

Biomes in NC

Name: _____ Period: _____ Date: _____

Essential Question: How do biotic and abiotic interactions result to the survival of species?

North Carolina is located within the **temperate deciduous forest global biome**, however, a great variety of forest and non-forest ecosystems may be found within the state. Temperate deciduous forests are most notable because they go through **four seasons**. Leaves change color in autumn, fall off in the winter, and grow back in the spring; this adaptation allows plants to survive cold winters.



North Carolina's geography is usually divided into three geographic areas: Coastal, Piedmont, and the Appalachian Mountains.

North Carolina is the most ecologically unique state in the southeast because its borders contain **sub-tropical, temperate, and boreal habitats**. Although the state is at temperate latitudes, the Appalachian mountains and the Gulf Stream influence climate and, hence, the vegetation (flora) and animals (fauna).

Geographic Areas of North Carolina

The Coastal Plain: The low, flat land of North Carolina's **eastern region** stretches from the sandy farmland of the Inner Coastal Plain to the state's Outer Banks, a string of barrier islands separated from the mainland by sounds or inlets. The Outer Banks has three capes -- Cape Hatteras, Cape Lookout, and Cape Fear.

The Piedmont

Piedmont is a French word meaning "**foot of the mountain**," and North Carolina's Piedmont region is sometimes referred to as "the foothills." The rolling hills of this region range in elevation from just 300 feet in the east to 1,500 feet near the mountains. The Piedmont is sometimes referred to as a plateau because it is high and mostly flat.

The Mountains

Western North Carolina's majestic landscape features the **Blue Ridge Mountains and the Great Smoky Mountains**, which help make up the Appalachian Mountains, possibly the oldest mountain range in the United States. The region is also home to **Mount Mitchell**. Rising 6,684 feet above sea level, Mount Mitchell is the tallest peak east of the Mississippi River.

Climate

While North Carolina is located in a **warm temperate zone**, its diverse regions can experience a great variety of weather conditions. While locations in the mountains may see average temperatures of **30 degrees Fahrenheit** in January and **65 degrees Fahrenheit** in August, locations in the coastal plains can often experience January averages in the mid 40's and August averages in the 90's. The state averages 44 inches of rainfall each year, and 5 inches of snow.

What are biomes?

Biomes are very large ecological areas on the earth's surface, with fauna and flora (animals and plants) adapting to their environment. **Biomes are often defined by factors such as climate, relief, geology, soils and vegetation**. If you take a close look, you will notice that plants and animals (biotic component) in any of the biomes have **special adaptations** that make it possible for them to survive. You may find many units of **ecosystems** within one biome. Generally, **biome** classification is **determined** by the climate and geography of an area.

What are biotic and abiotic components?

Abiotic factors refer to non-living physical and chemical elements in the ecosystem. Abiotic resources are usually obtained from the lithosphere, atmosphere, and hydrosphere. Examples of abiotic factors are water, air, soil, sunlight, R. Angat

and minerals. **Biotic factors** are living organisms in the ecosystem. These are obtained from the biosphere and are capable of reproduction. Examples of biotic factors are animals, birds, plants, fungi, and other similar organisms.

Biotic and abiotic interactions

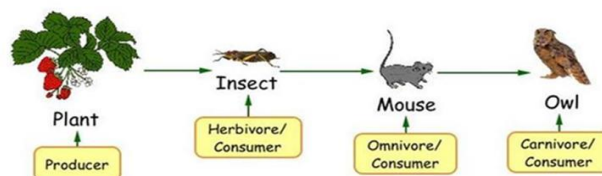
A simple example would be of abiotic interaction in plants. Water, sunlight and carbon dioxide are necessary for plants to grow. The biotic interaction is that plants use water, sunlight and carbon dioxide to create their own nourishment through a process called photosynthesis.

The **red wolf** once roamed over much of the **southeast United States**, but by the early 1900's it had almost disappeared. Fearing the species would become extinct, the U.S. Fish and Wildlife Service captured fourteen pure red wolves and started raising them in captivity. **In the 1980's, the species became extinct in the wild.** The first group of these captured wolves were released or re-introduced in the [Alligator Wildlife Refuge](#) in North Carolina in 1987. Additional red wolves were released on three islands off the coast of Florida and Georgia.

