

Lesson 5: The food chain

Objectives:

1. Understand the role of fungi in the ecosystem.
2. Identify fungi as decomposers and saprotrophs.
3. Understand how fungi depend on other species' for survival, and vice versa.
4. Make connections between fungi and other species using a food web.



An **ecosystem** is made up of a community of different species interacting with their environment. Ecosystems can look very different from one another; imagine the species of the Amazon tropical rainforest versus the subalpine of the Rocky mountains. Yet all ecosystems must have a flow of energy, and recycling of nutrients through it. They are all cyclical processes that allow the flora and fauna to thrive for many years. On Earth, all ecosystems receive energy from the sun that photosynthesizers can use to produce food. This energy works its way up the food chain for all living things to benefit. As one organism preys upon another, there is not only a transfer of energy, but nutrients in the form of organic matter. We gain carbohydrates, proteins and fats from eating a wide variety of fruits, vegetables, grains and protein. So do animals. Organisms that must find food in their environment to survive are known as **heterotrophs**, while organisms that are able to use photosynthesis to produce their own food are known as **autotrophs**.

1. Cut out the gray labels, blue stickies and green stickies from the page below. These are your tools to build a Food Web Mind Map. You may need to refer to the vocabulary list for definitions.

Gray Labels: arrange the labels onto a sheet of paper or whiteboard. Using the description given, DEDUCE the directions that nutrients and energy are being transferred from one species to another. Draw arrows to indicate all possible transfers that take place. For example: when a human consumes potatoes, nutrients and energy are being transferred from the potato to the human.

Blue Stickies: attach next to the correct gray label. (There may be more than 1 blue sticky per label)

Green Stickies: attach the blue sticky next to the gray labels. (There may be more than 1 green sticky per label)

Secondary consumers prey on primary consumers.

Producers are plants and certain types of bacteria that can undergo photosynthesis.

Decomposers digest and absorb nutrients from any type of dead organic matter.

Tertiary consumers prey on secondary consumers.

Primary consumers are animals that feed on producers.

AUTOTROPH

HETEROTROPH

HETEROTROPH

HETEROTROPH

HETEROTROPH

DECOMPOSER

SAPROTROPH

DETRITIVORE



2. Reflection

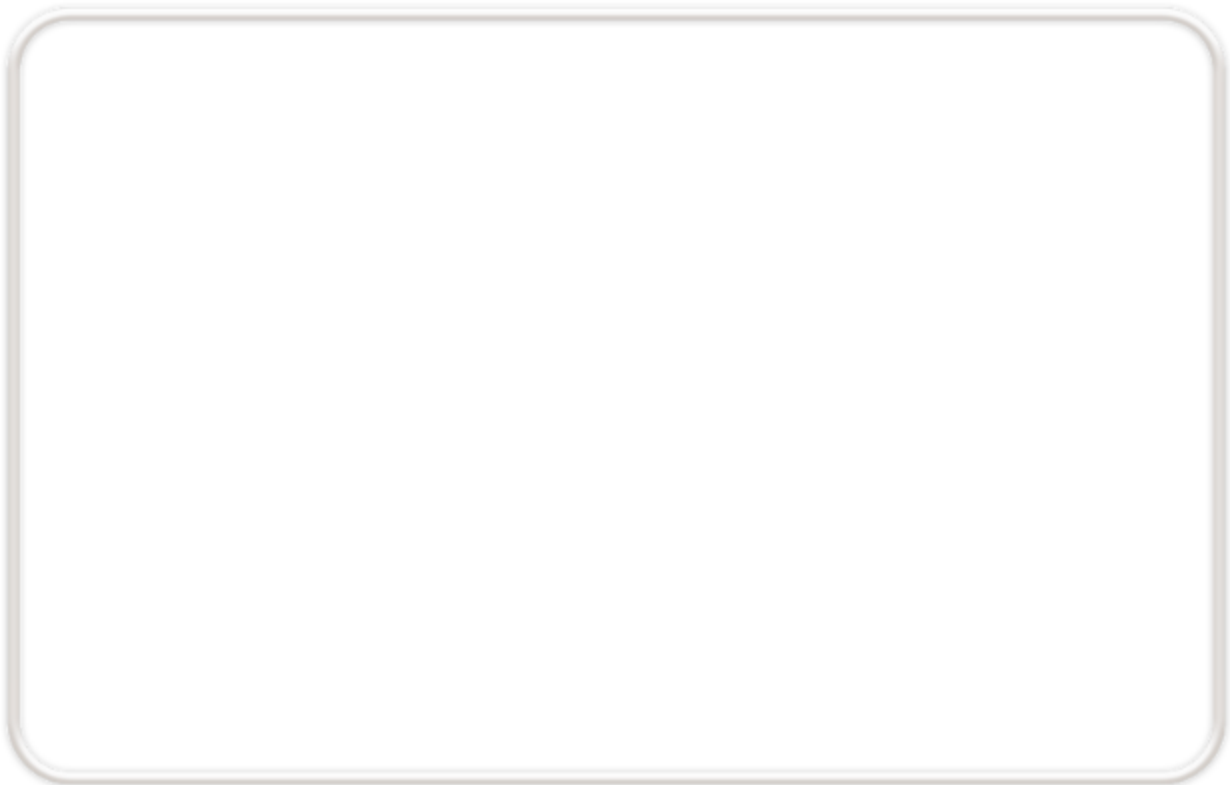
- What might happen if all producers were removed from the food web?
- How would you describe 'nutrients' in your own words?
- What are some observations you can make about fungi in this food web?
- What might happen if all fungi were removed from the food web?

3. Fungi as detritivores lab activity

In this activity you will observe fungi acting as a consumer.



- a. Brainstorm a list below of different substrates (food sources) you think mycelium may eat. Remember where they are on the food chain, and their role in the ecosystem! What is available for you to use? (Some ideas may include: coffee grounds, coconut husks, aspen wood shavings, etc). **Bonus:** what are some natural waste products in your local area that can be recycled in this way?



- b. For fun: Mycelium will even eat colorful dyes or glitter! You can add these to watch what happens.
- c. Choose 1-2 substrates from your list. Where will you acquire some of these substrates?

Substrate 1: _____

Substrate 2: _____

- d. Obtain permission from your teacher to test on these substrates.

Preparing the substrate

- e. Sterilize the substrate you found before use. This is to avoid contaminating your material with other growing bacteria/fungi. You can do this through a few different methods:
- Microwave the substrate on HIGH for at least 10 minutes.
 - Place substrate into a plastic bag and boil the bag. Keep the water boiling for at least 10 minutes.
 - Use a pressure cooker or autoclave, and follow the instructions specific to the apparatus.

Preparing the mycelium

- f. Your teacher will distribute a mini bag of dehydrated material, growth form, alcohol wipes and instruction card.
- g. At Step 1 “Cut Open Bag” of the [growth instructions](#), remove about 1/2 of the GIY material. Your teacher will collect this. Replace this with the same amount of the substrates you have already sterilized.
- h. Continue on through instructions, following Steps 2, 3 & 4.

Evaluation of results

- i. Observe the different types of substrates consumed by the groups in your class. Which substrates seemed to work best for the mycelium? (i.e. which provided the most mycelium growth?)



- j. Which substrates yielded low mycelium growth?

- k. Given what you have observed, what may make a sustainable mycelium that both helps mycelium grow and recycles waste from your local area?