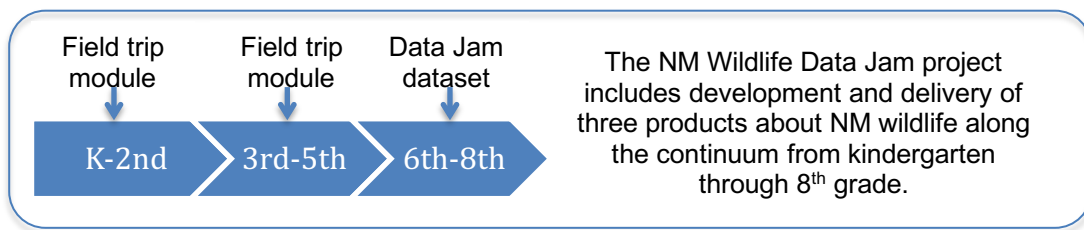


**Final Project Report**  
**NM Wildlife Data Jam: K-8 Students Collecting, Analyzing, and Communicating Data**  
Asombro Institute for Science Education

**Project Objective**

The New Mexico Wildlife Data Jam Project's goal was to increase K-8<sup>th</sup> grade students' knowledge of New Mexico wildlife and their ability to collect, analyze, and communicate scientific data about it. This one-year project incorporated activities about New Mexico wildlife to expand two of Asombro's successful programs: (1) hands-on, data-rich field trips for K-5<sup>th</sup> graders to Asombro's Chihuahuan Desert Nature Park and (2) the Desert Data Jam, which challenges middle school students to examine and analyze real datasets and then develop creative projects (e.g., songs, videos, physical models) to communicate trends in the data to nonscientist audiences.



**Project Accomplishments**

Despite school closures due to the COVID-19 pandemic for almost the entire project year (April 30, 2020 – April 30, 2021), we were still able to accomplish all major project components.

**1. Developed "At Home in the Desert: Habitat Needs of Desert Animals" field trip module for kindergarten and 1st-grade students**

This field trip module focuses on the burrowing owl (*Athene cunicularia*), which is found in the Chihuahuan Desert Ecoregion and listed as a Species of Greatest Conservation Need in the 2016 State Wildlife Action Plan for New Mexico because it is declining and vulnerable. The module focuses on three performance expectations from the Next Generation Science Standards: K-ESS3-1 - Use a model to represent the relationship between the needs of different plants and animals (including humans) and the places they live; K-PS3-1 - Make observations to determine the effect of sunlight on Earth's surface; and 1-PS4-3 - Plan and conduct investigations to determine the effect of placing objects made with different materials in the path of a beam of light.

Before, during, and after the field trip, students participate in hands-on activities that help them gain knowledge about the needs of plants and animals (food, water, shelter) using the burrowing owl as the focal species. This culminates in a guided walk where students determine if other New Mexico wildlife could or could not live in the Chihuahuan Desert Ecoregion. Activities include:

- **Pre-field trip activity** – Students search for the items they (humans) need to live in a habitat. This activity provides background information for students to apply to unknown animals for the field trip.

- **Station 1: Habitat Tower** - Students build a block tower to model the needs of four animals found in the Chihuahuan Desert, comparing the resources needed by each and discussing the similarities and differences. They then apply that knowledge to a small patch of desert to determine if a specific animal could be found there.
- **Station 2: Predator Telephone** - Students play a modified "telephone" game to showcase how the structure of a habitat can be important in determining the presence of a species. Students play the role of black-tailed prairie dogs in a clipped versus unclipped grassland habitat and race to communicate the presence and kind of predator nearby.
- **Station 3: No Place Like Home – Parts 1 and 2** - Students are introduced to the concept of species conservation by investigating possible materials to build artificial burrows for burrowing owls to raise their owlets. In Part 1 of this investigation, students observe what happens when objects made of different materials are placed in the path of a beam of light to determine what material(s) would make a dark burrow for the owlets. In Part 2, students measure the temperature of different objects exposed to sunlight and discuss what materials would keep the artificial burrow at the right temperature for the growing owlets. At the end of this station, students decide if there is a material that meets the burrowing owl's shelter needs and interact with an artificial burrowing system used by scientists.
- **Wrap-up activity: My Home in the Chihuahuan Desert** - After students have completed the field trip stations, they use what they have learned to evaluate areas along a guided walk, determining whether it is likely or unlikely to find a particular species in that habitat.
- **Post-field trip activity** – Students create a model habitat for an organism they learned about during the field trip.

