

Module 2: Florida Scrub Food Chain

By the Archbold Biological Station Education Department, 2013
with support from the Southwest Florida Water Management District

At a Glimpse

Students work in groups to complete Florida scrub food chain activity after watching a PowerPoint presentation.

Directions

1. Teacher presents “Florida Scrub Food Chain” slide show.
2. Review concepts from PowerPoint with questions about food chains and webs. Use white board to record answers (Questions supplied).
3. Divide students into small groups and hand out supplies. Each group needs a full set of organism cards. Project the image of all the organisms onto a screen while the students work.
4. Students work together in groups to make their food chains. After constructing a simple linear food chain, encourage students to make it more realistic by adding more organisms, and by modeling a food web.
5. As a class, discuss the lesson and the student’s food chains and webs. Students complete the review worksheet separately or together as a class. If used as a student assessment, Archbold Biological Station would appreciate having the scores.

Learning Goals

- Food chains and webs help us understand the interdependence of living things and the importance of all roles within a chain or web.
- Energy comes from the sun, moves through plants, and then to animals and decomposers.
- Organisms in a food chain rely on each other for food.
- Consumers can be herbivores, carnivores, omnivores., or insectivores.
- Examples of consumers living in scrub include Gopher Tortoise, Florida Mouse, Florida Sank Skink, Pygmy Mole Cricket, and Black Bear.
- Plants are the foundation of all food chains.
- Producers (green plants) are the only organisms that can make food from the sun’s energy through the process of photosynthesis.
- Examples of producers that live in the scrub include Saw Palmetto, Algae, Scrub Blazing Star, and Sand Live Oak.
- Decomposers (organisms that bread down dead animal or plant material and wastes) play an important role in recycling nutrients.
- Examples of decomposers that live in scrub include the Earthstar Mushroom, Turkey Vulture, and Dung Beetle.
- A food web is a group of connected food chains.

LENGTH

1 hour prep
15 minute slideshow
45 minute activities

MATERIALS

Whiteboard
Slide show
Printouts
Pens or pencils

KEY VOCABULARY

Organism
Ecosystem
Habitat
Energy
Food chain
Food web
Consumer
Decomposer
Producer
Fungi

GOING FURTHER

Students make a painting illustrating the concepts in the lesson.

Each group has five minutes to come up with a 30 sec. performance acting out one of the concepts in the lesson.

NEXT GENERATION FLORIDA SUNSHINE STATE

STANDARDS

SC.3.N.1.1
SC.3.L.15.1
SC.3.L.17.2
SC.4.N.1.1
SC.4.L.17.2
SC.5.L.17.3

Slideshow Review Activity

The teacher will review the concepts in the slideshow by encouraging students to verbally answer a series of questions.

Using a dry erase board to record responses, the teacher may ask students:

Can someone name a plant? (Leader writes/draws this plant on the white board.)

Where does this plant get its energy? **A: The sun**

(Leader writes/draws sun on the whiteboard and connects it to the plant with a line.)

What process does the plant use to change sunlight into energy? **A: Photosynthesis**

Can animals do this? Can animals make their own food from sunlight? **A: No**

Where do animals get their energy? **A: From the food they eat**

Who might eat this plant or parts of this plant? (Leader adds this to the board and connects the two organisms with an arrow to the animal.)

Who might eat this animal? (Leader adds an arrow pointing to the new animal)

What is this diagram called? **A: A food chain**

What does a food chain show us?

A: Who eats who and how the sun's energy makes its way through different organisms.

Who is the producer in this food chain? **A: The plant**

Who is the consumer(s)? **A: The animal eating the plant**

Which one is the foundation for the food chain? **A: plants or producers**

Can a consumer be a carnivore? An herbivore? An omnivore? **A: Yes**

What do decomposers do? **A: Decomposers play a very important role in the food web because they are responsible for the recycling of nutrients and they put these nutrients back into the earth/soil for plants to use.**

If this is a food chain, what is a food *web*? **A: A food web is a group of connected food chains. It is a more accurate model of the interactions between organisms.**

What happens if the population of an organism in a scrub food chain is reduced or no longer exists?

A: It would affect the whole food chain and ecosystem. Ex: If predators go extinct, their prey may overpopulate an area.

