

DIGITAL ASSIGNMENT – 1

Course: Environmental Sciences

Course Code: CHY1002

Faculty Name: Prof. Jianping Hu

Slot: G2/TG2

Name: Priyal Bhardwaj

Registration Number: 18BIT0272

Topic: Food Chain & Food Web

Submission Date: 20.10.2018

FOOD CHAIN & FOOD WEB

What are food chains & food webs?

Producers, or autotrophs, make their own organic molecules. Consumers, or heterotrophs, get organic molecules by eating other organisms.

A *food chain* is a linear sequence of organisms through which nutrients and energy pass as one organism eats another.

In a food chain, each organism occupies a different trophic level, defined by how many energy transfers separate it from the basic input of the chain.

Food webs consist of many interconnected food chains and are more realistic representation of consumption relationships in ecosystems.

NOTE:

Energy transfer between trophic levels is inefficient—with a typical efficiency around 10%. This inefficiency limits the length of food chains.

INTRODUCTION

Organisms of different species can interact in many ways. They can compete, or they can be symbionts—long term partners with a close association. Or, of course, they can do what we so often see in nature programs: one of them can eat the other, i.e. they can form one of the links in a food chain.

In ecology, a food chain is a series of organisms that eat one another so that energy and nutrients flow from one to the next. For example:

grass→cow→human (or) lettuce→human

We can't always fully describe what an organism —such as a human —eats with one linear pathway. For situations like the one above, we may want to use a food web that consists of many intersecting food chains and represents the different things an organism can eat and be eaten by.

At the base of the food chain lie the primary producers. The primary producers are autotrophs and are most often photosynthetic organisms such as plants, algae, or cyanobacteria.

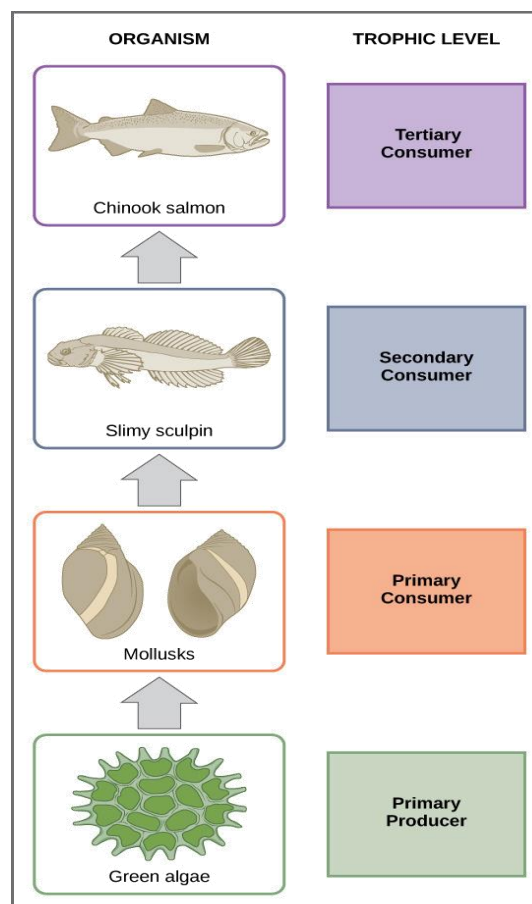
The organisms that eat the primary producers are called primary consumers. Primary consumers are usually herbivores, plant-eaters, though they may be algae-eaters or bacteria eaters.

The organisms that eat the primary consumers are called secondary consumers. Secondary consumers are generally meat-eaters—carnivores.

The organisms that eat the secondary consumers are called tertiary consumers. These are carnivore-eating carnivores, like eagles or big fish.

Some food chains have additional levels, such as quaternary consumers—carnivores that eat tertiary consumers. Organisms at the very top of a food chain are called apex consumers.

We can see examples of these levels in the diagram below. The green algae are primary producers that get eaten by mollusks—the primary consumers. The mollusks then become lunch for the slimy sculpin fish, a secondary consumer, which is itself eaten by a larger fish, the Chinook salmon—a tertiary consumer.



