

History of Wyoming's Public Lands

SWOOSH!!! Jets of hot water and steam roar up into Wyoming's skies. Geysers explode on the skyline and into the minds of the first European settlers exploring the west in the early 1800s. The beautiful landscape of northwest Wyoming attracted the attention of settlers, scientists, and presidents alike. In 1872, before Wyoming was even a state, President Ulysses S. Grant designated this remote area as a national park.



Norris Geyser Basin, Yellowstone National Park

Wyoming pioneered the first national park, first national monument, and first national forest, making this unique land a hot spot for early tourists. Yellowstone, the first national park, 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 base to summit. 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 public 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.

Around half of Wyoming is public land, owned by the federal government and the State of Wyoming. This means there is an unique opportunity for people to explore. Not only does Wyoming have beautiful scenery, it offers history in various forms. In addition to the National Historic Site, Ft. Laramie National Historic Site, there are twenty-five national Historic Landmarks and two national monuments: Devils Tower and Fossil Buttes. To keep these destinations accessible, private land owners, along with state and federal agencies, such as the Game and Fish, National Forest Service, and Bureau of Land Management, work to provide balance in conserving these resources for future generations.

Whether enjoying Wyoming's great outdoors in the 1800s or visiting historic and recreational sites today, we can all appreciate the stewardship practiced on our public lands. In order to maintain these unique areas for current and future generations, we each have a responsibility as a steward. What role do you play as a steward of these natural resources?



3-2-1

Think about three things you learned about **stewardship**, two connections you made between **yourself and stewardship**, and one thing you **wonder** about. Record your answers below.

I learned...

① _____

② _____

③ _____

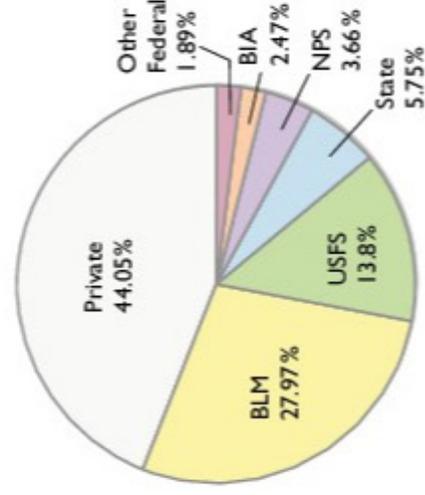
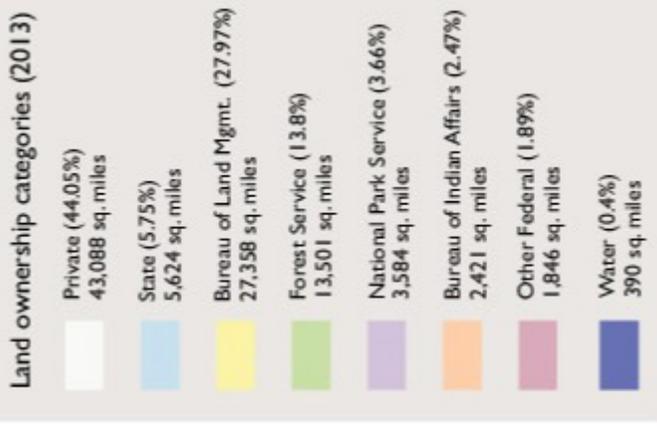
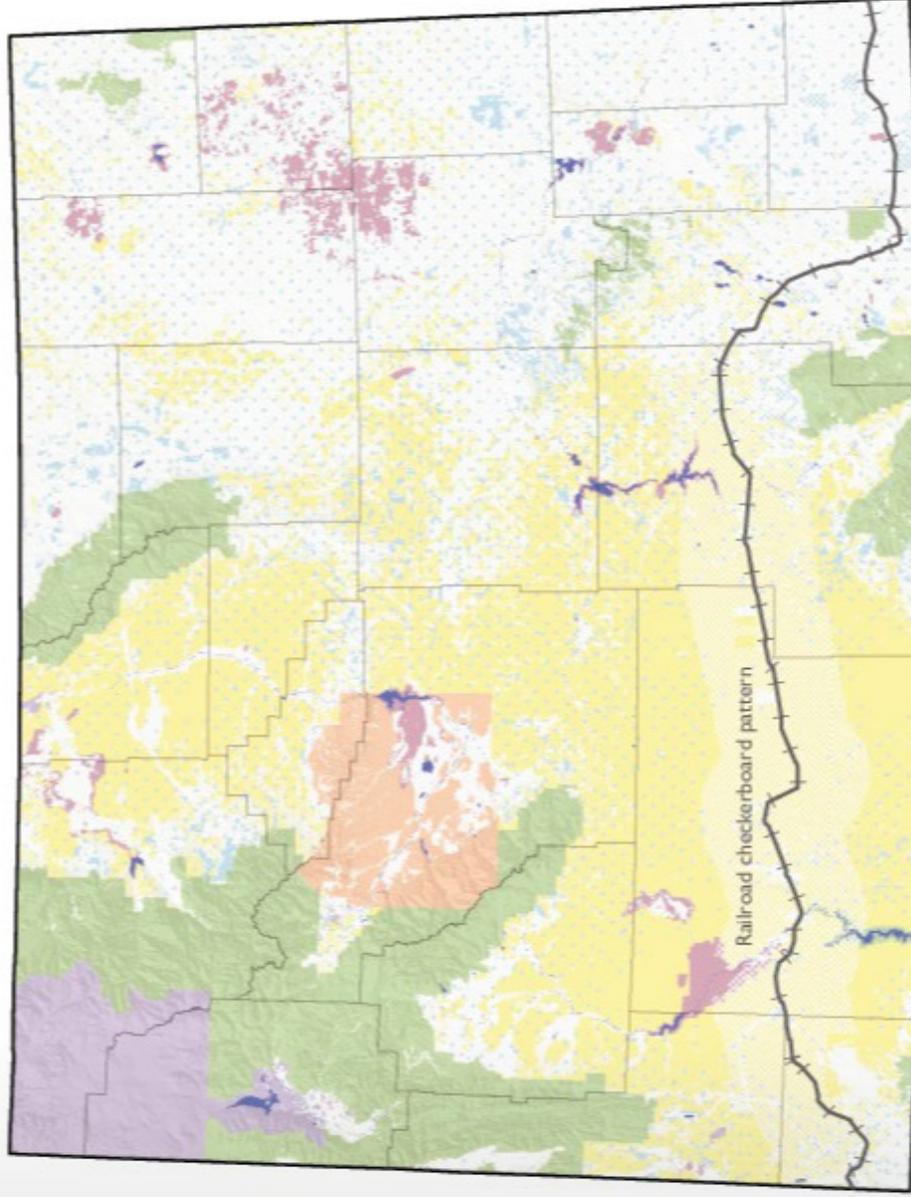
Connections...

① _____

② _____

I wonder...





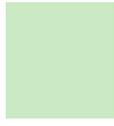
More than 48% of the land in Wyoming is owned by the federal government, placing Wyoming sixth among states in total acres and fifth in percentage of land owned by the federal government.