Food Chain Review Student Worksheet

Name:

Date:

Teacher:

Grade:

1. Where do plants get their energy?
2. What process does the plant use to change sunlight into energy?
3. Where do animals get their energy?
4. Which one is the foundation for the food chain? (producers) or (consumers)

5. An example of a <i>producer</i> is a _____	A. Florida Scrub-Jay
6. An Example of a <i>consumer</i> is a _____	B. Sand Live Oak Tree
7. An example of a <i>decomposer</i> is a _____	C. Turkey Vulture

8. True or False: Consumers can be predators and prey.
9. Decomposers are very important because they... (Circle one)
 - A: Keep plants from growing too tall.
 - B: Recycle parts of dead plants and animals back into the soil.
 - C: Are slimy and fun.
 - D: Use photosynthesis to change sunlight into energy.
10. What does a food chain show us? (Circle one)
 - A: Who eats who and how the sun's energy makes its way through different organisms.
 - B: Bigger animals are always at the top of the food chain.
 - C: Different animals live in different places.
 - D: Florida scrub is really cool.

Food Chain Review Student Worksheet Answers

Name:

Date:

Teacher:

Grade:

1. Where do plants get their energy? **A: The sun**
2. What process does the plant use to change sunlight into energy? **A: Photosynthesis**
3. Where do animals get their energy? **A: The food they eat**
4. Which one is the foundation for the food chain? (**producers**) or (consumers)

5. An example of a <i>producer</i> is a _____ B _____	A. Florida Scrub-Jay
6. An Example of a <i>consumer</i> is a _____ A _____	B. Sand Live Oak Tree
7. An example of a <i>decomposer</i> is a _____ C _____	C. Turkey Vulture

8. True or False: Consumers can be predators and prey. **True**
9. Decomposers are very important because they... (Circle one)
A: Keep plants from growing too tall.
B: Recycle parts of dead plants and animals back into the soil.
C: Are slimy and fun.
D: Use photosynthesis to change sunlight into energy.
10. What does a food chain show us? (Circle one)
A: Who eats who and how the sun's energy makes its way through different organisms.
B: Bigger animals are always at the top of the food chain.
C: Different animals live in different places.
D: Florida scrub is really cool.

Background Information For Teachers

Food Chain Facts

- A food chain is a sequence of who eats who or what in an ecosystem and follows one path as animals find food.
- A food web consists of many food chains connected together.
- The sun is the source of energy for a food chain.
- A food chain always starts with plants (producers), except that in some deep ocean food chains existing chemicals are the base of the food chain.
- Plants are the foundation of a food chain and use the process of photosynthesis to turn sunlight into energy. Some of this energy is used and some of it is stored in the leaves, stems and roots.
- Animals cannot make their own food.
- All animals are *consumers* and get their energy by eating other organisms.
- A decomposer is an organism such as bacteria and fungi, or scavengers like the Turkey Vulture, that feeds on decaying matter.
- Decomposers play a very important role in the food web because they are responsible for the recycling of nutrients and they put these nutrients back into the earth/soil for plants to use.
- A food chain ends with a decomposer.
- The further along the food chain you go, the less food (energy) remains available. Because of this most food chains have no more than four or five links.
- Because energy is lost every time one organism eats another, plants (producers) should exist in greater numbers than meat-eaters (consumers).
- Most animals are part of more than one food chain and eat more than one kind of food in order to meet their energy requirements.
- Food chains/webs show us the interdependence of organisms within an ecosystem. An ecosystem includes all the living organisms and non-living factors functioning together as a unit.
- A change in the size of one population in a food chain can affect other populations in that chain.
- Scientists can use their understanding of food chains/webs to make predictions about the ripple effects of population changes in a food chain or web. These population shifts might be result of changes in habitat, disease, herbicide and pesticide use, exotic species introduction, etc.
- Understanding food chains can be important when making complex conservation decisions.

Background Information For Teachers

Producers

Wiregrass

- Makes its own food by photosynthesis
- Grows in dense, spreading tufts
- Found in dry sandhills and flatwoods of the southeastern US.
- Produces flowers and small seeds
- Regenerates quickly after fire
- Is a preferred food of Gopher Tortoises

Broomsedge

- Makes its own food by photosynthesis
- A perennial bunch grass that grows at the edge of seasonal ponds
- Produces flowers and seeds in fall

Sand Live Oak

- Makes its own food by photosynthesis
- Found in sandy soils throughout the southeastern United States.
- Produces acorns that are important food for Florida Scrub-Jays
- Energy is stored in the acorns, bark, stems, leaves, and roots

Scrub Blazing Star

- Makes its own food by photosynthesis
- A Federal and state listed endangered species found only in Polk and Highlands counties, Florida
- Nectar-producing flowers bloom June-September

