

## EOC Review Part 7

### Unity and Diversity of Life, Ecological Relationships

#### Classification

What is the current eight-level classification system? (DKPCOFGS)

Domain, Kingdom, Phylum, Class, Order, Family, Genus, Species

What is binomial nomenclature?

The naming system invented by Linnaeus, whereby an organism is named using their genus name and their species name (written in italics, genus is capitalized and species is not).

Fill in the following chart with the characteristics of the various kingdoms.

Characteristics	Archaea	Eubacteria	Protista	Fungi	Plantae	Animalia
Eukaryotic or prokaryotic	Prokaryotic	Prokaryotic	Eukaryotic	Eukaryotic	Eukaryotic	Eukaryotic
Multicellular or Unicellular	Uni-	Uni-	Uni-	Mostly Multi-	Multi-	Multi-
Autotrophic, heterotrophic or both	Both	Both	Both	Hetero-	Auto-	Hetero-
Cell walls?	Yes	Yes	Yes & No	Yes	Yes	No

Explain the relationship between sickle cell anemia and malaria.

People who have sickle cell anemia or trait (heterozygous) are resistant to the malaria parasite.

Explain what vaccines do to the immune system.

Vaccines expose the immune system to the antigenic part of viruses. This stimulates an immune response without any risk of an actual infection.

Describe the life cycle of the malarial parasite. What is the vector? What are the symptoms? Mosquito (vector) bites an infected person, blood contains microscopic malaria parasites. Mosquito then bites uninfected person, releasing parasite into person being bitten. The malaria parasites then complete life cycle within the human host (cause high fever, chills, head and muscle ache, fatigue).

Complete the following Chart of Animal Behavior.

Type of Behavior	Explanation of Behavior
Suckling	An organism is born knowing how to obtain milk from its mother.
Phototaxis	Organisms moving away (negative) or toward (positive) light
Migration	Organisms move from one place to another periodically.
Estivation	An organism goes dormant for a long period of time to escape hot temperatures.
Hibernation	An organism goes dormant for a long period of time to escape cold temperatures.
Habituation	An organism learns to ignore a stimulus because it is repetitive and is not providing any valuable information.
Imprinting	Some baby bird species will follow the first moving object they see (usually mom).

Classical Conditioning	An animal makes a connection between a certain behavior and a reward/punishment.
Trial and Error	An organism can learn to choose an option with the best reward.
Pheromones	Chemical signals typically used to communicate.
Courtship Dances	An individual performs some ritual in order to attract a mate.
Territoriality	An organism will defend or mark a defined living space.

Which of the above behaviors are innate (or instinct)?

Suckling, Phototaxis, Migration, Estivation, Hibernation, Imprinting, Pheromones, Courtship Dances, Territoriality

Which of the above behaviors are learned?

Classical Conditioning, Habitation, and Trial & Error

## Ecology

How do organisms, species, populations, communities, ecosystems, and biomes relate to each other?

Organisms that interbreed and produce fertile offspring are a species. Individuals of the same species living in the same area are a population. All of populations in a given area make up a community.

The community and their surrounding abiotic factors (water, rocks, climate, etc) make up an ecosystem. Similar ecosystems are grouped into biomes.

What is a habitat?

The place where an organism lives out its life.

What is a niche?

The role a species has in its environment. The niche describes the species' function within this community.

*In the following chart, explain the symbiotic relationships.*

Relationship	Who benefits?	Example
Mutualism	Both organisms benefit	Lichen (fungus and algae)
Commensalism	One organism benefits and the other is unaffected	Epiphytes (fern and a tree)
Parasitism	One organism benefits, the other is harmed	Malaria

What is carrying capacity?

The number of individuals in a population that the environment can support.

List at least 3 biotic factors and 3 abiotic factors in an environment.

Biotic: trees, parasites, prey, predators, decomposers, pollinators. Abiotic: temperature, rainfall, humidity, soil, wind, sunlight

How does photosynthesis and aerobic respiration relate to the carbon cycle?

Photosynthesis takes carbon out of the atmosphere in the form of CO<sub>2</sub>. Aerobic respiration puts carbon back into the atmosphere in the form of CO<sub>2</sub>.

Explain the Greenhouse Effect in relationship to carbon dioxide in the atmosphere.

Increase of carbon dioxide prevents infrared light (heat) from leaving the atmosphere. This raises the earth's temperature just like glass in a greenhouse traps heat and keeps the greenhouse warm.