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

Scavenger Hunt

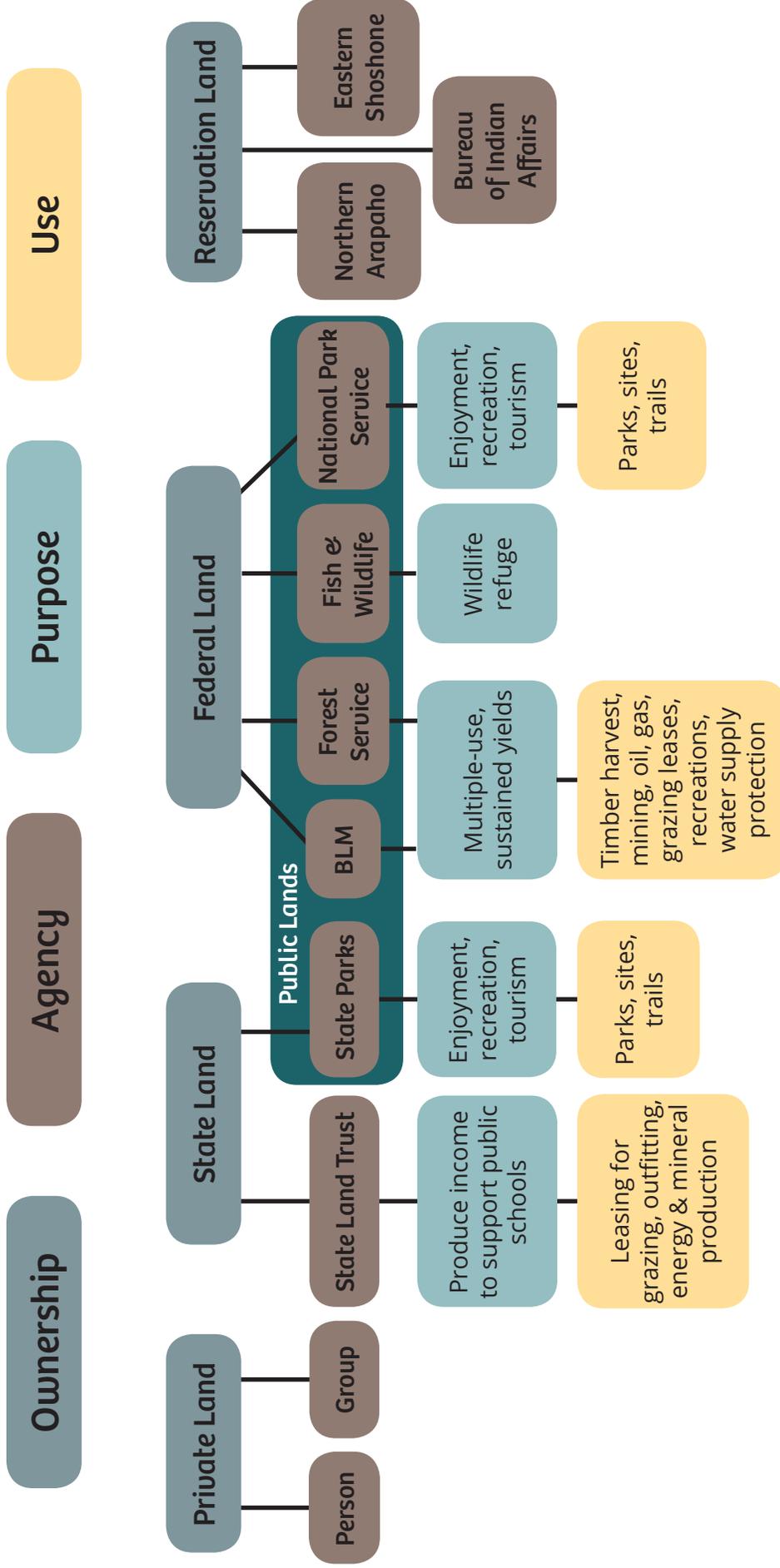
On the public land map, locate and name as many of the following as possible:

 <p><u>Historic Sites</u></p>	 <p><u>Wildlife Areas</u></p>	 <p><u>State Parks</u></p>	 <p><u>Campgrounds</u></p>	 <p><u>Historic Trails</u></p>
 <p><u>Grasslands</u></p>	 <p><u>Forests</u></p>	 <p><u>National Parks</u></p>	 <p><u>National Monuments</u></p>	 <p><u>Recreation Area</u></p>



Wyoming Land Ownership

Make as an anchor chart.



Exit Ticket

1. Explain the difference between private land and public land.

2. Name one type of public land, state its purpose, and name the agency that manages that land.



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Agency Scoot Cards

U.S. Fish and Wildlife Service (Federal)

What they do: Dedicated to the management and working with others to conserve, protect, and enhance fish, wildlife, plants and their habitats

Interesting facts:

Enforce federal wildlife laws
Manage fish hatcheries across the United States
Maintains National Wildlife System (National Elk Refuge in Jackson, WY)
Manage migratory birds
Nearly 700 field offices throughout the United States

Job opportunities: administration, biologists, fire management, wardens, habitat conservation, law enforcement, contaminants management, visitor services

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Agency Scoot Cards

1.

Is the U.S. Fish and Wildlife Service a state agency or a federal agency?

2.

Write the words that go in the blanks:
Dedicated to the management and working with others to _____, protect, and enhance _____, _____, plants and their _____

3.

Choose one other interesting fact about the U.S. Fish and Wildlife Service and write it in the box.



Agency Scoot Cards

Wyoming Game & Fish Department (State)

What they do: Charged with stewardship of the state's fish, game, and wildlife resources. The department sets fish and game regulations, issues hunting and fishing licenses, and enforces state regulations throughout the state.

Interesting facts:

- Hunting licenses and taxes on fishing/hunting equipment provide 80% of the funds for the agency
- Responsible for preventing the spread of aquatic invasive species (watercraft inspections)
- Monitor the black-footed ferret populations
- Hosts the Wyoming Outdoor Expo
- The Game and Fish was developed in response to game slaughter (beaver, bison, bear, deer, antelope, sage grouse and fishing) the 1800s.

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Agency Scoot Cards

4.

Is the Wyoming Game and Fish a state agency or a federal agency?

5.

How does this agency get most of its funding?

6.

Choose one job opportunity that you think is interesting and write it in your box.



Agency Scoot Cards

Wyoming State Parks & Cultural Resources (State)

What they do: Provides Wyoming citizens and visitors a variety of opportunities to enjoy our arts, parks, and history through recreational, cultural, and educational opportunities.

Interesting facts:

- Host a variety of events across the state (Smokey Bear's birthday, Gold Rush Days, etc.)
- Maintains state parks and archaeological sites
- The Wyoming Arts Council is part of this agency.
- They provide trail maps for state parks (off-road vehicles, snowmobiles, hikers).

Job opportunities: administration, geospatial data, brand inspector, seasonal work at parks, archaeologists, law enforcement, outdoor recreation

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Agency Scoot Cards

7.

Write the words that go in the blanks:
The Wyoming State Parks and Cultural Resources
maintains _____ and _____ sites.

8.

Write the words that go in the blanks: This
agency provides Wyoming citizens and _____
a variety of opportunities to enjoy our _____,
parks, and history through recreational,
_____, and _____ opportunities.

9.

Choose one other interesting fact about the
Wyoming State Parks & Cultural Resources and
write it in the box.



Agency Scoot Cards

Wyoming Board of Land Commissioners

What they do:

Manage State Trust Lands. State trust land managers lease and sell these lands to make money primarily for public schools. The money also supports current and future organizations, such as the Veteran's Home, Boys and Girls Schools, and the State Hospital.

Interesting facts:

The board is made up of five state elected officials (Governor, Secretary of State, State Auditor, State Treasurer, State Superintendent of Education).

The money for State Land Trust mostly comes from oil and gas royalties.

When Wyoming became a state (1890), the federal government granted approximately 4.2 million acres of land to the state of Wyoming.

State Trust Lands are used for a wide range of commercial uses (grazing & agriculture, wind energy development, oil & gas exploration, mining, roadways, schools).

Job opportunities: administration, grant writing, land management, engineers, biologist

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Agency Scoot Cards

10.

Is the Wyoming Board of Land Commissioners a state agency or a federal agency?

11.

The board manages the use of _____ _____
_____ to earn revenue for public schools.

12.

Along with the State Treasurer and the State Auditor, who else is on the board?



Agency Scoot Cards

National Park Service (Federal)

What they do: Manage all national parks, many national monuments, and other conservation and historical properties:

- making them available and accessible for public use and enjoyment
- preserving the scenic and historic qualities of the parks

Interesting facts:

- Motto: "Preserve, protect and promote most treasured places"
- Employs about 27,000 employees
- President Woodrow Wilson signed a bill August 25, 1916 creating the agency.
- Funds are used for public and educational programs for the general public and school groups.

Job opportunities: Visitor services, park protection, facility maintenance and operations, park support, resource stewardship

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Agency Scoot Cards

13.

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14.

The National Park Service manages all _____
_____ and many _____.

15.

Choose one other interesting fact about the National Park Service and write it in the box.



Agency Scoot Cards

United States Forest Service (Federal)

What they do: Provide leadership in the protection, management, and use of the nation's forest, rangeland, and aquatic ecosystems. Balance these three areas: resource extraction, resource protection, and providing recreation.

