



LESSON PLAN

Subject: Grade 8 Science

Lesson: A Balanced Web

Standards Addressed:

- Understand how organisms interact with and respond to biotic and abiotic components of their environment. (8.L.3)

Objectives:

- Explain how factors such as food, water, shelter, and space affect populations in an ecosystem.
- Summarize the relationships among producers, consumers, and decomposers, including positive and negative consequences of such interactions.
- Explain how the flow of energy within food webs is interconnected with the cycling of matter.

Materials Needed:

- A device for watching the “The Balance of Survival” video
- “A Balanced Web” activity sheet
- A device for student research, notecards, drawing supplies, and large paper or posters

Outline:

- Before the lesson, students should know the difference between biotic and abiotic environmental factors, the types of relationships between populations within an ecological community, and the difference between density-dependent factors and density-independent factors.
- Show “The Balance of Survival” video and discuss as a class familiar concepts discussed in the video.
- Students may complete “A Balanced Web” activity individually or in pairs.

Take It Further:

Pair students together and assign each group to find and research 3 producers in their local ecosystem, 6 consumers, and 2 decomposers. For each organism, students will create a notecard summarizing, the organism’s habitat, source of food/energy, and primary threats/predators.

Cross-Curriculum Connection:

Students will use the researched organisms to draw and label a food web on a large paper or poster. They can draw or collage images into their design. On the lines connecting each organism, they must define the relationship according to vocabulary terms they have learned over the unit.





A Balanced Web

Grade 8 Science

Name: _____



Date: _____

Activity 1:

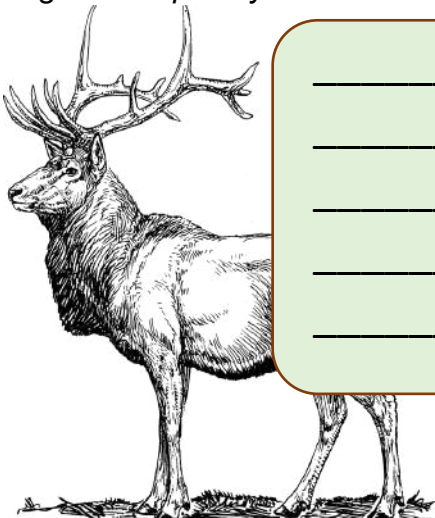
Categorize the highlighted factors below as biotic or abiotic factors of the local ecosystem.

Bethabara has a <u>stream</u> that runs through the area.	
The soil along the stream contains large deposits of <u>clay</u> .	
Grain crops like <u>wheat</u> do not grow well in clay soil.	
This environment received almost <u>no rain</u> this Summer.	
Vegetable crops like <u>pumpkins</u> require a lot of water.	
The native grass, <u>switchgrass</u> grows well in drought seasons.	
Wild game like <u>Deer</u> often make bedding in switchgrass.	



You can see how all of these biotic and abiotic factors work together to form a very specific community within this ecosystem.

Based on the factors listed above, what is a judgement you could make about sources of food for the human population within this ecosystem? Think about sources like grain, vegetables, and wild game. *Explain your reasoning.*







A Balanced Web



Activity 2:

Read the descriptions below of how some of the local populations interacted and categorize them according to the relationships in the word bank.

Word Bank:

Coexistence and Cooperation	Competition	Parasitism	Mutualism
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<p>Native peoples would often plant beans and corn together because the beans added nutrients to the soil. And corn stalks gave beans a structure to climb and reach more light.</p> <p><i>The relationship of beans and corn is:</i></p>	
<p>Wolves were known to kill deer and cattle in the area, making it harder for humans to have access to meat.</p> <p><i>The relationship of wolves and humans is:</i></p>	
<p>The Carolina parakeet relied heavily on seeds and buds from weeds in the forest as their food source. Whereas passenger pigeons also relied on the forest for food but preferred larger seeds and nuts from trees.</p> <p><i>The relationship of pigeons and parakeets is:</i></p>	
<p>Emerald ash borers are beetles that lay their eggs in the bark of an ash tree, gaining shelter from the tree. The holes in the tree can introduce disease and bacteria, often killing the tree.</p> <p><i>The relationship of beetles and trees is:</i></p>	