What effect might increased atmospheric carbon dioxide have on the environment? Increased trapping of heat and thus higher temperatures. Plants flower at different times, sea level rise due to melting. Increasing carbon dioxide levels also leads to an increase in acidity of the oceans.

What are the producers in the food web to the right?

Blossoms, Nuts, bark, leaves

What are the primary consumers?

Bees, Deer, Mice, Rabbits, Insects

What are the secondary consumers?

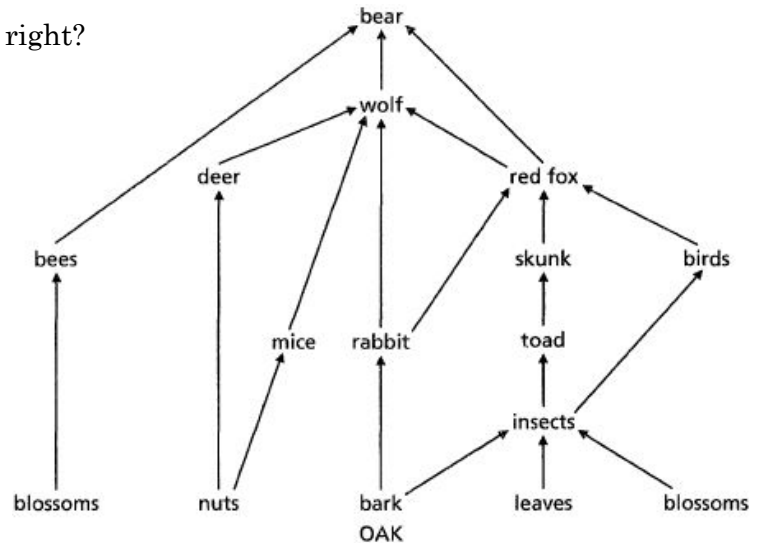
Bear, Wolf, Red fox, Toad, Birds

What is the highest level consumer in this food web?

Bear

What is the ultimate source of energy for this food web?

Sun



What is a food chain? Give an example of one from this food web.

A pathway that shows what organisms eat. Blossoms → Bees → Bear

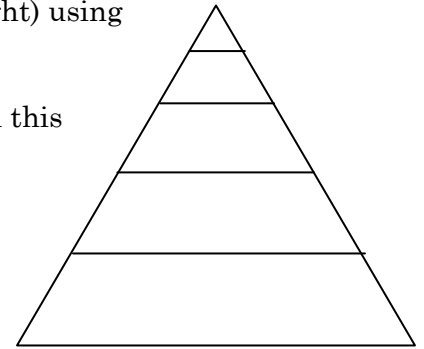
Create an energy pyramid from the food chain (label the pyramid to right) using the following organisms: leaves → insects → birds → redfox → bear

Where is the most energy in this pyramid? Where is the least energy in this pyramid?

Most Energy: Leaves. Least Energy: Bear

What happens to the amount of energy as it moves through the food chain/web?

Only 10% of energy at one trophic level can be used by consumers at the next trophic level.



Assume there are 10,000 kcal of energy in the leaves. Estimate the amount of energy in each of the other levels of the energy pyramid.

Leaves 10,000 kcal → Insects 1,000 kcal → Birds 100 kcal → Red fox 10 kcal → Bear 1 kcal

What is the role of decomposers in an ecosystem?

Recycle materials so they can be reused

What are the effects of bioaccumulation (*biomagnification*) of pesticides on a food web? At bottom of food web the poison is at low concentration and may cause no damage. As it moves up the food web, it builds up in the higher-level organisms and may make top level consumers sick, sterile or even dead. Compare logistic growth and exponential growth.

Logistic: Population increases until it hits an environmental limit (lack of food, shelter) preventing further population growth. AKA, "S Curve."

Exponential: Population grows exponentially indefinitely.

Explain the effect of population size (think humans, introduced species, etc.) on the environment.

Not enough resources for populations that are too big; humans also generate waste and pollution; introduced species take over (e.g., kudzu), making it difficult for native species to survive

How do increases in human populations affect populations of other organisms?

Increases in human populations can decrease other populations through hunting, habitat destruction, pesticides

What are some examples of sustainable practices and stewardship that can protect the environment?

Answers will vary. Reduce, reuse, recycle, drive less, use alternative energy, compost, etc.