

Do Now

Describe in words or draw using pictures the relationship between:

Mosquitos

Fish

Birds

Humans

Nutrition and Energy Flow: It All Cycles

10-5-10

Objectives

Content:

SWBAT

1. List the two categories of organisms
2. List the 5 types of heterotrophs
3. Define a food chain
4. Provide an example of an autotroph
5. Compare and contrast autotrophs and heterotrophs
6. Explain why autotrophs are more abundant
7. Define trophic level
8. Explain why only some of the food we eat turns into body mass
9. Predict what will happen if one type of heterotroph went missing from the environment.

Language:

By

1-9 Note taking and discussing in class

Agenda

1. Nutrition and Energy Flow
2. Energy is Important to Everyone
3. Organisms Obtain Energy
4. Heterotrophs vs. Autotrophs
5. 5 types of heterotrophs
6. Mater and Energy Flow in Ecosystems
7. Food Chains and Trophic Levels

Nutrition and Energy Flow: It All Cycles

- Do Now 😊
- What is the relationship between the grasshopper and the oriole?



Energy is Important to Everyone

- one important part of organism's niche is how it obtains energy
- Ecologists trace the flow of energy through communities to discover nutritional relationships
- Ultimate source of energy is...the SUN



Organisms Obtain Energy

- **The Producers: Autotrophes**

- Plants use the sun to *produce* energy (photosynthesis)

Autotroph: (organisms that use energy from the sun to *produce* their own nutrients)

Where are the autotrophs in the picture?

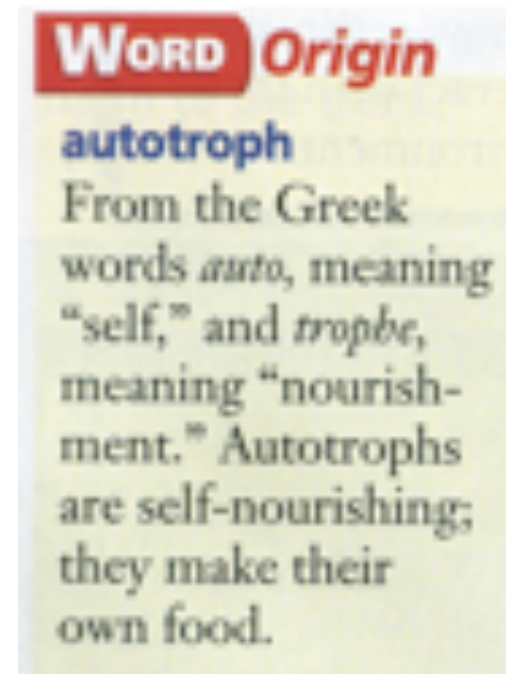


WORD Origin

autotroph

From the Greek words *auto*, meaning “self,” and *trophe*, meaning “nourishment.” Autotrophs are self-nourishing; they make their own food.

Organisms Obtain Energy (cont.)

