Khalifa City A School **Cycle 2**	دائـرة التـعـلـيـم والـمـعـرفـة DEPARTMENT OF EDUCATION AND KNOWLEDGE	**Science Grade (5)** **Term (1)** **2018 /2019**

Chapter (3)

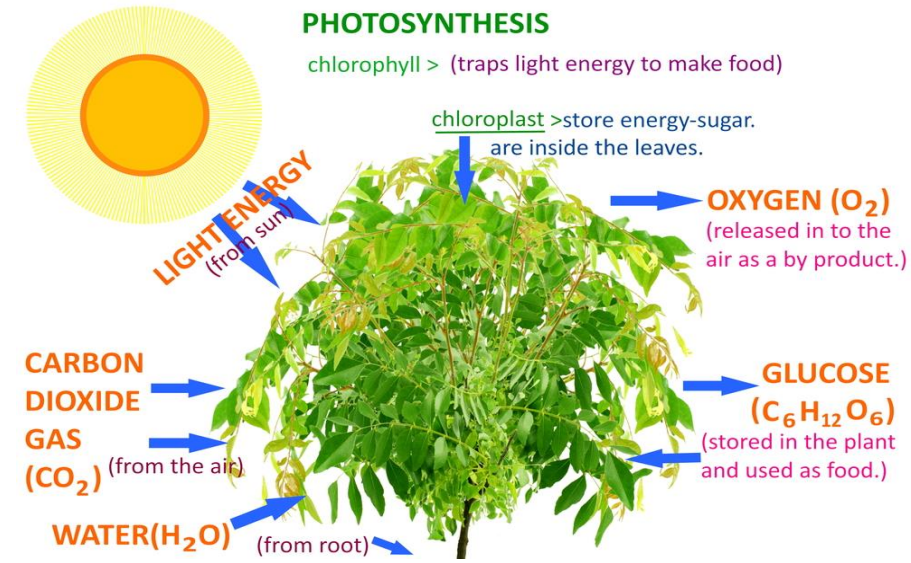
Interactions in Ecosystems

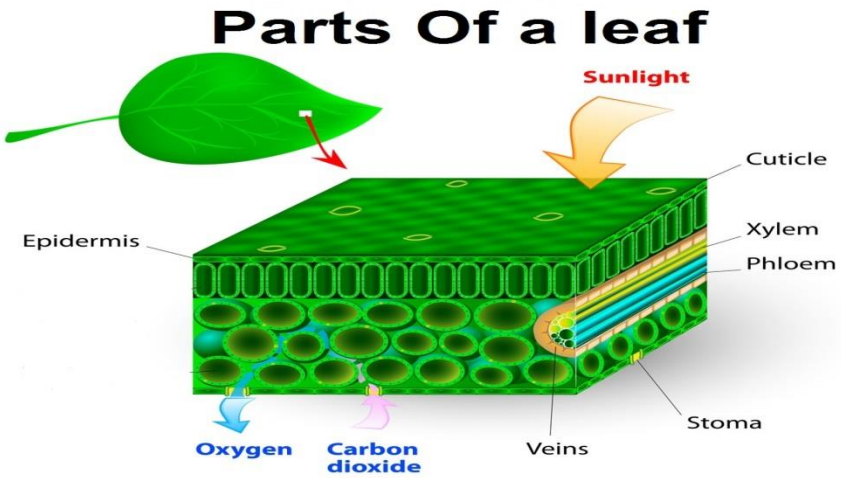
Lesson 1: Photosynthesis

Lesson 2: Energy Flow in Ecosystems

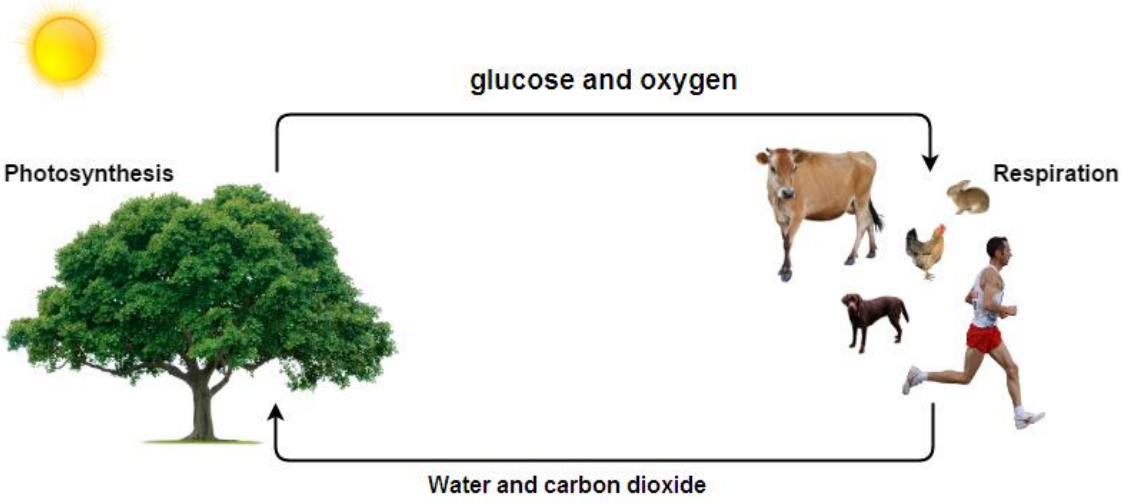
Lesson 3: Relationships in Ecosystems

Lesson 4: Adaptation and Survival





photosynthesis and respiration cycle



- **Photosynthesis:** **is the process of making food using sunlight in the plant(the plant use sunlight, water and carbon dioxide to perform photosynthesis)**

(Photosynthesis formula)

Reactants → **Products**

$$6CO_2 + 6H_2O + \text{Energy} \longrightarrow C_6H_{12}O_6 + 6O_2$$

Carbon dioxide + Water + (Sunlight) → **Sugar + oxygen**

(Carbohydrates, glucose)

Note: - **What raw materials does a plant need for photosynthesis?**

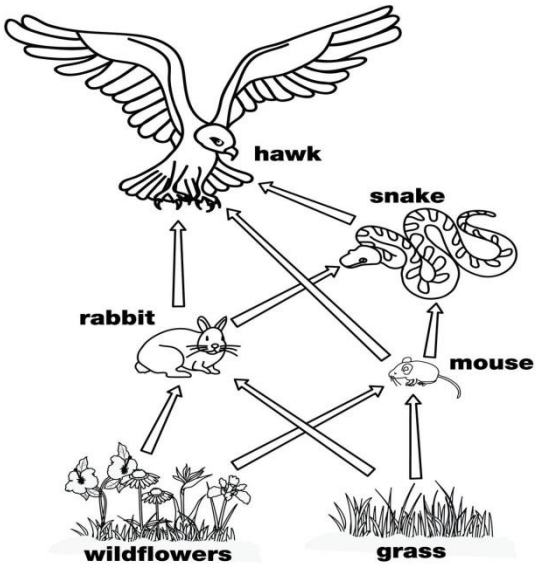
- **Carbon dioxide and water.**

Note: - **Sunlight isn't a raw material.**

Chloroplast:	**is a structure inside the plant cell where the plant making their own food**
Chlorophyll:	**is a green chemical which is found in the chloroplast inside the leaf cells and it capture energy from the sun**
Sunlight:	**is a form of energy that plants use to make their food. More sunlight result in the production of more sugars**
Stomata:	**are tiny pores in the plant leaves and also in some stems where the carbon dioxide need to carry out photosynthesis enters from the air to the plant. The opening closing of stomata is controlled by two guard cells**
Xylem:	**the tissue that carried the water from the roots to the leaves**
Epidermis	**is the outmost layer of a leaf which has the cells where the photosynthesis occurs**
Cuticle:	**a layer that prevent water loss.**
Phloem:	**is a tissue that transports the sugars (carbohydrates) to the plant's cells.**
Carbohydrate	**(sugar that plant produce during photosynthesis) is a name give to a group of substance made from carbon,hydrogen and oxygen**
Transpiration:	**is the loss of water from the plant leaves.**

