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Chapter 5– Section 2 Energy Flow in an ecosystem

Based on how they get energy they classified as two main types:

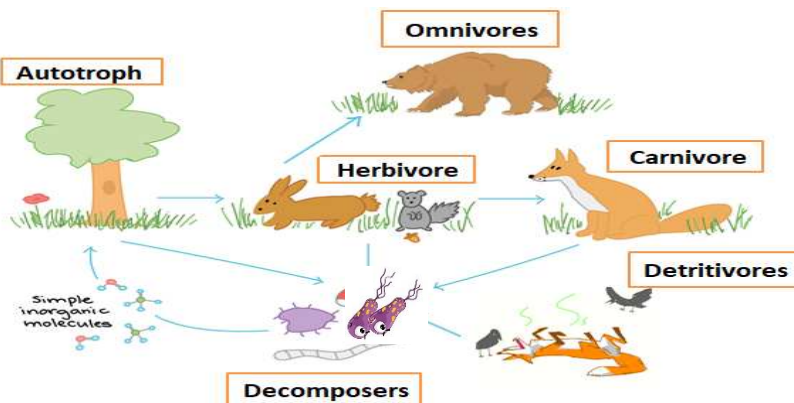
Heterotroph

كائن غيري التغذية

An organism that gets its energy requirements by consuming other organisms. Also called **Consumers**

There are 5 types of Heterotrophs:

Example مثال	Definition التعريف	Types الأنواع
Cow and Rabbit	Organisms eat only plants	1- Herbivores 1-أكل النباتات.
Wolves, Lion, lynx	Organisms eat other heterotrophs	2-Carnivores 2-أكلات اللحوم
Human, Bears and mockingbirds.	Organisms eat plants and animals.	3- Omnivores 3-كائنات متعددة التغذية
Worms, aquatic insects, Eagle, hyena	Organisms eat fragments of dead matter in an ecosystem. Return nutrients to the soil, air and water.	4- Detritivores 4- الكائنات الكانسة
Bacteria and fungi	Breakdown dead organisms by releasing enzymes	5-Decomposers 5- المحللات ...



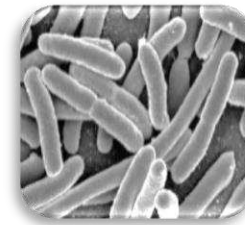
Autotroph

كائن ذاتي التغذية

An organism that collects energy from sunlight or from inorganic substances to produce food. Also called "**Producers**"

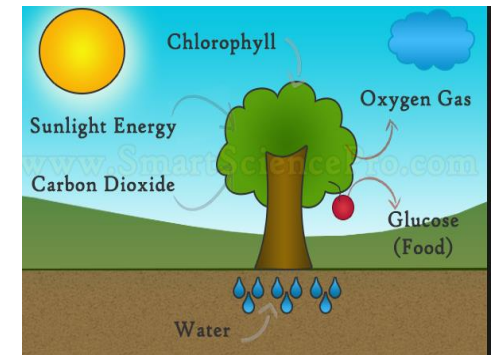
Example 2: Bacteria

When sunlight is unavailable, some bacteria use hydrogen sulfide and carbon dioxide to make food.



Example 1: Plants

Organisms that contain **chlorophyll** absorb energy during **photosynthesis** and use it to convert the inorganic substances like **carbon dioxide** and **water** into organic substances (food).



What is the importance of Detritivores and Decomposers for the Autotroph?

Provide the nutrients for the autotroph (plants)



Energy Flow in the Ecosystem

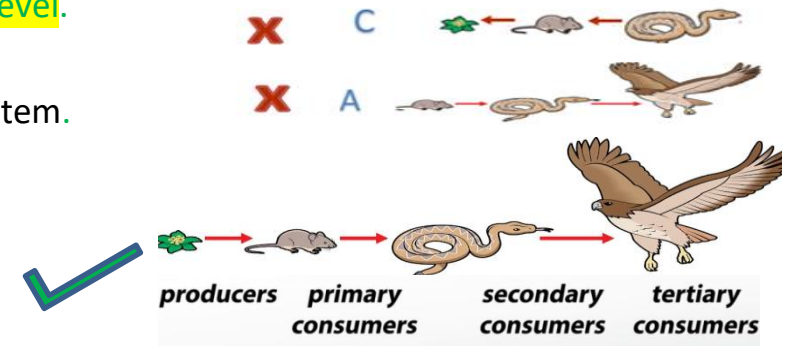
A- The food chain

	3Energy models	Definition
1	A food chain سلسلة غذائية	A simple model that shows how energy flows through an ecosystem .
2	A food web شبكة غذائية	Many interconnected food chains and pathways in which energy flows through a group of organisms.
3	Ecological Pyramids الهرم البيئي	A diagram that can show the relative amounts of energy , biomass or numbers of organisms at each trophic level in an organism.

