

Laurea Triennale in Scienze Biologiche

English for biological science students

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LESSON 1: BIOLOGY OF ANIMAL

1. Reading the paragraphs

Your task is to read these paragraphs and understand them to answer the questions below



As we have already discovered, Biology is the study of living things. Exactly what is a living thing? That can sometimes be a hard question to answer. Rather than try to define exactly what a living thing is, we are going to talk about the characteristics of different living things or organisms

Do you remember your first encounter with a living thing other than a person? Like bugs crawling around or spiders spinning their webs. Or may be it was a flower you saw blooming or a tree that you climbed, or perhaps it was the first fish you caught. All of these different forms of life, like us, require similar things to survive. One of the main things that all living organisms have in common is a compound known as DNA. These "blue – prints of life" help to direct the most basic needs living organisms have: metabolism, growth, and reproduction. Let's talk about each one of these characteristics individually in order to see their importance and how they are held in common by living things.

We talk of metabolism being the process that involves changing matter from an outer environment and transforming that matter within the cells of a living organism, so that organism can benefit from the energy being produced by metabolism and then uses it for the other necessities of life. Look at it in this way. We need to have the energy and strength to do what ever it is we do in life, play, study, work, or simply to maintain a health body. We need to eat. Let's say we eat an apple. Eating the apple is the process by which we take matter from the outer environment insides our bodies so that the cells in our bodies can transform the apple into substances that our body can use to help us live. One thing that happens as a result of talking in matter (like the apple) from the outer environment and putting it to work of forming it into usable substances is growth. You know that as you eat more you are able to grow. This is the same for any living organism. The more energy it can transform the more it can build itself and grow.

Along with being able to transform matter into usable energy, living organisms have the ability to make copies of themselves in order to insure that life will continue. As we have seen, this is called reproduction. This is often considered as an extension to growth process. There are two types of reproduction that characterize living things. The first is known as asexual reproduction. A good example of this type of reproduction is the bacteria. Bacteria grow and soon reach maturity. Once they've reached maturity they split into two separate organisms, each being (almost) identical. Thus, asexual reproduction has occurred where there is one parent and the cell(s) produced is/ are essentially identical. The other type of reproduction that is used by more complex living organisms is where two different parents join to produce a new organism and is known as sexual reproduction.

Another characteristic of living thing is that they are organized in what we'll call an increasing order. For example, when you look at a car or a house, you see the entire object or structure. Likewise, when you look at pine tree or an elephant you see the whole object. What we don't see are the individual parts like every nail in the house, or every hose in the car. The bottom line is that the entire object is made up of the bunch of smaller objects that perform a specific task. . We will study these different levels of organization as they deal with subatomic particles (protons, neutrons, and electrons) that form atoms, and combination of atoms that form molecules (like water). We will also see that cells contain smaller units called organelles that work together in sustaining life within the cell. Getting increasingly larger we see how cells that perform similar function form tissues which in turn form organs. The organs join to form organ systems which ultimately form multicellular organisms. Organisms then form population of similar organisms, populations of different organisms form a community and this, when combined with the physical environment is called an ecosystem. Different ecosystems join together to form the biosphere - or this world in which we live.

To give a brief example of this, let's look at our own human experience. When you think about it, our bodies are made up of billions and billions of atoms (which are made of the subatomic particles). These atoms form molecules (like sugar) which help us to live. Each one of the cells in our body has tiny organelles that help the cell to survive. Cells with like functions are joined together to form tissues, like muscle tissue. These tissues join to form an organ like the heart (a muscle) and the heart and all the other organs in the body (liver, eyes, stomach) make us a living organism. All human are alike and thus form a population, which, when joined with the other types of organisms around us (like trees birds, and other animal) form a community. One community in a specific area (for instance the community of living organisms in a desert) forms an ecosystem. And, the different ecosystems (like mountains, oceans, rivers, arctic regions, etc) come together to form the biosphere.

