

#464942

Topic: Ecosystem

What are trophic levels? Give an example of a food chain and state the different trophic levels in it.

Solution

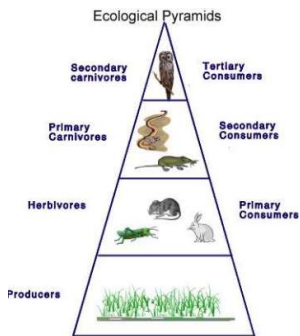
The trophic level of an organism is the place it has in a food chain. A food chain is mostly made up of three trophic levels. However, some trophic levels have four trophic level. An example is shown in the diagram.

→ Primary producers which are plants that are autotrophs and belong to the first trophic level.

→ Primary consumers are animals that belong to second trophic level and feed on plants. They are called herbivores.

→ Secondary consumers feed on herbivores and belong to the third trophic level. They are called primary carnivores.

→ Tertiary consumers feed on primary carnivores and belong to the fourth trophic level. They are called secondary carnivores.



#464943

Topic: Ecosystem

What is the role of decomposers in the ecosystem?

Solution

Various roles played by decomposers in the ecosystem are:

→ They decompose biodegradable substances into useful substances.

→ They release nutrients into soil by decomposing dead and decaying matter, thus making the soil fertile.

→ They maintain the nutrient pool by returning back the nutrients in the pool.

#464950

Topic: Ecosystem

Which of the following constitute a food-chain?

A Grass, Wheat and Mango

☒ B Grass, Goat and Human

C Goat, Cow and Elephant

D Grass, Fish and Goat

Solution

Food chain is a series of organisms where each is dependent on the next as a source of food. Grass forms the primary producers of the food chain, goat eats grass (herbivore) and humans eats goat (carnivore).

So, the correct answer is option B.

#464954

Topic: Ecosystem

What will happen if we kill all the organisms in one trophic level?

Solution

If we kill all the organisms of one trophic level it will create an imbalance in the ecosystem as every trophic level is interdependent on each other.

For example, in a food chain grass is eaten by a buffalo and buffalo is eaten by a lion. If all the lions in the population were to be removed, the number of buffalo will increase and this will ultimately lead to over-grazing. Over-grazing can lead to the barren land which will ultimately lead to soil erosion.

#464955

Topic: Ecosystem

Will the impact of removing all the organisms in a trophic level be different for different trophic levels? Can the organisms of any trophic level be removed without causing any damage to the ecosystem?

Solution

The impact of removing the organisms of a trophic level is different for different trophic levels. For example, if we remove plants from a food chain, no organism will get food as plants are the primary producers in the food chain. If herbivores are removed from a food chain then carnivores will starve and die and producers are also affected and may die due to competition for space and nutrients. It is not possible to remove a trophic level without causing damage to the ecosystem as they are interlinked.

#489233

Topic: Biogeochemical cycle

State whether the given statement is true or false. If true, write the reasons.

Human interference and changes of climate can maintain the ecosystem.

Solution

False

Human interference and changes of climate causes the loss of natural habitats and adversely affects the ecosystem.

#490403

Topic: Ecosystem

Define an ecosystem.

Solution

An ecosystem can be defined as a biological system which consists of all the living organisms (plants and animals) in an area as well as the nonliving things with which the organisms interact.

In an ecosystem, all the components are interdependent on each other.

#526274

Topic: Ecosystem

List the various abiotic environmental factors.

Solution

Ecosystem is an interaction between biotic and abiotic factors of a geographical area. The abiotic factors include a physical environment in which organisms can survive such as light, temperature, humidity and other climatic condition as well as physical factors like soil.

#526318

Topic: Ecosystem

What is the significance of the slope of regression in a species-area relationship?

Solution

The slope of regression in species-area relationship predicts species richness of an area. It indicates the dependency of species richness on the area as higher slope reflects higher dependency of the area. Taking into account of a large area, such as country, the slope is almost linear with the area. For a smaller area, lower slope value indicates independence of species richness over the area.

#526336

Topic: Ecosystem

Among the ecosystem services are control of floods and soil erosion. How is this achieved by the biotic components of the ecosystem?

Solution

The biotic components of the ecosystem are the living organisms such as plants, animals, and microorganisms. Plant roots bind the soil and prevent its erosion by rainwater thereby preventing soil erosion. Soil porosity is increased by plant roots which in turn allows infiltration of rainwater into the underground layers and thereby, preventing flooding.

#526397

Topic: Ecosystem

Fill in the blanks.