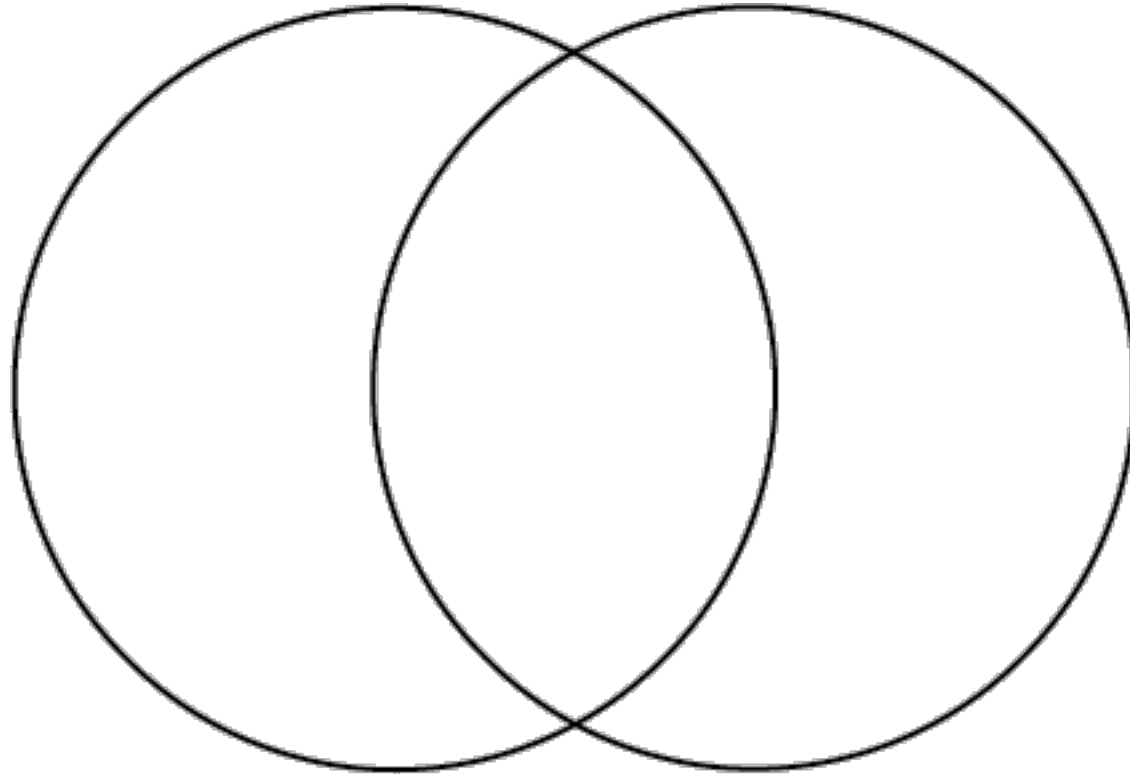


- **The Producers: Heterotrophs**
 - Deer eat clover, Bison eat grass, the Owl swallows a mouse...
 - the Deer, Bison, and Owl cannot make their own food

Heterotroph: (organisms that must feed on other organisms)

Where are the heterotrophs in the picture?

Heterotrophs vs. Autotrophs



5 Types of Heterotrophs

Type of Heterotroph	Characteristics	Example (word or pic)
1.		
2.		
3.		
4.		
5.		

5 Types of Heterotrophs

- **1.Scavengers**: (organisms that feed on decaying dead animals)
- play an important role in ecosystems



Coyotes



Vulcher

Think/Turn/Talk

Imagine if there were no scavengers. What would life be like?

5 Types of Heterotrophs

- **2. Herbivore**: (organisms that feed only on grass and plants)



herbivore

From the Latin words *herba*, meaning "grass," and *vorare*, meaning "to devour." Herbivores feed on grass and other plants.

Think/Turn/Talk

Can humans be *herbivores*? What would they eat? Of which macronutrient (carbs, protein, fats) would this person have trouble getting enough of in her/his diet?

5 Types of Heterotrophs

- **3. Carnivore**: (organisms that feed on other animals)



carnivore

From the Latin words *caro*, meaning "flesh," and *vorare*, meaning "to devour." Carnivores eat animals.

Think/Turn/Talk

What is the difference between *Carnivores* and *Scavengers*?

5 Types of Heterotrophs

- **4. Omnivore**: (organisms that feed on both plants and animals)



omnivore
From the Latin words *omnis*, meaning "all," and *vorare*, meaning "to devour." Omnivores eat both plants and animals.

Think/Turn/Talk

Why is being an omnivore more advantageous than being an herbivore or carnivore?

5 Types of Heterotrophs

- **5. Decomposers**: (organisms that break down and absorb nutrients from dead organisms)