We submitted the field trip module to the Share with Wildlife Coordinator and Conservation Education Coordinator on November 20, 2020. We have incorporated their suggestions, and the field trip module is ready to implement with students as soon as they are allowed to resume in-person field trips next school year.

## 2. **Developed "Conservation Research: Using Science to Protect Natural Resources" field trip module for 4<sup>th</sup> and 5<sup>th</sup>-grade students**

This field trip module focuses on the black-tailed prairie dog (*Cynomys ludovicianus*), which is found in the Chihuahuan Desert Ecoregion and listed as a Species of Greatest Conservation Need in the 2016 State Wildlife Action Plan for New Mexico because it is declining, vulnerable, and a keystone species. The module focuses on performance expectation 5-ESS3-1 from the Next Generation Science Standards: Obtain and combine information about ways individual communities use science ideas to protect the Earth's resources and environment.

Before, during, and after the field trip, students participate in hands-on activity stations to learn about the black-tailed prairie dog and the Chihuahuan Desert. This culminates in conservation action planning for the species. Activities include:

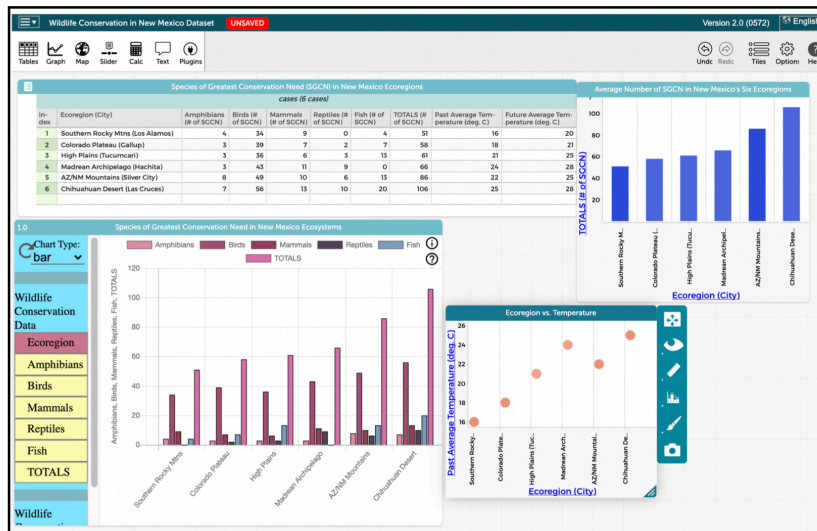
- **Pre-field trip activities** – Students create a Chihuahuan desert food web model and write a desert acrostic poem. These activities provide background information to prepare students for the field trip and provide artifacts to demonstrate increased student understanding from before to after the field trip.
- **Station 1: Ecosystem Tower** - Students use a giant stacking tower game to model interactions between biotic and abiotic ecosystem components and test the system's stability during environmental changes.
- **Station 2: Criollo Cattle** – Prairie dogs are often found on rangelands in the Chihuahuan Desert Ecoregion. Students view a live Raramuri criollo cow to learn how this heritage cattle type is being studied to determine if it can reduce the impacts of ranching on the desert environment.
- **Station 3: Habitat Suitability Survey** - In small sample plots that model the larger habitat, student groups collect data on plant cover, presence of tall plants, soil texture, temperature, humidity, and wind speed to determine habitat suitability for the black-tailed prairie dog.
- **Station 4: Increasing Habitat Quality: Action Planning for Black-tailed Prairie Dogs** – Students compile and analyze the data they collected to determine if the area meets the needs for black-tailed prairie dogs. They brainstorm possible action ideas for a habitat restoration project.
- **Post-field trip activities** – Students use data to support an argument for reintroducing the black-tailed prairie dog into a desert grassland. They also make a new desert acrostic poem.

We submitted the field trip module to the Share with Wildlife Coordinator and Conservation Education Coordinator on July 29, 2020. We have incorporated their suggestions, and the field trip module is ready to implement with students as soon as they are allowed to resume in-person field trips next school year.

