: **“We have two more really amazing stories today about people who spend their time and resources on management of invasive species in Wyoming. Follow along as I read about Margie Fey. Listen intently for information about invasive species. Make sure to highlight anything you think is important about invasive species in the text.”** Read the text aloud to students. Next, have students reread the text with a partner and compare and contrast information they highlighted about invasive species.
2. When pairs are finished, have students share out their findings with the whole group. Ideas that should be brought forth include the following: *Students should be able to say that invasive species can be carried into an area by people, animals, water, wind, etc. They should also highlight the word native and be able to make the connection that invasive species are not native to an area. Invasive species overtake and choke out native species. People work hard and spend a lot of money to manage invasive species.* Record students' ideas on the board or chart paper, and label them “What we know about the problem.” When finished, post Margie Fey's portrait to the Portrait Gallery.
-  3. Say: **“Our second story is a video about DeWitt Morris, a private landowner, who is working to manage cheatgrass on his property. As you are watching the video, jot down some notes on the back of your Margie Fey text on what is important about invasive species.”** Play the *Combating Cheatgrass On Private Ranchland in Wyoming Benefits Sage Grouse* video. When finished, have students share out with the whole group their notes, and post DeWitt Morris's portrait to the Portrait Gallery.
4. Once students have shared their notes, say: **“Now, we are going to be comparing some different ways that scientists have tried to solve the problem of invasive species by thinking specifically about the cheatgrass we learned about in DeWitt's video. We're going to look at three other ways that scientists have tried to tackle the problem of cheatgrass, but before we do that, we're**

going to identify some of the constraints for solving this problem. Problem constraints are limitations or restrictions on how a problem can be solved. For example, one constraint for the problem of cheatgrass would be cost. We would want to choose a cost-effective option. Remember that seeds live for 3 to 11 years. Scientists are not trying to eliminate the problem; they are trying to manage cheatgrass. Think of other constraints for solving this problem.” Have students identify other constraints that they would need to consider when evaluating whether a strategy for managing cheatgrass is a good one. Be sure that students name criteria: *related to science (for example, students might name effectiveness, impact on the environment, amount of land that needs to be managed, etc.); and economics (for example students might name cost of the treatment, cost over time, benefit vs. cost, etc.)*. After students have named the constraints, give them parameters for each. For example, when students name amount of land to be managed, assign an amount of land for them to work with to evaluate the possible solutions. Do this for each of the constraints they identify.

5.  Divide students into pairs or groups of three, and give each group a set of the Cheatgrass Proposed Solution cards, markers, and a sheet of chart paper. Say: **“Your group will create a poster and complete the following tasks: First, read each solution carefully. When finished reading the solutions, rank them based on how well each meets the constraints of the problem. After ranking the solutions, write on your chart paper the number of the solution your group chooses and summarize which constraints the solution met and how well it met them. Finish your poster by completing this statement: To manage the cheatgrass problem, we would recommend _____ because _____.”** *Charts should include group’s selected solution as well as a summary of how the solution matches the constraints. In regards to stewardship, the best single solution would be grazing followed by herbicides. Burning would be the least effective, though in the right scenario can be effective, too. However, for many landowners, the best plan is a combination of grazing and herbicide use.*

 In this task, students will be engaged in the higher order thinking skill of evaluation by judging and recommending.

6.  When groups are finished creating their posters, have students hang them around the room so they are visible to the whole class. Pose the questions below to the whole group. Have students respond to one before moving on to the next one.
- **“How did the constraints of the problem inform which choice you made?”**
 - **“In what ways did you use science constraints to help you make your stewardship decision?”**
 - **“Did you think that these constraints were more or less important than the others?”**

Assessment: For assessment purposes, students will demonstrate understanding of the content in this lesson with an exit ticket called “Evidence Bag.” Pass out the Evidence Bag exit tickets. Students write one idea they learned about invasive species and one idea they learned about being stewards on the front of the bag. They write evidence to support their ideas on the back of the bag. Students can use evidence from Margie Fey’s text, the video, and solution cards to complete this activity. Students demonstrate understanding by noting: *Invasive species are introduced into places they don’t belong. An invasive species drives out native species and disrupts the environment. If an invasive species can’t be eliminated from the land, it must be managed. They should also note how science and/or constraints can inform stewardship decisions. Stewardship examples should come from lesson ideas.*