Interesting facts:

- Motto: "Caring for the land and serving people"
- There are nine regions in the US Forest Service.
- The black bear, which was later named "Smokey Bear," was a successful poster campaign for the Forest Service. Smokey Bear has appeared in innumerable TV commercials with his popular catch phrase, "Only YOU can prevent forest fires."

Job Opportunities: Law enforcement & investigations, state and private forestry, research and development, fighting fires.

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Job Opportunities: Law enforcement & investigations, state and private forestry, research and development, fighting fires.



Agency Scoot Cards

16.

Is the U.S. Forest Service a state agency or a federal agency?

17.

What are the three areas that the U.S. Forest Service balances?

18.

Choose one job opportunity that you think is interesting and write it in your box.



Agency Scoot Cards

Bureau of Land Management (Federal)

What they do: Manage more than 17.5 million acres of public land and mineral rights for multiple use (energy production, livestock grazing and recreation)

Interesting facts:

- President Harry S. Truman created the BLM in 1946.
- BLM land contains world-class energy and mineral resources.
- BLM land offers abundant opportunities for recreation.
- Mission: "to sustain the health, diversity, and productivity of the public lands for the use and enjoyment of present and future generations."

Job opportunities: Law enforcement and security, biologists, historians, engineering, fire management, wild horse and burro management, business, renewable energy

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Agency Scoot Cards

19.

Is the BLM a state agency or a federal agency?

20.

What are the 3 types of land management the BLM tries to keep in balance?

21.

Choose one other interesting fact about the Bureau of Land Management and write it in the box.



Agency Scoot Cards

Private Landowner (Not an agency)

What they do: Own and manage nearly half of Wyoming's land. Grant permission and access to their property for any purpose. Understand rights, regulations, and permits of being a landowner.

Interesting facts:

- Work with public and private neighbors
- Can deny people access to their property
- Landowners need to understand water and mineral rights.
- As stewards, they maintain the property (trees, vegetation, wildlife, etc.).

Job opportunities: Anything!

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Job opportunities: Anything!



Agency Scoot Cards

22.

Is a private landowner an agency?

23.

Private landowners manage nearly _____ of Wyoming's land.

24.

List 3 jobs that you could do as a private land owner.



Agency Scoot

Name: _____

1.	2.	3.
4.	5.	6.
7.	8.	9.
10.	11.	12.
13.	14.	15.
16.	17.	18.
19.	20.	21.
22.	23.	24.



Agency Scoot

Name: Answer Key

1. Federal agency	2. conserve fish wildlife habitat	3. Student choice
4. State agency	5. selling hunting licenses	6. Student choice
7. State parks archaeological	8. visitors arts cultural educational	9. Student choice
10. State agency	11. State Trust Lands	12. Governor Secretary of State State Superintendent of Education
13. Federal agency	14. National parks monuments	15. Student choice
16. Federal agency	17. resource extraction resource protection providing recreation	18. Student choice
19. Federal agency	20. energy production livestock grazing recreation	21. Student choice
22. No	23. half	24. Student choice



Spectacular Landforms of Wyoming

Name: _____

Name of the Landform: _____

Location, location, location
(Where is this landform located?)

Draw a picture of this landform.

Write a brief description of this landform.

How was this landform formed?

What recreational activities could you do at this landform?

What would good stewardship look like at this landform?

Name one interesting fact about this landform:



Spectacular Landforms of Wyoming

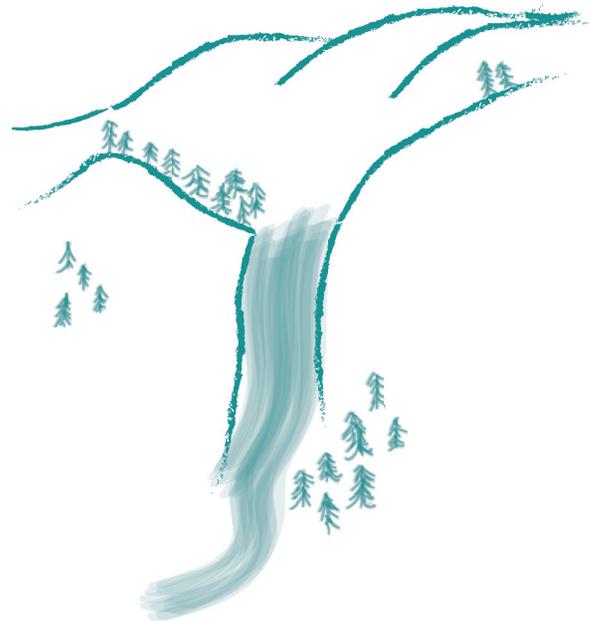
Name: **Teacher Sample**

Name of the Landform: **Grand Canyon of the Yellowstone**

Location, location, location
(Where is this landform located?)

Northwest corner of Wyoming, within the boundaries of Yellowstone National Park on the Yellowstone River.

Draw a picture of this landform.



Write a brief description of this landform.

- **20-mile-long canyon**
- **1200 ft. deep**
- **river tumbles 308 ft.**
- **appears green from algae and moss at the river's bottom**

How was this landform formed?

- **The canyon was carved by the Yellowstone River.**
- **The change in elevation causes the waterfall.**
- **The water from the waterfall hits softer rocks, eroding them away.**

What recreational activities could you do at this landform?

- **sight-seeing**
- **watching wildlife**
- **hiking**
- **photography**

What would good stewardship look like at this landform?

- **Follow rules and signs**
- **Carry in/carry out**

Name one interesting fact about this landform:

Lower Yellowstone Falls is twice as high as Niagara Falls.





97,818 SQUARE MILES OF TRAILS LESS TRAVELED

The memories are enough reason to make your way across Wyoming. But a few mementos are a nice perk. Explore Mother Nature's most breathtaking creations, like Yellowstone National Park, Devils Tower, and the Grand Tetons. Along the way, pick up collectible stickers that pay tribute to Wyoming's many areas of rugged majesty and possibility.

KEY

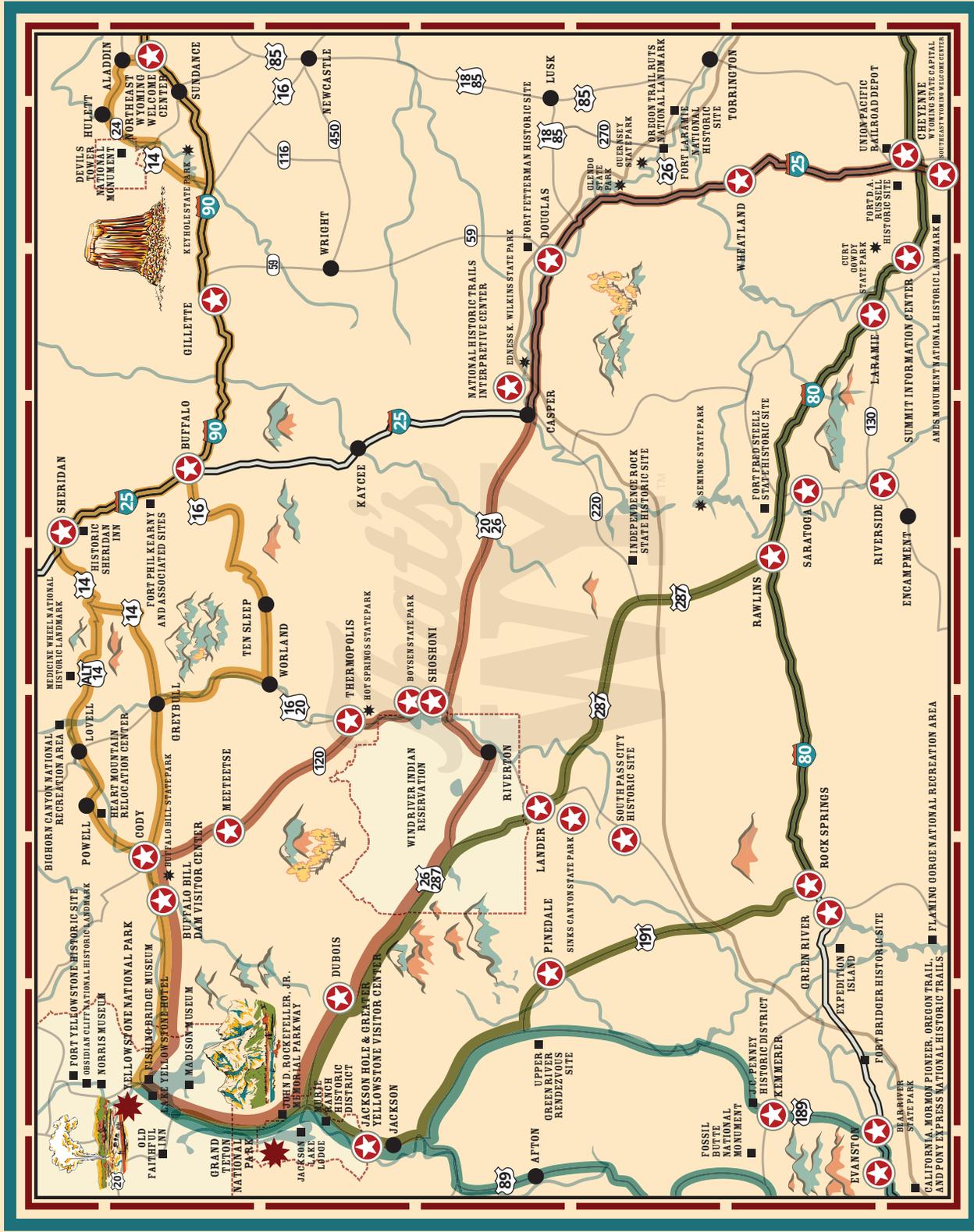
- SALT TO STONE ROUTE
- ROCKIES TO TETONS ROUTE
- PARK TO PARK ROUTE
- BLACK TO YELLOW ROUTE
- STICKERS LOCATED HERE
- NATIONAL PARK
- STATE PARK
- MONUMENT/LANDMARK
- CITY/TOWN
- CALIFORNIA, MORMON PIONEER, OREGON TRAIL, AND PONY EXPRESS
- PARK BOUNDARY