The **red wolf** has gone through **several adaptations** in order to help their population survive in the wild. The first adaptation is the ability to live in the climate of the southeast United States. Since the red wolf has such a heavy coat, the red wolves in the south now go through a molt in which they will lose their heavy fur for a lighter coat. Another way the red wolf keeps itself cool in the hot southern summers is with their large ears. These ears will help the wolf lose heat through the large surface area. The red wolf **preys** on mammals such as swamp rabbits, coypu(rodent), deer and raccoons.

All living things need food to give them the energy to grow and move. A **food chain** shows how each living thing gets its food. **It shows who is eating who.** The arrow means "is eaten by". Remember that a food chain always starts with a **producer**, plants or any photosynthetic organism.

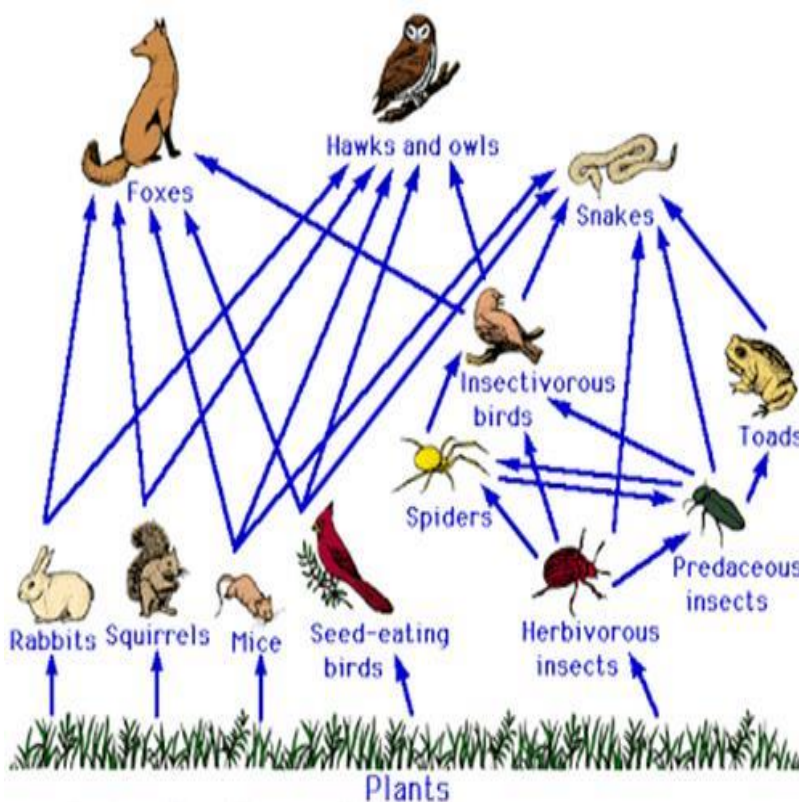
The Food Chain Of An Owl



A food chain shows the path of energy from one living thing to another. Decomposers like bacteria, are necessary for all food chains.

A **food web** consists of all the food chains in a single ecosystem. Each living thing in an ecosystem is part of multiple food chains. Each food chain is one possible path that energy and nutrients may take as they move through the ecosystem. All of the interconnected and overlapping food chains in an ecosystem make up a food web.

Trophic Levels: Organisms in food webs are grouped into categories called **trophic levels**. Roughly speaking, these levels are divided into **producers** (plants, photosynthetic organisms), **consumers** (herbivore, carnivore, and omnivores), and **decomposers** (bacteria and fungi).



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Essential Question: How do biotic and abiotic interactions result to the survival of species?

1. What kind of biome do we have in North Carolina?

2. What is most notable about temperate deciduous forests?

3. How do the trees in temperate deciduous forests adapt to the cold winters?

4. What are the three geographic areas of North Carolina?

5. Why is North Carolina the most ecologically unique state in the southeast?

6. What geographical area is the eastern region of North Carolina?

7. What are the three capes of North Carolina's outer banks?

8. What does it mean by Piedmont?

9. What is the elevation of the Piedmont area?

10. What geographical area is the western region of North Carolina?

11. Where can you find the Blue Ridge Mountains and the Great Smoky Mountains?

12. Describe the location of **Mount Mitchell** based on where you are. Think!

13. What factors contribute to the varying weather conditions in North Carolina? Think!

13. Why is it colder in the mountains than in the piedmont and coastal region? Think!

14. What are biomes?

15. What are the factors that define the type of biome?

16. What should living things do in order to survive in a certain type of biome? Think!

17. What are abiotic factors?

18. What are biotic factors?

19. Explain how plants (biotic) interact with abiotic factors like water, sunlight and carbon dioxide?

20. What are the probable reasons for the near extinction of the red wolf in the 1900's? Think! Research.

21. Why did the U.S. Fish and Wildlife Service capture fourteen pure red wolves and started raising them in captivity?

22. Upon re-introduction in the wild in 1987, what did the red wolf do in order to survive?

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23. How did the red wolf adapt to the south southern summer?