Credits/Sources:

1. Crocker, Ruth W. (2017). *People of Yellowstone: Margie Fey*. Mystic, CT: Elm Grove Press.
2. Sage Grouse Initiative. (2018, January 29). *Combating Cheatgrass On Private Ranchland in Wyoming Benefits Sage Grouse*. Retrieved October 14, 2018, from https://www.youtube.com/watch?time_continue=212&v=wuQ5O76e8IE
3. Thomas, Heather Smith. BEEF. (2017, March 6). *Got cheatgrass? Here's how to kill it and get your pastures back*. Retrieved October 14, 2018, from <http://www.beefmagazine.com/pasture/got-cheatgrass-heres-how-kill-it-and-get-your-pastures-back>

4. USDA. (2014, September). *Field Guide for Managing Cheatgrass in the Southwest*. Retrieved October 14, 208 2018, from https://www.fs.usda.gov/Internet/FSE_DOCUMENTS/stelprd_b5410110.pdf
5. Feldkamp, Lisa. Cool Green Science. (2016, September 7). *Attacking Invasive Cheatgrass at Its Root*. Retrieved October 14, 208 2018, from <https://blog.nature.org/science/2016/09/07/attacking-invasive-cheatgrass-root-soil-microbes-biocontrol-sage/>
6. Colorado State University: Extension. (2018). *Cheatgrass and Wildfire – 6.310: Controlled Burning Treatment*. Retrieved October 14, 208 2018, from <http://extension.colostate.edu/topic-areas/natural-resources/cheatgrass-and-wildfire-6-310/>
7. Jolley, Stephan A. Wheelabrator Environmental Systems Inc. Fire Management Today. (2001, Summer). *Fighting Fire Without Fire: Biomass Removal as a Prelude to Prescribed Fire – Prescribed Fire: Costs and Delay*. Retrieved October 14, 208 2018, from https://www.fs.usda.gov/Internet/FSE_DOCUMENTS/fsbdev2_018868.pdf
8. Wyoming Weed and Pest. (2018). *State Designated Noxious Weeds*. Retrieved October 14, 208 2018, from <https://wyoweed.org/noxious-species/listed-species/state-designated-noxious-weeds/>
9. Wyoming Weed and Pest. (2018). *State Designated Noxious Pests*. Retrieved October 14, 208 2018, from <https://wyoweed.org/noxious-species/listed-species/state-designated-noxious-pests/>

Margie Fey Story

National park ranger, aquatic invasive species inspector

During her early days as a health and physical education teacher looking for a summer adventure in 1975 with her husband, Rick Fey, Margie never imagined that she would work from turf to surf at Yellowstone National Park, at first perched high in a fire tower on Mount Washburn watching for forest fires, followed by twenty-five years in law enforcement, and moving eventually to resource management inspecting boats that might carry invasive aquatic species. Preventing the introduction of nonnative (from another continent or outside their normal range) aquatic species has become a passion for Margie. “People don’t realize how easy it is to bring a tiny hitchhiker along in the crevice of a boat when they’ve been boating in other waterways outside the park.”

Aquatic invasive species pose significant dangers to Yellowstone’s ecological processes. If a nonnative species has no natural predators in its adopted environment, its population may increase rapidly and threaten the native species, causing a native species to become extinct, with the highest extinction rates occurring in freshwater environments. In addition to nonnative fish in Yellowstone, three more aquatic invasive species are having a significant detrimental effect in the park: *Myxobolus cerebralis* is a parasite that causes whirling disease in cutthroat trout and other species; New Zealand mud snails, which form dense colonies and compete with native species; and red-rimmed melania, a small snail that was first imported by the aquarium trade in the 1930s and was discovered in the warm swimming area at the confluence of the Boiling and Gardner Rivers in 2009.