TRACK YOUR TRIP
#That'sWY

TravelWyoming.com/maps

Grade 3 - Outdoor Recreation & Tourism - Lesson 1



EVERY ROAD LEADS TO ADVENTURE. AND STICKERS.

Collect your set of Great American Roadtrip Stickers at Wyoming Visitor Centers throughout the state.

Visit TravelWyoming.com/maps for the sticker distribution center locations.



#SalttoStone

Outdoor aficionados, amateur paleontologists, wildlife lovers and history buffs flock to the Salt to Stone region. From the Great Salt Lake to Yellowstone National Park, those who explore these starkly beautiful landscapes will find natural treasures such as Fossil Butte National Monument, Killpecker Sand Dunes, Boat's Tusk and Jackson Lake. All around the region, towns immersed in history welcome you on your way to epic outdoor activities, including hiking, biking, kayaking, boating, skiing and snowmobiling.



#RockiestoTetons

Choose a route of epic scale along the eastern slope of the Continental Divide. The Rockies to Tetons region brims with a wide array of only-in-Wyoming experiences. Home to the Western-rooted capital city of Cheyenne; the Wind River Indian Reservation; and the snowy, Medicine Bow, Seminoe and Wind River mountain ranges, the area attracts both culture vultures and adventure seekers.



#ParktoPark

Follow the path of those who came before us on your way to Yellowstone. Stretch your legs on the historic trails winding through the heart of Wyoming and learn about the dinosaurs that trekked them more than 100 million years ago in the Big Horn Basin. Scenery straight out of an adventure magazine and plenty of welcoming towns make the Park to Park region ideal for a variety of getaways. From rugged backcountry escapes, to relaxing hot springs retreats.



#BlacktoYellow

Begin the adventure long before Yellowstone National Park's east entrance with detours through Wyoming's Black Hills National Forest, Devils Tower National Monument and Big Horn Canyon National Recreation Area. With little traffic, fewer people and wide-open skies, the Black to Yellow region will redefine your concept of fresh air. Dotting the spectacular landscape, you'll find charming towns where 19th-century hotels, shops and restaurants still welcome travelers and outdoor recreation abound. Acres of public land, sagebrush plains and rolling hills set the scene for trips ranging from family outings to solitary adventures.



TRACK YOUR TRIP #That'sWY

Exit Ticket

1. Because of this lesson, I learned _____

2. I was surprised _____

3. I still wonder _____



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2. I was surprised _____

3. I still wonder _____

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Wyoming Visitor Statistics

National Park or Site	Recreational Visits in 1975*	Recreational Visits in 2018**
Bighorn Canyon National Recreation Area	298,800	108,362
Devils Tower National Monument	148,900	468,216
Fort Laramie National Historic Site	105,500	52,414
Fossil Butte National Monument	8,600	21,349
Grand Teton National Park	2,173,500	3,491,151
John D. Rockefeller, Jr. Memorial Parkway	1,442,800	1,504,561
Yellowstone National Park	2,239,500	2,016,349
Total Wyoming Visits	6,417,600	7,662,402

* 1976 Public Use of the National Park System Calendar Year Report
**2018 Statistical Abstract, National Park Service



Cause and Effect

Name: _____

Current affects on our **economy** and **culture**:

Cause:

National Parks and Monuments are available for us to enjoy.

Effect:

Stewardship ideas that apply:

Cause:

Ski trails were opened in Grand Teton National Park.

Effect:

Stewardship ideas that apply:



Cause and Effect

Challenges to our economy and culture:

Cause:

A voluntary ban on rock climbing has been placed on Devil's Tower during the month of June to respect Native American cultural values.

Effect:

Stewardship ideas that apply:

Cause:

The North Platte River is closed to fishing, rafting, and other activities to prevent the spread of a parasite that kills thousands of fish.

Effect:

Stewardship ideas that apply:



Wildfire Case File

Casper Mountain

Activities

Located just a few miles south of the City of Casper, Casper Mountain offers a full range of activities in every season. Cross country nordic skiing, mountain biking, hiking, archery, horseback riding, Garden Creek Falls, mountain music, Midsummer's Eve, camping, and picnicking have transformed Casper Mountain into a year round destination for recreation.

Facilities

Each campground and facility has its own personality. You can hike the Braille Trail or the Bridle Trail depending on what experience you desire. You can picnic and camp from Beartrap Meadow on the east end of the mountain to Archery Range Park on the west and several places in between.

If you want to picnic at the base of the mountain, go to Rotary Park where Garden Creek, the Falls, and the Bridle Trail beckon. There is a facility and a location for every age and every level of enjoyment. Casper Mountain will keep you coming back to explore more of her natural wonders and top-notch facilities

Natrona County Wyoming. (n.d.). Casper Mountain. Retrieved July 12, 2019, from <http://www.natronacounty-wy.gov/232/Casper-Mountain>.



Wildfire Case File

Wildfire Danger

Editorial board: Fire danger should be taken seriously
STAR-TRIBUNE EDITORIAL BOARD Jun 26, 2019

Firefighters refill their brush truck from a water tender Sept. 9, 2012, while battling the Sheep Herder Hill Fire on Casper Mountain.

Depending on your perspective, we've either enjoyed or endured a cool and wet summer. Temperatures are expected to finally reach the upper 80s this week, but the past months have been milder than most Wyomingites have come to expect for this time of year.

Given that reality, some people might think that wildfires aren't a concern this summer. But nothing could be further from the truth. It's essential that all of us remain vigilant against the ever-present danger of wildfire. Because letting our guard down increases the likelihood of a fire that consumes homes and threatens lives.

Yes, it's true that the prairie is much greener than normal. Parts of Casper Mountain are still damp. But fire experts say it will take only a week of hot and dry conditions – which could arrive as soon as this week – to dry out the vegetation. And because of the wet spring, there is more of that vegetation around than normal.

What can be done? First, homeowners who live in forests or out on the prairie, should make sure they've taken the necessary steps to protect their property, should a wildfire ignite. That means creating a defensible space by clearing away extremely flammable timber and brush. Such actions have been proven to decrease the likelihood of a wildfire destroying homes. But property owners aren't the only ones with a responsibility to protect our community against wildfire. Anyone who spends time outdoors has a role to play. If you plan to camp this summer, make sure you build a safe and contained campfire. When it's time to leave, make sure it's fully extinguished. Not doing so can be incredibly destructive. The Roosevelt Fire, which destroyed 55 homes in western Wyoming last fall, was caused by an abandoned campfire.