Each of the categories above is called a trophic level, and it reflects how many transfers of energy and nutrients—how many consumption steps—separate an organism from the food chain's original energy source, such as light. Assigning organisms to trophic levels isn't always clear-cut. For instance, humans are omnivores that can eat both plants and animals.

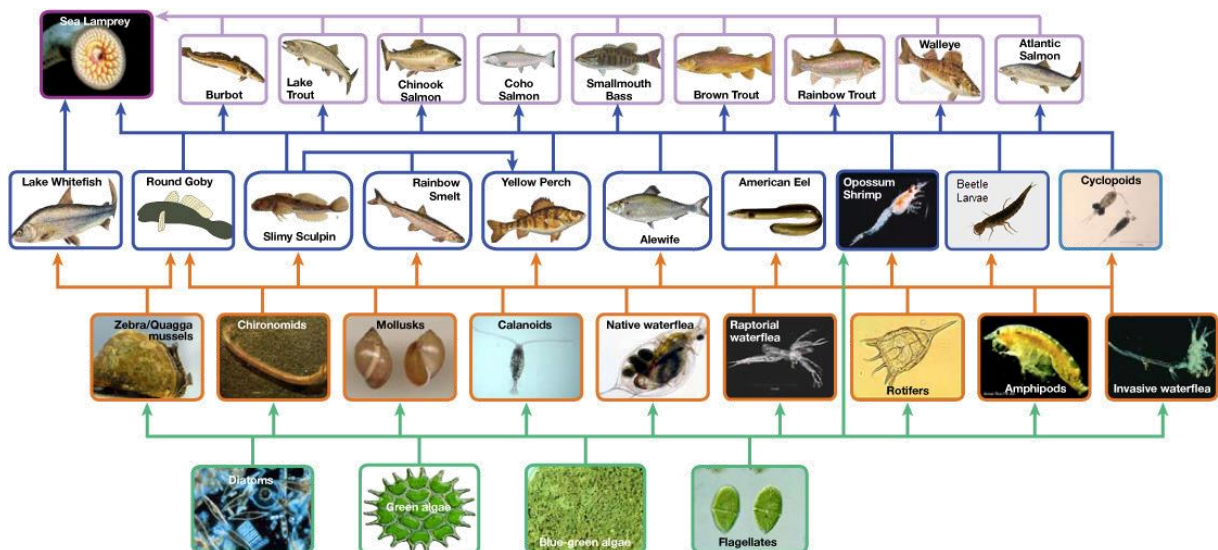
FOOD WEBS:

Food chains give us a clear-cut picture of who eats whom. However, some problems come up when we try and use them to describe whole ecological communities.

For instance, an organism can sometimes eat multiple types of prey or be eaten by multiple predators, including ones at different trophic levels.

To represent these relationships more accurately, we can use a food web, a graph that shows all the trophic—eating-related—interactions between various species in an ecosystem. The diagram below shows an example of a food web from Lake Ontario. In the diagram the following are marked as:

- Primary producers in green
- Primary consumers in orange
- Secondary consumers in blue
- Tertiary consumers in purple