Seeing how all these things rely on the others in order to live make it easier to understand the cycle of life or the food chain (as it is sometimes called). Put in simple terms, all organisms rely on other organisms for survival. Lions eat other animals like the antelopes or gazelles for their energy, while the antelopes and gazelles eat grass for their energy. The grass receives its energy and nutrients from the sun and the decomposed bodies of animals that have died. So the grass goes into the antelope

which goes into the lion which, after time, goes back into the grass being decomposed and it is one continuous cycle. In biology we have special terms for these different organisms within the food chain. The grass (and mainly all plants) is called producers, since they produce energy from the sun by means of the process known as photosynthesis. The antelopes that eat the grass (herbivores) and the lions that eat them (carnivores) are known as consumers. And once the consumers have gone, the decomposer (bacteria, fungi, etc) break up the organic material to be used by the producers. Incidentally, when the producers have also died, they are taken care of by the decomposers as well. And everything has its place in this cycle and biology helps us understand each place and function within cycle of life.

Vocabulary

Bio- life, living things

Eco- environment

Photo- light

Synthesis process of putting simpler building blocks together to form more complex blocks

-logy study of

Biology the study of life or living things

Environment the surroundings of any organisms

Ecology the study of environment

Photosynthesis the process by which plants transform the energy of the sun into usable energy as sugars

Metabolism the exchange of chemical matter with the outer environment and the transformation of organic material within the cells of an organism generally involves the release or use of chemical energy

Energy the ability of capacity to make things happen or do work

Growth the process in which an organism increases in size by taking in material from the environment and organizing it in its own structures.

Reproduction the ability of living things to produce copies of themselves

Asexual repro. Reproduction that involves only one parent and results in cells that are generally identical to the parent. Commonly seen in plants, simple animals, and bacteria

Sexual repro. Reproduction that involves two different parents joining to form a new individual. Generally seen in more complex organism

Atom the smallest particle of matter containing the properties of an element

Subatomic particle particles that make up an atom – proton, neutron, and electron

Molecule a unit of two or more of the same or different elements joined together

Organelle small sacs or compartments inside a cell that perform specific functions

Cell the smallest living unit which could live independently or form a part of an organism

Tissue a group of cells that have a similar structure that perform a specific activity

Organ a unit of tissues that perform a specific function in a body

Organ system two or more organs that act together to perform an activity

Organism	a unit composed of specialized cells, tissue, organs, and usually organ systems, generally any living plant or animal
Population	the total number of individuals of species or forms of plant or animal that live in the same area
Community	the population of all species living in the same area
Ecosystem	the community and its environment
Biosphere	the part of the earth's surface and its immediate atmosphere where organisms live
Producer	organisms capable of making organism material using the light from the sun, mainly plants
Consumer	any organism that consume other organisms like carnivore and herbivore
Decomposer	organism that feed on the remains of other organisms, like bacteria and fungi
Food chain	(cycle of life) a cycle in which organism are arranged in such a way that one group feeds on the group that comes before it
Herbivore	plant eater
Carnivore	meat eater

Exercise

1. The exchange of chemical matter with the outer environment and the transformation of organic material within the cell generally involves the release or use of chemical energy

- | | |
|---------------|-------------|
| A. metabolism | B. DNA |
| C. growth | D. molecule |