Fungus



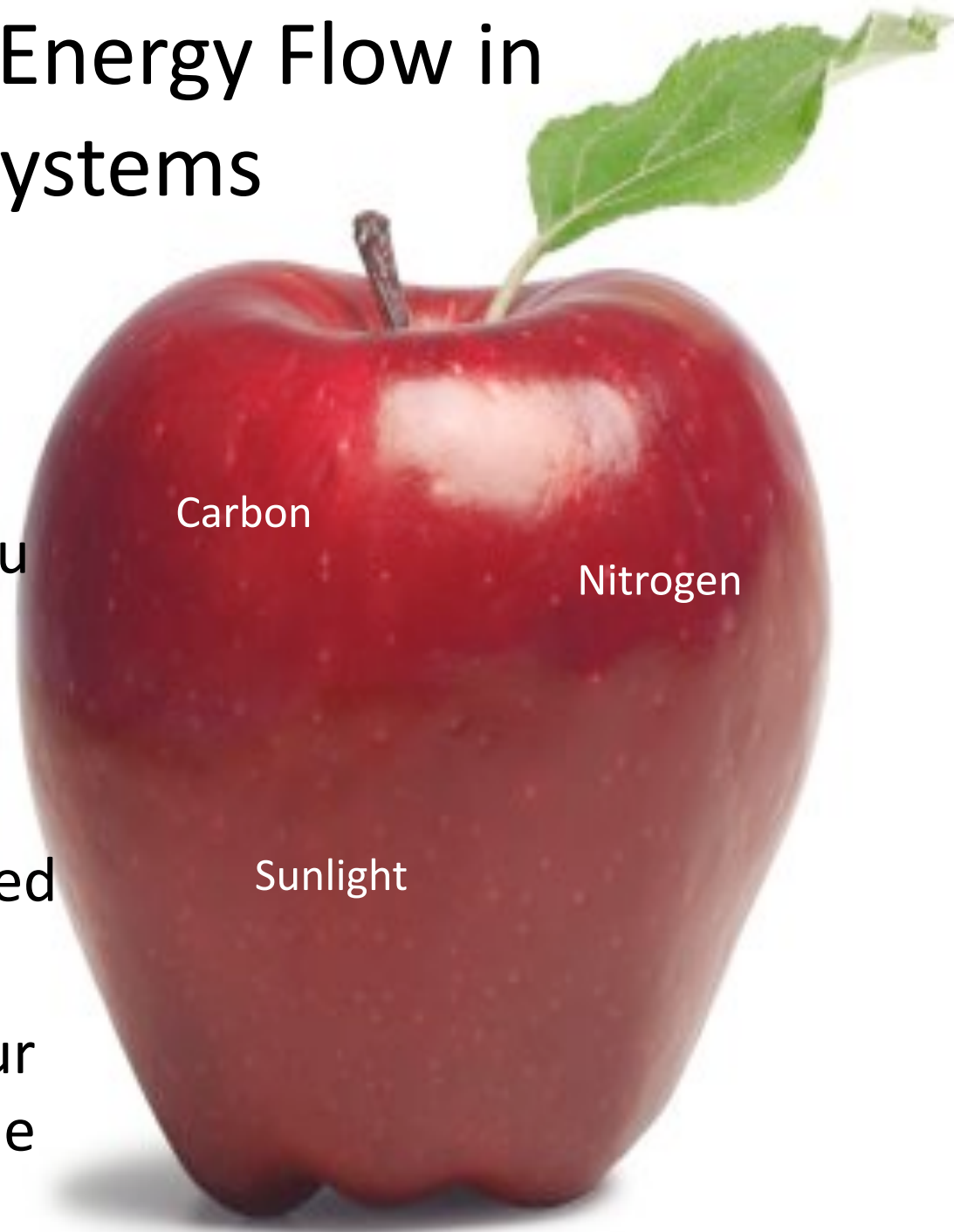
Bacteria

Think/Turn/Talk

What is the difference between a **decomposer** and a **scavenger**?

Matter and Energy Flow in Ecosystems

- Matter and energy flow through organisms in ecosystems
- When you eat an apple, you are not just eating a tasty piece of fruit...you are also eating nutrients
- Some nutrients are absorbed into your body
- Some will pass through your body and get recycled in the environment



Food Chains: Pathways for matter and energy

Food chains: Pathways for matter and energy

The wetlands community pictured in *Figure 2.16* illustrates examples of food chains. A **food chain** is a simple model that scientists use to show how matter and energy move through an ecosystem. Nutrients and energy proceed from autotrophs to heterotrophs and, eventually, to decomposers.

A food chain is typically drawn using arrows to indicate the direction in which energy is transferred from one organism to the next. One food chain in *Figure 2.16* could be shown as

algae → fish → heron

Food chains can consist of three links, or steps, but most have no

more than five links. This is because the amount of energy remaining in the fifth link is only a small portion of what was available at the first link. A portion of the energy is lost as heat at each link. It makes sense, then, that typical food chains are three or four links long.

- Food chains follow a single path of animals eating each other
- Food chains show one option for what the organism can eat



Matter and Energy Flow in Ecosystems

-When a herbivore eats, only a fraction of the energy (that it gets from the plant food) becomes new body mass;

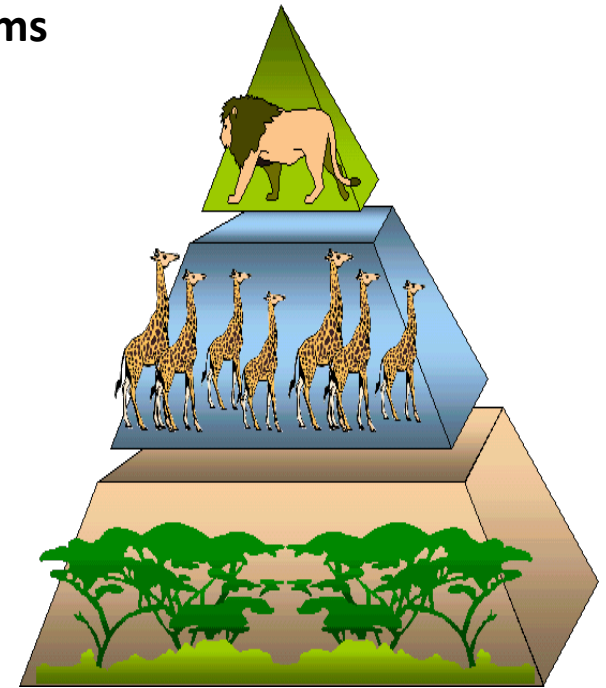
-the rest of the energy is lost as waste or used up by the herbivore to carry out its life processes (e.g., movement, digestion, reproduction).

