

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.

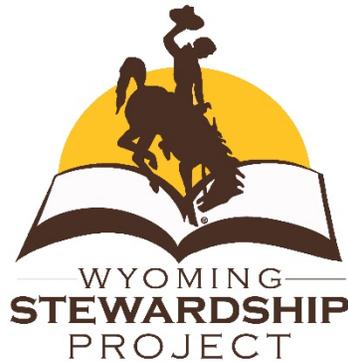
Found in the Educator Essentials document is everything needed to be prepared to teach this unit. We outline the Higher Order Thinking Skills and how to identify them throughout the units. We have compiled a material list of everything you need to complete all lessons: worksheets, PowerPoints, and video 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 Required 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:

- Assemble and laminate game board, so it can be posted on the wall.
- Staple all of the Scenarios and Student Recording sheets, so students have everything they need in one place.
- Lesson 3 will require more prep due to the cards and arrows that will need to be cut ahead of time. Be sure to have something to store the pieces.
- Familiarize yourself when and where points are awarded for the board game that is the focal point of this unit.

- If possible, talk to your local Weed and Pest Office or Conservation District. They might be able to come into the classroom and share their expertise on invasive species, or at the very least, provide you with additional background information.

The following materials will be needed for this unit:

- Sticky notes
- Document camera (optional)
- Envelopes/plastic bags to hold cut-out cards/arrows
- Different colored highlighters/colored pencils (one set per student)
- Chart paper
- 2 flyswatters

Master Stewards Board Game

This unit is structured around a giant game board in which students are racing to become master stewards. Students move along the game board by being awarded points for learning and applying new science content. They will have an opportunity to do this in each lesson of the unit; they will be presented with a scenario in which they will practice making stewardship decisions in order to earn points.

The purpose of the game is to engage students through a fun and somewhat competitive setting. It is not meant to be a public display of students' performance on the tasks. As such, teachers should use their discretion when awarding points to make sure that the system is helping to motivate all students to be active learners during the lessons.

OVERVIEW OF THE GAME:

1. Students can work in partners or as individuals.
2. Each student will create a game piece and place it on start of the class game board.
3. Throughout the unit, the students will be presented with 4 scenario tasks. The students can be awarded 0-3 points based on their answers.

Scenario 1 - Drought:

- **1 pt.** For accurately responding to: Does the option that you selected change your ecosystem positively?

- **1 pt.** For accurately responding to: Does the option that you selected change your ecosystem negatively?
- **1 pt.** How does it show good stewardship of the agricultural resources?

Scenario 2 - Weed Infestation:

- **1 pt.** For naming the difficulty of sugarbeets to meet their needs.
- **1 pt.** For describing how their solution helps the sugarbeets meet their needs.
- **1 pt.** How does it show good stewardship of the agricultural resources?

Scenario 3 - Multiple Planting Alfalfa and Grass

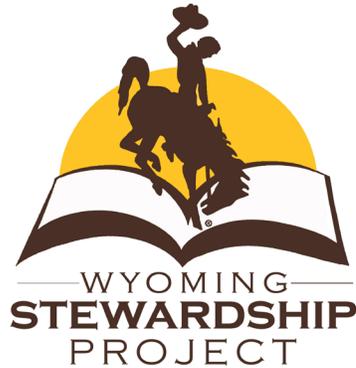
- **1 pt.** For explaining a positive or negative change to the ecosystem based on the option they chose.
- **1 pt.** For explaining how their choice helps multiple species survive in the ecosystem.
- **1 pt.** How does it show good stewardship of the agricultural resources?
- **1 BONUS pt.** For any student/groups who suggest the idea of using more than one of the techniques.

Scenario 4 - Alfalfa Weevil

- **1 pt.** For summarizing the potential changes the weevil will make on an ecosystem.
- **1 pt.** For summarizing the pros and cons of their choice.
- **1 pt.** For explaining how their choice shows good stewardship of agriculture resources.
- **1 BONUS pt.** For any student or group who suggested the idea of using more than one of the techniques and provided and analysis of each.

4. Students can be awarded up to 10 points for the final assessment. (This is intended to support all students in being able to achieve the status of master steward by the end of the unit).

