



Year: 10

**Topic 1.6 ECOSYSTEMS AND HUMAN
IMPACT ON THE ENVIRONMENT**

Knowledge and Understanding to be developed

Living organisms may form populations of single species, communities of many species and ecosystems, interacting with each other, with the environment and with humans in many different ways. This topic comprises coverage of the levels of organisation within an ecosystem and issues surrounding sustainability. Opportunities are given to look in detail at the factors affecting communities and how the numbers of organisms and biomass within each level can be represented.

The topics discussing the advantages and disadvantages of intensive farming methods and the need to balance the human requirement for food with the needs of wildlife will allow learners to develop skills in evaluating social, economic and environmental applications based on the evaluation of evidence and arguments. These would include the calculation of the percentage efficiency in biomass transfer between trophic levels, the calculation of arithmetic means, being able to understand and use percentiles, plotting and drawing appropriate graphs and selecting appropriate scales for the axes and extracting and interpreting information from charts, graphs and tables.

Key Terms to be learned this topic:

Producers consumers herbivores
Carnivores decomposers
Pyramids of number/biomass
Efficiency Trophic level
intensive farming fertiliser
pesticide yield indicator species
lichen heavy metals

**Learning Objectives and Outcomes:
Students should be able to :**

- (a) food chains and food webs showing the transfer of energy between organisms and involving producers; first, second and third stage consumers; herbivores and carnivores; decomposers
- (b) the fact that at each stage in the food chain energy is used in repair and in the maintenance and growth of cells whilst energy is lost in waste materials and respiration
- (c) pyramids of numbers and biomass
- (d) **how to calculate the efficiency of energy transfers between trophic levels and how this affects the number of organisms at each trophic level**
- (e) the issues surrounding the need to balance the human requirements for food and economic development with the needs of wildlife
- (f) the advantages and disadvantages of intensive farming methods: using fertilisers, pesticides, disease control and battery methods to increase yields
- (g) how indicator species and changes in pH and oxygen levels may be used as signs of pollution in a stream and how lichens can be used as indicators of air pollution
- (h) the fact that some heavy metals, present in industrial waste and pesticides, enter the food chain, accumulate in animal bodies and may reach a toxic level
- (i) the fact that untreated sewage and fertilisers may run into water and cause rapid growth of plants and algae, these then die and are decomposed, the microbes, which break them down, increase in number and use up the dissolved oxygen in the water and animals which live in the water may suffocate