2. The "blue-prints of life", a molecule found in most organisms that controls the structure of protein

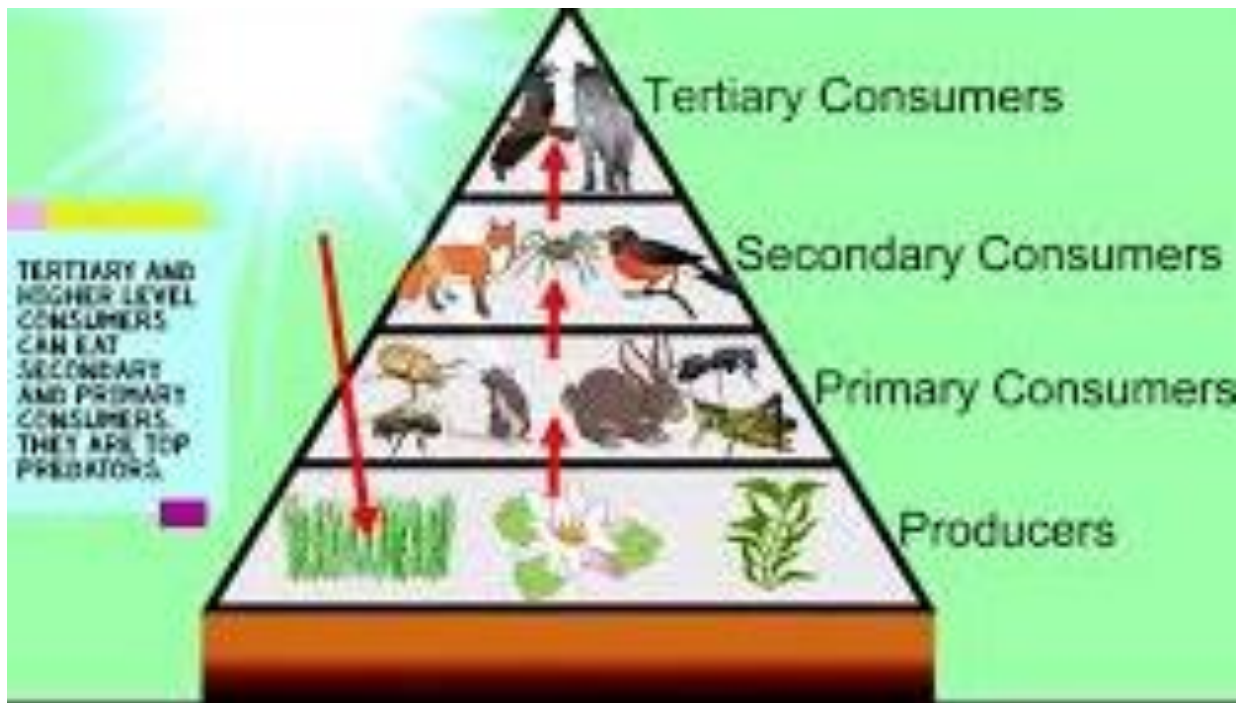
- | | |
|---------|--------------|
| A. cell | B. Organelle |
| C. DNA | D. organ |