Eliminating aquatic invasive species after they become established in a watershed is usually impossible and extremely expensive. Each summer Margie is part of a small team of park technicians who inspect, decontaminate, and air-dry visitors’ boats and angling gear before they can be placed in the water. Such decontamination is usually adequate to prevent the entry of most aquatic invasive species. She reminds people that it is illegal to use any fish as bait in Yellowstone National Park, and it’s also illegal to transport fish from one river or lake to another in the Yellowstone region.

During the years in which Margie returned to the classroom each fall, she says the Yellowstone experience created a remarkable increase in her skills as a teacher.

“It’s been a marvelous journey of learning and satisfaction that I’m contributing to the future of this wonderful place.”

*reprinted from People of Yellowstone, by Ruth Crocker.

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Cheatgrass

Proposed Solutions

SOLUTION 1: Cattle (source 3)

Using cattle for early-season grazing doesn't hurt the land or natural grass. To reduce cheatgrass density and size, have cattle graze while the cheatgrass is green during the spring and again in the fall by using a high intensity (many cows), short grazing time approach. Plants at this time of year are young and green which is more palatable (tasty) for cows. Proper timing and close management of livestock is required to minimize impact to desirable plant species.

Cheatgrass will not be eliminated by grazing. Cheatgrass will remain in the soil for several years because it has lots of seeds. However, when the next crop grows up in the spring without that cover from the former years' thatch (dried grasses) to protect it from full sunlight, it doesn't grow as vigorously.

Cost: It costs approximately \$0 per acre. Depending on the timing, this solution can actually save a ranch money that may have been spent on hay or other livestock feed.

SOLUTION 2: Apply Herbicides (sources 4 & 5)

Herbicides approved for use on cheatgrass are usually best applied in fall or early winter before soils are frozen. Spray can be used in the spring on plants that are 2 to 3 inches tall. Once cheatgrass is removed, native plants will grow, thereby allowing natural restoration. You may need to also reseed with native seeds to help promote growth of native plants. Sprayed areas should be re-treated as necessary with spot spraying. This multi-year program for cheatgrass control has been demonstrated to provide one of the best outcomes over the long term. Herbicides can not be used among crops, but they are useful on rangelands. It is important to gain information about the herbicide because some may not allow for grazing for up to a full year after use. Caution also has to be used due to the possibility of herbicides contaminating groundwater.

Cost:

It costs approximately \$15 per acre. It usually requires additional applications in future years to maximize effectiveness.



Cheatgrass

Proposed Solutions

SOLUTION 3: Fire (sources 6 & 7)

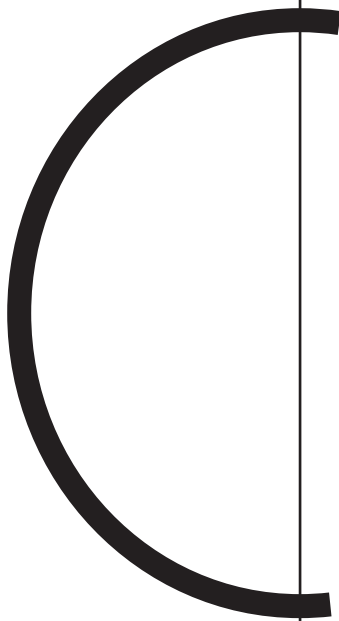
Controlled Burning Treatment should take place in late spring and summer; controlled burning has associated risks which should be addressed in a prescribed (planned) burn plan. Cheatgrass is highly flammable, with densely growing populations which provide lots of fuel that increase fire intensity. If not done correctly, prescribed burns may escape control and become wildfires, produce smoke that impairs visibility on highways or impacts individuals with respiratory problems, and may cause damage to desirable vegetation. For cheatgrass growing in a sagebrush habitat, burning will destroy the sagebrush leaving ground that cheatgrass can invade even quicker. If the native plant community is changed, erosion and damage to water resources can occur. To be most effective, the fire solution for cheatgrass should be used along with a plan for spraying herbicides and replanting.

Cost:

It costs between \$10 and \$435 per acre depending on the area to be burned, the number of firefighters, and the equipment required. A prescribed burn plan and cooperation with local fire districts and local controlled burn specialists is required.