Saw Palmetto

- Makes its own food by photosynthesis
- Insect-pollinated flowers produce nectar in spring
- Berries ripen in fall
- Each plant produces a total of 100-500 seeds per year
- Mammals (Black Bear, White-tailed Deer, Raccoon, Opossum, Gray Fox) and certain insects will consume the fruits
- Berries are collected and used in men's health medicine

Algae

- Makes its own food by photosynthesis
- Found up to 3 inches under the surface (light penetrates silica sand)
- Holds sand grains together forming a crust
- Is eaten by sand dwelling organisms such as the Pygmy Mole Cricket and some species of mosquito larva
- More than 30 different species of algae are found in Florida scrub

Background Information For Teachers

Consumers

Barred Yellow Butterfly

- One of more than 1,000 species of moths and butterflies identified in the Florida scrub
- Small, bright green caterpillar prefers to eat leaves of legumes
- Adults drink nectar

Black Bear

- Omnivore that eats insects (including honey bee larvae), berries, acorns, armadillos, grasses, etc.
- Will eat heart of palmettoes by pulling out the newest green leaves and eating the growing bud
- Largest native land mammal in Florida

Black and Yellow Garden Spider

- Builds a large circular web with dense zigzag silk pattern in the middle
- Typically hangs upside-down in the web, waiting for insects to get caught
- When prey is trapped, spiders undulate web back and forth to help secure prey
- Wraps prey in silk and then uses venom to kill prey, which can include insects and small invertebrates
- Eaten by birds, snakes, and praying mantis

Florida Mouse

- Eats seeds, acorns, mushrooms, insects
- Forages at night
- Will live in Gopher Tortoise and Armadillo burrows which also provide a source of insect food
- Predators include Indigo Snakes, Pine Snakes, Bobcats, Raccoons, Spotted Skunks, and birds of prey

Coyote

- Omnivore that eats mostly small mammals such as rabbits, squirrels, rats, and mice, but will also eat birds, reptiles, insects, fruits, and vegetables.
- Not native to Florida
- Usually hunts alone rather than in packs
- Most active at dawn and dusk
- Usually take their prey to a safe place to eat-even up to 1 mile away

Eastern Screech-Owl

- Eats mice, small reptiles, birds, frogs, and insects
- Mostly hunts at night, but will also search for food at dawn and dusk
- Florida's smallest owl

Brazilian Free-tailed Bat

- Eats night-flying insects
- Forages as far as 25-30 miles from their home at night, returning at dawn
- One of the most abundant native mammals in urban areas of Florida
- In Florida, they roost in structures, especially roofs of older buildings

Florida Sand Skink

- Hunts for food under the sand's surface
- Eats beetle larvae, termites, larval ant lions, and other invertebrates
- Active during the day
- Feeding occurs mostly in the evening and morning
- Is endemic to sandy ridges in Central Florida

Background Information For Teachers

Consumers

Florida Scrub-Jay

- Primarily eats insects during warmer months but is very opportunistic and will eat small snakes, frogs, and the eggs and nestlings of other birds
- Eats cached acorns during colder months
- Predators of adults include hawks, Bobcats, and snakes
- Nestlings are more likely taken by predators than adults, especially snakes
- Sentinel system used by jay families helps them avoid predators

Gopher Tortoise

- Feeds on low-growing plants like wiregrass, legumes, flowers, and other broadleaf grasses
- Will also eat prickly pear cactus, paw-paws, gopher apple, saw palmetto berries, and other fruits
- Can be observed in recently burned areas, eating grasses that resprout
- Soft shells of hatchlings make them especially vulnerable to predation by foxes, Raccoons, Opossums, skunks, dogs, and snakes

Fungus Gnat

- Eats fungi during its larval stage
- Does not eat as an adult

Pygmy Mole Cricket

- Feeds on a thin layer of algae close to the surface of the sandy soil
- Retreats to deep sand in the dry season and moves up to the soil crust after rain

Mosquito

- 80 known species in Florida
- Some species of mosquito lay eggs in moist soil rather than in water
- Important in aquatic and terrestrial food chains
- Eradicating mosquitoes could have unintended consequences on a ecosystem's food chain/web

Mushroom

- Most mushrooms in scrub are consumers that attach themselves to plant roots and absorb sugars and amino acids stored by the tree.
- They also help a tree absorb more water and minerals.
- This mutually beneficial relationship is called *mycorrhizal symbiosis*. (Two major decomposers in scrub are termites and fire)

