TALL TIMBERS | Red Hills Food Web | STUDENT WORKSHEET

Within any ecosystem is a community of interacting populations of organisms. All organisms need energy to carry out the processes of life. One way to investigate the relationships among organisms is to identify where they get energy. A simple example of these relationships is called a food chain. A generalized example is shown here.

Producer → Primary Consumers → Secondary Consumers

In this example, the producer transforms energy from the sun into stored chemical energy. The primary consumer acquires stored chemical energy by eating the producer. The secondary consumer gets the stored chemical energy it needs when it eats the primary consumer. Each level (e.g., primary consumer) is also called a trophic level, or feeding position, within that food chain. Scientists use both consumer position and trophic level to describe how organisms get their energy in an ecosystem.

As you look more closely at the relationships in an ecosystem, you will see that things get complicated as a primary consumer may eat many types of producers and many producers may be eaten by more than one type of primary consumer. Additionally, some organisms may feed at different trophic levels depending on their relationship within a given food chain, or may change trophic level with age or nutritional needs. For such reasons, it is helpful to view the individual food chains together as connected and overlapping webs. These food webs will help us understand the transfer of energy and matter through the longleaf pine ecosystem in the Red Hills region of North Florida and Southwest Georgia.

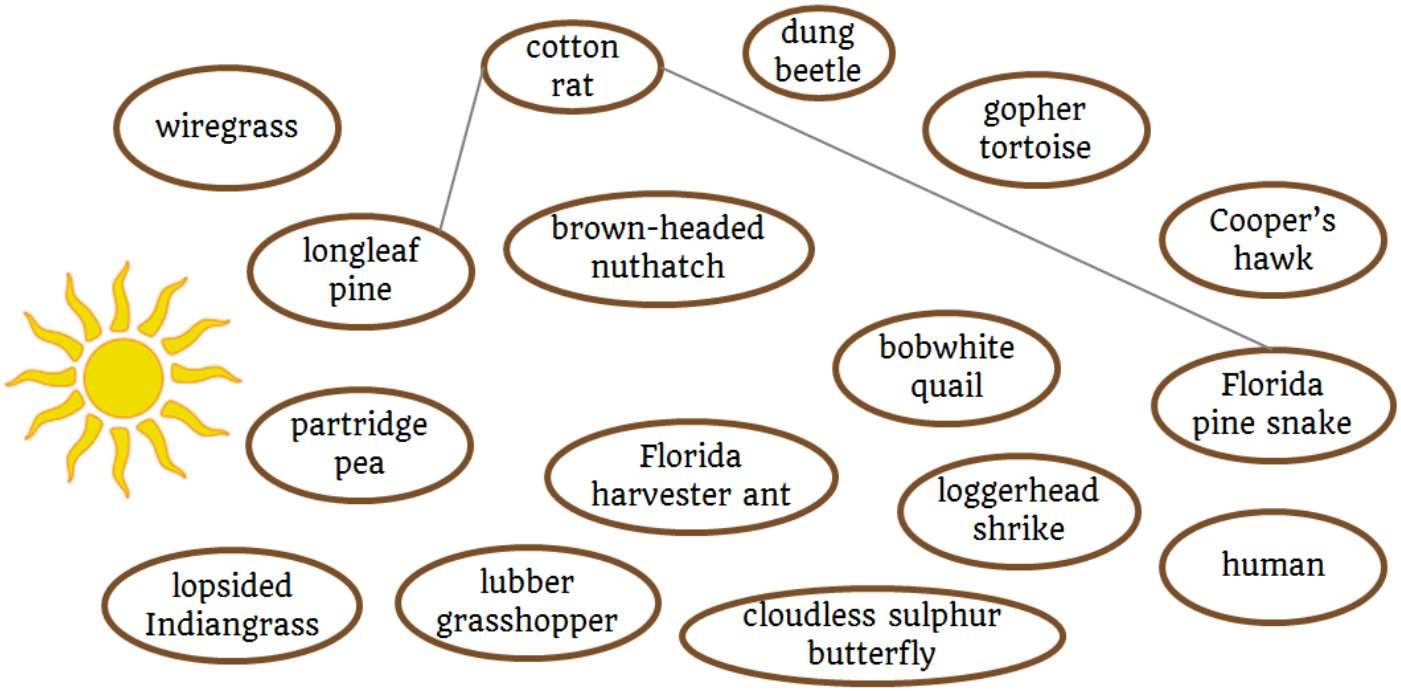
OBJECTIVES | Use a food web to identify producers, consumers, and decomposers. Understand the pathway of energy transfer through trophic levels and the reduction of available energy at successive trophic levels.
MATERIALS |Colored pencils and a ruler
PROCEDURE | A set of individual food chains within the longleaf pine ecosystem follows. Use these individual food chains and the following steps to form a food web and analyze it on the next page.

1. Using each food chain, draws lines with a regular pencil from each organism to the other organism that eats it. One example has been completed for you.
2. Show which organism is getting energy and matter by drawing an arrow on the end of each of the lines in the direction that energy and matter are moving in your food web.
3. Use a green colored pencil to trace the line from each producer to its primary consumer.
4. Develop a color code for the remaining lines based on their position in the food web. Include a key for your color code.
5. Answer the analysis questions following the food web.

Producer 1st Trophic Level	→	Primary Consumer 2nd Trophic Level	→	Secondary Consumers 3rd Trophic Level	→	Tertiary Consumers 4th Trophic Level
longleaf pine seed	→	cotton rat	→	Florida pine snake		
longleaf pine seed	→	brown-headed nuthatch	→	Cooper's hawk		
longleaf pine seed	→	Florida harvester ant	→	brown-headed nuthatch		
longleaf pine seed	→	Florida harvester ant	→	bobwhite quail	→	Cooper's hawk
wiregrass	→	gopher tortoise feces	→	dung beetle		
partridge pea	→	cloudless sulphur butterfly	→	loggerhead shrike		
partridge pea	→	bobwhite quail egg shells	→	cotton rat		
partridge pea	→	Florida harvester ant	→	bobwhite quail	→	human
partridge pea	→	Florida harvester ant	→	bobwhite quail egg	→	Florida pine snake
lopsided Indiangrass	→	lubber grasshopper	→	loggerhead shrike		
lopsided Indiangrass	→	gopher tortoise				

Red Hills Food Web

Name: _____



Analysis

1. How many of the food chains include any plant material?_____
2. Name the producers in your food web._____

_____

3. Organisms that eat only plant material are herbivores. List the herbivores based on your food web.

_____

4. Organisms that eat both plants and animals are omnivores. List the omnivores based on your food web.

_____

5. What is represented by the arrows that you drew in the food web?

_____

6. What is the ultimate source of the energy in this longleaf pine ecosystem? _____
   Draw yellow arrows from this ultimate source of energy to each producer.

7. Generally, only about 10% of the energy in one trophic level is transferred to the next trophic level. Most energy is lost as heat while an organism goes about meeting its needs. If you start with 100% of the available energy in a longleaf pine seed, what percent of that original energy in the seed is available to the Cooper's hawk?

_____

8. We know that all organisms have a lifespan and die. With this in mind, what group of organisms is NOT represented in this food web?

_____

9. What might happen to the Florida pine snake population if there were less bobwhite quail?

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