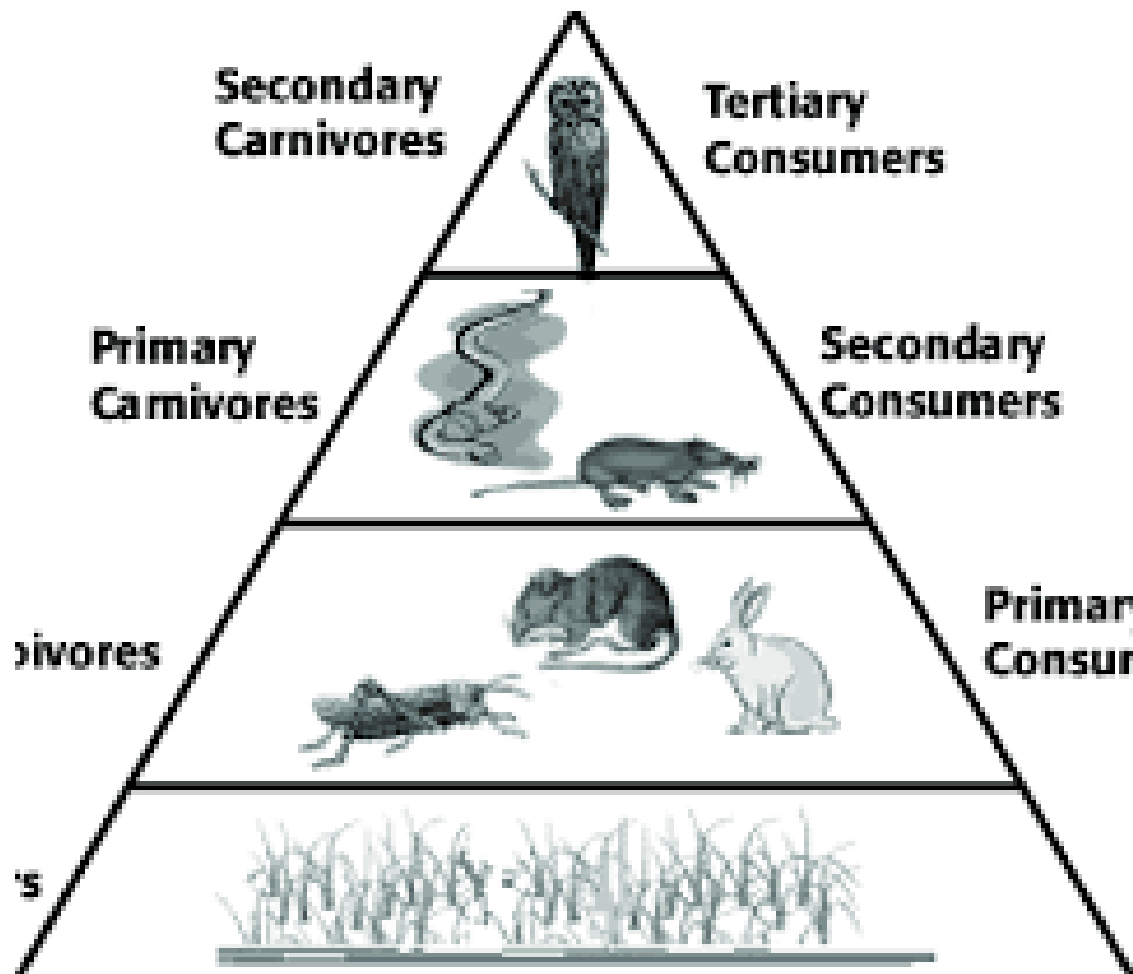
3. The process in which an organism increases in size by taking in material from environment and organizing it in its own structure
 - A. metabolism
 - B. population
 - C. growth
 - D. decomposition
4. A unit of two or more of the same different elements joined together
 - A. biosphere
 - B. ecosystem
 - C. community
 - D. molecule
5. Small sacs or compartments inside the cell that perform specific function
 - A. asexual reproduction
 - B. organelle
 - C. population
 - D. organism
6. The smallest living unit which could live independently or form part of organism
 - A. cell
 - B. tissue
 - C. biosphere
 - D. producer
7. A unit of tissues that performs specific function like a heart, liver
 - A. asexual reproduction
 - B. population
 - C. community
 - D. organ
8. Reproduction that involves only one parent and results in cells that are generally identical to the parent
 - A. asexual reproduction
 - B. sexual reproduction
 - C. organ system
 - D. food chain
9. A cycle in which organisms are arranged in such a way that one group feed on others
 - A. food chain
 - B. metabolism
 - C. consumer
 - D. producer
10. Reproduction that involves two different parents joining to form a new individual
 - A. ecosystem
 - B. sexual reproduction
 - C. producer
 - D. organ system
11. Organisms that feed on the remains of other organisms, like bacteria and fungi
 - A. energy
 - B. consumer
 - C. decomposer
 - D. photosynthesis
12. Two or more organs that act together to perform an activity
 - A. cycle of life
 - B. organ system
 - C. metabolism
 - D. organism
13. Organisms capable of making organic material using the light from the sun, mainly plants
 - A. consumers
 - B. reproducer
 - C. producer
 - D. decomposer
14. A group of cells that have similar structure that perform a specific activity
 - A. organisms
 - B. organ
 - C. tissue
 - D. DNA
15. The total number of individuals of a species or form of plant and animal that live in the same area
 - A. evolution
 - B. ecology
 - C. population
 - D. synthesis
16. Any organism that consume other organisms, like carnivores and herbivores
 - A. consumer
 - B. community
 - C. biosphere
 - D. ecosystem