### 3. **Developed "Wildlife Conservation" dataset for use in Desert Data Jam**

In summer 2020, we began creating a small dataset to allow students to learn about Species of Greatest Conservation Need while participating in Asombro's Desert Data Jam. We created this dataset using data from the 2016 State Wildlife Action Plan for New Mexico. The dataset includes the number of Species of Greatest Conservation Need in five taxa (amphibians, birds, mammals, reptiles, and fish) in six ecoregions (Colorado Plateaus, Southern Rocky Mountains, High Plains and Tablelands, AZ/NM Mountains, Madrean Archipelago, and Chihuahuan Desert). We also included average temperature data from a town in each ecoregion for students who wanted to explore that variable.

When it became clear that schools would remain closed for much of the 2020/2021 school year, we converted the entire Desert Data Jam to make it accessible for students learning remotely. This included converting all datasets, including the new one created with this grant, into an online version for students to explore using the Common Online Data Analysis Platform. Students access the wildlife conservation dataset here: <https://asombro.org/wildlife/> The screenshot below shows the data exploration page after students have started moving variables onto axes of the graphs to investigate relationships.



Asombro staff gave live Zoom lessons for 36 classes (approximately 900 6<sup>th</sup> – 8<sup>th</sup>-grade students) between January and March 2021. Each student got to choose one of five datasets for use in their Desert Data Jam projects; the new wildlife conservation dataset has been the most popular so far. Students are now using these datasets to identify a data trend and make a creative representation (e.g., song, poem, model, game, video) to explain the data trend to nonscientists. They will enter projects into the Asombro Institute's 9<sup>th</sup> Desert Data Jam competition in early May 2021.

4. **Created a plan and began developing a new "virtual field trip" for kindergarten and 1st-grade students**

School closures due to the COVID-19 pandemic prohibited students from attending in-person field trips during the grant. We received permission from the Share with Wildlife Coordinator to reallocate funds initially budgeted for students to come on in-person field trips in spring 2021 to develop a new virtual field trip program for kindergarten and 1st-grade students. This new virtual field trip includes many of the same components as the in-person module described earlier, including: the theme, NGSS performance expectations, and a modified hands-on artificial burrow material investigation. Students will receive individual kits with science supplies so they can all participate with the Asombro educators leading the "field trip" via video conference.

We will use the new virtual field trip as early as summer 2021 with incoming kindergarten and 1st-grade students participating in the Las Cruces Public Schools' K-5+ extended learning program. In addition, this program will also provide an option for students outside of our region to learn more about the Chihuahuan Desert and its wildlife. Asombro will also use it in the future when inclement weather makes an in-person field trip impossible.

**For More Information, Please Contact:**

Dr. Stephanie Bestelmeyer, Executive Director (575-524-3334 or [stephanie@asombro.org](mailto:stephanie@asombro.org))



**At Home in the Desert: Habitat Needs of Desert Animals  
Kindergarten**

**Overview**

Students will participate in four field trip stations to understand the different resources needed by animals living in the Chihuahuan Desert and how the presence or absence of those resources can determine the habitats where the animals are found. Burrowing owls and black-tailed prairie dogs will be used as the primary focal species to tell the story of how the desert meets the needs of many animals.

**Phenomenon**

What are the needs of desert animals, and do these needs determine where we find them?

**Next Generation Science Standards**

K-PS3-1. Make observations to determine the effect of sunlight on Earth’s surface.

K-ESS3-1. Use a model to represent the relationship between the needs of different plants and animals (including humans) and the places they live.

Asombro lessons are aligned with the three-dimensional learning model of the Next Generation Science Standards.

<b>Science &amp; Engineering Practices</b>	<b>Disciplinary Core Ideas</b>	<b>Crosscutting Concepts</b>
Planning and Carrying Out Investigations	ESS3.A Natural Resources	Systems and System Models
Developing and Using Models	PS3.B Conservation of Energy and Energy Transfer	Cause and Effect
	PS4.B Electromagnetic Radiation	

**Common Core State Standards**

**Math**

K.MD.A.1 Describe measurable attributes of objects, such as length or weight. Describe several measurable attributes of a single object.

K.MD.A.2 Directly compare two objects with a measurable attribute in common, to see which object has "more of"/"less of" the attribute, and describe the difference.