— Evidence Bag - Exit Ticket —

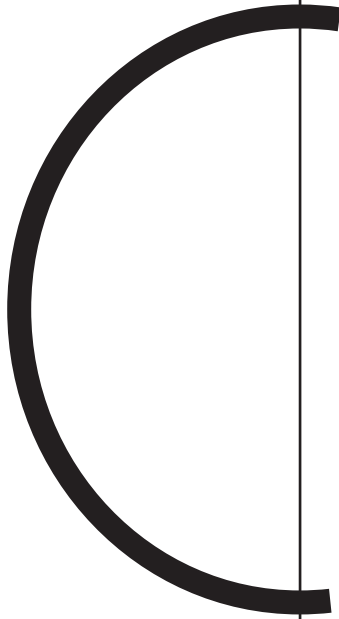


Important Ideas:

1. _____

2. _____

— Evidence Bag - Exit Ticket —

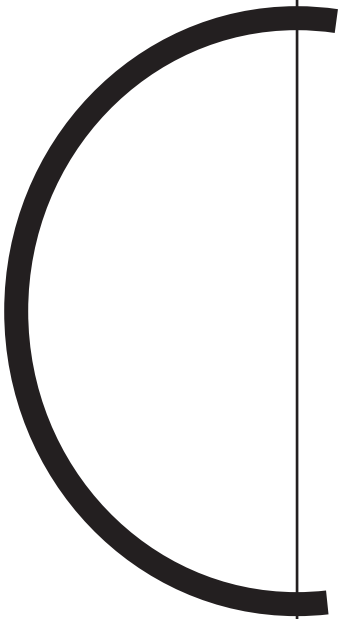


Important Ideas:

1. _____

2. _____

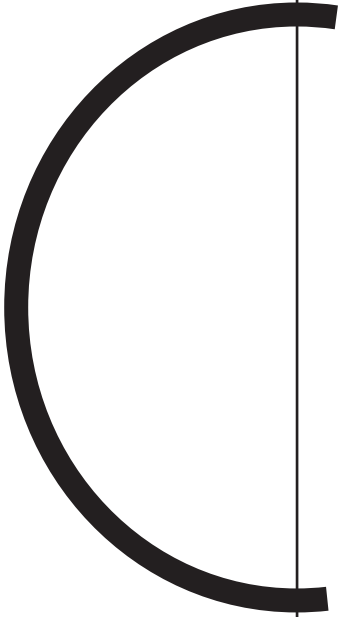
— Evidence Bag - Exit Ticket —



Evidence:

Eight horizontal lines for writing evidence.

— Evidence Bag - Exit Ticket —



Evidence:

Eight horizontal lines for writing evidence.



Margie Fey
National Park Ranger



© 2017 Wyoming Agriculture in the Classroom Materials



DeWitt Morris
Owner of Mountain Springs Ranch



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Lesson Seven: You: The Mystery Steward

Grade Level: 5th Grade

Time: 30 - 45 minutes

Essential Question: How can we be stewards of Wyoming's public and private lands to benefit current and future generations?

Objective: Students will examine various scenarios and decide which one they identify with in order to write a paragraph to accompany their portrait in the stewardship Portrait Gallery.

Purpose: Students see themselves as a good steward of Wyoming's public and private lands through the lens of being a responsible citizen.

Required Materials/Resources:

- Blank portraits (one per student)
- Markers, crayons, colored pencils
- Scenario Cards sheet (one per student)
- Half sheet of lined paper (one per student)

Suggested Teacher Preparation:

- Decide what materials students will use to create their portraits. See step 2.
- Find space to post your students' portraits and paragraphs in or near your Portrait Gallery.
- Decide whether students will read their paragraphs aloud at the end of the lesson. See step 5.

Standards:

Social Studies: SS5.1.1 (Explicit)

ELA: 5.W.4 (Practiced/Encountered)

Vocabulary: No new terms are introduced in the lesson.

Instructional Procedure/Steps:

This culminating activity will serve as the summative assessment for the unit.