➤ Each step in food chain or food web and ecological pyramids called **trophic level**.

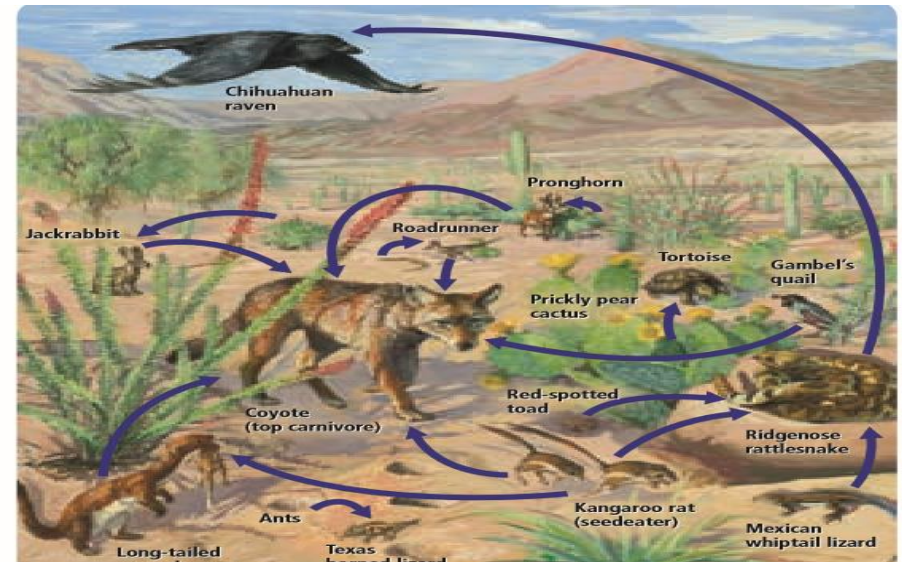
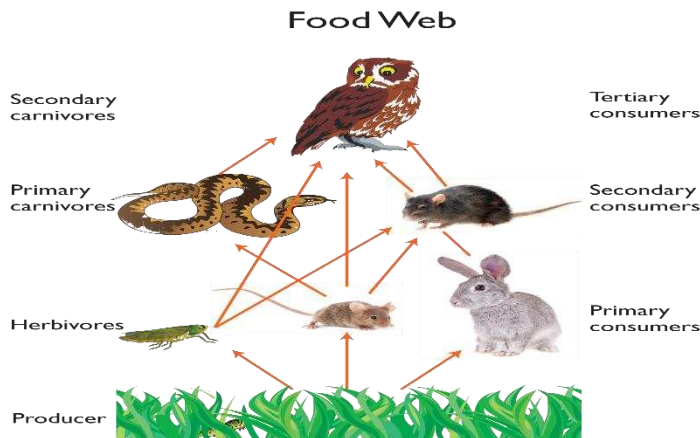
➤ **Plants (Autotrophs , Producers)** make up the first trophic level in all ecosystem.

➤ Represent the **one way energy flow**.



B- The Food web

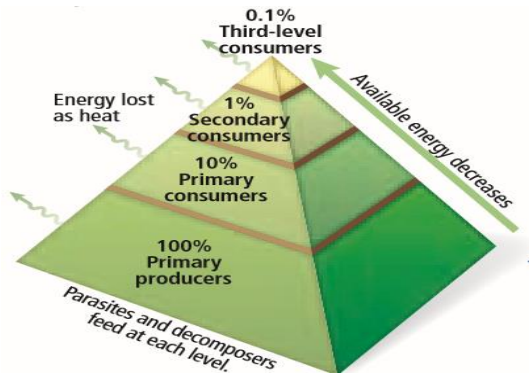
➤ Food web most often used to represent the feeding relationships



3-Ecological Pyramid, three types

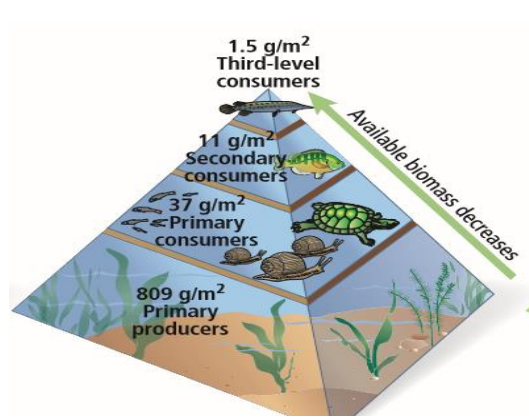
Pyramid of Energy

In a pyramid of energy, each level represents the amount of energy that is available to that trophic level. With each step up, there is an energy loss of 90 percent.



