OVERVIEW & PURPOSE

The purpose of these lessons are designed to integrate NGSS Science Standards into flexible assignments to use for various outdoor field trips. They are also designed to be used in conjunction with the others, or on their own, at varying levels of ability.

- Notice, there are three different options for data collection in this unit - choose whichever is right for your classroom ability, time frame, or location - If you are unfamiliar with the flora and fauna in the area, a downloadable app “Seek - iNaturalist” is a great resource to help with identification of the organisms.

3-LS3-2 Heredity: Inheritance and Variation of Traits
Use evidence to support the explanation that traits can be influenced by the environment.

3-LS4-2 Biological Evolution: Unity and Diversity
Use evidence to construct an explanation for how the variations in characteristics among individuals of the same species may provide advantages in surviving, finding mates, and reproducing.

3-LS4-3 Biological Evolution: Unity and Diversity
Construct an argument with evidence that in a particular habitat some organisms can survive well, some survive less well, and some cannot survive.

4-LS1-1 From Molecules to Organisms: Structures and Processes
Construct an argument that plants and animals have internal and external structures that function to support survival, growth, behavior, and reproduction.

5-LS2-1 Ecosystems: Interactions, Energy, and Dynamics
Develop a model to describe the movement of matter among plants, animals, decomposers, and the environment.

5-ESS3-1 Earth and Human Activity
Obtain and combine information about ways individual communities use science ideas to protect the Earth’s resources and environment.
**I SPY SOMETHING ALIVE!**

Look all around! You are surrounded by life. Your job as a detective is to find as many different things as possible on your trip. Draw 3 of each below (remember plants are alive, too)

<table>
<thead>
<tr>
<th><strong>What it Looks Like</strong></th>
<th><strong>Category</strong> (Circle One)</th>
<th><strong>Super Powers</strong> (What helps it survive) -draw or list</th>
<th><strong>Why</strong> (Circle how it helps them survive)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Insect</td>
<td>Bird</td>
<td>Keeps it Safe</td>
<td></td>
</tr>
<tr>
<td>Insect</td>
<td>Bird</td>
<td>Helps it Travel</td>
<td></td>
</tr>
<tr>
<td>Insect</td>
<td>Bird</td>
<td>Catch/find food</td>
<td></td>
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<tr>
<td>Insect</td>
<td>Bird</td>
<td>To live in area</td>
<td></td>
</tr>
<tr>
<td>Insect</td>
<td>Bird</td>
<td>To find a mate</td>
<td></td>
</tr>
<tr>
<td>Insect</td>
<td>Plant</td>
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<tr>
<td>Insect</td>
<td>Plant</td>
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<tr>
<td>Insect</td>
<td>Plant</td>
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<tr>
<td>Insect</td>
<td>Reptile</td>
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<td>Insect</td>
<td>Reptile</td>
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<tr>
<td>Insect</td>
<td>Reptile</td>
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<tr>
<td>Insect</td>
<td>Mammal</td>
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<td>Insect</td>
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<td>Insect</td>
<td>Mammal</td>
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<td>Insect</td>
<td>I'm not Sure</td>
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<td>Insect</td>
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<td>Insect</td>
<td>I'm not Sure</td>
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</tbody>
</table>


draw or list

Keeps it Safe
Helps it Travel
Catch/find food
To live in area
To find a mate
_______________________

Keeps it Safe
Helps it Travel
Catch/find food
To live in area
To find a mate
_______________________

Keeps it Safe
Helps it Travel
Catch/find food
To live in area
To find a mate
_______________________
Design your Own Superhero!

Choose **one or more** features in each category that would help your imaginary animal survive best in this, same environment, or make up your own.

<table>
<thead>
<tr>
<th>Body</th>
<th>Weapons</th>
<th>Protection</th>
<th>Reproduction</th>
<th>Escape</th>
<th>Other</th>
</tr>
</thead>
<tbody>
<tr>
<td>Skin</td>
<td>Stingers</td>
<td>Spikes</td>
<td>Color</td>
<td>Wings</td>
<td>Tail</td>
</tr>
<tr>
<td>Fur</td>
<td>Sharp Teeth</td>
<td>Thorn</td>
<td>Flare</td>
<td>Fins</td>
<td>Beak</td>
</tr>
<tr>
<td>Scales</td>
<td>Claws</td>
<td>Color</td>
<td>Compete</td>
<td>Feet</td>
<td>Ears</td>
</tr>
<tr>
<td>Feathers</td>
<td>Poison</td>
<td>Big Ears</td>
<td>Offspring</td>
<td>Long Legs</td>
<td>Odor</td>
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<tr>
<td>Other</td>
<td>Horns</td>
<td>Other</td>
<td>Other</td>
<td>Other</td>
<td>Others</td>
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<tr>
<td>Skin</td>
<td>Stingers</td>
<td>Spikes</td>
<td>Color</td>
<td>Wings</td>
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<td>Long Legs</td>
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<tr>
<td>Other</td>
<td>Horns</td>
<td>Other</td>
<td>Other</td>
<td>Other</td>
<td>Others</td>
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</tbody>
</table>