Florida Scrub Lizard

- Eats arthropods such as beetles, spiders and grasshoppers
- Forages on the ground
- Active during warm days, less active during cool days, and especially during the hottest hours of summer days

Spider Wasp

- Stings and immobilizes a spider and then lays its eggs on the spider's body
- When eggs hatch, wasp larva consumes spider's soft body parts
- Some spider wasp attack spiders that spin webs, others attack non-burrowing wolf spiders
- Drink flower nectar as adults

Background Information For Teachers

Consumers

Spot-winged Bee Fly

- Diet of larva diet is unknown
- Eats pollen nectar as an adult
- Resemble bees

Striped Skunk

- Active at night
- Eats insects, turtle eggs (including Gopher Tortoise), birds' eggs, lizards, frogs, and small mammals
- Predators include Great Horned Owls, foxes, bobcats, coyotes

Swallow-tailed Kite

- Eats lizards, snakes, birds, large insects and frogs
- Eat while flying
- Fledglings are prey for Great Horned Owls

Decomposers

Dung Beetle

- Eats mammal dung
- Digs burrows under piles of dung
- Remove waste products from soil surface and recycle nutrients
- Is eaten by birds, small mammals, toads, snakes

Earth Star

- The fruiting body of a decomposer fungi
- Nearly invisible fungal threads form the active feeding and growing structures
- Often found on dead leaves or other organic matter in soil

Turkey Vulture

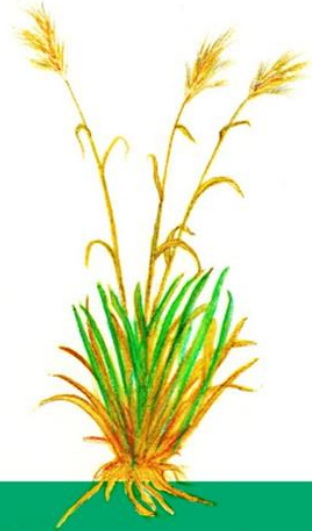
- Categorized as a decomposer because it eats carrion, or decaying flesh
- Will occasionally eat plants or vegetables Have a well-developed sense of smell to help them find carrion
- Will fly in groups to find food

