

Ch 1 (Biology & its Major Fields of Specialization) 1st Year Biology Notes

Chapter 1: Biology and its Major Fields of Specialization (Short Questions Answers)

Define biological control with an example, or What is biological control of pests?

In biological control the harmful organisms (e.g., pests) are controlled by letting them be eaten or killed by their predatory species e.g., an aphid that attacks walnut tree is being controlled biologically by a wasp that parasitizes this aphid.

Write down important features of a good theory?

A good theory is testable, predictable and verifiable. It predicts results which can be reproduced. It can explain an effect but not a cause. It can be disproven. It is not a statement of fact, but a statement of likelihood. It invites disagreement, alternative, and better explanations. It constantly undergoes revision and refinement.

What is deductive reasoning? Give examples.

Deductive reasoning is reasoning from the general to the specific. It involves drawing specific conclusion from some general principle/assumptions. Deductive logic of "if then" is frequently used to frame testable hypothesis. For example, if we accept that all birds have wings (premise # 1) and that sparrows are birds (premise # 2), then we conclude that sparrows have wings. If all green plants require sunlight for photosynthesis then any green plant when put in dark would not synthesize glucose, the end product of photosynthesis.

Define population and give its examples.

A population is a group of organisms of the same species located in the same place at the same time. Examples are the number of rats in a field of rice, the number of students in your biology class, or human population in a city.

Write names of four eras of geological time chart.

- Proterozoic era
- Palaeozoic era
- Mesozoic era
- Coenozoic era

Differentiate between biopesticides and biological control.

Biopesticides are certain types of pesticides derived from such natural materials as animals, plants, bacteria, and certain minerals. For example, canola oil and baking soda have pesticidal applications and are considered biopesticides in biological control the harmful organisms (e.g., pests) are controlled by letting them be eaten or killed by their predatory species e.g., an aphid that attacks walnut tree is being controlled biologically by a wasp that parasitizes this aphid.

Name a technique of food preservation.

Pasteurization

What type of food is preserved by pasteurization?

Milk and milk products.

What is hydroponic culture technique? Give its uses / importance.

In this technique the plants are grown in aerated water to which nutrient mineral salts have been added. It is used to test whether certain nutrients is essential for plants or not. This technique is used by astronauts.

Why hydroponic farming is not yet feasible?

Hydroponic farming is yet not feasible because it is expensive compared with growing crops in soil.

Who may use hydroponic culture technique?

Astronauts

Name the methods by which various diseases are controlled.

- Preventive measures
- Vaccination/Immunization
- Drugs treatment/Gene therapy

What is the cause of AIDS.

HIV (Human Immunodeficiency Virus) is the cause of AIDS (Acquired Immuno-Deficiency Syndrome).

How does AIDS spread?

It spreads through free sexual contact, through blood transfusion, by using contaminated syringes or surgical instruments etc.

How does hepatitis spread?

Hepatitis is caused by H. virus which is spread through blood transfusion by using contaminated syringes and surgical instruments.

Who first developed the technique of vaccination?

Edward Jenner first developed the technique of vaccination in 1795.

From which word evolved the present term vaccination and vaccine.

Cowpox pus is known as vacca. From this word evolved the present term vaccination and vaccine.

How people are vaccinated or what is vaccination or inoculation?

Inoculation or vaccination is carried out to make the people immune when exposed to the virus or bacteria at the time of epidemics or in some disease the individuals are vaccinated in their early life to make them immune to those diseases.

What is Radiotherapy?

It is the technique in which the cancerous part is exposed to short wave radiations from the radioactive material repeatedly at regular intervals.

What is chemotherapy?

Chemotherapy consists of administering certain anticancer chemicals to the patients at regular intervals.

What is gene therapy?

This technique has been developed to repair the defective gene. This consists of isolating the normal gene and inserting it into the host through bone marrow cells. This is called as gene therapy.

What is integrated disease management?