Draw and color your animal below - think about how the size, color and shape of your animal helps it:
Describe your “Superhero” Species and construct an argument for why it would survive best in this ecosystem (Explain why you chose the characteristics you did)
**DATA COLLECTION: SIGNS OF WILDLIFE**

You are a wildlife biologist, on the lookout for evidence of wildlife. As you travel on your adventure through the ecosystem, your job is to look for and record the following things, as evidence of wildlife. You might not see much with a noisy class to scare the animals away, but you can tell if they have been there:

<table>
<thead>
<tr>
<th>Sign of Wildlife</th>
<th>Picture</th>
<th>Type of Animal?</th>
<th>Total Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tracks</td>
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<tr>
<td>Bones</td>
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<td>Scat (poop)</td>
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<tr>
<td>Feathers</td>
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<tr>
<td>Other (Markings, home, hole, nest)</td>
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</table>
DATA COLLECTION- Single Species

As field scientists, you are responsible for collecting data of the number of plants and animals in an ecosystem - this is often used to track a species based on populations and behavioral patterns. Your teacher will assign you, or your group, a specific species to keep an eye out for - fill in the box below before starting and place a tally mark in the box every time you spot your organism:

<table>
<thead>
<tr>
<th>Name of Field Scientist(s):</th>
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</thead>
<tbody>
<tr>
<td>Date of Observation:</td>
</tr>
<tr>
<td>Time(s)</td>
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<tr>
<td>Distance Traveled:</td>
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<tr>
<td>Species:</td>
</tr>
<tr>
<td>Type (Taxonomy):</td>
</tr>
<tr>
<td>Picture (Identification)</td>
</tr>
<tr>
<td>Number (Tally Here)</td>
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</tbody>
</table>

Using the data collected from other groups and class members to fill in the chart below for a complex picture of the wildlife and plants that can be found within this ecosystem:

<table>
<thead>
<tr>
<th>Class Data Table</th>
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<tbody>
<tr>
<td>Group #</td>
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As field scientists, you are responsible for collecting data of the number of plants and animals in an ecosystem - this is often used to track a species based on populations and behavioral patterns. Fill in the boxes below as you encounter new organisms, draw a picture of it, identify it, and place a tally mark in the column every time you spot it. Your teacher, ranger or “Seek” App on your phone can help you identify these:

<table>
<thead>
<tr>
<th>Name of Field Scientist(s):</th>
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<tbody>
<tr>
<td>Date of Observation:</td>
</tr>
<tr>
<td>Time of Day:</td>
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<tr>
<td>Distance Traveled:</td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Species</th>
<th>Picture</th>
<th>Tally</th>
<th>Total</th>
<th>Class Total</th>
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14
For this activity, you will create a bar graph based on the number of organisms you and/or the class has spotted in the ecosystem - ask your teacher for clarification on which of these you should graph:

<table>
<thead>
<tr>
<th>Title:</th>
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</table>
ENERGY IN ECOSYSTEMS

For this activity, you will use all of the information in the previous activities to create a food chain, or a food web from the organisms in your data collection or knowledge of the ecosystem you visited - your teacher may even have pictures for you to cut out, or let you draw them on your own below:

If you want to know more about food chains food webs, watch this video: https://www.youtube.com/watch?v=MuKs9o1s8h8:
For this assignment, you will be responsible for interviewing the Ranger or the expert on your trip - Ask Questions and discover how to help. Pay attention to what your friends ask so you can write down the answers, too!

1. What are the most common ways visitors to this area hurt this ecosystem?

2. How can we help prevent that from happening?

3. What is the biggest environmental threat to this ecosystem right now (deforestation, habitat loss, resource depletion, pollution, climate change, etc)?

4. What can we do as individual students to help prevent this from happening?

5. Make up your Own:
   - Question:
   - Answer:

- **Calculate:** If every student left just one empty water bottle or chip bag, calculate how many pieces of litter there would be in total?
  
  \[ \text{___________} \times \text{___________} = \text{___________} \times \text{____801____} = \text{___________} \]

  (# in this class) (# of classes) (# schools in NM) (Total Elementary)
Your calculation is a rough estimate based on the number of public schools in New Mexico, how might this calculation be flawed?

Use such calculations from the previous page to draw what you think this ecosystem would look like if every middle school student from New Mexico left one piece of trash here:

- **Extension**: Design a sign or Social Media Campaign add that will help educate others about protecting this ecosystem.