Student Food Chain Cards



Saw Palmetto

Makes its own food
by photosynthesis



Broomsedge

Makes its own food
by photosynthesis



Algae

Makes its own food
by photosynthesis



Sand Live Oak

Makes its own food
by photosynthesis

Student Food Chain Cards

**Scrub Blazing Star**

Makes its own food
by photosynthesis

**Wiregrass**

Makes its own food
by photosynthesis

**Coyote**

Eats mice, birds, small
mammals, snakes,
lizards, and fruit

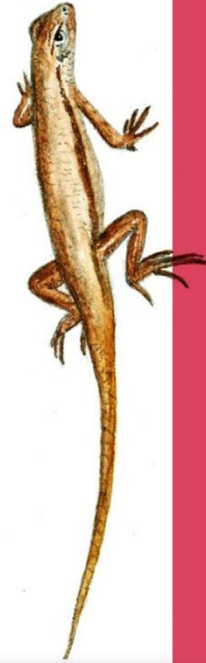
**Eastern
Screech-Owl**

Eats mice, small
reptiles, and insects

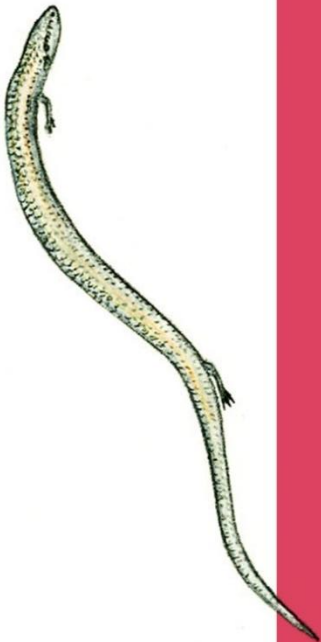
Student Food Chain Cards

**Florida Mouse**

Eats seeds, nuts,
acorns, and insects

**Florida Scrub Lizard**

Eats insects

**Florida Sand Skink**

Eats insects in leaf litter

**Fungus Gnat**

Eats fungi as a larva
and does not eat as an adult

Student Food Chain Cards

**Florida Scrub-Jay**

Eats insects, acorns, and small frogs and lizards

**Black Bear**

Eats grass, berries, nuts, acorns, fruit, and insects

**Fungus Gnat**

Eats fungi as a larva and does not eat as an adult

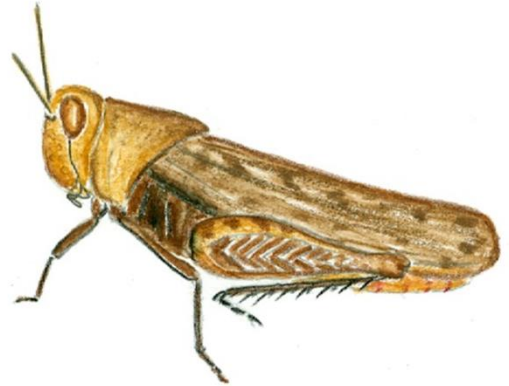
**Mosquito**

Eats algae as a larva and blood as an adult

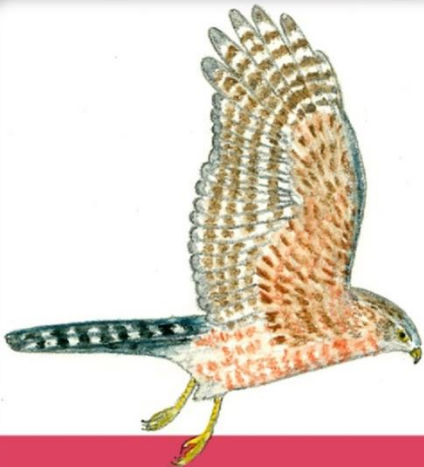
Student Food Chain Cards



Pygmy Mole Cricket
Eats algae



Grasshopper
Eats leaves
of plants and flowers



Red-shouldered Hawk
Eats mice, lizards,
frogs, and small birds



Mushroom
Gets nutrients from tree
roots and contributes water
and nutrients to tree

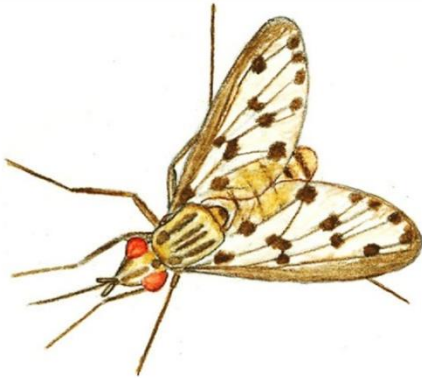
Student Food Chain Cards

**Gopher Tortoise**

Eats grasses, fruits,
berries, and flowers

**Striped Skunk**

Eats insects, birds' eggs,
lizards, and frogs

**Spot-winged
Bee Fly**

Diet of larva is not known,
eats pollen and nectar
as an adult

**Spider Wasp**

Eats spiders as a larva
and drinks flower nectar
as an adult

Student Food Chain Cards

**Swallow-tailed Kite**

Eats lizards, snakes, birds,
large insects, and frogs

**Barred Yellow
Butterfly**

Eats plants as a
caterpillar and drinks
flower nectar as an adult

**Black and Yellow
Garden Spider**

Eats insects

**Brazilian Free-tailed Bat**
Eats insects

Student Food Chain Cards



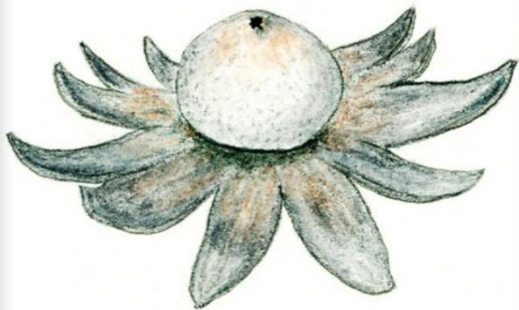
Turkey Vulture

Eats dead animals
and occasionally fruit



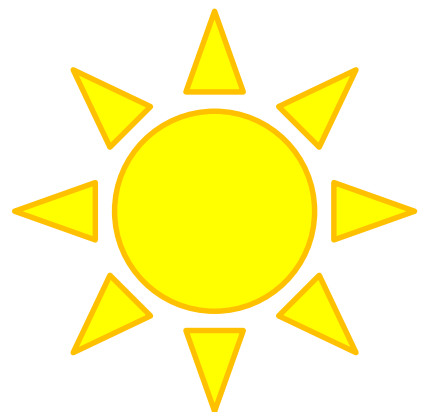
Dung Beetle

Eats dung



Earthstar

Decomposes
organic matter in soil



Student Food Chain Cards