1. Say: **“I am so excited because today we get to figure out who our mystery portrait belongs to. I am going to give you some hints about the person. This person is educated about Wyoming’s public and private lands. He or she knows that Wyoming’s lands have many different uses and have to be cared for in different ways. This person knows that it is his/her job as a citizen of Wyoming to be responsible and follow the rules and regulations on all types of land. He/she always cleans up campsites, fishing and hunting areas, and parks when finished using them. Our mystery person wants to help take care of our lands, so they are here for current and future generations to enjoy. Does anybody have a guess who our mystery person is?”**
2. Allow several students to give their guesses. Though there will probably be a variety of answers, hopefully, someone will share the idea that the students themselves are the mystery person. Once students figure this out, make a big deal out of it. Say: **“That’s right! Each one of you is a good steward who deserves to have your picture in our Portrait Gallery. That is exactly what we are going to do right now. I am going to pass out a blank portrait to each of you, and you will have 10 minutes to add your name and a representation of yourself.”** Pass out blank portraits and any others materials like markers, crayons, colored pencils, etc. for students to use. It is up to you how involved you want to make this project. You could add paint, yarn for hair, etc. Allow students at least 10 minutes to create their portraits.



In this task, students will be engaged in the higher order thinking skills of evaluation and synthesis by comparing ideas and using old concepts to create new ideas.



3. When time is up, have students set their portraits aside. Say: **“Now that you have your portraits, you need a story to go with it like each of the people in our gallery. I have five different scenario cards to share. I am going to read each card aloud. Listen carefully to see which scenario you identify with or feel strongly about.”** Pass out scenario sheets and read through scenarios together. Say: **“You are going to write a paragraph to go with your portrait so that it is similar to the other people/organizations in our Portrait Gallery. Each of our Portraits was a good steward of Wyoming’s public and private**

lands. Your paragraph needs to describe how you are a good steward dealing with the challenges in your scenario. You will have the next twenty minutes to write your paragraph. Use complete sentences and remember to start your paragraph with a topic sentence to guide your writing.” Pass out a half sheet of lined paper to each student for their writing.

4. Make sure that all students choose a scenario and have them write their paragraphs. As students finish, have students bring their portraits and paragraphs to you to be placed in the Portrait Gallery.
5. When all of the portraits are hung, take a minute to stand back and admire them along with Wyoming’s other stewards. To extend the activity, students can read their paragraphs to the class.

Assessment: The paragraphs students have written will serve as the assessment for the unit. Students’ paragraphs should include content from the unit. Their responses should include both the qualities of a good steward and how being a good steward benefits current and future generations. Possible student responses are listed below:

Scenario #1: *My family and I will turn around and leave this place because we can see that it is private property. It is against regulations to entry private property without permission. Even though it is late, we will have to return home. If we want to hunt here tomorrow, we will have to try to get permission from the owner.*