Similarly, people should heed burn bans, should authorities put them into effect later this year. Those bans are in place for a reason, and while it might be tempting for some to ignore them while away from civilization, they are there to keep our community safe. The same goes for fireworks bans. Here in Natrona County, fireworks are a big no-no. And yet every year, people defy the ban and set them off – endangering everyone in the process. Finally, be smart and be considerate. If you're a smoker, properly dispose of your cigarettes when you're outdoors. If you're riding an ATV, avoid dry areas that might be ignited by a spark from the exhaust.

Living in Wyoming means beautiful, open landscapes. It means a life that is unburdened by crowds and congestion. But it also means wildfire are a fact of life. We can't eliminate the threat, which could come from a passing thunderstorm. But if we all do our part, the chances of a catastrophic fire sweeping through our state will be lower.

Casper Star Tribune. (June 26, 2019). Editorial Board: Fire danger should be taken seriously. Retrieved July 12, 2019, from https://trib.com/opinion/editorial/editorial-board-fire-danger-should-be-taken-seriously/article_a6afb6af-7299-5de4-905f-71b6c4eaf21a.html.



Wildfire

Case File

Reuiving local saw mills could limit fire danger in the Rocky Mountain Region

By REBECCA MARTINEZ • AUG 2, 2013

Saw mills are re-opening in Wyoming and Colorado after a decade of being shuttered. They're harvesting and processing trees that have been killed by beetle infestation. Still, many are suitable for lumber. Wyoming Public Radio's Rebecca Martinez reports that this uptick in the timber business is helping with forest fire management.

(Firing up engine)

REBECCA MARTINEZ: On a densely wooded slope of Elk Mountain in southern Wyoming, a huge logging machine sets about clear-cutting a stand of Lodgepole pine and fir trees. (beeping) It has an enormous mechanical arm, wielding a claw and a circular saw. (saw noise) In a few smooth motions, it slices through several trees a few stories high, gently lifts them, and places them in a tidy bunch. (thunk) This device that fells and bunches trees is called a feller-buncher.

JOSH VAN VLACK: The equipment that the loggers use is very expensive, and just the labor that goes into it. If it weren't for the saw mills in the area, we probably wouldn't be able to do hardly any forest management.

MARTINEZ: Josh Van Vlack is with the Wyoming State Forestry Division. He says the area's new saw mill, Saratoga Forest Management, makes it possible to clear out hundreds of acres of beetle killed wood. The company sells the wood in the form of two-by-fours and wood chips ... and the Forestry Division gets help clearing out swaths of dense forest... Van Vlack points out that half of this forest is already dead.

VAN VLACK: The mountain pine beetle has attacked the Lodgepole pine and the Ponderosa pine at a pretty much landscape scale.

MARTINEZ: The region has seen serious wildfires spreading in recent years that have threatened cities and taken lives. Foresters blame poor management over the last century.

(end buzzing sound)

Historically, extinguishing fires was the priority, which allowed forests to grow denser. Then, in reaction to overharvesting, environmental restrictions drastically limited timber sales. Brian Ferebee, with the US Forest Service's Rocky Mountain Region adds that these factors have enabled a feeding frenzy among native bark beetles.

BRIAN FEREBEE: The host beetles have just taken advantage of a combination of climate change, drought and the lack of vegetation treatment on the landscape, and has really spread.



Wildfire

Case File

MARTINEZ: To make matters worse, competition from Canada and a weak domestic construction market forced many regional sawmills out of business in the early 2000s.

This January, one of the biggest saw mills in the region came back to life. Clint Georg is one of the owners of Saratoga Forest Management. He says once you eliminate fire and harvesting...

CLINT GEORG: ... What you end up with is densely spaced forest, where the trees are competing for nutrients. And therefore they're susceptible to disease, they're susceptible to insects, they're susceptible to fires.

(saw whirring)

MARTINEZ: The rash of beetle kill and rapidly spreading wildfires were game changers for the timber industry. Last year the forest service sold off nearly four times as much timber as it had in 2000. They're selling marketable timber to sawmills, and hiring loggers to strategically cut down the less valuable but more dangerous stuff.

Saw mills benefit, because beetle killed wood is just as strong as regular wood. And Saratoga's Clint Georg says federal, state, and private forest managers are happy because thinning wooded areas can also improve forest health, much like fire did naturally.

GEORG: We can go out into the forest, and when we harvest, it opens up the forest floor. The seeds now that are dropped during the process, the pinecones open up, the seeds start to regenerate, and you have a regeneration of the forest.

MARTINEZ: Saratoga Forest Management is processing about 25 million feet of logs per year. Owners say if more timber becomes available, the mill could handle three times that much, removing even more fuel from the regional forests.

Wyoming Public Media. (2013, August 2). Reviving local saw mills could limit fire danger in the Rocky Mountain Region. Retrieved July 12, 2019, from <https://www.wyomingpublicmedia.org/post/reviving-local-saw-mills-could-limit-fire-danger-rocky-mountain-region#stream/0>.



Wildfire

Case File

Wildfire can affect the environment in more ways than you might expect

4 Jun 22, 2019

A fire needs three things to start and survive — oxygen, heat and fuel.

“Any organic materials, living or dead, in the ground or on the ground, or in the air like tree branches that will ignite and burn,” said Eric Chapman, the Bureau of Land Management fuel assistant fire management officer in Casper.

Once a fire is burning, there are a number of factors that affect the damage, or good, the fire will do.

Topography and soil

Topography, the formation of



Rust-colored needles mark the declining foliage on a tree on Casper Mountain. Dead or dying branches are more flammable and pose a potential hazard.



A cabin that survived the 2012 wildfire on Casper Mountain thanks to defensible space the owner cleared around the home is shown.

the land, can influence how a fire will travel. The topography and fuels that come with a mountain landscape will influence a wildfire more than an open location, which leaves a fire more exposed to external climate factors such as wind, Chapman said.

Once a fire ignites, it can have catastrophic effects to the soil. An extremely hot fire that burns the ground can create a surface called the hydrophobic layer, said Dan Mattke, an area resource soil scientist for the Natural Resource Conservation Service in Riverton.

The hydrophobic layer is made up of a waxy material created from burned organic material that keeps water from being absorbed into the soil. This layer seeps under the top layer of soil as a gas then solidifies, Mattke said.

The repelled water will run off into nearby streams and creeks, causing water levels to rise. Erosion displaces fertile topsoil, carrying sediment that may clog streams and lower the water quality.

Water turbidity also rises when water is repelled from the hydrophobic layer. Turbidity is the process of sediment being



Wildfire

Case File

in stream and creek water, creating a haze and lowering the water quality, said Ryan DeSantis, the forest health program manager for the Wyoming State Forestry Division.

If the hydrophobic layer isn't properly dealt with, it can affect melting snow. Mattke said the burned black top will "absorb more heat, melting the snow faster."

Tilling soil is the best way to diminish the hydrophobic layer, DeSantis explained. Breaking the soil apart brings the soil under the hydrophobic layer up and can help moisture be absorbed and help seeds to take root.

To reduce erosion, there are multiple options, such as water bars — channels created with soil and bedded logs to funnel water away from a burned area, said George Soehn, resource adviser for the BLM. Reseeding, the process of planting native seeds to keep the soil in place, is another option. Dead trees can also be chopped down and placed at a contour perpendicular with a hill slope to act as water breaks and soil traps, Soehn explained.

If organic matter is still present when a burn happens, instead of the hydrophobic layer being created, the soil itself is damaged.

"If you have a fire that can get hot enough, you're pretty much burning off organic matter and you're basically sterilizing the soil," DeSantis said.

Sterilized soil can reduce the chance of bigger vegetation like trees growing. The 2012 fire near Laramie Peak burned an estimated 98,115 acres before being contained. The area still looks pretty black with some regeneration like grasses, DeSantis said.

Precipitation

Precipitation can have a major impact on a fire's severity.

More precipitation can lead to more vegetation during the growth season. That creates more fuel for a fire, according to Brett McDonald, a National Weather Service science and operations officer.