24. What is the diet of the red wolf in the wild?

25. How do living things acquire energy for growth and movement?

26. What is a food chain?

27. Food chains begin with _____.

28. Draw an example of a food chain. Think!

29. What is a food web?

30. What is the difference between a food chain and a food web? Think!

31. Describe producers. Think!

32. Describe consumers. Think!

33. What will happen to the **fox and the owl** if the rabbit population becomes extinct? Think!

Explain your answer for number 33. Think!

34. What will happen to the **fox and the owl** if the rabbit, squirrel, and mice populations become extinct? Think!

35. What will happen to the **toads and snakes** if all the insect populations become extinct? Think!

36. What are trophic levels?

37. Give examples of the following trophic levels:

A. Producers (1st trophic level): _____

B. Consumers (2nd trophic level): _____

C. Decomposers (3rd trophic level): _____

38. **Why is a more complex food web more stable than a simple food chain? Think! Research. (15 pts.)**

In geography, a **cape** is a headland or a promontory of large size extending into a body of water, usually the sea. A **cape** usually represents a marked change in trend of the coastline.



	Abiotic	Biotic
Introduction	In ecology and biology, abiotic components are non-living, chemical and physical factors in the environment which affect ecosystems.	Biotic describes a living component of an ecosystem; for example organisms, such as plants and animals.
Examples	Water, light, wind, soil, humidity, minerals, gases.	All living things — autotrophs like plants and heterotrophs like animals, fungi, and bacteria.
Factors	Affect the ability of organisms to survive, reproduce; help determine types and numbers of organisms able to exist in environment.	Living things that directly or indirectly affect organisms in environment; organisms, interactions, waste; parasitism, disease, predation.
Affects	Individual of a species, population, community, ecosystem, biome, biosphere.	Individual of a species, population, community, ecosystem, biome, biosphere.

Relevance

The scope of abiotic and biotic factors spans across the entire biosphere, or global sum of all ecosystems. Such factors can have relevance for an individual within a species, its community or an entire population. For instance, disease is a biotic factor [affecting](#) the survival of an individual and its community. [Temperature](#) is an abiotic factor with the same relevance.

Some factors have greater relevance for an entire ecosystem. Abiotic and biotic factors combine to create a system or, more precisely, an ecosystem, meaning a community of living and nonliving things considered as a unit. In this case, abiotic factors span as far as the pH of the soil and water, types of nutrients available and even the length of the day. Biotic factors such as the presence of [autotrophs](#) or self-nourishing organisms such as [plants](#), and the diversity of consumers also affect an entire ecosystem.

Influencing Factors

Abiotic factors affect the ability of organisms to survive and reproduce. Abiotic limiting factors restrict the growth of populations. They help determine the types and numbers of organisms able to exist within an [environment](#).

Biotic factors are living things that directly or indirectly affect organisms within an environment. This includes the organisms themselves, other organisms, interactions between living organisms and even their waste. Other biotic factors include parasitism, disease, and predation (the act of one animal eating another).

BIOTIC-ABIOTIC INTERACTIONS

Group description/Main objectives

Ecosystem structure and function are controlled by a variety of biotic and abiotic factors that act alone and in combination. Almost all definitions of ecosystems refer in some manner to communities of organisms interacting with each other and with biogeochemical factors that collectively represent the environment. The totality of interactions includes species-species interactions (competition, predation) species-abiotic factor interaction (resource limitations and responses, physiological stress) and non-additive relations. The group aims at studying the roles of several factors in controlling ecosystem function, in order to characterize these complex interactions. As a group we aim to underpin key interactions that regulate ecosystem processes, to link structure and function, and develop methods to analyze the complex whole system. Our research covers several aspects of the biotic and abiotic interactions mainly in soil and we are mainly focused on plant-soil interactions mutualisms in the rhizosphere; physiology of plant nutrition and productivity; biologically-mediated nitrogen and carbon dynamics. The greatest strength of the group lies in its integrated multi-level ecosystem approach, involving a mechanistic approach of the interactions between carbon, phosphorus and nitrogen dynamics at several levels of organization, from microbial networks to gas exchanges between soil and atmosphere.