- (a) Plants are called as because they fix carbon dioxide.
- (b) In an ecosystem dominated by trees, the pyramid (of numbers) is type.
- (c) In aquatic ecosystems, the limiting factor for the productivity is
- (d) Common detritivores in our ecosystem are
- (e) The major reservoir of carbon on earth is

Solution

- (a) Plants are called as Autotrophs because they fix carbon dioxide and produces their own food.
- (b) In an ecosystem dominated by trees, the pyramid (of numbers) is of Inverted type because it makes more biomass that leads to the large population of birds and insects as compared to the trees.
- (c) In aquatic ecosystems, the limiting factor for productivity is light as plants and algae cannot grow in the absence of light.
- (d) Common detritivores in our ecosystem are earthworms as they get nutrients from decaying organic matter.
- (e) A major reservoir of carbon on earth is oceans.

#526401

Topic: Ecosystem

Which one of the following has the largest population in a food chain?

- (a) Producers
- (b) Primary consumers
- (c) Secondary consumers
- (d) Decomposers

Solution

Decomposers are the organisms that feed on debris left behind by scavengers and release the nutrients in form of simpler substances back to atmosphere. Mostly bacteria and fungi serve the role and represent the largest population of food chain. Thus, the correct answer is option D.

#526402

Topic: Ecosystem

The second trophic level in a lake is

- (a) Phytoplankton
- (b) Zooplankton
- (c) Benthos
- (d) Fishes

Solution

In lake ecosystem, phytoplanktons are the primary producers while zooplanktons represents primary consumers. Benthos and fishes occupy higher trophic levels. Since zooplanktons feed on primary producers, they occupy the second trophic level. The correct answer is B.

#526404

Topic: Ecosystem

Secondary consumers are

- (a) Herbivores
- (b) Producers
- (c) Carnivores
- (d) None of the above

Solution

In a food web or chain, there will be producers like the plants. As the name indicates they produce their own food material by using sunlight and provides food for other organisms also. Then they are eaten by the primary consumers called the herbivores these are plant-eating animals like the cow, goat etc., they are in return eaten by the carnivores the flesh eating animals called the secondary consumers like the lion, tiger etc.

Hence, the correct answer is option C.

#526406

Topic: Ecosystem

What is the percentage of photosynthetically active radiation(PAR), in the incident solar radiation.

A 100%

☒ B 50%

C 1 - 5%

D 2 - 10%

Solution

Around 50% of total radiation from sunlight falls under photosynthetically active radiation and support the process of photosynthesis. It constitutes the light of 400-700 nm wavelength which is absorbed by chlorophyll pigment. Out of which only 2 - 10% are captured by plants. Thus, the correct answer is option B.

#526410

Topic: Ecosystem

Distinguish between.

(a) Grazing food chain and detritus food chain

(b) Production and decomposition

(c) Upright and inverted pyramid

(d) Food chain and food web

(e) Litter and detritus

(f) Primary and secondary productivity

Solution

(a) Producers serve as a source of food in a grazing food chain and constitute the first trophic level and serve to incorporate nutrients into the body of living organisms whereas detritus food chain begins with detritivores that feed on the dead and decaying matter and serves to release the nutrients back into the atmosphere.

(b) Production refers to the rate of synthesis of organic matter by primary producers through the process of photosynthesis while decomposition refers to the breakdown of complex substances into simpler ones and is carried out by heterotrophic decomposers.

(c) Number and biomass of producers are largest and gradually decrease while moving from primary consumers to top consumers; it gives upright pyramid while Inverted pyramids exhibit lowest quantity of selected attribute at producer level.

(e) Litter constitutes both biodegradable and nonbiodegradable waste while detritus is the only biodegradable waste.

(f) Primary productivity refers to the total organic matter produced by primary producers per unit area per unit time while secondary productivity refers to rate conversion of food molecules into biomass at consumer level per unit area per unit time.

#526412

Topic: Ecosystem

Describe the components of an ecosystem.

Solution

The ecosystem is an assemblage of biotic and abiotic factors of a geographical area and also takes account of the interaction between them. Biotic factors of an ecosystem include all plant and animal species present in there. These biotic factors of a self-sufficient ecosystem contain types of organisms—producers, consumers, and decomposers.

The abiotic factors include a physical environment in which they can survive. It includes light, temperature, humidity and other climatic condition as well as physical factors like soil.

#526415

Topic: Ecological pyramids, succession

Define ecological pyramids and describe with examples, pyramids of number and biomass.