-Therefore, when the herbivore is eaten by a carnivore, it passes only a small amount of total energy (that it has received) to the carnivore.

-Of the energy transferred from the herbivore to the carnivore, some energy will be "wasted" or "used up" by the carnivore.

-The carnivore then has to eat many herbivores to get enough energy to grow.

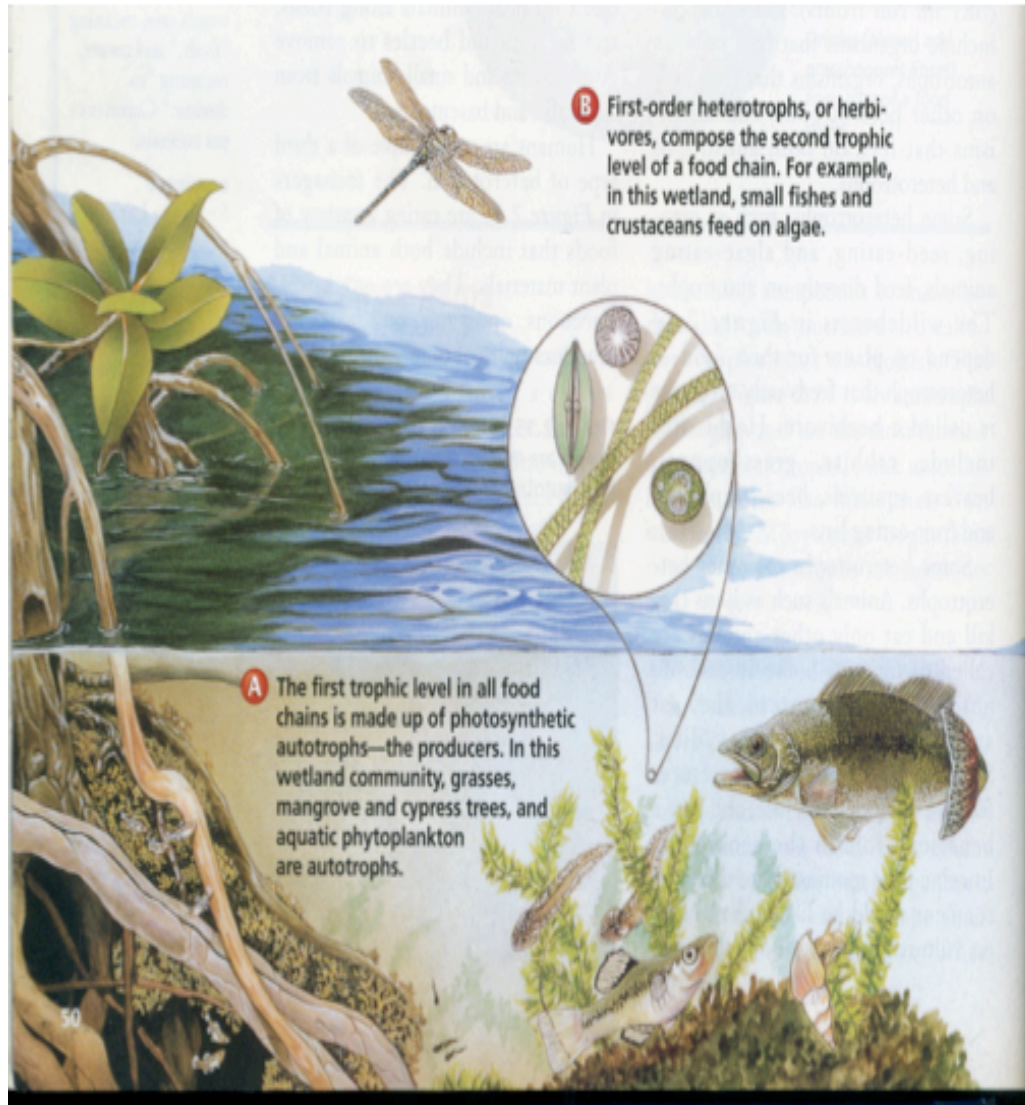
-Because of the large amount of energy that is lost at each link, there is less energy at higher **trophic levels**: (each organism/step in a food chain)



Think/Turn/Talk

Why do autotrophs always more abundant and occupy the lowest level of the ecological pyramid?

Matter and Energy Flow in Ecosystems



Matter and Energy Flow in Ecosystems

1. A **food chain** is: ()
2. Nutrients move from _____ to _____, and eventually to _____.
3. There is more energy available at the _____.
4. The arrows in a food chain show _____.
5. Why are food chains usually only 3 or 4 links long?
6. In words, explain the following food chain
– Algae → Fish → Heron (bird)