**N5 Biology Life on Earth Unit Revision Summary**

Biomes are areas of the world characterised by the dominant forms of plant and animal life that are found there, as well as the climate. There are several different biomes including: rainforests, desert, tundra etc.


Within an ecosystem there may be a number of different habitats, each with a wide variety of plants and animals

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| **Term** | **Meaning** |
| Habitat | A habitat is a place where an organism lives |
| Population | A population is members of the same species (animal/plant) living in the same area.  |
| Community | A community is all the populations of plants and animals in a particular area.  |
| Ecosystem | An ecosystem is made up of living organisms and their habitats |

Examples of ecosystems are – woodland, moorland, freshwater and marine.



Identify the following:

consumer carnivore

prey producer

omnivore predator

herbivore

Add arrows to the diagram to help you identify these terms.

In any area, animals and plants compete for resources. Plants compete for light, water, nutrients and root space. Animals can compete for a mate, food and a habitat (for shelter). When organisms compete, one animal will be successful, and the other, competing organism, will be unsuccessful, will decrease in numbers, and may eventually die out.

Interspecific competition occurs between animals of different species. Intraspecific competition is often more intense as organisms of the same species are competiting for exactly the same resources.

To decrease competition between organisms, animals often have a specific niche. A niche is the role an organism plays within its community, which can often lead to differences in gathering food. Examples of this include Darwin’s finches.



A food chain is a diagram showing feeding relationships between several organisms. Arrows in a food chain point from food source to feeder, and show the direction of energy flow.

In a food chain, 90% of energy is lost as heat, movement or undigested materials. Only 10% of the energy is passed on, as it is used for growth.

Consumers which eat producers are called primary consumers. Consumers which eat primary consumers are called secondary consumers.

Predators are animals which feed on other animals, victims of predators are called prey. A food chain must always start with a green plant (called producers).

Food webs are more complicated diagrams showing interconnecting food webs.



Unexpected results may sometimes arise from the removal of an organism. An insecticide will remove insects (like the grasshopper); frogs will now feed only on beetles in the area which decreases the frog population. Less frogs means foxes must eat more mice; the insecticide has affected populations directly and indirectly.

A pyramid of numbers shows the number of organisms at each level in a food chain - the number of organisms decrease as you move along the chain (large energy loss). A pyramid of biomass shows the mass of organisms at each level in a food chain, the mass of organisms decrease as you move along the chain. The size of organisms increases as you move along the chain.



Sampling techniques are used to find out what and approximately how many organisms are present in a particular ecosystem. A quadrat is used to sample non-moving or very slow moving organisms.



A pitfall trap is used to obtain a sample of small invertebrates living on the ground surface. Both quadrats and pitfall traps must be placed randomly and many samples taken if a representative sample is to be obtained. The class results can be collated, and an average calculated. Both of these allow for more reliable results.

An abiotic factor is a non-living factor in the ecosystem which can affect the lives and distribution of organisms, e.g. light intensity, moisture, pH, temperature. Biotic factors are living factors that affect the survival of living organisms e.g. grazing and predation.

A light meter can be used to measure light intensity. The light meter is held at the soil surface (or any other area) and pointed at the direction of maximum light, a reading is then taken. The light meter should not be shaded, several readings should be taken and the average calculated.

A moisture meter can be used to estimate the water content of the soil. The probe of the meter is pushed carefully into the soil and the meter is read. The pH of the soil can be estimated by using a pH probe/meter, again the probe is carefully pushed into the soil and a reading taken.

Climatic factors (weather) have a major influence on the distribution of organisms - temperature, light, rainfall, wind. Green plants are not found in areas of constant low light intensity. Many organisms are not found in very dry or very wet areas. Many of these factors work together to influence the distribution of organisms.

Low light intensity and very dry soil are unfavourable conditions for photosynthesis – few plants in these areas. Very wet areas have a lack of oxygen for plant roots or may drown many organisms.

In the nitrogen cycle, animal and plant proteins are produced using nitrogen from nitrates. There are several different stages in the nitrogen cycle.



Decomposers, like fungi and bacteria, decay dead material. The dead material is then converted to ammonia.

Ammonia is converted to nitrites, then nitrates by nitrifying bacteria. Some plants e.g. peas, beans and clover, have special root nodules which contain nitrogen fixing bacteria. There are also some nitrogen fixing bacteria that live freely in the soil. These bacteria can fix nitrogen gas from the air into nitrates.

One last type of bacteria, denitrifying bacteria, convert nitrates into nitrites, or into nitrogen gas.

A mutation is a change in a chromosome or gene (DNA) that occurs spontaneously, and at random. One type of chromosome mutation that occurs in humans is the condition known as Down ’s syndrome.



There are three different type of mutation:

Advantageous Disadvantageous Neutral

Many mutations are disadvantageous, as they are unfortunately harmful and disrupt the proper working of cells. Some plant mutations are advantageous.

Plant examples: fruit which have increased in size due to a mutation can be selected for e.g. strawberries, apples, pears. Fruit which contain no seeds due to a mutation can be selected for e.g. bananas and watermelon. These types of mutations arise due to polyploidy.



**Mutation to chromosome number**

Mutations are very rare. Most mutations are due to some external factor (a mutagen). Examples of mutagens are radiation (X-rays, ultra violet and radioactive material) and some other chemicals (mustard gas, colchicine, Agent Orange).

Natural selection is the survival of those organisms best adapted to their environment. Those with a favourable characteristic will have a selective advantage and survive (i.e. the survival of the fittest.)

When animals breed, more offspring are produced than are required. Many offspring do not survive due to competition for food, disease, predation or harsh conditions in the environment. Only the organisms best suited, will survive. These organisms will mate with other organisms who have survived, and pass on their favourable genes to the next generation.



DDT is a non-biodegredable pesticide that was used last century to kill pests (insects). DDT built up in the bodies of the organisms in the food chain, and affected the organisms at the top of the food chain to the greatest extent, and can often be lethal.



To avoid using pesticides and insecticides, other methods can be used to control pest species. Introducing a natural predator of the insect can reduce their numbers – an example of this would be to add ladybugs to an area where crop plants were being eaten by greenfly. This type of natural pest management is known as biological control.

Pesticides are used in agriculture to ensure an adequate food supply for the world’s increasing human population. In addition to pesticides and herbicides, farmers use fertilisers to ensure high crop yields.

Fertilisers can leach into fresh water, increasing algal blooms. This leads to a reduction in oxygen levels. This occurs because light can no longer reach underwater plants. The reduction in oxygen levels causes organisms to die. This increases the number of bacteria in the water, further reducing the oxygen levels. This process is known as eutrophication.

In a similar way, organic waste e.g. sewage can also cause water pollution. Bacteria feed off the sewage, using up the dissolved oxygen.

Some organisms in freshwater act as indicator species to this type of pollution. Examples are nymphs, freshwater shrimps, rat tailed maggots and sludgeworms.



Lichens are indicators of air pollution as they are sensitive to sulphur dioxide.