Once a fire has started, rain for a long duration of time is preferable to a large amount of rain falling quickly. The longer rain falls, vegetation and the ability to burn is affected.



Natrona County High School JROTC cadets Shane Shoupe, left, and Dylan Hager construct a sediment trap in November 2012 to prevent soil erosion on the south side of Casper Mountain that was burned by the Sheep Herder Hill Fire.

Wildfire

Case File

A lot of precipitation over a short period of time causes run-off and doesn't have long-term effects on vegetation, said Flint Cheney, planning section chief of the Rocky Mountain Type 1 Incident Management Team.



Heavy smoke from the Cole Creek Fire rises along Metro Road on Oct. 11, 2015, near Evansville. The fire burned more than 10,000 acres and destroyed 14 homes.

Benefits

Fires aren't all bad, though. Fire is a healthy and natural change, said Soehn, the BLM resource adviser. The negative connotation is only applied when humans enter the situation.

Different species of trees, like the lodgepole pine are fire dependent. They require a stand-replacing fire — a fire big enough and intense enough to kill a large area of the trees. These fires help the tree reproduce, as it has two kinds of cones — ordinary cones that release seeds seasonally and serotinous cones that release seeds with extreme heat, like fire, or intense sunlight, DeSantis said.

Soehn explained the only reason for humans to step in is to eliminate nonnative invasive species of plants like cheatgrass or

knapweeds. Herbicide chemicals are used to kill invasive species and reduce the regrowth.

The reseeding of native plants helps jump-start the area. Forests in a healthy condition before a fire can recover by themselves in a timely manner, even as soon as the following spring, Soehn said.

While wildfires can do a large amount of harm to human life, they can certainly help the environment.

"It's probably best to let nature do what it's been doing for thousands of years," Soehn said.

Casper Star Tribune. (2019, June 22). Wildfire can affect the environment in more ways than you might expect. Retrieved July 31, 2019 from https://trib.com/news/state-and-regional/wildfire-can-affect-the-environment-in-more-ways-than-you/article_73bafdaf-51d5-52ec-8954-c0d3fc4e61f5.html



Wildfire Case File

After reading and/or reviewing the Wildfire case file: consider the following:

- What does the area have to offer?
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- Why might you need to conserve this area?
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- How was the environment impacted?
- Ultimately, how can you be a steward for Wyoming lands?

Here is your challenge: How can you prevent wildfires on Wyoming lands?



Avalanche

Case File

Winter Activities in the Grand Tetons

Ranger-guided Snowshoe Walks

Are you curious about winter ecology or snow science? Have you ever wanted to experience the park in the winter? A snowshoe walk with a park naturalist is the perfect way to introduce yourself to winter in the Tetons and to experience the fun of traveling on snowshoes. Naturalists provide guided snowshoe walks from the Taggart Lake Trailhead when snow conditions permit, usually the day after Christmas to mid-March



Safety in the Backcountry

Hikers and climbers are reminded that your safety is your responsibility. You must rely on your own good judgment, adequate preparation, and constant awareness. Backcountry users should be in good physical condition and stick to routes that are within your ability and comfort levels. Hypothermia and frostbite can set in quickly and are difficult to care for while in the backcountry. Take preventative measures to avoid the dangers of cold

weather; look for signs of hypothermia and frostbite in members of your group. Traveling alone can be especially dangerous; always give friends or family a detailed itinerary and stick to that plan. Permits are required for all overnight backcountry trips.



Avalanche

Case File

Cross-country Skiing & Snowshoeing

Cross-country skiing and snowshoeing are two of the best ways to experience the exhilaration of winter travel. Winter is an excellent time to see wildlife and/or signs of wildlife in the snow. From November 1 to May 1, the Teton Park Road from the Taggart Lake Trailhead to Signal Mountain Lodge is open for non-motorized use only. You can ski or snowshoe on this road, which is intermittently groomed to provide a

packed surface for snowshoeing and cross-country touring. Other places to enjoy cross-country skiing and snowshoeing include: Colter Bay, Antelope Flats Road, Taggart Lake and Flagg Ranch. If you plan to ski or snowshoe the Moose-Wilson Road, park at the Granite Canyon Trailhead or at the junction to the Death Canyon Road.



Snowmobiling

Please inquire at a visitor center for updated information about snowmobiling in the Greater Yellowstone area.

National Park Service. (2017). Grand Teton: National Park Wyoming - Winter Trip Planner. Retrieved August 16, 2017, from <https://www.nps.gov/grte/planyourvisit/winter.htm>

Avalanche

Case File

Avalanche Danger



SNOWY CONDITIONS PERSIST IN HIGH COUNTRY - JUNE 12, 2017

While the snow continues to melt noticeably below 9,500 feet, opening up larger sections of dry trail, conditions remain remarkably winter-like above that elevation. Ice axes and (possibly) crampons are required for approaching and descending most alpine climbs as well as for traversing mountain passes. To make matters worse, a recent storm deposited up to a foot of fresh snow above 9,500 feet. Backcountry travelers headed into the higher elevations should be prepared to deal with winter-like conditions. Please be aware of current

backcountry closures that remain in effect.

Grand Teton Association's Jenny Lake Rangers Fund. (2017, June 12). Grand Teton National Park: Climbing & Backcountry Information. Retrieved August 16, 2017, from <http://tetonclimbing.blogspot.com/2017/06/snowy-conditions-persist-in-high.html>



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Avalanche

Case File

Avalanche Danger



Wyoming Avalanche Season Deadliest Since 2009

By Caroline Ballard • Mar 9, 2016

2016 has been the worst year for avalanche deaths in Wyoming since 2009. So far this year there have been five avalanche deaths in Wyoming, more than any other state. Bob Comey is a forecaster with the Bridger Teton Avalanche Center. He says part of the problem is that there are more inexperienced people heading into the backcountry. "You know we have more people going out taking more risks, and some of them are maybe not as knowledgeable and as experienced or prepared as they could be," says Comey.

Ballard, Caroline. Wyoming Public Media Statewide Network. (2016, March 9). Wyoming Avalanche Season Deadliest Since 2009. Retrieved August 16, 2017, from <http://wyomingpublicmedia.org/post/wyoming-avalanche-season-deadliest-2009>



© 2017 Wyoming Agriculture in the Classroom Materials

Avalanche

Case File

Avalanche Danger



wikimedia commons

Avalanche Risk “Considerable” For Northwest Wyoming **By Caroline Ballard • Dec 11, 2015**

The avalanche risk warning for Northwest Wyoming is “Considerable,” right now, or a 3 on a 5 point scale.

Bob Comey is the director at the Bridger-Teton National Forest Avalanche Center. He says this risk level is associated with the most avalanche deaths, because more people are still willing to take the chance on venturing into the backcountry, as opposed to when the risk level is “High” or “Extreme.”

Comey cautions skiers, snowboarders, snowmobilers, and snowshoers to check avalanche conditions before heading out, and be more conservative when assessing risks.

Ballard, Caroline. Wyoming Public Media Statewide Network. (2015, December 11). Avalanche Risk “Considerable” For Northwest Wyoming. Retrieved August 16, 2017, from <http://wyomingpublicmedia.org/post/avalanche-risk-considerable-northwest-wyoming>



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Avalanche

Case File

Avalanche Danger

On April 1st, 2011 world famous photographer and skier Jimmy Chin was skiing in Grand Teton National Park, Wyoming with Jeremy Jones & Xavier du la Rue. Jeremy went first, hid in a safe zone, and waited for Jimmy. Jimmy dropped in, and the whole thing ripped out on his third turn. Here is a unique perspective of his experience we can all learn from via his journal entry from that day:

“Hope fades and fear rises. It is a dark time. I feel speed, velocity, power, forces unnatural for a body to experience. Then comes the weight. It pushes down. It compresses. It is more and more and more and more.....It is unbearable. I hear myself roar from a place I knew a long time ago. It is primal. It comes from my stomach and into my chest. I hold on to my body. Bracing, bracing, tightening for impact. The impact never comes, but the weight gives me no release and I feel my chest compressed and crushed. No chance to breathe. No chance to expand my lungs. It is dark and it is dark.