<http://cba.fc.ul.pt/research/bioticabioticinteractions.php>

Food chain: <https://www.pinterest.com/pin/560487116097545013/>

Youtube: Biotic and abiotic factors: https://www.youtube.com/watch?v=E1pp_7-yTN4

<http://www.secretary.state.nc.us/kidspg/geog.htm>

<http://eschooltoday.com/ecosystems/what-is-a-biome.html>

Red wolves: <http://www.arkive.org/red-wolf/canis-rufus/>

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Red wolves: <http://www.nhptv.org/natureworks/redwolf.htm>

Red wolves http://tracker.cci.fsu.edu/redwolf/files/2013/05/Red_Wolf_Printable.pdf

<https://sites.google.com/site/islandecology2011/eastern-gray-squirrel>

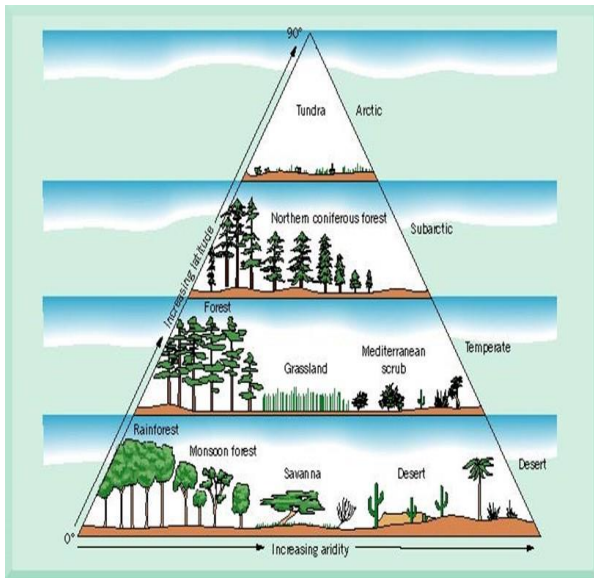
http://www.ecologyedu.com/education_resources/what_is_a_food_chain_what_is_a_food_web.html

<https://www.flickr.com/photos/47548141@N04/4383453044/>

http://www.diffen.com/difference/Abiotic_vs_Biotic

<http://www.worldatlas.com/webimage/countrys/namerica/usstates/lcolor/nccolorlf.htm>

<https://smartsite.ucdavis.edu/access/content/user/00002950/bis10v/week1/b2.jpg>



Food web: <https://sites.google.com/site/islandecology2011/eastern-gray-squirrel>

<https://sites.google.com/site/islandecology2011/eastern-gray-squirrel>

[https://tautogncscience.wordpress.com/2011/10/page/3/A diagram of a food web.](https://tautogncscience.wordpress.com/2011/10/page/3/A%20diagram%20of%20a%20food%20web)

What is a Food Web?

A food web is a diagram of the links among species in an ecosystem – essentially who eats what. A food chain shows only the organisms that contribute to the diet of the top consumer.

Figures 1 and 2 show examples of [typical terrestrial](#) and [aquatic](#) food webs, respectively. The triangular diagram in Figure 1 is an example of the main components of a food web.

- The base of a food web is occupied mostly by vegetation (producers) and fine organic debris (decomposers).
- Herbivores (primary consumers) and carnivores (secondary consumers) occupy the higher levels.
- Omnivores occupy an intermediate level in the food web.
- Food webs are complicated by the fact that many species feed at various levels.

Food Web and its Function

Why Study Food Webs?

