

Dinner Dilemma [Grades 3-5]

Georgia Standards of Excellence Addressed:

S4L1. Obtain, evaluate, and communicate information about the roles of organisms and the flow of energy within an ecosystem.

- a. Develop a model to describe the roles of producers, consumers, and decomposers in a community.
- b. Develop simple models to illustrate the flow of energy through a food web/food chain beginning with sunlight and including producers, consumers, and decomposers.
- c. Communicate a scenario to demonstrate the effect of a change on an ecosystem.

Enduring Understandings:

- 🔍 One small change in a food web can impact the entire food web.
- 🔍 Prey and predator roles can change in a complex food web.

Objectives:

- 🔍 Students will be able to identify the difference between predator and prey.
- 🔍 Students will arrange the different aquatic species into a food web model.

Time Frame:

- 🔍 45-60 minutes

Vocabulary:

- 🔍 Pinniped
- 🔍 Carnivores
- 🔍 Parasites
- 🔍 Plankton
- 🔍 Producers
- 🔍 Consumers
- 🔍 Decomposers
- 🔍 Food web

Materials

- 🔍 One set of Predator and Prey: Which is Which? pictures
- 🔍 Copies of the Dinner Dilemma sheet for each group
- 🔍 Copies of the Who Am I? sheet for each student
- 🔍 Dinner Dilemma answer sheet

Background Information:

Food webs are an important aspect of any ecosystem, but what are they? According to the America Heritage Dictionary, a food web is “a group of interrelated food chains in a particular ecological community.” For example, sharks eat sea turtles that eat jellies that eat plankton. But that is just one chain, as sharks can also eat rockfish that eat smaller fish that eat snails that eat algae. My oh my! The combinations are numerous and interconnected, which is why we use the term *food web* to describe the complex relationships between animals and their environments. In the Pacific Ocean, one of the major food webs that exists is centered around the California sea lion, ocean sunfish and Pacific sea nettles.

The California sea lion is a type of **pinniped**, fin-footed animal, that lives in cool waters off the rocky coast of Western North America and is known for its intelligence and liveliness – as well as noisy barking. This marine mammal makes roaring sounds (hence its name), barks, and honks. Sea lions are fast swimmers, swimming up to 25 mph in short bursts. They can also move quickly on land, "walking" with all four flippers.

Sea lions congregate in large groups on land (called *colonies*) and smaller groups in the water (called *rafts*). Breeding areas are called *rookeries*. Males can reach more than 850 lbs. and more than seven feet in length, where females grow to more than 240 lbs. and six feet in length. Sea lions are **carnivores** that eat fish, squid, octopuses, crabs, clams and lobsters. They don't chew their food, but rather swallow it in large chunks. They have a very high metabolism, and must eat a lot. Sea lions are hunted by orcas and large sharks.

The ocean sunfish, also known as the *Mola mola*, is the world's heaviest known bony fish. They are called sunfish because they are often seen basking at the surface. They are sometimes mistaken for sharks due to their large dorsal fin. An adult ocean sunfish can reach well over 2,000 lbs. in weight and over 11 feet in length! Wow! Ocean sunfish are found in temperate and tropical oceans worldwide. They have large lobe shaped fins above and below their tails that provide maneuverability in their habitat. Their diet is mainly jellies, which are nutritionally poor, so the sunfish must consume very large quantities. Ocean sunfish can become infested with skin **parasites**, and will often allow small fish or even birds to feed on these parasites and remove them from their skin. They will even breach the surface and land with a splash in an attempt to shake the parasites loose.

Jellies have drifted along the ocean's currents for millions of years. They have no eyes, no brain, and are invertebrates (no skeleton). They survive in cold and warm ocean water, deep water, and along coastlines. Jellies have tiny tentacles with special cells that sting fish, invertebrates or other prey items and paralyze it, making their food easy to consume.

Pacific sea nettles have a reddish tint along their bell and can span 3 feet. Their tentacles, which contain venomous barbs, can be 12 feet long. Pacific sea nettles have the ability to maneuver relatively well by flexing their bell. They capture prey in their tentacles. These sea nettles consume small fish, **plankton** (any organism, living in the water column incapable of moving against the current – plants, animals, algae, etc.) and small crustaceans. The stinging cells on the tentacles paralyze the prey long enough for it to be consumed.

Food webs are made up of **producers, consumers and decomposers**. All food webs start with the sun, followed by those organisms that create their food directly from the sun (called producers). These organisms are, in turn, eaten by other organisms (which are consumers). Food webs "end" with top predators, animals that have few or no natural enemies. Also part of the web, there are organisms that feed on dead and rotting organisms (called decomposers). The position of some organisms in the food web can change as their diet fluctuates. An overabundance or shortage of organisms within any level in the food web can lead to changes in the entire ecosystem. For example, not enough plants in the plankton level would starve out the consumers that eat them. Also, a lack of jellies in an area could cause the ocean sunfish to look elsewhere for their food. On the other hand, too many sea lions might hunt all the sunfish in the vicinity, causing them to seek other food sources or move to a different location, not to mention a population boom of the jellies that the sunfish would have kept in check.