Solution

An ecological pyramid is a diagrammatic representation in the context of energy, biomass and number organisms showing the linkage between the various trophic levels of the ecosystem.

Pyramid of number- The pyramid that gives the number of organisms at each trophic level is called pyramid of number.

For example- oak → caterpillar → blue tit → sparrowhawk

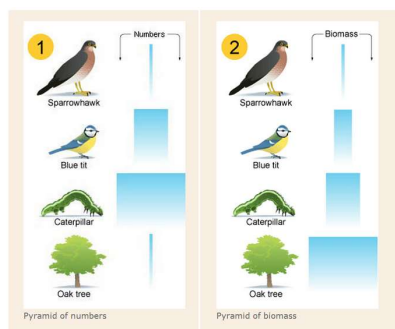
The producer in the given food chain is the oak plant.

A caterpillar feeds on many oak leaves, the blue tit feeds on many caterpillars and finally, the sparrow hawk feeds on many the blue tits. Hence the number of organisms decreases at each trophic level.

Pyramid of biomass The pyramid that gives the total weight of the organisms at each trophic level is called pyramid of biomass.

For example- oak → caterpillar → blue tit → sparrowhawk

The total mass of organisms at each stage of a food chain decreases as the number of organisms decreases at each trophic level.



#526418

Topic: Ecosystem

What is primary productivity? Give brief description of factors that affect primary productivity.

Solution

Primary productivity refers to the total organic matter produced by primary producers per unit area per unit time. It is affected by nutrient availability, types and number of primary producers present in an ecosystem, temperature, sunlight, water, precipitation etc.

#526420

Topic: Ecosystem

Define decomposition and describe the processes and products of decomposition.

Solution

Decomposition refers to the breakdown of complex organic matters into simpler substances. Decomposers are the microbial heterotrophs that carry out decomposition and use the decomposition products as a source of energy. The process starts with the fragmentation of detritus into smaller pieces by detritivores. Leaching refers to the process by which dissolved materials are carried with water down to the soil layers. Soil inhabiting microbes carry out decomposition of organic matter and the resultant partly decayed organic portion of the soil is referred to as humus; the process of humus formation is called as humification. Nutrient present in the soil in biologically unavailable forms (for example, nitrogen) are converted into biologically useful forms by the process of mineralization.

#526422

Topic: Ecosystem

Give an account of energy flow in an ecosystem.

Solution

Photosynthesis fixes carbon from the abiotic environment and incorporates it into the biological compounds of producers; food chain transfers the fixed carbon to different trophic levels. Plants absorb 2% of sun energy for photosynthesis. With each trophic level, only 10% energy is transferred and 90% is lost as heat in respiration. The longer the food chains, the lesser is the energy transfer efficiency. To increase the energy transfer efficiency, food chains must be smaller and consumers should directly feed on producers.

#526425

Topic: Biogeochemical cycle

Write important features of a sedimentary cycle in an ecosystem.

Solution

Sedimentary cycle is the cycle of mineral found in the earth crust e.g., phosphorus, sulphur etc. Important features of a sedimentary in an ecosystem are:

- 1) It is the major reservoir for nutrients elements in the lithosphere and the elements are released by weathering.
- 2) E.g. phosphorous cycle, sulphur cycle, iodine cycle.
- 3) The sedimentary cycle is very slow than gaseous cycle and takes more time.
- 4) It is a less perfect cycle as elements get locked in earth crust for the longer time.

#526428

Topic: Biogeochemical cycle

Outline salient features of carbon cycling in an ecosystem.

Solution

Photosynthesis fixes carbon from the abiotic environment and incorporates into the biological compounds of producers; food chain transfers the fixed carbon to different trophic levels. Burial of dead trees in past led to the formation of coal beds and oils of aquatic animals led to underground deposits of oil and natural gas. Coal, oil, and natural gas (fossil fuels) serve as vast deposits of carbon compounds. Burning and combustion of fossil fuel return the carbon back to the atmosphere. Carbon stored in the shell of marine organisms forms sedimentary rocks. When exposed, chemical and physical weathering return the carbon back to the atmosphere.

#638442

Topic: Ecosystem

Micro-organisms act upon the dead plants to produce

- (i) sand (ii) mushrooms (iii) humus (iv) wood

Solution

Micro-organisms act upon the dead plants to produce humus. The micro-organisms which convert the dead plants and animals to humus are known as decomposers like bacteria and fungi. For the healthy soil, humus contains many useful minerals and nutrients.