



The Reality of Relationships in the Grasslands

In our introductory lesson to our science study for the year I compared the whole of Creation to a giant puzzle that God designed, with only He knowing how many pieces there are, how they ALL fit perfectly together, and what the ultimate big picture of Creation looks like. In the field of science, mankind discovers, observes, and studies many different puzzle pieces, striving to learn how it all fits together. After “traveling” to deserts, deciduous forests, and now grasslands, I hope you are now starting to see more clearly how the many smaller pieces of biotic and abiotic features of an ecosystem all fit and work together to create a perfectly balanced and healthy “bigger picture.” Did you notice that I not only said that the pieces FIT together, but also WORK together? Many times the “working together” is what makes them “fit together.” Every single organism has their own unique space to live, food that they eat, and a role or job to play in a balanced ecosystem, which is called their **niche**. However, they don’t go about their lives without interacting with both living and non-living things in their environment. The interactions are a big part of determining what their niche is. The definitions of two terms you have already been introduced to in this study, **ecology** and **ecosystem**, both include the phrase “living and non-living things and how they interact.” Relationships are all about interacting. Discussing grassland flora and fauna is the perfect opportunity to learn more about specific ecological relationships, their type of interactions, and the terms that describe them, as well as revealing to you even more of the bigger picture of just how intricately designed God made our earthly home.

You may have heard the phrase “symbiotic relationship” which is often used to describe a relationship between two living things, each receiving something beneficial or good out of the match up. However, symbiotic relationships are not always positive. They can also be neutral or negative. The word symbiotic or **symbiosis** comes from the Greek word that means “state of living together.” It simply means a close relationship between two different species living closely together in a particular area. There are three types of symbiotic relationships (commensalism, parasitism, and mutualism), as well as two other ecological relationships, not often considered to be symbiotic (predation and competition). We will learn about each of these five types of ecological relationships as we look at examples using the flora and fauna of temperate and tropical grasslands.

Predation— You have already learned about this type of interaction although you were not given the fancy name for it! **Predation** is basically the predator-prey relationship, where one animal (the predator) kills and consumes another (the prey) for food. If you are a zebra in the savanna, this is a deadly interaction, with a carnivore like a lion or hyena gaining ALL the benefit from the tasty encounter! However, predation is not always a carnivorous one. Seeds are living organisms too, so if a field mouse eats the seeds of a sunflower, that can also be considered predation since the consumed seed will not be able to grow. So basically, a predation-type relationship results in the “death” of an organism in order to provide energy for another. This “relationship” may seem sad and horrible when you think of the poor zebra, but it is a necessary one in keeping the balance in an ecosystem. If the population of grass eaters were to get out of control, there would be no grassland ecosystem left.

There is one relationship that I would like to mention, although I did not include it in the main five since it is somewhat related to predation. Although eating seeds can be labeled as predation with the seed considered “dead” since it will not be able to grow, eating plants is not. When animals eat plants, it is considered **herbivory**, due to the fact that most plants do not completely die off when eaten. Many plants develop adaptations to increase their survival when eaten. The acacia tree of the African savanna is a prime example with several adaptations. Not only do they have long root systems to survive drought and fire-proof bark to survive wildfires, they have sharp, ominous thorns throughout their branches to protect against herbivores devouring their water-filled leaves, leaving them to die during times of

drought. The thorns limit the number of snacking herbivores allowing the tree to survive. The giraffe is one of the few animals that is able to eat the acacia with their long, purple tongues working around the long thorns.

Competition— Competition is when species or populations compete for the same resource in the same location at the same time. Animals are not usually polite when it comes to rumbly tummies and a limited food buffet, so you can count on there being competition when it comes to getting the energy they need to survive! Sometimes the competition occurs within the same species population, such as zebras competing for the same grass. Most often though it is an ecological relationship between differing species, such as lions and hyenas competing for the same zebra prey. When space becomes limited, it decreases the food supply and competition increases. A lack of biodiversity can also increase competition because there is less food selection to choose from. Animals adapt to competition by having different food preferences, as well as sometimes changing locations by migrating to where food is more plentiful. A very interesting example of this is the Great Migration of the wildebeests in Africa. Over 1.5 million wildebeests, along with other various herbivores, migrate every year in a gigantic loop pattern, following the rains in search of greener grasses. The migration controls the competition of such a large number of herbivores, while at the same time, benefitting the grasslands with their waste fertilizing the soil and their stampeding hooves allowing new grasses to grow. Competition is another necessary relationship in maintaining the balance in an ecosystem.

Commensalism— This is a type of symbiotic relationship where when one species benefits, but the other is neither helped nor harmed. An example of this is the relationship between buffalo and cattle egrets. Cattle egrets are large birds that follow herds of buffalo or other cattle. As the cattle move through the grasses, insects are stirred up and make it easy for the egrets to find food. The egrets benefit from this relationship, but the cattle are neither helped nor harmed by it, and are most likely completely unaware.

Parasitism— There is an old phrase that goes, “happy as a tick on a fat dog.” This describes parasitism, when one species benefits and the other is harmed. Within the term parasitism, you may recognize the word parasite. Parasites are organisms that live on or inside another organism known as **hosts**. Parasites depend on their host for food and other things they need to live. This is NOT beneficial to the host, making them sick, uncomfortable, or in pain, but it does not usually end in death. Examples are ticks, fleas, tapeworms, leeches, and lice. In the Savanna, large mammals like the zebra, rhinoceros, hippopotamus, and the wildebeest attract the attention of blood-sucking flies and lots of ticks. These parasites dig into their flesh, feeding on their blood, causing itchiness, rashes, or sores. The tick may be happy, but the rhino certainly is not!

Mutualism— When people use the phrase “symbiotic relationship,” they most likely are referring to mutualism. Mutualism is a special, positive relationship between species in which both benefit or get something good out of the interaction. There are many interesting examples of mutualism in grassland ecosystems but I would like to feature two special ones as we conclude this lesson. First, let’s go back to the bothersome relationship that large mammals have with parasites in the Savanna. Lucky for them, there is an awesome mutualistic relationship to counteract their itchy problem. The oxpecker bird loves to feast on ticks and blood-sucking flies, so you will often find them riding on the backs of zebras, rhinos, and other suffering mammals, where they enjoy a grassland dinner cruise, feasting on the blood-sucking parasites, thus relieving the infested mammals. This is a win-win relationship! But that’s not all! As the oxpecker birds hitch a ride on the backs of rhinos and other mammals, they stand guard and often sound an alarm if they sense potential danger from predators and even human poachers!

The temperate grasslands provide another interesting example of mutualism with the monarch butterfly and the milkweed plant. Milkweed is found in grassland prairies and along roadsides. It is poisonous to humans and animals, but not to the monarch caterpillar! The caterpillars feast on the toxic leaves, which in turn, makes them toxic, protecting them from predators. Milkweed is the ONLY food source that monarch caterpillars can feed upon and grow before metamorphosing into butterflies that act as pollinators for flowers, including milkweed flowers. Another win-win! Sadly, milkweed is becoming harder to find. Less milkweed means less monarch butterflies, which means another disappearing pollinator!