I think about fighting, but there is nothing to fight. I can't tell which way is up or down. I am completely overpowered and overwhelmed with the weight. I don't have a breath and I know there is no out. Sometime in this moment I become only my consciousness. I don't leave my body per se, but I am no longer a part of it. The roar of the avalanche diminishes and I am only a thought “I always wondered how I was going to die and now I know....I always wondered how I was going to die and now I know....I always wondered how I was going to die and now I know.” Then it became “If I'm thinking, then I must be alive, if I am alive, if I am alive, I should fight.” The conversation is strangely unattached or emotional. It feels like it could have gone either way. It seemed merely a second thought that I wasn't ready to leave yet...but it becomes a decision.” – Jimmy Chin



Jimmy Chin

Chin, Jimmy. Snowbrains. (2013, July 16). Surviving an Avalanche in the Tetons. Retrieved August 16, 2017, from <https://snowbrains.com/surviving-an-avalanche-with-jeremy-jones-by-jimmy-chin/>



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Avalanche

Case File

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- What does the area have to offer?
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- Why might you need to conserve this area?
- Who are the people impacted?
- How was the environment impacted?
- Ultimately, how can you be a steward for Wyoming lands?

Here is your challenge: How can you prevent avalanches on Wyoming lands?



Rock Slide

Case File

The Wind River Canyon Scenic Byway begins in the town of Shoshoni at milepost 100. Following U.S. 20 north through Wind River Canyon and the Wind River Indian Reservation, the route ends just north of the city of Thermopolis at milepost 134. Without stopping, the total drive time is about 40 minutes.

Along the Way

As you travel north from Shoshoni into Boysen State Park, you come face-to-face with the windswept west. You can see the bare yellow and red rock of the Owl Creek Mountains stretching off to forever, and the deep blue of Boysen Reservoir rippling in contrast. You might even think, with the water skiing and swimming and the walleye and trout fisheries, that you've come to the high point of the byway. But then you drive into Wind River Canyon. Spectacular rock walls rise 2,500 vertical feet on either side to the ridge tops. You can crane your neck and see some of the oldest rock formations in the world, dating back to the Precambrian period, (more that 2.9 billion years ago) visible right from the highway, their black and pink cliffs protruding to the sky. The geology of every layer is marked by interpretive signage, making the drive a geology lesson and a trip through time.

The Wind River itself flows north through the canyon. Wind River Canyon Whitewater & Flyfishing Outfitter, a Native American-owned business, is the only outfitter permitted to raft/fish in the Indian Reservation portion of the canyon. With fallen rocks and boulders jutting from the riverbed, the unique water hydraulics make for some spectacular white water indeed.

Before it leaves the canyon, the river changes names. At the "Wedding of the Waters," the Wind River becomes the Rocky Mountain Bighorn River, named for the mountain sheep indigenous to the area. Keep an eye out for these woolly cliff dwellers as you drive. 1995 saw 43 bighorns "transplanted" along the canyon rim. After making the trip from Dubois, WY in horse trailers, the sheep were then loaded onto flatcars by Burlington-Northern Railroad before traveling the final 7 miles by railroad. They were released in the canyon, bolstering today's population to an estimated 100 sheep in Wind River Canyon.

Thermopolis

The byway ends just north of Thermopolis, home of the world's largest mineral hot spring in Hot Springs State Park. Needless to say, this town is worth a stop. Here you can enjoy hot springs facilities, cooling ponds, a swinging foot bridge across the Big Horn River, hiking paths and a chance to see wild buffalo.

Travel Wyoming. Wind River Canyon Scenic Byway. (n.d.). Description. Retrieved July 31, 2019, from <https://www.travelwyoming.com/listing/shoshoni/wind-river-canyon-scenic-byway>



Rock Slide

Case File

Wind River Canyon



Prepelka, Benjamin. Scenic USA Artist Website. (2013-2015). Wind River Canyon Scenic Byway. Retrieved August 16, 2017, from <http://www.scenicusa.net/081213.html>

Wind River Canyon train derailment



One BNSF locomotive lies partly in the river, while another lies on its side halfway down the embankment of the Wind River after the derailment on May 12, 2010 just south of Thermopolis, WY.

Gordon, Elias & Seely LLP. (2010, May 14). BNSF Train Derails in Wyoming Wind River Canyon - Photos. Retrieved August 16, 2017, from <http://www.gordon-elias.com/blog/570/bnsf-train-derails-in-wyoming-wind-river-canyon-photos/>



Rock Slide

Case File

U.S. 20 through Wind River Canyon could reopen Wednesday following rock slides

Star-Tribune staff

May 26, 2015

Multiple rock and mud slides in Wind River Canyon demolished train tracks and closed U.S. 20 beginning Sunday, May 24, 2015.

U.S. 20 between Thermopolis and Shoshoni was expected to reopen as early as Wednesday morning following a series of rock and mud slides in Wind River Canyon.

Wyoming Department of Transportation officials cleared the road Tuesday but wanted to wait out anticipated showers that could dislodge more debris.

"We got everything cleaned up, but we're waiting to see if more rock is going to fall," Robin Clapp, a maintenance foreman at WYDOT's Riverton office, said Tuesday.

Meanwhile, the Fremont County Transportation Department closed several rural roads Tuesday after motorists seeking alternate routes around the canyon became stranded. Several individuals became stuck on muddy roads and required assistance from Hot Springs County Search and Rescue, according to a news release.

Dry Bridger Creek, Bridger Creek and Nowood roads are all impassable due to recent rain and snowfall.

Earlier Tuesday, specialist Cody Beers said officials were considering hiring contractors to help clear U.S. 20.

Beers estimated the slide, located 10 miles south of Thermopolis, was at least a quarter of a mile wide and 6 to 8 feet deep.

"I've been up there four times in the last two days, and they've done a really good job of cleaning things up," Beers said.

Engineers will continue to evaluate the condition of the roadway underneath the mud and debris.

"Long-term, there are several major projects that we're going to have to do in there," Beers said, "but the goal right now is to get the road open."

No injuries were reported in the slides, though officials shuttled three people to different sides of the canyon to retrieve required medical prescriptions.

Slides blocked travel in both directions Sunday evening. Crews and heavy equipment began working to clear the road Monday morning, Beers said.

Beers said mud and rock also took out about 300 feet of rail track across the Big Horn River. Railroad crews are still working to repair the track.

The Associated Press contributed to this report.

Casper Star Tribune

Casper Star Tribune. (2015, May 26). [Updated] U.S. 20 through Wind River Canyon could reopen Wednesday following rock slides. Retrieved August 16, 2017, from http://trib.com/news/state-and-regional/updated-u-s-through-wind-river-canyon-could-reopen-wednesday/article_49274497-8443-51a3-9d95-f27fa56c82bc.html#comments



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Rock Slide

Case File

Wind River Canyon route reopens after rock slide destroys guardrail

Star-Tribune staff
May 3, 2017

This is a rock slide near the north end of the Wind River Canyon on Wednesday.

A rock slide in the Wind River Canyon destroyed about 100 feet of guardrail late Tuesday.

The highway through the Wind River Canyon reopened early Wednesday

after crews cleared a rock slide that destroyed about 100 feet of guardrail, according to a news release from the Wyoming Department of Transportation.

“The rock slide covered both driving lanes of the highway at the north end of Wind River Canyon, took out about 100 feet of guardrail, and damaged the highway shoulder,” WYDOT area maintenance supervisor Clint Huckfeldt of Thermopolis said in the news release. “The highway was closed for about 90 minutes.”

Around the state, the department is maintaining and monitoring other sites, as well. WYDOT workers were taking concrete barrier from storage in Rock Springs to the Lander area in preparation for possible spring flooding.

A slide on Wyoming 296 is still moving around milepost 26.1, which is about 20 miles west of the highway’s intersection with Wyoming 120. State geologists are analyzing and mapping the slide, the release said.

A large slope failure slide is creeping onto U.S. 26/287, on Togwotee Pass, about 10 miles east of Moran Junction. Crews are cleaning and monitoring the slide. Speed limits have also been reduced near two other slides in the Togwotee Pass area close to the Shoshone National Forest boundary west of Dubois. Those slides have been patched, but they are still moving.