Procedure:

1. Lead a discussion with students about what a food web is. Next hold up the animal predator and prey picture cards from the "Predator and Prey: Which is Which? Worksheet." Read the corresponding statements on the sheet and have students identify the relationship for each. Guide students in defining what a predator is and what prey is. (A predator is an animal that hunts other animals for food. Prey is an animal that is hunted and eaten for food.) Write the definitions on the board.
2. Have the students suggest other food web examples that might include humans. Check to make sure these examples agree with the definitions.
3. Divide the class into small groups. Provide each group with the "Dinner Dilemma" and the "Who Am I" information sheets. Have students work in teams, using the "Who Am I" sheets to complete the animal sheets. Check responses as a class.
4. Explain that these three animals are only part of a complex food web. Have students brainstorm other animals that may be part of this ecosystem and identify whether they are predators or prey, and whether they are producers, consumers or decomposers.
5. Discuss with students what might happen if there is an overabundance or shortage of one animal such as the sea lions or fish in general. What might be the causes of the changes in the number of prey or predators? (For sea lions, it is overfishing by humans. Sea lions are having to compete for resources.)
6. As a culminating activity, have students create a narrative about life as a sea lion and how it finds its food.

Assessment:

- ◆ Check that each group of students has correctly organized the sea lion food change.

Predator or Prey: Which is Which?

Note to teacher: Cut out predator/prey pairs and mount on note cards to use in class discussion . Read the following statements about predator/prey relationships. Have students determine which animal is prey and which is a predator.

1. A snapping turtle in a pond eats a small perch.
2. A shrew is eaten by a barn owl.
3. A seagull lands near an alligator and the alligator eats it.
4. A gray wolf hunts and eats a rabbit.
5. A blue whale swallows krill.
6. A penguin is eaten by a leopard seal
7. A seagull pulls an earthworm from the grass and eats it.
8. A rabbit eats a carrot out of your garden
9. A small perch eats a dragonfly.
10. A penguin eats fish underwater.



Snapping Turtle



Small Perch



Shrew



Barn Owl



Seagull



Alligator



Gray Wolf



Rabbit



Krill



Blue whale



Penguin



Leopard Seal



Earthworm



Fish



Dragonfly



Carrot

Dinner Dilemma Student Worksheet



Animal:

As a predator, it eats:

As prey, it is eaten by:



Animal:

As a predator, it eats:

As prey, it is eaten by:



Animal:

As a predator, it eats:

As prey, it is eaten by:

Dinner Dilemma (answer key)



Animal: *California sea lion*

As a predator, it eats: *ocean sunfish*

As prey, it is eaten by: *sharks, orcas*



Animal: *ocean sunfish*

As a predator, it eats: *jellies*

As prey, it is eaten by: *California sea lions.*



Animal: *Pacific sea nettle*

As a predator, it eats: *small fish, plankton and crustaceans*

As prey, it is eaten by: *ocean sunfish*

Who Am I?

#1. I can grow to be quite large, weighing over 2,000 pounds and more than 10 feet in length. In fact, I am the heaviest bony fish species. I live mostly in the Pacific Ocean but can be found in temperate or tropical waters of the world. My food of choice is jellies. My fleshy fins are eaten by sea lions, orcas and sharks.

#2. I live in large colonies on land or groups called rafts in the sea. Because I have a very high metabolism (rate that I use energy), I eat a lot! My favorite food, ocean sunfish, has many skin parasites, so I mainly eat their large upper and lower fins. I am a really fast swimmer; I have to be to escape from the orcas and great white sharks that try to eat me!

#3. My species has been around for millions of years. I do not have a skeleton or eyes or even a brain. I have tentacles that hang down from my bell shaped body that have barbs that contain paralyzing venom. This venom allows me to capture my prey, such as small fish, animal plankton in the water column, or fish eggs. I can move around a bit to avoid the ocean sunfish that would like to have me as their next meal.

Sea Lion Food Chain Student Worksheet

Producer	
Consumer	
Consumer	
Consumer	
Consumer	
Top Consumer	
Decomposer(s)	

Sea Lion Food Chain (suggested answers)

Producer	Phytoplankton
Consumer	Zooplankton
Consumer	Jellies
Consumer	Ocean Sunfish
Consumer	Sea Lion
Top Consumer	Orca, Sharks
Decomposer(s)	Crabs, Sea Stars