Ecosystem:	are all living (biotic) and non-living (abiotic) things in an environment
Abiotic:	are non-living things like soil, sunlight, air and water
Biotic:	are living things like plant and animals
Population:	all members of a single species in an area at a given time
Community:	Is made from many different populations including all the living things in an ecosystem.
Food chain:	Model the feeding relationships between organisms in an ecosystem and the energy in food chain starts with the sun.
Producers:	are organisms the use the sun's energy to make sugar and oxygen and they are the base of every food chain (Plants)
Consumers:	Is any animal that eats plants or other animals
Herbivores:	animals that eat producers (plants) like squirrels, some birds, some insects and grazing animals
Carnivores:	animals that eat other animals like bobcats and hawks
Omnivores:	are animals that eat both plants and other animals like raccoons, mice and some crabs
Decomposer:	are organisms that obtain energy by consuming wastes and dead organisms like fungi, bacteria, termites and many worms' species
Scavenger:	Is a consumer that eats the remains of dead animal that it did not hunt or kill like vultures, raccoons, jackals, crowns and some crabs
Food web:	Is a network of food chains that has some links in common.
Predator:	Is a living thing that hunts and kills other living things for food
Prey:	are organisms that are eaten by predators
Energy pyramid:	is a diagram that shows the amount of energy available at each level of an ecosystem

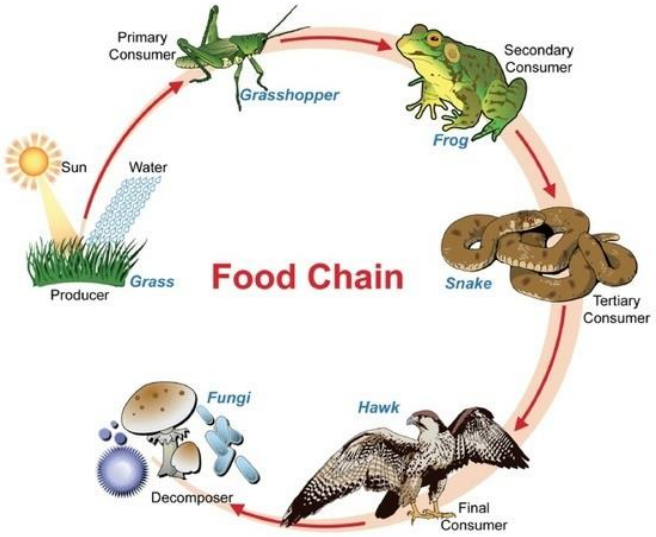
Food web



A food web shows how energy is passed on from one living thing to the next. It shows the feeding habits of different animals that live together in an ecosystem.

In the food web energy is passed from the grass to the mouse to the snake to the hawk.
Producers are living things that make their own food with sun and air. The producers are pictured at the bottom of the food web.
Consumers are living things that eat other living things.

