**Ecological Relationships**

**5E Lesson**

**Grade Level:** 8  **Subject Areas:** Science

**Lesson Overview:** There are many ecological interactions that occur in the natural world. Population dynamics is the pattern of any process or interrelationship that affects growth or change in a population of organisms. This lesson goes through some of the ecological relationships dealing with population dynamics, including producer-consumer systems, predator-prey relationships, parasite-host relationships, competition between organisms for resources, and the flow of energy and nutrients in a food web.

**Unit Objectives:** Students will be able to describe producer/consumer, predator/prey, and parasite/host relationships as they occur in food webs within marine, freshwater, and terrestrial ecosystems. Students will investigate how organisms and populations in an ecosystem depend on and may compete for biotic and abiotic factors such as quantity of light, water, range of temperatures, or soil composition.

**Standards Addressed:** Science TEKS 8.11 A and Science TEKS 8.11 B

**Phase 1: Engage**

Habitat Lap Sit (found in TPWD’s Project WILD):

Every habitat needs to have four things to make it successful: food, water, shelter, and space. In this short activity, students will represent these four things in a ‘habitat’ circle; then see what happens when a certain requirement is removed from the ‘habitat’. First, have students stand shoulder-to-shoulder in a circle. Going around the circle, assign each student to represent food, water, shelter, or space until all students have a requirement to represent. Next, have everyone turn to the right so that they are looking at the back of someone else’s head, and take one big step towards the middle of the circle. Students should be standing close together. Now, have everyone place their hands on the shoulders of the person in front of them and, on the count of three, sit down slowly on the knees of the person behind them, keeping their own knees together for support for the person in front of them. As the students are sitting, explain how food, water, shelter and space are needed in a proper arrangement for a suitable habitat (suitable habitat is represented by the intact lap-sit circle). Have students stand up again and offer them an ecological event that would remove a requirement from the ‘habitat’, such as a drought. The students representing that requirement step out of the circle, and the remaining students try the lap-sit again, without moving the circle closer together. At this point, the circle should collapse or suffer some sort of disruption without the missing habitat requirement. Ask students what this means to them in terms of habitats and varying resources or conditions. This activity should take about 10-15 minutes.

**Phase 2: Explore**

The Predator-Prey Activity is attached to the lesson. Let students go through the worksheet in groups, using the graphs of snowshoe hare and bobcat populations to draw conclusions about interactions between predator and prey populations. This activity should take about 10-15 minutes.

**Phase 3: Explain**

The Ecological Relationships powerpoint is attached to the lesson. The powerpoint covers information on population dynamics in predator-prey, producer-consumer, and host-parasite systems, as well as inter- and intra-species competition for resources. The presentation should take about 30-40 minutes.

**Phase 4: Elaborate**

Lead a discussion with the students about ecological relationships. Ask students to come up with examples of each system that was discussed that was not included in the powerpoint. Why do these kinds of relationships exist in nature? Are they good or bad? What factors contribute to the concept of competition that could affect numbers in animal populations? Plant populations?

**Phase 5: Evaluate**

Provided with the lesson is a quiz with questions that cover the information in the powerpoint.

You can also do the following homework assignment or mini-project:

Have the students choose one of the systems from the powerpoint and pick two specific organisms that are a part of that system. For example, for producer-consumer systems, they would choose algae and marine iguanas; for predator-prey systems, they would choose bobcats and snowshoe hares; for parasite-host systems, they would choose heartworms and dogs. Have the students research their chosen organisms’ relationship and write up a short 1-2 page paper using ideas from the powerpoint, discussing the relationship, and how that relationship could be affected by competition.