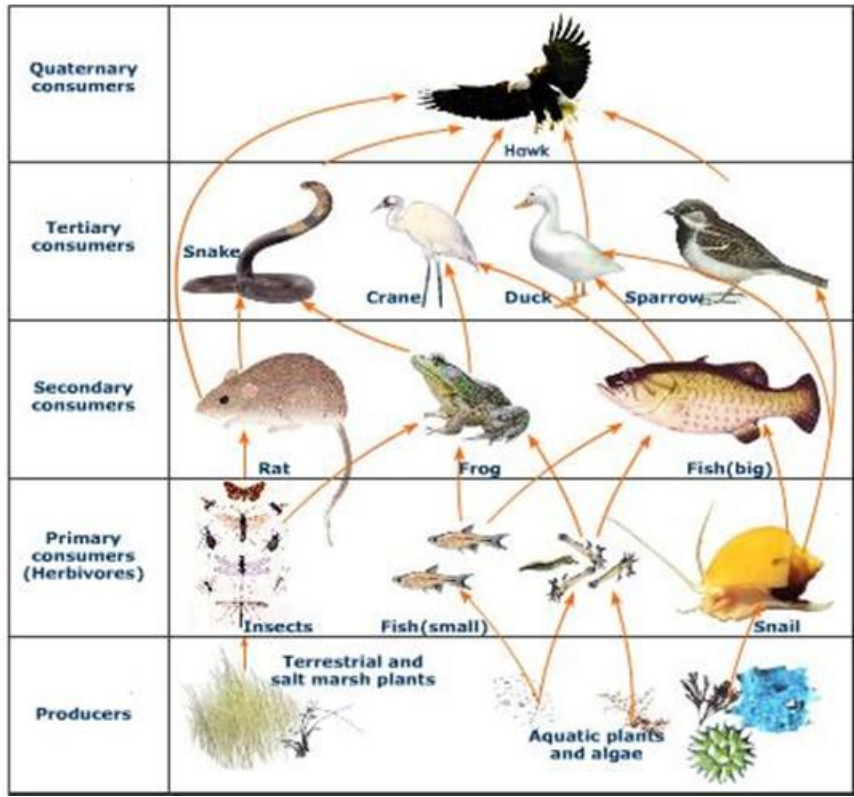
The study of food webs is critical to understanding the route by which pollutants get concentrated (bioaccumulated) up the food chain (e.g., in game fish such as bass). Current examples of bioaccumulation that the USGS is studying are mercury in the Florida Everglades, selenium in the Central Valley, and selenium and mercury in San Francisco Bay.

The knowledge of how species interrelate is also necessary to understanding how natural and man-made environmental pressures affect ecosystems. These include destructive pollution (toxic chemicals such as PCBs, DDT, mercury, and selenium) which can break or alter the food chain, and nutrient pollution which can shift whole ecosystems toward nutrient-hungry species. An example of the latter is crop fertilizers, sewage, and animal waste escaping into lakes and streams, causing massive algae blooms at the expense of fish and other species.

See some [examples](#) of other applications of isotopes to food web studies.

A food web is a diagram of species and an eco system like who eats what who eats it. Which is different from what a food chain is. A food chain is based on the largest consumer, it is pretty much based on what the top consumer does. Because if you don't have the top consumer, the chain it can't go on because everything after the top would have to change and make a whole different process.

Facts found on: <http://wwwrcamnl.wr.usgs.gov/isoig/projects/fingernails/foodweb/definition.html>



What is a biome?

Biomes are very large ecological areas on the earth's surface, with fauna and flora (animals and plants) adapting to their environment. Biomes are often defined by abiotic factors such as climate, relief, geology, soils and vegetation. A **biome** is NOT an ecosystem, although in a way it can look like a massive ecosystem. If you take a closer look, you will notice that plants or animals in any of the biomes have special adaptations that make it possible for them to exist in that area. You may find many units of ecosystems within one biome.

There are five major categories of biomes on earth. In these five, there are many sub-biomes, under which are many more well defined ecosystems.

Let us take a quick look at each of these biomes below:

(Click Green Buttons Below)

The Desert Biomes: They are the Hot and Dry Deserts, Semi Arid Deserts, Coastal Deserts and Cold Deserts.

DESERT ►

The Aquatic Biomes: Aquatic biomes are grouped into two, Freshwater Biomes (lakes and ponds, rivers and streams, wetlands) and Marine Biomes (oceans, coral reefs and estuaries).

AQUATIC ►

The Forest Biomes: There are three main biomes that make up Forest Biomes. These are the Tropical Rainforest, Temperate and Boreal Forests (also called the Taiga)

FOREST ►

The Grassland Biomes: There are two main types of grassland biomes: the Savanna Grasslands and the Temperate Grasslands.

GRASSLAND ►

The Tundra Biomes: There are two major tundra biomes—The Arctic Tundra and the Alpine Tundra.

TUNDRA ►

Biomes play a crucial role in sustaining life on earth. For example, the Aquatic biome is home to millions of fish species and the source of the water cycle. It also plays a very important role in climate formation. The terrestrial biomes provide foods, enrich the air with oxygen and absorb carbon dioxide and other bad gases from the air. They also help regulate climate and so on.

<http://eschooltoday.com/ecosystems/what-is-a-biome.html>