**Chapter 5**

**Evolution of Biodiversity**

**Key Ideas**

* The three levels of biodiversity are ecosystem, species and genetic diversity.
* Species richness and species evenness are two different measure of species diversity
* The three ways evolution can occur is by artificial selection, natural selection, and random processes.
* Evolution by random processes can occur by mutations, genetic drift, the bottleneck effect and the founder effect.
* When a species is geographically isolated from other populations, two distinct species can form
* Natural evolution is an extremely slow process
* Artificial evolution can be incredibly fast
* Animals have a set of ideal conditions known as their fundamental niche
* As environments change, species can adapt, move or become extinct.
* Scientists use the fossil record to study species that lived millions of years ago
* There have been five major times when the earth has experience mass extinctions
* Scientists believe we are in the sixth mass extinction

**Vocabulary**

Ecosystem diversity

Species diversity

Genetic diversity

Species richness

Species evenness

Phylogeny

Evolution

Microevolution

Macroevolution

Genes

Genotype

Mutation

Recombination

Phenotype

Evolution by artificial selection

Evolution by natural selection

Fitness

Adaptations

Genetic drift

Bottleneck effect

Founder effect

Geographic isolation

Reproductive isolation

Allopatric speciation

Sympatric speciation

Genetically modified organisms

Questions

1. Why is it challenging to determine the number of species on Earth? What is the estimate?
2. Why are estimates of species diversity valuable to environmental scientists?
3. What is the difference between species richness and species evenness? Why are they both important measures?
4. What is evolution, and what are the three main ways in which it occurs?
5. How are artificial and natural selection similar? How are they different?
6. How does evolution lead to biodiversity?
7. How does geographic isolation lead to reproductive isolation?
8. What factors influence a species’ chances of adapting successfully to a change in its environment?
9. Why is the pace of human – driven evolution faster than that of natural evolutionary processes?
10. How do fundamental niches and realized niches differ?
11. How does environmental change determine species distribution? When does it lead to extinction?
12. How are human activities affecting extinction rates, and why is their impact a particular concern?