**English Language Arts**

SL.K.1 Participate in collaborative conversations with diverse partners about *kindergarten topics and texts* with peers and adults in small and larger groups.

SL.K.2 Confirm understanding of a text read aloud or information presented orally or through other media by asking and answering questions about key details and requesting clarification if something is not understood.

SL.K.5 Add drawings or other visual displays to descriptions as desired to provide additional detail.

L.K.4 Determine or clarify the meaning of unknown and multiple-meaning words and phrases based on kindergarten reading and content.

L.K.5.A Sort common objects into categories (e.g., shapes, foods) to gain a sense of the concepts the categories represent.

Funding for the development of this field trip module was provided, in part, by a grant to the Asombro Institute for Science Education from the New Mexico Department of Game and Fish's Share with Wildlife Program (<http://www.wildlife.state.nm.us/conservation/share-with-wildlife/>).

Date: \_\_\_\_\_

Asombro staff: \_\_\_\_\_



**At Home in the Desert: Habitat Needs of Desert Animals**  
**1<sup>st</sup> Grade**

**Overview**

Students will participate in four field trip stations to understand the different resources needed by animals living in the Chihuahuan Desert and how the presence or absence of those resources can determine the habitats where the animals are found. Burrowing owls and black-tailed prairie dogs will be used as the primary focal species to tell the story of how the desert meets the needs of many animals.

**Phenomenon**

What are the needs of desert animals, and do these needs determine where we find them?

**Next Generation Science Standards**

1-PS4-3. Plan and conduct an investigation to determine the effect of placing objects made with different materials in the path of a beam of light. (i.e. animal homes, plastic, cardboard, and a mirror)

Asombro lessons are aligned with the three-dimensional learning model of the Next Generation Science Standards.

<b>Science &amp; Engineering Practices</b>	<b>Disciplinary Core Ideas</b>	<b>Crosscutting Concepts</b>
Planning and Carrying Out Investigations	ESS3.A Natural Resources	Systems and System Models
Developing and Using Models	PS3.B Conservation of Energy and Energy Transfer	Cause and Effect
	PS4.B Electromagnetic Radiation	

**Common Core State Standards**

**Math**

1.MD.C.4 Organize, represent, and interpret data with up to three categories; ask and answer questions about the total number of data points, how many in each category, and how many more or less are in one category than in another.

**English Language Arts**

SL.1.1 Participate in collaborative conversations with diverse partners about *grade 1 topics and texts* with peers and adults in small and larger groups.

SL.1.2 Ask and answer questions about key details in a text read aloud or information presented orally or through other media.

SL.1.5 Add drawings or other visual displays to descriptions when appropriate to clarify ideas, thoughts, and feelings.

L.1.4 Determine or clarify the meaning of unknown and multiple-meaning words and phrases based on *grade 1 reading and content*, choosing flexibly from an array of strategies.

L.1.5.A Sort words into categories (e.g., colors, clothing) to gain a sense of the concepts the categories represent.

Funding for the development of this field trip module was provided, in part, by a grant to the Asombro Institute for Science Education from the New Mexico Department of Game and Fish's Share with Wildlife Program  
(<http://www.wildlife.state.nm.us/conservation/share-with-wildlife/>).

Date: \_\_\_\_\_

Asombro staff: \_\_\_\_\_





## Conservation Research: Using Science to Protect Natural Resources 4<sup>th</sup> Grade

### Overview

Students will engage in four field trip stations as wildlife-biologists-in-training to understand how people can use scientific information to protect wildlife and natural resources in the Chihuahuan Desert. They will use three field methods to examine the suitability of desert habitat for black-tailed prairie dogs, a Species of Greatest Conservation Need. Students will then use data collected during this investigation to create a black-tailed prairie dog reintroduction plan. In another station, students will use a large, Jenga-style game to model interactions between biotic and abiotic factors and effects of human and natural changes on the stability of the ecosystem. Finally, they will learn how range scientists are studying the use of a desert-adapted heritage cattle type, Raramuri Criollo, to reduce the impacts of cattle ranching on the desert environment.

### Phenomenon

How can we use science understanding to protect wildlife and the environment?

### Next Generation Science Standards

Asombro lessons are aligned with the three-dimensional learning model of the Next Generation Science Standards.