The content focus of this unit is the development of students' ability to use science ideas to make stewardship decisions. They will be combining this emerging skill with economic and cultural decision-making lenses to practice stewardship of Wyoming's agricultural resources. The unit begins with students defining agricultural ecosystems that exist across the state. This work will be the foundation upon which all other work is anchored. As students proceed through the unit, developing their understanding of food webs, the relationship between species and resources, and the impacts of changes of a species within an ecosystem, they will continually revisit their defined ecosystem to evaluate how their new learning applies to this big idea. The unit culminates with the addition of the cultural and economic lenses for stewardship decision making. Students will end the unit by revisiting each of the decisions they've made throughout the lesson and reevaluating those decisions based on these new lenses. Students will ultimately apply their understanding of stewardship in a summative assessment that introduces a problem scenario. Students will formulate a response based on their learning from throughout the unit.



AGRICULTURE 101

Wyoming Agriculture Statistics at a glance:

- The value added to Wyoming's economy by the agricultural sector totaled \$1.72 billion in 2016.
- Of that total, animals and animal products accounted for \$1.084 billion, crops totaled \$338 million, and farm-related income totaled \$300 million.
- In 2016, 11,600 farms and ranches used 30.3 million acres to raise agricultural products in Wyoming.
- Farmer and rancher cash receipts totaled \$1.39 billion.
- Cattle and calves ranked as the largest livestock commodity raised in the state, followed by miscellaneous livestock (mostly horses and sheep), and hogs.
- Hay was the largest crop raised based on cash receipts, followed by sugar beets, and barley.

*Provided by the National Agriculture Statistics Service, Wyoming Annual Bulletin, 2017

Wyoming Agriculture Overview:

Wyoming farms and ranches provide food, fiber, and open space. Farmers and ranchers make daily stewardship decisions for water, soil, rangeland, and the agricultural commodities they raise/grow. Agriculturists support communities throughout Wyoming, and the culture of hard work and neighboring help is noteworthy. Wyoming agriculture is not an easy business but a necessary way of life that farmers and ranchers pursue to provide for the nation's people, open space, and wildlife.

The story of agriculture in Wyoming started in 1830, when the first five cattle were brought to the state. Even then, it took almost another 40 years of cattle moving through Wyoming before large herds were brought to stay. The arrival of the railroad in 1867 started off the cattle boom in Wyoming. Free grass, a country hungry for beef, and railroad access for shipping provided the chance for businessmen to make money raising cattle. Raising sheep was also big business, and the sheep industry grew along with the cattle ranches. In fact, by the early 1900s, there were more sheep in Wyoming than cattle!

About that same time, homesteading acts began allowing settlers to claim pieces of land across the West. As the settlers arrived, the large areas of free grazing land used by the cattle and sheep men were broken into smaller pieces. This led to conflict between the different groups over the best uses for the land and resources. This time in history is now known as “The Range Wars” and includes events and people such as the Johnson County War, Tom Horn, and “Cattle Kate.” The Taylor Grazing Act of 1934 changed the way grazing was managed on public lands and ended “The Range Wars.”

Many of the early settlers tried raising crops as well as livestock. Farming in Wyoming was a unique challenge for the settlers because of harsh weather conditions in our state. The rain water received each year is not enough to support most crops, and unless the settler was lucky enough to claim land near a stream or river, it was not possible to irrigate. Challenges in keeping crops watered led to building irrigation districts and water storage systems in several areas of the state. In areas without access to irrigation, dryland farming allowed farms to thrive.

By the 1920s, new farming equipment and technology encouraged the growth of larger farms and ranches and led to fewer small farms and ranches. Many are still family owned and operated today. As technology and culture have changed over the years, many people have moved into urban areas. In comparison, there are fewer farms and ranches remaining, but agriculture is still alive and well in Wyoming.

Today, dryland farming and irrigation have allowed Wyoming farmers and ranchers to raise crops that can thrive in our environment. Wyoming farmers raise hay, oats, barley, corn, beans, sugarbeets, and other crops. More than one million head of cattle, and over 350,000 sheep graze Wyoming’s grasslands, outnumbering the people here.

Wyoming is still one of the few states in the country with agriculture at its core, and our farmers and ranchers carefully steward the water, soil, and rangeland to make sure they are available for future generations.

Stewardship

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



