

## **MiSP ECOLOGY/FOOD RELATIONSHIPS - PREDATOR PREY UNIT**

**Introduction:** During this unit, students will review the ecological food relationships and focus on predator-prey relationships and how they affect population size.

This week long study should occur after students have learned about ecological levels: population, community, ecosystem, biome, biosphere and after reviewing food chains and webs (learned in Elementary Level Science), and reviewing/being introduced to the following vocabulary: producer, consumer, herbivore, omnivore, carnivore (scavenger, predator, prey), and decomposer. (See ILST Core Curriculum - Standard 4 Living Environment 5.1d, 5.1e, 6.1a and 6.1b. Optional for this unit: energy pyramids.

**ILST Core Curriculum - Major Understandings:**  
Standard 4 Living Environment 7.1b, 7.2a

### **Objectives:**

After completing this unit students will be able to

- Explain the ecological food relationships that exist in ecosystems
- List reasons that a population does not increase indefinitely
- Produce and interpret a graph with predator (wolf) and prey (deer) populations
- Describe how the size of the predator population is affected by the prey population and how the size of the prey population is impacted by the predator population.
- Quantify the changes in deer and wolf population by calculating unit rate of change (L2)
- Calculate the formula for two segments of the wolf population curve and use those formulae to predict wolf populations (L3)

### **Day 1 - Food Relationships**

Discuss/review with the students the various ecological food relationships - see the introduction above.

Students should complete Predator Prey Worksheet #1. The worksheet should be reviewed or collected to assess the students' understanding of the concepts.

**QUESTION OF THE DAY:**

Are carnivores like the wolf, shark, lion, boa constrictor, preying mantis, and hyena good or bad?

Very often in United States History, people have wanted to wipe out (eliminate the whole population) a particular predator (the wolf is an example). Why do some people want that to happen?

**Day Two - Population Growth**

Students should be reminded that a population is all the members of a species that exists in a particular area at a certain time.

The students will work on Predator Prey Worksheet #2 Population Growth.

A fun way to introduce unrestricted population growth is a video clip from a very old **Star Trek** television series episode called *Trouble with Tribbles*.



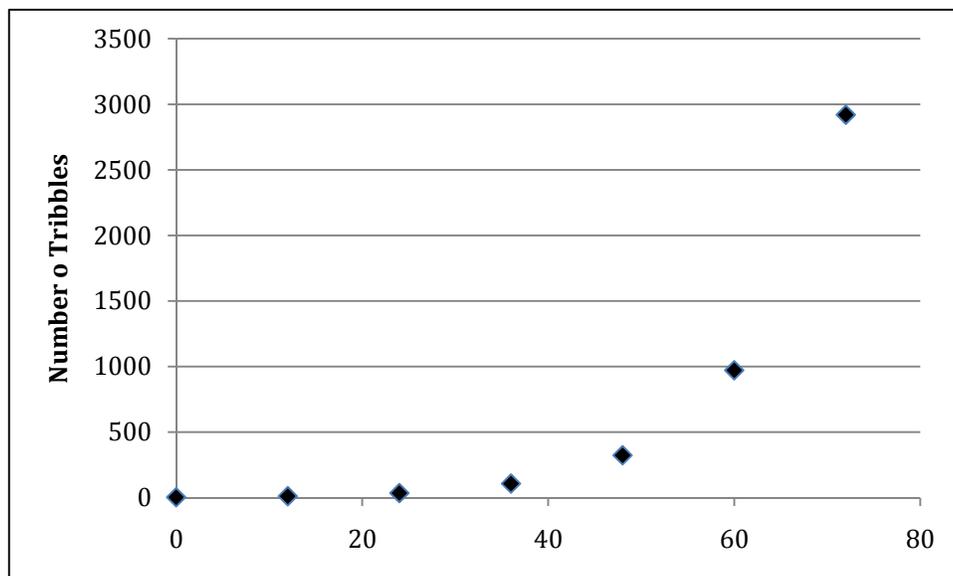
[http://www.youtube.com/watch?v=8\\_l5n1kYuzo&feature=related](http://www.youtube.com/watch?v=8_l5n1kYuzo&feature=related)

The goal of the lesson is for the students to understand that no population can increase unchecked. Populations are limited by death (due to hunger, accident, disease, and predation). Other limits to population that are more complicated but possibly will be contributed by the students are immigration/emigration, mating behaviors and rituals (territories, dominance hierarchies limiting the individuals that may mate), infanticide [i.e. lions], etc.)

In the **Star Trek** episode, a few tribbles are allowed to reproduce and the growing population of Tribbles eventually eats all the wheat seed that the crew of the Enterprise was supposed to protect. Luckily for the Enterprise crew, the wheat had been poisoned so the crew inadvertently saved their government from the embarrassment of giving a new colony contaminated wheat.

The class will graph the tribble population data and see how quickly a population, unchecked, will grow. Students will need some guidance to graph the y data with a range from 5 to 3645 tribbles. The graph works well if one uses a y scale of one box equal to 200.

At level 2 the students calculate the unit rate of change in three places within the population growth curve and discuss the change in that measurement. At level 3 the students determine the unit rate of change and the formula for three line segments on the tribble growth curve.



### QUESTION OF THE DAY:

Leopard frog females may lay as many as 6,000 eggs at a time. If there were 50 mature female frogs in a pond they could produce 300,000 tadpoles when the eggs hatch. The pond would be filled up with frogs in no time if they all lived. What happens to most of them? Why do the frogs produce so many eggs?

## **Day 3 and 4 - Predator Prey Graph**

### **Overview**

The data and lesson idea comes from [www.biologycorner.com](http://www.biologycorner.com) . Students will construct a graph of wolf and deer populations over a period of 10 days.

### **Procedure notes:**

It will be easier for the students to number the years (0 to 9) rather than graphing the data by calendar years. The relationship between the deer and the wolf populations is easily visualized if a scale of one box/200 deer and one box/ 2 wolves is used.

Levels 2 and 3 - The graphed information is not a straight line but the linear mathematics can be applied to segments of the graphed data that approximate linearity.

### **Day 5 Predator Prey Assessment - Day 5**

Administer assessment (Predator Prey Worksheet #3).