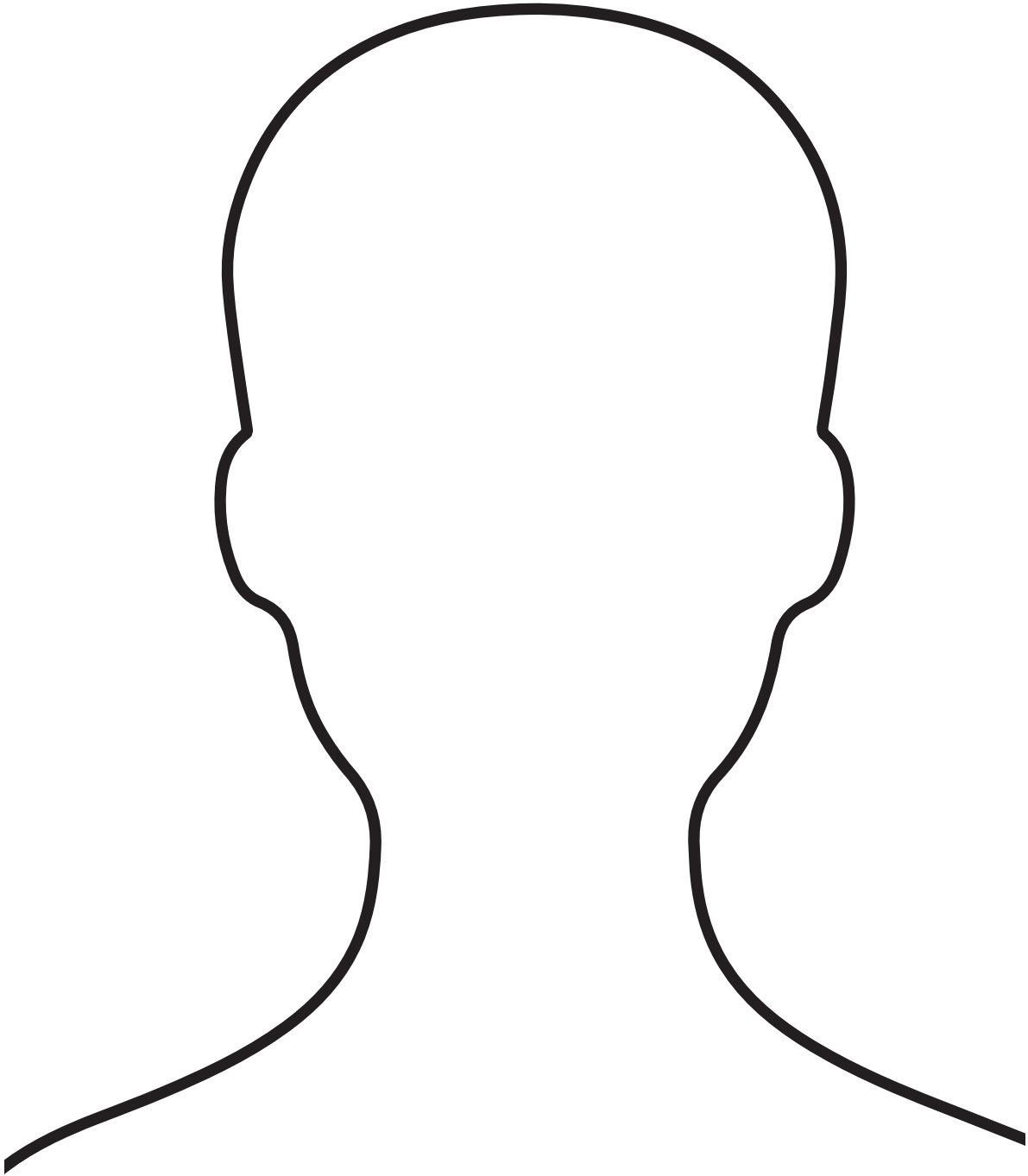
Scenario #2: *I know that I am on public land that is intended for camping. The place where my grandfather wants to camp has no fire pit. We can still camp there, but we can’t build a fire because the grasses are dry, and it would be against regulations. We could cause a grass fire that would endanger everyone in the area. We should watch for another spot to open up and move to a spot with a fire pit if possible.*

Scenario #3: *I know that this is public land that everyone should get to enjoy. When my friends and I come here to hang out, we shouldn’t have to see damage that other people have done. I would clean up what I can, and I would report the problem to my parents, so they can notify the right agency. I would also like to see if signs could be posted saying there is a fine for defacing public land.*

Scenario #4: *I have had the experience of going to the park with my family for a picnic in the past. When we got there, the site was full of someone else's trash. We had to clean it all up before we could set up our picnic. Wasps were flying all around the picnic table. It was not enjoyable to clean up after others, but it was the right thing to do. As a good steward, I will make sure the place is enjoyable for others like we learned in our unit.*

Scenario #5: *My brother and I already have permission from the rancher to cross his property to get to the hiking trail that is on public land. I know that he is not home right now, but we already have an agreement. I decide that we can go through his property as long as we shut the gate, so the cattle will not get out. My friend and I will be very respectful while we cross his property making sure to stick to the marked area.*

Credits/Sources: Not applicable



Your Name



Scenario Cards

Scenario 1:

You and your family are going hunting this weekend. Your dad says this is a new place he hasn't tried before. You are all very excited to get there. When you arrive, it is later in the evening and starting to get dark. Your dad pulls up to the property to find a sign that says, "No Trespassing, Private Property". No one is around, and it is late at night. As good stewards, what should you and your family do at this point? Make sure to explain why you make the decision you do.