Casper Star Tribune. (2017, May 3). Wind River Canyon route reopens after rock slide destroys guardrail. Retrieved August 16, 2017, from http://trib.com/news/state-and-regional/wind-river-canyon-route-reopens-after-rock-slide-destroys-guardrail/article_df4365e9-0553-5eae-85de-505bf25c5de2.html



© 2017 Wyoming Agriculture in the Classroom Materials

Rock Slide

Case File

After reading and/or reviewing the Rock Slide case file: consider the following:

- What does the area have to offer?
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- Who are the people impacted?
- How was the environment impacted?
- Ultimately, how can you be a steward for Wyoming lands?

Here is your challenge: How can you prevent rock slides on Wyoming lands?



Stewardship Challenge

Name: _____

Use this assessment to show what you know! Think about the concepts you learned about in this unit. Be sure to be clear and concise in your answers.

1. On what kinds of land do these events occur? _____

2. What kind of recreational activities can you do on this land? _____

3. What other opportunities does this land offer? _____

4. Who would you consult to gather more information? _____

5. Why is it important to manage or conserve this piece of land? _____

6. How can you be a steward of Wyoming's public lands to benefit current and future generations? _____



Evaluating our Designs

What are the major challenges associated with wildfires?

Option	4-ESS3-2 (DCI): Which challenges does this option address?	4-ESS3-2 (SEP): How well does this solution meet the constraints?	4-ESS3-2 (CCC): Other than helping mediate challenges associated with wildfires, what other effects might this option have?



Evaluating our Designs

What are the major challenges associated with avalanches?

Option	4-ESS3-2 (DCI): Which challenges does this option address?	4-ESS3-2 (SEP): How well does this solution meet the constraints?	4-ESS3-2 (CCC): Other than helping mediate challenges associated with avalanches, what other effects might this option have?



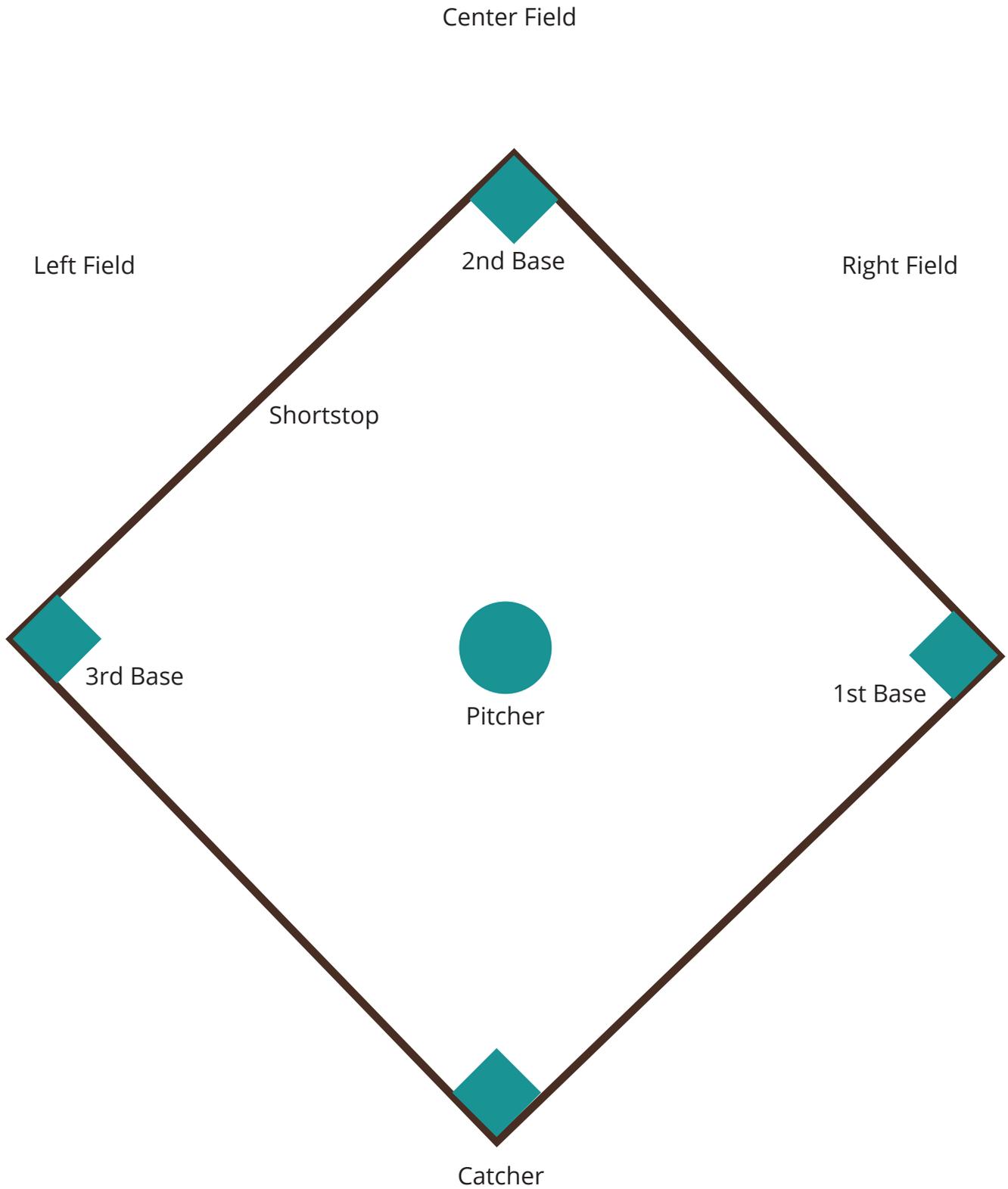
Evaluating our Designs

What are the major challenges associated with rock slides?

Option	4-ESS3-2 (DCI): Which challenges does this option address?	4-ESS3-2 (SEP): How well does this solution meet the constraints?	4-ESS3-2 (CCC): Other than helping mediate challenges associated with rock slides, what other effects might this option have?



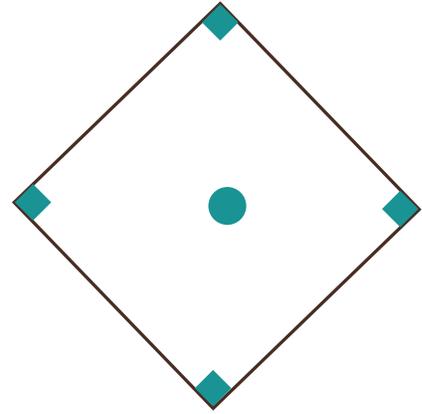
Baseball Diagram



Stewardship Baseball

Directions:

Explain, on the lines below, how each team member contributes to outdoor recreation and tourism in Wyoming.



Team Roster

Team Member #1: Federal Agencies (National Forest Service, BLM, Fish & Wildlife)

Contributes to Wyoming outdoor recreation and tourism by _____

Team Member #2: State Agencies (Wyoming Game & Fish, State Trust Land)

Contributes to Wyoming outdoor recreation and tourism by _____

Team Member #3: State and National Parks

Contributes to Wyoming outdoor recreation and tourism by _____

Team Member #4: Lodging and Travel Industry

Contributes to Wyoming outdoor recreation and tourism by _____



Stewardship Baseball

Team Roster (continued)

Team Member #5: Food Service Industry

Contributes to Wyoming outdoor recreation and tourism by _____

Team Member #6: Entertainment Industry (Ex: tour guides, souvenir shops)

Contributes to Wyoming outdoor recreation and tourism by _____

Team Member #7: Private Land Owner

Contributes to Wyoming outdoor recreation and tourism by _____

Team Member #8: Tourists

Contributes to Wyoming outdoor recreation and tourism by _____

Team Member #9: Citizen: _____

Contributes to Wyoming outdoor recreation and tourism by _____



Stewardship Baseball

Student Argument Sheet

Consider all members of your team, and answer the questions below.

1. How does the team work together? _____

2. Why is outdoor recreation and tourism important to the economy of Wyoming? _____

3. How can the team members work together to steward Wyoming's land and resources?



Stewardship Baseball

Student Argument Sheet

Now, go back and select one team member that you want to pretend to be. Imagine you are that team member. During a game, your coach decides to bench you. On the lines below, write why your coach **SHOULDN'T** bench you.

Position: _____

4. Why are you important to outdoor recreation and tourism in Wyoming? _____

5. How do you cooperate with other players on the team? _____

6. What are the benefits to the other players to have you on the team? _____