Science & Engineering Practices	Disciplinary Core Ideas	Crosscutting Concepts
Asking Questions and Defining Problems	<b>ESS3.C</b> Human impacts on Earth systems  <b>LS2.A</b> Interdependent relationships in ecosystems	Cause and Effect
Developing and Using Models		Scale, Proportion, and Quantity
Planning and Carrying Out Investigations		Systems and System Models
Analyzing and Interpreting Data		Stability and Change
Using Mathematical and Computational Thinking		
Constructing Explanations and Designing Solutions		
Obtaining, Evaluating, and Communicating Information		

### Common Core State Standards

CCSS.ELA-LITERACY.W.4.2. Write informative/explanatory texts to examine a topic and convey ideas and information clearly.

CCSS.ELA-LITERACY.SL.4.1. Engage effectively in a range of collaborative discussions (one-on-one, in groups, and teacher-led) with diverse partners on *grade 4 topics and texts*, building on others' ideas and expressing their own clearly.

CCSS.ELA-LITERACY.L.4.4. Determine or clarify the meaning of unknown and multiple-meaning words and phrases based on grade 4 reading and content, choosing flexibly from a range of strategies.

CCSS.MATH.CONTENT.4.NBT.A.3. Use place value understanding to round multi-digit whole numbers to any place.

Funding for the development of this field trip module was provided, in part, by a grant to the Asombro Institute for Science Education from the New Mexico Department of Game and Fish's Share with Wildlife Program  
(<http://www.wildlife.state.nm.us/conservation/share-with-wildlife/>).

Date: \_\_\_\_\_

Asombro staff: \_\_\_\_\_



## Conservation Research: Using Science to Protect Natural Resources 5<sup>th</sup> Grade

### Overview

Students will engage in four field trip stations as wildlife-biologists-in-training to understand how people can use scientific information to protect wildlife and natural resources in the Chihuahuan Desert. They will use three field methods to examine the suitability of desert habitat for black-tailed prairie dogs, a Species of Greatest Conservation Need. Students will then use data collected during this investigation to create a black-tailed prairie dog reintroduction plan. In another station, students will use a large, Jenga-style game to model interactions between biotic and abiotic factors and effects of human and natural changes on the stability of the ecosystem. Finally, they will learn how range scientists are studying the use of a desert-adapted heritage cattle type, Raramuri Criollo, to reduce the impacts of cattle ranching on the desert environment.

### Phenomenon

How can we use science understanding to protect wildlife and the environment?

### Next Generation Science Standards

5-ESS3-1: Obtain and combine information about ways individual communities use science ideas to protect the Earth’s resources and environment.

Asombro lessons are aligned with the three-dimensional learning model of the Next Generation Science Standards.

Science & Engineering Practices	Disciplinary Core Ideas	Crosscutting Concepts
Asking Questions and Defining Problems	<b>ESS3.C</b> Human impacts on Earth systems  <b>LS2.A</b> Interdependent relationships in ecosystems	Cause and Effect
Developing and Using Models		Scale, Proportion, and Quantity
Planning and Carrying Out Investigations		Systems and System Models
Analyzing and Interpreting Data		Stability and Change
Using Mathematical and Computational Thinking		
Constructing Explanations and Designing Solutions		
Obtaining, Evaluating, and Communicating Information		

### Common Core State Standards

CCSS.ELA-LITERACY.W.5.2. Write informative/explanatory texts to examine a topic and convey ideas and information clearly.

CCSS.ELA-LITERACY.SL.5.1. Engage effectively in a range of collaborative discussions (one-on-one, in groups, and teacher-led) with diverse partners on *grade 5 topics and texts*, building on others' ideas and expressing their own clearly.

CCSS.ELA-LITERACY.L.5.4. Determine or clarify the meaning of unknown and multiple-meaning words and phrases based on grade 5 reading and content, choosing flexibly from a range of strategies.

CCSS.MATH.CONTENT.5.NBT.A.4. Use place value understanding to round decimals to any place.

Funding for the development of this field trip module was provided, in part, by a grant to the Asombro Institute for Science Education from the New Mexico Department of Game and Fish's Share with Wildlife Program  
(<http://www.wildlife.state.nm.us/conservation/share-with-wildlife/>).

Date: \_\_\_\_\_

Asombro staff: \_\_\_\_\_