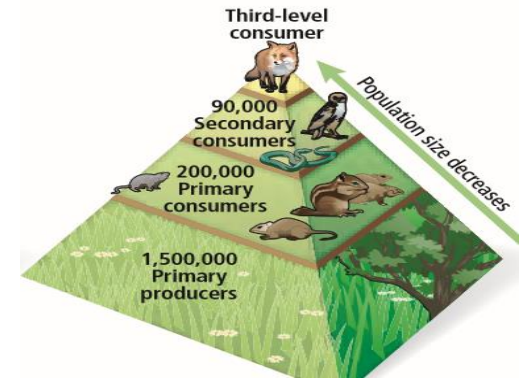
Pyramid of Biomass

In a pyramid of biomass, each level represents the amount of biomass consumed by the level above it.



Pyramid of Numbers

In a pyramid of numbers, each level represents the number of individual organisms consumed by the level above it.



Questions

Q1- In the energy pyramid how much energy transferred to the next level?

Andy why? 10 % ...

Energy is decrease; because organisms are consuming energy in cellular processes Or the energy is released to the environment as heat..

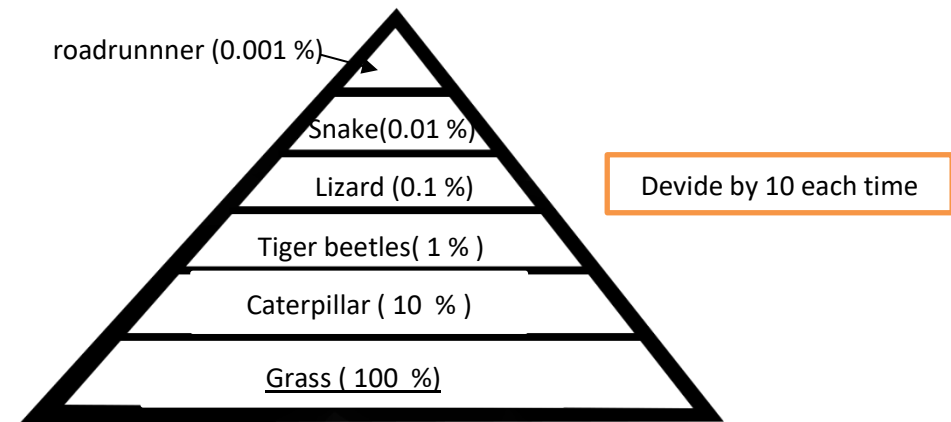
Q2- What is the Biomass?

Biomass is the total mass of living matter at each trophic level.

Q3- What is happening to the number of organisms at each trophic level?

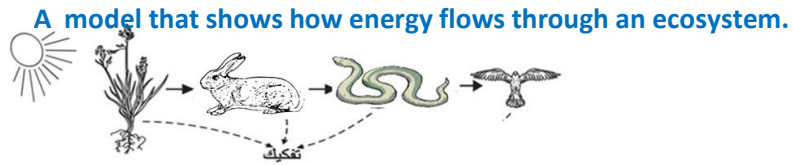
And why? .Decrease, because there is less energy available to support organisms.

Q-4 Critical thinking: Draw and energy pyramid for a food chain made of grass, caterpillar, tiger beetles, lizard, snake, and a roadrunner. Assume that 100 percent of energy is available for the grass. At each stage , show how much energy is lost and how much is available to the text trophic level.



Test your understanding

A – Food Chain



Q1 -Based on the above figure, answer the following question.

- 1-The main source of energy for all organisms is **Sun**
- 2- The producers in this food chain is **plant**.
- 3- The first consumer (herbivore) is the **Rabbit**
- 4- The second consumer (carnivore) is the**Snake**...
- 5- The third consumer (carnivore) is the **Falcon**
- 6- What we call the organisms that breakdown the organic residues of all organisms above?**Decomposers**

Q2 - Explain how the energy flows in this ecosystem. Use the given words..
(the plant - environment – food – the second – the third – cellular processes)

- 1 The plant takes part of the sun energy and converted into ... **food**
- 2- The energy transfer from the producers (...**plant**...) to the first consumer (Rabbit) , then to ...**the...second** consumer(snake), then to**the third**..... consumer (falcon).
- 3- The organisms used the energy for **cellular processes** (Growth, build new cells).
- 4- The rest of energy is released into the surrounding **environment**.

B- Food webs

Q1- Draw a web chain by using the following organisms:
Grasshopper – plants- carrot – bird – Mouse- Rabbit – snake - Owl - Falcon

Creating a Food Web – Draw and Connect