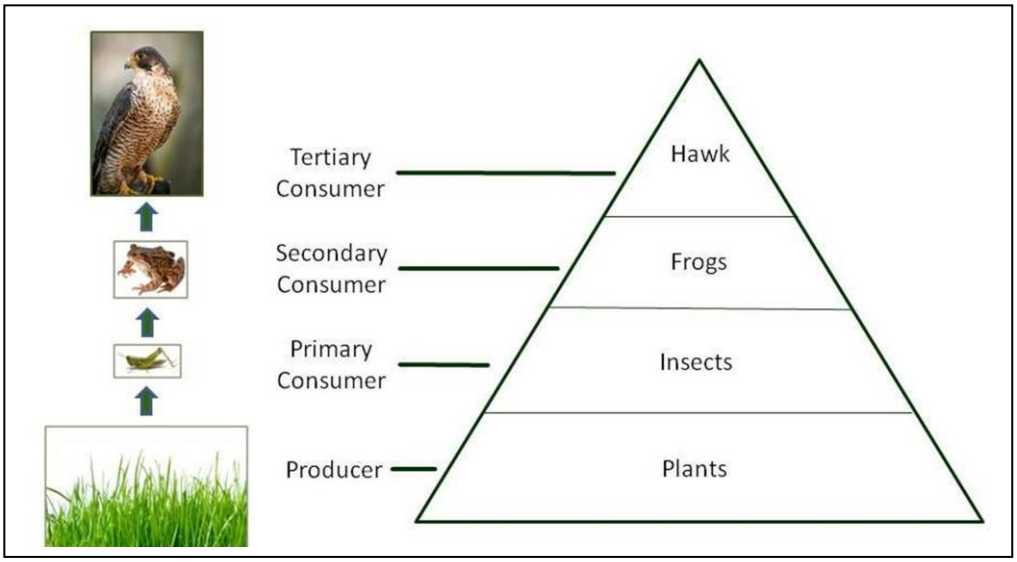
Food Chain



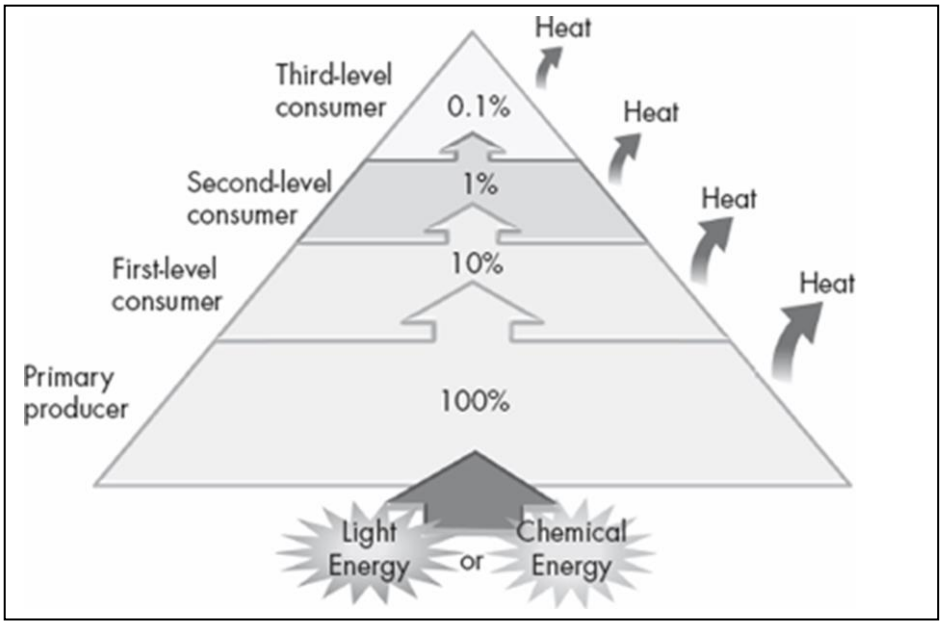
How do energy pyramids compare?

When a producer is eaten about 10% of the energy gets to the consumer

There is less energy and less animals at each level as it goes up



Energy, pyramids illustrate that it takes a huge number of organisms to support an ecosystem. The bottom of the pyramid represents the producers. It is the largest level because it contains the most organisms and therefore the most energy. There are fewer numbers of organisms and less available energy at each level of the pyramid.



What happens when a top carnivore is removed from a food web?

- When top carnivores are removed from a food chain, prey populations are no longer controlled. Now prey organisms can reproduce in number, more producers are required to supply them with energy. For example, if you removed the bobcat from the forest food web the populations of birds, mice, and raccoons would increase. Soon there would be less grass, trees and other producers to support these organisms.

- Red tides can occur when nutrient-rich deep water gets brought to the surface after a storm. With so many nutrients in the water, the algae keep reproducing.
  Toxins produced by the algae can cause the organisms that eat the algae such as small fish to die

limiting factor:	**is any resource that restricts the growth of populations.** **for example a forest can support many more populations in summer; than in winter.**
The Carrying capacity:	**is the greatest number of individuals within a population that an ecosystem can support** **For example a rain forest can support a certain number of jaguars. If the jaguar population increases, their food becomes harder to find. Soon some of the jaguars die and the population returns to its former level**
A habitat:	**is the physical place where an organism lives and hunts for food. Some organisms have very small habitats.** **for example pill bugs spend most of their time under and around a stump or rock.**
A niche:	**is the special role that an organism plays in a community. For example, two bids might live in the same location and eat the same food. But one bird is active at night while the other is active during the day. Therefore, the two birds occupy different niches.**

Symbiosis:

Is a relationship between two or more kinds of organisms that lasts over time.