Scenario 2:

You and your grandparents are going camping for the weekend. When you arrive at the campground, all of the campsites are taken. Your grandfather drives around the campground several times looking for an open spot. He notices a small meadow off the side of the road where he thinks he could set up tents and make a camp. There is no fire pit in this area, and the grasses are pretty dry. Your family really wants to camp and have a fire for roasting marshmallows. What should you do? Make sure to explain why you make the decision you do.

Scenario 3:

There is a creek running through some public land not far from your house. Near the creek bank are some large rocks. You and your friends often go to the place to play soccer, go fishing, or ride bikes. Today, when you go to the creek to go fishing, you notice that someone has spray painted names and pictures on the rocks. What should you do? Make sure to explain why you make the decision you do.

Scenario 4:

The city park in your town is a busy place. Many families love to go there to play on the equipment and have picnics. A lot of people take their dogs to the park to play frisbee. One sunny afternoon while you are at the park, you see a large group of children playing and eating at the park. The adult with the children tells them it is time to get ready to go. As the children start leaving, you notice that they are leaving their lunch trash all over the place. What would you do in this situation? Make sure to explain why you make the decision you do.

Scenario 5:

You and your brother want to go hiking on the public land that is on the other side of a local ranch. The only entrance to the hiking area is a marked trail through the private property of the rancher. The rancher has given you permission to pass through his property to get to the hiking trail but wants you to only go on the marked trail and to not bother/endorse his cattle. The rancher isn't around right now, and he has cattle grazing near the gate. What should you do? Make sure to explain why you make the decision you do.





Glossary

Agency	a business or organization established to provide a particular service
Bureau of Land Management (BLM)	an agency within the United States government that administers more than 247.3 million acres of public lands mainly located in twelve western states of the United States
Care	providing for something in a positive way
Develop	to aid in growth, maturation, or expansion
Economy	financial system of interaction and exchange
Ecosystem	everything that exists in a particular environment (an ecosystem includes living things, such as humans, animals, and plants, and things that are not living, such as sunlight and water)
Federal Land	Lands owned by the government and managed through a federal agency
Fish and Wildlife Service	the United States Fish and Wildlife Service (USFWS or FWS) is an agency of the federal government within the U.S. Department of the Interior dedicated to the management of fish, wildlife, and natural habitats
Forest Service	the United States Forest Service (USFS) is an agency of the U.S. Department of Agriculture that administers the nation's 154 national forests and 20 national grasslands, which encompass 193 million acres
Held in Trust	principle that the governing body holds certain lands in trust for public use in some way

Industry	a group of businesses that provide a particular product or service
Invasive	growing and dispersing easily, usually to the detriment of native species and ecosystems
Manage	be in charge of, run, be head of, head, direct, control, preside over, lead, govern, rule, command, supervise, oversee, administer, organize, conduct, handle, guide
National Park Service	the National Park Service is an agency of the United States federal government that manages all national parks, many national monuments, and other conservation and historical properties with various title designations
Native	found originally in a place, not introduced from another place
Natural Resource	sources of life, materials, or energy that we are able to get naturally from the earth
Noxious Weeds	plant that has been introduced, accidentally or intentionally, into an environment and causes or is likely to cause environmental or economic harm; plants that have been declared by a legislative body as worthy of regulation and management
Private Land	land owned by a person or group and kept for their exclusive use; permission and access for any purpose must be granted by the owner
Property	land mass of varying size
Public Land	land owned by a government (may or may not be accessible to the public)
Reclaim the land	returning land back to its original state often with improvement
Resource	a place or thing that provides something useful
State Parks	state lands reserved to be enjoyed by the public for recreation and tourism and do not generate income through development
State Trust Lands	lands that were granted to Wyoming and designated to generate revenue for public schools and other state institutions
Stewardship	As Wyoming citizens, we are stewards entrusted with the responsible development,

	care, and use of our resources to benefit current and future generations.
Sustainability	the ability to be maintained, able to last for a long time
Tourism	the activity of traveling to a place for pleasure that can generate revenue from the enjoyment of Wyoming's land and/or resources
Tourist	vacationer, traveler, sightseer, visitor
Use	the way in which land can be interacted with based on regulations