

5E Lesson Plan Template

Teach Date: 5/18/2012	Names of Student(s) teaching: Jessica Svoboda
Length of lesson: 90 min	Title of Lesson: Predator – Prey interactions
Main Idea of the Lesson: Predators and prey are both essential for an ecosystem to flourish	
TEKS for lesson: 12 (A): Students interpret relationships – predation 12 (D): Recognize that long term survival of species is dependent on changing resource bases that are limited	
Objective/s- Write objective/s in SWBAT form... The SWBAT:	Evaluation In the space below, write at least one question to match the objective you listed or describe what you will look at to be sure that students can do this.
<p>The student will be able to infer that predators and prey are both important for an ecosystem based on data collection.</p> <p>The student will be able to hypothesize how predator prey interactions will continue or discontinue over time given certain circumstances.</p> <p>The student will be able to analyze the inter-relatedness of all members of an ecosystem.</p> <p>The student will be able to predict the outcome of an ecosystem if one or more members are removed.</p> <p>The student will be able to strategize effective means of survival when placed in the role of a predator or prey.</p>	<p>Is it more beneficial for an ecosystem to contain more predators or more prey?</p> <p>We will look at the students’ ability to strategize effective ways to complete the simulation and how they analyze the data from the simulation.</p>

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<p>Engagement: Estimated Time: 10 – 15 min Description of Activity: Interrelatedness of organisms in an ecosystem using string connectivity</p>		
What the teacher does:	What the student does:	Questions
<p>The teacher is participating in the circle of organisms and telling the story that goes along with the activity. “Please get in a circle. In this activity, we will be holding onto this string and then passing the string to another member in the circle. Make sure you hold onto yours before passing the string off.” “First we want to ask a question. Please state your name and the answer to the following question starting with the student that possesses the “W”. “Do you think it is better for an ecosystem to have more predators or more prey?” “In Yellowstone park, the decision was made to remove the wolves from the park so as not to endanger any tourists. (All students with a W drop your string) Once the wolves were taken away, the deer population was no longer being predated upon as heavily and increased exponentially. This large increase in population size caused the deer to eat more resources and eventually wipe out a lot of the vegetation in the area (all students with a leaf drop your string). With all the vegetation gone, there was nothing to build dams for the beavers or hold the river banks in place to keep the dams safe and the beavers lost their homes (all students with a blue “B” drop your string). The rivers now contained lots of debris and disruptions of flow due to a reduction in river banks. This caused the salmon population to decrease since they were unable to reach their breeding grounds (all students with a salmon colored star drop your string). With the salmon population decreasing, the bears of Yellowstone had fewer resources to keep their population alive (all students with a bear necklace drop your string). Finally, the deer ate the vegetation to the point that there were limited to no resources left to sustain their population and they started to die off as well (all students with a medal drop your string).” After completing this activity, do you still agree with your original hypothesis?</p>	<p>Students are in a circle with different roles in an ecosystem indicated by a necklace. Students will drop their string once their animal/plant suffers loss of population numbers in the story.</p>	<p>Do you think it is better for an ecosystem to have more predators or more prey? After completing this activity, do you still agree with your original hypothesis?</p>

Resources Needed: String, indicator necklaces

Safety Considerations: Throwing a ball of string around

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Exploration: Estimated Time: 30 - 40		
Overview of Activity:		
What the teacher does:	What the student does:	Questions
<p>The teacher assigns students roles as either predator or prey. The teacher is participating in the game while also clarifying instructions when needed.</p>	<p>Students are completing a simulation: The object of the game is to study predator prey interactions by playing a game that requires students to collect resources (whether it be pasta or prey) Each team of predators and prey must strategize for one minute before each round of resource collection. Each round of resource collection will last one minute. When “ten seconds” is called out, the prey have ten seconds to reach their prey zone safely or they are considered captured.</p> <p>Predators: the job of the predator in the game is to keep the prey from reaching their safe zones by removing their flags. Predators collect flags as an indication of their resource collection. Rules: 1. Predators must return to their predation zone if all prey are within safe zones 2. Predators must behave respectfully when removing the flags of prey (no rough play or violence of any kind).</p> <p>Prey: The job of the prey is to collect resources in a safe zone while avoiding the predators. Rules: 1. Only two prey allowed in a safe zone at a time 2. Once the resources are collected in a given safe zone, prey will have to move to another safe zone 3. Prey will scoop the resources (spiral pasta) onto a plate in the safe zone. LEAVE THE PLATE AT THE SAFE ZONE, do not remove it.</p>	<p>Which strategies for data collection were successful?</p> <p>What happened when there were more prey than predators?</p> <p>What happened when there were an equal amount of predator and prey?</p> <p>What happened when there were more predators than prey?</p> <p>(Direct the students answers in terms of resources)</p>