Mutualism:

A symbiotic relationship that benefits both organisms
Example for mutualism:

1. **The relationship between a pollinator and flowering plant (the pollinator usually an insect or a bird gets sweet nectar from the flower. The plant gets its pollen transported to the pistil of another flower. Both organisms gain from the relationship.**
2. **The relationship between ants and acacia trees:**

The acacia tree provides food and a home for the ants, in turn the ants defend the tree against other insect pests.

Commensalism:

A symbiotic relationship that one organism has benefit without harming other.
Example for commensalism remoras are fish that attach themselves to the bodies of rays and sharks. The remora gets food and protection from the ray. In any way, remora does not hurt it, and does not help either.

Parasitism:

is a symbiotic relationship where one organism benefits and the other is harmed.
Example for *Parasitism,* parasite lives in or on a host organism and benefits from the relationship. Some parasites are very harmful for the host organism. Millions of people around the world have parasites called tapeworms. These worms live inside a person's intestinal tract. Tapeworms more than 70 cm in length have been found in humans. Tapeworms can harm their hosts by causing fevers and digestive problems.

	Mutualism	Commensalism	Parasitism
Definition	Benefits both organisms	Benefits one organism without harming the other	One organism benefits and the other harm
example	•Pollinator (insect or bird) and a flowering plant •Ants and acacia trees •Lichens (the fungus and algae)	• Remoras are fish attach themselves to the bodies of rays and shark to get food,Transportation and protection • Orchids growing on trees in a rain forest.	• Ticks and parasims on animals • Tapeworm in human • Amoeba cause a disease called dysentery

Adaptation	Is any characteristic that helps an organism survive in its environment
Structure Adaptation	Are adjustment to internal or external physical structure Ex: fur color, long limbs, strong jaws, and the ability to run fast.
Behavioral adaptation	An adjustment in an organism's behavior .ex. wolves traveling in packs. Birds, fish and butterflies migration.
Migration	Is the movement of animals to find food. Reproduce in better condition or find a less sever climate
Hibernation	Is a period of inactivity during cold weather. Ex:bats, turtle, frogs and snakes.
Nocturnal:	Desert animals that are active at night
Camouflage	Any coloring, shape or pattern that allows an organism to blend in with its environment
Protective coloration	Is a type of camouflage in which the color of an animal helps it bland in with its background example: • In winter, the arctic fox has a white coat that blend in with the snow • In summer, the fox's coat changes color to help it blend in with the plants that grow in the worm weather. • Tiger's strips make it difficult to see in the grass
Protective resemblance	Matching the color, shape and texture of an environment
Mimicry	An adaptation in which an animal is protected against predators by its resemblance to an unpleasant animal example • Viceroy butterfly look like poisons monarch butterfly • Robber fly resemble the dangerous bumblebee • The king snake mimics the coloring of the poisons coral snake

Plant Adaptation:

Plant	Adaptation
Cacti	• Thick waxy stem to prevent water loss • Dense shallow roots to soak up rain quickly
Oak tree	• Loose their leaves in winter to prevent water loss
Moss	• Complete their life cycle in a shortened growing season
Water lilies	• Have stomata on the top surface of the leave instead of the bottom to take in and release carbon dioxide and oxygen
Milkweeds	• Produce chemicals that are poisons to most animals to protect the plant from the predators

Animal Adaptation:

Plant	Adaptation
Animal lives in cold climate	• Have thick fur and extra body fat that keep them worm
Desert animal	• Are nocturnal or active at night to search for food • They stay in shelters or underground burrows during the to avoid the heat.
Aquatic animals (animals live in water)	• Swim quickly • Can breathe under the water • Can hold their breath for long periods of time
Prey animals	• Gazelles can run at speed of up to 80 km/hr to escape from predator • Skunks spray a bad smelling liquid
Predator animals (Owls)	• Ears excellent in hearing • Large eyes to see tiny prey • Large muscular wings to help it swiftly hunt for prey • Feet with large claws for hunting