

Kirkuk University
College of science
Biology department
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Cellubus

- 1- Introduction about Environmental science ,What is ecology And Impacts on the environment
- 2- Physical Environment : Earth surface (Lithosphere) and
- 3- Physical Environment: Atmosphere , the structure and composition of Atmosphere ,Weather and climate
- 4- Biogeochemical cycles
- 5- Biological Environment:Ecosystem, Types of ecosystem,food chain and food webs
- 6- The Energy of life ,Laws of Thermodynamic, Energy flow in Ecosystem
- 7- Ecosystem productivity, Primary & secondary production , Ecological Pyramids
- 8- Ecosystem and living organisms (Population),:Introduction , Population growth and population Regulation
- 9- Biological communities : Introduction, Succession , How communities change over time , Primary and secondary succession.
- 10- Interactions among organisms , Symbiosis , Predation and Competition , Species richness
- 11- Terrestrial Biomes (Biogeographic regions): Tundra , Taiga
- 12- Terrestrial Biomes (Biogeographic regions): Temperate deciduous forest , Mediterranean Vegetation and Chaparral
- 13-Terrestrial Biomes (Biogeographic regions): Temperate grassland , Desert and Tropical rain forest
- 14- Aquatic Biomes: Fresh water biomes
- 15- Aquatic Biomes: Marine biomes

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Introduction about Environmental science ,What is ecology And Impacts on the environment

- According to the Ernest Haeckel in 1869, Ecology is the scientific study of interactions between organisms and their environment.
- Ecology is the scientific study of the distribution and abundance of organisms and how are affected by interactions between organisms and their ecosystem that include physical factors which can be described as the sum of local abiotic factors as sun light (Insolation) , climate and geology and biotic factors which are other organisms that share its habitat.
- Krebs in 1972 defined ecology as the scientific study of the interactions that determine the distribution and abundance of organisms .What is the lack of the definition ?itis necessary to define the word Environment because the environment of organisms consists of all factors out side organisms that influence it,whethere they are include physical ,chemical and biological factors .(Environmental science ,fourth edition By Begon etel. In 2005).
- Ecology try to establish general principals about how natural world are functions.
- According to Odum in 1971 ,Ecology is the study of ecosystem.

The scope of Ecology

Ecology is usually considered as a branch of biology .why?,the general science that studies living organisms . organisms can be studied at many different levels , from proteins and nucleic acids (in biochemistry and molecular biology) , to cells in (cytology) , to individuals (in botany, zoology and other disciplines) and to population and community level.

Environmental science combines informations from many sciences as biology , geography , chemistry, geology, physics , economics

Ecology serves as the level of biological organization in which organisms interact with each other and with the environment.As such , ecosystems are a level above that of ecological community (organisms of different species interacting with each other), but are at a level or equal to biomes and biosphere.biomes are the regional ecosystems and biosphere is the largest of all possible ecosystems.

Atoms>molecules----protoplasm---cells---tissues---organs---organisms---populations---communities---Ecosystem---biomes---biosphere---earth----solar systems---Galaxies>Universe

Levels of organization of Ecology ,highlighting ecosystems

What is the difference between Ecology and Environmental sciences?

Are Ecologists interested with natural environment or What? What are the issues that they are concerned? For modern ecologists, ecology can be studied at several levels: population level, biocoenosis level (community of species) ecosystem level and biosphere level. Environmental science encompasses many interconnected issues:

Human population

Earth's natural resources

Environmental pollution

Classification of Ecology

- Population ecology (Autecology): focuses on the interactions between individuals within a population.
- Community ecology (Synecology): focuses on the interactions between species within an ecological community.
- Ecosystem ecology: focuses on the study of the energy flows and matter through the biotic and abiotic components of ecosystems.
- Landscape ecology: Examines processes and relationships across multiple ecosystems or very large geographic areas.
- Ecology can be sub-divided according to the species of interest into fields such as animal ecology, plant ecology, insect ecology, etc.
- Another frequent method of subdivision is by biome studied as arctic ecology, tropical ecology, and desert ecology.

For modern ecologists, ecology can be studied at several levels: Population level, community level, and biosphere level.

The outer layer of planet Earth can be divided into several compartments: the hydrosphere (sphere of water), the lithosphere (sphere of soils and rocks) and atmosphere. The fourth envelope is all living matter on the planet or that portion of the planet occupied by life.

The origin of life

It is thought that life first developed in the hydrosphere, at shallow depths in the photic zones. Although recently a competing theory has emerged, that life originated around hydrothermal vents in the deeper ocean. Multicellular organisms then appeared and colonized benthic zones. Photosynthetic organisms gradually produced the chemically unstable—oxygen rich atmosphere. Terrestrial life developed later. When? Diversification of terrestrial species is thought to be increased.

How did life develop on the planet?

What are the roles of Environmental sciences?

- Explain how things are work
- Explain how we can make our environment safer and comfortable for life.
- Ecologists try to gained knowledge about the ability to manage the earth's resources in a sustainable manner and improve our life.
- Deals with interactions with our environment in order to devise solutions to our most pressing challenges.
- Study more environmental problems

Environmental science is the scientific study of our environment>Natural or what?

Environmental science is an interdisciplinary pursuit .Explain how?

It means that borrows techniques from multiple disciplines and brings their research results together into a broad synthesis.

What is the meaning of Ecological foot print ?

Ecological footprint

Represents the toatal area of biologically productive land and water needed to produce the resources and dispose of the waste for a given person or population..our ecological footprint now surpasses earth's productive capacity by about 30%.

How human Impact our environment?

Our Environment

It is consists of all the living and nonliving things around us .It includes the continents , ocean , clouds , and ice caps as well as all animals , plants , forests and farms that comprise the landscapes surrounding us .It encompasses our built environment as well the structures , urban centers, and living spaces that people have created .our environment also includes the complex social relationships and in situations that shape our daily lives.

Natural resources

Natural resources are the various substances and energy sources that found in our environment and we need to survive.:

- 1- **Renewable resources** such as sunlight and wind energy that are replenished over short period (Inexhaustible resources).
- 2- **Nonrenewable natural** resources such as mineral ores, natural gases and crude oil in finite supply and are formed much more slowly than we use them.

Can natural renewable resources deplet?how?Give an examples.

Sustainability

Means living within the planet's means .such that earth's resources can sustain us and other species for the future.

How we can develop sustainable meanings?

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