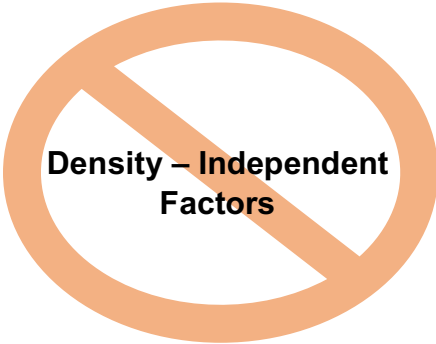
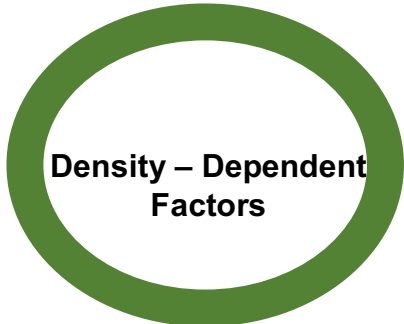
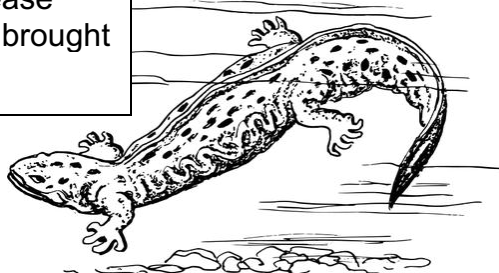
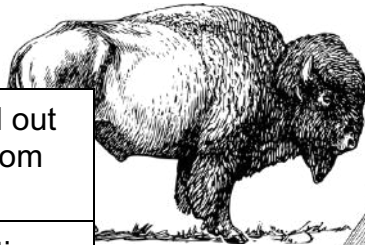
A Balanced Web

Activity 3:

The ecosystem that the Moravians moved into in North Carolina was home to many wildlife populations like elk, bison, passenger pigeons, wolves, and the Carolina parakeet. All of these populations are now either extinct or endangered in North Carolina because of important changing factors of their ecosystem.

Read the descriptions below and draw a line connecting the organism to the proper factor:

- | |
|---|
| <p>The local bison population died out primarily due to overhunting from humans.</p> |
| <p>The passenger pigeon population grew too big and led to crowding and over-competition for food.</p> |
| <p>A wildflower called “Barbara’s Buttons” only grew in deep, flooding riverbanks. Over time, the local streams filled with sediment while humans took actions to reduce flooding. This led to the extinction of this population within North Carolina.</p> |
| <p>The Carolina parakeets faced destruction of their habitat as humans and pigeons destroyed forests, until there wasn’t enough habitat space to support the crowded population.</p> |
| <p>Many local salamander species are endangered due to a disease introduced by Chinese newts brought in as pets.</p> |





A Balanced Web

ANSWER KEY

Activity 1:

Categorize the highlighted factors below as biotic or abiotic factors of the local ecosystem.

Bethabara has a <u>stream</u> that runs through the area.	Abiotic
The soil along the stream contains large deposits of <u>clay</u> .	Abiotic
Grain crops like <u>wheat</u> do not grow well in clay soil.	Biotic
This environment received almost <u>no rain</u> this Summer.	Abiotic
Vegetable crops like <u>pumpkins</u> require a lot of water.	Biotic
The native grass, <u>switchgrass</u> grows well in drought seasons.	Biotic
Wild game like <u>Deer</u> often make bedding in switchgrass.	Biotic

You can see how all of these biotic and abiotic factors work together to form a very specific community within this ecosystem.

Based on the factors listed above, what is a judgement you could make about sources of food for the human population within this ecosystem? Think about sources like grain, vegetables, and wild game. *Explain your reasoning.*



_____ The abiotic factors of this environment do not support the growth of vegetables or grains as well as wild game. Therefore, humans will need to rely on more meat in their diet than vegetables or grain. _____



A Balanced Web

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<p>Wolves were known to kill deer and cattle in the area, making it harder for humans to have access to meat.</p> <p><i>The relationship of wolves and humans is:</i></p>	Competition
<p>The Carolina parakeet relied heavily on seeds and buds from weeds in the forest as their food source. Whereas passenger pigeons also relied on the forest for food but preferred larger seeds and nuts from trees.</p> <p><i>The relationship of pigeons and parakeets is:</i></p>	Coexistence and Cooperation
<p>Emerald ash borers are beetles that lay their eggs in the bark of an ash tree, gaining shelter from the tree. The holes in the tree can introduce disease and bacteria, often killing the tree.</p> <p><i>The relationship of beetles and trees is:</i></p>	Parasitism