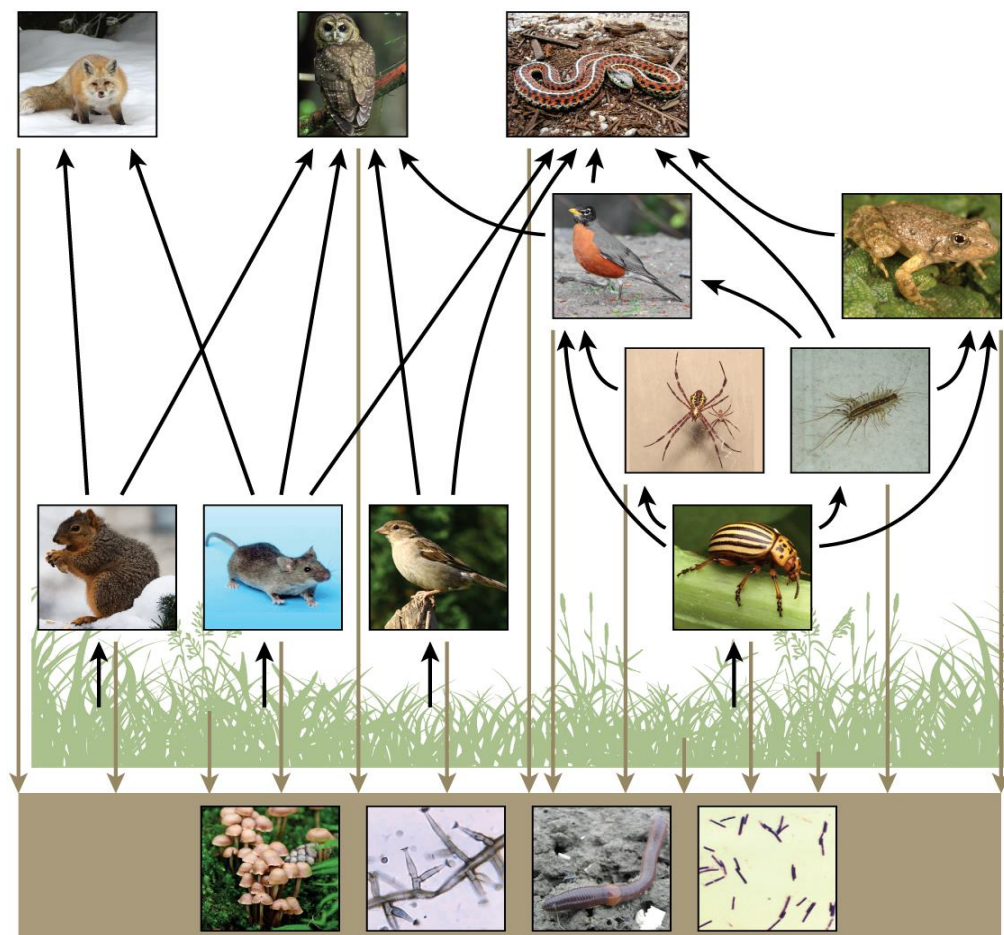


In food webs, arrows point from an organism that is eaten to the organism that eats it. As the food web above shows, some species can eat organisms from more than one trophic level. For example, possum shrimp eat both primary producers and primary consumers.

Grazing Food Webs v/s Detrital Food Webs:

Food webs don't usually show decomposers—you might have noticed that the Lake Ontario food web above does not. Yet, all ecosystems need ways to recycle dead material and wastes. That means decomposers are indeed present, even if they don't get much air time.

For example, in the meadow ecosystem shown below, there is a grazing food web of plants and animals that provides inputs for a detrital food web of bacteria, fungi, and detritovores. The detrital web is shown in simplified form in the brown band across the bottom of the diagram. In reality, it would consist of various species linked by specific feeding interactions—i.e. connected by arrows, as in the grazing food web aboveground. Detrital food webs can contribute energy to grazing food webs, as when a robin eats an earthworm.



FOOD CHAIN V/S FOOD WEB

Food chain	Food Web
1. Food chain is defined as the phenomenon of transfer of energy through series of organisms falling on successive trophic levels.	1. Food web is an interconnection of food chains which shows relation between them.
2. In food chains, usually member of high trophic level feed upon a single type of organism of lower trophic level.	2. In food web members of higher trophic level feed upon many organisms of lower trophic level.
3. In food chains, separate and isolated food chains increase the instability of the ecosystem.	3. In food web, stability of the ecosystem increases by the presence of complex food webs.
4. It comprises of only one chain.	4. It comprises of many chains.
5. Removal of one group of organism disturbs the whole chain.	5. Removal of one group of organism not at all disturbs food web.

References:

- 1) Meritnation.com
- 2) Khanacademy.com