Expalnation : Types of nutrition

The teacher begins the class by asking the students what nutrition is and what are the types of nutrition . He begins by taking answers from the students and then begins explaining the lesson.

Nutrition:

All living things require some form of nutrition. Nutrition is how living organisms take in and use food materials. This provides them with the materials needed to carry out other life processes: reproduction, growth, and repair and maintenance of their internal environment.

The fascinating thing about nutrition is the variety of how different organisms can obtain it.

Some animals, like us, simply eat other organisms, but plants can obtain their own food by converting sunlight into chemical energy.

There are even some amazing creatures that live deep under the sea in hydrothermal vents that obtain their energy from chemicals like hydrogen sulfide, which would be toxic to ahuman! However, this is how these creatures obtain their nutrition.

All living organisms use a process called cellular respiration to release energy from their food.

Key Terms: Nutrition and Cellular Respiration

Nutrition:
Nutrition is the assimilation by living organisms of food materials that enable them to grow, maintain themselves, and reproduce.

Cellular Respiration:
Cellular respiration is a process in living organisms through which carbon-containing compounds (such as glucose) are broken down to release energy in the form of ATP.

Modes of Nutrition Autotrophic and Heterotrophic:

There are two broad classifications of the methods of nutrition: autotrophic and heterotrophic.

The suffix "-trophic" means "food," while "auto" means "self." This explains why autotrophic organisms acquire their nutrients by making their own food, like how plants convert sunlight into sugars within their cells.

Hetero" means "different," and heterotrophic organisms, such " as most animals, acquire nutrients by consuming, or ingesting, a different organism.

We are going to look into these two types of nutrition in more detail.

Then the teacher begins by showing the students pictures of different types of nutrition, such as plant nutrition and animal nutrition, and begins by asking the students what are autotrophic organisms and what are heterotrophic organisms

From here, the teacher begins talking about this part in detail:

Definitions: Autotrophic Organisms and Heterotrophic Organisms:

<u>Autotrophic Organisms:</u>
Autotrophic organisms are able to synthesize their own food from inorganic materials.

<u>Heterotrophic Organisms:</u>
Heterotrophic organisms obtain food from consuming other organisms or organic matter.

Autotrophs: Photoautotrophs
Autotroph is the name given to any organism that carries out autotrophic nutrition.

Green algae, some bacteria, and plants such as the sunflower are an example of autotrophs, as they make their own food. They do this by converting light energy from the Sun into chemical energy (glucose) in a process called photosynthesis.

For this reason, they can be classified as photoautotrophs, the "photo-" prefix meaning "light." They also absorb minerals and water from the soil to help them build up large molecules in their cells and to carry out their life processes.

Autotrophs: Chemoautotrophs

There are other types of autotrophs too. One such grouping is a chemotroph, "chemo-" meaning "chemical" referring to their method of nutrition, which is converting one type of chemical into another. This process is called chemosynthesis.

Chemoautotrophs are usually found in locations with little light, which are full of chemicals that would be toxic to other organisms. They make good use of these chemicals, however, by converting them into sugars like glucose to be used in cellular respiration to release energy.

Bacteria as an Example of Chemoautotrophs:

The bacteria shown in the diagram live in deep-sea hydrothermal vents and convert hydrogen sulfide in the smoke from these vents into usable energy sources.

They use carbon dioxide and the hydrogen sulfide to produce important sugars as glucose for a source of energy.

These organisms are speculated to be one of the first groups of living things to live on Earth, and some scientists believe they may even exist on the dark and toxic moons of Jupiter.

Heterotrophs:

Heterotroph is the name given to any organism that obtains its nutrition heterotrophically. Heterotrophs get their food by eating or absorbing another living, or once living, organism. This might be by eating plants or other animals or breaking down parts of those plants and animals using enzymes and absorbing the remains.

The heterotroph must digest the organism it uses for its nutrition.

Some heterotrophs like fungi digest, or break down, the organism before absorbing the nutrients.

Others, like humans, ingest (eat) the organism first, and then digestion occurs thanks to the enzymes and organs of our digestive system breaking down the large molecules into smaller ones.

Once digestion has occurred, regardless of its method, the smaller molecules can then be used by cells to build up a variety of different useful molecules to carry out their functions.

Heterotrophs: Parasites
Parasites live on or inside another organism that is called its host. The parasite, for example, Plasmodium falciparum, which is responsible for causing malaria, will get its nutrition at the expense of the host. The Plasmodium parasite does this by infecting human red blood cells and absorbing their nutrients.

Many parasites are associated with disease, as often in the process of gaining their nutrition, the host will either lose some of their own source of nutrition or be harmed in the process.

Malaria is the cause of more than 400 000 deaths per year, most of which are young children living in sub-Saharan Africa.

Parasitic Plants:
Some plants can also be parasites; for example, the tree in the picture has another parasitic plant's roots surrounding its trunk.

This parasitic plant is likely "stealing" the nutrients that the tree has made through photosynthesis or obtained from the soil.

This is a common trick used by plants, lower down in the canopy, that cannot access enough light for photosynthesis or nutrients from nutrient-poor soil themselves.

Heterotrophs: Saprophytes
Another form of heterotroph is called a saprophyte. "Sapro-" means "rotting" and "-phyte" relates to feeding, as saprophytes, which are typically bacteria or fungi, usually get their nutrition from dead and rotting material.

Saprophytes do this by releasing enzymes from their cells to the extracellular environment when they are in contact with decaying organic matter, like dead leaves or dead tree stumps.

Thus, saprophytes play the role of decomposers because they break down dead organism.

Once the organic matter has been digested by the enzymes particles are then released by the saprophytes, the smaller absorbed by the saprophyte. This is called extracellular digestion, as it occurs outside the saprophyte itself.

Heterotrophs: Holozoic

The last form of heterotrophic nutrition we will look into is called holozoic nutrition, and it will likely be the one you are most familiar with. Holozoic nutrition involves anything characterized by ingesting and digesting solid, liquid, or gaseous food particles internally

There are three main types of holozoic nutrition: carnivores, herbivores, and omnivores

Humans, dogs, and many other animals exhibit omnivorous feeding habits, which means that they gain their nutrition from consuming and internally digesting both plant and animal matter. Carnivores, such as lions, snakes, sharks, and even spiders, gain their nutrition from consuming animal matter only.

Herbivores, such as goats, cows, rabbits, elephants, and mice, gain their nutrition from consuming plant matter only. Some humans classify themselves as herbivores too!

At the end of the class, the teacher presents questions to the students, which the students can answer to ensure that the students understand the lesson.