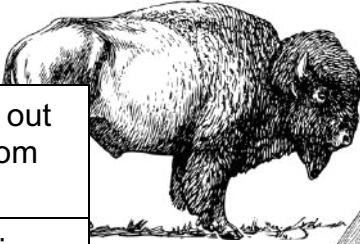
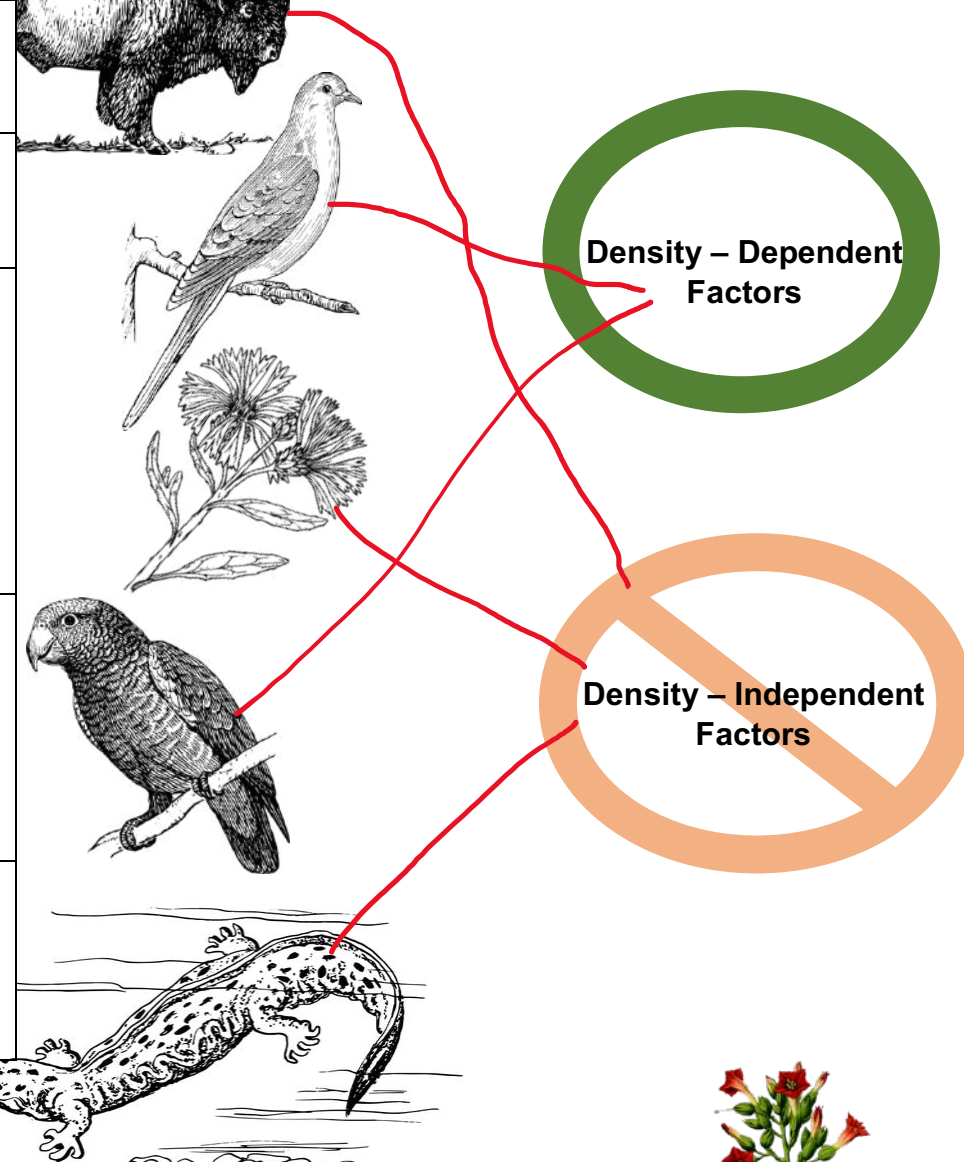
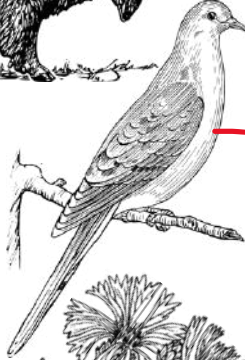

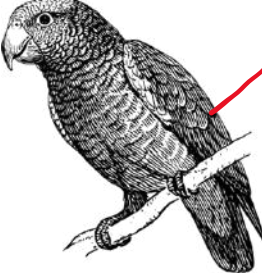
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