17. The population of all species living t=in the same area
 A. metabolism B. subatomic particles
 C. community D. population
18. The community and its environment
 A. species B. atom
 C. ecology D. ecosystem
19. The part of the earth's surface and its immediate atmosphere where organism live
 A. species B. atom
 C. biosphere D. ecosystem
20. Another name for herbivores and carnivores in cycle of life is
 A. food chain B. metabolism
 C. consumer D. community

2. Larning points

Look at the chart Ecological pyramid and explain it in english.






3. Key structures

NORMAL SENTENCE PATTERN IN ENGLISH


Most simple sentence has a structure explained as below

<i>Subject</i>	<i>verb</i>	<i>complement</i>	<i>modifier</i>
Doctor	can remove	a lung cancer	nowadays
Scientists	used	this method	last year

 **COMPLEMENT:** a complement completes the verb. It is similar to the subject because it is usually a noun or noun phrases; however, it generally follows the verb when the sentence is in the active voice. *Every sentence does not require a complement.* The complement **CANNOT** begin with a **preposition**. A complement answers the question what? Or whom?

Examples of complements:

Prokaryotic cells lack <u>a nucleus</u> .	(What do prokaryotic cells lack?)
Gram-negative bacteria contain <u>an outer wall layer</u> . contain?)	(What do Gram-negative bacteria contain?)
Mr. Brown was raising <u>a lot of cows</u> .	(What was Mr. Brown raising?)
Dana took care of <u>her husband</u> for nine years.	(Whom did Dana take care for 9 years?)

 **MODIFIER:** a modifier tells the time, place, or manner of the action. Very often it is a prepositional phrase. A prepositional phrase is a group of words that begins with a preposition and ends with a noun. *A modifier of time usually comes last if more than one modifier is present.*

Example of prepositional phrases:

In the morning, at the university, on the table

A modifier can also be an adverb or an adverbial phrase.

Last night, hurriedly, next year, outdoors, yesterday

NOTE: *every sentence does not require a modifier. A modifier answers the question when? Where? Or how?*

Example of modifier:

Most energy conservation occurs in cyclic photophosphorylation.

Modifier of place

(Where does most energy conservation occur?)

Non-small cell lung cancers spread slowly to other parts of the body.

Modifier of manner

Modifier of place

(How do non-small cell lung cancers spread to other parts of the body?)

Scientists used this method last year.

Modifier of time

(When did scientists use this method?)

♣ **NOTE:** the modifier normally follows the complement, but not always. However, the modifier, especially when it is a prepositional phrase, usually cannot separate the verb and the complement.

Exercise: Underline each components (S, V, Modifier, Complements) of these sentences

1. Most people have heard the sound of bees among flowers
2. Each colony lives in a hive
3. Pollen is the reproductive material of plants
4. Bees make honey through a special process

4. Special difficulties

Prefixes and suffixes mean "NOT"

- **UN** + ADJ => ADJ

Eg: unavailable, unable, and uncomfortable

- **IN** + ADJ => ADJ

eg: (usually il- before "l" <illogical>, im- before "b, m, or p" <imbalance, immoral, impractical>, ir- before r <irreducible>, and in- before other sound <inappropriate>

- **DIS**+ADJ/Verb => ADJ/V

eg: disadvantage, disappear, dislike

- **NON**+ADJ/N => ADJ/N

eg: a non-stop flight, non-alcoholic drinks, a non-smoker

- **DE**+N/V => N/V

eg: defrost a fridge, dehydration

- **NOUN** + **LESS** => ADJ

Eg: careless, harmless, and homeless

- **A/an** + ADJ => ADJ

Eg: asexual, atypical, anaerobic

Please try to find out some words like these in the passages and make complete sentences in which have the words you got