Combating of disease by utilizing all methods as and when required and ensuring a participation of community in this programmes is known as integrated disease management.

Define Clone and cloning?

A clone is defined as a cell or individual and all the asexually produced offspring while Cloning is the process of generating a genetically identical copy of a cell or an organism.

What is bioremediation? Give example-

The removal or degradation of environmental pollutants or toxic materials by living organisms is called bioremediation e.g., application of oil-degrading bacteria to an oil

spill.

What are endangered species?

Various animals which if not protected would soon be extinct. Such animals are said to be endangered species.

Write a short note on cloning.

Cloning is a technology for achieving eugenic aims. A clone is defined as a cell or individual and all its asexually produced offspring. All members of a clone are genetically identical except when a mutation occurs. Generally no normal animal reproduces naturally by cloning. Several insects and many plants do, in some circumstance whereas few do so regularly.

Give significance of the study of the fossil.

We know about extinct groups like dinosaurs, ammonites and trilobites through fossils. Some animals and plants are only known to us as fossils. By studying the fossil record we can tell how long life has existed on Earth, and how different plants and animals are related to each other.

Name macromolecules. Why they form structure of cells?

Proteins, carbohydrates, nucleic acids, and lipids are the four major classes of macromolecules. Macromolecules are made up of single units known as monomers that are joined by covalent bonds to form larger polymers. They are most stable and energetic compounds so involved in the formation of cellular structures.

Define biosphere.

The part of earth's surface and atmosphere where living organisms are found, is called biosphere.

Define species.

A group of closely related organisms that are very similar to each other and are usually capable of interbreeding and producing fertile offspring.

Differentiate between organ and organelle.

Sub-cellular specialized structures like mitochondria, Golgi complex, endoplasmic reticulum, ribosomes etc., are called organelles. While different tissues having related function assemble together in a structure to carry out its function with great efficiency. Such structures are called organs e.g., stomach, kidney.

Differentiate organ and organ system formation between animals and plants.

In animals organ formation is far more complex and clear, which are part of organ systems where total functions involved in one process or phenomenon are carried out. The organ level is much less definite in plants then it is in animals. One might distinguish roots, stems, leaves and reproductive structures.

How does law differ from theory? Compare theory with law.

A theory is a possible explanation, but a scientific law is a proven explanation of a phenomenon. A scientific law describes observations while a theory provides an explanation. A scientific law cannot be changed by additional observations, but a theory can be changed.

What is meant by integrated pest management technique?

Combating of pests by utilizing all methods as and when required and ensuring a participation of community in this programmes is known as integrated disease management.

Mention disadvantages of chemotherapy.

Fatigue, Hair loss, Easy bruising and bleeding, Infection, Anemia (low red blood cell counts), Nausea and vomiting, Appetite changes, and Constipation.

What is the importance of cloning?

Cloning stem cells from an individual with a disease lets scientists and researchers understand the disease and develop a treatment for it. In medicine cloning is used to find out about many genes that cause diseases, this is also known as gene therapy.

Explain two methods to produce clones.

There are three common types of cloning:

- Gene cloning
- Cell cloning/tissue culture
- Organism cloning

Gene cloning: It is the manipulation (treatment or use) of genes. In this process, desired genes or pieces of DNA are introduced into a host (usually bacteria) by means of a carrier (called vector, usually plasmid of bacterium) system. The foreign DNA becomes a permanent feature of the host. It is replicated and passed on to daughter cells along with host DNA.

Cell cloning / Tissue culture: Multiplication or asexual production of a line of cells genetically identical to the original is called cell cloning or tissue culture. It is now common in plants however not yet possible in animals. Bacteria and yeast naturally exercise this technique.

Organism cloning: Organisms with desired characters (transgenic organisms) may be produced in large numbers by an asexual process without the involvement of meiosis and fertilization. Such production of organisms is called organism cloning.

Define an ecosystem with an example.

An ecosystem is a community made up of living organisms and nonliving components such as air, water, and mineral soil.