Resources Needed: Flags (to mark off safe zones), flag football belts, 3 plates, 6 spoons, assorted colored pasta

Safety Considerations: rough play, wet grass, strenuous exercise, physical contact

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Explanation: Estimated Time: 15 – 18 min Overview of Activity: Students are analyzing their data collected during the activity		
What the teacher does:	What the student does:	Possible questions to ask students – <i>think like a student and consider possible student responses</i>
Teacher is modeling how to use the ipad to interpret the data collected during the experiment.	<p>Students are creating bar graphs on the ipad with data collected from the simulation.</p> <p>Students are given 8 minutes to discuss the questions with their tables. (Caution – students will be very excited after play time, give them time to calm down during discussion).</p>	<p>What do you notice about the relationship between predator/prey and resources?</p> <p>If we took out the predators, what would happen to the resources?</p> <p>If all of the prey were captured, what happened with the resources and predators?</p> <p>(If time constraints only complete discussion around question: How does the simulation relate to the story told during the first string activity?)</p>

Resources Needed: ipads

Safety Considerations

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Elaboration: Estimated Time: 8-10 minutes Overview of Activity: Students are reading aloud and discussing the terms “biotic potential” and “carrying capacity”		
What the teacher does:	What the student does:	Possible questions to ask students – <i>think like a student and consider possible student responses</i>
<p>Passes out paper and calls on students who volunteer to read the background information aloud.</p>	<p>Students volunteer and either read the background information aloud or follow along with a fellow student reading. Students then discuss with their peers how these words apply to the game they just played.</p>	<div style="border: 1px solid black; padding: 10px; text-align: center;"> <p>Name: _____ Date: _____</p> <p>preAP Biology</p> <h2 style="margin: 10px 0;">Predator Prey Game</h2> <p>PURPOSE Illustrate a predator-prey relationship and analyze the affect this relationship has on the dynamics of a population.</p> <div style="border: 1px solid black; padding: 5px; margin: 5px 0;"> <p>BACKGROUND INFORMATION A population is all the individuals of the same species within a community. The maximum rate of reproduction of a population is its biotic potential. This is the rate at which a population would produce offspring if every new individual lived and reproduced at maximum capacity. Populations never achieve their biotic potential because the environment can only support a limited number of organisms. The maximum number of individuals of a species that can be supported by the environment is called the carrying capacity. Populations tend to stabilize, or stop growing in size, when the carrying capacity of the environment is reached. The environmental factors that limit the size of populations are called limiting factors. Predators are considered limiting factors because they can limit the size of the prey populations. Conversely, the availability of prey is a limiting factor on the populations of predators.</p> <p>Populations in nature are often controlled by predation. The regulation of a population by predation takes place within a predator-prey relationship, one of the best-known mechanisms of population control.</p> </div> </div>

Resources Needed: Handouts, pen, paper, document camera or projector to project document onto screen

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Evaluation: Estimated Time: 15-20 minutes

Description of Activity: Answer the questions associated with the game play, see worksheet below

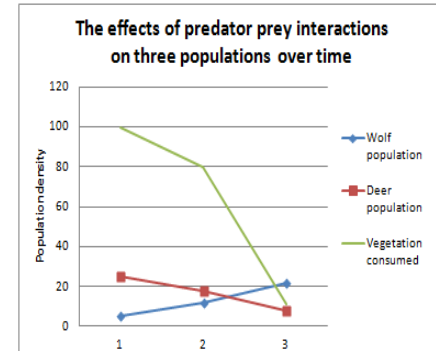
Evaluate the Process

1. Which strategies for data collection were successful?
2. In terms of carrying capacity, what happened in the scenario when there were more prey than predators? Specifically, which species did the environment support at those ratios?
3. What happened in the scenario when there were an equal amount of predator and prey? Who had a better biotic potential at those ratios?
4. In terms of carrying capacity, what happened in the scenario when there were more predators than prey? Specifically, which species did the environment support at those ratios?

Using the iPad, make a bar graph of the data from each scenario.

Evaluate the Data

1. What do you notice about the relationship between predator/prey and resources?
2. If we took out the predators, what would happen to the resources?
3. If all of the prey were captured, what happened with the resources and predators?



Based on this graph, predict the numbers of all three populations if these trends continued to 5 years. Support your answer with EVIDENCE.

Predators:

Prey:

Vegetation population:

Resources Needed:

Handout, pen or pencil, data generated during class time